

INSTRUCTIONS No. 2640D

FOR INSTALLING AND OPERATING

Fairbanks-Morse

210 AND 420 GALLON

Home Water Plants

For Shallow Wells



210 GALLON HOME WATER PLANT (COVER LIFTED)

(3963M)

FAIRBANKS, MORSE & CO.

(INCORPORATED)

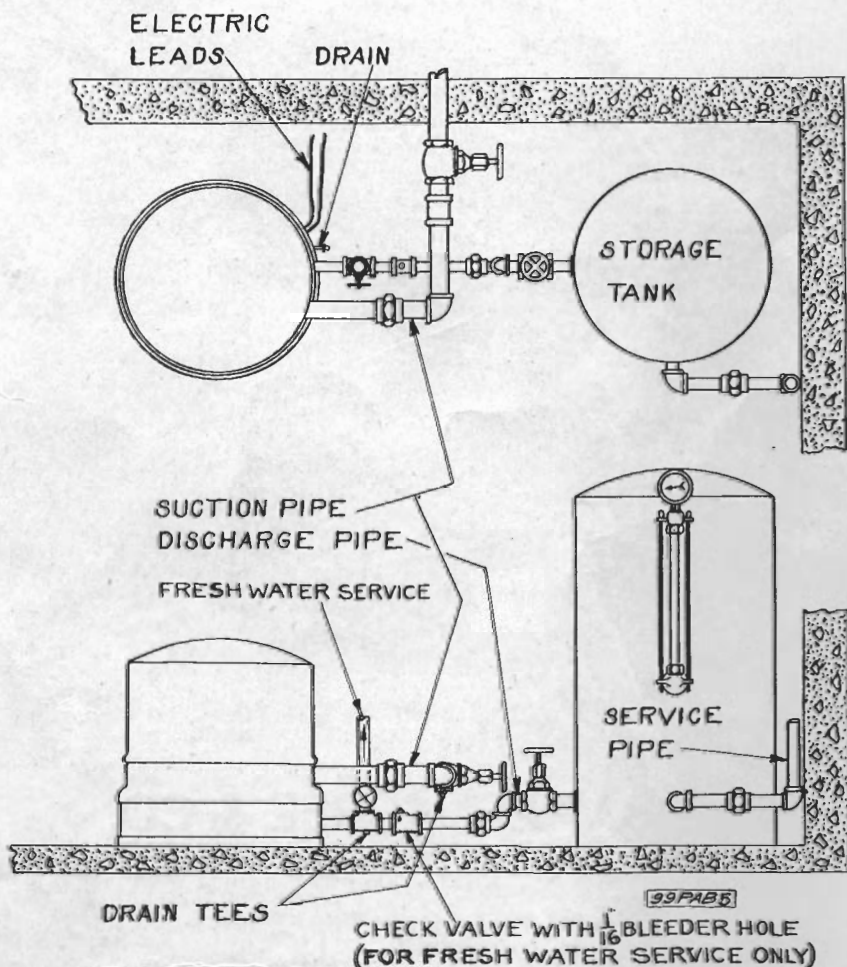
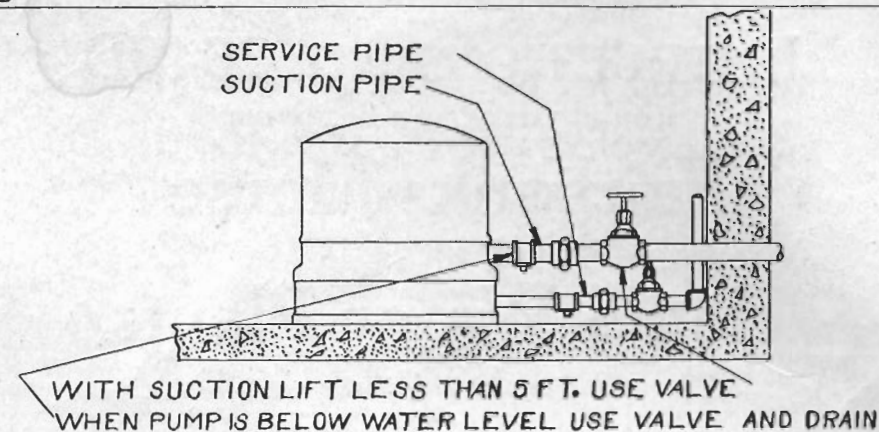
CHICAGO

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Instructions—Home Water Plants for Shallow Wells



PIPING DIAGRAMS

Upper View — No Storage Tank
Lower View — With Storage Tank

Instructions for Installing and Operating FAIRBANKS-MORSE HOME WATER PLANTS FOR SHALLOW WELLS

INSTALLATION

Location

1. The pump and the motor should be located as close to the source of water supply as possible, leaving sufficient room to connect the piping and to make repairs if necessary. Locate the pump so that its suction pipe connection is not more than 22 feet above the low water level in the well. In case the lift is more than 22 feet, and it is necessary to install the pump in a well, the motor must be one of our special types which has received treatment for operation under such conditions. A special motor is also required if the pump is to be installed where there is dust or acid fumes in the air.

Foundation

2. These plants do not require a special foundation, but can be set on the floor, if desired. If set on a concrete floor, it is well to fasten them on 2-inch planks, in such a way as to provide ventilation and drainage under the tank base.

It is suggested that the plant be mounted on a simple but rigid table or platform, in order to keep it up out of the dirt and water that may accumulate on the floor from time to time and so that it may be more conveniently cared for.

Piping

3. Plants to be used without an auxiliary storage tank should be connected in the same manner as shown in the upper part of diagram 99PAB5 on page 2.

When it is desired to use a large storage tank in connection with the plant, connect the system as shown in the lower part of diagram 99PAB5.

Your dealer is prepared to furnish either a 35 gallon or a 70 gallon tank on special order. A gauge glass and a pressure gauge to fit these storage tanks, also can be furnished on special order.

Suction Pipe

4. Connect the suction pipe to the plant as shown in the diagram. Provide a pipe union near the pump, and install a tee with plugged outlet for draining purposes. If the suction pipe must be larger than the suction opening in the pump, use a reducer in the line, just outside of the tank base.

If possible, the suction pipe should slope downward from the pump. Air pockets may be prevented by avoiding overhead loops. Make the pipe as straight as possible, for bends and elbows increase the pipe friction. Arrange the piping so that the end of the suction pipe is always below the low water level in the well. In a cistern, it is advisable to place a strainer at the end of the suction pipe. It is absolutely essential that the suction line be free from air leaks, otherwise the pump will draw air instead of water.

Recommended Suction Pipe Sizes

5. In case the water has to be drawn horizontally as well as vertically from the source of supply, the correct size of suction pipe can be determined from the following table:

PUMP SUCTION PIPE SIZES

| Vertical Distance in Feet from Pump to Water Supply | Horizontal Distance in Feet from Pump to Water Supply with the Correct Size of Suction Pipe in Inches | | | | | | | |
|---|--|---------------|---------------|----------------|---------------|----------------|----------------|----------------|
| | 0 to 10 | | 10 to 50 | | 50 to 100 | | 100 to 200* | |
| | 210 Gallon | 420 Gallon | 210 Gallon | 420 Gallon | 210 Gallon | 420 Gallon | 210 Gallon | 420 Gallon |
| 20-22..... | $\frac{3}{4}$ | 1 | | | | | | |
| 15-20..... | $\frac{3}{4}$ | 1 | 1 | $1\frac{1}{4}$ | 1 | $1\frac{1}{4}$ | $1\frac{1}{4}$ | $1\frac{1}{4}$ |
| 10-15..... | $\frac{3}{4}$ | 1 | $\frac{3}{4}$ | 1 | $\frac{3}{4}$ | 1 | 1 | $1\frac{1}{4}$ |
| 0-10..... | $\frac{3}{4}$ | 1 | $\frac{3}{4}$ | 1 | $\frac{3}{4}$ | 1 | $\frac{3}{4}$ | 1 |

*Where the distance exceeds that given in the table, use the next larger size of pipe.
Avoid elbows and overhead loops.

Suction Lift

The pump should not be subjected to a total suction lift, at the pump, of more than 23 feet, that is 22 feet of static lift and one foot additional for pipe friction. If the pipe friction is greater, the static lift will have to be proportionately less. Increase the pipe size to reduce the friction.

Pump Discharge Pipe

6. These pumps discharge directly into the 5-gallon tank upon which they are mounted. The outlet pipe from this tank comes through the lowest hole in the tank base. A standard $\frac{3}{4}$ inch wrought iron pipe is to be used with a pipe union next to the pump. For draining, and for relieving the pressure in the 5 gallon tank in case of repairs, place a tee in the line and plug the outlet.

While the plant may be used for pumping both hard and soft water, it is much more practicable and desirable to use a separate plant for each service.

Recommended Discharge Pipe Sizes

7. If a storage tank is used in connection with the regular 5-gallon tank and the tank is located some distance from the pump, use the following sizes of discharge pipe:

PUMP TO TANK PIPE SIZES

| Horizontal Distance In Feet Pump to Tank | Size of Pipe, Inches | |
|---|----------------------|-----------------|
| | 210 Gallon Pump | 420 Gallon Pump |
| 0—15..... | $\frac{3}{4}$ | $\frac{3}{4}$ |
| 15—50..... | $\frac{1}{2}$ | $\frac{1}{2}$ |
| 50—200..... | 1 | 1 $\frac{1}{4}$ |

The size of the pipe must be increased in order to reduce the pipe friction and thus enable the pump to keep the tank pressure at the maximum for which the automatic switch is set. If the opening in the 5 gallon tank will not accommodate the size of pipe necessary, use a reducer just outside of the tank base. Avoid the use of elbows and overhead loops.

Service Piping

8. When a storage tank is used in connection with the plant, the service pipe which distributes the water to the system should be connected to this tank at the opening located near the bottom of the tank directly below the openings for the gauge glass.

All tanks have connections for $\frac{3}{4}$ " pipe.

Safety Valve

9. In a water system where a hot water tank is used, we suggest that a pop safety valve (set to blow off at 50 pounds pressure) be installed at the hot water tank to protect the system against an excessive rise in pressure due to overheating the water. Also, install a check valve in the line between the hot water tank and the pump storage tank.

Low Suction

10. If the water lift is less than 5 feet, it will be necessary to put a valve in the suction line, and when the system requires air, to close it gradually until air can be heard passing through the air valve. After the air is restored to the system, open the valve in the suction line.

Air Bound

11. The cistern or well, from which water is drawn, should be provided with a vent. This not only aerates the water and keeps it fresh, but also prevents the well from becoming air bound. A film of ice in the well will prevent the pump from drawing water. The source of water supply must be vented to atmospheric pressure, always.

Electrical Connections

12. Before connecting the motor to the line, compare the name plate data with the specifications of the available electric current. If the current is 110 volt alternating current, the motor must be a 110 volt alternating current motor; if 32 volt direct current, the motor must be a 32 volt direct current motor, etc. Do not connect a direct current motor to an alternating current circuit. The wiring diagram 99PAB7 shows the correct connections. The leads connecting the fused switch with the automatic switch pass through the insulating bushing in the pump housing. Place an approved type of enclosed fused switch between the motor and the line, unless a main line enclosed service switch is already installed when the plant may be connected to an individual fused circuit without the addition of another enclosed switch. Do not make the connection to an ordinary lamp socket. To insure a permanent circuit and to prevent heating, solder and tape all wire connections.

Wire Sizes

13. For connecting the pump motor to the power line use the following sizes of wire:

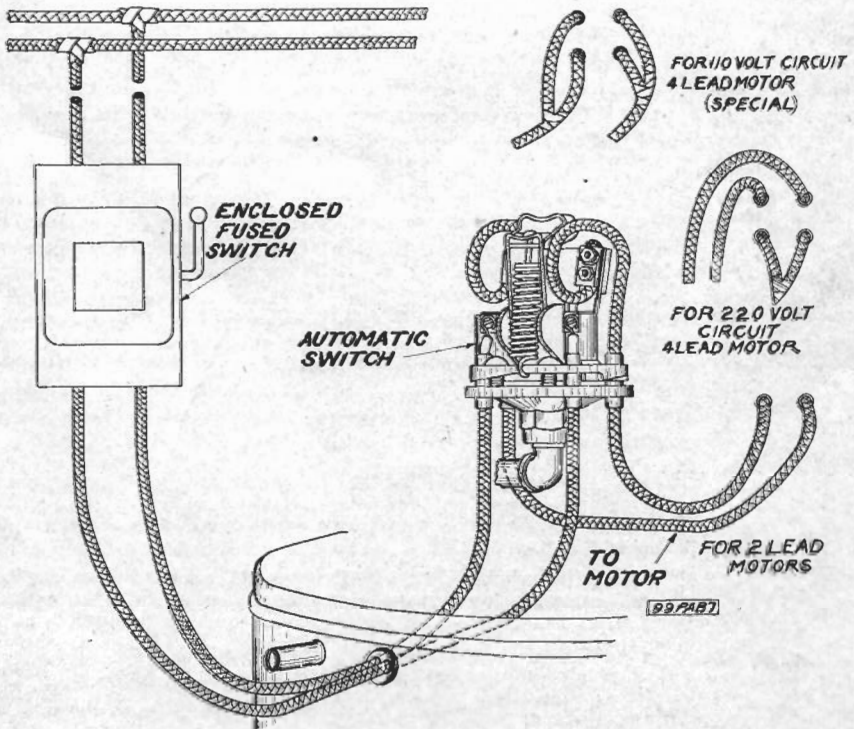
(Based on 100 feet distance from motor to power line.)

RECOMMENDED WIRE SIZES*

B. & S. Gauge—Rubber Covered Copper Wire

| Size of Plant | 32 Volts D. C. | All Other Voltages—D. C. | All Other Voltages—A. C. |
|---------------|----------------|--------------------------|--------------------------|
| 210 | 12 | 14 | 14 |
| 420 | 10 | 14 | 14 |

*Do not use a smaller wire than No. 14 for any installation.



WIRING DIAGRAM

(99PAB7)

Instructions—Home Water Plants for Shallow Wells

Fuses 14. A fuse of the right size is a protection to the motor, and must be installed according to the wiring diagram and size recommended in the following table:

Caution. Do not use larger fuse sizes than those given in the table below.

| Size of Plant Gallons per Hour | Current | Voltage | Size of Fuse Amperes |
|-----------------------------------|---------|---------|-------------------------|
| 210 | A. C. | 110 | 6 |
| | A. C. | 220 | 3 |
| | D. C. | 32 | 15 |
| | D. C. | 115 | 6 |
| | D. C. | 230 | 3 |
| | D. C. | 250 | 3 |
| 420 | A. C. | 110 | 10 |
| | A. C. | 220 | 5 |
| | D. C. | 32 | 30 |
| | D. C. | 115 | 10 |
| | D. C. | 230 | 6 |
| | D. C. | 250 | 6 |

**Wiring
Diagram**

15. As indicated in the wiring diagram 99PAB3, place the fuses between the main line and the motor. This will prevent injury to the motor should it become greatly overloaded, such as would be the case if the pressure switch should fail to operate at the proper time and the relief valve should be slow in opening.

CARE AND OPERATION

Lubrication

16. When the plant is received, remove the oil hole plug and fill the crankcase up to the edge of the hole with a good grade of medium lubricating oil. The word "OIL" in raised letters near this plug clearly indicates its location. Always replace the oil hole plug in order to exclude any foreign matter from the lubricating oil. The lubrication of the pump is automatic, and no further lubrication is necessary until the level of this oil has dropped approximately $\frac{1}{4}$ of an inch, then more oil should be added. Replenish this oil at least every six months. Remove the old oil every two years and replace with a fresh supply. Where the pump will be subjected to cold weather use a light grade of oil.

**Priming
and Starting**

17. Unscrew the bonnet head machine bolt, then remove the bonnet and valve plate, leaving the lower valve plate gasket in place. Fill both sides of the cylinder chamber with water and allow to stand until the piston cup leathers are well soaked up. The higher the suction lift, the more necessary it is to soak the leathers thoroughly, in order to make them tight enough to pump properly. After they are sufficiently soaked, fill both sides of the water box until the water stands as high as possible over the valve plate lower gasket. Now carefully replace the valve plate, bonnet gasket and bonnet in their original positions and screw the bonnet machine bolt down securely.

If the bonnet, piping, etc., have been made air tight, and the cup leathers are sufficiently soaked, the pump should be pumping properly within two or three minutes after starting up.

If the pump fails to prime after proceeding as above, repeat the priming, first being sure that no air leaks exist and also that the cup leathers are thoroughly soaked.

**Special
Priming**

18. For extreme suction lifts, a special method of priming may be used. This method employs a valve in the discharge line, next to the 5-gallon tank, and the valve is closed, while priming, in order to build up a pressure of 5 to 10 pounds in the tank.

With the priming plug 1109D, page 12, removed from the bonnet, pour about 3 gallons of water into the priming opening while the pump is running. As soon as water enters the cylinders, suction will be audible at the priming plug opening.

Now stop the pump, replace the priming plug tightly and again start the pump. Within 3 to 7 minutes, depending on the suction lift, the pump should be fully primed and pumping properly.

Should the pump fail to prime, open the valve in the discharge line to relieve the pressure in the tank, close the valve again and repeat the priming process.

Self-Priming Pump

19. After the first priming, the pump will start without further priming, provided of course that the pump and piping remain air tight. A small hole near each discharge valve allows water forced by pressure from the tank to leak back, keeping the piston chamber full regardless of any small leak at the stuffing box. If the pump does not start working promptly, it may be that these holes are clogged. They can be opened with a needle after removing the bonnet.

Air Valve and Water Level

20. The air valve 2418A, in the water box 2E on the same side as the oil filler opening, provides air to maintain the proper pressure and air cushion for the system. On plants equipped with a storage tank, a mark on the storage tank, behind the gauge glass, indicates the proper water level in the tank when the gauge shows a tank pressure of 40 pounds per square inch. Whenever the water level comes higher than this mark on the tank, more air should be added to the system. Remove the air valve cap 2417 and press in slightly on the valve to insure that it is not stuck. When the pump is started, a small amount of air will be drawn in at each revolution. Do not leave the cap unscrewed continuously or the system will fill with air. This air valve has a special spring, as the ordinary air valve will not admit air. The water box may be drained at the air valve end by removing the valve.

Automatic Switch

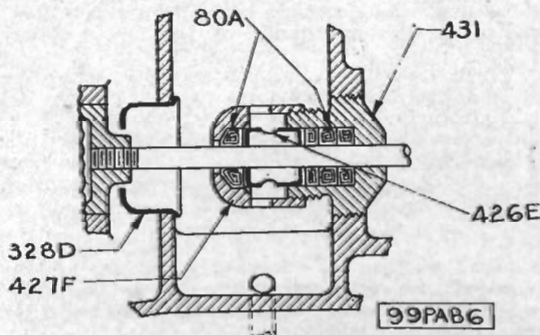
21. After the system is once supplied with water, the operation is automatic. The automatic switch is set at the factory to start the motor when the tank pressure drops to about 20 pounds, and to stop the motor when the pressure rises to about 40 pounds. By tightening the switch main spring screw 2260, the cut-out and the cut-in points can be increased, but should not be adjusted beyond the maximum pressure of 50 pounds per square inch. By tightening the switch range spring screw 2262, the range over which the switch operates can be increased. In other words, the automatic switch provides for the adjustment of the maximum pressure as well as for the adjustment of the working range of pressure between the cut-in point and the cut-out point. When a new diaphragm 1352 is used, the switch frame to base round head machine screws should be tightened evenly so that the switch pad post will be in correct alignment. Be sure that all the electrical connections are tight and that the two sets of brush leaves make contact at the same time.

Inspect the System

22. It is well to inspect the system occasionally to see that all the joints are tight and that the parts are properly lubricated. Oil the automatic switch sparingly so as to prevent oil from running onto the rubber diaphragm. In case the automatic switch should fail to function properly, examine it to see that the switch pad post moves freely in the orifice of the switch base 624B. The fulcrum pins should be free from rust and have about $\frac{1}{32}$ " end play. The two switch brush leaves should close at the same time to avoid excessive arcing.

Packing

23. If the pump leaks water around the piston rod, screw up the piston rod stuffing box gland cap 427F, or repack the stuffing box. To repack the stuffing box, unscrew the gland cap and push it back, then move the gland 426E back and add the required number of packing rings 80A. Replace the gland and tighten the gland cap with gland cap wrench 2263 provided. The packing ring in the gland cap should be replaced when repacking the gland or in case of excessive leakage along the piston rod.



SECTION THROUGH STUFFING BOX (99FAB6)

Instructions—Home Water Plants for Shallow Wells

Strainer 24. A strainer 187D for catching any dirt that might interfere with the operation of the valves, is located in the discharge valve plate 386D. Remove and clean it occasionally. This may be done by unscrewing the bonnet cap screw and lifting off the bonnet and valve plate.

Relief Valve 25. The relief valve 284D is located in the bonnet of the pump. The purpose of this valve is to by-pass the water should the discharge pressure become excessive. The valve is set at the factory to open at a pressure of about 65 pounds per square inch.

Draining the System 26. When there is any likelihood of freezing, drain the system completely. To drain the stuffing box end of the water box, remove the air valve. On 420-gallon pumps remove also the pipe plug, opposite the air valve on the other side of the pump, to drain that side of the water box.

To drain the head end of the water box, remove the fresh water fitting and water box head pipe plugs (2 on the 420-gallon pump). Remove the bonnet and valve plate so that the water can drain out freely.

By means of the tees mentioned in paragraphs 4 and 6, drain the suction and discharge pipes, and the adjacent parts of the pump.

All outside piping must be laid below the frost line and be provided with drains.

MOTOR INSTRUCTIONS

Starting 27. The motor will start successfully under load within the limits of the automatic switch. No starting rheostat is necessary.

Lubrication 28. The motor bearings are provided with a wick oiling device that is supplied from a well below the bearing. To lubricate raise the spring cap above the bearing and fill the well with a good grade of light or medium mineral oil. Lubricate the bearings every three months.

Commutator 29. Use no lubricant on the commutator, and keep it free from oil and grease. If the surface of the commutator becomes very black or rough, polish the commutator with No. 00 sandpaper while the motor is running. Do not use emery cloth. When polished thoroughly, wipe with a kerosene dampened cheese cloth. If the commutator is kept clean, sanding seldom will be necessary.

Brushes 30. The brushes must slide easily in the holders and press rather firmly on the commutator at all times. Examine the brushes and clean the brush holders occasionally. Make sure that the brushes fit the brush holder and the commutator properly. When fitting the brushes, take a piece of fine sand paper and place it around the commutator, sand side out, then rotate it under the brushes. This will give the brush the same curvature as the commutator.

Cleaning 31. If dust or dirt accumulates in the motor, it should be blown out with a bellows or with low pressure air.

Motor Troubles 32. If the instructions for installing and operating these plants are followed carefully, no trouble should be encountered.

These motors are in good running condition when they leave the Factory, having been rigidly tested separately as well as in operation on the pumps. However, regardless of the perfection of any make of motor, always there will be a certain percentage of improper installations or lack of care that results in motor trouble.

It is for the purpose of assisting the purchaser of these pumping plants to determine and the more quickly to remedy any such troubles, if they occur, that a rather exhaustive summary of symptoms, causes and remedies of motor troubles is provided below.

TROUBLE CHART FOR PUMPS

The accompanying chart gives a list of pump troubles, together with the probable causes and remedies, which might occur and which the purchaser can remedy himself. Any trouble which might arise which is not mentioned in the chart should be taken care of by an expert; or, in case an expert is not available, the purchaser should refer to the dealer for instructions.

| Trouble | Probable Cause | Remedy |
|--|--|--|
| Pump will not prime. | <ol style="list-style-type: none"> 1. Leaky suction line. 2. Leaky gaskets under bonnet or priming plug cap. 3. Bonnet bolt not tight. 4. Bleeder holes through valve plate or fresh water valve plugged. 5. Valves not seating properly. 6. Water box not filled full in priming. 7. Cup leathers not soaked up. 8. Valves worn out after long service. | <ol style="list-style-type: none"> 1. Tighten up suction line. 2. If gaskets are in good condition anneal by heating to dull red and quenching in water. 3. Tighten bolt. 4. Open holes. 5. Clean sand and dirt from seat. See that there are no burrs at valve seat openings. 6. Fill waterbox full. 7. Allow a short time for leathers to soak up. 8. Replace with new valves. |
| Pump noisy | <ol style="list-style-type: none"> 1. Strainer clogged. 2. 5 gal. tank water logged. 3. Relief valve opening. 4. Vibration of pipe lines against wall or other pipes. | <ol style="list-style-type: none"> 1. Clean Strainer. 2. Admit air (See Para. 20, page 7) 3. Switch opens at too high a pressure. See that switch orifice is not clogged. Relief valve opening at too low a pressure. (See Para. 25, page 8.) 4. Anchor pipes. |
| Pump loses prime after being in operation. | <ol style="list-style-type: none"> 1. Bleeder holes in valve plate or fresh water valve seat clogged. 2. Dirt etc., under valves. 3. Valves worn out after long service. | <ol style="list-style-type: none"> 1. Clear holes. 2. Clean valve seats. 3. Replace with new valves. |

TROUBLE CHART FOR MOTORS

The accompanying chart gives a list of the possible motor troubles, together with the probable causes and remedies, which might occur and which the purchaser can remedy himself. Any trouble which might arise which is not referred to in the chart should be taken care of by an expert electrician; or, in case an expert is not available, the purchaser should refer to the dealer for instructions.

| Trouble | Probable Cause | Remedy |
|-------------------------------|---|--|
| Motor will not start | <ol style="list-style-type: none"> 1. Fuses blown. 2. Poor connections. 3. Motor brushes stuck in brush holder. 4. One of switch contacts burned through. 5. One of switch brushes not making contact. | <ol style="list-style-type: none"> 1. Replace fuse seeing that it makes good contact. 2. Tighten up all connections. See that contact surfaces are bright. 3. Remove brushes and clean. Brushes must be free in holder. 4. Renew contacts. 5. Motor will start when switch cam lever is pressed down. Throw off power and adjust brushes slightly by bending. |
| Motor seems weak | <ol style="list-style-type: none"> 1. Low voltage from power line. | <ol style="list-style-type: none"> 1. Refer to power company. |
| Motor fuses blow | <ol style="list-style-type: none"> 1. Motor terminals not properly connected to power circuit. 2. Damaged motor windings. | <ol style="list-style-type: none"> 1. Check motor line connections. See diagram 99PAB3 (Page 5). 2. Should be repaired by expert or report to dealer for instructions. |
| Excessive sparking at brushes | <ol style="list-style-type: none"> 1. Brush spring tension weak. 1 (b) Brush spring not in proper position. 2. Brushes not properly fitted. 3. Natural wear of brushes. 4. Rough commutator. | <ol style="list-style-type: none"> 1. 1 (b) Correct spring position or replace spring. 2. Take a thin piece of No. 00 sand paper (not emery) and place under the brush with rough side next to the brush. Hold the two ends close to the commutator bars and sand the brush until it conforms to the curve of the armature. 3. Replace with new brushes from the factory. The ordinary carbon brush will not give satisfactory results. Fit new brush to commutator as explained above. 4. Polish commutator with No. 00 sandpaper (do not use emery). |
| Worn bearings | <ol style="list-style-type: none"> 1. Insufficient lubrication. 2. Wrong kind of lubrication 3. Excessive end play. | <ol style="list-style-type: none"> 1 & 2. Replace bearings and lubricate thoroughly with medium weight, high grade engine oil. 3. If end play exceeds $\frac{1}{32}$" tighten adjusting nuts. |

INSTRUCTIONS FOR ORDERING REPAIR PARTS

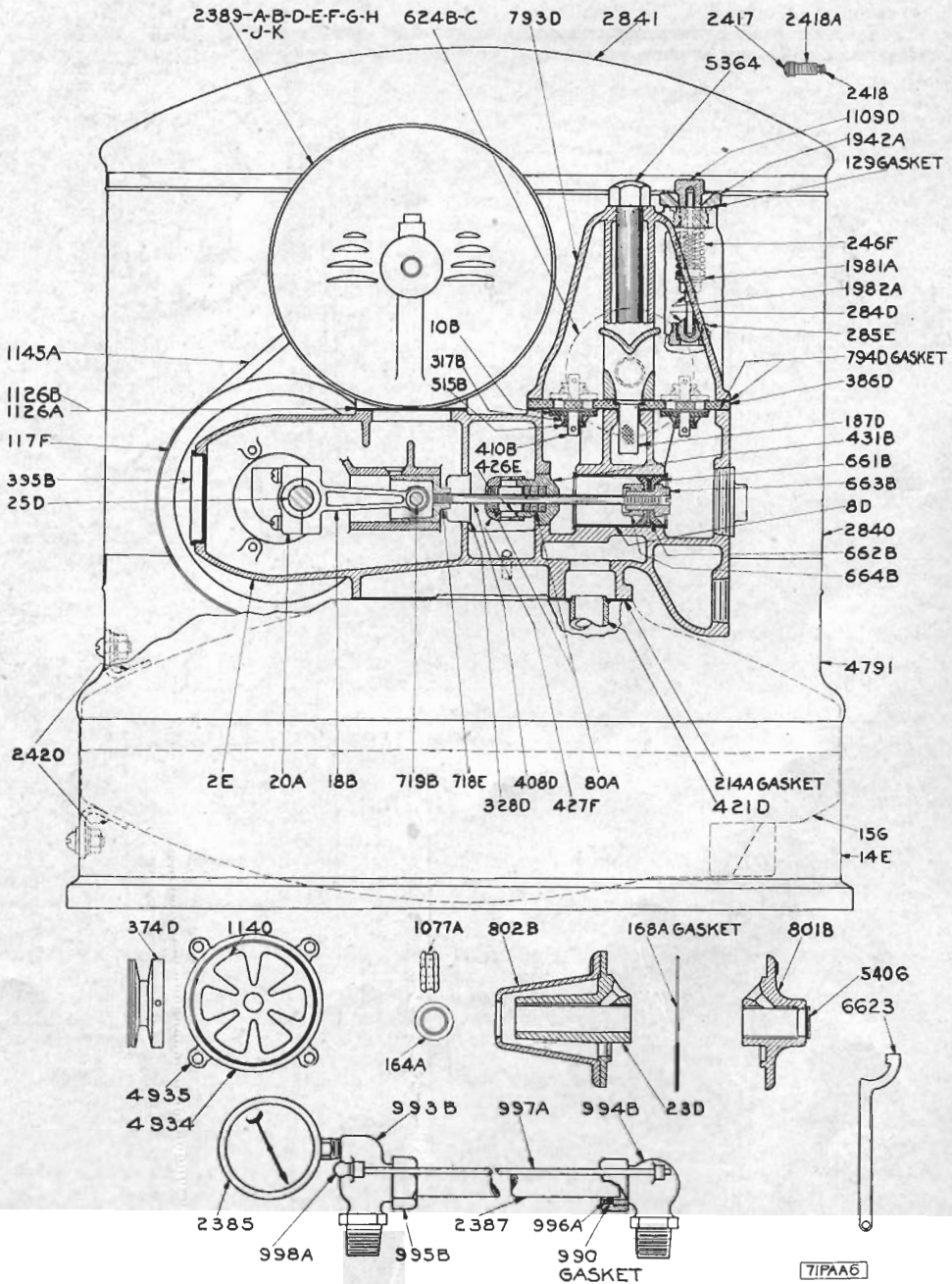
To insure obtaining the proper repair parts without delay, give the complete description of the part, or parts, wanted, as shown in the following example:

| | |
|---------------------|--|
| Description of Part | <ol style="list-style-type: none"> 1. Quantity of parts wanted—"one." 2. Repair number—"395B." 3. Name of part—"frame end plate." 4. Size of plant—"420 gallons." 5. Type of plant—"Home Water Plant." 6. Style of plant—"shallow well." 7. Pump serial number—"102665B." |
| Repair Order | The repair order in this case, should read: "One 395B, frame end plate for 420 gallon shallow well Home Water Plant serial number 102665B." |
| Pump Serial Number | IMPORTANT —The most important items of the above information are the repair number and the pump serial number. The latter is stamped on the opposite pulley side of the frame and water box casting, on the motor pad. |

HOW TO USE THE REPAIR LIST AND THE REPAIR CHARTS

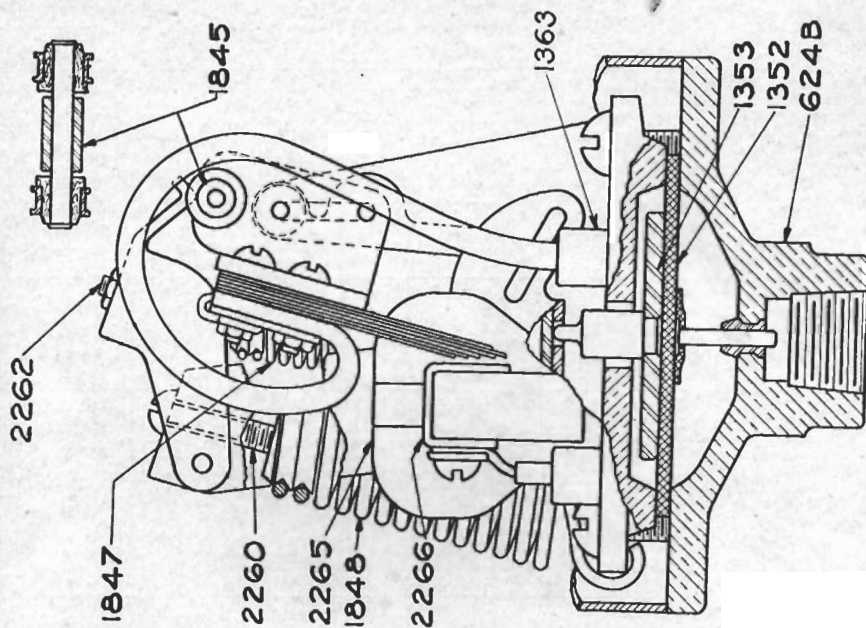
| | |
|------------------------------|---|
| Numerical Arrangement | The first column at the left of each page shows the repair numbers of all complete groups and all separate parts, arranged in numerical order. |
| Complete Group | The repair number, when shown in bold-face type and followed by a dash and the letter "C" (indicating complete), is a group number which covers all the items to the next horizontal line. |
| "Group Part" Column | The second column from the left contains the repair numbers of all the parts included in each of these groups. |
| Bracketed Group | Parts, which are followed by the words "always with," are not furnished separately, but only with the parts included within the brackets. |
| "Included in Group" Column | When a part is shown with its repair number in numerical order (in the first column), the "Included in Group" column will indicate whether this part is also in a group. |
| "Number Used" Column | The number of parts used in each group is shown in the "Number Used" column. The total number of parts used is shown when the part is arranged in numerical order. |
| Repair Charts | The repair charts show all the parts which have repair numbers. The part wanted can be found by locating its repair number on the repair chart, and the name of the part then found by locating the same repair number, in numerical order, in the repair list. |
| Ordering by Groups | Always order by group number if possible. Before doing so, carefully check over the group to make sure that all parts included therein are wanted, for they will all be furnished unless otherwise specified. If it is found that in a group every part but one or two is wanted, order the group and specify "less" the repair numbers not wanted. For example, if in the 284D-C group, every part is wanted except the relief valve spring 246F; the order should read: "One 284D-C Relief Valve less relief valve spring 246F for 420 Gallon Shallow Well Home Water Plant, serial number 102665B." |
| Parts without Repair Numbers | If any part without a repair number is wanted, such as a stud, cap screw, bolt, etc., refer to the repair chart and find the number of the part with which it is used. Then by referring to the repair list, the part without a repair number will be found following the numbered part with which it is used. In some cases, the part without a repair number will be found following the numbered part in the numerical arrangement of the repair numbers. Use the name and the size of the parts, as shown in the repair list, when ordering parts which have no repair numbers. If the size of these parts is the same on all sizes of the product, only one dimension is shown following the part (in the "NAME OF PART" column) when arranged in numerical order. If the sizes of the parts without repair numbers are different, each dimension is listed in the same order as in the "Number Used" columns. |

Repair List—Home Water Plants for Shallow Wells



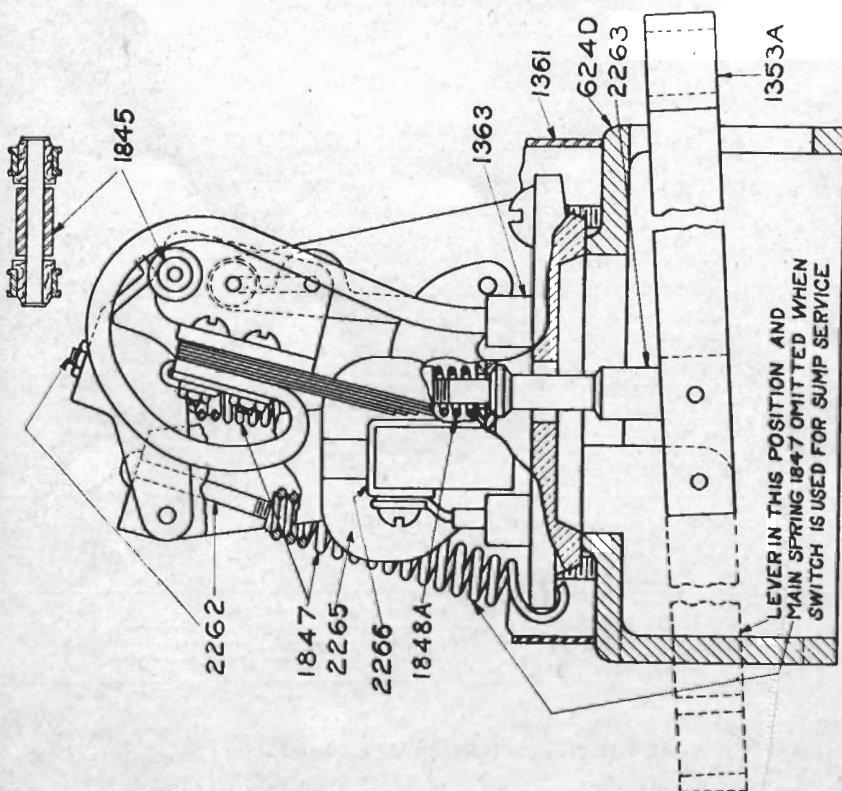
REPAIR CHART—HOME WATER PLANT

(71PAA6)



71PBD12

REPAIR CHART
(71PBD12)



71PBD13

REPAIR CHART
(71PBD13)

FLOAT SWITCH

LEVER IN THIS POSITION AND
MAIN SPRING 1847 OMITTED WHEN
SWITCH IS USED FOR SUMP SERVICE

Repair List—Home Water Plants for Shallow Wells

| Repair Numbers | | Before Ordering Repair Parts Read the Instructions on Page 11 | Included in Group | Number Used | |
|-------------------------|--------------------------|--|-------------------------|----------------|-------------|
| Arranged Numerically | Group Part | | | 210 Gal. | 420 Gal. |
| | | NAME OF PART | | | |
| 2F-C | 2F 8D 431B | 2F-C Frame and Water Box..... | | 1 | |
| | | Frame and Water Box, always with..... | | 1 | |
| 2F | 328D | Frame and Water Box Liner..... | | 1 | |
| | | Piston Rod Stuffing Box..... | | 1 | |
| | | Frame and Water Box Oil Hole Plug..... | | 1 | |
| | | Frame and Water Box Elbow..... | | 1 | |
| | | Frame and Water Box Nipple..... | | 1 | |
| | | Frame and Water Box Nipple..... | | 1 | |
| | | Fresh Water Fitting Pipe Plug..... | | 1 | |
| | | Oil Shield..... | | 1 | |
| | | Water Box Head Pipe Plug..... | | 1 | |
| | | Frame and Water Box Oil Hole Plug, 1/4"..... | 2F | 1 | |
| 2F-C | 2F 8D 431B 328D | Frame and Water Box Elbow, 1/8"..... | | 1 | |
| | | Frame and Water Box Nipple, 1/8x1 1/2"..... | | 1 | |
| | | Frame and Water Box Nipple, 1/8x9"..... | | 1 | |
| | | Fresh Water Fitting Pipe Plug, 1/2"..... | | 1 | |
| | | Water Box Head Pipe Plug, 1 1/4"..... | | 1 | |
| | | 2F-C Frame and Water Box..... | | 1 | |
| | | Frame and Water Box, always with..... | | 1 | |
| | | Frame and Water Box Liner..... | | 2 | |
| | | Water Box Head Pipe Plug..... | | 2 | |
| | | Piston Rod Stuffing Box..... | | 2 | |
| 2F | 328D | Frame and Water Box Oil Hole Plug..... | | 1 | |
| | | Oil Shield..... | | 2 | |
| | | Frame and Water Box Drain Pipe Plug..... | | 1 | |
| | | Frame and Water Box Elbow..... | | 1 | |
| | | Frame and Water Box Nipple..... | | 1 | |
| | | Frame and Water Box Nipple..... | | 1 | |
| | | Fresh Water Fitting Pipe Plug..... | | 1 | |
| 8D 10B 14E | 15G | Water Box Head Pipe Plug, 1 1/4"..... | 2F | 2 | |
| | | Frame and Water Box Oil Hole Plug, 1/4"..... | | 1 | |
| | | Frame and Water Box Drain Pipe Plug, 1/8"..... | | 1 | |
| | | Frame and Water Box Elbow, 1/8"..... | | 1 | |
| | | Frame and Water Box Nipple, 1/8x1 1/2"..... | | 1 | |
| | | Frame and Water Box Nipple, 1/8x9"..... | | 1 | |
| | | Fresh Water Fitting Pipe Plug, 1/2"..... | | 1 | |
| | | Frame and Water Box Liner..... | 2F | 1 | |
| | | Suction and Discharge Valve..... | 386D | 2 | |
| | | Tank Base..... | 15G | 8 | |
| 15G | 15G | 5 Gallon Tank (Standard), always with..... | | 1 | |
| | | Pump Stud..... | | 4 | |
| | | Pump Stud Nut..... | | 4 | |
| | | Pump Discharge Pipe (Not furnished separately)..... | | 4 | |
| | | Tank Base..... | | 1 | |
| | | Tank Housing Collar..... | | 1 | |
| | | Tank Housing Wiring Insulator..... | | 1 | |
| | | Tank Bracket (Not furnished separately)..... | | 1 | |
| | | Tank Bracket to Base and Collar R. H. Stove Bolt..... | | 6 | |
| | | Tank Bracket to Base and Collar Bolt Plate Washer..... | | 6 | |
| 18B-C 18B | 18B 20A | Tank Bracket to Base and Collar Bolt Lockwasher..... | | 9 | |
| | | Pump Stud, 1/4x1 1/2"..... | | 4 | |
| | | Pump Stud Nut, 1/2"..... | | 4 | |
| | | Tank Bracket to Base and Collar Stove Bolt, 1/4x3/8"..... | 15G | 4 | |
| | | Tank Bracket to Base and Collar Bolt Plate Washer, 1/4"..... | | 6 | |
| | | Tank Bracket to Base and Collar Stove Bolt Lockwasher, 1/4"..... | | 9 | |
| | | 18B-C Connecting Rod..... | | 1 | |
| | | Connecting Rod, always with..... | | 1 | |
| | | Connecting Rod Cap (Not furnished separately)..... | | 1 | |
| | | Connecting Rod to Cap Fillister Head Cap Screw..... | | 2 | |
| 20A 23D | 20A 23D | Connecting Rod Cap Screw Lockwasher..... | | 2 | |
| | | Connecting Rod to Cap Fillister Head Cap Screw, 1/4x1"..... | | 2 | |
| | | Connecting Rod Cap Screw Lockwasher, 1/4"..... | 18B-C | 4 | |
| | | Connecting Rod Cap (Not furnished separately)..... | | 1 | |
| | | Main Bearing Liner (Pulley side)..... | | 1 | |
| 26D-C 25D | 25D 164A | 26D-C Crankshaft..... | | 1 | |
| | | Crankshaft, always with..... | | 1 | |
| | | Oil Thrower..... | | 1 | |

Repair List—Home Water Plants for Shallow Wells

15
2640D

| Repair Numbers | | Before Ordering Repair Parts Read the Instructions on Page 11 | Included in Group | Number Used | |
|--|---------------|--|-------------------------|----------------|-------------|
| Arranged Numerically | Group Part | | | 210 Gal. | 420 Gal. |
| 80A 80A 117F | | Piston Rod Stuffing Box Packing Ring..... | 431B-C | 4 | 8 |
| | | Piston Rod Gland Cap Packing Ring..... | 431B-C | 1 | 2 |
| | | Pump Pulley with Woodruff Key (Give motor speed)..... | 117F | 1 | 1 |
| | | Pump Pulley Woodruff Key #3..... | 117F | 1 | 1 |
| | | Pump Pulley Lock Nut, 3/8" N. F..... | 117F | 1 | 1 |
| | | Pump Pulley Lockwasher, 3/8"..... | 117F | 1 | 1 |
| 129 | | Bonnet Cap Gasket..... | 117F | 1 | 2 |
| 164A | | Crankshaft Oil Thrower..... | 25D-C | 1 | 1 |
| 168A | | Main Bearing Plate Gasket..... | 117F | 10 | 10 |
| 187D | | Suction Strainer..... | 117F | 1 | 2 |
| 214A | | Pump to Tank Gasket..... | 117F | 3 | 3 |
| 246F | | Relief Valve Spring..... | 284D-C | 1 | 2 |
| 284D-C | | 284D-C Relief Valve..... | | 1 | 2 |
| 284D | 284D | Relief Valve..... | | 1 | 2 |
| 285E | 285E | Relief Valve Seat..... | | 1 | 2 |
| | 246F | Relief Valve Spring..... | | 1 | 2 |
| | 1981A | Relief Valve Spring Collar..... | | 1 | 2 |
| | | Relief Valve Spring Collar Lock Nut, 1/4"..... | | 1 | 2 |
| | 1982A | Relief Valve Stem..... | | 1 | 2 |
| | | Relief Valve Spring Collar Lockwasher, 1/4"..... | | 1 | 2 |
| 317B | | Suction and Discharge Valve Spring..... | 386D-C | 4 | 8 |
| 328D | | Oil Shield..... | 2F | 1 | 2 |
| 374D | | Motor Pulley (Give motor speed) with Set Screw..... | 374D | 1 | 1 |
| | | Motor Pulley Set Screw, 1/4"x3/8"..... | 374D | 1 | 1 |
| 386D-C | | 386D-C Valve Plate..... | | 1 | 2 |
| | 386D | Valve Plate, always with..... | | 1 | 2 |
| | 410B | Valve Stem (Not furnished separately)..... | | 4 | 8 |
| | 10B | Suction and Discharge Valve..... | | 4 | 8 |
| | 317B | Suction and Discharge Valve Spring..... | | 4 | 8 |
| | 515B | Suction and Discharge Valve Spring Guard..... | | 4 | 8 |
| | | Suction and Discharge Valve Stem Cotter..... | | 4 | 8 |
| 395B | | Frame End Plate..... | | 1 | 1 |
| 408D-C | | 408D-C Piston Rod..... | | 1 | 2 |
| | 408D | Piston Rod, always with..... | | 1 | 2 |
| | 718E | Cross Head (Not furnished separately)..... | | 1 | 2 |
| | 663B-C | Water Piston..... | | 1 | 2 |
| 410B | | Suction and Discharge Valve Stem (Not furnished separately).... | 386D | 4 | 8 |
| | | Suction and Discharge Valve Stem Cotter, 5/16"x1/2"..... | 386D | 4 | 8 |
| | | Pump Discharge Pipe Coupling, 3/4"..... | 15G | 1 | 1 |
| | | Pump Discharge Pipe (not furnished separately)..... | 15G | 1 | 1 |
| 421D | | Piston Rod Stuffing Box Gland..... | 431B-C | 1 | 2 |
| 426F | | Piston Rod Stuffing Box Gland Cap..... | 431B-C | 1 | 2 |
| 427F | | | | | |
| 431B-C | | 431B-C Piston Rod Stuffing Box..... | | 1 | 2 |
| 431B | 431B | Piston Rod Stuffing Box..... | 2F | 1 | 2 |
| | 426E | Piston Rod Stuffing Box Gland..... | | 1 | 2 |
| | 427F | Piston Rod Stuffing Box Gland Cap..... | | 1 | 2 |
| | 80A | Piston Rod Stuffing Box Packing Ring..... | | 4 | 8 |
| | 80A | Piston Rod Gland Cap Packing Ring..... | | 1 | 2 |
| | 6623 | Gland Cap Wrench..... | | 1 | 1 |
| 515B | | Suction and Discharge Valve Guard..... | 386D-C | 4 | 8 |
| 624B-C | | 624B-C Pressure Switch..... | | 1 | 1 |
| | | The following switch parts can be furnished for repairs: | | | |
| 624B | 624B | Switch Base with Insert..... | | 1 | 1 |
| | | Switch Frame to Base R. H. M. Screw 1/4"-20x3/4"..... | | 6 | 6 |
| | 1352 | Switch Diaphragm with Washer and Rivet..... | | 1 | 1 |
| | 1353 | Switch Pad with Post..... | | 1 | 1 |
| | 1363 | Switch Wire Insulation Bushing..... | | 4 | 4 |
| | 1845 | Switch Cam Lever Roller with Shaft..... | | 1 | 1 |
| | 1848 | Switch Main Spring with Plug..... | | 1 | 1 |
| | 2260 | Switch Main Spring Screw..... | | 1 | 1 |
| | 1847 | Switch Range Spring with Plug..... | | 1 | 1 |
| | 2262 | Switch Range Spring Screw with Nut..... | | 1 | 1 |
| | 2265 | Switch Terminal Base..... | | 2 | 2 |
| | | Switch Terminal Base R. H. M. Screw #6-32x1/4"..... | | 4 | 4 |
| | 2266 | Switch Terminal Base Contact..... | | 2 | 2 |
| | | Switch Terminal Base Contact R. H. M. Screw #6-32x1/4"..... | | 2 | 2 |
| | | Switch Terminal Base Contact R. H. M. Screw Washer..... | | 2 | 2 |
| <p>Note: If repairs other than those listed above are required, the complete switch should be returned to the company for servicing. A flat rate service charge will be made.</p> | | | | | |

Repair List—Home Water Plants for Shallow Wells

| Repair Numbers | | Before Ordering Repair Parts Read the Instructions on Page 11 | Included in Group | Number Used | |
|-------------------------|---------------|---|-------------------------|----------------|-------------|
| Arranged Numerically | Group Part | | | 210 Gal. | 420 Gal. |
| 624D-C | | 624D-C Float Switch for Sump Service | | 1 | 1 |
| | | The following switch parts can be furnished for repairs: | | | |
| 624D | 624D | Float Switch Base..... | | 1 | 1 |
| | 1353A | Float Switch Float Lever with Pin..... | | 1 | 1 |
| | 2263 | Float Switch Link Bolt..... | | 1 | 1 |
| | | Float Switch Link Bolt Nut #10-24..... | | 1 | 2 |
| | | Lead Wire Ferrules..... | | 2 | 2 |
| | 1361 | Switch Cover..... | | 1 | 1 |
| | 1363 | Switch Wire Insulation Bushing..... | | 4 | 4 |
| | 1845 | Switch Cam Lever Roller with Shaft..... | | 1 | 1 |
| | 1848A | Switch Link Bolt Spring..... | | 1 | 1 |
| | 1847 | Switch Range Spring with Plug..... | | 1 | 1 |
| | 2262 | Switch Range Spring Screw with Nut..... | | 1 | 1 |
| | 2265 | Switch Terminal Base..... | | 2 | 2 |
| | | Switch Terminal Base R. H. M. Screw #6-32x $\frac{1}{8}$ "..... | | 4 | 4 |
| | 2266 | Switch Terminal Base Contact..... | | 2 | 2 |
| | | Switch Terminal Base Contact R. H. M. Screw..... | | 2 | 2 |
| | | Switch Terminal Base Contact R. H. M. Screw Washer..... | | 2 | 2 |
| | | Note: If repairs other than those listed above are required, the complete switch should be returned to the company for serv- icing. A flat rate service charge will be made. | | | |
| 661B | | Piston Cup Leather..... | 663B-C | 2 | 4 |
| 662B | | Piston Cup Leather Spreader..... | 663B-C | 2 | 4 |
| 663B-C | | 663B-C Piston | 408D-C | 1 | 2 |
| 663B | 663B | Piston..... | | 1 | 2 |
| | 661B | Piston Cup Leather..... | | 2 | 4 |
| | 662B | Piston Cup Leather Spreader..... | | 2 | 4 |
| 664B | 664B | Piston Follower..... | | 1 | 2 |
| 718E | | Crosshead (Not furnished separately)..... | 408D | 1 | 2 |
| 719B | | Crosshead Pin..... | | 1 | 2 |
| 793D | | Bonnet with Relief Valve Seat 285E..... | | 1 | 2 |
| 794D | | Bonnet and Valve Plate Gasket..... | | 2 | 4 |
| 801B | | Main Bearing Plate (Opposite pulley side)..... | | 1 | 1 |
| | | Main Bearing Plate R. H. M. Screw, $\frac{1}{4}$ "—20x $\frac{1}{4}$ "..... | | 6 | 6 |
| 802B | | Main Bearing Plate (Pulley side)..... | | 1 | 1 |
| 1077A | | Tank Housing Wiring Insulator..... | 15G | 1 | 1 |
| 1109D | | Bonnet Priming Plug..... | | 1 | 2 |
| 1126A | | Frame Top Plate..... | | 3 | 1 |
| 1126B | | Frame Adapter Plate..... | | 1 | 2 |
| | | Frame Adapter Plate Capscrew, $\frac{3}{8}$ x1"..... | | 2 | 2 |
| | | Frame Adapter Plate Capscrew Lockwasher, $\frac{3}{8}$ "..... | | 2 | 2 |
| 1140 | | Fan..... | | 1 | 1 |
| | | Fan Fillister Head Screw, #4—40x $\frac{1}{4}$ "..... | | 3 | 3 |
| | | Fan Fillister Head Screw Lockwasher, #4..... | | 3 | 3 |
| 1145A | | Endless Belt..... | | 1 | 2 |
| 1352 | | Switch Diaphragm with Washer and Rivet..... | 624B-C | 1 | 1 |
| 1353 | | Switch Pad with Post..... | 624B-C | 1 | 1 |
| 1353A | | Float Switch Float Lever with Pin..... | 624D-C | 1 | 1 |
| 1361 | | Switch Cover..... | 624D-C | 1 | 1 |
| 1363 | | Switch Wire Insulation Bushing..... | 624B-C | 4 | 4 |
| | | | 624D-C | | |
| 1845 | | Switch Cam Lever Roller with Shaft..... | 624B-C | 1 | 1 |
| | | | 624D-C | | |
| 1847 | | Switch Range Spring with Plug..... | 624B-C | 1 | 1 |
| | | | 624D-C | | |
| 1848 | | Switch Main Spring with Plug..... | 624B-C | 1 | 1 |
| 1848A | | Switch Link Bolt Spring..... | 624D-C | 1 | 1 |
| 1942A | | Bonnet Cap..... | | 1 | 2 |
| 1981A | | Relief Valve Spring Collar..... | | 1 | 2 |
| | | Relief Valve Spring Collar Lockwasher, $\frac{1}{4}$ "..... | | 1 | 2 |
| | | Relief Valve Spring Collar Locknut, $\frac{1}{4}$ "..... | 284D-C | 1 | 2 |
| | | Relief Valve Spring Stem..... | | 1 | 2 |
| 1982A | | Switch Main Spring Screw..... | 624B-C | 1 | 1 |
| 2260 | | Switch Range Spring Screw..... | 624B-C | 1 | 1 |
| 2262 | | | 624D-C | | |
| | | Switch Range Spring Screw Nut #6-32..... | 624B-C | 1 | 1 |
| | | | 624D-C | | |
| 2263 | | Float Switch Link Bolt..... | 624D-C | 1 | 1 |
| | | Float Switch Link Bolt Nut #10-24..... | 624D-C | 1 | 1 |
| 2265 | | Switch Terminal Base..... | 624B-C | 2 | 2 |
| | | | 624D-C | | |
| | | Switch Terminal Base R. H. M. Screw #6-32x $\frac{1}{8}$ "..... | 624B-C | 4 | 4 |
| | | | 624D-C | | |
| | | Switch Terminal Base Contact..... | 624B-C | 2 | 2 |
| | | | 624D-C | | |
| 2266 | | Switch Terminal Base Contact R. H. M. Screw #6-32x $\frac{1}{8}$ "..... | 624B-C | 2 | 2 |
| | | | 624D-C | | |

Repair List—Home Water Plants for Shallow Wells

17
2640D

| Repair Numbers | | Before Ordering Repair Parts Read the Instructions on Page 11 | Included in Group | Number Used | |
|-------------------------|---------------|--|-------------------------|----------------|-------------|
| Arranged Numerically | Group Part | | | 210 Gal. | 420 Gal. |
| | | NAME OF PART | | | |
| | | Switch Terminal Base Contact R. H. M. Screw Washer..... | { 624B-C 624D-C } | 2 | 2 |
| 2389 | | *Motor A. C. 110 Volts, 60 Cycle, 1725 R. P. M..... | | 1 | 1 |
| 2389A | | *Motor D. C. 32 Volts, 1725 R. P. M..... | | 1 | 1 |
| 2389B | | *Motor D. C. 115 Volts, 1725 R. P. M..... | | 1 | 1 |
| 2389D | | *Motor D. C. 230 Volts, 1725 R. P. M..... | | 1 | 1 |
| 2389E | | *Motor A. C. 110 Volts, 50 Cycle, 1425 R. P. M..... | | 1 | 1 |
| 2389F | | *Motor A. C. 110-220 Volts, 40 Cycle, 1125 R. P. M..... | | 1 | 1 |
| 2389G | | *Motor A. C. 110-220 Volts, 30 Cycle, 1725 R. P. M..... | | 1 | 1 |
| 2389H | | *Motor A. C. 110-220 Volts 25 Cycle, 1425 R. P. M..... | | 1 | 1 |
| 2389J | | *Motor A. C. 220 Volts, 60 Cycle, 1725 R. P. M..... | | 1 | 1 |
| 2389K | | *Motor A. C. 220 Volts, 50 Cycle, 1425 R. P. M..... | | 1 | 1 |
| | | Motor to Frame Stud, 1/4x1 1/2..... | | 2 | 2 |
| | | Motor to Frame Capscrew 1/4x1 1/2..... | | 2 | 2 |
| | | Motor Stud Nut, 1/4..... | | 2 | 2 |
| | | Motor Stud Nut Lockwasher, 1/4..... | | 2 | 2 |
| 2417 | | Air Valve Cap..... | 2418A | 1 | 1 |
| 2418 | | Air Valve Inside with Spring..... | | 1 | 1 |
| 2418A | | Air Valve with Cap 2417..... | | 1 | 1 |
| 2420 | | Tank Bracket (Not furnished separately)..... | | 6 | 6 |
| | | Tank Bracket to Base and Collar R. H. Stove Bolt, 1/4x3/8..... | 15G | 6 | 6 |
| | | Tank Bracket to Base and Collar Bolt Plate Washer, 1/4..... | | 6 | 6 |
| | | Tank Bracket to Base and Collar Bolt Lockwasher, 1/4..... | | 9 | 9 |
| 2422 | | Switch Lead Wire..... | | 2 | 2 |
| 2840 | | Pump Housing Shell, always with..... | | 1 | 1 |
| 2841 | | Housing Top (Not furnished separately)..... | | 1 | 1 |
| 4791 | | Tank Housing Collar..... | 15G | 1 | 1 |
| 4823 | | Machine Bolt Gasket..... | | 1 | 2 |
| 4934 | | Fan Housing..... | | 1 | 1 |
| 4935 | | Fan Housing Clip..... | | 4 | 4 |
| 5364 | | Bonnet Cap Screw..... | | 1 | 2 |
| 5406 | | Main Bearing Plate Cover..... | | 1 | 1 |
| 6623 | | Gland Cap Wrench..... | 431B-C | 1 | 1 |
| | | The following parts are special when ordered with special 35 and 70 Gallon Tanks. | | | |
| 990 | | Water Gauge Glass Gasket..... | | 2 | 2 |
| 993B | | Water Gauge Arm Upper..... | | 1 | 1 |
| 994B | | Water Gauge Arm Lower..... | | 1 | 1 |
| 995B | | Water Gauge Gland Cap..... | | 2 | 2 |
| 996A | | Water Gauge Glass Washer..... | | 2 | 2 |
| 997A | | Water Gauge Glass Guard Rod with End 998A..... | | 2 | 2 |
| 998A | | Water Gauge Glass Guard Rod End..... | | 2 | 2 |
| 2385 | | Pressure Gauge..... | | 1 | 1 |
| 2387 | | Water Gauge Glass..... | | 1 | 1 |
| | | The following motor parts can be furnished for repairs. | | | |
| | | Armature, complete..... | | | |
| | | Base, separable..... | | | |
| | | Base Screws..... | | | |
| | | Base Screw Washer..... | | | |
| | | Bearing, Self-aligning..... | | | |
| | | Bearing Adjusting Nut..... | | | |
| | | Brush Holder Assembly, complete..... | | | |
| | | Brush Holder, Ring only..... | | | |
| | | Brush Ring Retaining Screw..... | | | |
| | | Brush Box..... | | | |
| | | Brush Box Insulating Fibre..... | | | |
| | | Brush Spring..... | | | |
| | | Brush Spring Pin..... | | | |
| | | Brush Spring Pin Key..... | | | |
| | | Brush Box Screws..... | | | |
| | | Brush..... | | | |
| | | Commutator..... | | | |
| | | Cover, Shaft Projection end, complete with bearing, bearing nut, oil, oil plug and wicks..... | | | |
| | | Coil, (two per set) specify voltage..... | | | |
| | | Cover only, Commutator end..... | | | |
| | | Cover Screws..... | | | |
| | | End Thrust Washer, fibre..... | | | |
| | | Field, complete with Coils..... | | | |
| | | Oil..... | | | |
| | | Oil Well Plug..... | | | |
| | | Short Circuiting Device..... | | | |
| | | Short Circuiter Nut..... | | | |
| | | Shutter..... | | | |
| | | Shutter Screws..... | | | |
| | | Stator complete (specify voltage)..... | | | |
| | | Wick, cotton, lower..... | | | |
| | | Wick, cotton, upper..... | | | |

*Motors sent out for repairs always furnished with proper motor pulley, Fan, Fan Screws and lockwashers, and fan housing complete. When ordering motors for repairs, always specify Current, Voltage, and Cycles in addition to information requested on page 11. When motor must withstand excessive dampness, order motor specially treated for such service.

HOME OF THE SHALLOW WELL PUMPS



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