LESSON
9

Electric mixer / Juicer/ Grinder and Water purifier

X2BTV

LEARNING OBJECTIVES

The main objective of this lesson is to know about repairs and maintenance of home appliances such as mixer, juicer grinder and water purifier.

Table of Content

9.1 INTRODUCTION

The Electric mixer, Juicer and Grinder are the electrical household appliances used for domestic purposes. It is important to know about the operating principles and repairing of the appliances for its successful operation.

9.2 ELECTRIC MIXER

An electric mixer is an electric appliance used for grinding the food products to make it as powder or paste. It is a portable device, which can be operated in a vertical position only. Mixer grinder is available in various sizes and comes with three jars.

9.2.1 Types of jars

The various types of mixer jars are noted below.

1. Dry jar
2. Wet jar
3. Chutney jar
4. Multi-purpose jar

1) Dry jar

The jar which is used for grinding dry particles is called a dry jar. This jar is smaller in size and has no gasket in the lid.

2) Wet jar

The jar is used for pulping of vegetables for soups, lassi, milkshakes wet masalas, chutneys and preparing the batter for dosas, vadas ad iddlies. This jar is having a big gasket in the lid.

3) Chutney jar

The chutney jar is used to prepare chutneys, masalas (or) nuts in small quantities. To lock the chutney jar, the base unit is placed over the locking arm to the right side of the knob.

Fig 9.1 *Electric mixer*

4) Multi-purpose jar

In a multipurpose jar, it consists of four different types of blades for the operation. They are

1. Juicer blade,
2. Dry grinder blade,
3. Grater blade and
4. Whipping blender blade.

9.2.2 Types of Blades

Blades are used for grating coconut, cucumber, crushing ice, almond, cashew nuts, dry fruits, etc. The different types of blades used in electric mixer are

1) Wet grinder blade
2) Dry grinder blade
3) Juicer blade
4) Chutney grinder blade
5) Blender blade
6) Mincer blade and
7) Whipping blade

The jar can be used according to the requirement of things and quantities.

9.2.3 Working process

The working process of mixie can be understood from the following steps.

1. Place the mixer always on a clean and dry surface.
2. Keep away from heat and water.
3. Fix the jar properly.
4. Fix the top of the lid tightly.
5. Use the proper three-pin socket
6. Properly earthed and switch on the supply.

9.3 ELECTRIC JUICER

An electric juicer is an appliance used to extract juice from fruits, herbs, leaf greens and vegetables. It crushes, grinds and squeezes the juice out of the pulp. This process is called juicing. The fig 9.2 shows the outlook image of a juicer.

Fig 9.2 Main parts of electric juicer

9.3.1 Different types of electric juicer

The different types of juicer are

1. Manual style reamer
2. Centrifugal type juicer,
3. Masticating juicer,
4. Twin gear juicer and
5. Juice press.

1. Manual style reamer

Reamers are used for squeezing juice from citruses such as grape fruits, lemons, limes and oranges. Juice is extracted by pressing or grinding a halved citrus along with a juicer's rigid conical center and discarding the rind.

2. Centrifugal type juicer

A centrifugal type of juicer is also known as a fast juicer and is the most popular type. It takes the fresh fruits and vegetables through a feed tube and directly into contact with a blade that runs at a speed of 6000 to 14000 RPM. The juice is thrown by the centrifugal force of the spinning basket towards the sides collected in a jug.

3. Masticating juicer

Masticating juicers are known as slow juicers. In this, a slow gear is used to crush the fruits and force against a speed of 80 to 100 RPM. The juice is pulpy, foamy and can be bitter to taste.

4. Twin gear juicer

In this type, twin gear utilizes two gears that spin and pull the product in and chew it up. The gears extract the juice by pushing the product into a decreasing size.

5. Juice press

A juice press is the only type of juicer that actually contains a press, and therefore is the only true and cold press juicer. Juice presses are commonly referred to as two-stage juicers since there are two stages. First, the product is ground up into pulp, then the juice is slowly extracted by pressing the pulp under thousands of pounds of pressure.

9.3.2 Components of electric juicer

The components of an electric juicer are

1. Motor,
2. Body or Base housing,
3. On / Off switch.
4. Three pin power cord,
5. Juice container,
6. Pulp container

1. Motor

The machine makes the other juicer parts move to perform their functions. It is powered by electricity and to make mechanical movements.

2. Body or Base housing

The body provides the outer part which covers the juicer motor. It is of non conductive materials. It conceals the motor to make it safer to use the appliance.

3. On/Off switch

The On / Off switch turns the juicer ON and OFF. Some juicers have control over speed number. In which, we can choose how fast to require to rotate the juicer.

4. Three pin power cord

The power cord is the wire which connects the juicer to an electric supply.

5. Juice container

It is the container where the juice is collected, ready for drinking. Usually, this juice container is made of glass or transparent plastic materials.

6. Pulp container

The pulp container is made of stainless steel or plastic materials. In this where the pulp would be dispensed.

9.3.3 Repairs, causes and the remedies of an electric mixer and electric juicer

S.No.	Defects	Reasons	Remedies
1	The appliance is not functioning.	1. Either no voltage or low voltage.	1. Check the voltage with the help of a multimeter and act accordingly.
		2. Open circuit in field winding or armature winding	2. Test the continuity of field or armature winding with the help of test lamp and rectify it.
		3. The power cord wire is opened or does not have continuity.	3. Check the continuity of the power cord and ensure its continuity.
2	The motor is not running for the rated supply voltage.	Due to an overload of things in the jar the safety switch opened.	Load accordingly to the quantity and release the safety switch.
3	The motor is not running in a specific speed	The connection in the regulator knob is not properly connected.	Check the regulator knob connection and connect properly.
4	Overheat is produced in the appliance while in use.	1. Short circuit in field or armature winding.	1. Test the coil and ensure it is not short-circuited.
		2. Worn out bearing or defects in bearing	2. Bearing should be replaced.

9.4 ELECTRIC GRINDER

The appliance electric grinder is used in the domestic and hotels for the preparation of food grains into paste or batter. It consists of granite stones that rotate inside a metal drum with the help of an electric motor and the food grains get crushed between the stone and drum.

9.4.1 Types of grinder

The various types of grinder are

1. Old stone wet grinder,
2. Tabletop wet grinder,
3. Tilting table top wet grinder and
4. Commercial wet grinder

1. Old stone wet grinder

Old stone wet grinders are used in the early days as traditional and now they are being used in villages and small towns. Electric supply is not required for this type.

2. Tabletop wet grinder

Tabletop Wet grinder consists of granite stones which rotate inside a metal drum with the help of an electric motor and the food grains get crushed between the stone and drum. It is portable and easy to maintain.

3. Tilting table top wet grinder

Tilting table top wet grinders are solid and utilize less space. This type of wet grinder is mostly used in domestic which don't make high noise and easy to clean.

4. Commercial wet grinder

Commercial wet grinder is used in the places where huge quantities of batter is required (or) food grind are caused. This type is used only in hotels and commercial food preparation areas.

9.4.2 Components of electric wet grinder

1. Circulating stone

A circulating stone is a solid stone in which the graining particles were gets battered.

2. Rubber belt

The belt is a hard-drawn insulated rubber that connects the motor shaft to the drum for rotating.

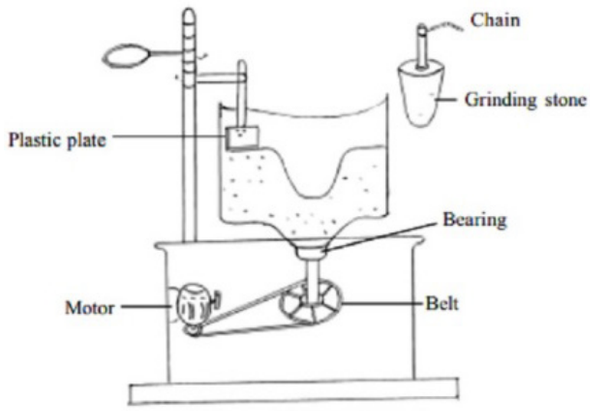

Fig 9.3

3. Motor

A motor is a rotating machine that transforms electrical energy into mechanical energy and makes the container drum rotate for grinding. It is fitted below the drum table as in fig.

4. Shaft and pulleys

The main purpose of the shaft and pulley is used to connect the motor and the drum with the help of a belt.

5. Plastic plate

The plastic plate is fitted with the drum used to circulate the batter to grain according to the density of batter required.

6. Bearing

Bearing is a connective device used in the handle and bottom of the drum to rotate easily.

9.4.3 Trouble shoot chart of an electric grinder

S.No.	Defects	Reasons	Remedies
1	When the supply is ON, the grinder is not functioning.	1. Low supply	1. Ensure the supply is normal and ON.
		2. Power cord is not connected properly.	2. Connect the power cord properly without loose connection.
		3. Loose wire connection in the motor of the grinder table.	3. Connect the wire properly to the grinder table.
2	While in ON supply, the fuse gets melted.	1. Short circuit occurs in the winding.	1. Test the winding and ensure short circuits do not occur.
		2. Phase wire gets short-circuited with neutral in the socket.	2. Connect phase and neutral wire properly.
3	Motor running. But the grinder drum is not rotating	1. Belt is loosened.	1. Belt has to be replaced and ensure it is tight.
		2. Worn out belt.	2. New belt has to be changed.
4	Sound is produced while running the motor.	1. Not applying lubrication.	1. Lubrication has to be applied.
		2. Bearings get worn out.	2. Replace the bearing.
5	Noise occurs at the bottom of the grinder drum.	1. Lubrication not applied in the bearing below the drum.	1. Apply lubrication in the bearing of the drum.
6	While the appliance is ON, the metal parts get shocked.	1. Supply wire may have a chance of contacting the conductive parts of the appliance due to improper insulation. (Earth connection)	1. Find out the area and insulate it properly.

9.5 WATER PURIFIER

Introduction

Pure, clean and safe drinking water is most important to live. Growing population, industrial development and environmental degradation are causing the water to pollute. So, purification water is important for safe drinking.

Natural water contains more minerals that are essential to human being. But if it exceeds the limit, it causes so many diseases.

A good water purifier is an appliance which removes the excess salts, suspended particles and microbes, and retains its essential vitamins and minerals.

9.5.1 Electrical circuit diagram of water purifier

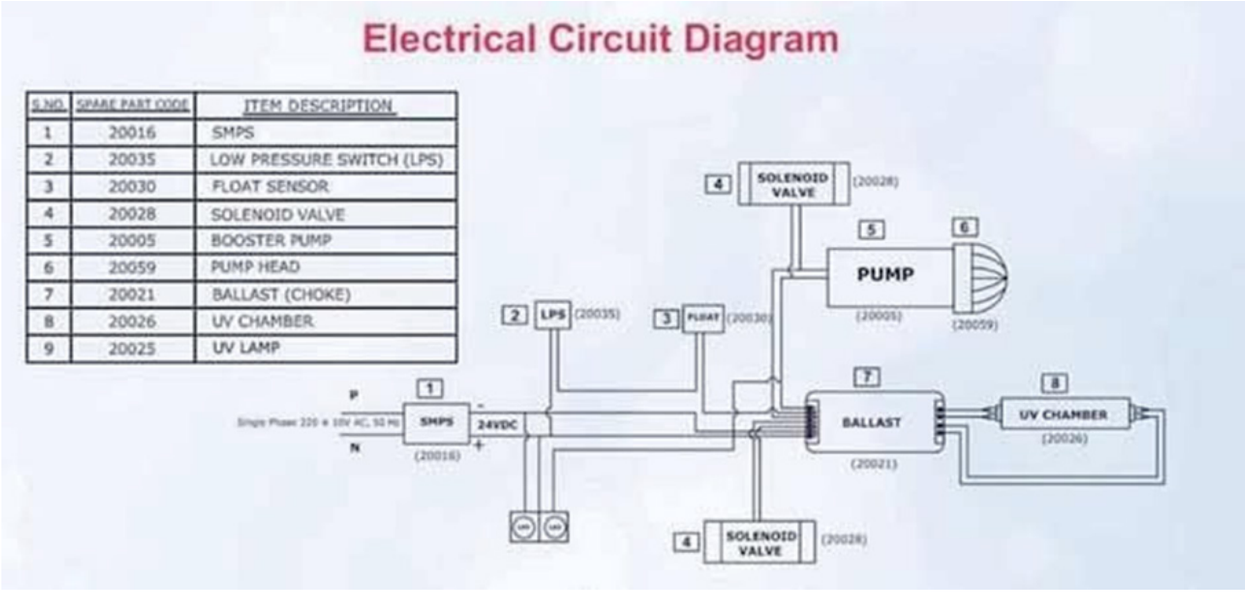

Fig 9.4 Circuit diagram of water purifier

The water purifier is a device that purifies impure water to pure water. The diagram 9.5 shows the various parts of the water purifier like sediment filter, carbon filter, RO booster pump, etc.

9.5.2 Water flow diagram

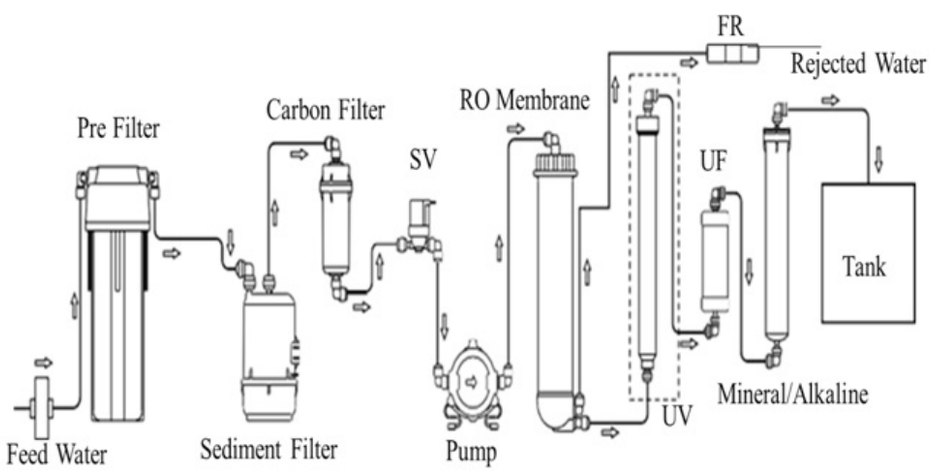

Fig 9.5 Main components of water purifier

Fig 9.4 shows the various valves and switches used in the water purifier. Solenoid valves are used for controlling the water flow at the input side. Float valves are used for controlling the water at the storage end.

9.5.3 Water purification process and different layers

Membranes are made up of very thin sheets of synthetic plastic material which have very fine holes or pores. The size of pores is varied according to the types of water purification like Micro filtration membranes (MF), Ultra filtration membranes (UF), Nano - filtration membranes (NF) and Reverse Osmosis (RO) membranes.

The types of membranes used in Reverse Osmosis water purifiers have the smallest pores which are just a little larger than the size of a water molecule. Hence it allows pure water molecules to pass easily but will stop the passage of larger molecules of salts and organic chemicals.

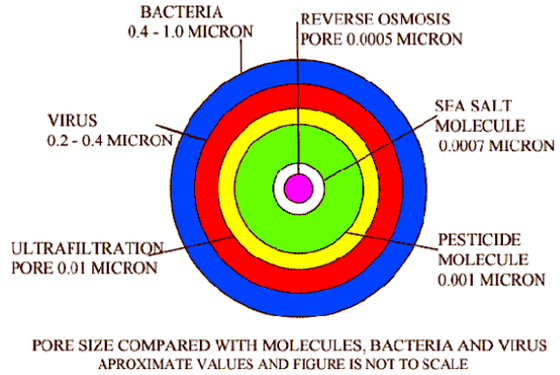

Fig 9.6 Types of membranes

The fig. 9.6 is a graphical representation of the pore sizes of different types of membranes used to purify water and how the pore sizes of types of membranes compare with the size of salt molecules, viruses, etc.

9.5.4 Different layers of filter

Depending on the water purification methods water purifiers are can be classified into 5 types.

1. Sediment filter

This type of filter purifies water like RO and UV. The particles which are collected at the bottom of the water are known as sediment. Sediment may be rust flakes of metal pipes, sand, or mud particles and removes turbidity of water. Basically, it filters the unwanted dust, impure particles present in the water.

2. Activated carbon filter

Activated Carbon is a form of carbon that is divided into small pieces and activated from charcoal. Activated Carbon removes the waterborne disease which is present in pesticides and heavy metal makes water tasteless and bad smell. Activated Carbon is most effective to remove chlorine from water.

3. Reverse Osmosis filter (RO)

In an RO water purifier, a semi-permeable membrane is used to purify the water. In this process, the dissolved solids like arsenic, fluoride, lead, chlorine, nitrates and sulphates are trapped and filtered through the RO membrane and get purified water.

4. Ultra violet filter (UV)

UV or Ultra violet water purifier is a proven technology that kills water-borne diseases which cause microorganisms, pathogens such as bacteria, viruses and cysts. UV water purifier consists of a UV lamp tube through which water has to pass for purification. When running water is exposed to UV light, germs like bacteria and viruses are destroyed and made inactive.

5. Ultra filtration filter (UF)

In Ultra filtration, the hollow fibers of the membrane are made of a thin layer that is used to separate water and impure particles present in water. When water feed through the UF membrane, the suspended solids, bacteria and viruses were retained in the UF membrane. The UF filter is similar to RO technology, the only difference is RO can block very minute particles, whereas UF blocks large particles.

GLOSSARY

Electric mixer	—	மின் கலக்கி
Electric juicer	—	மின் சாறு பிழி கருவி
Electric grinder machine	—	மின்அரவை இயந்திரம்
Batter	—	மாவு
Portable	—	எளிதில் எடுத்துச் செல்ல
Chores	—	வேலைகள்
Gasket	—	அடை வளையம்
Grater blade	—	அரம் போன்ற கத்தி
Centrifugal	—	மைய விலக்கு
Masticating	—	மென்மையாக்குதல்
Pulp	—	கூழ்
Water purifier	—	நீர் சுத்தகரிப்பான்
Degradation	—	சீரழிவு
Microbes	—	நுண்ணுயிரிகள்
Sediment filter	—	வண்டல் வடிகட்டி
Membrane	—	சவ்வு
Rust	—	துரு
Turbidity	—	கொந்தளிப்பு
Proven technology	—	அங்கீகரிக்கப்பட்ட தொழில்நுட்பம்
Rind	—	தோல்
Cyst	—	நீர்க்கட்டி

Q A

PART A

Mark 1

Choose the correct answer:

1. Mixer is an electric appliance used for
   a. Grinding the food products to make it powder.
   b. Cutting of food products.
   c. Mixing of food product materials.
   d. Grinding of hard products only.

2. An electric mixer is a
   a. Static appliance.
   b. Portable and operated only in vertical.
   c. Mechanical appliance.
   d. Unstable appliance.

3. Which jar is used for grinding dry particles?
   a. Wet jar
   b. Chutney jar
   c. Dry jar
   d. Glass jar

4. For, pulping of vegetables and fruits _____ jar is used.
   a. dry jar
   b. chutney jar
   c. glass jar
   d. wet jar

5. For, preparation of small quantities of masala, we use _____ .
   a. chutney jar
   b. wet jar
   c. dry jar
   d. glass jar

6. The appliance used for extracting juice from fruits and vegetables are _____
   a. Grinder
   b. Juicer
   c. Mixer
   d. Beater

7. Which type of juicer is having a rigid conical center?
   a. Centrifugal type
   b. Masticating type
   c. Manual style reamer
   d. Twin gear type

8. Which juicer is the fast and most popular type?
   a. Manual style reamer
   b. Masticating juicer
   c. Twin gear juicer
   d. Centrifugal type juicer

9. Which juicer is known as slow juicer?
   a. Masticating juicer
   b. Twin gear juicer
   c. Manual style reamer
   d. Centrifugal type juicer

10. What is the speed of centrifugal type juicer?
   a. 3000 RPM to 5000 RPM
   b. 6000 RPM to 14000 RPM
   c. 5000 RPM to 7000 RPM
   d. 7000 RPM to 9000 RPM

11. The revolution speed of masticating juicer is _____
   a. 40 RPM to 60 RPM
   b. 60 RPM to 80 RPM
   c. 80 RPM to 100 RPM
   d. 100 RPM to 120 RPM

12. The juicer that spins, pulls and chews are belongs to _____
   a. manual style reamer
   b. centrifugal type juicer
   c. masticating juicer
   d. twin gear juicer

13. The appliance for preparation of batter is _____
   a. mixer
   b. grinder
   c. juicer
   d. purifier

14. Which grinder does not require electricity?
   a. Table top wet grinder
   b. Tilting tabletop wet grinder
   c. Old type stone wet grinder (Manual)
   d. Commercial wet grinder

15. Which type of grinder runs with low noise?
   a. Old type stone wet grinder (Manual)
   b. Table top wet grinder
   c. Commercial wet grinder
   d. Tilting table top wet grinder

16. The shaft and pully is connected with the help of _____ in grinder.
   a. rod
   b. belt
   c. coupling
   d. bolt and nut

17. For easy rotation, _____ is used in grinder.
   a. starter
   b. gear
   c. bearing
   d. plate

18. The appliance which purifies the impure water is _____
   a. juicer
   b. mixer
   c. grinder
   d. water purifier

19. Activated carbon is most effective to remove _____ from water.
   a. chlorine
   b. salt
   c. iodine
   d. bacteria

20. Solid particles like arsenic, fluoride, lead etc. are filtered in which layer?
   a. Ultraviolet
   b. Reverse osmosis
   c. Activated carbon
   d. Ultra filtration

21. Which layer kills micro-organisms, bacteria, virus and cysts?
    a. Activated carbon
    b. Reverse osmosis
    c. Ultraviolet
    d. Ultra filtration

22. Large suspended particles present in water is filtered in _____ layer.
    a. ultraviolet
    b. reverse osmosis
    c. ultra filtration
    d. activated carbon

Q A PART B

Mark 3

Answer the questions in briefly

1. Write about an electric mixer?
2. List out the types of jar in an electric mixer.
3. Name the type of blades used in a mixer.
4. Define – Electric juicer.
5. Write down the types of juicers.
6. List out the components of juicer.
7. What is called a grinder?
8. What are the various types of grinder?
9. List out the components of wet grinder.
10. Write short note about water purifier.
11. Name the different layers of filter.

Q A

PART C

Mark 5

Answer the questions not exceeding one page

1. Write about the functions of various parts of an electric juicer.
2. Write about the components of an electric juicer.
3. Write about the components of wet grinder.
4. Draw the electrical circuit diagram of a water purifier.

Q A

PART D

Mark 10

Answer the questions not exceeding two page

1. Tabulate the repairs, causes and the remedies of an electric juicer.
2. Draw the diagram of wet grinder and explain the types of grinder.
3. Tabulate the trouble shoot chart of a grinder.
4. Explain the water purification process and its different layers of filter.