WESTFALIA SEPARATOR

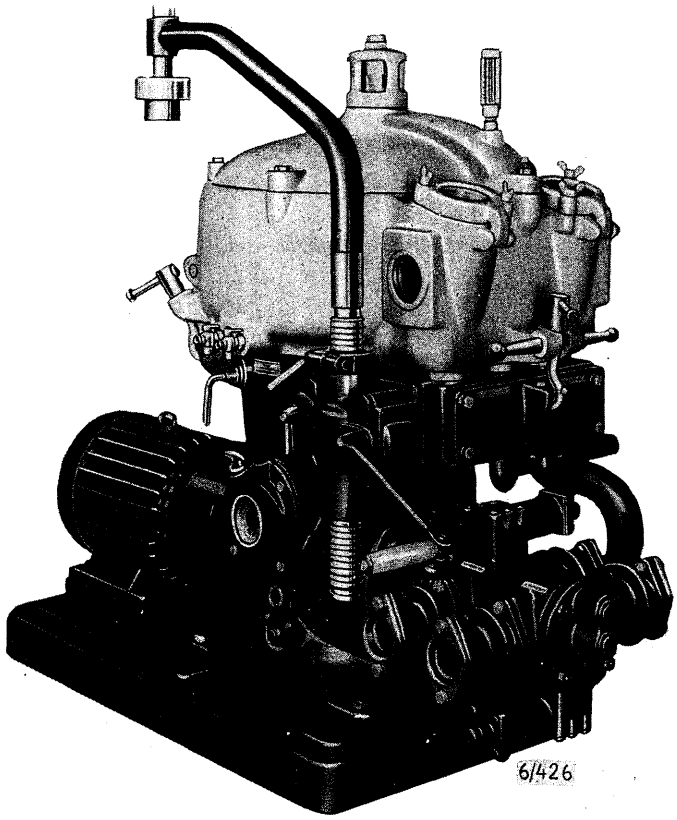
INSTRUCTION MANUAL AND PARTS LIST

No. 0820 - 9001 - 000

WESTFALIA

OIL SEPARATORS

Model MOC 515 - MOC 8015



WESTFALIA SEPARATOR AG. / 4740 OELDE/WESTF. (GERMANY)

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OPERATING SAFETY OF THE SEPARATOR

The WESTFALIA separator is a high-speed centrifuge which ensures absolutely reliable service even under unfavourable working conditons as long as it is operated and attended to strictly in accordance with our working instructions.

Liquids with a higher specific gravity than that indicated on the name-plate of the machine may only be treated after WESTFALIA SEPARATOR AG. or authorized representative have been contacted for possible reduction of bowl speed by exchanging the corresponding gear parts. Operational safety greatly depends on the careful observation of this rule.

It is strongly recommended that the bowl be fed with a liquid of rather constant solids content. Greater variations in the solids content must be avoided.

When assembling the bowl, follow the instructions of this working manual very carefully, to avoid unbalance which may result in heavy damage.

When working at high separating temperatures or with high flow velocities, or when treating liquids which have a corrosive or an eroding effect, the bowl material may be attacked and, consequently, overloaded after a short service time already. To avoid this danger, all bowl parts must, therefore, be checked at regular intervals. Special attention should be paid to the bowl locking ring.

We, therefore, recommend in your own interest to have your separator inspected by WESTFALIA specialists at regular intervals. Such controls will contribute to maintain operational safety of the machine, and prevent undesirable shut-downs which might be caused through lack of attention.

If bowl repair proves necessary, please advise us in time. We shall then check with you how to avoid interruption of work.

IMPORTANT HINTS TO MAINTENANCE MEN

1) The bowl speed of the separator as stated on page 6 applies to a specific gravity of the feed liquid and of the centrifugally removed sludge respectively, up to 1.1 kg/dm^3. Before handling liquids with a higher specific gravity, contact WESTFALIA SEPARATOR AG. or authorized representative for information.

2) Do not dismantle any separator part before the bowl has come to a complete stop!

3) Bowl parts must never be welded, or heated with a welding torch.

4) If the bowl comes up to its rated speed too quickly (see "Speed and Starting Time of Bowl", page 6), resulting in too high a starting current of the electric motor, reduce number of clutch shoes to 4 or 3 or 2. Observe instructions given in Sect.14 and 16!

C O N T E N T S

List of Parts

W O R K I N G I N S T R U C T I O N S

1. INSTALLATION

When installing the separator make sure that sufficient room is available to raise the hinged-type hood, to mount and dismount both motor and pump, and to remove the horizontal drive shaft which is pulled out on the side opposite the motor (i.e. on separators with pump assembly: on the pump side).

The base plate is fastened for separators both aboard ships and in shore installations by foundation bolts, and, in addition, for separators in shore installations by grouting with cement. To avoid damage to bearings, take care that the foundation of the separator has no contact with foundations of other machines (e.g. auxiliary Diesel engine, or pumps).

How to fasten the separator on the base plate see page 53.

The feed and discharge lines are to be connected to the flanges provided for this purpose. The pipe lines should have sufficient fall; they must not have sharp curves. It is important that the pipe lines have a sufficiently large diameter, particularly the pump suction lines, and the feed line from overhead tank to separator.
Hot water can be supplied either through a flexible tube, to be connected to threaded nipple 110, or through funnel screwed on to the top part of the hood.

2. MOTOR CONNECTION

Three Phase AC Motor

According to local conditions, the three phase motor can be connected as shown in wiring diagrams a, b, or c of Fig. 1.

Every three phase AC motor can be connected to power lines with two different voltages. If e.g. the motor is marked for 220/380 Volts, it can be connected across the line to 380 Volts as per wiring diagram a, or to 220 Volts as per wiring diagram b.

If, for a special reason, a motor is marked for 220 Volts, in delta connection (which is the same as 220/380 Volts), it can of course also be connected to 380 Volts as per wiring diagram a, (in star connection).

If start is effected by means of a star-delta switch, the motor can only be connected to the delta voltage as per wiring diagram c. If the motor is e.g. marked for 220/380 Volts, connection can consequently only be made to 220 Volts. Switching from star to delta will have to be done after 4 to 6 seconds.

Switch diagram for three-phase current motor

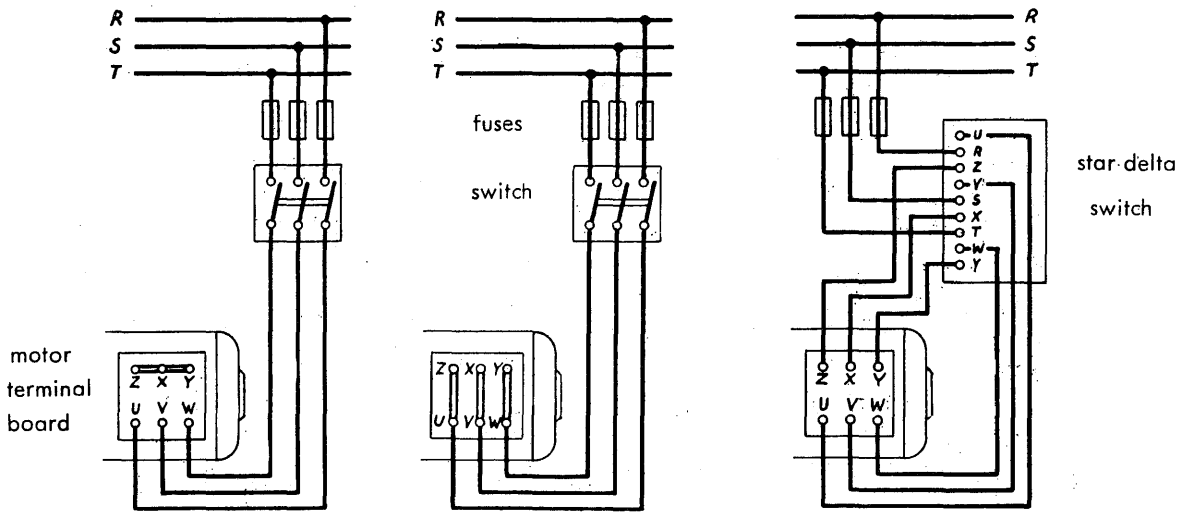


Fig. a
motor in star-connection
(for higher tension)

Fig. b
motor in delta connection
(for lower tension)

Fig. c

In order to convert direction of rotation two of the three connecting wires are to be exchanged :

Fig. 1 and 2 U with V
or V with W
or W with U

Fig. 3 R with S
or S with T
or T with R

Fig. 1

Switch diagram for DC motors

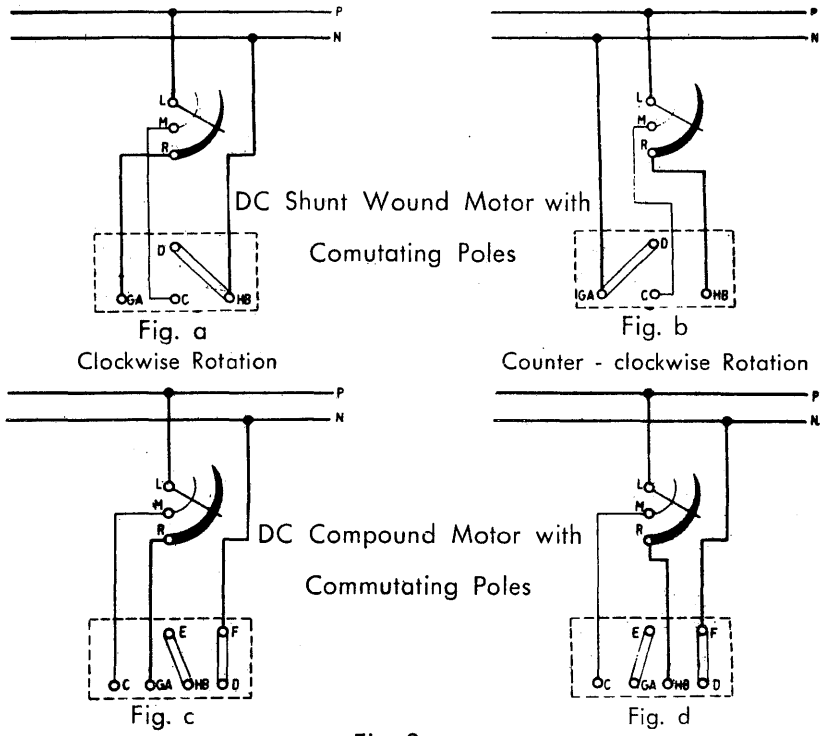


Fig. a
Clockwise Rotation

Fig. b
Counter - clockwise Rotation

Fig. c

Fig. d

Fig. 2

In case an overload relay, adjusted to the nominal current of the motor, is installed, it must be jumped during starting time because of the increased starting current. This starting current can reach 1.5 to 1.8 times the value of the nominal current. This should also be considered when choosing the size of the lead wires, and when fusing the lead wires.

D.C. Motor

DC motors are connected according to one of the four wiring diagrams of Fig. 2. To start the motor, use a DC Full Load Starter. The idling speed of the motor should be checked from time to time. Nominal speed should not be exceeded by more than 6% as maximum.

Direction of Rotation of Separator Bowl

If the bowl of a separator with a three phase motor rotates counter clockwise (incorrect), the direction of rotation is reversed by interchanging two terminal leads, as shown in Fig. 1.

Switch diagrams, Fig. 2, Page 5 illustrate how rotation direction of DC motors is reversed.

Speed and Starting Time of Bowl

Fig. 3
Exchanging the Tachometer

Rated speed and starting time of bowls:

Separator Model	Speed of bowl RPM	Starting time of bowl, min
MOC 515	9700	1 to 3
MOC 1015	7600	3 to 5
MOC 2015	7200	3 to 5
MOC 4015	6000	5 to 8
MOC 8015	5500	5 to 8

These speeds apply to a specific gravity of the feed liquid and of the centrifugally removed sludge respectively, up to 1. 1 kg/dm^3. Before handling liquids with a higher specific gravity, contact WESTFALIA SEPARATOR AG. or authorized representative for information. The bowl speed may have to be reduced.

On Models 1015 to 8015 the bowl speed is indicated by tachometer 48. To exchange the tachometer, merely unscrew by hand (Fig. 3).

Make certain that the bowl comes up to its rated speed within its starting time as stated previously, and that this speed is maintained during operation (see pages 25 and 26).

3. LUBRICATION

All bearings and gears are splash lubricated from a central oil bath.

Before starting the separator the first time, fill gear chamber with oil through threaded nipple 51 (on MOC 515) or through the opening of oil fill plug 51 (on MOC 1015 to 8015), until the oil level reaches center of oil sight glass 19. The oil level must never be below the center of the sight glass. When machine is new, make first oil change after two to three weeks of operation.
Make complete oil change when conditions warrant. As a rule, this is done every 8 - 10 weeks.

When replacing the sight glass (see Fig. 4), use the special wrench supplied with the separator.

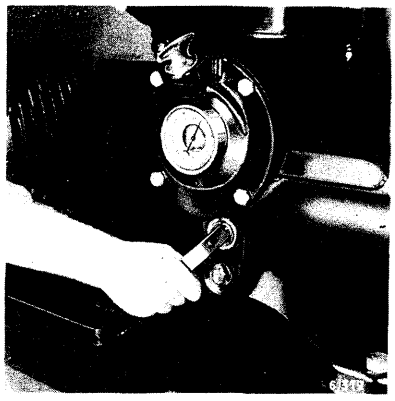


Fig. 4
Replacing the
Sight Glass

For lubrication only use well refined mineral oils of the following viscosity.

for MOC 515 to 2015:
6.5 to 8°E/50°C
for MOC 4015/8015:
8 to 10°E/50°C
} (SAE 30)

Bear in mind that viscosity group "SAE 30" comprises the viscosity range 6.5 to 10°E/50°C. Only such oils of SAE No. 30 should be used as fall within the above mentioned viscosity range of the separator type concerned. If for Models MOC 4015-8015 oils of SAE 30 of the viscosity 8 to 10°E/50°C are not available, choose only such oils of viscosity range 6.5 to 8°E/50°C as contain EP (Extreme Pressure) admixtures, i.e. high pressure lubricating oils.

EP oils may be used only on condition that they have no corrosive effect.

4. THE BOWL

Operating Principles - General Remarks

Every MOC Type bowl can be used for purification, i.e. with water and impurities removal, and clarification, removal of impurities only, no water.
Purification (Fig. 17a) applies to oil-water mixtures containing impurities as well.

For this purpose, the rising channels are open. Blind disc 184 (unperforated, without spacers), is placed on top of the disc set. By inserting the appropriate water ring dam, to be chosen from set 174 (see page 12-14), adjust the bowl for the specific gravity of the oil to be treated.

Clarification (Fig. 17b)

applies to water-free oils if clarification only is to be effected without adding water.

For this purpose, the rising channels are not utilized. Blind disc 184 (unperforated, without spacers) is placed directly on the distributor base (or on the anti-corrosion disc if this is inserted in the disc set) to close the rising channels. Sealing assembly 170-173, instead of water ring dam 174, is used to completely seal off the water discharge.

Assembling the Bowl (Fig. 5)

This depends on whether the bowl is to be used for purification or clarification.

For purification: see items 1-6 and 8-14; Fig. 5a and 24-30

For clarification: see items 1-5, 7-12, 15-17; Fig. 5b, 24-29, and 31.

For purification and clarification: items 1-5

1) Carefully de-grease cone of spindle and of lower bowl part and wipe dry.

2) By means of the special device furnished with the separator, place lower bowl part 185 on worm spindle 145 (see Fig. 24).

3) Turn bowl locking screws 41 slightly into recesses of lower bowl part. One of the two recesses is situated below the "0"mark of the lower bowl part.

4) Fasten spindle nut 130 tightly (see Fig. 25).

5) For separators Model MOC 4015/8015: insert sludge liner in lower bowl part 185.

For purification: item 6

6) Put the discs on the neck of distributor 182 in the following order:

   a) Anti-corrosion disc (made of aluminium or zinc, perforated, without spacers). This disc is supplied in special cases only (see Sect. 7, item 4).

   b) Discs 183 in numerical order (consecutively numbered from the bottom to the top). See that the correct order is observed.

   c) Blind disc 184 (unperforated, without spacers, highest disc-No.).

   d) Blind spare disc 184 (unperforated, without spacers). This blind spare disc is only used if a disc with an overall thickness less than that of the normal disc 183 with spacers, is required to obtain the necessary tension in the disc set. If not already inserted in the bowl, it is furnished as second spare disc.

   If the necessary tension in the disc set lessens, put spare disc 183 or blind spare disc 184 on top of the disc stack.

For clarification: item 7

7) Put the discs on the neck of distributor 182 in the following order:

   a) Anti-corrosion disc (made of aluminium or zinc, perforated, without spacers). This disc is supplied in special cases only (see Sect. 7, item 4).

b) Blind disc 184 (unperforated, without spacers, highest disc-No.).

c) Discs 183 in numerical order (consecutively numbered from the bottom to the top). See that the correct order is observed.

d) Blind spare disc 184 (unperforated, without spacers). For particulars, see item 6d.

For purification and clarification: items 8-12

8) With the aid of the lifting device supplied for this purpose, insert distributor 182 with disc set assembly in lower bowl part 185 (see Fig. 26) and see that the locating pin of the distributor fits in the corresponding groove of the lower bowl part. "0"mark to be above "0"mark!

9) Put on separating disc 180 (see Fig. 27) and bear in mind the locating points: "0"mark of separating disc must be below "0"mark of distributor neck.

10) Insert gasket 177 and 178 in upper bowl part 179 (see Fig. 5).

11) By means of special wrench supplied, place upper bowl part 179 on lower bowl part 185 in such a way (see Fig. 28) that the locating lug of the lower bowl part fits in the corresponding slot of the upper bowl part.

12) Put thin film of graphite paste or preferably "MOLYKOTE G" (since the latter need only be applied occasionally) on inner surface of bowl locking ring 176.

Then screw on the bowl locking ring by hand in counter-clockwise direction, and tighten it by rapping wrench handle (Fig. 29) smartly with mallet or solid bar until "0"marks are in line. Do not slip a pipe over wrench handle to obtain leverage!

For purification: items 13-14

13) Insert the water ring dam, chosen from set 174 (see page 12-14).

14) Screw on lock ring 175 and tighten with hook wrench; lefthand thread! See Fig. 30.

For clarification: items 15-17

15) Put on sealing disc 173, gasket 172, and pressure ring 171.

16) Screw on lock ring 175 and tighten with hook wrench (lefthand thread). See Fig. 30.

17) Screw on threaded ring 170 and tighten with hook wrench (lefthand thread). See Fig. 31.

When using a bowl lifter: see page 19.

If two or more WESTFALIA Separators are used, do not interchange bowl parts. Each bowl is individually balanced with its component parts.

Disassembling the bowl for simple cleaning

1) Stop the separator bowl (see page 16/17, items 1 to 6).
2) Loosen thumb nuts 14; raise the hood and lock it with tension ring 99.
3) Release brakes by turning handles 37 clockwise.
4) Turn bowl locking screws 41 slightly into recesses of lower bowl part. One of the two recesses is located below the "0"mark of the upper bowl part 179.
5) Unscrew bowl locking ring 176 with the aid of the special wrench by turning clockwise, striking wrench handle smartly with solid bar.
6) By means of special lifting device, press upper bowl part 179 off the lower bowl part (see Fig. 32); then use special wrench to lift upper bowl part (see Fig. 28).
7) Remove separating disc 180 (see Fig. 27).
8) Use lifting tongs to lift distributor 182 with disc set assembly 181 out of lower bowl part 185 (see Fig. 26).
9) On separators MOC 4015/8015: pull out sludge liner inserted in lower bowl part 185, using the special hook furnished with the separator (see Fig. 6).

When using a bowl lifter: see page 19.

Disassembling the bowl for thorough cleaning

After stopping the separator bowl (see Sect. 8) proceed in the reverse order of assembly (see Sect. 4, items 4-17). Then follow the instructions given in Sect. 11, items 3-5.

Before unscrewing bowl locking ring 176, release brakes by turning both handles 37 to the right, and turn bowl locking screws 41 slightly into recesses of lower bowl part 185. One of the two recesses is located below the "0"mark of upper bowl part 179.

Component Parts of Bowl MOC 515/8015
for Purifying and Clarifying
in order of assembly

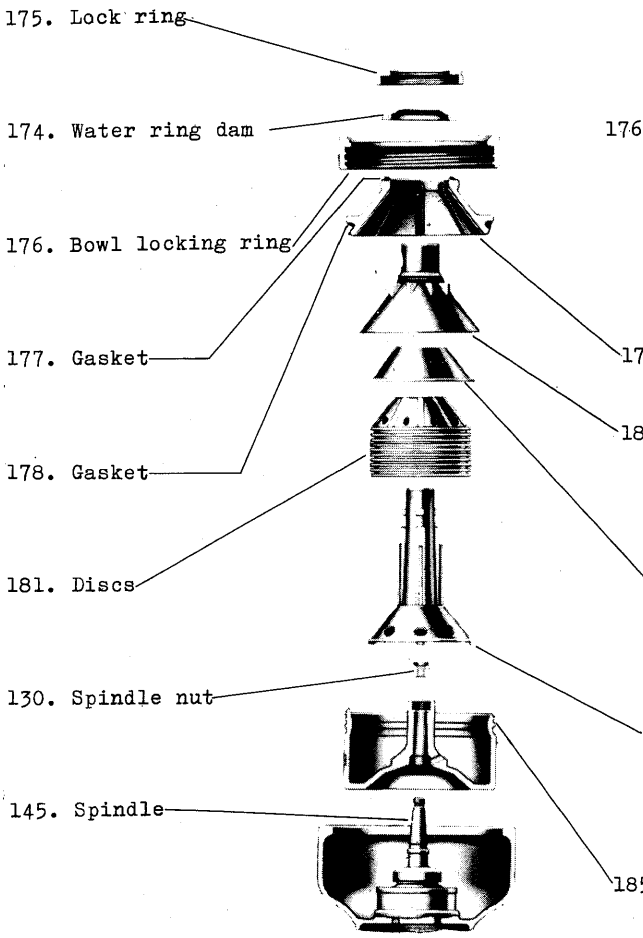


Fig. 5a
Purification

Item:
184: Blind disc (on top)
174: Water ring dam

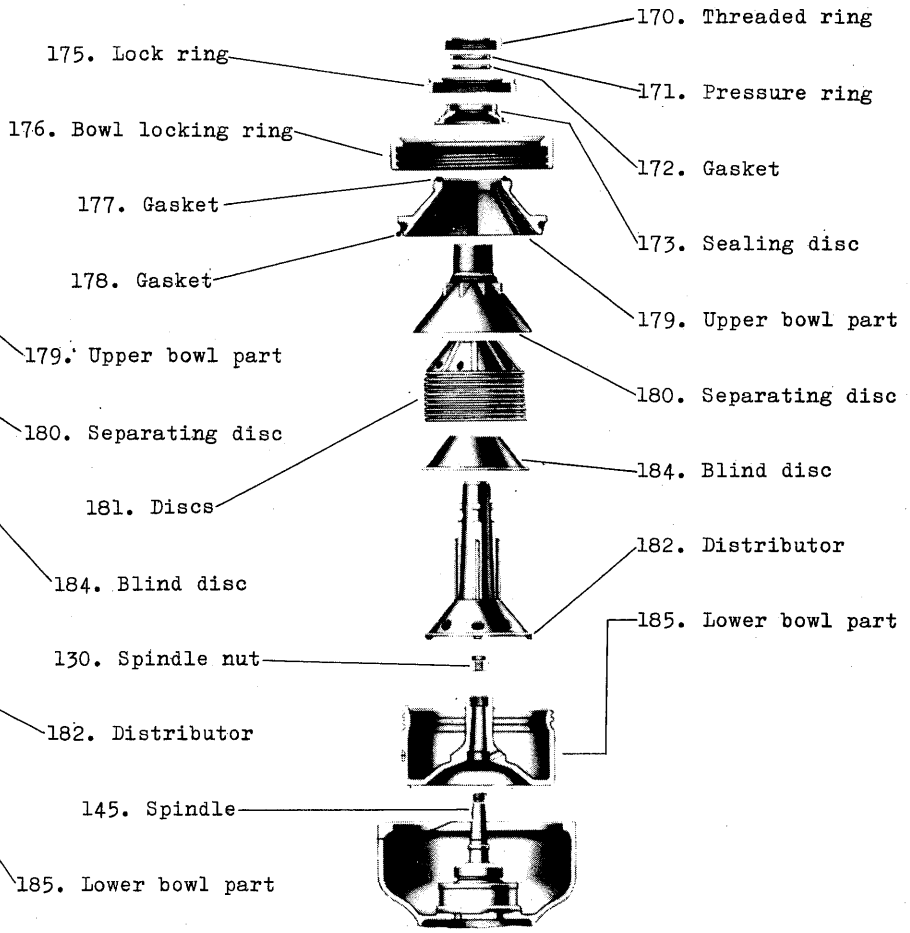


Fig. 5b
Clarification

Item:
184: Blind disc (on bottom)
170-173: Sealing assembly

5. HOW TO CHOOSE THE CORRECT WATER RING DAM

Purpose of water ring dam

Oils containing water can only be perfectly de-hydrated if the bowl is correctly adjusted for the specific gravity of the oil. A water ring dam with an appropriate inner diameter, i.e. with the diameter corresponding to the specific gravity of the oil to be processed, should therefore be inserted into the bowl. This ring can be chosen from the set of water ring dams (with different inner diameters) furnished with the separator. The inner diameter of the ring dam to be chosen can be determined by calculation (see next paragraph) or by experiment. The general rule is:

- small diameter ring dams for handling heavy oil -
- large diameter ring dams for handling light oil -

Determining size of water ring dam by calculation (diagram)

For simple calculation of the correct inner diameter of the ring dam, the diagram on page 13 is recommended.

Bear in mind that the specific gravities depend on the temperature. For water, the following figures will apply:

Temperature	20°C = 68°F	40°C 104°F	60°C 140°F	80°C 176°F	90°C 194°F	95°C 203°F	100°C 212°F
Specific Gravity kg/dm³	0.998	0.992	0.983	0.972	0.965	0.961	0.958

Change of the specific gravity of oil due to thermal action

$\gamma_{20°}$ = specific gravity at 20°C (68°F)

γ_t = specific gravity at separation temperature

t = separation temperature (°C)

$\gamma_t = \gamma_{20°} - 0.0007\ (t-20)$

Example:

Given: $\gamma_{oil\ 20°} = 0.974$ kg/dm³

$t = 90°C$ (194°F)

To be determined: Inner diameter of water ring dam for Separator MOC 8015

$\gamma_{water\ 90°} = 0.965$ kg/dm³

$\gamma_{oil\ 90°} = 0.974 - 0.0007\ (90-20) = 0.925$ kg/dm³

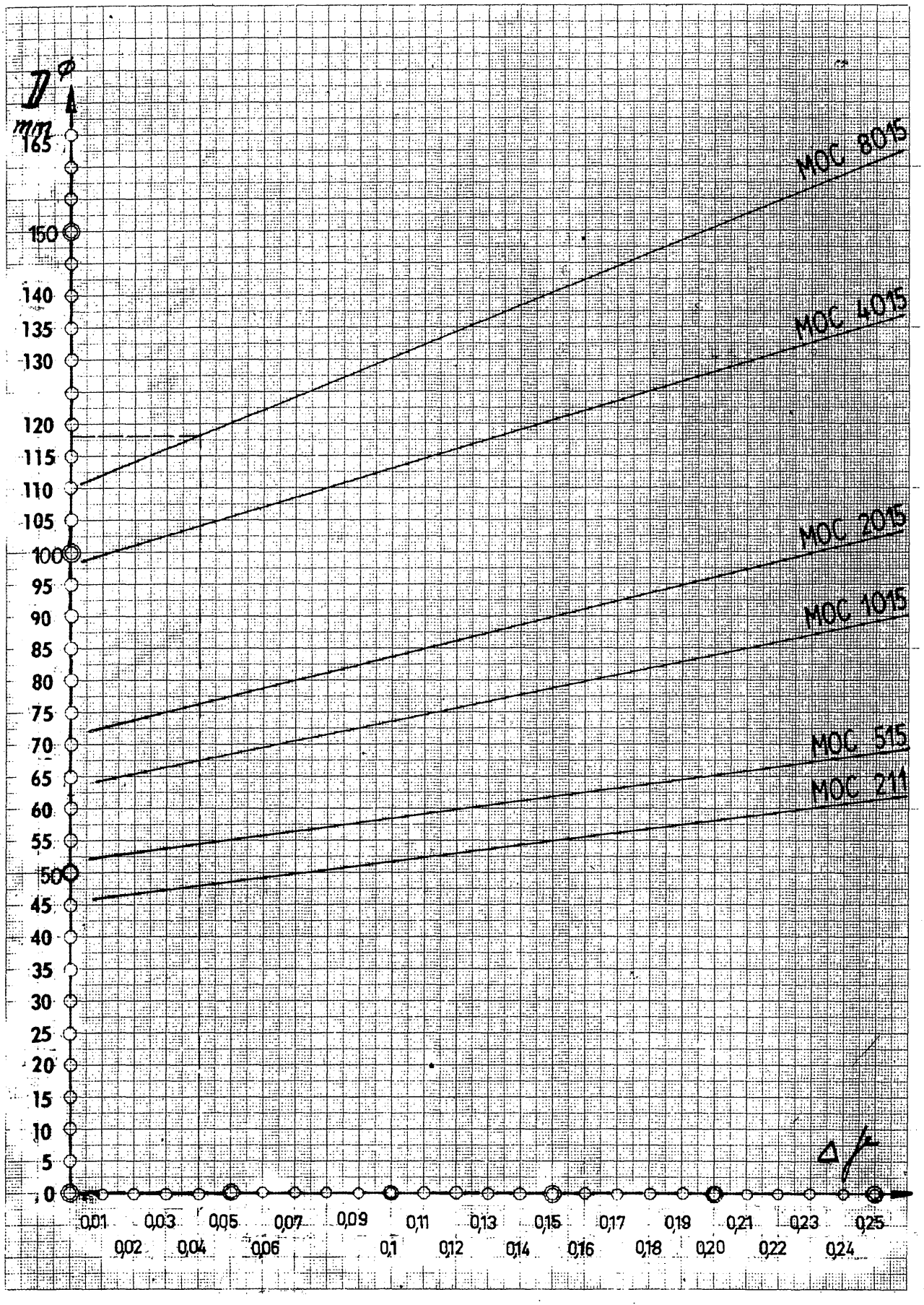
$\Delta\gamma = \gamma_{water} - \gamma_{oil} = 0.965-0.925 = 0.04$

Determined, according to diagram, page 13:

Inner diameter of water ring dam:

118 mm

DIAGRAM FOR DETERMINING CORRECT SIZE OF WATER RING DAM



If no water ring dam of the determined inner diameter is available, a smaller diameter ring can be machined to the necessary dimension. Before doing so, however, check by experiment (see next paragraph), whether the water ring dams available are suitable for perfect de-hydration. In general, the ring dams furnished with the machine are adequate.

Determining size of water ring dams by experiment

Begin by inserting a large diameter ring dam and change to the next smaller one. In case of too large a diameter, the water discharging through the water outlet will contain oil; in case of too small a diameter, the oil discharging through the clean oil outlet will contain water.

In addition, open the bowl to check the separating zone between water and oil. This zone is, in general, easily distinguished on the individual discs. If de-hydration is properly accomplished, the separation zone runs through the outer third of the rising channels. In case the water-oil separating zone is found to be more toward the bowl center, a larger diameter water ring dam should be inserted; if the line is found to be more toward the outside, choose a smaller diameter ring.

Characteristics of good de-hydration

The correct ring dam has been chosen when the discharging water is free of oil and the discharging oil is free of water.

Cloudiness of the water is normal, since it results from the oil washing process.

6. STARTING THE SEPARATOR

For purification and clarification: Items 1-7

1) Turn bowl locking screws 41 back.
2) Release brakes by turning both handles 37 to the right.
3) Make sure bowl can be turned by hand and gear chamber is filled with sufficient quantity of oil (slightly above center of sight glass).
4) Close the hood and tighten it with thumb nuts 14.
5) Start motor; wait until the bowl has reached its rated speed (see page 6).
6) Open valve in suction line of feed pump or in feed line to separator, to feed dirty oil to heater. Close valve as soon as oil appears at feed sight glass 108.
7) Switch on the heater and heat oil to separating temperature. Watch heater so that separating temperature is not exceeded.

For Purification: Items 8-9

8) FEED BOWL WITH HOT FRESH WATER BEFORE FEEDING OIL.

   When bowl is sufficiently heated (which is of particular importance when processing oils which have a strong tendency to emulsify), throttle hot water supply to the amount that corresponds to the type of oil to be processed (see Sect. 7).

   The seal formed by the hot fresh water will prevent the oil from escaping through the water outlet (see Sect. 7, item 1).

9) As soon as the bowl is sufficiently warmed, open valve and adjust to desired oil flow rate

For clarification: Items 10-11

10) DO NOT FILL THE BOWL WITH WATER!

The bowl is heated by slowly feeding hot oil (open valve slightly only).

11) As soon as the bowl is sufficiently warmed, adjust valve to desired oil flow rate.

7. THE SEPARATOR IN OPERATION

The capacity of the separator depends upon viscosity, temperature, specific gravity, degree of impurity, water content of feed liquid, and the desired degree of purity of the separated oil.

Purification: Items 1-5

1) Make sure that the water seal (see Sect. 6, item 8) which prevents the oil from escaping through the water outlet, is maintained during separation. In order to hold the water seal which, in the presence of hot oil, gradually evaporates, feed the bowl constantly or at intervals (i.e. after 1 to 2 hours at the latest) with hot fresh water (see items 3-5).
It is recommended that a needle valve be installed in the hot water feed line for precise flow regulation.

2) The temperature of added water should be at least as high as the separating temperature, and preferably 5°C higher.

3) When treating Fuel Oils, hot fresh water is added dropwise only, merely to maintain the water seal in the bowl. If salt is present in the oil, the fresh water will become saturated and carry it off.

4) When treating Lubricating Oils, the quantity of constantly added hot fresh water generally amounts to 2 - 5% of the throughput capacity. By adding this amount of water, the water seal is maintained in the bowl. With the discharging water, a great portion of light impurities is continuously flushed out, resulting in longer periods of operation until bowl cleaning becomes necessary.

In Diesel lube oils e.g., the impurities consist of light carbon and soot sludge, and of sulphurous acids. From the combustion process in the Diesel engine, sulphurous residues, decomposition products, and water vapour will result which after condensation of the water vapour will produce acidulous water. This acidulous water mixes with the circulating lube oil, resulting in great damage to bearings, pistons, and cylinders. The acidulous water is re-separated from the oil by the separator.

To protect the bowl from excessive corrosion, an anticorrosion disc of aluminium or zinc is placed, in particular cases, on the distributor base. Since in the electro-chemical contact series aluminium and zinc have an unfavourable position as compared with the bowl materials, the anti-corrosion disc attracts corrosion, thus distracting it from the other bowl parts. As soon as the disc is used up, it must be replaced by a new one.

5) When treating oils that are sensitive to water (some oils with additives), the acid-saturated water seal should be re-newed either from time to time, i.e. after 1 to 2 hours at the latest, by stopping the oil supply and feeding the bowl with hot fresh water, or constantly, by adding hot fresh water dropwise (1 to 3 drops per second, according to throughput capacity).

Clarification

Feed the bowl with water-free oils only! Do NOT feed water to clarifier bowl, neither before nor during separation.

Approximate values regarding separating temperatures and water addition percentages

Type of Oil	Separating Temperature	Water Addition (Fresh Water)
Gas oil	room temperature	0-1%
Diesel oils, medium	up to 40°C (104°F)	0-1%
Diesel oils, heavy	up to 70°C (158°F)	0-1%
Residual fuel oils (bunker oil C or No. 6)	80 to 100°C (176-212°F)	0-1%
Steam turbine lube oils	70 to 75°C (158-167°F)	0-2%
Diesel lube oils without additives	75 to 90°C (167-194°F)	2-5%
Diesel lube oils with additives (HD oils)	75 to 90°C (167-194°F)	0-1%

For processing emulsified oils, increase the separating temperature.

The separating temperature of the incoming feed liquid is indicated on thermometer 111 mounted on the top part of the hood.

It is recommended that a thermostat be installed for the control of the heater.

8. STOPPING THE SEPARATOR

DO NOT DISMANTLE ANY PART BEFORE THE BOWL HAS COME TO A COMPLETE STOP!

1) Switch off the heater; continue feeding with oil for a few minutes, since it continues to heat.
2) Stop oil supply: close valve in suction line of feed pump or in feed line to separator.
3) Stop water supply.
4) Switch off motor.
5) Brake the bowl by turning handles 37 counter-clockwise.

   WAIT UNTIL BOWL HAS COME TO A COMPLETE STOP!

   Holes in lower bowl part 185 and frame drain 42 permit self-draining when the machine is at a standstill. The solid impurities remain in the bowl.

6) Open drain cock 84 in feed line for dirty oil, and drain the oil contained in the feed channel of the hood. Then shut the drain cock.

7) If shut-down for a longer period is intended, follow the instructions given on page 18.

9. CLEANING

Cleaning the bowl

1) General

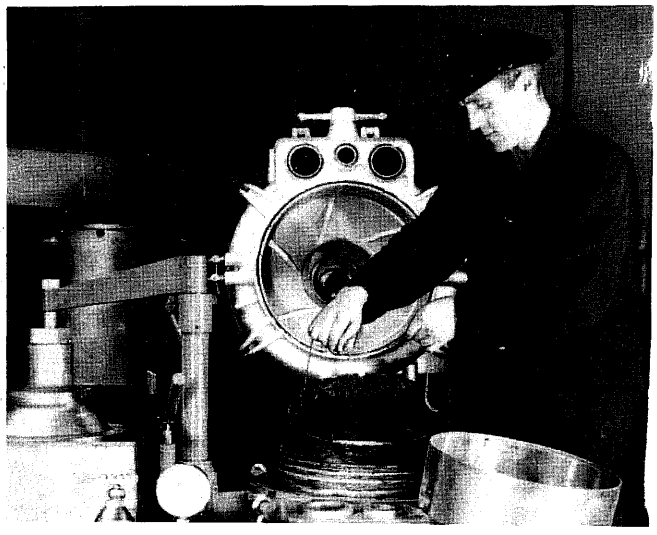


Fig. 6
Removing the Sludge Liner

The bowl should be stopped for cleaning as soon as the sludge space is filled with solids. To reduce the down-time as much as possible, the bowls of separators MOC 4015 and MOC 8015 are equipped with an exchangeable sludge liner (see Fig. 6) that collects the centrifugally settled solid matter. By means of the special hooks supplied, the sludge liner can easily be pulled out of the lower bowl part. The lower bowl part remains in the separator frame. Never wait until the settled solids reach the outer disc set rim before removing and cleaning the sludge liner. If this rule is followed, cleaning of the disc set can be avoided. When removing the sludge liner, be careful not to spill sludge between lower bowl part and frame rim

Before inserting the cleaned sludge liner, wipe out the lower bowl part thoroughly.

Simple bowl cleaning

The simple bowl cleaning which may become necessary several times a day, depending on the degree of impurity of the oil to be processed, is generally limited to cleaning the sludge space (on Models MOC 5015/2015), and to removing and cleaning the sludge liner resp. (on Models MOC 4015/8015). See page 19 for instructions on how to use bowl lifter when disassembling the bowl.

If, in addition to cleaning the sludge space or the sludge liner, the discs must be washed, it is recommended (provided, however, that the discs are not too dirty) that the distributor with disc set assembly be put into a basin filled with a solvent,

(e.g. Diesel Oil), where the discs are left to soak. In most cases the discs need then not be brushed individually. The distributor with its disc set may be re-inserted into the bowl and the bowl be started without liquid feed. This will permit the soft sludge to slide easily to the sludge space without being hampered by liquid.

When removing and re-inserting the distributor with disc set assembly, see that the individual discs are not moved against one another, because solids will tend to settle between the spacers on the upper surface of the discs and the lower surface of the next higher disc.

Thorough bowl cleaning

In case the bowl is very dirty, disassemble it for thorough cleaning, in accordance with instructions given on page 10. Clean the individual discs and bowl parts thoroughly with the wooden scrapers and brushes (for distributor and disc set). Remove the collected solid sludge from between the ribs of the distributor neck with the distributor brush.

DO NOT USE METAL SCRAPERS OR METAL BRUSHES!

Swollen rubber rings should be left to dry in a warm place. It is recommended to use alternately several sets of rubber rings.

Cleaning the upper frame part

To remove the sludge which gradually collects in the upper frame part, dismantle the bowl and lift the lower bowl part out of the frame (see page 10 and page 19, items 2 to 5).

IMPORTANT! Before starting the cleaning operation, place neck bearing protection hood over spindle (see Fig. 34) to prevent wash liquid from entering the gear chamber and rendering the gear lubricating oil unserviceable.

Cleaning the gear chamber

The gear chamber should occasionally be thoroughly flushed with oil to clean out bronze particles.

Before shutting down the separator for a longer period

give it a thorough cleaning (as described above).
See that the cleaned bowl parts are entirely dry. All polished parts should be wiped and greased, to avoid rusting.

On separators aboard ships, the bowl should be locked, after cleaning and re-assembly, by applying the brakes and engaging the bowl locking screws, in order to avoid damage to bearings, which might be caused by ship's vibrations while the separator is at a standstill.

When shutting down separators in shore installations for a longer period, it is recommended to keep the clean bowl in a dry place.

Check valves in feed water line for tightness. If necessary, shut off the water supply to avoid damage which may be caused by drip water.

10. BOWL LIFTER

The bowl lifter (see Fig. 22) essentially facilitates both disassembling and assembling of the bowl, and consequently bowl cleaning.

After unscrewing and removing the bowl locking ring (lefthand thread), distributor with disc set, separating disc, and upper bowl part are not lifted individually, but in a body; they are re-inserted in the same way.

Before re-insertion make sure that the close fit surfaces of the different bowl parts are clean. When inserting the parts, see that "0"marks on distributor, separating disc, upper bowl part, and lower bowl part are aligned.

11. REMOVING THE VERTICAL GEAR PARTS

1) Disassemble the bowl (see page 10).
2) Unscrew spindle nut 130 (see Fig. 25).
3) By means of the special device push lower bowl part 185 off the cone of worm spindle 145 (see Fig. 33).
4) Disengage bowl locking screws 41.
5) Lift out lower bowl part with the aid of the special device (see Fig. 24).
6) Loosen oil drain screw 17 and drain oil into oil cup.
7) Take off tachometer housing 45 (on types MOC 1015/8015) and wheel protection cap 45 resp. (on type MOC 515).
8) Unscrew hexagon screws 139.
9) Remove worm spindle assembly with neck bearing protection cap 134 (on MOC 4015/8015), neck bearing protection shield 133 (on MOC 1015/8015), neck bearing bridge assembly (on MOC 515), and distance ring 143b (if used), by pulling upwards.
10) Remove neck bearing bridge assembly 135-138, 141 (on MOC 1015/8015).
11) Unscrew bottom bearing cap 155.
12) Unscrew bottom bearing threaded piece 153 by turning counter-clockwise and remove it together with bottom bearing assembly 148-153.

12. ASSEMBLING THE VERTICAL GEAR PARTS

Assembling the bottom bearing

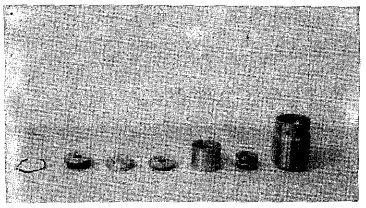


Fig. 7
Individual parts of bottom bearing in order of assembly (from right to left)

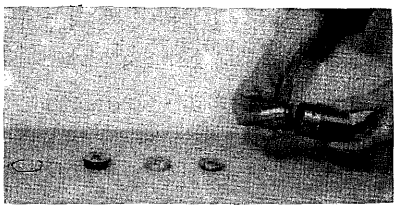


Fig. 8
Putting bottom bearing pressure piece with inserted helical spring into bottom bearing threaded piece.

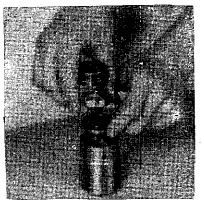


Fig. 9 Fig. 10
Fig. 9: Inserting bottom bearing running parts (pressure disc, ball retaining ring, running disc) in bottom bearing threaded piece.
Fig. 10: Inserting expansion ring.

1) Carefully clean all parts of bottom bearing assembly 148 to 153 (Fig. 7).

2) Insert helical spring 152 in bottom bearing pressure piece 151.

3) Put bottom bearing pressure piece 151 with inserted helical spring 152 into bottom bearing threaded piece 153 (Fig. 8).

4) Insert entire assembly of bottom bearing running parts, viz.: bottom bearing pressure disc, ball retaining ring, bottom bearing running disc, in bottom bearing threaded piece (Fig. 9).

5) Insert expansion ring 148 in bottom bearing threaded piece 153 (Fig. 10).

General

When assembling the vertical gear parts, proceed in reverse order of disassembly (see preceding paragraph).

Bear in mind that the height of the bowl has to be re-adjusted by turning bottom bearing threaded piece 153, after each assembly of vertical gear parts (see next paragraph).

13. ADJUSTING THE HEIGHT OF THE BOWL

Separator Model	Adjusting Dimension "h"	
	mm	inches
MOC 215	28	1 1/8
MOC 515	40	1 9/16
MOC 1015	44	1 3/4
MOC 2015	62	2 7/16
MOC 4015	77	3 1/16
MOC 8015	109	4 5/16

After unscrewing bottom bearing cap 155 (Fig. 16) adjust the height of the bowl by turning bottom bearing threaded piece 153 so that the distance between the upper edge of bowl locking ring 176 and the upper edge of the frame border equals dimension "h" (see Fig. 35).

Correct adjustment can only be made if the bowl is entirely closed, i.e. if "O"marks of bowl locking ring and of upper bowl part are in line with each other.

14. CENTRIFUGAL CLUTCH

The centrifugal clutch gradually brings the bowl to its rated speed, eliminating premature wear on gear parts and on motor. The friction force of the clutch shoes that regulates the start of the bowl depends on the number of shoes inserted. The acceleration time can be regulated by the number of clutch shoes used.

When fewer clutch shoes are used, the friction moment will be lower, starting time longer, and wear on gear parts and motor less. Only 2 or 3 or 4 or 6 clutch shoes, equally distributed, may be inserted in the driving plate (see page 23/24). Note that the driving effect of new clutch shoes will improve after several starts.

For the first few starts, smoking of the clutch is normal. This will cease automatically as soon as the superfluous impregnating matter on the linings is evaporated.

If the bowl comes up to its rated speed too quickly (see page 6), resulting in too high a starting current of the motor, reduce number of clutch shoes to 4 or 3 or 2 shoes. See that the clutch shoes are equally distributed (see page 24).

15. REMOVING THE HORIZONTAL GEAR PARTS

Removing the clutch shoes

1) Unscrew hexagon screws 233 and remove protection case 232.
2) Loosen hexagon screw 238 and push clutch cover 239 to the drive side (on MOC 1015-MOC 8015).
   Push expansion ring 238 and ring 239 to the drive side (on MOC 515).
3) Pull out clutch shoes 244 towards the drive side.

Removing the motor

1) Remove lead wires from motor terminals.
2) Take out clutch shoes (see preceding paragraph).
3) Unscrew hexagon screws (fastening the motor base). Remove setpins from motor base. Remove motor together with driving plate 240.
4) Loosen hexagon screw 242 (on MOC 1015-MOC 8015) and pointed threaded pin 242 resp. (on MOC 515). Pull driving plate 240 off the motor shaft end by means of special device supplied.

Dismantling the centrifugal clutch

1) Remove the motor (see preceding paragraph).
2) Screw hexagon screw 241 out of worm wheel shaft-end and remove disc 243 (on MOC 1015-MOC 8015). Loosen pointed threaded pin 241 (on MOC 515).
3) By means of the special device supplied pull off clutch pulley 237 from end of worm wheel shaft 224 on motor side, and take it off by hand.

Removing the gear pump

1) Loosen threaded pin 301d and push clutch pulley 301c to pump side.
2) Remove flexible coupling 301b.
3) Unscrew hexagon screws situated at expansion joint, and remove expansion joint.
4) Unscrew hexagon screws (holding pump to separator), and pull off pump together with clutch pulley 301c.
5) Pull off clutch pulley 301a from end of worm wheel shaft 224.
6) Pull off clutch pulley 301c from pump shaft end.

Removing the worm wheel shaft

1) Remove the motor (see paragraph "Removing the motor").
2) Take off the gear pump (see preceding paragraph), or unscrew hexagon screws 235 and remove protection cap 234.
3) Loosen oil drain screw 17 and drain the oil into the oil cup.
4) Screw off tachometer housing 45 (on MOC 1015-MOC 8015), or wheel protection cover 45 (on MOC 515).
5) Loosen hexagon screws 223 in worm wheel, while holding clutch pulley 237 to prevent the worm wheel shaft from rotating.
6) Loosen clamp plate 217 (on MOC 515) and 217 and 222 resp. (on MOC 1015-MOC 8015) until the worm wheel can be moved on the worm wheel shaft.
7) Screw hexagon screw 241 out of end of worm wheel shaft, and remove disc 243 (on MOC 1015-MOC 8015). Loosen pointed threaded pin 241 (on MOC 515).

8) By means of the special device furnished, pull off clutch pulley 237 from end of worm wheel shaft 224, and take it off by hand.

9) Remove key from the shaft end of worm wheel shaft 224 that is situated at the motor side.

10) Pull safety ring 246 (on MOC 1015) and disc 246 resp. (on MOC 4015 and MOC 8015) off the worm wheel shaft end that is situated at the motor side.

11) Unscrew hexagon screws 231.

12) Place hard wood block against the worm wheel shaft 224, on the motor side, and tap gently with a hammer to drive out shaft with bearing 225 and nut 227 (on MOC 1015-MOC 8015) and expansion ring 226 resp. (on MOC 515), and bearing cover 230. When completely loosened, hold worm wheel with one hand to prevent damage to gear teeth, and pull shaft out with the other one.

13) Take worm wheel assembly 217-223 out of gear chamber.

16. ASSEMBLING THE HORIZONTAL GEAR PARTS

General

When assembling the horizontal gear parts, proceed in reverse order of disassembly (see Sect. 15). On completion of assembly, see that gear chamber is filled with sufficient quantity of oil (slightly above center of sight glass).

When assembling the worm wheel make sure that the middle of the gearing of toothed rim 219 meshes precisely in the middle of the worm of spindle 145.

The worm wheel must be firmly clamped to worm wheel shaft 224 (see Sect. 17 item 9) by tightening clamp plates 217 and 222 with screws 223 evenly and firmly, giving each screw single consecutive turns.

After assembling a new toothed rim or a new worm spindle, run the separator in without bowl for about 1 hour; then assemble bowl.

It is recommended that clutch shoes 244 be removed at intervals (see page 21) to check the wear. As soon as the lining of a clutch shoe is nearly worn down to the rivet heads, the shoe must be replaced to avoid damage to the running surface of the clutch pulley ring.

Inserting the clutch shoes

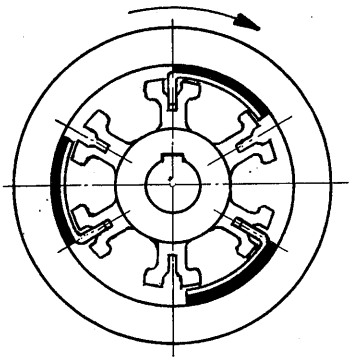


Fig. 11
Driving plate with clutch shoes

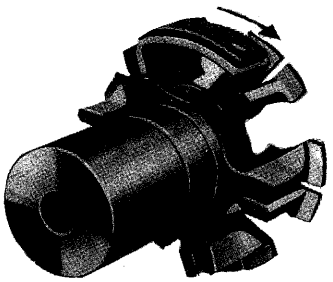


Fig. 12
Driving plate with clutch shoe

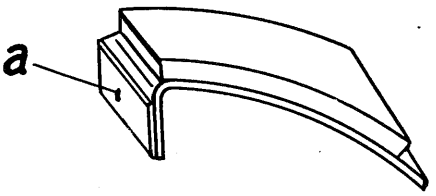


Fig. 13
Clutch shoe

When inserting the clutch shoes, proceed in the reverse order of removal (see page 21). The following should be kept in mind:

1) The clutch shoes must be inserted in driving plate 240, evenly distributed (either 2, or 3, or 4, or 6 shoes). See Fig. 11.
2) The clutch shoes must be pushed (and not pulled) by the driving plate. They must fit in the slot of the driving plate. See Fig. 12.
3) After inserting the clutch shoes see that clutch cover 239 is pushed towards clutch pulley 237 until it lies on the centering border of driving plate 240 and not in front of it.
4) Noises that might occur in the centrifugal clutch during start-up of the separator, can easily be eliminated by providing metal lips "a" (Fig. 13) of clutch shoes with a very light film of graphite paste or "Molykote". If too thick a film is applied, small particles of the paste might be centrifugally thrown on the friction surfaces, thus causing slipping of the clutch (see next paragraph: "Troubles, - their causes and remedies").

17. TROUBLES, - THEIR CAUSES AND REMEDIES

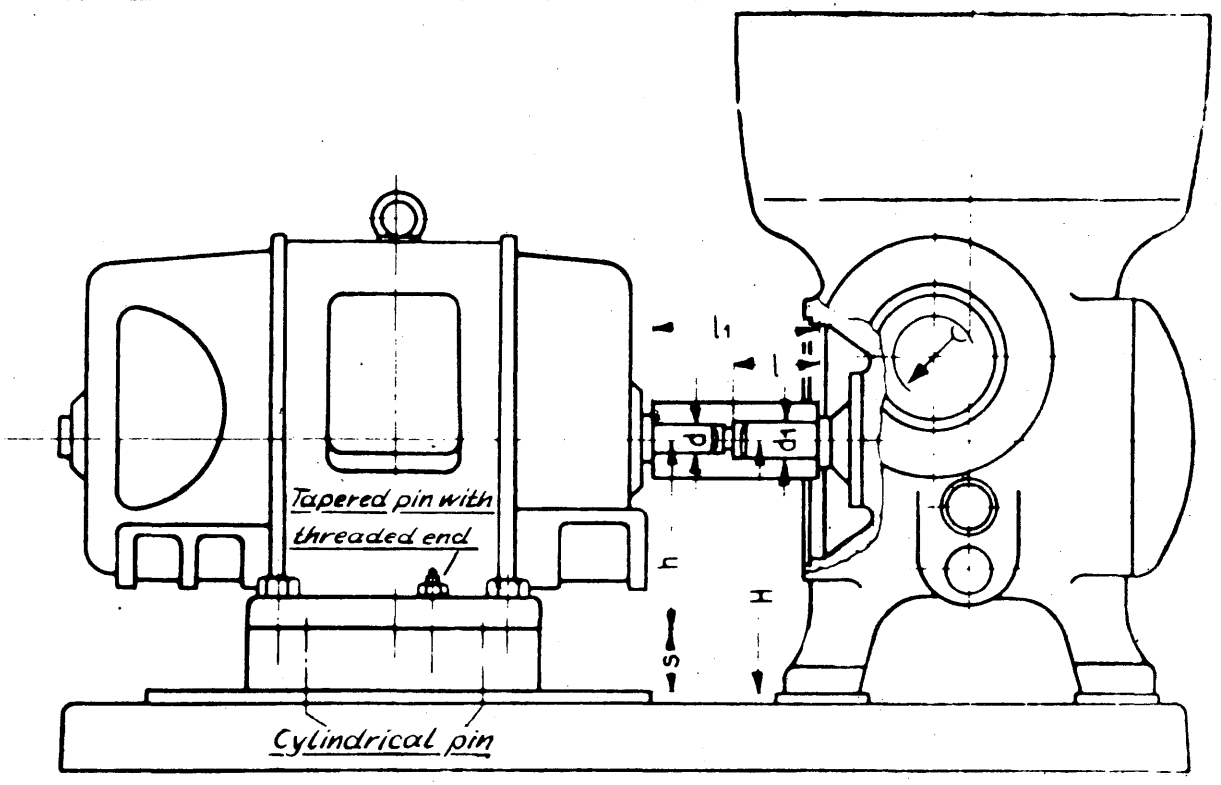
Troubles	Causes	Remedies
The bowl does not, or takes too long to come up to rated speed (see page 6)	1) Brakes are on	Release brakes (see Sect. 6 item 2)
	2) Bowl locking screws are in	Turn bowl locking screws back (see Sect 6 item 1)
	3) Motor is not properly connected	See switch diagrams, page 5
	4) Friction surfaces of clutch shoes are oily	Wipe friction surfaces dry. DO NOT USE BENZINE!
	5) Linings of clutch shoes are worn	Replace clutch shoes (see pages 21 and 24)
	6) Insufficient number of clutch shoes	Add one or two clutch shoes (see pages 21 and 24)
	7) Bowl is adjusted too high and, therefore, touches the frame hood	Adjust to correct bowl height (see Sect. 13, page 21)
	8) Liquid or sludge has collected in the upper frame part, resulting in slow-down of bowl	Check frame drain: liquid must run out freely. Do NOT equip frame drain with shut-off device! Check shut-off devices in feed lines for tightness. Clean upper frame part (see page 18)
	9) Clamp plates are not sufficiently tightened; worm wheel slips on worm wheel shaft	Tighten long hexagon screws on worm wheel evenly and firmly, giving each one single, consecutive turns (see Sect. 16, page 23)

Troubles	Causes	Remedies
The bowl speed drops during operation	1) Friction surfaces of clutch shoes are oily	Wipe friction surfaces dry. DO NOT USE BENZINE!
	2) Line voltage is dropping	Check line voltage
	3) Speed of motor drops during operation	Inspect the motor
The bowl comes up to its rated speed too quickly (see page 6), resulting in too high a starting current of the motor	1) Number of clutch shoes inserted is too high	Reduce number of clutch shoes to 4, 3 or 2 and see that shoes are equally distributed (see page 24)
The bowl runs roughly	1) The sludge is deposited unequally in the bowl	Clean the bowl (see page 17)
	2) Bowl has been improperly assembled, or parts of different bowls, if plant has several separators, have been interchanged	Assemble the bowl in the correct way, according to paragraph "Assembling the bowl".
	3) Tension of disc inset has slackened	Check whether bowl locking ring is firmly tightened (see:"Assembling the bowl", item 13). Check the number of discs. Add spare disc or compensation disc (see:"Assembling the bowl", item 9).
	4) Neck bearing springs have slackened or are broken	Replace <u>all</u> of the 6 neck bearing springs

Troubles	Causes	Remedies
The bowl runs roughly (contd.)	5) Helical spring in bottom bearing is broken; bowl is found to be about 2 mm too low in the frame	Check bowl height (see page 21). Fit in new helical spring (see page 20)
	6) Ball bearings or gear parts are worn	Exchange damaged parts IMPORTANT! As spindle bearings use ball bearings of spezial running precision only (see list of parts)!
	7) Bowl is damaged and, therefore, out of balance	Send bowl to factory or authorized factory repair shop. Do NOT attempt to make your own repairs. Never weld or solder. Bowl is made of heat treated steels.
Dirty-oil pump does not suck	1) Dirty-oil pump is defective	Check shaft gaskets in pump. Inspect spill valve; if necessary, re-adjust.
	2) Suction pipe lines are clogged or leaky	Clean and/or tighten suction pipe lines
	3) Pre-strainer is clogged or leaky	Clean pre-strainer (see Fig. 21); replace cover gasket.

18. Instructions for Mounting Electric Motors on WESTFALIA Oil Separators Model MOC

Sep. Type	H[mm]	d_1 [mm]	l_1[mm]	l[mm]
MOC 515	155	$14^{\phi 37}$	93	30
MOC1015	165	$25^{\phi 37}$	132	55
MOC 2015	173	$25^{\phi 37}$	135	58
MOC4015	198	$35^{\phi 37}$	202	92
MOC8015	223	$35^{\phi 37}$	202	92



Perfect operation or the centrifugal clutch can only be assured if shaft ends of motor and separator are aligned exactly and if distance "l_1" is observed. Differences in height must be compensated for exactly by placing shims (of thickness s = H minus h) underneath the motor frame.

Alignment is facilitated by using an alignment bushing. The main dimensions of the alignment bushing required for the different separator sizes are given in the above table. Diameter "d" will have to be adapted to the motor shaft end. The tolerance of the diameter should correspond to a close sliding fit.
Shaft ends are in line if after tightening the fastening screws in the motor feet the alignment bushing can be easily turned on both shaft ends.

Shims and motor feet should be locked on the base plate by means of cylindrical pins or taper pins with threaded end.

L I S T O F P A R T S

IMPORTANT!

When ordering parts, please indicate the following:

1 - Model Number of Separator
2 - Serial Number of Separator

Both numbers are shown on the name-plate.
The Serial Number also appears on the frame border, and on the bowl locking ring.

3 - Description
4 - Part Number

} of the part to be replaced.

For details, see parts list.
The Part-No. is also shown on all major parts.

Parts marked with * can only be replaced by a WESTFALIA factory engineer or by a special repair shop authorized by WESTFALIA, because of special re-fitting to machine and possible re-balancing of bowl.

Part Nos. followed by letter "L" designate parts which are available in different designs for the separator concerned. When ordering such parts, it is recommended to state the number shown on the part itself, instead of the Part No. as stated in the list. To ensure correct delivery of these parts, it is indispensable to state Model and Serial No. of the separator.

When ordering spare parts for single and double gear pump:

see page 48.

Separator Assembly MOC 515

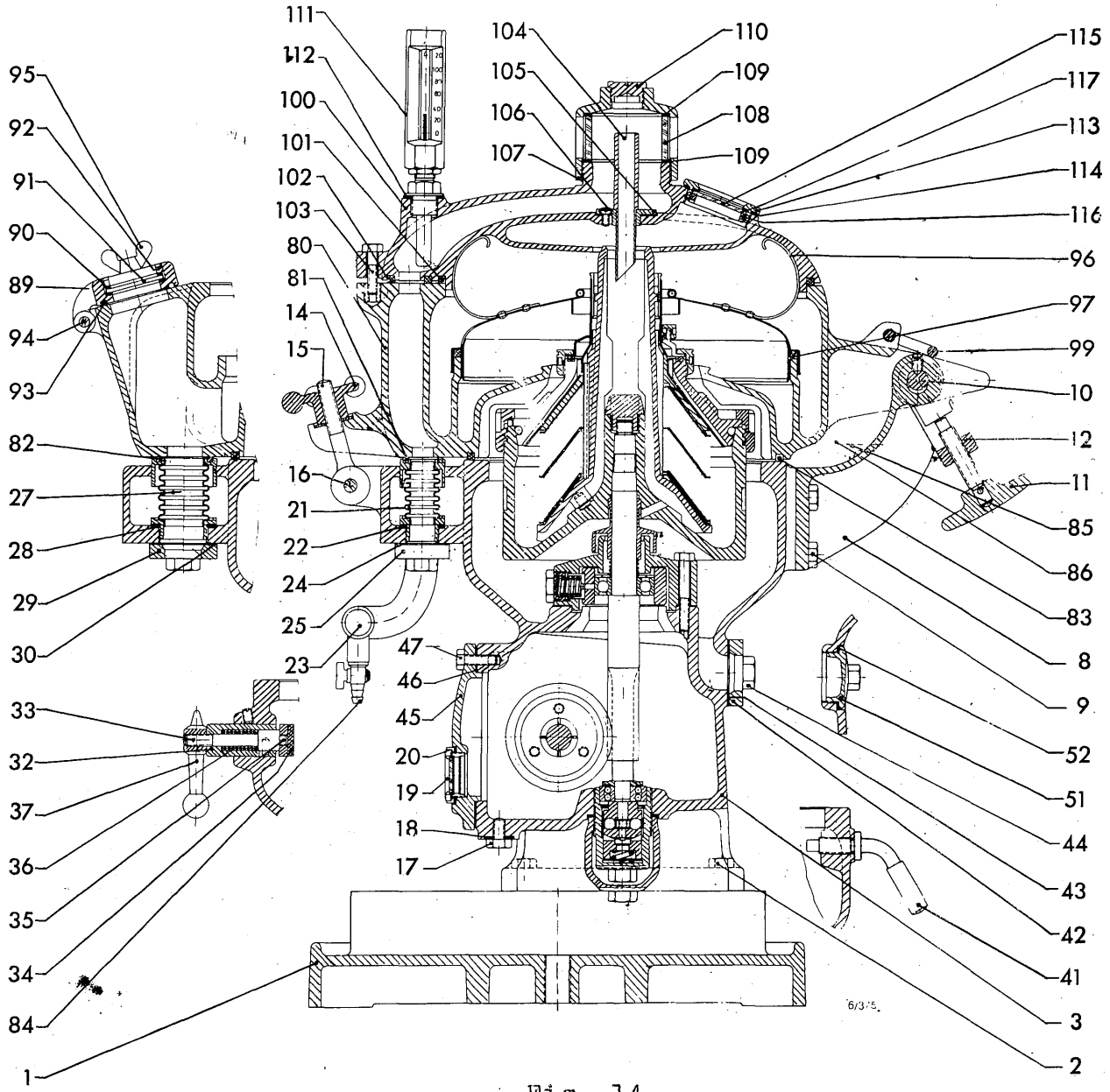


Fig. 14

Separator Assembly MOC 1015/8015

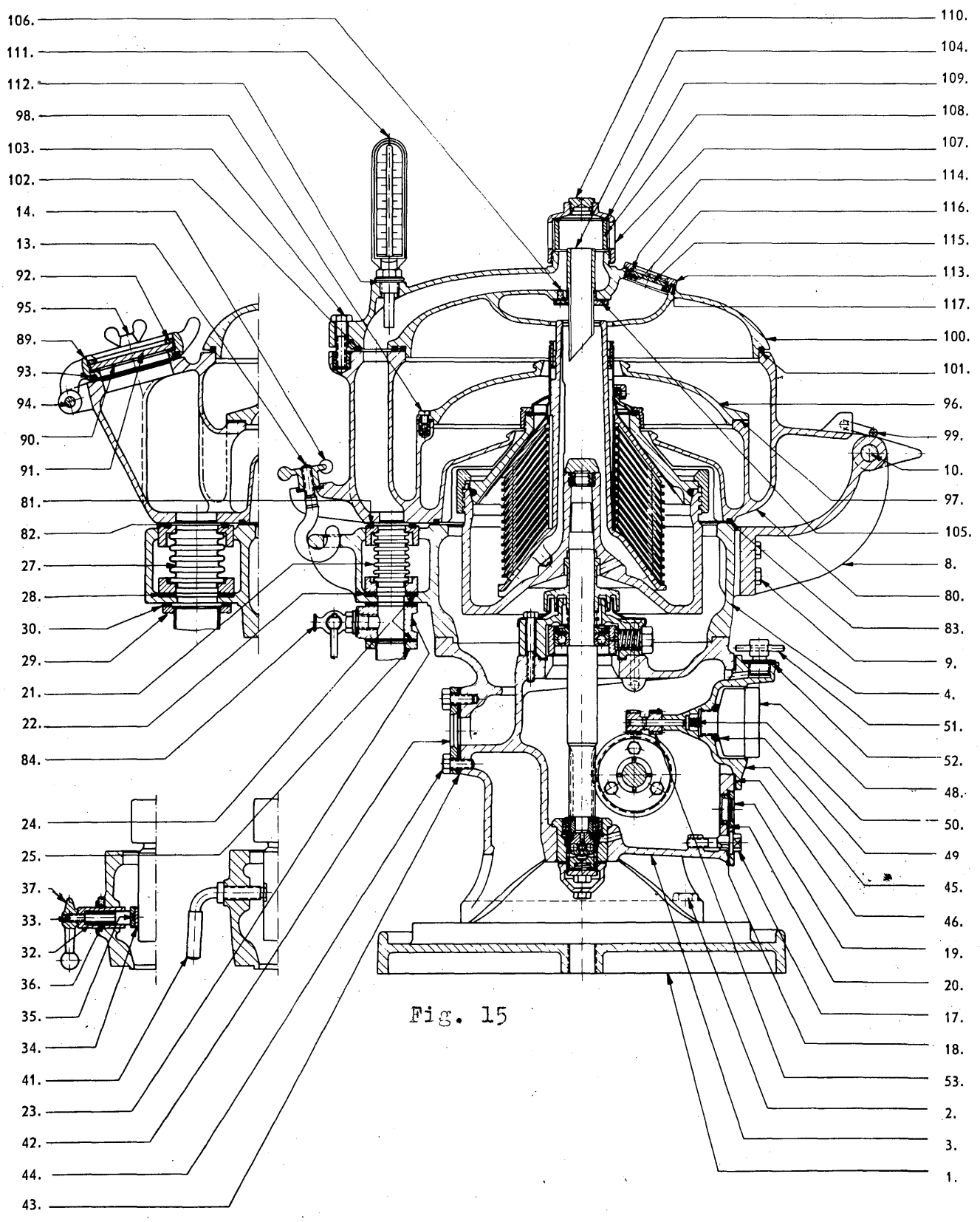


Fig. 15

Frame, Hood, Tachometer MOC 515-MOC 8015

List of Parts shown in Figures 14 and 15

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
-		Frame assembly	1	0820-1100-01	0821-1100-06	0822-1100-01	0823-1100-01	0824-1100-01
1	14,15	Base plate	1	0820-1003-00	0821-1003-01	0822-1003-07	0824-1003-00	0824-1003-01
2	14,15	Hexagon screw	4	19-0043-03	19-0945-03	19-0945-03	19-0950-03	19-0950-03
3	14	Frame	1	0820-1001-00	-	-	-	-
3	15	Lower frame part	1	-	0821-1001-00	0822-1001-00	0823-1001-00	0824-1001-00
4	15	Upper frame part	1	-	0821-1002-01	0822-1002-02	0823-1002-02	0824-1002-08
8	14,15	Support	1	0820-1243-00	0821-1243-00	0822-1243-00	0824-1243-00	0824-1243-00
9	14,15	Hexagon screw	2	19-0036-03	19-0038-03	19-0038-03	19-0074-03	19-0074-03
10	14	Hinge bolt	1	26-1127-03	-	-	-	-
10	15	Hinge bolt	1	-	0405-1833-00	0405-1833-00	0409-1833-00	0409-1833-00
11	14	Shackle tightening bolt	1	0265-1836-02	-	-	-	-
12	14	Shackle	1	0820-1437-00	-	-	-	-
13	15	Threaded bolt	1	-	-	0821-1418-00	-	-
13	15	Threaded bolt	2	-	-	0405-1418-00	-	-
13	15	Threaded bolt	3	-	0821-1418-00	-	0405-1418-00	0405-1418-00
14	14,15	Handle nut	1	*0021-3117-230*	-	-	-	-
14	14,15	Handle nut	3	-	*0021-3117-230*	*0021-3117-230*	13-3091-09	13-3091-09
15	14	Hinge screw	1	19-0508-03	-	-	-	-
16	14	Cylindrical pin	1	26-1117-03	-	-	-	-
17	14,15	Oil drain screw	1	19-0033-03	19-0292-64	19-0292-64	19-0292-64	19-0292-64
18	14,15	Gasket	1	04-1871-72	04-1874-71	04-1874-71	04-1874-71	04-1874-71
19	14,15	Sight glass assembly	1	01-0005-64	01-0005-64	01-0005-64	01-0005-64	01-0005-64
20	14,15	Gasket	1	04-5034-76	04-5034-76	04-5034-76	04-5034-76	04-5034-76
21	14,15	Feed pipe assembly	1	0819-1865-00	0821-1864-01	0822-1864-00	0823-1864-00	0824-1864-00
22	14,15	Gasket	1	04-5290-70	04-5413-74	04-5238-74	04-5305-70	04-5057-74

Frame, Hood, Tachometer MOC 515-MOC 8015

List of Parts shown in Figures 14 and 15

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
23	14	Feed pipe assembly, for dirty oil	1	0820-1170-00	0821-1170-00	0822-1170-00	0823-1170-00	0824-1170-00
24	14,15	Gasket	1	04-5446-74	04-5447-74	04-5449-74	04-5455-74	04-5457-74
25	14,15	Flange	1	01-0138-00	01-0140-00	01-0141-00	01-0142-00	01-0143-00
27	14,15	Discharge pipe assembly	2	0820-2865-00	0821-2865-01	0822-2865-00	0823-2865-00	0824-2865-00
28	14,15	Gasket	2	04-5298-70	04-5416-74	04-5242-74	04-5320-70	04-5071-74
29	14,15	Flange (outlet)	2	01-0140-00	01-0142-00	01-0143-00	01-0201-00	01-0205-00
30	14,15	Gasket	2	04-5447-74	04-5453-74	04-5457-74	04-5006-74	04-5476-74
-		Brake assembly (32-37)	1	0136-1043-02	-	-	-	-
-		Brake assembly (32-37)	2	-	0136-1043-02	0169-1043-00	0112-1043-01	0116-1043-01
32	14,15	Brake housing	1	21-3530-64	-	-	-	-
32	14,15	Brake housing	2	-	21-3530-64	21-3530-64	0112-1037-00	0112-1037-00
33	14,15	Brake bolt assembly	1	0136-1031-01	-	-	-	
33	14,15	Brake bolt assembly	2	-	0136-1031-01	0169-1031-00	0112-1031-01	0116-1031-01
34	14,15	Brake lining	1	21-4088-85	-	-	-	-
34	14,15	Brake lining	2	-	21-4088-85	21-4091-86	21-4092-85	21-4092-85
35	14,15	Countersunk rivet	2	26-1262-55	-	-	-	-
35	14,15	Countersunk rivet	4	-	26-1262-55	26-1262-55	-	-
35	14,15	Countersunk rivet	8	-	-	-	26-1262-55	26-1262-55
36	14,15	Helical spring	1	06-4130-16	-	-	-	-
36	14,15	Helical spring	2	-	06-4130-16	06-4132-16	06-4140-16	06-4140-16
37	14,15	Handle	1	0021-3512-690	-	-	-	-
37	14,15	Handle	2	-	0021-3512-690	0021-3512-690	0021-3511-690	0021-3511-690
-		Threaded pin (for brake)	1	19-0415-00	-	-	-	-
-		Threaded pin (for brake)	2	-	19-0453-00	19-0415-00	-	-

Frame, Hood, Tachometer MOC 515-MOC 8015

List of Parts shown in Figures 14 and 15

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
-		Cylindrical screw (f.brake)	4	-	-	-	19-0253-03	19-0253-03
-		Threaded shell (to item 41)	2	-	-	-	19-0557-60	19-0561-60
41	14,15	Bowl locking screw	2	0019-1401-150	0019-1406-150	0019-1409-150	19-0532-15	19-0537-16
42	14,15	Flange (Frame drain)	1	01-0140-00	01-0140-00	01-0141-00	01-0143-00	01-0143-00
43	14,15	Gasket	1	04-5447-74	04-5447-74	04-5449-74	04-5457-74	04-5457-74
44	14,15	Hexagon screw	2	19-0070-03	19-0070-03	19-0070-03	19-0070-03	19-0070-03
45	14	Wheel protection cap	1	0819-1004-00	-	-	-	-
45	15	Tachometer housing	1	-	0822-3493-02	0822-3493-02	0824-3493-03	0824-3493-03
46	14,15	Gasket	1	04-5249-70	04-5250-70	04-5250-70	04-5257-74	04-5257-74
47	14	Hexagon screw (to item 45)	4	19-0019-03	19-0017-03	19-0017-03	19-0036-03	19-0017-03
48	15	Tachometer assembly	1	-	8473-3000-00	8473-3000-00	8473-3000-00	8473-3000-00
49	15	Felt ring (f. tachometer)	1	-	04-1974-83	04-1974-83	04-1974-83	04-1974-83
50	15	Spring (f. tachometer)	1	-	06-4013-16	06-4013-16	06-4013-16	06-4013-16
-		Tachometer drive assembly (for 50 cycles)	1	-	0821-3500-07	0822-3500-06	0824-3500-08	0824-3500-08
51	15	Oil fill screw	1	-	0853-1288-01	0853-1288-01	0853-1288-01	0853-1288-01
51	14	Threaded nipple	1	0136-1241-00	-	-	-	-
52	14,15	Gasket	1	04-5037-71	04-5036-74	04-5036-74	04-5036-74	04-5036-74
53	15	Pinion (for 50 cycles)	1	-	0821-3483-06	0822-3483-02	0824-3483-07	0824-3483-07
-	14,15	Hood assembly *	1	0820-8759-00	0821-8759-01	0822-8759-00	0823-8759-00	0824-8759-00
80	14,15	Lower part of hood *	1	0820-8751-19	0821-8751-01	0822-8751-00	0823-8751-00	0824-8751-00
81	14,15	Gasket (for feed)	1	07-2218-75	07-2123-75	07-2250-75	07-2148-75	07-2146-75
82	14,15	Gasket (for discharge)	2	07-2235-75	07-2137-75	07-2163-75	07-2149-75	07-2150-75
83	14,15	Packing cord	1	04-2361-758 6x6x785	04-2361-758 6x6x970	04-2361-758 6x6x1000	04-2364-758 8x8x1550	04-2364-758 8x8x1640

Frame, Hood, Tachometer MOC 515-MOC 8015

List of Parts shown in Figures 14 and 15

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
84	14,15	Drain cock (Frame)	1	18-1524-60	18-1533-60	18-1533-60	18-1533-60	18-1533-60
85	14	Drain cock (Hood)	2	18-1524-60	18-1532-60	18-1532-60	18-1532-60	18-1532-60
86	14	Gasket	2	04-1906-71	04-1874-71	04-1874-71	04-1874-71	04-1874-71
-		Sight glass assembly (at side)	2	-	0821-8182-00	0229-8182-00	0229-8182-00	0229-8182-00
-		Sight glass (Sight glass assembly)	2	-	01-0043-82	01-0050-82	01-0050-82	01-0050-82
-		Gasket (Sight glass assembly)	2	-	04-5040-74	04-5056-74	04-5056-74	04-5056-74
-		Threaded ring (Sight glass assembly)	2	-	0857-8090-00	0229-8087-00	0229-8087-00	0229-8087-00
-		Screw-in ring (Sight glass assembly)	2	-	0821-8090-00	0229-8089-02	0229-8089-02	0229-8089-02
89	14,15	Inspection hole with cover (for oil)	1	0819-8089-00	0821-8089-00	0823-8089-00	0823-8089-00	0823-8089-00
-		Inspection hole with cover (for water)	1	0819-8089-01	0821-8089-01	0823-8089-01	0823-8089-01	0823-8089-01
90	14,15	Gasket (for oil and water inspection holes with cover)	2	-	-	04-5063-74	04-5063-74	04-5063-74
90	14,15	Gasket (for oil and water inspection holes with cover)	4	04-1915-74	04-5040-74	-	-	-
91	14,15	Sight glass (for oil and water inspection holes with cover)	2	01-0040-82	01-0043-82	01-0057-82	01-0057-82	01-0057-82
92	14,15	Threaded ring (for oil and water inspection holes with cover)	2	0220-8090-00	0857-8090-00	0823-8090-00	0823-8090-00	0823-8090-00
93	14,15	Gasket	2	07-2220-75	07-2163-75	07-2150-75	07-2150-75	07-2150-75
94	14,15	Cylindrical pin	2	26-1103-03	26-1103-03	26-1116-03	26-1116-03	26-1116-03
95	14,15	Wing screw	4	19-0963-03	19-0963-03	19-0968-61	19-0968-61	19-0968-61
96	14,15	Oil chamber bottom	1	0820-8740-01	0821-8741-01	0822-8741-00	0823-8741-00	0824-8741-00
97	14,15	Packing cord (for oil chamber bottom)	1	04-2361-758 6x6x860	04-2361-758 6x6x1030	-	-	-
97	15	Gasket	1	-	-	04-5023-77	04-5024-77	04-5513-77
98	15	Cylindrical screw	6	-	-	19-0253-03	19-0286-03	-
98	15	Cylindrical screw	9	-	-	-	-	19-0286-03

Frame, Hood, Tachometer MOC 515-MOC 8015

List of Parts shown in Figures 14 and 15

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
99	14,15	Tension ring	1	03-3798-01	03-3798-01	03-3798-01	03-3798-01	03-3798-01
100	14,15	Top part of hood	1	0820-8702-19	0821-8702-01	0822-8702-00	0823-8702-00	0824-8702-00
101	14,15	Packing cord (f. top part of hood)	1	04-2361-758 6x6x932	04-2361-758 6x6x1120	04-2361-758 6x6x1350	04-2364-758 8x8x1720	04-2364-758 8x8x2030
102	14,15	Gasket	1	07-2122-75	07-2123-75	07-2250-75	07-2148-75	07-2146-75
103	14,15	Hexagon screw	3	19-0023-03	19-0080-03	-	-	-
103	14,15	Hexagon screw	5	-	-	19-0080-03	19-0081-03	19-0081-03
104	14,15	Inlet nozzle	1	0856-7705-00	0821-7705-00	0822-7705-00	0823-7705-00	0824-7705-00
105	14,15	Gasket	1	04-5337-77	04-5339-77	04-1804-70	04-5347-77	04-5347-77
106	14,15	Countersunk screw 1/4"x15	3	-	19-0351-03	19-0351-03	19-0351-03	19-0351-03
106	14	Lens countersunk screw AM 5x12 DIN 88-4D	3	19-3234-00	-	-	-	-
107	14,15	Cap	1	0220-8817-19	0220-8817-19	0220-8817-19	0823-8817-00	0823-8817-00
108	14,15	Cylindrical sight glass	1	01-0104-82	01-0104-82	01-0104-82	01-0116-82	01-0116-82
109	14,15	Gasket	2	04-1917-74	04-1917-74	04-1917-74	04-5060-74	04-5060-74
110	14,15	Threaded nippel	1	19-0832-03	19-0832-03	19-0832-03	19-0668-03	19-0668-03
111	14,15	Thermometer	1	01-0324-28	01-0324-28	01-0324-28	01-0324-28	01-0324-28
112	14,15	Gasket	1	04-5030-59	04-5030-59	04-5030-59	04-5030-59	04-5030-59
-		Sight glass assembly (f.overflow)(113-116)	1	0220-8080-00	0220-8080-00	0220-8080-00	0220-8080-00	0220-8080-00
113	14,15	Ring	1	0220-8089-00	0220-8089-00	0220-8089-00	0220-8089-00	0220-8089-00
114	14,15	Gasket	1	04-1915-74	04-1915-74	04-1915-74	04-1915-74	04-1915-74
115	14,15	Sight glass	1	01-0040-82	01-0040-82	01-0040-82	01-0040-82	01-0040-82
116	14,15	Threaded ring	1	0220-8090-00	0220-8090-00	0220-8090-00	0220-8090-00	0220-8090-00
117	14,15	Gasket	1	04-1916-74	04-1916-74	04-1916-74	04-1916-74	04-1916-74

Vertical Gear Parts MOC 515/1015

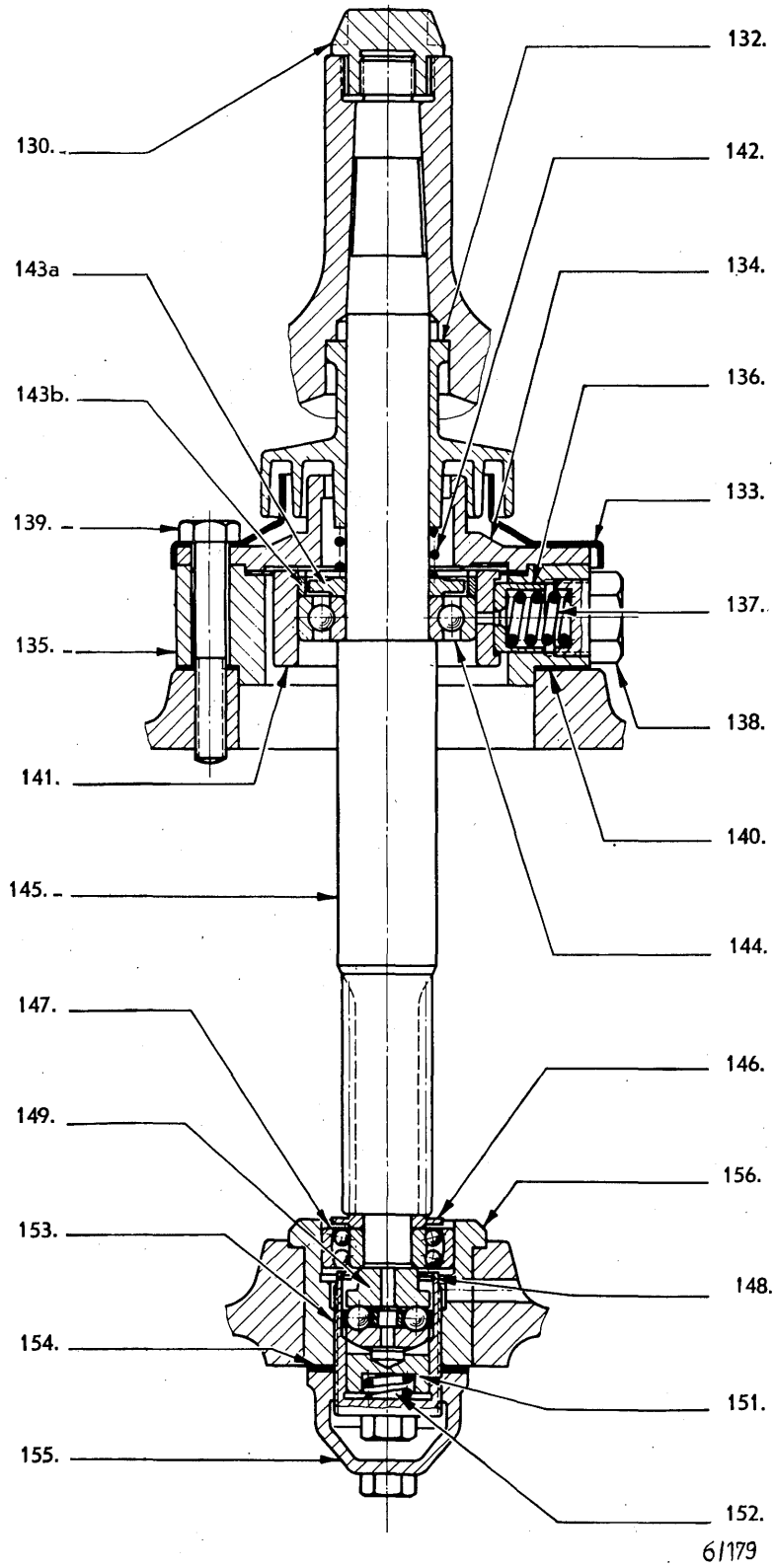


Fig. 16

Vertical Gear Parts MOC 515-MOC 8015 (for 50 cycle three-phase AC, and DC)

(for 60 cycle gear, see page 47)

List of Parts shown in Fig. 16

Item No.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
	Speed of: Motor/Bowl n =		1450/9700 RPM	1450/7600 RPM	1450/7200 RPM	1450/6000 RPM	1450/5500 RPM
-	Gear assembly (for 50 cycles)	1	0820-3300-01	0821-3300-08	0822-3300-01	0823-3300-01	0824-3300-01
130	Spindle nut	1	13-2978-51	13-2975-30	13-2979-30	13-2980-30	13-2982-30
132	Spindle cap	1	08-2001-67	0821-3148-00	08-3001-66	08-3501-50	08-4501-03
-	Neck bearing bridge assembly with covering (133-141, 143b)	1	-	0821-3143-00	0857-3143-01	0217-3143-00	0414-3143-00
-	Neck bearing bridge assembly (135-138, 141)	1	0853-3140-00	0821-3140-00	0857-3140-01	0217-3140-00	0414-3140-00
133	Neck bearing protection shield	1	-	08-2503-00	0169-3320-01	0216-3320-00	0414-3320-00
134	Neck bearing protection cap	1	-	-	-	0216-3319-00	0414-3319-00
135	Neck bearing bridge	1	08-2006-21	0821-3142-00	0857-3142-01	0217-3142-00	0414-3142-00
136	Spring piston	6	26-1284-09	26-1282-09	26-1286-11	26-1288-11	26-1285-12
137	Set of helical springs	1	06-4175-06	06-4179-06	06-4212-06	06-4220-06	06-4232-06
138	Threaded nipple	6	19-0666-03	19-0669-03	19-0665-03	19-0667-03	19-0668-03
139	Hexagon screw	3	19-0025-09	19-0048-03	19-0062-09	19-0085-09	19-0087-09
140	Lower gasket	1	04-5354-77	04-5004-77	04-5010-77	04-5013-77	04-5013-77
-	Upper gasket	1	-	-	-	04-5013-77	04-5017-77
141	Neck bearing pressure ring	1	08-2007-00	0136-3153-00	08-3007-00	0217-3153-00	0414-3153-00
142	Spindle spring	1	06-4127-16	06-4184-16	06-4192-16	06-4226-16	06-4231-16
143a	Upper ball bearing locking ring	1	-	0136-3151-00	08-3008-00	0112-3151-01	0134-3151-01
143b	Distance ring	1	26-1817-00	-	08-3009-01	-	-
144	Upper ball bearing 6204/C412	1	11-6204-01	-	-	-	-
144	Upper ball bearing 6205/C412	1	-	11-6205-01	-	-	-
144	Upper ball bearing 6206/C412	1	-	-	11-6206-01	-	-
144	Upper ball bearing 6207/C412	1	-	-	-	11-6207-01	-
144	Upper ball bearing 6209/C412	1	-	-	-	-	11-6209-01

Vertical Gear Parts MOC 515-MOC 8015 (for 50 cycle three-phase AC, and DC)

(for 60 cycle gear, see page 47)

List of Parts shown in Fig. 16

Item No.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
-	Worm spindle assembly (for 50 cycles)						
	(132, 142, 143a, 144-147)	1	0820-3429-04	0821-3429-00	0822-3429-02	0823-3429-00	0824-3429-00
145	Worm spindle (for 50 cycles)	1	0820-3420-04	0821-3420-00	0822-3420-00	0823-3420-00	0824-3420-00
146	Lower ball bearing locking ring	1	08-1208-00	08-1208-00	08-1708-00	0823-3161-00	08-2508-00
147	Pendulum ball bearing 1301F/C412	1	11-1301-03	11-1301-03	-	-	-
147	Pendulum ball bearing 1303F/C412	1	-	-	11-1303-03	-	-
147	Pendulum ball bearing 2304F/C412	1	-	-	-	11-2304-03	-
147	Pendulum ball bearing 2305F/C412	1	-	-	-	-	11-2305-03
-	Bottom bearing assembly (148-153)	1	10-3000-02	0136-3170-01	0136-3170-01	0134-3170-00	0134-3170-00
148	Expansion ring	1	26-1473-17	26-1473-17	26-1473-17	26-1482-17	26-1482-17
149	Bottom bearing running parts	1 set	10-3010-00	10-3010-00	10-3010-00	10-4210-00	10-4210-00
151	Bottom bearing pressure piece	1	10-3001-21	10-3001-20	10-3001-20	10-4201-20	10-4201-20
152	Helical spring	1	06-4209-16	06-4209-16	06-4209-16	06-4250-16	06-4250-16
153	Bottom bearing threaded piece	1	10-3002-02	10-3002-03	10-3002-03	0134-3171-00	0134-3171-00
154	Gasket	1	04-5040-74	04-1891-71	04-1891-71	04-5048-74	04-5048-74
155	Bottom bearing cap	1	10-3003-22	10-3003-23	10-3003-23	0134-3176-00	0134-3176-00
156	Bottom bearing housing	1	-	0821-1112-009	0169-1112-009	0134-1112-009	0824-1112-009
-	Threaded pin (for bottom bearing housing)	1	-	19-0452-00	19-0452-00	19-0452-00	19-0452-00

Bowl MOC 515 8015

Purification and Clarification

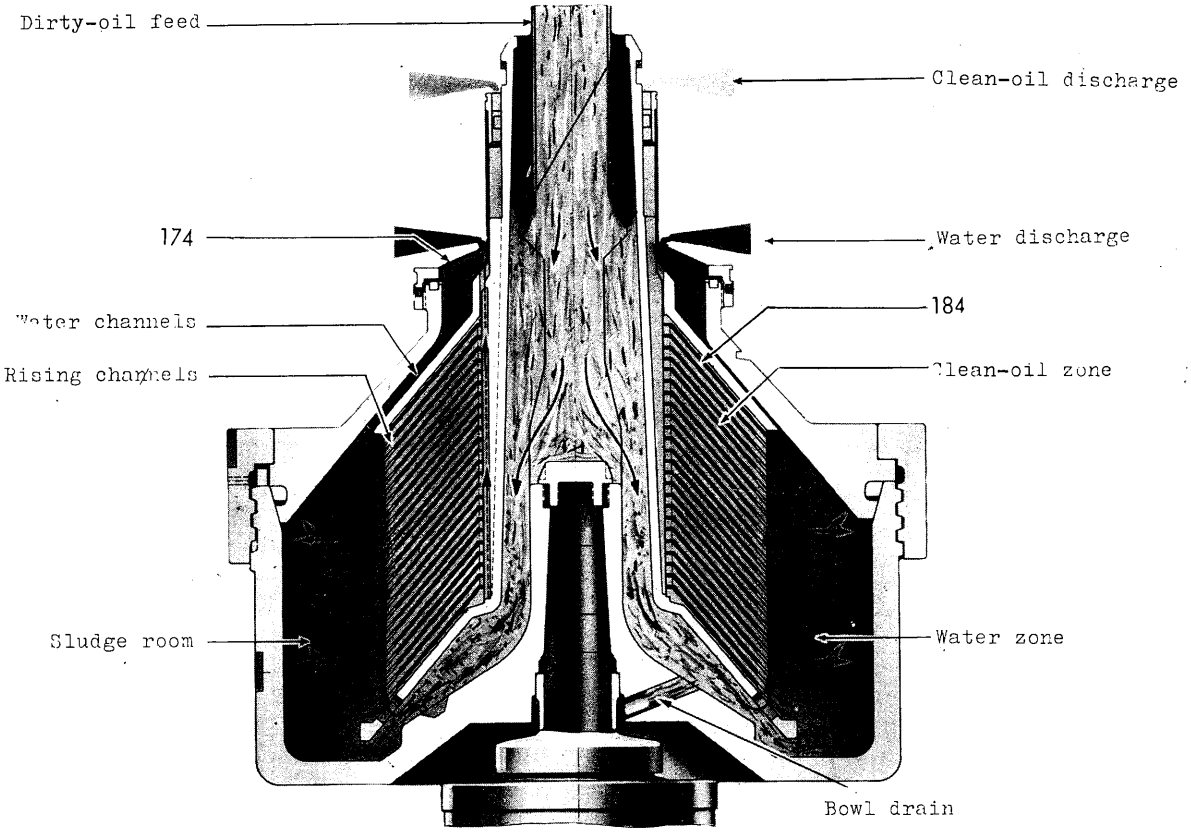


Fig. 17a

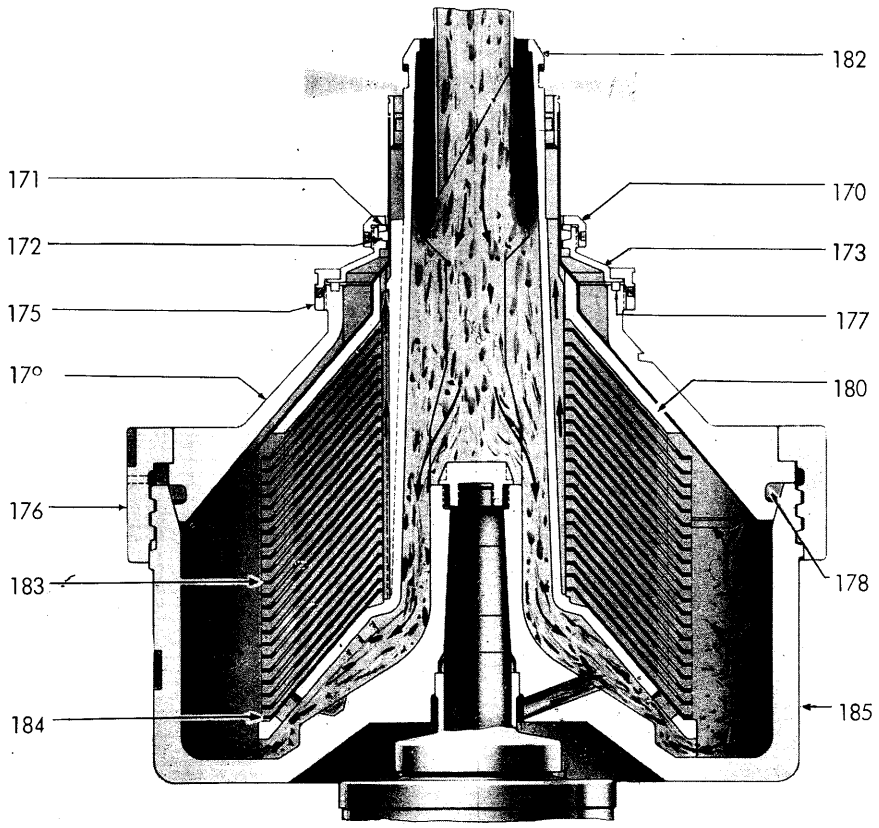


Fig. 17b

Bowl MOC 515-MOC 8015

List of Parts shown in Figures 17a and 17b

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
-		Bowl assembly	1	0820-6600-11	0821-6600-20	0822-6600-18	0823-6600-07	0824-6600-27
-		Sealing assembly (170-173)	1	0820-6690-01	0821-6690-00	0822-6690-01	0823-6690-00	0824-6690-00
170	17b	Threaded ring	1	0820-6693-01	0821-6693-00	0822-6693-01	0823-6693-00	0219-6693-00
171	17b	Pressure ring	1	0820-6694-00	0821-6694-00	0822-6694-01	0823-6694-00	0219-6694-00
172	17b	Gasket	1	07-2249-75	07-2141-75	07-2242-75	07-2114-75	07-2121-75
173	17b	Sealing disc	1	0820-6692-01	0821-6692-00	0822-6692-01	0823-6692-00	0824-6692-00
174	17a	Set of water ring dams	1	0820-6691-06	0821-6691-06	0822-6691-06	0218-6691-02	0824-6691-05
175	17b	Lock ring	1	0853-6631-01	0821-6631-01	0875-6631-01	0218-6631-03	0824-6631-06
176	17b	Bowl locking ring *	1	0820-6631-01	0821-6631-00	0822-6631-01	0823-6631-06	0824-6631-02
177	17b	Gasket	1	07-2358-75	07-2145-75	07-2128-75	07-2134-75	07-2153-75
178	17b	Gasket (to item 179)	1	07-2064-75	07-2082-75	07-2084-75	07-2043-75	07-2160-75
179	17b	Upper bowl part *	1	0820-6610-00	0821-6610-00	0822-6610-00	0823-6610-00	0824-6610-00
180	17b	Separating disc	1	0820-6650-069	0821-6650-119	0822-6650-119	0823-6650-199	0824-6650-279
182	17b	Distributor *	1	0820-6620-01	0821-6620-00	0822-6620-13	0823-6620-11	0824-6620-02
-		Disc set assembly * (183-184)	1	0854-6660-01	0865-6660-03	0876-6660-06	0823-6660-07	0824-6660-27
-		Anti-corrosion disc	1	0820-6669-13	0821-6669-00	0822-6669-00	0823-6669-13	0824-6669-24
183	17b	Disc	about	0853-6663-01 37 pieces	0864-6663-03 40 pieces	0875-6663-06 57 pieces	0823-6663-07 74 pieces	0824-6663-25 91 pieces
184	17a 17b	Blind disc	1	0820-6666-04	0864-6666-03	0822-6666-03	0823-6666-04	0824-6666-04
185	17b	Lower bowl part *	1	0820-6604-06	0821-6604-07	0822-6604-13	0823-6604-17	0824-6604-22
-		Sludge liner	1	-	-	-	0823-6695-00	0824-6695-00

Horizontal Gear Parts MOC 515

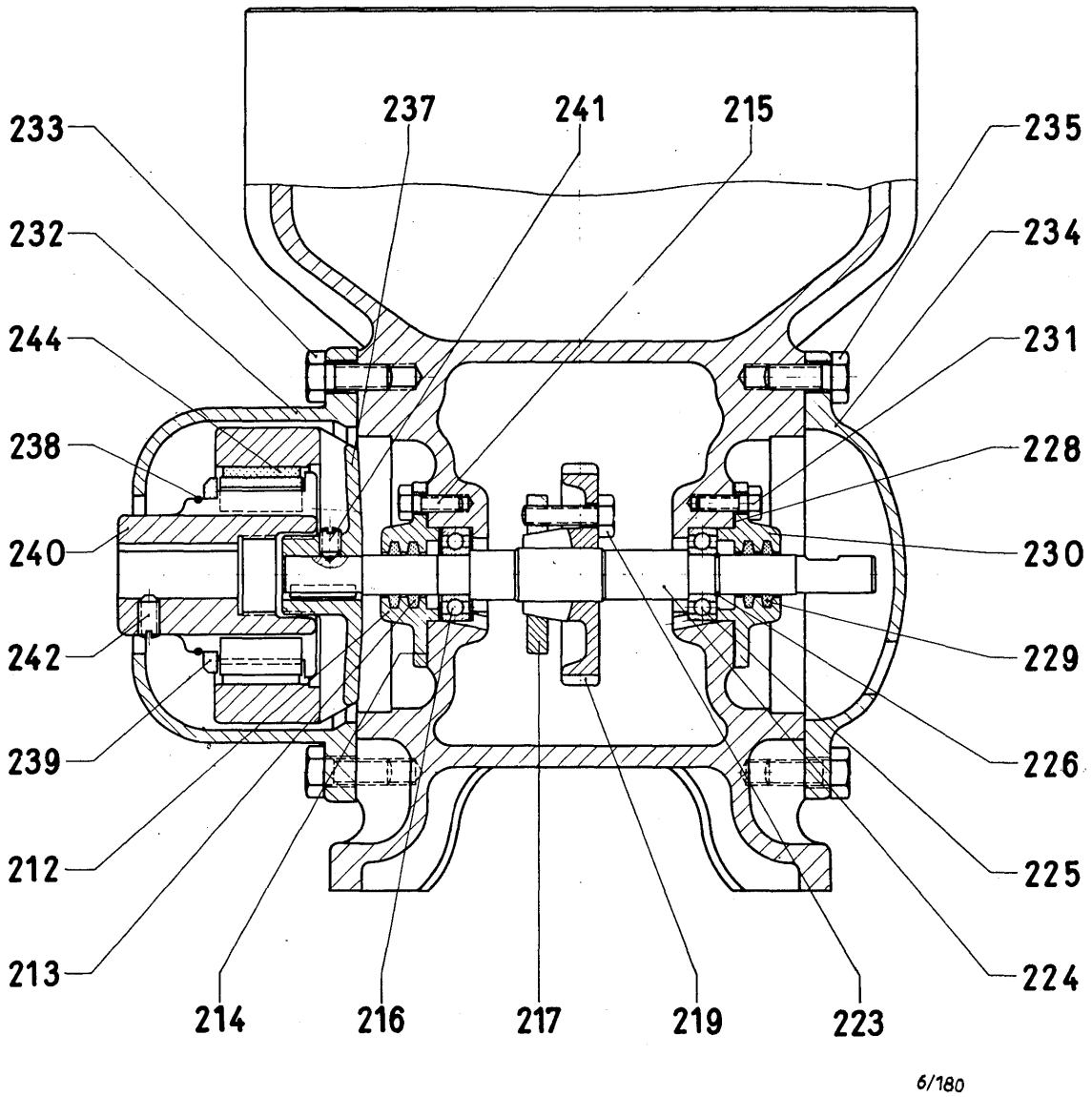


Fig. 18

Horizontal Gear Parts MOC 1015/8015

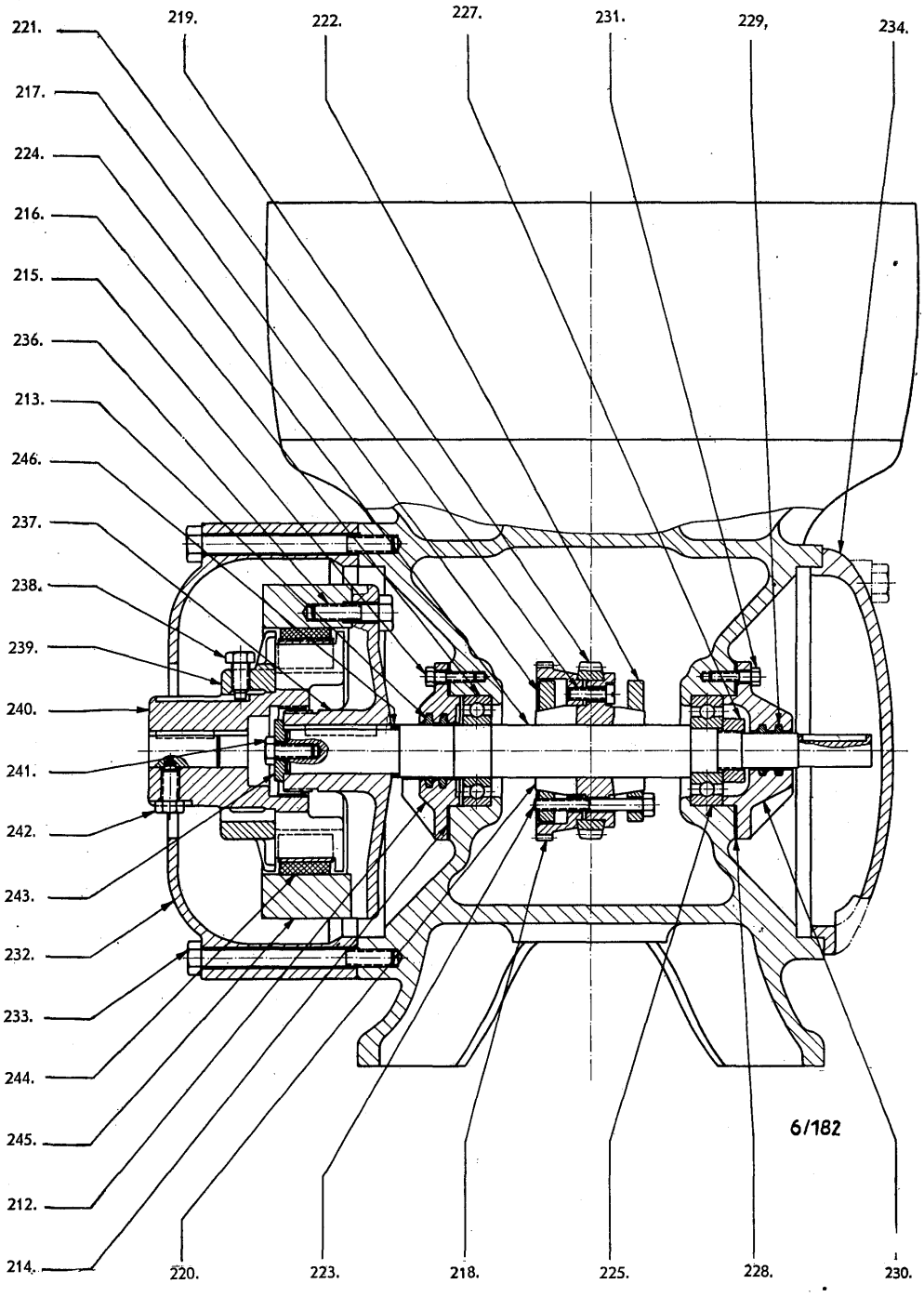


Fig. 19

Horizontal Gear Parts MOC 515-MOC 8015 (for 50 cycle three-phase AC, and DC)

(for 60 cycle gear, see page 47)

List of Parts shown in Figures 18 and 19

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
-		Key (shaft end on motor side)	1	26-1722-16	26-1743-16	26-1743-16	-	-
-		Key	2	-	-	-	26-1765-16	26-1765-16
212	18,19	Bearing cover	1	0819-3375-00	0821-3125-00	0822-3125-03	0824-3125-01	0824-3125-01
213	18,19	Felt ring	2	04-1929-83	04-1941-83	04-1945-83	04-1953-83	04-1953-83
214	18,19	Gasket	1	04-5209-70	04-5214-70	04-5217-70	04-5222-70	04-5222-70
215	18,19	Hexagon screw	3	19-0006-03	19-0006-03	19-0006-03	19-0038-03	19-0042-03
216	18,19	Ball bearing 6202 (Drive side)	1	11-6202-00	-	-	-	-
216	18,19	Ball bearing 6205	1	-	11-6205-00	-	-	-
216	18,19	Ball bearing 6206	1	-	-	11-6206-00	-	-
216	18,19	Ball bearing 6208	1	-	-	-	11-6208-00	11-6208-00
-		Worm wheel assembly (for 50 cycles)(217-223)	1	0820-3449-00	0821-3449-00	0822-3449-00	0823-3449-01	0824-3449-01
-		Worm wheel assembly without clamp plates (for 50 cycles)(218-221)	1	-	0821-3440-00	0822-3440-00	0823-3440-01	0824-3440-01
217	18,19	Clamp plate (with thread)	1	6197-3446-00	6166-3446-01	0178-3446-01	0824-3446-03	0824-3446-03
218	19	Pressure ring (for 50 cycles)	1	-	0821-3442-00	0822-3442-00	0824-3442-01	0824-3442-01
219	19	Toothed rim (for 50 cycles)	1	-	6166-3443-009	0857-3443-009	0823-3443-009	0824-3443-009
219	18	Worm wheel (for 50 cycles)	1	0820-3441-00	-	-	-	-
220	19	Wheel body	1	-	6166-3441-00	0822-3441-00	0824-3441-01	0824-3441-01
221	19	Cylindrical screw	3	-	19-0253-03	19-0253-03	-	-
221	19	Cylindrical screw	4	-	-	-	19-0279-03	19-0279-03

Horizontal Gear Parts MOC 515-MOC 8015 (for 50 cycle three-phase AC, and DC)

(for 60 cycle gear, see page 47)

List of Parts shown in Figures 18 and 19

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
222	19	Clamp plate (without thread)	1	-	6166-3446-00	0178-3446-00	0824-3446-02	0824-3446-02
223	18,19	Hexagon screw (for clamp plates)	3	19-0018-03	19-0030-09	19-0030-09	-	-
223	18,19	Hexagon screw (for clamp plates)	4	-	-	-	19-0052-03	19-0052-03
224	18,19	Worm wheel shaft	1	0819-3400-00	0821-3400-03	0822-3400-00	0824-3400-05	0824-3400-05
225	18,19	Ball bearing 6202 (Protection cap- or pump-side)	1	11-6202-00	-	-	-	-
225	18,19	Ball bearing 6304 (Protection cap- or pump-side)	1	-	11-6304-00	-	-	-
225	18,19	Ball bearing 6305 (Protection cap- or pump-side)	1	-	-	11-6305-00	-	-
225	18,19	Ball bearing 6306 (Protection cap- or pump-side)	1	-	-	-	11-6306-00	11-6306-00
226	18	Expansion ring (Protection cap- or pump-side)	1	26-1434-17	-	-	-	-
227	19	Nut (to item 224) (Protection cap- or pump-side)	1	-	13-2554-00	0013-3138-06	0824-3308-00	0824-3308-00
228	18,19	Gasket (Protection cap- or pump-side)	1	04-5209-70	04-5214-70	04-5217-70	04-5222-70	04-5222-70
229	18,19	Felt ring (Protection cap- or pump-side)	2	04-1929-83	04-1934-83	04-1933-83	04-1942-83	04-1942-83
230	18,19	Bearing cover (Protection cap- or pump-side)	1	0819-3375-01	0821-3299-00	0822-3375-00	0824-3299-00	0824-3299-00
231	18,19	Hexagon screw	3	19-0006-03	19-0006-03	19-0006-03	19-0038-03	19-0042-03
232	18,19	Protecting housing	1	0820-1470-07	0821-1135-000	0822-1470-03	0824-1470-07	0824-1470-07
233	18,19	Hexagon screw	2	19-0038-03	19-0925-03	19-0054-03	19-0926-03	19-0926-03
234	18,19	+ Protection cap	1	0820-1466-02	0821-1466-03	0822-1466-00	0824-1466-02	0824-1466-02
235	18	+ Hexagon screw	2	19-0040-03	19-0052-03	19-0085-09	19-0092-03	19-0092-03
-	18,19	Centrifugal clutch assembly (236-246)	1	0820-3385-01	0821-3385-01	0822-3385-07	2101-3385-02	2101-3385-01
236	19	Hexagon screw (to item 237) M 10x35 DIN 931 5D kad.	4	-	-	19-6511-09	-	-
		M 10x50 DIN 931 5D kad.	4	-	-	-	19-6514-09	19-6514-09
237	18,19	Clutch pulley	1	0820-3365-00	0821-3365-00	0822-3365-00	2101-3365-00	2101-3365-00

+ Not used on separators with attached pump

Horizontal Gear Parts MOC 515-MOC 8015 (for 50 cycle three-phase AC, and DC)

(for 60 cycle gear, see page 47)

List of Parts shown in Figures 18 and 19

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
238	18	Expansion ring	1	26-1457-17	-	-	-	-
238	19	Hexagon screw with pin AM 10x25 DIN 561-4D kad.	1	-	19-5194-03	19-5194-03	19-5195-03	19-5195-03
239	18	Ring	1	0820-3387-00	-	-	-	-
239	19	Clutch cover	1	-	0821-3479-00	3033-3479-00	3313-3479-01	3313-3479-01
240	18,19	Driving plate (according to motor size)	1	0820-3468-L	0821-3468-L	0822-3468-L	3313-3469-L	3313-3469-L
241	18	Threaded pin M 8x10 DIN 438-4D	1	19-3973-00	-	-	-	-
241	19	Hexagon screw M 8x20 DIN 933-5D kad.	1	-	19-6903-09	19-6903-09	-	-
		M 10x20 DIN 933-5D kad.	1	-	-	-	19-6933-09	19-6933-09
242	18	Pointed threaded pin M 8x15 DIN 553-4D	1	19-5053-00	-		-	-
242	19	Hexagon screw with pin M 10x20 4D kad.	1	-	-	-	19-0167-03	19-0167-03
		AM 10x20 DIN 561-4D kad.	1	-	19-5194-03	-	-	-
		AM 10x25 DIN 561-4D kad.	1	-	-	19-5195-03	-	-
243	19	Centering disc	1	-	26-1656-00	26-1656-00	-	-
243	19	Holding disc	1	-	-	-	0991-3464-00	0991-3464-00
244	18,19	Clutch shoe assembly	4	-	0821-3397-00	3033-3397-02	3313-3397-00	-
244	18,19	Clutch shoe assembly	6	0820-3397-00	-	-	-	3313-3397-00
245	19	Ring	1	-	-	3033-3366-00	2101-3366-00	2101-3366-00
246	19	Disc	1	-	-	-	26-5752-00	26-5752-00
246	19	Safety ring	1	-	26-5861-17	-	-	-

Gear Parts MOC 515-MOC 8015 (for 60 cycle three-phase AC)

All gear parts are identical with those of the 50 cycle gear, except for the parts as stated in the following list. (50 cycle gear: Tachometer drive see page 34
Vertical gear parts see pages 37 - 39
Horizontal gear parts see pages 42 - 46)

List of Parts shown in Figures 15, 16, 18, 19

Item No.	Fig.	Part Description	Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
		Speed of Motor/Bowl n =		1720/9700 RPM	1720/7600 RPM	1720/7200 RPM	1720/6000 RPM	1720/5500 RPM
-		Gear assembly	1	0820-3300-06	0821-3300-16	0822-3300-06	0823-3300-06	0824-3300-06
-		Tachometer drive assembly	1	-	0821-3500-08	0822-3500-07	0823-3500-07	0824-3500-11
53	15	Pinion (for tachometer drive)	1	-	0821-3483-07	0822-3483-03	0823-3483-00	0824-3483-08
-		Worm spindle assembly	1	0820-3429-06	0821-3429-01	0822-3429-03	0823-3429-01	0824-3429-06
145	16	Worm spindle	1	0820-3420-06	0821-3420-01	0822-3420-01	0823-3420-01	0824-3420-06
-		Worm wheel assembly	1	0820-3449-02	0821-3449-01	0822-3449-01	0823-3449-02	0824-3449-04
-		Worm wheel assembly without clamp plates	1	-	0821-3440-01	0822-3440-01	0823-3440-02	0824-3440-04
218	19	Pressure ring	1	-	0821-3442-01	0822-3442-01	0823-3442-00	0824-3442-03
219	19	Toothed rim	1	-	0855-3443-009	0857-3443-029	0823-3443-029	0824-3443-049
219	18	Worm wheel (one piece)	1	0820-3441-01	-	-	-	-

Single Gear Pump and Double Gear Pump
with Pump Clutch, for MOC 515/8015

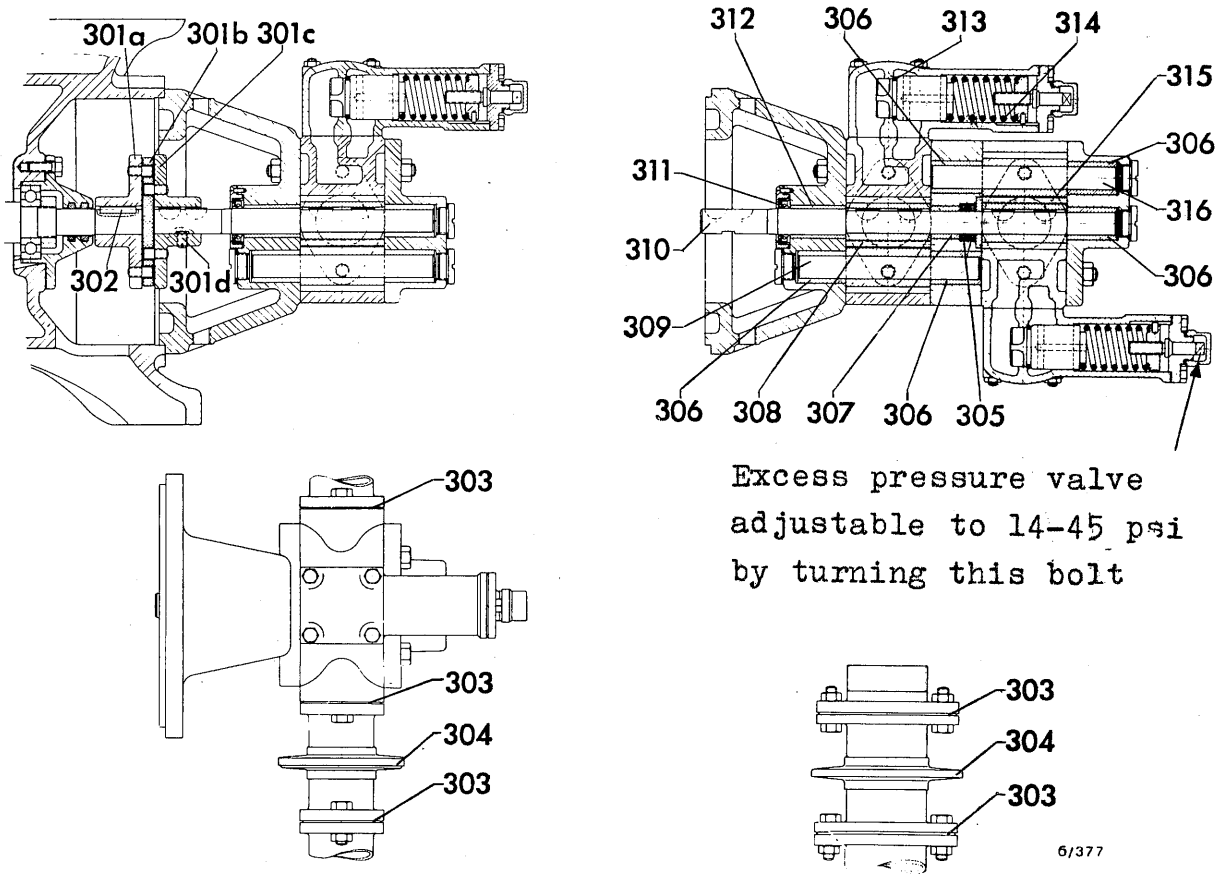


Fig. 20

IMPORTANT

When ordering parts for single and double gear-pump, please indicate the following.

- 1 - Model Number of Pump
- 2 - Serial Number of Pump

  Both numbers are shown on the name-plate of the pump.

- 3 - Description
- 4 - Part No. and Item No. respectively

  of the part to be replaced. For both details please see page 49.

In addition please give Model and Serial No. of the separator concerned (see page 29).

Pump Clutch and Pump MOC 515-MOC 8015

List of Parts shown in Fig. 20

Item No.	Part Description	Single Pump Number	Double Pump Number	Part No. MOC 515	MOC 1015	MOC 2015	MOC 4015	+)MOC 8015
-	Pump clutch assembly (301a-d)	1	1	2160-3320-00	0821-3425-00	0822-3425-00	0823-3394-16	0823-3394-16
301a	Clutch pulley (separator side)	1	1	2160-3325-00	0821-3426-01	0822-3426-00	0823-3426-00	0823-3426-00
301b	Flexible coupling	1	1	21-4791-71	21-4792-71	21-4793-71	21-4794-71	21-4794-71
301c	Clutch pulley (pump side)	1	1	2160-3322-00	0821-3426-04	0822-3426-02	0823-3426-01	0823-3426-01
301d	Threaded pin (to item 301c)	1	1	19-3973-00	19-0414-00	19-0421-00	19-0421-00	19-0421-00
-	Threaded pin (to item 301a)	1	1	19-3973-00	-	-	-	-
302	Key	1	1	26-1722-16	26-1727-16	26-1744-16	26-1744-16	26-1744-16
303	Gasket	3	7	04-5445-74	04-5447-74	04-5454-74	04-5457-74	04-5006-74
304	Expansion joint	1	3	0820-2832-00	0821-2832-00	0822-2832-00	0823-2832-00	0824-2832-00
	Rated capacity of pumps per stage			600 liters/h	1500 liters/h	3000 liters/h	5000 liters/h	10000 liters/h
-	Single pump	1	-	HDFW 2/24	HDFW 3/30	HDFW 3,5/50	HDFW 3,5/80	HDFW 4/120
-	Double pump	-	1	2HDFW 2/24	2HDFW 3/30	2HDFW 3,5/3/50	2HDFW 3,5/3/80	2HDFW 4/120
305	Packing ring	-	2					
306	Bearing shell	3	5					
307	Central bearing shell	-	1					
308	Couple of wheels	1	1					
309	Intermediate shaft	1	1					
310	Driving shaft	1	1					
311	Packing ring	1	1					
312	Driving shell	1	1					
313	Valve bolt	1	2					
314	Valve spring	1	2					
315	Couple of wheels (dirty oil side)	-	1					
316	Intermediate shaft	-	1					

When ordering parts for single and double gear pumps, please state the item-No. (see column 1 and Fig. 20), instead of the Part No. as required for separator parts.

+) Separator MOC 8015 can also be equipped with pumps HDFW 3,5/80 or 2HDFW 3,5/3/80. In this case please ask for the parts listed for MOC 4015.

Pre-strainer

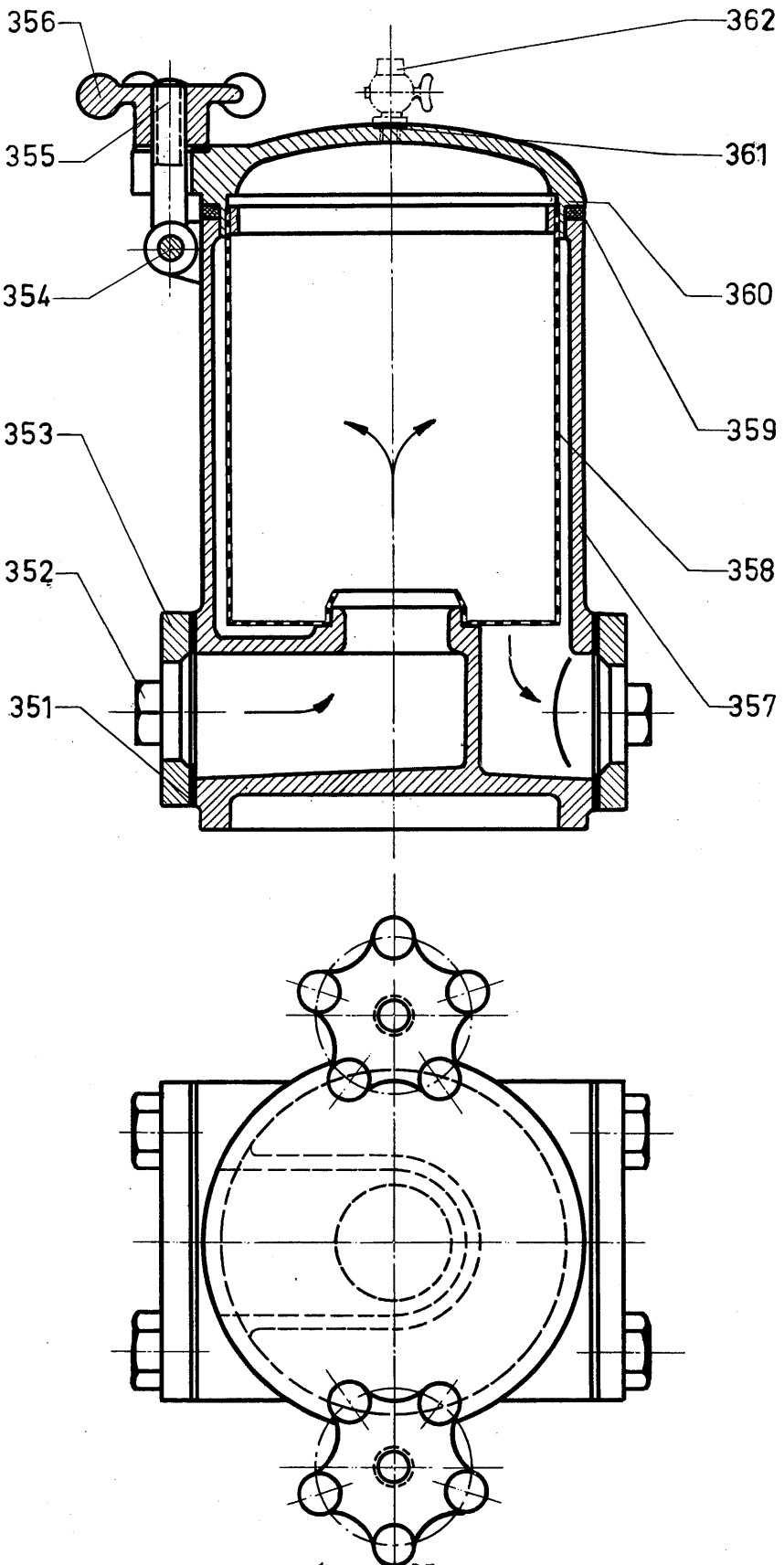


Fig. 21

The pre-strainer protects the dirty-oil gear pump from coarse impurities.

Pre-strainer MOC 515-MOC 8015

List of Parts shown in Fig. 21

Item No.	Part Description	Number	Part No. MOC 515 MOC 1015	Part No. MOC 2015	Part No. MOC 4015 MOC 8015
-	Pre-strainer assembly	1	8821-2110-01	8822-2110-01	8823-2110-03
351	Gasket	2	04-5447-74	04-5454-74	04-5003-74
352	Hexagon screw M 12x30 DIN 931-5D kad.	4	19-6532-09	19-6532-09	-
	M 12x30 DIN 931-5D kad.	12	-	-	19-6532-09
353	Flange	2	01-0140-00	01-0146-00	01-0201-00
354	Cylindrical pin	2	26-1117-03	26-1117-03	26-1115-03
355	Hinge screw	2	19-0518-03	19-0518-03	19-0508-03
356	Handle nut	2	21-3117-23	21-3117-23	21-3117-23
357	Sieve housing	1	8462-2114-06	8462-2114-07	8823-2114-02
358	Screen insert assembly	1	8462-2119-00	8462-2119-00	8823-2119-00
359	Gasket	1	07-2132-75	07-2132-75	-
359	Packing cord	1	-	-	07-2364-758 8x8x600
360	Housing cover	1	8462-2115-03	8462-2115-03	8823-2115-01
361	Gasket (for cock)	1	-	-	04-1872-72
362	cock (for de-aeration)	1	-	-	18-1530-60

Mechanical Bowl Lifter for MOC 2015-MOC 8015

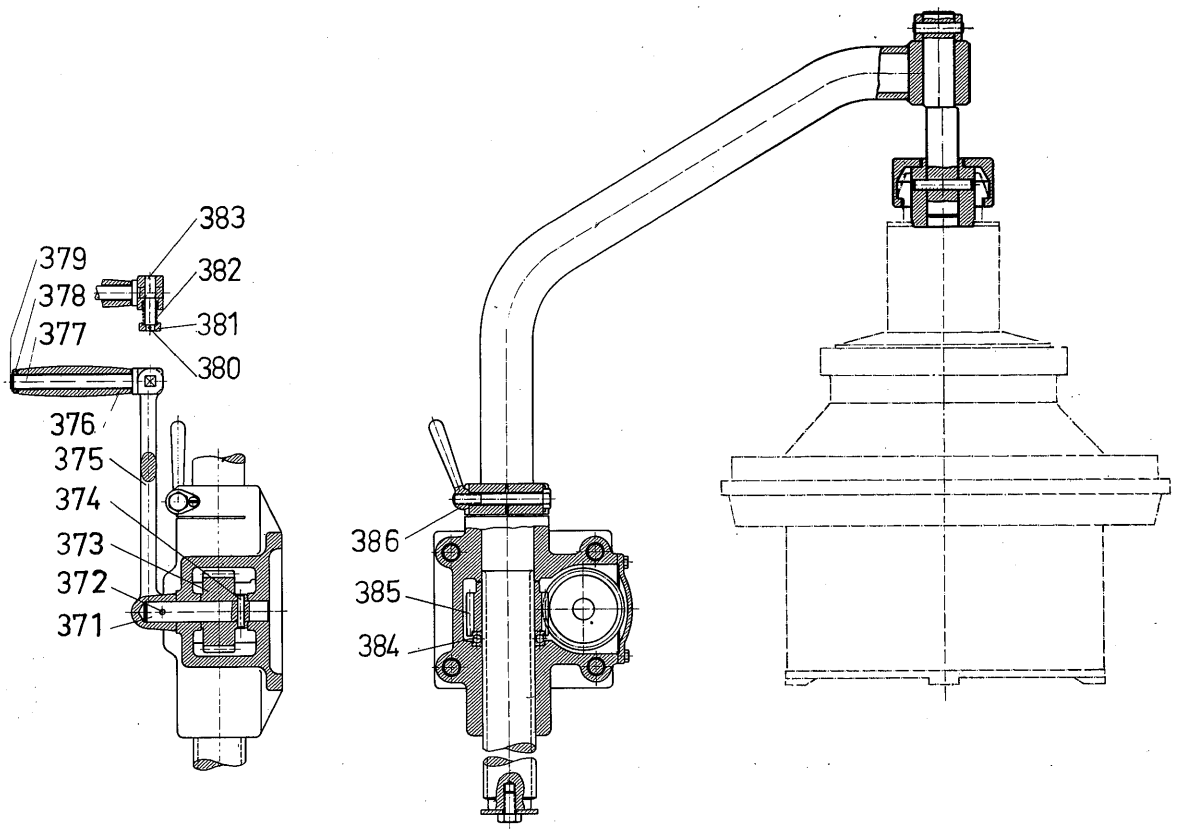


Fig. 22

List of Parts shown in Fig.22

Item No.	Part Description	Number	Part No. MOC 2015	Part No. MOC 4015 MOC 8015
-	Mechanical bowl lifter assembly			
	for MOC 2015 and MOC 4015	1	8150-9000-00	8151-9000-00
	for MOC 8015	1	-	8152-9000-00
371	Shaft	1	8150-9400-00	-
371	Cylindrical pin	1	-	26-5716-03
372	Tapered notch pin	1	26-1408-12	26-1408-12
373	Worm (for drive)	1	8150-9443-00	8152-9443-00
374	Tapered pin	1	26-1020-06	-
374	Cylindrical pin	1	-	26-5688-06
375	Crank arm	1	6511-3451-00	8152-9451-00
376	Crank handle	1	21-3233-95	21-3234-95
377	Crank pin	1	19-0818-00	-
377	Bolt	1	-	8152-9877-00
378	Disc	1	-	26-1371-00
379	Safety ring	1	-	26-5857-17
380	Cylindrical pin	1	-	26-1046-03
381	Pressure disc	1	-	8152-9866-00
382	Helical spring	1	-	06-4107-16
383	Bolt	1	-	8152-9867-00
384	Axial ball bearing	1		10-7010-00
385	Worm	1	8150-9423-00	8152-9423-00
386	Tapered handle	1	13-2866-00	13-2866-00

Mounting the Base Plate MOC 515-MOC 8015

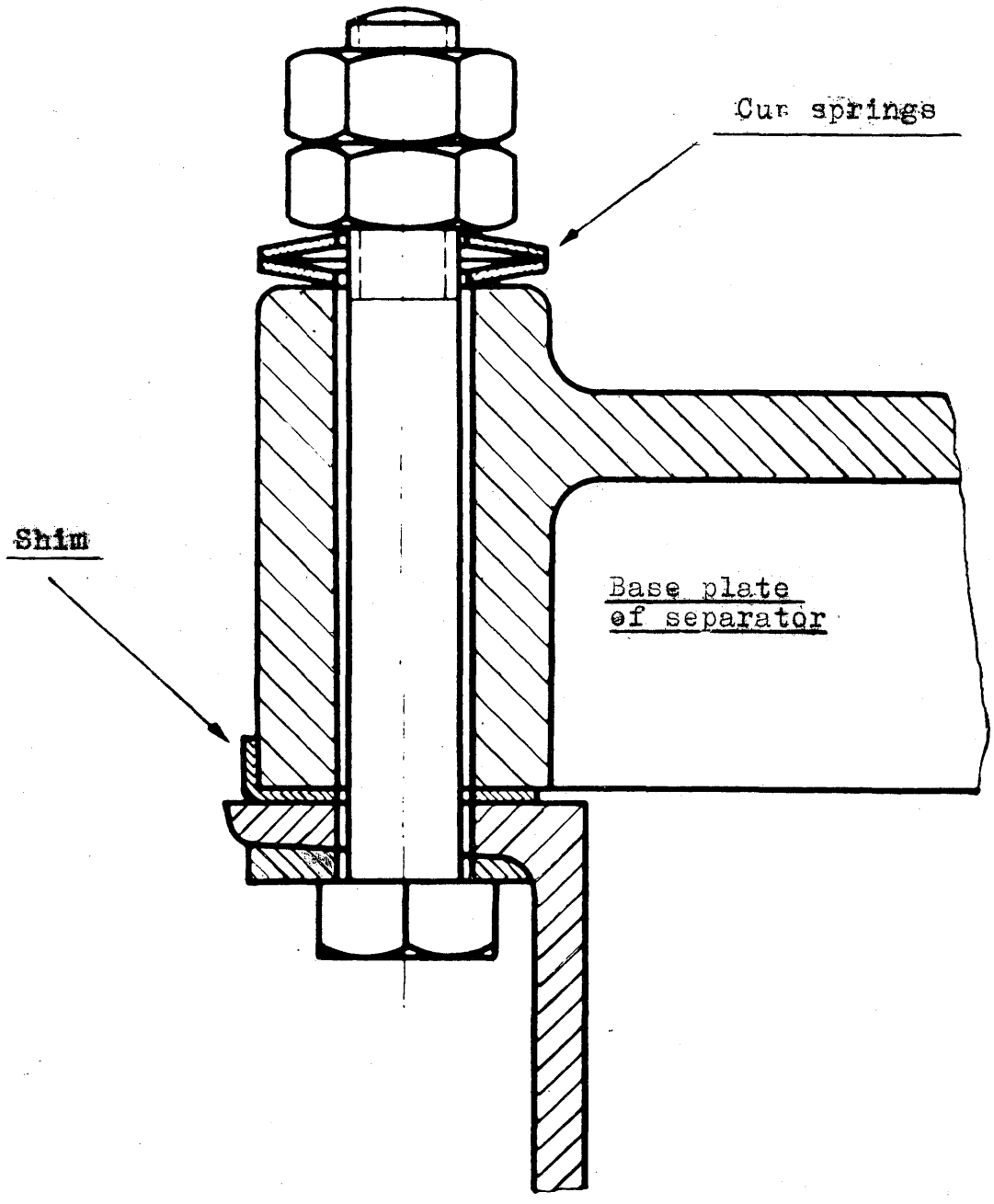


Fig. 23

Uneven spots of the ground or floor on which the separator base plate is mounted should be compensated for by shims placed underneath the base plate.

Two shock absorbing cup springs should be placed between base plate and each hexagon nut.

Shims and cup springs of different thickness are furnished with the separator.

ILLUSTRATIONS

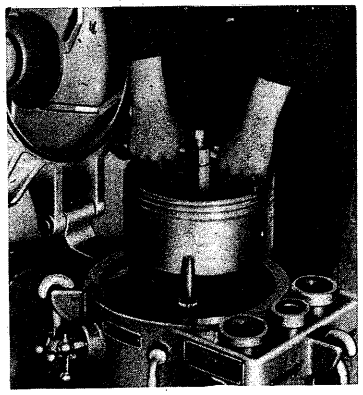


Fig. 24

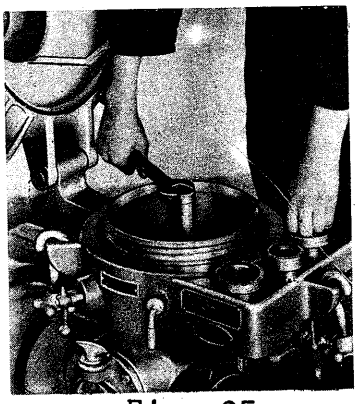


Fig. 25

Fig. 26

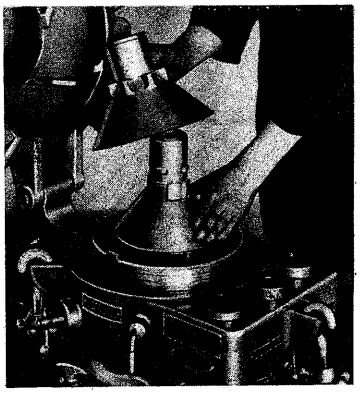


Fig. 27

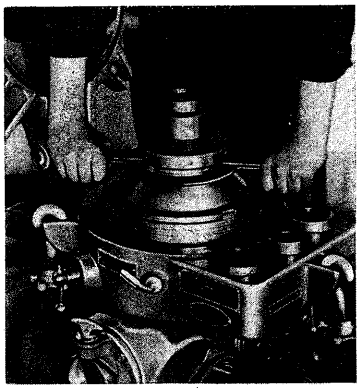


Fig. 28

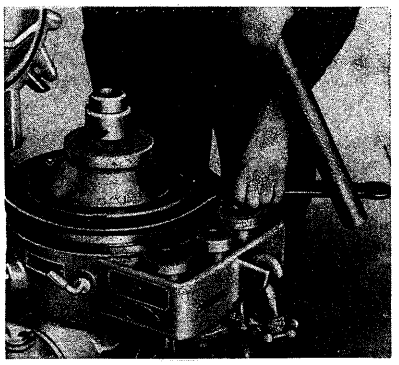


Fig. 29

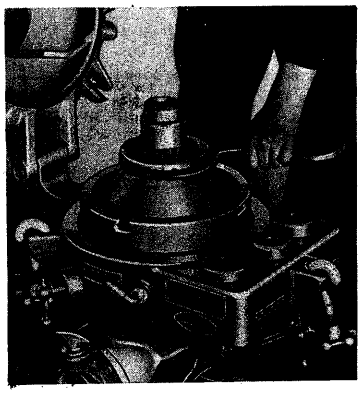


Fig. 30

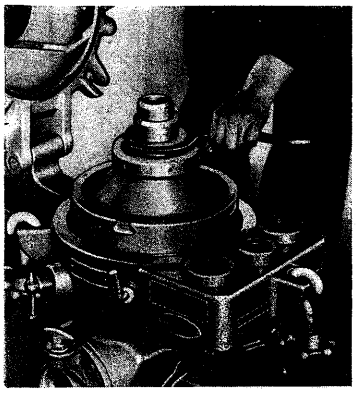


Fig. 31

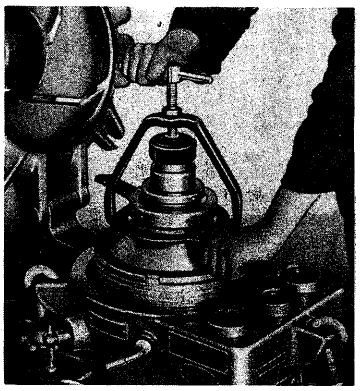


Fig. 32

Fig. 33

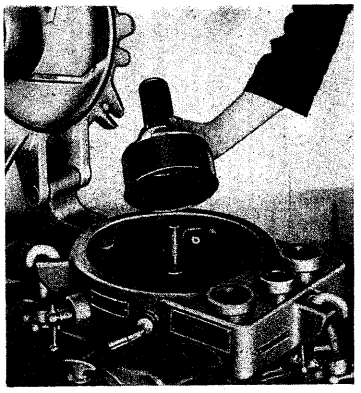


Fig. 34

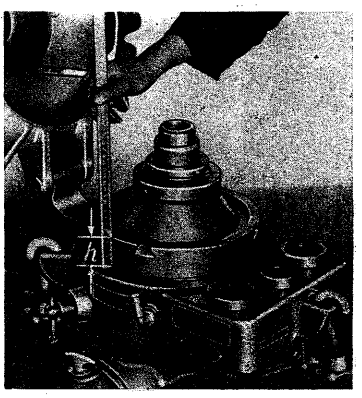
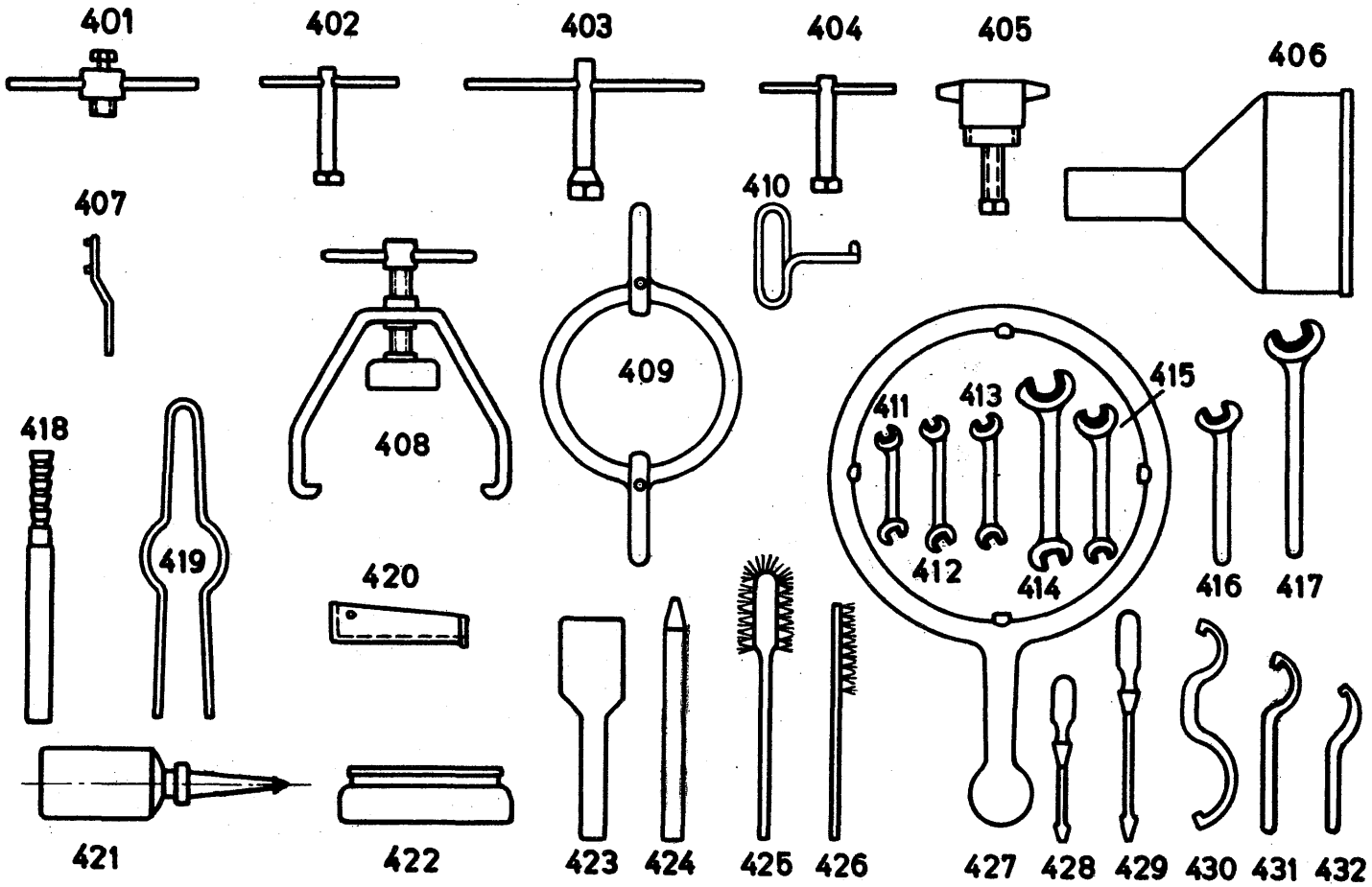


Fig. 35

All the parts mentioned in the packing list with the separator be found in the packing case.

List of Parts shown in Fig. 36



Tools and Accessories MOC 515 - MOC 8015

All the parts mentioned in the packing list furnished with the separator should be found in the packing case.

List of Parts shown in Fig. 36

Item No.	Part Description	Number of Pieces	Part-No. MOC 515	MOC 1015	MOC 2015	MOC 4015	MOC 8015
401	Lifting device (for bowl bottom)	1	0820-9822-010	0821-9822-010	0822-9822-000	0823-9822-010	0919-9822-020
402	Hexagon socket wrench 17 DIN 659	1	-	-	0003-4228-030	-	0003-4228-030
403	Hexagon socket wrench 22 DIN 659	1	-	-	0003-4230-030	0003-4230-030	0003-4230-030
404	Hexagon socket wrench 19 DIN 659	1	-	0003-4229-030	0003-4229-030	0003-4229-030	0003-4229-030
405	Lifting device (for clutch)	1	0820-9910-010	3033-9910-000	3033-9910-000	3313-9910-000	3313-9910-000
406	Neck bearing protection hood	1	0003-0295-000	0003-0295-000	0003-0297-000	0003-0295-000	0003-0295-000
407	Wrench (for sight glass)	1	0003-4585-000	0003-4585-000	0003-4585-000	0003-4585-000	0003-4585-000
408	Lifting device (for bowl top)	1	0820-9830-000	0821-9830-000	0822-9830-000	0823-9830-000	0824-9830-000
409	Annular wrench (for bowl top)	1	0853-9850-000	0821-9850-000	0875-9850-000	0252-9850-000	0252-9850-000
410	Hook (for sludge Liner)	2	-	-	-	2195-9863-010	2195-9863-010
411	Double wrench 10x11	1	0003-4201-320	0003-4201-320	-	-	-
412	Double wrench 12x13	1	0003-4202-320	0003-4202-320	0003-4202-320	0003-4202-320	0003-4202-320
413	Double wrench 17x19	1	0003-4205-320	0003-4205-320	0003-4205-320	0003-4205-320	0003-4205-320
414	Double wrench 27x32	1	-	-	0003-4211-320	0003-4211-320	-
415	Double wrench 22x27	1	0003-4208-320	0003-4208-320	0003-4208-320	0003-4208-320	0003-4208-320
416	Wrench 30	1	-	0003-4209-320	0003-4209-320	-	-
417	Wrench 41	1	-	-	-	0003-4218-110	0003-4218-110
418	Mallet	1	-	0003-0200-000	0003-0200-000	0003-0200-000	0003-0200-000
419	Lifting tongs (for distributor)	1	0003-3547-170	0003-3550-170	0003-3446-170	0003-3424-000	0003-3426-000
420	Oil filler	1	0003-0400-000	-	-	-	-
421	Pressure oil can	1	0003-0315-010	0003-0315-010	0003-0315-010	0003-0315-010	0003-0315-010
422	Oil cup	1	0003-0273-000	0003-0275-000	0003-0275-000	0003-0274-000	0003-0274-000
423	Large scraper	1	-	0003-0211-950	0003-0211-950	0003-0211-950	0003-0211-950
424	Small scraper	1	0003-0210-950	0003-0210-950	0003-0210-950	0003-0210-950	0003-0210-950
425	Brush (for distributor)	1	0003-4695-960	0003-4695-960	0003-4695-960	0003-4695-960	0003-4695-960
426	Brush (for discs)	1	0003-4690-960	0003-4690-960	0003-4690-960	0003-4690-960	0003-4690-960
427	Annular wrench (for bowl lockring)	1	0003-3997-000	0003-4024-030	0003-4036-030	0003-4049-030	0003-4059-030
428	Screw driver 0,8x5,5 x200	1	0003-4636-050	0003-4636-050	0003-4636-050	0003-4636-050	0003-4636-050
429	Screw driver 1,6x10 x290	1	0003-4637-050	0003-4637-050	0003-4637-050	0003-4637-050	0003-4637-050
430	Double hook wrench	1	0003-3681-000	0003-3685-000	0003-3686-000	0003-3687-000	-
431	Hook wrench	1	-	-	-	-	0003-3678-000
432	Hook wrench	1	-		-	-	0003-3674-000
-	Notched pin (for hook wrench)	2	0026-1550-130	0026-1558-130	0026-1558-130	0026-1672-130	0026-1672-130
-	Notched pin (for hook wrench)	2	0026-1558-130	0026-1671-130	0026-1671-130	0026-1672-130	-