МИНИСТЕРСТВО СЕЛЬСКОГО ХОЗЯЙСТВА
И ПРОДОВОЛЬСТВИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

ГЛАВНОЕ УПРАВЛЕНИЕ ОБРАЗОВАНИЯ,
НАУКИ И КАДРОВОЙ ПОЛИТИКИ

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И ТРУДОВОГО КРАСНОГО ЗНАМЕНИ
СЕЛЬСКОХОЗЯЙСТВЕННАЯ АКАДЕМИЯ»

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АНГЛИЙСКИЙ ЯЗЫК

AGRICULTURAL MACHINERY

Пособие
для студентов, обучающихся по специальностям
общего высшего образования 6-05-0812-01 Техническое
обеспечение производства сельскохозяйственной продукции,
6-05-0812-03 Технический сервис в агропромышленном комплексе

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Приведены тексты и упражнения для обучения специальной лексике и развития умений чтения профессиональной литературы.

Для студентов, обучающихся по специальностям общего высшего образования 6-05-0812-01 Техническое обеспечение производства сельскохозяйственной продукции, 6-05-0812-03 Технический сервис в агропромышленном комплексе.

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ВВЕДЕНИЕ

Данное пособие предназначено для студентов факультета механизации сельского хозяйства, обучающихся по специальностям общего высшего образования 6-05-0812-03 Технический сервис в агропромышленном комплексе и 6-05-0812-01 Техническое обеспечение производства сельскохозяйственной продукции. Цель предложенного материала – ознакомить студентов с английской сельскохозяйственной терминологией и подготовить их к чтению оригинальной научно-технической литературы.

Каждый урок содержит предтекстовые упражнения, тексты для чтения, за которыми следуют задания, закрепляющие основную лексику и грамматические структуры английского языка, а также дополнительные тексты, предназначенные для чтения и письменного перевода.

Учебные задания могут быть использованы как для самостоятельной работы студентов, так и для работы в аудитории.

UNIT 1

Moldboard Plows

Exercise 1. Translate the following nouns into Russian and put them in the plural form. Pay attention to the model.

Model: *a wheel – wheels*

A place, a datum, a dress, a watch, a fox, a key, a city, a country, a man, a woman, a tooth, a month, a goose, a hero, a son-in-law, a schoolgirl, a fisherman, a crisis, a ship, a deer, a swine, a wharf, a wolf, a safe, a roof.

Exercise 2. Use the Possessive Case according to the model.

Model: the economy of Britain – *Britain's economy*

1. The house of the cat. 2. The poems of Lermontov. 3. The talk of five minutes. 4. The plays of Chekhov. 5. The newspaper of today. 6. The birthday of my daughter. 7. The departure of the "Suvorov".

Exercise 3. Practise the pronunciation of the following words and translate them into Russian.

Agricultural [ˌægrɪ'kʌlʧərəl]; although [ɔ:l'ðəu]; advantage [əd'vɑ:ntɪʤ]; plowing [plauɪŋ]; moldboard [ˈməuldbɔ:d]; tremendously [trɪ'mendəslɪ]; primary ['praɪmərɪ]; economically [ˌi:kə'nɔmɪkəlɪ]; initial [ɪ'nɪʃəl]; perpendicular [ˌpɜ:pən'dɪkjulə]; length [leŋθ]; invert [ɪn'vɜ:t].

Exercise 4. Read and memorize the following words and word combinations.

arrangement [ə'reɪnʤmənt] – устройство, конструкция

bottom ['bɔtəm] – корпус плуга

disposable [dɪs'pəuzəbl] – безремонтный, одноразовый

frame [freɪm] – рама

furrow slice ['fʌrəu slaɪs] – гребень борозды, пласт

hydraulic controls [haɪ'drɔ:lɪk kən'trəulz] – механизмы гидравлического управления

implement ['ɪmplɪmənt] – орудие

inch (in.) [ɪnʧ] – дюйм

landside ['lænd¸saɪd] – полевая доска плуга

lateral axis ['lætərəl 'æksɪs] – поперечная ось

longitudinal axis [ˌlɔnʤɪ'tju:dɪnəl 'æksɪs] – продольная ось

mounted plow ['mauntɪd plau] – навесной плуг

pulverize ['pʌlv(ə)raɪz] – измельчать

resharpen [rɪ'ʃɑ:p(ə)n] – перезатачивать

share wing [ʃeə wɪŋ] – пятка лемеха

separate ['sepərət] – отдельный
tillage tool ['tılıʤ tuːl] – орудие для обработки почвы
tip [tıp] – кончик
trailed plow [treıld plau] – полунавесной плуг
trip [trıp] – проход
two-piece ['tuːpiːs] – состоящий из двух частей
two-way plow [ˌtuː'weı plau] – оборотный плуг
unit ['juːnıt] – агрегат
width [wıtθ] – ширина захвата
worn [wɔːn] – изношенный

Text A

Exercise 5. Read and translate the following text.

1. The plow is one of the oldest of all agricultural implements and is generally considered to be the most important tillage tool. Although yield studies have indicated that under certain conditions with some crops there is no apparent advantage in plowing, the moldboard plow is still by far the most used implement for primary tillage in seedbed preparation. There are many different types of moldboard plows nowadays. The popularity of mounted plows, for example, has increased tremendously since the advent of hydraulic controls on tractors. Mounted plows generally have from one to four and sometimes even more bottoms, whereas common sizes of trailed plows have from five to nine bottoms.

2. Most moldboard plows are designed to turn the furrow slices only to the right. Some plows, however, have two sets of opposed bottoms (right-hand and left-hand) that can be used selectively. With this arrangement, known as a two-way plow, all the furrows can be turned toward the same side of the field by using the right-hand bottoms for one direction of travel and the left-hand bottoms on the return trip. The two sets of bottoms may be mounted on separate frames so that they can be raised and lowered independently, or they may be on opposite sides of a common frame that is rotated about either a longitudinal or a lateral axis when the plow is raised at the end of the field.

3. It is common knowledge that the basic unit of a moldboard plow is the plow bottom. The primary functions of the plow bottom are to cut the furrow slice, loosen and pulverize the soil then invert the furrow slice to cover trash. The size of a moldboard plow bottom is the width of furrow that it is designed to cut. With the standard length of share, the size is the

perpendicular distance from the landside to the share wing tip. The most common sizes are 12-, 14-, and 16- in., although both larger and smaller widths are available.

4. The shares can be removed or resharpened when they become dull. The present trend, however, is toward disposable shares of so called single-piece disposable type and two-piece disposable type. Since disposable shares have a lower initial cost, they can economically be replaced when dull or worn, rather than being resharpened. Because the point wears much faster than the rest of the share, some disposable shares are two-piece units.

Exercise 6. Answer the following questions.

1. The plow is one of the oldest of all farm tools, isn't it? 2. Why has the popularity of mounted plows increased? 3. How does a two-way plow operate? 4. What are the functions of a bottom? 5. Are the disposable shares more economic?

Exercise 7. Put the questions beginning with the words in given brackets.

1. The disposable shares have a lower initial cost. (*Do…?*) 2. The two sets of bottoms may be mounted on separate frames. (*Where…?*) 3. The moldboard plow is the most used implement for primary tillage. (*What.…?*) 4. Moldboard plows turn the furrow slices to the right. (*How.…?*) 5. The trailed plows have from five to nine bottoms. (*How many.…?*)

Exercise 8. Complete the sentences inserting the words and word combinations given below in italic using the text.

1. Because the … wears much faster than the rest of the share. 2. The most common sizes are 12-, 14-, and 16- in., although both larger and … are available. 3. With this …, known as a two-way plow, all the furrows can be turned toward the same side of the field. 4. It is common knowledge that the … of a moldboard plow is the plow bottom. 5. The sets of bottoms may be rotated about either … axis when the plow is raised at the end of the field.

A longitudinal or a lateral; basic unit; arrangement; smaller widths; point.

Exercise 9. Give the English equivalents using the text.

Почвенный пласт; корпус плуга; продольная ось; оборотный плуг; проход, орудие; полевая доска плуга; съемный; орудие обработки почвы; навесной плуг; полунавесной плуг; дюйм; перетачивать; механизмы гидравлического управления; пятка лемеха; агрегат; устройство; конструкция; рама; поперечная ось; кончик; изношенный; состоящий из двух частей; разрыхлять и измельчать; безремонтный лемех; стандартная длина лемеха; большая и меньшая ширина захвата; основной.

Exercise 10. Complete the following sentences using the text.

1. Since disposable shares have a lower initial cost, … .
2. Mounted plows generally have from one to four and sometimes even more … .
3. The size of a moldboard plow bottom … .
4. The primary functions of the plow bottom … .
5. With the standard length of share, the … .

Exercise 11. Fill in the blanks with the necessary prepositions using the text.

1. The two sets ... bottoms may be mounted … separate frames so that they can be raised and lowered independently, or they may be … opposite sides … a common frame that is rotated about either a longitudinal or a lateral axis when the plow is raised … the end … the field.
2. … this arrangement, known as a two-way plow, all the furrows can be turned toward the same side … the field … using the right-hand bottoms … one direction … travel and the left-hand bottoms … the return trip.
3. … the standard length … share, the size is the perpendicular distance … the landside … the share wing tip.
4. The plow is one … the oldest … all agricultural implements and is generally considered to be the most important tillage tool.

Exercise 12. Say whether the following statements are true or false. Correct the false ones.

1. The latest yield studies showed that there is no longer need for using plow to receive high yield of agricultural crops. 2. Mounted and trailed plows commonly have the same number of bottoms. 3. The primary functions of the plow bottom are to make the soil as firm as possible for proper seed germination. 4. The application of disposable shares leads to the overall ear of the plow that is why they are not used nowadays.

Exercise 13. Give the Russian equivalents.

Agricultural implement; most important tillage tool; apparent advantage in plowing; primary tillage; seedbed preparation; mounted plows; furrow slices; two sets of opposed bottoms; right-hand bottoms; can be raised and lowered; common frame; primary functions; loosen; pulverize; cover trash; standard length of share; shares can be removed or resharpened; initial cost.

Exercise 14. Translate the following sentences from Russian into English in written.

1. Последние исследования доказали тот факт, что отвальные плуги являются самыми важными орудиями. 2. Применение механизмов гидравлического управления на тракторах позволило применять два типа

отвальных плугов: навесных и полунавесных. 3. Конструкция оборотного отвального плуга позволяет производить вспашку в одну сторону посредством применения как левой секции плуга, так и правой.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Types of Moldboards

1. Because soil types and plowing conditions vary widely, many different shapes of moldboards have been developed. The most common general types are the sod or *breaker bottom*[1], the *stubble bottom*[2], the general-purpose bottom, and the black earth bottom. There are many variations of shape within each of these general classifications.

2. The sod bottom has a long, low moldboard with a gradual twist that completely inverts the furrow slice with a minimum of break-up, thus covering vegetative matter thoroughly. A stubble bottom has a relatively short and broad moldboard that is curved rather abruptly near the top, resulting in a greater degree of pulverization than with other types.

3. The general-purpose bottom lies in between these two extremes and is suitable for a wide range of conditions. Special shapes of general-purpose bottoms have been developed for plowing efficiently at relatively high speeds. The black land bottom has a relatively small moldboard area, and its shape tends to promote scouring in heavy black land zones.

[1] breaker bottom – корпус плуга для вспашки целинных или задернелых почв

[2] stubble bottom – корпус плуга для вспашки жнивья

UNIT 2

Attachments for Plowing

Exercise 1. Put in *a(an) the* where necessary.

1. This is … apple. 2. I have … sister. 3. They have … dog and two … cats. 4. This is … good … book. 5. Yesterday I received … letter from my … friend. 6. There is a TV in … corner. 7. He came … home on … Friday. 8. … Browns are in … south now. 9. …Neva flows into … Gulf of Finland. 10. … Kazbek is … highest peak of … Caucasus. 11. … Mars is far away.

Exercise 2. Put in *some, any, no*.

1. There are … pictures in this book. 2. Are there … new students in your group? 3. There … old houses in our street. 4. Are there … maps on the walls? – Yes, there are … . 5. There is … ink in my pen. May I use yours? 6. I don't have … books on biology. Give me …, please. 7. There was … soap in the plate. It is empty. 8. Is there … snow in the street?

Exercise 3. Practise the pronunciation of the following words and translate them into Russian.

Evaluating [ɪ'væljueɪtɪŋ]; tillage ['tɪlɪʤ]; investigating [ɪn'vestɪgeɪtɪŋ]; distinguish [dɪ'stɪŋgwɪʃ]; diameter [daɪ'æmɪtə]; penetrate ['penɪtreɪt]; miniature ['mɪnəʧə]; function ['fʌŋkʃən]; coverage ['kʌvərɪʤ.

Exercise 4. Translate into Russian the following words.

Hardness, redness, steadiness, dryness, idleness, gentleness, roughness, boldness, yellowness, forgiveness, willingness, darkness, oneness.

Exercise 5. Express the given word combinations in one word using the suffix *-ness*. Pay attention to the model.

Model: the quality of being firm – *firmness*

The state of being happy; the state of being weary; the state of being glad; the state of being joyful; the state of being ready; the quality of being white; the quality of being black; the quality of being kind.

Exercise 6. Read and memorize the following words and word combinations.

tremendous [trɪ'mendəs] – огромный
draft [drɑːft] – тяговое усилие
in terms of [ɪn tɜːmz ɔv] – посредством
cross-section ['krɔssekʃn] – поперечное сечение
unit draft ['juːnɪt drɑːft] – удельная тяга
sharpness [ʃɑːpnəs] – острота заточки
coulter ['kəultə] – предплужник, нож плуга
attachment [ə'tæʧmənt] – дополнительное оборудование
adjustment [ə'ʤʌstmənt] – регулировка
fit [fɪt] – снабжать
rolling coulter ['rəulɪŋ 'kəultə] – дисковый нож
shin [ʃɪn] – полевой обрез плужного отвала
beam [biːm] – балка, грядиль
clogging [klɔgɪŋ] – забивание
sod [sɔd] – дерн
stationary jointer ['steɪʃənərɪ 'ʤɔɪntə] – неподвижно закрепленный предплужник

strip [strıp] – полоса

lister ['lıstə] – листер

landside ['lænd¸saıd] – полевая доска

wing tip [wıŋ tıp] – кончик пятки лемеха

trailed tool carrier [treıld tu:l 'kærıə] – полунавесное шасси

tractor tool bar ['træktə tu:l bɑ:] – брус (тяга) трактора для навески орудий

tractor-mounted arrangement ['træktə 'mauntıd ə'reınʤmənt] – навесное устройство

depth-gage wheel [depθ geıʤ wi:l – опорное колесо

planter attachment ['plɑ:ntə ə'tæʧmənt] – дополнительное посадочное оборудование

Text A

Exercise 7. Read and translate the following text.

1. Because of the tremendous amount of energy consumed for plowing, a great amount of work has been done in evaluating the various factors that affect the draft of a plow and investigating possible means for reducing the energy requirements. It is common practice to express the draft of plows in terms of pounds per square inch of furrow cross-section. This quantity will be designated by the term *unit draft*, to distinguish it from the total draft of the plow. The unit draft of plows varies widely under different conditions, being affected by such factors as the soil type and condition, plowing speed, shape of moldboard, sharpness of share, depth of plowing, width of furrow slice, type of attachments, and adjustment of the plow and attachments.

2. There are several kinds of attachments fitted to plows while operating for primary tillage. For example, rolling coulters are employed to help cut the furrow slice and to cut through trash that might otherwise collect on the shin or beam and cause clogging. The coulter depth under usual conditions should be about half the depth of plowing but may need to be greater than this in sod and less in hard ground. A large-diameter coulter goes through heavy trash better than a smaller one but does not penetrate hard ground as readily. Diameters of 15 to 18 in. are typical for 12 to 16 in. bottoms.

3. A stationary jointer is a miniature plow bottom that cuts a narrow, shallow furrow ahead of the shin. Its function is to move the trash and roots from this strip over toward the main furrow in such a manner as to insure complete coverage by the main plow bottom. The usual operating depth is

$1^1/_2$ to 2 in. The most common application of a jointer is in conjunction with a rolling coulter where complete coverage of heavy trash is desired.

4. As for the listers they are basically the same as two opposed moldboard plow bottoms (right-hand and left-hand) placed back to back, with the landside eliminated and soil being thrown to both sides. Various sizes (measured between outside wing tips of the lister share) are available, 144 in. being a common size. Lister bottoms are sometimes mounted on trailed tool carriers but more often are attached to tractor tool bars. Depth-gage wheels are frequently employed in the tractor-mounted arrangement. In some areas crops such as corn, soybeans, and cotton are planted with listers having planter attachments that place the seed in the soil at the bottom of the furrow.

Exercise 8. Answer the following questions.

1. Why does the unit draft of plows vary widely? 2. What kinds of plow attachments are mentioned in the text for primary tillage? 3. What is the purpose of a stationary jointer fitted to plows? 4. Where are the lister bottoms usually mounted for good operation? 5. Is it possible to provide planter attachments to plows while operating?

Exercise 9. Read the following sentences and define the function of the underlined words in italic with the ending – *ing*: whether they are gerunds, participles or verbal nouns.

1. There are several kinds of attachments fitted to plows while *operating* for primary tillage. 2. For example, *rolling* coulters are employed to help cut the furrow slice and to cut through trash that might otherwise collect on the shin or beam and cause *clogging*. 3. The coulter depth under usual conditions should be about half the depth of *plowing* but may need to be greater than this in sod and less in hard ground. 4. The *operating* of a plow is very efficient on condition that it is maintained well. 5. Corn, soybeans, and cotton are planted with listers *having* planter attachments.

Exercise 10. Complete the following sentences using the text.

1. … planter attachments that place the seed in the soil at the bottom of the furrow.

2. … in such a manner as to insure complete coverage by the main plow bottom.

3. … through trash that might otherwise collect on the shin or beam and cause clogging.

4. … to distinguish it from the total draft of the plow.

5. … factors that affect the draft of a plow and investigating possible means for reducing the energy requirements.

Exercise 11. Complete the sentences inserting the words and word combinations given below in italic using the text.

1. Lister bottoms are sometimes mounted on … but more often are attached to tractor tool bars. 2. The most common application of a jointer is in conjunction with a … where complete coverage of heavy trash is desired. 3. The … under usual conditions should be about half the depth of plowing. 4. It is common practice to express the draft of plows in terms of pounds per … of furrow cross-section. 5. A large-diameter coulter goes through … better than a smaller one.

Heavy trash, square inch, coulter depth, rolling coulter, trailed tool carriers.

Exercise 12. Give the English equivalents using the text.

Дисковый нож; тяговое усилие; посадочное дополнительное оборудование; брус трактора для навески орудий; листер; дерн; кончик пятки лемеха; полевая доска; дополнительное оборудование; посредством; поперечное сечение; удельная тяга; острота заточки; регулировка; снабжать; полевой обрез плужного отвала; балка; грядиль; забивание; неподвижно закрепленный предплужник; полоса; полунавесное шасси; навесное устройство; опорное колесо; дно борозды.

Exercise 13. Fill in the blanks with the necessary prepositions using the text.

1. Lister bottoms are sometimes mounted … trailed tool carriers but more often are attached … tractor tool bars.

2. There are several kinds … attachments fitted … plows while operating … primary tillage.

3. As … the listers they are basically the same as two opposed moldboard plow bottoms placed back … back, … the landside eliminated and soil being thrown … both sides.

4. It is common practice to express the draft … plows … terms … pounds per square inch … furrow cross-section.

Exercise 14. Say whether the following statements are true or false. Correct the false ones.

1. The unit draft of plows stays always the same regardless of plowing conditions. 2. The rolling coulters are employed to help cut the furrow slice and to cut through trash that might cause clogging. 3. The application of a jointer is in conjunction with a rolling coulter where there is no trash whatsoever. 4. A large-diameter coulter goes through heavy trash better than a smaller and penetrates hard ground readily.

Exercise 15. Translate the following sentences from Russian into English in written.

1. Огромное количество энергии потребляется при применении плуга для обработки почвы. 2. Чтобы снизить тяговое усилие, отвальный плуг оснащается различным дополнительным оборудованием, таким, как дисковый нож. 3. Неподвижно закрепленный предплужник позволяет удалять остатки предыдущих сельскохозяйственных культур в борозду. 4. В современном сельском хозяйстве применяются различные конструкции плугов – навесные, полунавесные и оборотные

Exercise 16. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Standard Disk Plows

1. The standard disk plow consists of a series of individually mounted, inclined disk blades on a frame supported by wheels. It is most suitable for conditions under which the moldboard plow does not work satisfactorily. A disk plow can be operated in hard, dry soils where a moldboard plow will not penetrate, in sticky soils where a moldboard plow will not *scour*[1], in stony fields, in soils containing heavy roots, and in peat lands. It is also suitable for deep plowing.

2. According to some authors, the moldboard plow, in soils where it works properly, has a lower unit draft than a disk plow. The disk plow does not cover trash as thoroughly as a moldboard plow, and under usual plowing conditions it leaves the field rougher and more cloddy, thus requiring a greater number of subsequent operations to obtain a good seedbed. These characteristics, however, may be advantageous where erosion is a problem.

3. Standard disk plows generally have from one to seven concave disk blades, spaced to cut from 7 to 12 in. per disk. The disks on standard disk plows have diameters between 24 and 32 in. The trend is toward the larger-diameter disks because they take a wider cut, permit deeper plowing where it is desired, and cut through trash better. Most standard disk plows are furnished with *scrapers*[2].

[1] scour – очищаться
[2] scraper – скребок

UNIT 3

Harrows

Exercise 1. Put in *much* and *many*.

1. Don't put … pepper on the meat. 2. There were so … plates on the table. 3. I never eat … bread with soup. 4. Why did you eat so … ice-cream yesterday? 5. She wrote us very … letters. 6. … of these student don't speak English. 7. … in this work was difficult. 8. … of the students' answers were excellent. 9. There are so … pictures in the room. 10. There were too … teachers in the yard.

Exercise 2. Translate the following words into Russian.

Fatality, ability, reality, stupidity, workability, timidity, publicity, certainty, capability, respectability, adaptability, brutality, partiality.

Exercise 3. Express the given word combinations in one word using the suffix *-ty*. Pay attention to the model.

Model: the quality of being rapid – *rapidity*

The state of being legal; the state of being hostile; the state of being neutral; the state of being regular; the state of being equal; the quality of being rare; the quality of being extreme; the quality of being stable.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Nineteenth [ˌnaɪn'tiːnθ]; subsequent ['sʌbsɪkwənt]; opposed [ə'pəuzd]; additional [ə'dɪʃənəl]; difficulty ['dɪfɪkəltɪ]; adjusted [ə'ʤʌstɪd]; untilled [ʌnˈtɪld]; width [wɪtθ]; medium ['miːdɪəm]; hydraulic [haɪ'drɔːlɪk]; necessarily ['nesəsərəlɪ]; particularly [pə'tɪkjələlɪ].

Exercise 5. Read and memorize the following words and word combinations.

disk harrow [ˌdɪsk 'hærəu] – дисковая борона

heavy-duty [ˌhevɪ'djuːtɪ] – тяжелый, усиленный

cut up [kʌt ʌp] – измельчать

single-acting disk harrow ['sɪŋgl 'æktɪŋ ˌdɪsk 'hærəu] – односледная дисковая борона

gang [gæŋ] – секция

outward ['autwəd] – по направлению от, направленный наружу

tandem disk harrow ['tændəm dɪsk 'hærəu] – двухследная дисковая борона

offset disk harrow ['ɔfset dɪsk 'hærəu] – офсетная дисковая борона

ft. (foot) [fut] – фут

rigid ['rɪʤɪd] – жестко закрепленный

hinged [hɪnʤd] – подвешенный на шарнирах

broadcasted seeds ['brɔ:dkɑ:stɪd si:dz] – высеянные разбросным севом семена

spike-tooth harrow [spaɪk tu:θ 'hærəu] – зубовая борона

break [breɪk] – разбивать

crust [krʌst] – корка

Text A

Exercise 6. Read and translate the following text.

1. The disk harrow first attained wide popularity during the latter part of the nineteenth century. It is now second only to the moldboard plow in its importance as a tillage implement. Heavy-duty disk harrows are used for controlling weeds, cutting up and mixing stubble with the soil, and for primary tillage in orchards and vineyards as well as in open fields. Lighter units are often used in seedbed preparation subsequent to plowing. A single-acting disk harrow has two opposed gangs of disk blades, both throwing dirt outward from the center of the tilled strip. A tandem disk harrow has two additional gangs that throw the dirt back toward the center as a second operation, thus tilling the soil twice. Both the single-acting and the tandem disk harrows leave an untilled strip of soil between the center blades of the front gangs and leave the field in an uneven condition. A properly adjusted offset disk harrow overcomes both of these difficulties.

2. Trailed tandem disk harrows are by far the most common type, with widths usually ranging from about 5 to 12 ft. Single-acting disk harrows are available in widths up to about 20 ft. Offset disk harrows with rigid gangs generally range in size from $4^1/_2$ to 12 ft, but units with hinged gangs may be somewhat wider. Some of the small and medium-size trailed disk harrows have wheels between the front and rear gangs that are used for depth control, for raising the harrow at the end of the field, and for transport on roads or highways. Hydraulic control is generally employed.

3. Since the advent of tractor-mounted tools in the late 1930's mounted disk harrows have been developed and are popular for certain applications. Their weight is necessarily limited because they must be lifted by the tractor. Their principal advantages are in maneuverability and ease of transport.
It should be noted that a spike-tooth harrow is a universally used implement and is as old historically as the plow. Its principal function is to finish the seedbed by smoothing it and breaking surface clods, particularly in a mel-

low soil. A spike-tooth harrow is often pulled directly behind the plow. It is not very effective in breaking clods after they have become hard. This tool is effective in killing small weeds that are just starting and is also useful in covering broadcasted seeds and in breaking crusts that have formed over newly planted crops.

Exercise 7. Answer the following questions.

1. Is disk harrow so important for the modern soil preparation technology? 2. What kinds of disk harrow are used for tillage? 3. What is the operational width of the harrows mentioned in the text? 4. What is the function of the wheels fitted to the disk harrows? 5. The spike-tooth harrow has various kinds of applications, has not it?

Exercise 8. Translate the following sentences into Russian paying attention to the Passive Voice forms.

1. The broadcasted seeds are covered with spike-tooth harrow. 2. The disk harrow was equipped with wheels by our designers. 3. The tractor-mounted tools will be used by farmers for seedbed preparation. 4. An untilled strip has been left by the single-acting and tandem disk harrows. 5. At present lighter harrows are being used for tillage by the farmers.

Exercise 9. Translate from Russian into English the words and words combinations given in brackets using the text.

1. This (орудие) is effective in killing small weeds and is also useful in (заделке высеянных разбросным севом семян) and in (разбивании корки) that have formed over newly planted crops.

2. Since the advent of (навесных орудий) in the late 1930's (навесные дисковые бороны) have been developed and are popular for certain applications.

3. Some of the (малые и средние полунавесные дисковые бороны) have wheels between the (передние и задние батареи) that are used for depth control, for raising the harrow (в конце поля), and for transport on roads or highways.

4. A single-acting disk harrow has (две противоположно направленные батареи) of disk blades, both throwing dirt outward from the center of the (обрабатываемой полосы).

Exercise 10. Give the Russian equivalents.

Crust; offset disk harrow; orchards and vineyards; cut up; moldboard plow; range in size; opposed gangs; tilled strip; spike-tooth harrow; trailed disk harrows; broadcasted seeds; front gangs; mellow soil; maneuverability; principal function; heavy-duty; single-acting disk harrow; hinged gangs; outward; tandem disk harrow; small weeds; covering; newly planted crops.

Exercise 11. Match the beginning of the following sentences with their endings using the text.

1. It is not very effective …	a) in its importance as a tillage implement.
2. Their principal advantages are …	b) because they must be lifted by the tractor.
3. A properly adjusted offset disk harrow …	c) in breaking clods after they have become hard.
4. It is now second only to the moldboard plow …	d) in maneuverability and ease of transport.
5. Their weight is necessarily limited …	e) overcomes both of these difficulties.

Exercise 12. Fill in the blanks with the necessary prepositions using the text.

1. Since the advent … tractor-mounted tools … the late 1930's mounted disk harrows have been developed and are popular … certain applications. 2. The wheels … the front and rear gangs are used … depth control, … raising the harrow … the end … the field, and … transport … roads or highways. 3. Offset disk harrows … rigid gangs generally range … size … $4^1/_2$ … 12 ft, but units … hinged gangs may be somewhat wider. 4. Its principal function is to finish the seedbed … smoothing it and breaking surface clods, particularly … a mellow soil. 5. Trailed tandem disk harrows are … far the most common type, … widths usually ranging … … 5 … 12 ft.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. Heavy-duty disk harrows may be used for primary tillage. 2. The spike-tooth harrow is pulled directly behind the plow only. 3. Some of the small and medium-size trailed disk harrows have wheels to increase maneuverability while operating. 4. Both the single-acting and the tandem disk harrows leave the field in an uneven condition. 5. The mounted disk harrows have certain advantages.

Exercise 14. Translate the following sentences from Russian into English using the text.

1. Сегодня дисковые бороны популярны и по значимости занимают второе место после отвального плуга при подготовке почвы. 2. Как односледная дисковая борона, так и двухследная дисковая борона имеют определенное количество дисковых батарей. 3. Применение гидравлического оборудования на полунавесных дисковых боронах дает возможность установить колеса для удобства в работе и транспортировке. 4. Ширина обработки почвы дисковыми боронами колеблется от $4^1/_2$ до 20 футов.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Rotary Tillers

1. *Rotary tillers*[1] are available as (a) garden-type, self-propelled units (two-wheel, with 8 to 30 in. widths of cut), (b) trailed or tractor-mounted units with PTO drives (usually 3 to 4 ft cut), (c) trailed units with auxiliary engines (4 to 7 ft cut, with engines as large as 90 to 110 hp), and (d) field-type, self-propelled machines (6 to 8 ft cut, with engines as large as 180 hp).

2. The garden-type rotary tillers have proved themselves practical and effective for preparing seedbeds from unplowed ground for nurseries, greenhouses, vegetable crops, and similar jobs. These narrow machines are also suitable for shallow cultivation and weed control between rows of certain crops. In addition, special tractor-mounted units have been developed for cultivation of *row crops*[2] on a field scale. In the usual arrangement, the rotor consists of a *power-driven*[3] *transverse shaft*[4] on which knives or tines are mounted to cut the trash and soil. Rotor speeds are generally in the order of 200 to 300 rpm. Many types and shapes of tines or knives are available, none being ideal under all conditions.

3. One of the serious problems with rotary tillers is that of tine breakage or bending in hard or stony ground. To combat this problem, various systems are employed to reduce the *impact shock*[5] and protect against overloads. It has been a general observation that the rotary tiller produces a satisfactory seedbed under most conditions although in some cases the soil is so loose that it is desirable or necessary to pull a roller behind the tiller to firm the seedbed.

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[1] rotary tiller – почвофреза
[2] row crop – пропашная культура
[3] power-driven – с механическим приводом
[4] transverse shaft – поперечный вал
[5] impact shock – ударная нагрузка

UNIT 4

Cultivators

Exercise 1. Put in *little* and *few*.

1. I have … time, so I can't go with you. 2. Mike has … English books. 3. There is … ink in my pen. 4. There are … bears in the zoo. 5. There is too … soap in my plate. Give me some more. 6. There was too … light in the room. I could not read. 7. He has read … books. 8. Ann returned sad from the forest. She found … mushrooms. 9. We have acquainted with … people at the conference. 10. We know … interesting things.

Exercise 2. Translate the words into Russian.

Movement, statement, embarrassment, settlement, engagement, arrangement, treatment, appointment, adjustment, equipment, denouncement.

Exercise 3. Give the nouns corresponding to the following verbs using the suffix *-ment*. Pay attention to the model.

Model: announce – *announcement*

Pay; resent; assign; attain; employ; develop; astonish; achieve; amuse; acknowledge; enlarge; enrich; fulfill; amaze.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Cultivation [ˌkʌltɪ'veɪʃən]; promote [prə'məut]; functions ['fʌŋkʃənz]; chemical ['kemɪkəl]; common ['kɔmən]; machinery [mə'ʃi:nərɪ]; conjunction [kən'dʒʌŋkʃən]; adoption [ə'dɔpʃən]; hydraulic [haɪ'drɔ:lɪk]; vertical ['vɜ:tɪkəl]; beneath [bɪ'ni:θ]; visibility [ˌvɪzə'bɪlətɪ]; purpose ['pɜ:pəs].

Exercise 5. Read and memorize the following words and word combinations.

range [reɪndʒ] – колебаться

horse-drawn ['hɔ:sˌdrɔ:n] – на конной тяге

row-crop cultivator [rəu krɔp 'kʌltɪveɪtə] – пропашной культиватор

tricycle-type ['traɪsɪkl taɪp] – трехколесный

all-purpose tractor [ˌɔ:l'pɜ:pəs 'træktə] – универсальный трактор

adjustable rear-wheel tread [ə'dʒʌstəbl rɪə wi:l tred] – регулируемая ширина колеи задних колес

mounted cultivator ['mauntɪd 'kʌltɪveɪtə] – навесной культиватор

row-crop equipment [rəu krɔp ɪ'kwɪpmənt] – орудия для обработки пропашных культур

mounted equipment ['mauntɪd ɪ'kwɪpmənt] – навесные орудия

adjustable front-wheel tread [ə'dʒʌstəbl frʌnt wi:l tred] – регулируемая ширина колеи передних колес

dual front wheel ['djuːəl frʌnt wiːl] – спаренное переднее колесо

high-clearance tractor [haɪ 'klɪərəns 'træktə] – трактор с высоким дорожным просветом

rear-mounted [rɪə 'mauntɪd] – навешиваемый сзади

disk weeder [dɪsk 'wiːdə] – дисковый пололь ник

disk hiller [dɪsk 'hɪlə] – дисковый окучник

dirt [dɜːt] – взрыхленная почва

rotary hoe unit ['rəutərɪ həu 'juːnɪt] – ротационная мотыга

sweep [swiːp] – двусторонняя полольная лапа

Text A

Exercise 6. Read and translate the following text.

1. Cultivation of row crops refers primarily to tillage operations performed after the seed has been planted. The general purpose of cultivation is to promote plant growth, the most important reason for cultivating being to kill weeds. In irrigated sections additional functions are to prepare the land for the application of irrigation water and to improve water penetration. Incorporation of chemical fertilizers into the soil is another function of cultivation. The cultivators for row-crop operations range in size from small, up to four-row, tractor-mounted cultivators with effective widths of 13 to 14 ft or more. Horse-drawn cultivators have, of course, been common for many years, but in most areas of the world they have now been largely replaced by tractor-mounted units. The present-day farm machinery designer is interested primarily in mounted cultivators and tractors especially designed for operations in conjunction with row-crop cultivators.

2. The tricycle-type, all-purpose tractor with adjustable rear-wheel tread was developed primarily for mounted cultivators and other row-crop equipment. Since the general adoption of hydraulic controls for mounted equipment, the trend to mounted cultivators, as well as to other types of mounted equipment, has been rapid. Four-wheel tractors with adjustable front-wheel tread are available in addition to the tricycle type with single or dual front wheel. A recent development for the cultivation of tall row crops is the high-clearance tractor with minimum vertical clearance of more than 30 in. beneath the axles and frame. Small tractors with rear-mounted engines have been developed to provide improved visibility for cultivation of vegetable crops.

3. With respect to cultivating tools many types and combinations of them are used in row crops, the selection being influenced by such factors

as type and size of crop plants, soil type and field condition, and the purposes for which cultivation is being performed. Various sizes and shapes of these tools are available. Among the many other types of equipment are tools such as disk weeders and disk hillers for moving dirt to or from the row, and rotary hoe units. Sweeps are used extensively for weed control, since shallow cultivation is generally desired. Special sweeps have been developed that can be operated at high speeds without throwing excessive amounts of dirt which provides uniformly worked tilth and good conditions for crops.

Exercise 7. Answer the following questions.

1. What is the general purpose of cultivation? 2. What is the present-day farm machinery designer's primary interest? 3. Why has the trend to mounted cultivators and other types of mounted equipment been rapid? 4. What is the selection of cultivating tools influenced? 5. What equipment is used for operating at high speeds?

Exercise 8. Pay attention to the following sentences and define the function of the underlined words as the Participle II.

1. Cultivation of row crops refers primarily to tillage operations performed after the seed has been planted. 2. Replaced by tractor-mounted units, the horse-drawn cultivators are not used nowadays. 3. The present-day farm machinery designer is interested primarily in mounted cultivators and tractors especially designed for operations in conjunction with row-crop cultivators. 4. When developed by the engineers, modern tractors acquired improved visibility for cultivation of vegetable crops.

Exercise 9. Translate from Russian into English the words and words combinations given in brackets using the text.

1. (Двусторонние полольные лапы) are used extensively for (борьбы с сорняками), since (неглубокая культивация почв) is generally desired.

2. (Четырехколесные трактора) with adjustable front-wheel tread are available in addition to the (трехколесному типу) with single or dual front wheel.

3. A (недавняя разработка) for the cultivation of (высоких пропашных культур) is the high-clearance tractor with minimum (вертикальный дорожный просвет) of more than 30 in. beneath the axles and (рамой).

Exercise 10. Give the Russian equivalents.

Tillage operations; to move dirt to or from the row; cultivating tools; soil type and field condition; chemical fertilizers; improved visibility; adjustable rear-wheel tread; beneath the axles; single front wheel; hydraulic controls; in conjunction with row-crop cultivators; various sizes and shapes

of tools; minimum vertical clearance; all-purpose tractor; to promote plant growth; present-day farm machinery designer; mounted equipment; rear-wheel tread; shallow cultivation; at high speeds.

Exercise 11. Complete the following sentences using the text.

1. Incorporation of chemical fertilizers … .
2. … and field condition, and the purposes for which cultivation is being performed.
3. Small tractors with rear-mounted engines … .
4. … mounted cultivators and other row-crop equipment.
5. Horse-drawn cultivators have … .

Exercise 12. Fill in the blanks with the necessary prepositions using the text.

1. The selection … cultivating tools is influenced … such factors as type and size … crop plants, soil type and field condition. 2. … the general adoption … hydraulic controls … mounted equipment, the trend … mounted cultivators, as well as … other types … mounted equipment, has been rapid. 3. … irrigated sections additional functions are to prepare the land … the application … irrigation water and to improve water penetration. 4. … respect … cultivating tools many types and combinations … them are used … row crops. 5. Special sweeps have been developed that can be operated … high speeds … throwing excessive amounts … dirt.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. The only purpose of cultivation is to incorporate the chemical fertilizers into the soil. 2. The selection of cultivating tools is only influenced by types and sizes of tractors. 3. The tractor with high-clearance up to 30 in. has recently been developed for the cultivation of tall row crops. 4. The tricycle-type, all-purpose tractor with adjustable rear-wheel tread was developed primarily for plowing.

Exercise 14. Translate the following sentences from Russian into English.

1. Возделывание пропашных культур с помощью культиваторов производится, чтобы способствовать их стабильному росту. 2. Современные тракторы способны работать с навесными и полунавесными культиваторами. 3. Выбор вида, формы и габаритов почвообрабатывающих орудий зависит от конкретных условий полевых работ. 4. Орудия, которые могут применяться для культивации пропашных культур на больших скоростях сегодня получили широкое распространение.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Types of Cultivators

1. The *separated-gang cultivator*[1] is designed for a specific number of rows and has either one or two gangs per row. The *tool bar*[2] of the individual gangs drop down between the rows, an arrangement that provides maximum vertical clearance for the plants. A cultivator of this type is often known as a *cotton-and-corn cultivator*[3], since they are the crops for which it is most used.

2. The *continuous-tool-bar cultivator*[4] has tool bars that extend across the tops of the rows rather than dropping down between them. A cultivator of this type is adaptable to a wide range of row spacings, the maximum number of rows depending upon the length of tool bar and the row spacing.

3. Cultivating units of either type may be front-mounted or rear-mounted or may include both front and rear gangs. Front-mounted cultivators afford good visibility of the work and direct response to steering. Rear-mounted gangs permit loosening of the soil behind the tractor wheels and are adaptable to simple and easy attachment.

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[1] separated-gang cultivator – культиватор с отдельными секциями рабочих органов

[2] tool bar – брус трактора для навески орудий

[3] cotton-and-corn cultivator – культиватор для обработки хлопка и кукурузы

[4] continuous-tool-bar cultivator – культиватор с общими поперечными брусьями для рабочих органов

UNIT 5

Crop Planting

Exercise 1. Change the underlined words for the personal pronouns.

1. The teacher is helping the students to translate the article. 2. Mother will send Mary to buy tickets. 3. The man gave the books to the boy. 4. My friend is going to write a letter to his sister today. 5. This book is not suita-

ble for young children. 6. Helen worked hard at history. 7. Tom went to see his parents yesterday. 8. Nick and Sue want to watch a new film.

Exercise 2. Translate the words into Russian.

Hopeless, aimless, topless, merciless, windowless, meaningless, expressionless, breathless.

Exercise 3. Express the given word combinations in one word using the suffix *-less*. Pay attention to the model.

Model: without sound – *soundless*

Without a collar; without an end; without a home; without a heart; without a sin; without a shape; without help; without defence; without motion; without harm; without effort.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Tuber ['tju:bə]; accommodate [ə'kɔmədeɪt]; mechanical [mɪ'kænɪkəl]; acceptable [ək'septəbl]; among [ə'mʌŋ]; moisture ['mɔɪsʧə]; medium ['mi:dɪəm]; average ['ævərɪʤ]; equipped [ɪ'kwɪpt]; double ['dʌbl]; discharge [dɪs'ʧɑ:ʤ]; satisfactory [ˌsætɪs'fæktərɪ]; combination [ˌkɔmbɪ'neɪʃən].

Exercise 5. Read and memorize the following words and word combinations.

predetermined depth [ˌpri:dɪ'tɜ:mɪnd depθ] – заданная глубина
seed planter [si:d 'plɑ:ntə] – сеялка
meter ['mi:tə] – высевать в нужном количестве
compact [ˌkəm'pækt] – уплотнять
furrow opener ['fʌrəu 'əupənə] – сошник
full runner [ful 'rʌnə] – изогнутый полозовидный сошник
stub runner [stʌb 'rʌnə] – укороченный полозовидный сошник
corn planter [kɔ:n 'plɑ:ntə] – кукурузная сеялка
hoe-type opener ['həu taɪp 'əupənə] – анкерный сошник
spring trip ['sprɪŋ trɪp] – пружинный предохранитель
disk-type opener ['dɪsk taɪp 'opener] – дисковый сошник
single-disk opener ['sɪŋgl dɪsk 'opener] – однодисковый сошник
double-disk opener ['dʌbl 'opener] – двухдисковый сошник
seed-metering device [si:d 'mi:tərɪŋ dɪ'vaɪs] – высевающий аппарат
cell [sel] – ячейка
moving member ['mu:vɪŋ 'membə] – подвижный элемент
“force-feed”device [fɔ:s fi:d dɪ'vaɪs] – высевающий аппарат с принудительной подачей
hopper ['hɔpə] – семенной ящик

stationary-opening unit ['steɪʃənərɪ 'əupənɪŋ 'juːnɪt] – высевающий аппарат с постоянно открытыми высевными отверстиями

agitator ['ædʒɪteɪtə] – ворошитель

fluted-wheel feed ['fluːtɪd wiːl 'fiːd] – высевающий аппарат рифленокатушечного типа

internal double run [ɪn'tɜːnəl 'dʌbl rʌn] – внутриреберчатый высевающий аппарат

broadcast seeder ['brɔːdkɑːst 'siːdə] – разбросная сеялка

grain drill [greɪn drɪl] – рядовая сеялка

fertilizer-grain drill ['fɜːtɪlaɪzə greɪn drɪl] – комбинированная зернотуковая сеялка

passage ['pæsɪdʒ] – канал, проход

seed tube [siːd tjuːb] – семяпровод

drag chain [dræg ʧeɪn] – цепной шлейф

steel presswheel [stiːl preswiːl] – стальное прикатывающее колесо

rubber-covered presswheel ['rʌbə'kʌvəd preswiːl] – прикатывающее колесо с резиновой шиной

pneumatic presswheel [njuː'mætɪk preswiːl] – пневматическое прикатывающее колесо

disk hiller [dɪsk hɪlə] – дисковый окучник

Text A

Exercise 6. Read and translate the following text.

1. Crop planting operations may involve placing of seeds or tubers (such as potatoes) in the soil at a predetermined depth and generally a seed planter is required to perform all the following mechanical functions: open the seed furrow to the proper depth, meter the seed, deposit the seed in the furrow in an acceptable pattern and cover the seed and compact the soil around the seed.

2. **Furrow openers.** There are different devices for making furrows in the seedbed: both rotating and fixed types of furrow openers. The choice, among these types or others similar to them is influenced by a number of factors. The optimum depth of planting varies widely with different crops and is influenced by soil moisture conditions, soil temperature, time of year, etc. The full runner is a simple device that works well at medium depths in mellow soil free of trash and weeds. It is suitable for the average conditions encountered by corn and cotton planters. The stub runner is sometimes used on corn planters in rough or trashy ground. Hoe-type openers, when equipped with spring trips are suitable for stony or root-infested soils. Disk-

type openers are suitable for hard or trashy ground, and in wet, sticky soils they are more satisfactory than fixed openers because they can be kept reasonably clean with scrapers. The single-disk opener is more effective than the double disk in regard to penetration and cutting of trash. It is suitable for a wide variety of conditions and is the usual type of opener found on grain drills. Double-disk openers are particularly well adapted to medium or shallow seeding of row crops that are critical in regard to planting depth.

3. **Seed-metering devices.** Most seed-metering devices are classified as: (a) those having cells on a moving member, the cells being sized to accommodate single seeds or groups of a few seeds each, (b) the so-called "force-feed" devices, each having a moving member to remove seed from the hopper and discharge it in a more or less continuous stream, and (c) stationary-opening units, usually with an agitator above the opening. The two common types of force-feed metering devices are the fluted-wheel feed and the internal double run. Their principal application is in grain and grass drills. The fluted-wheel feed is generally favored where only relatively small seeds (such as the small grains) are to be handled. Small-diameter fluted wheels are used for metering the small grass seeds. The double-run feed is suitable for larger seeds such as soybeans and peas, as well as being satisfactory for the small grains.

4. **Grain Drills.** In comparison with broadcast seeders, grain drills tend to give higher yields because of the greater uniformity of seed distribution and the more uniform seeding depth. A fertilizer-grain drill has a divided hopper, the front section being for seed and the rear section for fertilizer. The fertilizer may be deposited through the same tubes with the seed or through separate passages behind the seed tubes.

5. **Covering devices.** Among the many types of covering devices employed on seeders are drag chains, steel presswheels, rubber-covered or pneumatic presswheels, disk hillers, and various combinations of these units. Ideally, a covering device should place moist soil in contact with the seeds, press the soil firmly around the seeds, cover them to the proper depth, and leave the soil directly above the row loose enough to minimize crusting and promote easy emergence.

Exercise 7. Answer the following questions.

1. What mechanical functions are performed by a seed planter? 2. What devices are used for making furrows? 3. What types of openers are mentioned in the text? 4. How are the seed-metering devices classified? 5. A fertilizer-grain drill is more suitable than a broadcast seeder, isn’t it? 6. Do you know all the functions of the covering devices?

Exercise 8. Translate the following sentences into Russian paying attention the modal verbs.

1. Crop planting operations may involve placing of seeds in the soil at a predetermined depth. 2. A covering device must place moist soil in contact with the seeds. 3. The designers of agricultural machinery have to fit the seed planters with improved seed-metering devices. 4. The broadcasters cannot provide a uniform seeding. 5. Different furrow openers should be applied to seeders to provide high quality performance.

Exercise 9. Translate from Russian into English the words and words combinations given in brackets using the text.

1. A fertilizer-grain drill has a (разделенный семенной ящик), the (передняя секция) being for seed and the (задняя секция) for fertilizer.

2. The (высевающий аппарат рифлено-катушечного типа) is generally favored where only relatively (маленькие зерна) are to be handled.

3. (Анкерный сошник), when equipped with spring trips are suitable for (каменистая или засоренная корнями) soils.

4. There are (различные орудия) for making furrows in the seedbed: both (вращающегося и закрепленного неподвижно) types of furrow openers.

Exercise 10. Give the Russian equivalents.

Minimize crusting; combinations of these units; moist soil; separate passages; in comparison with; seed distribution; small grass seeds; principal application; continuous stream; above the opening; seeding of row crops; wide variety of conditions; hard or trashy ground; average conditions; mellow soil; soil temperature; optimum depth of planting; crop planting operations; perform mechanical functions; acceptable pattern.

Exercise 11. Complete the following sentences using the text.

1. It is suitable for a wide variety of conditions … .
2. Small-diameter fluted wheels … .
3. It is suitable for the average conditions … .
4. The optimum depth of planting varies widely with different … .
5. The fertilizer may be deposited through … .

Exercise 12. Fill in the blanks with the necessary prepositions using the text.

1. Crop planting operations may involve placing … seeds or tubers … the soil … a predetermined depth. 2. … comparison … broadcast seeders, grain drills tend to give higher yields because … the greater uniformity … seed distribution. 3. The so-called "force-feed" devices, each having a moving member to remove seed … the hopper and discharge it … a more or less continuous stream. 4. Double-disk openers are particularly well adapted …

medium or shallow seeding … row crops that are critical … regard … planting depth. 5. The double-run feed is suitable … larger seeds such as soybeans and peas, as well as being satisfactory … the small grains.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. Crop planting involves several mechanical operations concerning the seed. 2. The choice among the types of devices for making furrows in the seedbed is never influenced by any factors. 3. Disk-type openers are suitable for different soil conditions. 4. There are three main types of seed-metering devices mounted on the seeders. 5. A fertilizer-grain drill combines two operational functions in itself.

Exercise 14. Translate the following sentences from Russian into English.

1. Заделывающие органы создают благоприятные условия для быстрого и равномерного прорастания семян. 2. Сошники применяются в различных почвенных условиях, чтобы обеспечить оптимальные условия для высева семян. 3. На рядовых сеялках устанавливаются различные высевающие аппараты для посева зерновых и травяных культур. 4. Рядовые сеялки могут выполнять две функции за один проход: высевать зерновую культуру и вносить минеральное удобрение.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Checkrow Planting

1. *Checkrow planting*[1] is a precision operation, the primary function of which is to simplify the control of weeds, by permitting *cross-cultivation*[2]. The checking operation should be accurate to give straight *cross-rows*[3], and the desired number of seeds should be dropped in each hill without *appreciable scattering*[4].

2. As a checkrow planter moves across the field, *buttons*[5] on a *wire*[6] passing through one of the two *checkheads*[7] on the planter, engage the *checkfork*[8] and move it backwards with respect to the planter frame, thus opening two valves simultaneously in each *seed boot*[9]. Seeds that had been resting on the lower valve are ejected a relatively short distance into the furrow, while seeds accumulated on the upper valve are released to fall down onto the lower valve. *Spring action*[10] closes the valves before the seeds from the upper valve have time to reach the lower valve.

3. The movement of the checkfork also engages a *clutch*[11] in the *seed-plate*[12] *drive*[13], which subsequently rotates the *feed shaft*[14] through one revolution and then automatically disengages. During the one revolution of the feed shaft, the seed plate is moved sufficiently to meter out and accumulate on the upper valve the number of seeds required for a hill.

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[1] checkrow planting – квадратно-гнездовой сев
[2] cross-cultivation – перекрестная культивация
[3] cross-row – поперечный ряд
[4] appreciable scattering – заметный разброс
[5] button – упор
[6] wire – мерная проволока
[7] checkhead – узлоуловитель
[8] checkfork – вилка узлоуловителя
[9] seed boot – корпус сошника
[10] spring action – действие пружины
[11] clutch – сцепная муфта
[12] seed-plate – высевной диск
[13] drive – привод
[14] feed shaft – вал привода

UNIT 6

Potato Harvesting

Exercise 1. Put in the necessary reflexive pronouns.

1. I will ask him … . 2. She will answer the letter … . 3. We will do it … 4. Did you invite him … ? 5. He wants to do it … . 6. Careful! You will hurt … . 7. I looked at … in the mirror. 8. Put on the thicker coat to protect … from the rain. 9. They told me the news … . 10. He made his home task … .

Exercise 2. Put in *this, that, these, those*.

1. Pass me … box from the table. 2. Who said … ? 3. Do it … way, not like … . 4. Do you like … music? – I don't. 5. I did not like … stories he told us. 6. He is ill, … is why he is away. 7. Do you remember … people we met at the party? 8. What's … on the sofa? 9. … hotel is expensive but it's very nice. 10. Listen – … will make you laugh. 11. Did you hear … noise at night? 12. Which shoes do you like? – … or … ?

Exercise 3. Translate the words into Russian.

Preventable, exhaustible, changeable, knowable, agreeable, serviceable, checkable, eatable, teachable, recommendable, buyable.

Exercise 4. Express the given word combinations in one word using the suffix *-able*. Pay attention to the model.

Model: that can be bought – *buyable*.

That can be realized; that can be forgiven; that can be drunk; that can be adjusted; that can be removed; that can be modified; that can be understood.

Exercise 5. Practise the pronunciation of the following words and translate them into Russian.

Machine [mə'ʃi:n], separation [ˌsepə'reɪʃən], conveying [kən'veɪɪŋ], occasional [ə'keɪʒənəl], beneath [bɪ'ni:θ], ordinarily ['ɔ:dənərəlɪ], foreign ['fɔrɪn], straight [streɪt], elongated ['i:lɔŋgeɪtɪd], bruised [bru:zd].

Exercise 6. Read and memorize the following words and word combinations.

potato harvester [pə'teɪtəu 'hɑ:vɪstə] – картофелеуборочная машина

elevating digger ['elɪveɪtɪŋ 'dɪgə] – элеваторный картофелекопатель

potato combine [pə'teɪtəu kəm'baɪn] – картофелеуборочный комбайн

vine [vaɪn] – вьющийся стебель

conveying mechanism [kən'veɪŋ 'mekənɪzəm] – конвейерный механизм

sift out [sɪft aut] – просеивать

power-operated ['pauə 'ɔpəreɪtɪd] – с механическим приводом

shaker chain ['ʃeɪkə ʧeɪn] – протряхивающий элеватор

debris ['deɪbri:] – мусор

roller ['rəulə] – каток

blade [bleɪd] – лемех

scoop up ['sku:p ʌp] – копать, вскапывать

pointed ['pɔɪntɪd] – заостренный

continuous [kən'tɪnjuəs] – сплошной

rod-chain type of elevating conveyor ['rɔdʧeɪn taɪp əv 'elɪveɪtɪŋ kən'veɪə] – подъемный элеватор пруткового типа

idler sprocket ['aɪdlə 'sprɔkɪt] – звездочка-встряхиватель

provision [prə'vɪʒən] – устройство

linear speed ['lɪnɪə spi:d] – линейная скорость

sorting conveyor ['sɔ:tɪŋ kən'veɪə] – отборочный транспортер

Text A

Exercise 7. Read and translate the following text.

1. Mechanical potato harvesters may be classified as elevating diggers and potato combines. With either type of machine, final separation of the

tubers from clods, vines, stones, and other foreign material is done by hand. Both types are available in one-row and two-row sizes. Power for operating the conveying mechanism is generally furnished through the tractor PTO in the case of diggers, but potato combines often have separate engines.

2. **Diggers.** Present-day power-operated diggers have shaker chains that elevate the potatoes and sift out most of the soil, dropping the tubers and remaining debris (vines, clods, occasional stones, etc.) from the rear of the conveyor onto the ground. The potatoes are then picked up by hand and placed in bags or boxes. Sometimes a roller is mounted beneath the rear of the conveyor to firm and smooth the soil on which the potatoes are to be dropped.

3. Various types of blades are employed for digging or scooping up the soil and potatoes. One-row diggers are ordinarily equipped with pointed blades. A two-row digger may have either a separate, pointed blade for each row or a continuous, straight blade across both rows. The blade is operated at a depth just below the tuber zone. The blade delivers the entire mass of potatoes and surrounding soil onto a rod-chain type of elevating conveyor. Two-row diggers have a separate elevator for each row.

4. Elongated or oval-shaped idler sprockets support the elevator chain and agitate it with an up-and-down motion to aid in sifting out the soil. Some diggers have provision for changing the linear speed of the elevator to suit the operating conditions. The higher speeds give a better cleaning action, but the potatoes are more likely to be bruised.

5. **Potato Combines.** Potatoes harvested with a potato combine are lifted with the soil in the same manner as with a standard digger. But the potatoes, instead of being dropped back onto the ground to be picked up by hand, pass from the elevator onto a sorting conveyor. Workers standing on platforms on each side of the conveyor remove vines, stones, clods and other foreign material that has not been separated mechanically. The potatoes are then discharged from the sorting conveyor into sacks or are elevated into trucks.

Exercise 8. Answer the following questions.

1. What mechanical units are used to harvest potato? 2. How does a power-operated digger operate? 3. What types of blades are used on power-operated diggers? 4. Is there any difference between a power-operated digger and a potato combine?

Exercise 9. Put the following adjectives into the necessary form.

1. One-row power-operated diggers are (efficient) than those of two rows. 2. The potato combines are (complex) than potato diggers. 3. The pointed blades on potato diggers are as (big) as on potato combines.

4. The (long) the rod-chain type of elevating conveyor on a potato combine, the (good) the sifting out process. 5. The trailed potato diggers are not so (maneuverable) as the mounted ones.

Exercise 10. Translate from Russian into English the words and words combinations given in brackets using the text.

1. The potatoes are then (выгружаются) from the sorting conveyor into into (грузовики). 2. The higher speeds give a better (очистное действие), but the potatoes are more likely to be bruised. 3. (Двухрядные картофелекопалки) have a separate (транспортер) for each row. 4. The (лемех) is operated at a depth just below the tuber zone. 5. (Энергия) for operating the (конвейерный механизм) is generally furnished through the (ВОМ трактора) in the case of diggers, but potato combines often have (отдельные двигатели).

Exercise 11. Fill in the blanks with the necessary prepositions using the text.

1. Potatoes harvested … a potato combine are lifted … the soil … the same manner as … a standard digger.

2. Elongated or oval-shaped idler sprockets support the elevator chain and agitate it … an up-and-down motion to aid … sifting out the soil.

3. Various types … blades are employed … digging or scooping up the soil and potatoes.

4. Sometimes a roller is mounted beneath the rear … the conveyor to firm and smooth the soil … which the potatoes are to be dropped.

Exercise 12. Complete the following sentences using the text.

1. … pass from the elevator onto a sorting conveyor.
2. … speed of the elevator to suit the operating conditions.
3. … each row or a continuous, straight blade across both rows.
4. … hand and placed in bags or boxes.
5. … clods, vines, stones, and other foreign material is done by hand.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. Such mechanical potato harvesters as combines provide potato gathering without hand work. 2. Sometimes a roller is mounted beneath the rear of the conveyor. 3. A two-row digger has various types of blades. 4. The oval-shaped idler sprockets support the elevator chain and deliver up-and-down motion. 5. There are no platforms for workers on the potatoes combines.

Exercise 14. Give the Russian equivalents.

Foreign material; an up-and-down motion; platforms; pick up by hand; standard digger; conveying mechanism; potato combine; separate engine; operating conditions; one-row digger; aid in sifting out the soil; oval-shaped

idler sprocket; straight blade; various types of blades; beneath the rear of the conveyor; remaining debris; present-day power-operated digger.

Exercise 15. Translate the following sentences from Russian into English.

1. В настоящее время применяются картофелеуборочные машины, которые могут быть как самоходными, так и прицепными. 2. Протряхивающий элеватор современных картофелекопателей применяется для очищения картофельных клубней от остатков мусора. 3. Как комбайны, так и картофелекопатели оснащаются лемехами разных видов в зависимости от методов возделывания картофеля. 4. Картофелеуборочный комбайн являются очень эффективной машиной в процессе производства картофеля.

Exercise 16. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Potato Planting

1. Potatoes are generally grown from seed pieces cut from the whole tubers, although small potatoes are sometimes planted without cutting. Since planting rates[1] are in the order of 800 to 1500 lb per acre, large seed hoppers are necessary. Fertilizing units with hoppers holding several hundred pounds per row are available for most potato planters. The fertilizer is deposited in bands[2] on either or both sides of the row by means of disk openers. The seed furrows are generally made with runner or hoe-type openers[3]. Concave covering disks bury the seed pieces to a depth of perhaps 4 in. and leave a ridge over each row.

2. Automatic potato planters have vertical, rotating picker wheels[4] with devices to either pierce or grip[5] individual seed pieces and then drop them into the furrow. Semiautomatic planters require the assistance of an operator to see that each pocket on a horizontal, rotating feed ring[6] has a seed piece in it. Planters of the semiautomatic type are not adaptable to high-speed operation. Trailed one-, two-, and four-row automatic planters are available that can be operated at speeds up to 5 mph.

[1] planting rate – норма посадки
[2] band – линия
[3] hoe-type opener – анкерный сошник
[4] picker wheel – пикерный диск
[5] grip – захватить
[6] feed ring – питающее кольцо

UNIT 7

Sprayers

Exercise 1. Put in *who, whom, whose, what, which*.

1. … will help me? 2. … of you will help me? 3. … of these girls is the youngest? 4. … hat is this? 5. … is your telephone number? 6. … pencil is this, Peter's or Helen's? 7. … are you drinking? 8. … are you expecting? 9 … understands this rule? 10. … do you love?

Exercise 2. Put the questions to the words in italics.

1. He is looking at *me* in surprise. 2. *My* brother is a student. 3. This letter is from *my* friend. 4. *I* live on the third floor. 5. We are waiting for *them*. 6. *They* met *me* at the library. 7. This book is *hers*. 8. *He* asked for a cup of coffee. 9. This girl is *my* sister. 10. Ann called *me* last week.

Exercise 3. Translate the words into Russian.

Moneyed, hooked, turreted, poppied, forked, peaked, borrowed, toothed, depressed, affected, approved, bloodied, balconied, pillared, salaried.

Exercise 4. Express the given word combinations in one word using the ending *-ed*. Pay attention to the model.

Model: having a beard – *bearded*

Having sleeves; having hoofs; having spectacles on; having the character of a dog; having a curtain on; having a shape of a hood; made of dots; having the chin in the shape of a point.

Exercise 5. Practise the pronunciation of the following words and translate them into Russian.

Suction ['sʌkʃən]; angle ['æŋgl]; components [kəm'pəunənts]; comprise [kəm'praɪz]; swirl [swɜːl]; rather ['rɑːðə]; manufacturer [ˌmænjə'fækʧərə]; typical ['tɪpɪkəl]; horizontal [ˌhɔrɪ'zɔntəl]; width [wɪtθ]; project [prə'ʤekt]; multiple ['mʌltɪpl]; diameter [daɪ'æmɪtə]; acre ['eɪkə].

Exercise 6. Read and memorize the following words and word combinations.

sprayer ['spreɪə] – опрыскиватель
tank [tæŋk] – емкость, цистерна
pump [pʌmp] – насос
delivery line [dɪ'lɪvərɪ laɪn] – питающий трубопровод
boom [buːm] – штанга
nozzle ['nɔzl] – распылитель
pressure gauge ['preʃəˌgeɪʤ] – манометр
control valve [kən'trəul vælv] – распределительный клапан

anti-drip mechanism ['æntıdrıp 'mekənızəm] – противокапельный механизм

relief valve [rı'li:f vælv] – перепускной клапан

bypass ['baıpɑ:s] – перепускать

agitator ['æʤıteıtə] – мешалка

flat blade [flæt bleıd] – плоская лопасть

diaphragm pump ['daıəfræm pʌmp] – мембранный насос

centrifugal pump [ˌsentrı'fju:gəl pʌmp] – центробежный насос

rotary pump ['rəutərı pʌmp] – ротационный насос

piston pump ['pıstən pʌmp] – поршневой насос

outer end ['autə end] – наружная сторона

hinge [hınʤ] – прикреплять шарнирно

fold [fəuld] – сгибать, складывать

castor wheel ['kɑ:stə wi:l] – ролик, колёсико

apparatus [ˌæpə'reıtəs] – оборудование, агрегат

hoop skid – однополозковый опорный башмак

atomization ['ætəmaızeıʃən] – распыление

swirl nozzle ['swɜ:l nɔzl] – вихревой распылитель

hydraulic folding [haı'drɔ:lık 'fəuldıŋ] – складывание посредством гидравлического привода

fan nozzle ['fæn nɔzl] – веерный распылитель

cone-shaped ['kəun ʃeıpt] – конусный, конусообразный

spray [spreı] – распыление; распылять

outfit ['autfıt] – снабжать

controlled droplet application [kən'trəuld 'drɔplət ˌæplı'keıʃən] – опрыскивание с заданным средним размером капель

rotary nozzle ['rəutərı nɔzl] – ротационный распылитель

spinning cup ['spınıŋ kʌp] – форсунка с вращающимся распылителем

advantageous [ædvənˈteıʤəs] – предпочтительный, выгодный

Text A

Exercise 7. Read and translate the following text.

1. Typical sprayers are comprised of the following basic parts: a tank, a pump, filters in the suction and delivery lines, a boom, and nozzles. Additional components include a nozzle, pressure gauge, a control valve including anti-drip mechanism, and a relief valve to bypass excess material back to the tank. The most commonly used machine-operated sprayers for field application are low-pressure sprayers.

2. **Tanks**. Within the steel or plastic tanks there are agitators which are either mechanically or hydraulically operated. If the agitators are operated mechanically, a horizontal shaft with flat blades is employed. Many manufacturers use hydraulic agitation rather than mechanical. In this case, a pump with a capacity of approximately 20-30 gallons (76 to 114 L) per minute is included on the apparatus; the pump's full output circulates the contents in the tank.

3. **Pumps**. Among the most commonly used types of sprayer pumps are diaphragm pumps, medium-pressure centrifugal pumps, and low-pressure rotary pumps. Some machines also comprise high-pressure and medium-pressure piston pumps, but they are expensive and difficult to maintain.

4. **Booms**. Typical sprayers are comprised of a boom between 15 to 40 feet (4.6 to 12 m) in length, with nozzles fitted at various intervals. Often, booms are mounted in three sections, with the outer ends being hinged and therefore able to be folded for transport, while the middle section is fixed to the machine. Larger sprayers may have booms measuring up to 66 feet (20 m), mounted in five sections to enable hydraulic folding. Light castor wheels or hoop skids are often used at the ends of a boom to avoid ground contact and resulting damage of the nozzles.

5. **Nozzles**. While some sprayers achieve atomization with a blast of air, this is not always the case. Nozzles that do not employ air can be divided into two categories: swirl nozzles and fan nozzles. In swirl nozzles, the fluid coming from the sprayer's tank is propelled in a whirling motion, resulting in a cone-shaped spray when it emerges. These nozzles are outfitted with controls to adjust the spray volume, including the width of spray angle and size of droplets; they are normally used on high-volume applications. Conversely, fan nozzles are normally used in low volume applications with lower pressures.

6. **Controlled droplet application**. A significant development in sprayer application methods is controlled droplet application (CDA). In contrast to conventional nozzles that produce droplets that are widely variable in size, CDA technology produces uniform droplets using a rotary spray nozzle. In operation, the rotary nozzle accumulates spray solution at the bottom of a spinning cup. The centrifugal force of the cup creates spray droplets, which are forced up multiple grooves on the inside of the cup. From there, the solution reaches the top of the rotary nozzle, and droplets are projected in a circular pattern up to a six-foot (1.8-m) diameter. Droplet diameter is determined by the speed of the cup. CDA is seen as advantageous as less water is required per acre of spray: conventional sprayers use 20 to 30 gallons (76 to 113 L) per acre (0.4 ha), CDA technology uses one gallon (3.79 L) or even less.

Exercise 8. Answer the following questions.

1. What are the typical chemical sprayers comprised of? 2. What kind of agitators are there within the steel or plastic tanks? 3. What are the most commonly used types of sprayer pumps? 4. What two types of sprayer booms do you know? 5. What device is used to avoid damaging nozzles on the boom? 6. What is the reason for applying the CDA technology? 7. Is the CDA technology advantageous?

Exercise 9. Match the words with their definitions.

1. sprayer	a) a device that is used to force a liquid or gas to flow.
2. nozzle	b) a liquid in which a solid substance has been dissolved.
3. valve	c) a circular object that revolves on an axle.
4. tank	d) a shaft is a rod that turns round continually.
5. pump	e) the rate at which someone or something moves.
6. droplet	f) a large receptacle or storage chamber.
7. shaft	g) a very small drop of a liquid.
8. wheel	h) a device to control the passage of fluid through a pipe.
9. solution	i) a spout at the end of a pipe, hose, or tube.
10. speed	j) equipment used for spraying liquid.

Exercise 10. Read and translate the following sentences and state the functions of the Infinitive.

1. Our plane was the last to take off. 2. The combine to be bought is the most reliable. 3. Tom is expected to come back home in time. 4. You are too small to paint that high wall. 5. The battery turned out to be powerful enough for this bulldozer. 6. In order to put into operation this mechanism you have to press that button. 7. We see the combine harvest this wheat at the moment. 8. They heard the engineer ring on the phone. 9. The rear wheels are likely to be used for this kind of crop. 10. The purpose of this apparatus is to control the fuel supply.

Exercise 11. Give the Russian equivalents.

Top of the rotary nozzle; uniform droplets; droplet diameter; centrifugal force; widely variable in size; conventional sprayer; droplet application; size of droplets; adjust spray volume; sprayer's tank; width of spray angle; atomization; blast of air; whirling motion; middle section; hydraulic folding; damage of the nozzles; expensive and difficult to maintain; types of sprayer pumps; hydraulic agitation; additional components.

Exercise 12. Translate the following words paying attention to suffixes. State the part of the speech.

Following; measuring; significant; horizontal; centrifugal; various; advantageous; expensive; basic; suction; atomization; delivery; mechanically;

approximately; hydraulically; agitator; sprayer; employed; included; propelled; mounted; outfitted.

Exercise 13. Give the English equivalents using the text.

Существенное совершенствование; обычный распылитель; жидкость для распыления; вытеснять вверх; многочисленные пазы; ротационный распылитель; выбрасываться; распыление; поток воздуха; разделять на категории; размер капель; применение химиката большими объемами; низкое давление; на разном расстоянии; три секции; складываться для транспортировки; избежать контакта с землей; дорогой и сложный; максимальная производительность; с механическим приводом; основные части; избыточный материал; поршень.

Exercise 14. Put in the necessary words using the text.

1. The sprayers used for field application are … sprayers. 2. If the … are operated mechanically, a horizontal shaft with … is employed. 3. Many … use … agitation rather than mechanical. 4. Some … also comprise high-pressure and … piston pumps. 5. Typical … are comprised of a … between 15 to 40 feet. 6. Larger … may have booms … up to 66 feet (20 m), mounted in five sections. 7. Light … are often used … of a boom. 8. These … are outfitted with … to adjust the spray volume. 9. Conversely, … are normally used in … applications with lower pressures.

Exercise 15. Translate the following sentences from Russian into English.

1. Типовые опрыскиватели помимо основных частей, имеют дополнительные узлы. 2. Все современные опрыскиватели снабжены гидравлическими и механическими мешалками. 3. Производители опрыскивателей устанавливают насосы четырех разных видов. 4. Пятисекционные штанги опрыскивателей позволяют обрабатывать широкую полосу захвата.

Exercise 16. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Spraying

1. In agriculture, a machine or device for *atomizing*[1] and applying liquid pesticides in the form of solutions, suspensions, and *emulsions*[2] of varying concentration to plants for the purpose of controlling pests, diseases, and weeds. There are various types of sprayers for treating field crops, orchards, and vineyards. The spraying mechanism may be hydraulic, fan, or aerosol.

There are portable sprayers, tractor-drawn and tractor-mounted sprayers. In hydraulic sprayers, the toxic liquid chemical is fed by pressure to nozzles, in which it is atomized and discharged onto the object being treated. In fan sprayers, the toxic chemical is atomized in nozzles and then expelled by a jet of air onto the object being treated.

2. The basic components and mechanisms of a sprayer are a tank with a *stirrer*[3] to mix the chemical, a pump to create the pressure necessary to atomize the liquid and give its particles a certain velocity, a fan (in fan sprayers), a hose, a pressure regulator, atomizing nozzles, and a *suction cock*[4] for reloading the sprayer. A pressure gauge monitors the degree of compression of the liquid within the tank. The working elements of tractor-drawn sprayers are driven by a takeoff shaft of the tractor engine. Portable sprayers are usually operated manually.

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[1] atomizing – распыление
[2] emulsion – эмульсия
[3] stirrer – мешалка
[4] suction cock – всасывающий кран

UNIT 8

Application of Fertilizers

Exercise 1. Correct the mistakes in the sentences.

1. They arrived at the 9 o'clock. 2. Minsk was founded in the eleven century. 3. He was born on the twenty-two of May. 4. Sunday is the seven day of the week. 5. How old is he? I think he is twenty-first. 6. What's the two month of the year? 7. I came to Nottingham third days ago. 8. The population of my native town is three hundreds fifty thousands people.

Exercise 2. Translate the words into Russian.

Beautiful, masterful, helpful, dutiful, useful, watchful, forgetful, thankful, wonderful, lawful, successful, youthful.

Exercise 3. Express the given word combinations in one word using the ending - *ful*. Pay attention to the model.

Model: giving pain – *painful*

Full of hope; full of doubt; full of truth; full of trust; full of resources; full of events; full of grace; giving force, giving rest.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Equipment [ɪ'kwɪpmənt]; diversified [daɪ'vɜːsɪfaɪd]; market ['mɑːkɪt]; strip [strɪp]; adjustable [ə'ʤʌstəbl]; aircraft ['eəkrɑːft]; interval ['ɪntəvəl];

pasture ['pɑ:stʃə]; cultivator ['kʌltıveıtə]; encountered [ın'kauntəd]; extensively [ık'stensıvlı]; attachment [ə'tætʃmənt]; distributor [dı'strıbjutə].

Exercise 5. Read and memorize the following words and word combinations.

broadcast ['brɔ:dkɑ:st] – разбрасывать

centrifugal broadcaster [ˌsentrı'fju:gəl 'brɔ:dkɑ:stə] – центробежный разбрасыватель удобрений

ribbed [rıbd] – ребристый, рифленый

metering device ['mi:tərıŋ dı'vaıs] – дозирующее устройство

full-width-feed broadcaster [ful wıtθ fi:d 'brɔ:dkɑ:stə] – туковая сеялка для разбрасывания удобрений по всей ширине захвата

opening ['əupənıŋ] – отверстие

space [speıs] – устанавливать на определенное расстояние

star-wheel feed ['stɑ:wi:l fi:d] – звездчатый туковысевающий аппарат

feed rate [fi:d reıt] – норма подачи, норма высева

revolving-bottom principle [rı'vɔlvıŋ'bɔtəm 'prınsəpl] – по принципу вращающегося дна

Text A

Exercise 6. Read and translate the following text.

1. Because of the wide variation in types of fertilizers and operating conditions, fertilizer equipment is one of the most diversified classes of farm machinery on the market. In general, however, the various devices may be classified as those that broadcast the material onto the surface of the ground and those designed for placing the fertilizer in rows or bands beneath the surface. Centrifugal fertilizer broadcasters are similar to centrifugal seed broadcasters, in that the material is metered from a hopper and distributed by horizontally rotating, ribbed disks. Uniformity of distribution across the broadcasted strip is likely to be poor and is affected by wind. The principal application for centrifugal broadcasters is in spreading lime. Full-width-feed broadcasters have adjustable openings or other metering devices spaced at regular intervals along the full length of a hopper. Machines of this type are suitable for spreading either lime or fertilizers. Some full-width-feed broadcasters have furrow openers available for placing bands of fertilizer at various depths and spacings, either in tilled soil or in pasture.

2. Equipment for row or band placement of fertilizers includes (a) special fertilizer drills for deep or shallow placement, (b) attachments for planters, cultivators, and various tillage implements, and (c) combination units such as the fertilizer-grain drill. In certain areas fertilizers are broadcast by

an aircraft, particularly on crops such as rice and the small grains and on hilly pasture lands. Many different types of metering devices for dry fertilizers have been developed in an attempt to obtain a uniform metering action under the wide variety of conditions encountered in distributing commercial fertilizers. The star-wheel feed is used extensively on grain-drill fertilizing units, as well as on some row-crop attachments and some full-width-feed broadcasters. Fertilizer carried between the teeth of the feed wheel falls into the delivery tube by gravity, while material carried on top of the wheel is scraped off into the delivery opening. The feed rate is controlled by raising or lowering a gate above the wheel. Many row-crop fertilizing attachments utilize the revolving-bottom principle. Two other types of metering devices for row crops are the auger-type distributor and the belt-type device. Most fertilizer distributors are equipped with rotating agitators in the hoppers.

Exercise 7. Answer the following questions.

1. How are the fertilizer devices classified? 2. Are centrifugal fertilizer broadcasters efficient in applying fertilizers? 3. What does the equipment for row or band placement of fertilizers include? 4. May the fertilizer be distributed by an aircraft? 5. What metering devices are used to obtain a uniform metering action?

Exercise 8. Translate the following sentences into Russian paying attention to the Continuous tense forms.

1. Last year we *were developing* the revolving-bottom attachments while our competitors *were testing* the auger-type distributor. 2. The combination of units for efficient fertilizer placement *is being utilized* increasingly these days. 3. At present the star-wheel feed *is being employed* mostly on grain-drill fertilizing units. 4. This time next Monday the workers *will be adjusting* the metering device. 5. The mechanics of our farm *are mounting* fertilizer attachments on the potato planters now.

Exercise 9. Translate from Russian into English the words and words combinations given in brackets using the text.

1. Two other types of (дозирующее устройство) for row crops are the (шнековый распределитель) and (устройство ременного типа). 2. Fertilizer carried between the (зубцы) of the feed wheel falls into the (тукопровод) by gravity, while material carried on top of the wheel (счищается) into the (высевное отверстие). 3. The (основное применение) for centrifugal broadcasters is in (разброс извести). 4. The (оборудование по внесению удобрений) is one of the most diversified classes of (сельскохозяйственной техники) on the market.

Exercise 10. Give the Russian equivalents.

Rotating agitators; fertilizer distributors; row-crop; teeth of the feed wheel; grain-drill fertilizing units; wide variety of conditions; uniform metering action; centrifugal speed; hilly pasture lands; aircraft; principal application; affected by wind; broadcasted strip; horizontally rotating unit; surface of the ground; various devices; on the market; operating conditions; gate above the wheel; variety of conditions; fertilizer equipment.

Exercise 11. Complete the following sentences using the text.

1. Many row-crop fertilizing attachments … .
2. The star-wheel feed is used extensively on grain-drill fertilizing units, as well as … .
3. In certain areas fertilizers are broadcast by … .
4. Machines of this type are suitable … .
5. Uniformity of distribution across the broadcasted strip … .

Exercise 12. Fill in the blanks with the necessary prepositions using the text.

1. Most fertilizer distributors are equipped … rotating agitators … the hoppers. 2. Because of the wide variation ... types … fertilizers and operating conditions, fertilizer equipment is one … the most diversified classes … farm machinery … the market. 3. The various devices may be classified as those that broadcast the material … the surface … the ground and those designed … placing the fertilizer … rows or bands … the surface. 4. The feed rate is controlled … raising or lowering a gate … the wheel.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. The fertilizer equipment is not actually diversified. 2. Equipment for row or band placement of fertilizers consists of three main types of machines. 3. Full-width-feed broadcasters are suitable for spreading lime only. 4. The fertilizers cannot be broadcast by an aircraft because of their great mass. 5. Uniformity of distribution across the broadcasted strip may be affected by wind.

Exercise 14. Translate the following sentences from Russian into English.

1. Дозирующее устройство является очень важным элементом на машинах, вносящих удобрения. 2. Благодаря разнообразному оборудованию, удобрение можно внести на заданную глубину. 3. Удобрения вносятся не только посредством обычных сельскохозяйственных машин, но и с помощью летательных аппаратов. 4. Минеральные удобрения могут быть внесены как отдельно, так и вместе с высеваемыми и высаживаемыми культурами.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Application of Manure

1. A *manure spreader*[1] is basically a special-purpose farm wagon or trailer with a mechanical unloading and *spreading arrangement*[2]. A *chain-and-slat conveyor*[3] moves the load to the rear, where two *beaters*[4] and a *widespread distributor*[5] with *spiral blades*[6] (augers or *paddles*[7]) *shred*[8] it and distribute it over a strip of land usually 6 to 8 ft. wide. In the most common arrangement of manure spreaders the beaters, distributor, conveyor employ PTO drives. This type of drive permits operation of the spreader under more adverse field conditions. Tractor-drawn manure spreaders are ordinarily of the four-wheel type, since maneuverability in the barnyard is important.

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[1] manure spreader – навозоразбрасыватель
[2] spreading arrangement – разбрасывающее устройство
[3] chain-and-slat conveyor – цепочно-планчатый транспортер
[4] beater – битер
[5] widespread distributor – разбрасывающий механизм
[6] spiral blade – спиралевидная лопасть
[7] paddle – лопасть
[8] shred – измельчать

UNIT 9

Grain and Seed Harvesting

Exercise 1. Explain the use of the verb *to be* in the following sentences. Translate them into Russian.

1. They were at home last night. 2. They are to leave for Berlin to-night. 3. The children were working down the street. 4. The letter will be posted at once. 5. We were to part that day. 6. The letter was written by his secretary. 7. They were to have arrived at seven o'clock. 8. The purpose of his visit was to negotiate the deal.

Exercise 2. Translate the words into Russian.

Hearten, redden, tighten, brighten, blacken, freshen, shorten, darken, threaten, liken, heighten.

Exercise 3. Express the given word combinations in one word using the ending *-en*. Pay attention to the model.

Model: to make light – *lighten*

To make soft; to become sad; to make glad; to make deaf; to make mad; to subject to threat; to subject to fright; to subject to haste; to impart strength; to impart length; to impart height.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Removal [rɪ'muːvəl]; debris ['deɪbriː]; stalk [stɔːk]; beater ['biːtə]; canvas ['kænvəs]; conveyor [kən'veɪə]; directly [dɪ'rektlɪ]; cylinder ['sɪlɪndə]; threshed [θreʃt]; mixture ['mɪkstʃə]; upward ['ʌpwəd]; agitate ['ædʒɪteɪt]; discharged [dɪs'tʃɑːdʒd]; rearward ['rɪəwəd]; through [θruː].

Exercise 5. Read and memorize the following words and word combinations.

combine ['kɔmbaɪn] – комбайн

cutting ['kʌtɪŋ] – скашивание

picking up ['pɪkɪŋ ʌp] – подбор

windrow ['wɪndrəu] – валок

conveying [kən'veɪŋ] – перемещение

feeding ['fiːdɪŋ] – подача

cut material [kʌt mə'tɪərɪəl] – скошенная масса

threshing mechanism ['θreʃɪŋ 'mekənɪzm] – молотильный механизм

head [hed] – колос

pod [pɔd] – стручок

chaff [tʃɑːf] – мякина

reel [riːl] – мотовило

cutter bar ['kʌtə bɑː] – режущий аппарат

header platform ['hedə 'plætfɔːm] – платформа хедера (*жнеи*)

feeder canvas ['fiːdə 'kænvəs] – питающий (*полотенный*) транспортер

cross-conveyor [krɔs kən'veɪə] – поперечный транспортер

feeder conveyor['fiːdə kən'veɪə] – подающий транспортер

cylinder-and-concave assembly ['sɪlɪndə ənd kɔŋ'keɪv ə'semblɪ] – молотильный аппарат

grain pan ['greɪn pæn] – стрясная доска

concave grate [kɔŋ'keɪv greɪt] – заслонка подбарабанья (*деки*)

concave-extension grate [kɔŋ'keɪv ɪk'stenʃn greɪt] – заслонка удлинителя деки

oscillating grain pan ['ɔsɪleɪt greɪn pæn] – качающаяся стрясная доска

strip [strɪp] – сдирать

cylinder beater ['sılındə 'biːtə] – отбойный битер
check curtain [ʧek 'kɜːtn] – фартук
straw carrier [strɔː 'kærıə] – соломотряс
grain return pan [greın rı'tɜːn pæn] – скатная доска
chaffer sieve ['ʧæfə sıv] – мякинное (*верхнее*) решето
air blast [eə blɑːst] – воздушный поток
chaffer extension ['tʃæfə ık'stenʃən] – удлинитель мякинного (*верхнего*) решета
tailings auger ['teılıŋz 'ɔːgə] – колосовой шнек
shoe sieve [ʃuː sıv] – нижнее решето
grain tank [greın tæŋk] – бункер для зерна
tailings ['teılıŋz] – необмолоченные колосья
clean-grain auger [kliːngreın 'ɔːgə] – зерновой шнек
clean-grain elevator [kliːngreın 'elıveıtə] – зерновой элеватор

Text A

Exercise 6. Read and translate the following text.

1. The five basic operations performed by a combine are: a) cutting (or picking up from the windrow), b) conveying and feeding the cut material to the threshing mechanism, c) threshing or removal of the seed from the head or pod, d) separating the seed and chaff from the straw, e) cleaning the chaff and other debris from the seed. In direct combining, the reel pushes the standing stalks against the cutter bar and then delivers the cut material back onto the header platform or directly onto the inclined feeder canvas. The platform cross-conveyor delivers the material from the header platform to the feeder conveyor (usually chain-and-slat type). The feeder canvas or feeder conveyor elevates the material and feeds it into the cylinder-and-concave assembly where the threshing and much of the separation take place. The seed and chaff separated by the concave grate (and concave-extension grate, if one is provided) fall directly onto the oscillating grain pan or onto a conveyor.

2. The cylinder beater tends to strip the threshed material from the cylinder, aids in further separation at this point, and directs the straw and remaining seed onto the straw carrier. The check curtain (or curtains) prevents threshed seed from being thrown out of the rear of the machine by the beater or the cylinder. The straw carrier agitates the material to separate out any remaining seed and unthreshed heads as the straw is moved rearward to be discharged from the machine. The material separated from the straw is col-

lected by the grain return pans (or a conveyor) and delivered to the grain pan at the front of the chaffer sieve.

3. The mixture of threshed seed, unthreshed heads or pods, chaff, and other small debris is moved from the grain pan onto the front of the oscillating chaffer sieve. As the mixture is moved rearward over the chaffer sieve, an air blast directed upward through the sieves aids in separating out the free (threshed) seed and unthreshed heads and blows the light chaff out the rear of the machine. Most of the unthreshed heads ride over the chaffer sieve and drop through the larger openings of the chaffer extension into the tailings auger. The tailings are then returned to the cylinder for rethreshing. The free seed falls through the chaffer sieve and is further cleaned by passing through the shoe sieve, which has smaller openings. The cleaned seed is then delivered to the grain tank by means of the clean-grain auger and elevator. From the grain tank the cleaned seed is unloaded into a vehicle.

Exercise 7. Answer the following questions.

1. What are the main five operations performed by a combine? 2. The reel's function is only to push the standing stalks against the cutter bar, isn't it? 3. Where do the threshing and separation operations take place? 4. Does the straw carrier separate out the remaining seed? 5. The air blast aids in separating out the free or threshed seed doesn't it? 6. How is the free seed delivered to the grain tank?

Exercise 8. Translate the following sentences into Russian paying attention the Perfect tense forms.

1. Today the combine operator *has demonstrated* the conveying, feeding and threshing of the newly designed harvester. 2. That field *had been harvested* by a combine before the truck came. 3. By the end of the next hour the expert *will have explained* to the repairmen how the threshing is fulfilled. 4. The tailings *will have returned* for rethreshing before the debris from the seed is discharged. 5. My friend *has worked* as a chief engineer at the grain harvesters manufacturing plant for ten years.

Exercise 9. Translate from Russian into English the words and words combinations in brackets using the text.

1. The free seed (падает через) the chaffer sieve and is further cleaned by (проходя через) the shoe sieve, which has (отверстие меньшего размера).

2. The straw carrier (встряхивает скошенную массу) to separate out any (остающееся зерно) and (необмолоченные колосья) as the straw is moved rearward to be discharged from the machine.

3. The (необмолоченные колосья) are then returned to the cylinder for (повторного обмолота).

4. In (непосредственной уборке комбайном), the reel (толкает) the standing stalks against the cutter bar and then (подает) the cut material back onto the (платформу хедера).

Exercise 10. Give the Russian equivalents.

Cleaned seed; larger openings; threshing mechanism; unthreshed heads; rear of the machine; cylinder beater; through the sieves; shoe sieve; directed upward; to move rearward; straw carrier; small debris; further separation; seed and chaff; to strip the threshed material; by means of the clean-grain auger; chaffer sieve; grain pan; feeder conveyor; picking up from the windrow; to discharge from the machine; concave grate.

Exercise 11. Fill in the blanks with the necessary prepositions using the text.

1. The mixture … threshed seed, unthreshed heads or pods, chaff, and other small debris is moved … the grain pan … the front … the oscillating chaffer sieve

2. The seed and chaff separated … the concave grate (and concave-extension grate, if one is provided) fall directly … the oscillating grain pan or … a conveyor.

3. … direct combining, the reel pushes the standing stalks … the cutter bar and then delivers the cut material back … the header platform or directly … the inclined feeder canvas.

Exercise 12. Complete the following sentences using the text.

1. … by means of the clean-grain auger and elevator.

2. … drop through the larger openings of the chaffer extension into the tailings auger.

3. … and delivered to the grain pan at the front of the chaffer sieve.

4. … to the feeder conveyor (usually chain-and-slat type).

5. … of the rear of the machine by the beater or the cylinder.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. The reel is actually not used in direct combining. 2. The cylinder beater aids in separation grain from debris. 3. The air blast device is employed on a combine to produce good separation. 4. The basic operations performed by a combine are cutting and windrowing. 5. Most of the unthreshed heads are returned to the cylinder for rethreshing.

Exercise 14. Translate the following sentences from Russian into English.

1. Основным механизмом комбайна по отделению зерна от колосьев или стручков является молотильный аппарат.

2. Отбойный битер сдирает и направляет обмолачиваемую массу на соломотряс, где происходит дальнейшее отделение зерен от мусора.

3. Струя воздуха, проходя через сита, выдувает легкие частицы мякины.

4. После всех стадий обмолота и очистки чистое зерно подается в зерновой бункер.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Windrowing[1]

1. A *windrower*[2] includes a reel, a cutter bar, and one or more cross-conveyors (usually canvas) to discharge the cut material into the windrow. For cutting *tangled*[3] crops, a short, vertical cutter bar is sometimes mounted at one end of the main cutter bar. Windrowers may be trailed, *self-propelled*[4], or mounted on the rear of a tractor. Widths of cut ordinarily range from 8 to 15 ft. The knife and the conveyors are ordinarily driven from the tractor PTO or from the mounted engine on self-propelled units. For best *curing*[5] and good combine performance, the windrows should be continuous, uniform, and not too tight. In windrowing the stubble should be at least 6 to 8 in. tall to permit free air circulation beneath the windrow.

2. The arrangement of the windrower should be such that the material is not discharged onto stubble that has been run over by a wheel. For windrow combining, a *pickup*[6] is attached to the front of the combine header. It should have *support runners*[7] operating on the ground and be hinged to the header so that it can "float" without the necessity for precise control of the header height. For best performance and minimum s*hattering*[8], the *peripheral speed*[9] of the pickup unit should be 10 to 20 per cent greater than the forward speed.

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[1] windrowing – валкообразование
[2] windrower – жатка-валкообразователь
[3] tangled – запутанный
[4] self-propelled – самоходный
[5] curing – сушка
[6] pickup – подборщик
[7] support runner – опорный башмак
[8] shattering – осыпание зерна
[9] peripheral speed – окружная скорость

UNIT 10

Cutting and Conveying

Exercise 1. Explain the use of the verb *to have* in the following sentences. Translate them into Russian.

1. She has come home. 2. She has a large family. 3. We have to leave home early. 4. He had the letter typed. 5. He has dinner at home. 6. They had to complete their work on Monday. 7. We shall have plenty of fruit in autumn. 8. He will have read the story by ten o'clock. 9. I will have to participate in the conference.

Exercise 2. Translate the words into Russian.

Uglify, beautify, simplify, glorify, rarefy, classify, horrify, falsify, personify, terrify, certify, electrify.

Exercise 3. Express the given word combinations in one word using the suffix -*(i)fy*. Pay attention to the model.

Model: to make simple – *simplify*

To turn into glass; to turn into nitre; to make solid; to make just; to become acid; to become jelly; to become intense; to become pure.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Header ['hedə]; surface ['sɜːfɪs]; construction [kən'strʌkʃən]; interchangeable [ˌɪntə'ʧeɪnʤəbl]; adjustable [ə'ʤʌstəbl]; front [frʌnt]; uniformly ['juːnɪfɔːmli]; shatter ['ʃætə]; occasionally [ə'keɪʒənəlɪ]; midway [ˌmɪd'weɪ]; merit ['merɪt]; exclusively [ɪks'kluːsɪvlɪ]; predominating [prɪ'dɔmɪneɪtɪŋ].

Exercise 5. Read and memorize the following words and word combinations.

assembly [ə'semblɪ] – агрегат, узел

mower ['məuə] – сенокосилка

ledger plate ['leʤə pleɪt] – вкладыш пальцевого бруса косилки

serrate ['serɪt] – нарезать мелкие зубы

slat [slæt] – планка мотовила

radial arm ['reɪdɪəl ɑːm] – луч мотовила

accommodate [ə'kɔmədeɪt] – приспосабливать

straight-through combine [streɪtθruː 'kɔmbaɪn] – прямоточный комбайн

inclined conveyor [ɪn'klaɪnd kən'veɪə] – наклонная камера

beater canvas draper ['biːtə 'kænvəs 'dreɪpə] – битерный полотенный транспортер

impact ['ɪmpækt] – динамическое воздействие

rubbing action ['rʌbɪŋ 'ækʃn] – воздействие трением

clearance space ['klɪərəns speɪs] – зазор

spike-tooth cylinder [spaɪktu:θ 'sɪlɪndə] – зубовой барабан

concave [kɔŋ'keɪv] – подбарабанье

staggered teeth ['stægəd ti:θ] – зубья, расположенные в шахматном порядке

combing action ['kəumɪŋ 'ækʃn] – воздействие чесанием

perforated ['pɜ:fəreɪtɪd] – решетчатый

removable section [rɪ'mu:vəbl 'sekʃn] – сменный

rasp-bar cylinder [rɑ:sp bɑ: 'sɪlɪndə] – бичевой барабан

corrugated cylinder bar ['kɔrəgeɪtɪd 'sɪlɪndə bɑ:] – рифленый бич барабана

stationary bar ['steɪʃənərɪ bɑ:] – неподвижный бич

Text A

Exercise 6. Read and translate the following text.

1. The cutting and conveying assembly known as the header includes the reel, the cutter bar, a platform or conveyor for receiving the cut material, and conveyors for delivering the material to the cylinder. The cutter bar is similar in construction to that of a mower, but the ledger plates are usually smooth and the knife sections serrated on the upper surface. The most common type of reel has eight slats mounted rigidly on radial arms. Nowadays the reel is power driven with interchangeable sprockets. The peripheral speed of the reel should ordinarily be 25 to 50 per cent greater than the forward speed of the machine. The position of the reel with respect to cutter bar is adjustable both vertically and horizontally to accommodate different crop conditions.

2. In a straight-through type of combine, an inclined conveyor carries the cut material directly from the cutter bar to the cylinder. The larger most of modern self-propelled machines have platforms across the front of the combine. Canvas drapers or large augers are generally employed to convey the cut material to the end or center of the platform. A separate feeder conveyor is ordinarily provided to elevate the material from the platform to the cylinder. Most combines have a beater or a short canvas draper mounted above or behind the upper end of the elevating conveyor to assist in feeding the material uniformly into the restricted area between the cylinder and concave.

3. Removal of seeds from the heads or pods is ordinarily accomplished with rotating cylinders whose threshing action depends primarily upon impact. When the relatively slow-moving material comes in contact with the high-speed cylinder (peripheral speed of 5000 to 6000 rpm for wheat), the impact shatters the heads or pods and frees a considerable portion of the seed from the straw. Further threshing is obtained by the rubbing action as the material is accelerated and passes through the restricted clearance space between the cylinder and the concave.

4. The arrangement of the spike-tooth cylinder and concave is such that the cylinder teeth pass midway between staggered teeth on the concave, thus producing a combing action. The teeth in the concave are mounted on perforated, removable sections, usually with two rows of teeth per section. The total number of rows of teeth needed in the concave (usually two, four, or six) depends upon the crop and the threshing conditions. In a rasp-bar cylinder, threshing is done between corrugated cylinder bars and stationary bars of the concave grate. Corrugated bars are occasionally used on the concave as well as on the cylinder. There is considerable difference of opinion regarding the relative merits of the different types of cylinders. Until about 1980, the spike-tooth cylinder was used almost exclusively. Since then the trend has been toward the other types, with the rasp-bar construction predominating.

Exercise 7. Answer the following questions.

1. What does the cutting and conveying assembly include? 2. Is the position of the reel adjustable to accommodate different crops? 3. What device is used to convey the cut material to the end or center of the platform across the front of the combine? 4. Combines have a beater or a short canvas draper to assist in feeding the material into the cylinder and concave, don't they? 5. What happens to seed in heads when the slow-moving material comes in contact with the high-speed cylinder? 6. How many rows of teeth are there usually in the concave? 7. What types of cylinders have been used since 1980s?

Exercise 8. Translate the following sentences into Russian paying attention to the Gerund.

1. The reel has eight slats for *pushing* the standing stalks. 2. The adjustable position of the reel results in *accommodating* different crops. 3. The method of *carrying* material directly from the cutter bar to the cylinder is widely used. 4. After *shattering* seeds from the heads or pods, the further threshing is obtained by the rubbing action. 5. The director was against *applying* the combine with spike-tooth cylinder. 6. It is no good *employing* the reel with four slats. 7. The operator will continue working on the combine.

Exercise 9. Translate from Russian into English the words and words combinations in brackets using the text.

1. There is considerable (разница во мнении) regarding the (сравнительные эксплуатационные характеристики) of the (различные типы) of cylinders.

2. In a (бичевом барабане), threshing (производится между) (рифленый) cylinder bars and (неподвижный) bars of the concave grate.

3. (Удаление зерна из колосьев или стручков) is ordinarily accomplished with (крутящимися барабанами) whose threshing action (зависит в первую очередь) upon impact.

4. The (режущий аппарат) is similar in construction to that of a mower, but the (вкладыши пальцевого бруса косилки) are usually (гладкие) and the (сегменты) serrated on the upper surface.

Exercise 10. Give the Russian equivalents.

Rasp-bar construction; restricted clearance space; threshing conditions; total number; two rows of teeth per section; teeth in the concave; pass midway between; further threshing; peripheral speed; material comes in contact; removable sections; restricted area between the cylinder and concave; upper end of the elevating conveyor; end or center of the platform; cut material; arrangement; interchangeable sprocket; cylinder and stationary bars.

Exercise 11. Complete the following sentences using the text.

1. The teeth in the concave are mounted on … .

2. Further threshing is obtained by the rubbing action as the material is accelerated and … .

3. Canvas drapers or large augers are generally employed … .

4. The position of the reel with respect to cutter bar is adjustable … .

5. Nowadays the reel is power driven … .

Exercise 12. Fill in the blanks with the necessary prepositions using the text.

1. … then the trend has been toward the other types, … the rasp-bar construction predominating. 2. The total number … rows … teeth needed … the concave (usually two, four, or six) depends … the crop and the threshing conditions. 3. The peripheral speed … the reel should ordinarily be 25 … 50 per cent greater than the forward speed … the machine. 4. The larger most … modern self-propelled machines have platforms across the front … the combine.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. The ledger plates are rather different from those on the mower. 2. The peripheral speed of the reel should ordinarily be 50 to 150 per cent greater

than the forward speed of the machine. 3. Most combines have a beater or a short canvas draper to assist in feeding the material uniformly. 4. The spike-tooth cylinder and concave produce a rubbing action. 5. There is no difference when regarding the relative merits of the different types of cylinders.

Exercise 14. Translate the following sentences from Russian into English.

1. Бичевой молотильный барабан позволяет эффективно обмолачивать колосья зерновых и стручки бобовых культур. 2. Зубовой барабан оснащен несколькими рядами зубов, которые расположены в шахматном порядке. 3. Скорость вращения молотильного барабана настраивается либо автоматически, либо в ручном режиме. 4. Комбайн оснащен битерным полотенным транспортером, который равномерно подает скошенную массу в молотильный барабан.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Separating

1. Under normal operating conditions, a large portion of the threshed seed is separated from the straw at the threshing unit, falling through openings in the *concave-and-grate assembly*[1] or through the *concave-extension grate*[2] (*finger grate*[3]). Separation of the remaining free seed and unthreshed seed takes place on the straw carrier as the straw is agitated and moved to the rear of the machine.

2. The most common types of straw carriers are *multiple-section straw walkers*[4]. The action of the *straw rack*[5] (or straw walkers) accelerates the straw in a rearward and upward direction during a portion of the cycle. While returning to the forward position, me rack tends to leave the straw *momentarily*[6] in *midair*[7]. The material then falls onto a section of the rack nearer to the *discharge end*[8] and is moved another step toward the rear by the next *stroke*[9] of the rack. It is *tossing*[10] and agitation that is responsible for the separating action.

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[1] concave-and-grate assembly – подбарабанно-решетчатый агрегат

[2] concave-extension grate – решетка удлинителя деки

[3] finger grate – пальцевая решетка

[4] multiple-section straw walker – многоклавишный соломотряс

[5] straw rack – платформенный соломотряс

[6] momentarily – на мгновение
[7] midair – в воздухе
[8] discharge end – разгрузочный конец
[9] stroke – удар
[10] tossing – подбрасывание

UNIT 11

Hay Harvesting

Exercise 1. Put in the auxiliary verbs *shall* or *will* and translate the sentences into Russian.

1. … you have a cup of tea or a cup of coffee? 2. … we go to the cinema? 3. I am very glad that summer … come soon. 4. Tom … go to the library tomorrow. 5. What … we read for the examination? 6. … I begin to read text 3? 7. They … not help you because they have no time. 8. If I go to Minsk, I … use a car. 9. She … reach Sochi before eight.

Exercise 2. Translate the words into Russian.

Unfair, unkind, unclean, unaffected, unaccomplished, unjust, untrue, unacquainted, uncertain, unconcerned.

Exercise 3. Express the given word combinations in one word using the prefix *un-*. Pay attention to the model.

Model: not coiled – *uncoiled*

Not able; not seen; not lawful; not well; not intentional; not explored; not selfish; not common; not clear; not coated; not codified.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Combination [ˌkɔmbɪ'neɪʃən]; cutting ['kʌtɪŋ]; entirely [ɪn'taɪəlɪ]; typical ['tɪpɪkəl]; height [haɪt]; gauged [geɪdʒd]; weight [weɪt]; prevent [prɪ'vent]; optimum ['ɔptɪməm]; either ['aɪðə]; frequent ['fri:kwənt]; rear [rɪə].

Exercise 5. Read and memorize the following words and word combinations.

chopping ['ʧɔpɪŋ] – измельчение
mowing ['məuɪŋ] – косьба, кошение
raking [reɪkɪŋ] – сгребание
windrow ['wɪndrəu] – сгребать в валки, валковать
swath [swɔθ] – скошенная полоса, прокос
haul [hɔ:l] – транспортировать
wagon ['wægən] – телега
trailer ['treɪlə] – прицеп

sweep rake [swiːp reɪk] – волокуша
stacking ['stækɪŋ] – скирдование
baling [beɪlɪŋ] – прессование сена в тюки
automatic-tying machine [ˌɔːtə'mætɪk taɪŋ mə'ʃiːn] – машина с автоматической вязкой
bale [beɪl] – тюк
baler ['beɪlə] – пресс-подборщик (*сена, соломы*)
bale loader [beɪl 'ləudə] – погрузчик тюков
field chopper [fiːld 'ʧɔpə] – полевой измельчитель
van [væn] – фургон
knife clip [naɪf klɪp] – нажимная лапка пальцевого бруса косилки
wearing plate ['weərɪŋ pleɪt] – пластина трения
adjustable shoe sole [ə'ʤʌstəbl ʃuː səul] – регулируемый башмак
rear hinge pin [rɪə hɪnʤ pɪn] – задняя ось подвески полунавесной косилки
eccentric bushing [ɪk'sentrɪk 'buʃɪŋ] – задний палец подвески полунавесной косилки
guard [gɑːd] – палец пальцевого бруса косилки
knife-head ball [naɪf hed bɔːl] – шар головки ножа косилки
grass rod [grɑːs rɔd] – прут для травы
yoke [jəuk] – вилка, скоба, кронштейн
lift linkage [lɪft 'lɪŋkɪʤ] – подъемный механизм
tilt adjustment [tɪlt ə'ʤʌstmənt] – регулятор наклона
pull bar [pul bɑː] – растяжка
pitman ['pɪtmən] – шатун, соединительная тяга
support spring [sə'pɔːt sprɪŋ] – поддерживающая пружина
outer divider ['autə dɪ'vaɪdə] – наружный делитель
grass board [grɑːs bɔːd] – травоотделительная доска
bouncing ['baunsɪŋ] – подпрыгивание
roughness ['rʌfnəs] – неровность
ledger plate ['leʤə pleɪt] – вкладыш пальцевого бруса косилки
cutting edge ['kʌtɪŋ eʤ] – режущая кромка
underserrated [ˌʌndəsɪ'reɪtɪd] – с нижней насечкой
thrust [θrʌst] – осевая нагрузка

Text A

Exercise 6. Read and translate the following text.

1. Many different combinations of operations are employed in harvesting hay. All methods, with the exception of field chopping of standing crops, include mowing and raking. The usual practice is to windrow the hay

within a few hours after cutting, because the leaves dry considerably faster in the swath than do the stems and would shatter badly. The hay is commonly hauled with wagons or trailers, but it is often moved short distances with sweep rakes. Loading and stacking is done entirely with mechanical aids. Most baling is now done in the field with automatic-tying machines. The bales are usually allowed to drop from the baler onto the ground and are picked up later with mechanical bale loaders.

2. In the field-chopping method of harvesting hay the hay is picked up from the windrow with a field chopper. The chopped hay is blown directly into vans or special trailers, from which it can be unloaded mechanically and put into storage. The construction of a typical mower includes a cutting bar, knifes, knife clips and wearing plates, an adjustable shoe sole, a rear hinge pin, an eccentric bushing, guards, knife-head balls, a grass rod, a yoke, a lift linkage, a tilt adjustment, a pull bar, a pitman, a support spring, an outer divider, a grass board.

3. The height of cut is ordinarily gauged by adjustable shoes at the ends of the cutter bar. The adjustable support spring acts through the lift linkage to carry most of the weight of the cutter bar so that it “floats” along the ground. The lift linkage can be adjusted to change the relative amounts of weight on the inner and outer shoes. These weights should be just enough to prevent bouncing of the cutter bar, the optimum amounts being influenced by the roughness of the field and the forward speed. Typical values are 80 to 100 lb. on the inner shoe and 20 to 30 lb. on the outer shoe.

4. The ledger plates are ordinarily serrated on the underside and are occasionally replaced but never sharpened. The cutting edges of the knife sections may be either smooth or underserrated, both types being resharpened at frequent intervals. Knife clips and wearing plates are mounted together and are generally spaced three or four guards apart. The wearing plates provide vertical support for the rear of the knife sections and also absorb the rearward thrust of the knife.

Exercise 7. Answer the following questions.

1. What is the usual practice of harvesting hay? 2. How is the hay commonly transported? 3. Is baling used to harvest the hay? 4. Is field-chopping a complex method of harvesting hay? 5. What does the construction of a typical mower usually include? 6. What is the use of the adjustable support spring? 7. What is the purpose of the weights on the inner and outer shoes? 8. What types of knife sections are employed?

Exercise 8. Translate the following sentences into Russian paying attention to the Participle Constructions.

1. The chief mechanic wanted the baler repaired in time.

2. The farmers watched the field chopper working well.

3. The standard mower being mounted on the tractor, the grass will be mowed very quickly.

4. The repair man serrated the ledger plates, the tractor operators helping in adjusting the cutter bar.

5. The support spring having been adjusted completely, the mower could be put into operation.

6. The stock of hay is fairly considerable on the farm, the farmers having worked hard to achieve that.

7. We heard the baler operating in the field.

8. When the chief engineer arrived at the field he saw the grass cut.

Exercise 9. Translate from Russian into English the words and words combinations in brackets using the text.

1. Knife clips and wearing plates (монтируются вместе) and are generally spaced (три или четыре пальца на расстоянии друг от друга).

2. The bales (обычно позволяется падать) from the baler onto the ground and are picked up later with (механическими погрузчиками тюков).

3. All methods, (за исключением) of field chopping of standing crops, include (косьбу и сгребание).

Exercise 10. Give the Russian equivalents.

1. To absorb the rearward thrust; to provide vertical support; at frequent intervals; to serrate on the underside; outer shoe; typical values; optimum amounts; to change the relative amounts; “to float” along the ground; height of cut; typical mower; chopped hay; to pick up from the windrow; loading and stacking; standing crops; leaves shatter badly.

Exercise 11. Complete the following sentences using the text.

1. … and are occasionally replaced but never sharpened.

2. The lift linkage can be adjusted to change … .

3. … entirely with mechanical aids.

4. Most baling is now done in the field … .

5. … are employed in harvesting hay.

Exercise 12. Fill in the blanks with the necessary prepositions using the text.

1. The cutting edges … the knife sections may be either smooth or underserrated, both types being resharpened … frequent intervals.

2. The adjustable support spring acts … the lift linkage to carry most … the weight … the cutter bar so that it "floats" … the ground.

3. … the field-chopping method … harvesting hay the hay is picked up … the windrow … a field chopper.

4. The hay is commonly hauled … wagons or trailers, but it is often moved short distances … sweep rakes.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. The usual practice is to put the hay into storage within a few hours after cutting. 2. The hay is often moved either short or long distances with sweep rakes. 3. In the field-chopping method the hay is blown directly into vans or special trailers. 4. The support spring prevents the "floating" of the mower. 5. The ledger plates are ordinarily resharpened at frequent intervals.

Exercise 14. Translate the following sentences from Russian into English.

1. Уборка сена – это трудоемкий механический процесс, который предусматривает скашивание и измельчение травы. 2. Сенопрессы оснащены механизмами автоматической вязки и прессования. 3. Высота скашивания стандартной сенокосилки устанавливается посредством регулируемых башмаков. 4. Подъемный механизм, поддерживающая пружина и механизм регулирования веса сенокосилки позволяют ей находиться в «плавающем» положении. 5. Типы ножей, используемых на сенокосилках, могут быть как гладкими, так и с нижней насечкой.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Tractor-mounted Mowers

1. Common arrangements for mowers on tractor include *side mounting*[1] between the front and rear tractor wheels, *rear mounting*[2], and semimounting at the rear of the tractor. Side mounting gives better visibility of the work and direct response to steering. The rear-mounted (or semimounted) mowers are generally easier to attach or remove.

2. Cutter bars on tractor mowers are usually 6 to 7 ft long. Since the inertia of all but the smallest tractors is relatively high, it is important that the cutter bar be provided with a *safety device*[3] that will allow the bar swing back if it strikes an obstruction. The conventional, pitman-type cutter bar requires a great deal of maintenance and repair and is not well adapted to high-speed tractor operation.

3. The knife of the conventional mower is driven through a pitman attached to the *knife head*[4] by means of a *ball-and-socket joint*[5]. The *knife*

stroke[6] and *guard spacing*[7] are ordinarily 3 in., and *crank*[8] speeds on tractor mowers without a *reciprocating counterbalance*[9] are in the order of 800 to 1000 rpm (1600 to 2000 cutting strokes per minute).

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[1] side mounting – навеска сбоку

[2] rear mounting – навеска сзади

[3] safety device – предохранительное устройство

[4] knife head – ножевая головка

[5] ball-and-socket joint – шаровое шарнирное соединение

[6] knife stroke – ход ножа

[7] guard spacing – расстояние между пальцами

[8] crank – кривошип

[9] reciprocating counterbalance – возвратно-поступательный противовес

UNIT 12

Forage Chopping

Exercise 1. Read and translate the following sentences paying attention to the modal verbs *can* and *could*.

1. I can easily carry this case. 2. He said he could arrive in time the previous day. 3. When he was young he could run a mile in a less than five minutes. 4. He can't have done it, it is very unlike him. 5. I could do it tomorrow, if I were free. 6. If I had received the letter last week, I could have helped him. 7. Can Tom speak Chinese? He studied only French at school.

Exercise 2. Translate the words into Russian.

Denuclearize, denationalize, demoralize, demilitarize, degasify, decentralize, deodorize, decompose, dehydrate, demobilize.

Exercise 3. Express the given word combinations in one word using the prefix *de-*. Pay attention to the model.

Model: to remove code – *decode*

To deprive of the throne, to deprive of the electricity, to remove the horn, to remove the frost, to remove the forest, to remove the flesh,

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Whereas [weə'ræz]; silage ['saılıʤ]; primarily [praı'mer(ə)lı]; inherent [ın'her(ə)nt]; requirement [rı'kwaıəmənt]; trailer ['treılə]; although [ɔ:l'ðəu]; height [haıt]; component [kəm'pəunənt]; adaptable [ə'dæptəbl]; sorghum ['sɔ:gəm]; continuous [kən'tınjuəs]; packaging ['pækıʤıŋ]; wrap [ræp].

Exercise 5. Read and memorize the following words and word combinations.

stationary chopper ['steɪʃənərɪ 'ʧɔpə] – стационарный измельчитель

field chopper [fi:ld 'ʧɔpə] – полевой измельчитель

forage harvester ['fɔrɪʤ 'hɑ:vɪstə] – машина для уборки кормовых культур

stationary cutter ['steɪʃənərɪ 'kʌtə] – стационарная силосорезка

complementary [ˌkɔmplɪ'mentərɪ] – дополнительный

impeller-blower [ɪm'pelə 'bləuə] – пневматическая швырялка

tow [təu] – буксировать

forage chopper ['fɔrɪʤ 'ʧɔpə] – силосорезка

feed table [fi:d 'teɪbl] – стол для подачи

spring-loaded feed roll [sprɪŋ'ləudɪd fi:d rəul] – пружинный питающий валец

cutterhead ['kʌtə hed] – режущая головка

interchangeable attachment [ˌɪntə'ʧeɪnʤəbl ə'tæʧmənt] – сменное оборудование

windrow-pickup unit ['wɪndrəu'pɪkʌp 'ju:nɪt] – подборщик

cutter-bar unit ['kʌtəbɑ: 'ju:nɪt] – режущий аппарат

row-crop attachment [rəukrɔp ə'tæʧmənt] – оборудование для уборки пропашной культуры

rake [reɪk] – грабли

dump rake [dʌmp reɪk] – поперечные (*сбрасывающие*) грабли

side-delivery rake [saɪd dɪ'lɪvərɪ reɪk] – боковые грабли

wire-tying machine ['waɪə taɪŋ mə'ʃi:n] – вяжущая машина, использующая проволоку

twine-tying machine [twaɪntaɪŋ mə'ʃi:n] – вяжущая машина, использующая шпагат

rectangular-cross-section bale [rek'tæŋgjələ 'krɔssekʃən beɪl] – тюки прямоугольного профиля

round-bale machine [raundbeɪl mə'ʃi:n] – рулонный пресс

Text A

Exercise 6. Read and translate the following text.

1. Stationary choppers for corn silage date back to the latter part of the nineteenth century, whereas field choppers, commonly known as forage harvesters, appeared in the late 1930s. Field choppers rapidly replaced stationary cutters, both for silage and for hay chopping, primarily because of the inherent reduction in labor requirements.

2. With a field chopper and its complementary equipment, the hay-making or silage-making operation can be completely mechanized. The chopped material is blown (by means of an impeller-blower) directly into trailers that are towed behind the chopper or pulled beside it with a separate power source, or into trucks driven behind or beside the chopper. Elevation of the chopped material into storage is most commonly done with an impeller-blower, although mechanical elevators are employed to a limited extent for moderate heights.

3. In general, forage choppers, include the following components: a) a conveyor or feed table for the material to be chopped, b) spring-loaded feed rolls to compress and hold the material for chopping, c) a cutterhead, d) an impeller-blower (or other conveying device) to elevate the chopped material into storage or deposit it in the transporting vehicle.

4. Field choppers must, in addition, have one or more of the following interchangeable attachments, which make them adaptable for a variety of jobs: (a) windrow-pickup unit; (b) cutter-bar unit for direct mowing and chopping of hay or grass for silage or direct feeding; and (c) row-crop attachment for direct cutting of such crops as corn or sorghum for silage.

5. **Raking**. Two general types of rakes are in common use for windrowing hay. Dump rakes produce windrows that are not continuous but are larger than those formed by side-delivery rakes. Side-delivery rakes were introduced just before the turn of the century, for use with mechanical hay loaders. Interest in this type of rake was greatly increased by the more recent advent of pickup field balers and field choppers. Side-delivery rakes produce uniform windrows that are continuous and thus well suited to pickup machines.

6. **Baling**. Hay baling is essentially a packaging operation. Most balers are now of the field pickup type. These machines, however, are suitable for field operation. The automatic-tying balers are common. Automatic balers are available as wire-tying machines or twine-tying machines, both making rectangular-cross-section bales, or as round-bale machines that wrap the bale with twine.

Exercise 7. Answer the following questions.

1. Why did the field choppers replace the stationary cutters?
2. The field chopper provides fully mechanized hay-making or silage-making operation, doesn't it?
3. What components does a forage chopper include?
4. What interchangeable attachments should a field chopper have?
5. What types of rakes are commonly applied?
6. What automatic balers are available now?

Exercise 8. Translate from Russian into English the words and words combinations in brackets using the text.

1. Side-delivery rakes produce (однообразные валки) that are (непрерывные) and thus (хорошо подходят) to pickup machines.

2. Dump rakes (производят валки) that are not continuous but are larger than those formed by (боковые грабли).

3. With a field chopper and its (дополнительное) equipment, the (производство сена) or silage-making operation can be (полностью механизирована).

4. Stationary choppers for (кукурузного силоса) date back to the (концу) of the nineteenth century, whereas field choppers, (общеизвестны) as forage harvesters, appeared in the late 1930's.

Exercise 9. Translate the following sentences into Russian paying attention to the functions of the Infinitive.

1. To chop the grass is very helpful for drying hay. 2. The engineer's aim is to maintain all the farm machinery in order. 3. The combine operator should know how to adjust a grain harvester. 4. The repairmen promised to finish their work in time. 5. The mechanic had a great desire to start a complete overhaul. 6. I remained in the workshop to see how the new equipment worked. 7. The mower was too narrow to work between the apple trees. 8. It was hard for our director to allow buying one more sprayer. 9. We expected our workmen to install the new equipment on time. 10. We are said to be good drivers. 11. He is said to have been appointed a chief engineer.

Exercise 10. Give the Russian equivalents.

To wrap the bale with twine; rectangular-cross-section; field operation; field pickup; packaging operation; pickup machines; recent advent; mechanical hay loaders; turn of the century; types of rakes; direct cutting; direct feeding; direct mowing; adaptable for; transporting vehicle; conveying device; to compress; conveyor; moderate heights; power source; labor requirements; wire-tying machines; twine-tying machines; silage.

Exercise 11. Complete the following sentences using the text.

1. Interest in this type of rake was greatly … .

2. These machines, however, are … .

3. The chopped material is blown directly into trailers that are towed behind the chopper … .

4. Hay baling is essentially … .

5. Elevation of the chopped material into storage is most commonly done with an impeller-blower, although … .

Exercise 12. Fill in the blanks with the necessary prepositions using the text.

1. Two general types … rakes are … common use … windrowing hay.

2. Side-delivery rakes produce uniform windrows that are continuous and thus well suited … pickup machines.

3. An impeller-blower (or other conveying device) to elevate the chopped material … storage or deposit it … the transporting vehicle.

4. Row-crop attachment … direct cutting … such crops as corn or sorghum … silage.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. Automatic balers are available as wire-tying machines and twine-tying machines. 2. The chopped material is blown into towed trailers or trucks. 3. Field choppers rapidly replaced stationary cutters for silage only. 4. Dump rakes and side-delivery rakes produce continuous windrows. 5. In general, forage choppers, include five principal components.

Exercise 14. Translate the following sentences from Russian into English.

1. Кормоуборочные комбайны в значительной степени снизили потребности в рабочей силе. 2. Вяжущие машины производят тюки сена одинаковой формы, в отличие от рулонного пресса. 3. Поперечные грабли не производят непрерывного валка и поэтому не используются для прессования сена. 4. Силосорезка оборудована рядом рабочих механизмов, которые измельчают траву на силос для дальнейшего его хранения.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Corn Picking and Shelling

1. *Corn harvesters*[1] may be classified as (a) *snappers*[2], (b) *picker-huskers*[3] commonly known as pickers, and (c) *picker-shellers*[4]. Basically, a picker-husker includes the following components: a) an arrangement to guide the stalks into the machine, b) snapping *rolls*[5] to remove the *ears*[6] from the stalks, c) *lugged*[7] gathering chains above the snapping rolls to assist in feeding the stalks into the rolls and moving the stalks and snapped ears rearward through the *snapping zone*[8], d) a unit to remove the husks

from the ears, e) a conveying system to elevate and deliver the husked ears into a wagon.

2. A snapper is essentially the same as a picker-husker except that there is no provision for removing the husks, the snapped ears being conveyed directly to the wagon. Some husks, however, are removed in the snapping operation, most of the removed husks remaining attached to the stalks. A picker-sheller does not have a husking unit as such, but it does include a shelling and *cleaning unit*[9]. The shelled corn is generally delivered to a *bulk tank*[10] on the machine, from which it is unloaded into a wagon or truck.

3. The machine called *picker-chopper*[11] first picks the ears from the standing stalks and delivers them to a wagon trailed behind the machine. The stalks are then cut and fed into a conventional forage-chopper cutterhead. The chopped material may be discharged onto the ground for incorporation into the soil, or it may be delivered into a truck or wagon moving along beside the harvester.

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[1] corn harvester – кукурузоуборочный комбайн
[2] snapper – початкоотделитель
[3] picker-husker – обрывающий и очищающий початки комбайн
[4] picker-sheller – кукурузоуборочный комбайн с молотилкой
[5] roll – валец, ролик
[6] ear – початок
[7] lugged – снабженный лапками
[8] snapping zone – отсек отделения початков
[9] cleaning unit – узел очистки
[10] bulk tank – бункер для зерна
[11] picker-chopper – пиккер-измельчитель

UNIT 13

Application and Control of Motors

Exercise 1. Read and translate the following sentences paying attention to the modal verb *must*.

1. I must do my exercises. 2. You must go and see this film! 3. You mustn't be absent from your class, Paul! 4. We must run to get to the station in time. 5. Must Sue get up at once? 6. Grandfather must be angry with me. 7. He must have missed the train. 8. Students must have read that book.

Exercise 2. Translate the following words into Russian paying attention to the prefixes *in- (il-, im-, ir-).*

Irresistable, irresponsible, indelicate, illegible, immoral, impartial, incomparable, infrequent, illiterate, illiberal, impatient, immovable, inaccurate, inartistic, inattentive, incapable, incomplete, inefficient.

Exercise 3. Give the Russian equivalents and state the part of the speech of the following words.

Mechanically, to mechanize, mechanical, mechanics; to cultivate, cultivated, cultivation, cultivator; cooling, cooler, coolness, to cool; to start, starter, started, starting; to convey, conveyor, conveying, conveyed; mounted, to mount, mounting, mounter; to dismantle, dismantled, dismantling; compressor, to compress, compression, compressed; pump, to pump, pumping, pumped; to separate, separated; separately, separating.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Required [rɪ'kwaɪəd]; housed [hausd]; storage ['stɔ:rɪʤ]; definite ['defənət]; complex ['kɔmpleks]; shaft [ʃɑ:ft]; emergency [ɪ'mɜ:ʤənsɪ]; adjacent [ə'ʤeɪsənt]; receptacle [rɪ'septəkl]; stainless ['steɪnləs]; essential [ɪ'senʃəl]; exterior [ɪk'stɪərɪə]; cascading [kæs'keɪdɪŋ]; size [saɪz].

Exercise 5. Read and memorize the following words and word combinations.

milk [mɪlk] – доить

vacuum pump ['vækju:m pʌmp] – вакуумный насос

milking plant [mɪlkɪŋ plɑ:nt] – доильная установка

unit ['ju:nɪt] – агрегат

enclosed [ɪn'kləuzd] – закрытый

driving motor ['draɪvɪŋ 'məutə] – приводной электродвигатель

milking parlour [mɪlkɪŋ 'pɑ:lə] – доильный зал

hand switching [hænd swɪʧɪŋ] – выключение посредством ручного привода

remote [rɪ'məut] – дистанционный

control switch [kən'trəul swɪʧ] – контрольный выключатель

milking point [mɪlkɪŋ pɔɪnt] – место дойки

starter ['stɑ:tə] – пусковое устройство

give overload [gɪv ˌəuvə'ləud] – *зд.* выдержать перенапряжение

no-volt protection [nəuvəlt prə'tekʃ(ə)n] – защита от понижения напряжения

release point [rɪ'li:s pɔɪnt] – место выхода

motor shaft ['məutə ʃɑ:ft] – вал электродвигателя

surface cooler ['sɜːfɪs 'kuːlə] – поверхностный охладитель

in-can cooling [ɪn'kæn 'kuːlɪŋ] – охлаждение тары снаружи

jacketed bulk tank ['ʤækɪtɪd bʌlk tæŋk] – закрытый кожухом наливной танк

Text A

Exercise 6. Read and translate the following text.

1. **Milking Machines.** The action required to milk a cow is obtained mechanically by a vacuum pump. The size of the pump varies with the size of milking plant: the smallest unit, for milking a herd of 20 cows, has a 3/4 hp motor; the largest vacuum pump for herds up to about 300 cows has a 5 hp motor. For herds of 150 cows it is usual to have more than one vacuum pump. Motors used are totally enclosed. The vacuum pump with a driving motor is usually housed in a separate room from the milking parlour and from the area used for cooling and storage. Starting is invariably by hand switching which may be remote from the motor position. A control switch at the milking point is a definite advantage as the operator can quickly stop the plant in an emergency. All motors must have a suitable starter to give overload and no-volt protection. In smaller sizes, usually up to 2 hp direct on-line starting is permitted.

2. **Milk Pumps.** The vacuum in the system is used to convey the milk from the cow to an adjacent receptacle where the milk can be released without breaking the vacuum. In the more complex plants the milk is pumped from the release point to the dairy. A small motor (up to about 2 hp) is used to drive the pump which is directly mounted on the motor shaft. Milk pumps are made from stainless steel and dismantle easily for cleaning. Totally-enclosed motors are used as it is usual for these units to be in damp or even wet situations. Starting can be direct on-line but it is important that a suitable starter is used to give protection.

3. **Milk Coolers.** Refrigeration is now generally accepted as essential for cooling milk, an operation which must be carried out as soon as possible after the milk has left the cow. The type of cooling varies between (1) surface coolers, in which the chilled water passes through the cooler and the milk passes over the exterior surface; (2) in-can cooling with pumped chilled water cascading down the outside of the can and (3) a jacketed bulk tank with an evaporation coil within the jacket. In each case the size of motor required is directly related to the quantity of milk to be cooled after each milking. Commercial-type compressors are used with standard motors which should be totally enclosed.

Exercise 7. Answer the following questions.

1. Does the size of the pump vary as for a milking plant? 2. Where is the vacuum pump with a driving motor usually housed? 3. Why is starting invariably performed by hand switching? 4. What is the vacuum in the milking system used for? 5. What types of cooling are usually employed as soon as the milk has left the cow?

Exercise 8. Translate the given in brackets Russian prepositions into the necessary English ones.

1. The chopper will be adjusted (в) six o'clock. 2. The combine is (в) the field. 3. The new tractor will be delivered (в) Monday. 4. The chief engineer came (в) the room. 5. The harvesting period usually lasts (с) July (до) October. 6. The farmers have been working here (с) last month. 7. I came up (к) the window. 8. The threshing assembly will have been repaired (к) Wednesday. 9. The truck went (через) the field. 10. The travellers passed (через) the forest. 11. The spring wheat was sown (вокруг) the lake. 12. The compressors have been taken (из) the boxes. 13. It was 20 degrees (выше) zero. 14. There were (около) 150 tractors and implements on our farm last year. 15. The students worked at that plant (в течение) two months. 16. (В течение) the vacation we visited many interesting places. 17. There is a great difference (между) these two machines. 18. This is the best machine (среди) the others. 19. Many specialists came (кроме) our mechanic. 20. I like many flowers (кроме) dandelion.

Exercise 9. Translate from Russian into English the words and words combinations given in brackets.

1. (Компрессоры промышленного типа) are used with (типовыми моторами) which should be (полностью) enclosed. 2. (Пуск) can be (при наличии постоянного тока в цепи) but it is important that a suitable starter is used (обеспечить токовую защиту). 3. In the more (сложных установках) the milk (перекачивается) from the release point to the (молочный завод). 4. A control switch at the milking point is a (несомненное преимущество) as the (оператор) can quickly stop the plant in an (аварийной ситуации). 5. The (действие) required to milk a cow is obtained (механически) by a vacuum (насосом).

Exercise 10. Give the Russian equivalents.

Size of motor; dismantle; stainless steel; chilled water; exterior surface; evaporation coil; milking; within the jacket; outside of a can; water cascading down; pass through a cooler; type of cooling; suitable starter; damp and wet situations; totally-enclosed motor; drive the pump; adjacent receptacle; stop the plant; motor position; cooling and storage; separate room.

Exercise 11. Complete the following sentences using the text.

1. … related to the quantity of milk to be cooled after each milking.
2. … for these units to be in damp or even wet situations.
3. … to give overload and no-volt protection.
4. … to drive the pump which is directly mounted on the motor shaft.
5. … as the operator can quickly stop the plant in an emergency

Exercise 12. Fill in the blanks with the necessary prepositions using the text.

1. Milk pumps are made … stainless steel and dismantle easily … cleaning. 2. The vacuum pump … a driving motor is usually housed … a separate room … the milking shed or parlour and … the area used … cooling and storage. 3. The vacuum … the system is used to convey the milk … the cow … an adjacent receptacle where the milk can be released … breaking the vacuum. 4. The chilled water passes … the cooler and the milk passes over the exterior surface. 5. … herds … 150 cows it is usual to have more than one vacuum pump.

Exercise 13. Say whether the following statements are true or false. Correct the false ones.

1. The vacuum pump with a driving motor is usually housed in the same room from the milking shed.
2. The size of the pump varies with the size of milking plant.
3. The type of cooling does not vary much.
4. A big motor (up to about 30 hp) is used to drive the pump which is directly mounted on the motor shaft.
5. Any kinds of motors are used in damp or wet situations.
6. Commercial-type compressors are used with totally opened motors.

Exercise 14. Translate the following sentences from Russian into English.

1. В зависимости от количества поголовья крупнорогатого скота применяются различные по мощности вакуумные насосы. 2. Как правило, вакуумный насос находится в отдельном помещении. 3. Доильная установка оснащена дистанционным управлением для экстренного выключения в случае аварийной ситуации. 4. В крупных хозяйствах молоко перекачивается непосредственно от ферм к их собственным молочным заводам. 5. Для охлаждения молока применяются три различные холодильные установки.

Exercise 15. Read the following text and translate it into Russian in written by using a dictionary.

Text B

Electric Motors

The electric motor is a simple machine which will provide power quietly and smoothly, without fumes. It is a clean source of mechanical power, requires very little attention, and can be run continuously for long periods at a constant speed and with the minimum of maintenance. Electric motors can be started and stopped by the touch of a button and full power is available from the moment that the motor is started. The *fire risk*[1] is very low and the motor can be placed almost anywhere. Electric motors use energy only while they are running.

The *open frame type*[2] of electric motor is the simplest design but it is not recommended for use on farms. Most farm motors need to be of the enclosed *surface-cooled*[3] type which prevents, dust and moisture from entering the *windings*[4]. A motor may be chosen with regard to the normal running condition but neglecting conditions of overload. This may well result in *undermotoring*[5]. Motors which run at the higher speeds, e.g. 1,450 and 2,850 rpm are generally more efficient and, as they are of smaller dimensions and less costly, consideration should be given, wherever possible, to their use in the process of production.

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[1] fire risk – пожароопасность
[2] open frame type – открытого типа
[3] surface-cooled – поверхностноохлаждаемый
[4] winding ['waɪndɪŋ – обмотка
[5] undermotoring – снижение количества оборотов

UNIT 14

Beet Harvester

Exercise 1. Put the particle *to* before the infinitive where necessary.

1. I think you ought … apologize. 2. Make him … speak loader. 3. Help me … carry this bag. 4. My son asked me … let him … go to the club. 5. I must … go to the country. 6. It cannot … be done to-day. 7. She asked me … read the letter carefully. 8. The man told me not … walk on the grass.

Exercise 2. Translate the following words into Russian paying attention to the prefix *dis*-.

Disadvantage, disloyal, disarrange, disappear, dishonesty, dissimilar, disunion, disconnect, dislike.

Exercise 3. Express the given word combinations in one word using the prefix *dis-*. Pay attention to the model.

Model: to cease to charge – *discharge*

Not to agree; not to allow; not to approve; not to engage; not to join; not to obey; to cease to continue; to cease to arm; to cease to regard.

Exercise 4. Practise the pronunciation of the following words and translate them into Russian.

Specifically [spə'sɪfɪkəlɪ]; ripened ['raɪpənd]; industrial [ɪn'dʌstrɪəl]; several ['sevərəl]; machinery [mə'ʃi:nərɪ]; greenery ['gri:nərɪ]; attached [ə'tæʧt]; yield [ji:ld]; earth [ɜ:θ]; cause [kɔ:z]; depth [depθ]; equipment [ɪ'kwɪpmənt]; transfer [træns'fɜ:]; designed [dɪ'zaɪnd]; evenly ['i:vənlɪ]; course [kɔ:s].

Exercise 5. Read and memorize the following words and word combinations.

beet harvester [bi:t 'hɑ:vɪstə] – свеклоуборочный комбайн
topper ['tɔpə] – ботворез
beet collector [bi:t kə'lektə] – свекловичный подборщик
conveyor belt [kən'veɪə belt] – ленточный транспортёр
holding crate ['həuldɪŋ kreɪt] – бункер
capacity [kə'pæsətɪ] – мощность
maneuver [mə'nu:və] – маневрировать, перемещать
foliage ['fəulɪɪʤ] – листва, ботва
trimming mechanism ['trɪmɪŋ 'mekənɪzm] – обрезной механизм
slice off [slaɪs] – срезать слоями
leafy ['li:fɪ] – лиственный
tops [tɔps] – ботва
crush [krʌʃ] – дробить, мять
mince [mɪns] – крошить
stem [stem] – стебель
top [tɔp] – обрезать верхушку
scoop out [sku:p aut] – выкапывать
at an angle [ət ən 'æŋgl] – под углом
wheel [wi:l] – диск
shift back [ʃɪft bæk] – перемещать назад
pull [pul] – тянуть
sow [səu] – сеять
accommodate [ə'kɔmədeɪt] – *зд.* адаптироваться
row width [rəu wɪdθ] – ширина междурядий
shake off [ʃeɪk ɔf] – отряхивать
minor ['maɪnə] – незначительный

discrepancies [dɪs'krepənsɪs] – неточности, расхождения

computer terminal [kəm'pju:tə 'tɜ:mɪnəl] – автоматизированный пульт управления

cabin ['kæbɪn] – кабина

adjust [ə'ʤʌst] – регулировать, настраивать

global positioning system ['gləubəl pə'zɪʃənɪŋ 'sɪstəm] – глобальная система местоопределения

course [kɔ:s] – направление

solely ['səullɪ] – исключительно

Text A

Exercise 6. Read and translate the following text.

1. Beet harvester is a large farming machine specifically designed to gather ripened beets. They are quite large: about the same size as combines because they are designed to collect beets from industrial sized beet farms. A harvester can be driven or pulled behind a tractor. Like many farming machines, the beet harvester is complex and requires many parts to function. Generally, this includes a vehicle, a topper, the beet collector mechanism, the conveyor belt and the holding crate. Smaller beet harvesters are pulled behind a tractor. A larger harvester, however, may itself be a vehicle. In this case, it must have the capacity of a tractor, including the ability to maneuver several tons of machinery and crop. Before harvesting, the beet is separated from its foliage by a topper, a trimming mechanism that slices the leafy green tops off of the beet. Typically, the greenery is crushed, minced, or sliced and returned to the ground. The topper must be adjusted to remove the correct amount of foliage. Too little, and parts of leaves and stems will remain attached to the beets. Too much, and the topper will remove part of the beet, reducing the yield.

2. The topped beets are then scooped out of the earth with two wheels, placed side by side at an angle. As the wheels pass over a beet, the shape of the beet causes the angle of the wheels to shift back, pulling the beet with it. The depth of penetration and width of the wheels can be adjusted. Spacing of rows differs from farm to farm, depending on the equipment used to sow the beets, and the harvester must be able to accommodate a variety of row widths. After the beet is topped and scooped from the ground, it is passed to a conveyor belt. The main purpose of the belt is to transfer the beet into the holding crate, but sometimes the belts are also designed to shake off excess

dirt from the vegetable. The operator harvests beets until the holding crate is full, after which the beets must be transferred to another vehicle.

3. Industrial sized harvesters typically work with four to nine rows at a time, depending on the machine itself. In some cases, the rows are not planted evenly or straight, but the beet harvester may be equipped to adjust for minor discrepancies. Computer terminals in the cabin allow the driver to adjust the machine without stopping the beet harvester or leaving the cabin. Some beet harvesters use a global positioning system (GPS) to determine a course for the harvester. The beet harvester follows the programmed course, allowing the operator to devote his or her attention to the crop. If problems occur with the collection, the operator is more likely to notice them if he or she is not solely focused on directing the harvester.

Exercise 7. Answer the following questions.

1. What is a beet harvester designed for? 2. What are the main parts of a beet harvester? 3. How is the beet separated from its foliage? 4. Why must the topper be adjusted correctly? 5. How are the topped beets scooped out of the earth? 6. What is the purpose of the belts? 7. Can a beet harvester be adjusted without stopping or leaving its cab? 8. Is the global positioning system mounted on beet harvesters?

Exercise 8. Match the following words to make the word collocations the way they are used in the text.

1. specifically	a) harvester
2. designed	b) stopping
3. larger	d) attached
4. remain	e) harvester
5. topped	f) discrepancies
6. row	g) purpose
7. main	h) widths
8. minor	i) beets
9. without	j) to collect beets
10. beet	k) designed

Exercise 9. Give the English equivalents using the text.

Сельскохозяйственная машина; промышленное свекловодческое хозяйство; зрелая свекла; свеклоуборочный комбайн меньшего размера; иметь мощность; способность перевозить несколько тон; листья и стебли; часть свеклы; размещать рядом под углом; колесо проходит по свекле; смещаться назад; глубина проникновения; в зависимости от оборудования; приспосабливаться к разнообразию ширины междурядий; перемещать свеклу в бункер, запрограммированное направление.

Exercise 10. Give the Russian equivalents.

Farming machine; gather ripened beets; beet farm; capacity of a tractor; several tons of machinery; separate from foliage; leafy tops; return to the ground; correct amount of foliage; reduce the yield; at an angle; depth of penetration; width of the wheels; from farm to farm; accommodate a variety; conveyor belt; transfer the beet; shake off excess dirt; industrial harvesters; determine a course; programmed course; direct the harvester.

Exercise 11. Complete the sentences matching the appropriate halves given below. Consult the text if necessary.

1. The beet harvester is complex and … .
2. Smaller beet harvesters are … .
3. It must have the ability to maneuver several … .
4. The topper must be adjusted to remove … .
5. The depth of penetration and width of … .
6. The main purpose of the belt is to transfer … .
7. Some beet harvesters use a global positioning system (GPS) … .

a) to determine a course for the harvester
b) tons of machinery and crop
c) the beet into the holding crate
d) the wheels can be adjusted
e) requires many parts to function
f) the correct amount of foliage
g) pulled behind a tractor

Exercise 12. Match the words with their definitions.

a) harvester 1) a machine with an engine.
b) machine 2) a person who operates equipment or a machine.
c) capacity 3) the necessary items for a particular purpose.
d) remove 4) an amount produced of an agricultural product.
e) yield 5) take something away or off from the position occupied.
f) equipment 6) the ability or power to do something.
g) operator 7) an apparatus using mechanical power.
h) vehicle 8) a machine which cuts and often collects crops.

Exercise 13. Fill in the blanks with the necessary prepositions using the text.

1. Computer terminals … the cabin allow the driver to adjust the machine … stopping the harvester. 2. Industrial harvesters typically work … four … nine rows … a time. 3. The main purpose … the belt is to transfer the beet … the holding crate. 4. … this case, the harvester must have the capacity … a tractor, and the ability to maneuver several tons … machinery

and crop. 5. The topped beets are then scooped out … the earth … two wheels, placed side … side … an angle.

Exercise 14. Translate the following sentences from Russian into English.

1. Свеклоуборочный комбайн состоит из ботвореза, свекловичного подборщика, ленточного транспортёра и бункера. 2. Для высева свеклы используются различные сеялки, поэтому ширина междурядий разнится от фермы к ферме. 3. После заполнения бункера свеклой ее выгружают в другое транспортное средство. 4. Автоматизированный пульт управления позволяет оператору настроить узлы комбайна, не выходя из кабины.

Exercise 15. Read the following text and translate it by using a dictionary.

Text B

Modern Beet Harvesters

1. Harvesting machines are either power take-off driven or self-propelled and comprise built-in self-unloading tanks. This feature eliminates the need for an additional tractor or trailer to transport the beets. Today they are available in one- to six-row sizes, and can harvest up to 20 to 24 acres (8.1 to 9.7 ha) per day. Some of the largest models are capable of harvesting 500 tons in 10 hours. Topping a sugar beet is necessary. Beets must be topped in such a way that the entire crown of green leaves is removed. Once a row of beets is topped, the leftover material must be moved away so that the tops are not lifted with the roots. This is accomplished with the use of a flail device, positioned at the back of the topping device.

2. The harvesters are outfitted with a lifting device in the form of steel shares, positioned ahead of the main elevator. These shares enable the beets, after being removed from the soil, to pass directly onto the elevator. By pressing the soil downward at the sides of the sugar beets, allowing the beet to rise up the shares and onto the elevator. A typical method to remove clinging soil from a lifted beet is to use agitating devices. While a beet is being elevated, the agitation of the open-type elevating web causes the beet to bounce, shedding its dirt through the web and back onto the field. Once the beets are cleaned and elevated, they are dropped onto a cross elevator, to be moved into a trailer moving beside the harvester, or, in the case of a tanker model, into the harvester’s tank.

SUPPLEMENTARY MATERIAL FOR READING AND TRANSLATING IN WRITTEN

Text 1

1. **Agricultural engineering** is an industry that provides demand for equipment such as soil tillage before sowing, sowing and planting equipment, irrigation, irrigation and fertilization equipment. In addition, harvesters and post-harvest tillage machines are needed for some crops. Agricultural engineering also produces units for animal care, forage processing and harvesting. It should be noted that certain crops and animals require unique models of equipment, and any farm needs additional mechanisms to ensure water supply, as well as equipment for land reclamation operations.

2. Agricultural engineering in Russia is represented by several dozen large manufacturers that produce mainly grain processing, grain harvesting, sowing equipment, harrows, seed dressers, sprayers, cultivators, rippers, seeders, mowers, plows, precision seeding systems and other equipment. In addition, you can purchase domestic grain dryers, silage harvesting equipment, tractors, loaders, as well as grain storage complexes. Domestic agricultural engineering is experiencing quite strong competition from Western manufacturers, whose products, however, are more expensive, which saves Russian manufacturers.

3. Agricultural engineering plays an important role in ensuring the country's food security, so experts note with satisfaction that in recent years there has been some growth in this sector of the Russian economy. Some enterprises have switched to equipping the basic equipment with environmentally friendly engines, the use of which is required, for example, in Europe. Thus, the Rostselmash enterprise has so successfully advanced along the path of integrating Western experience into domestic developments that it has received customers in more than twenty countries of the world. It should be noted that Russian equipment of this level is three times cheaper than foreign analogues, not inferior to them in quality, which makes it very attractive for farmers and component manufacturers from other countries. Russian manufacturers produce samples with an optimal "price-quality" ratio, which allows them to successfully conquer the market of the CIS countries and supply products all over the world.

Text 2

1. **The basic technology** of agricultural machines has changed little in the last century. Though modern harvesters and planters may do a better job or be slightly tweaked from their predecessors, the combine of today still cuts, threshes, and separates grain in the same way it has always been done. However, technology is changing the way that humans operate the ma-

chines, as computer monitoring systems, GPS locators and self-steer programs allow the most advanced tractors and implements to be more precise and less wasteful in the use of fuel, seed, or fertilizer. In the foreseeable future, there may be mass production of driverless tractors, which use GPS maps and electronic sensors.

2. The Food and Agriculture Organization of the United Nations (FAO) defines agricultural automation as the use of machinery and equipment in agricultural operations to improve their diagnosis, decision-making, or performance, reducing the drudgery of agricultural work and improving the timeliness, and potentially the precision, of agricultural operations.

3. The technological evolution in agriculture has been a journey from manual tools to animal traction, then to motorized mechanization, and further to digital equipment. This progression has culminated in the use of robotics with artificial intelligence (AI). Motorized mechanization automates operations like ploughing, seeding, fertilizing, milking, feeding, and irrigating, thereby significantly reducing manual labor. For instance, autonomous crop robots can harvest and seed crops, and drones can collect information to help automate input applications. Tractors, on the other hand, can be transformed into automated vehicles that can sow fields independently.

4. A 2023 report by the United States Department of Agriculture (USDA) revealed that over 50% of corn, cotton, rice, sorghum, soybeans, and winter wheat in the United States is planted using automated guidance systems. These systems, which utilize technology to autonomously steer farm equipment, only require supervision from a farmer. This is a clear example of how agricultural automation is being implemented in real-world farming.

Text 3

1. **The use of electric motors** in agriculture (as well as in the automotive sector) was first experienced in the early 1900s, when the introduction of the first tractors led to experimentation with a wide variety of technological solutions. Due to numerous technical limitations, mainly related to the absence of accumulators suitable for use in agriculture and the need to power electric motors via cable, these solutions have been supplanted by the use of endothermic engines. Nowadays, the use of electric motors on agricultural machinery is back in vogue thanks to the introduction of brushless motors, which guarantee greater reliability and a wide range of speed variation. These engines, powered by the tractor's electrical circuit (therefore powered by the alternator), can be installed wherever it is necessary to act with high precision.

2. An excellent example of the application of electric drives on operating machines is certainly the use of electric motors on precision seed drills. In this case, there can be several electric drives in the seeding elements: the

rotation of the seeding disc can be performed by a direct drive electric motor, while pressure and/or vacuum can be generated by pumps driven by electric motors. In this case, the advantages are greater seeding precision with a reduction in failures and multiple seeding, thus ensuring higher operating speeds. In addition to these advantages, the use of electric drives allows the installation of electrically driven seeding modules without the need for a power take-off connection.

3. In addition to the seeders, electric drives can also be seen on machines used for crop protection. In fact, many manufacturers have started to install electric fans to generate the flow to transport the treatment mixture to the crop. In this case, in addition to the ability to precisely adjust the air speed so as to ensure perfect penetration into the vegetation, while at the same time reduce drift, the use of electric fans makes it possible to quickly interrupt the air flow at the headland during turning phases. In addition, the absence of cardan joints connecting the hydraulic pump and fan allows reducing overall dimensions and increasing the volume of transportable mixture. Also, with regard to sprayers, some models equipped with nozzles with PWM (pulse with modulation) valves are available. These solenoid valves are able to modulate the quantity of product sprayed and are applied in the presence of sensors (sonar or laser) capable of detecting the volume of foliage to be sprayed.

Text 4

1. **Sprayer is a machine which** is used to atomize the liquid chemical and spray at the plant uniformly. In agriculture, a sprayer is a piece of equipment that is used to apply herbicides, pesticides and fertilizers to agricultural crops. Sprayers range in size from man-portable units to trailed sprayers that are connected to a tractor, to self-propelled units. Spraying is the final defence in an integrated pest management plan, timed according to pest and plant development. For optimal results, make minor adjustments before each application, to account for changes in the crop (size, shape and canopy density), weather conditions (relative humidity, wind speed and wind direction), the nature of the pest and the product chemistry.

2. Adjust sprayer output and distribution at least twice a year, to ensure the sprayer will uniformly cover the target with the optimal volume. The first adjustment should take place during calibration at the beginning of the season; the second when the target crop has grown and the canopy filled to such an extent that it requires different sprayer settings to achieve coverage. For example, apple trees at the 1in. fruit stage of development require different sprayer settings than when they are at budbreak. The tree is larger and requires more spray to cover the increase in surface area (i.e., leaves and fruit). At this stage, adjust the sprayer to enable higher output to match the shape and density of the target. Altering driving speed and/or pressure to

account for wind or canopy density is common practice for making minor changes, but changing nozzle tips is more accurate and is the preferred method.

3. Spray droplet size is highly important for efficient utilization of pesticides with minimum contamination of environment. Select optimum droplet size for selection of type of nozzle to be used. Usually spray droplet size vary from coarse sprays (more than 400μm) to aerosols (<50μm) and accordingly, a good sprayer should be able to produce droplets of uniform size. To apply a specified rate of chemical to the target surface (e.g. plant, soil, pest); one need to measure the total spray output of the machine, the travel speed and the swath width. Then calculate the application rate. The aim here is to measure the total liquid sprayed from the spray machine in one minute. First, disengage the gearbox and set the engine revs (1500 is a good starting point) with the power take-off (PTO) engaged at a normal operating speed. Set the pressure at the correct level for spraying. The correct pressure is specified by the manufacturer and determined by the type of nozzles used. All nozzles used for spraying should be left on.

Text 5

1. **The electric power generation** system is driven by V-belt, which gets drive from the crankshaft. It converts mechanical energy obtained from engine into electrical energy. Its main function is to recharge the battery. It also supplies electric current to the other accessories when engine is running. Generators can be DC (dynamos) or AC (alternators). Alternators can give current output up to 35 amps whereas dynamo output is limited to 12-14 amps.

2. Regulator is also fitted on the tractor to regulate the current produced by the generator. If no regulator is provided, the current produced by the Alternator would be so much that it would damage the battery and the other electrical units of the Tractor. High electric current is permitted to flow by the regulator when battery is in a discharged condition or when the tractor electric unit is turned on. It helps in controlling the voltage produced by the alternator when the battery is in a charged condition or when the electric units are switched off.

3. The battery stores energy in chemical form. The reaction in the battery starts as soon as any circuit is completed by the action of a switch. It supplies current up to 400 amps, required to crank the engine and a limited current to the accessories. It is continually charged by the alternator when engine is running. Electrical energy is converted into chemical energy while the plates of the battery are being charged. When the battery is being discharged, the energy stored in the chemicals is released as electricity. The tractor is provided with 12 Volt-80 ah. / 88 ah. maintenance free batteries. Maintenance free battery has an indicator to show the condition of the bat-

tery. Three color codes are given on the side of the indicator as follows: *green*: “O.K”, *white*: “Needs Charging”, *red* : “Add Distilled Water”.

4. In every modern tractor an electric power unit is installed to produce and store electric energy that is delivered either at low voltage or in the form of high voltages. Electrical equipment fitted on tractors is required to operate without failure for very long periods with little attention.

5. The power unit also provides an electrical means of cranking the engine, since the same is not capable of starting by itself. It automatically controls the voltage in the system. It also supplies power for lights and other tractor accessories. The tractor electric system is quite simple in spite of the fact that it plays an important and multifarious role in the operation of the modern tractor.

Text 6

1. **A chaser bin is a trailer** towed by a tractor with a built-in auger conveyor system, usually with a large capacity which is typically used to transport harvested grain or corn over fields from a combine harvester to a waiting nearby truck which is used to cover larger distances over roads. The use of a chaser bin allows the harvester to operate continuously, eliminating the need to stop and unload. In contrast, trucks are kept off the field which eliminates the need to load their trailers with crops from the combine itself. These require tractors with large power outputs and are popular on the generally larger and more open fields. The typical setup of a chaser bin is a cross auger, which feeds the folding unload auger, which in turn empties the contents into waiting Grain hopper trailers.

2. In the past bins ranged in size, from 12T to 38T in most cases. Single axle bins usually can only handle a maximum of 20T of grain. Bins above a capacity of 20T, tend to feature a “walking beam” chassis. This chassis design features an independent axle setup, allowing the bin to smoothly travel across ditches, as well as more easily access fields where the road is higher than the field level. It also allows the load to be evenly distributed along the length of the chassis, further reducing the risk of axle failure when traveling over rough terrain, particularly with a full bin.

3. The design of the bins usually follows the same pattern regardless of capacity, with smooth flowing curves to allow the grain to easily unload via the cross auger. This also helps prevent the grain sticking to the walls of the bin, preventing corrosion. The cross auger is smaller than the main unload auger, which allows the unload auger to expel the grain at a constant rate. The bins can also feature cross auger cut-offs, which allow the operator to reduce the feed rate to the unload auger if it starts struggling. Unload augers can empty a full bin in a matter of minutes, with 15" augers unloading at a rate of 6T per minute, and 19" augers unloading at 10T per minute.

СОДЕРЖАНИЕ