

Instruction Manual and Parts List

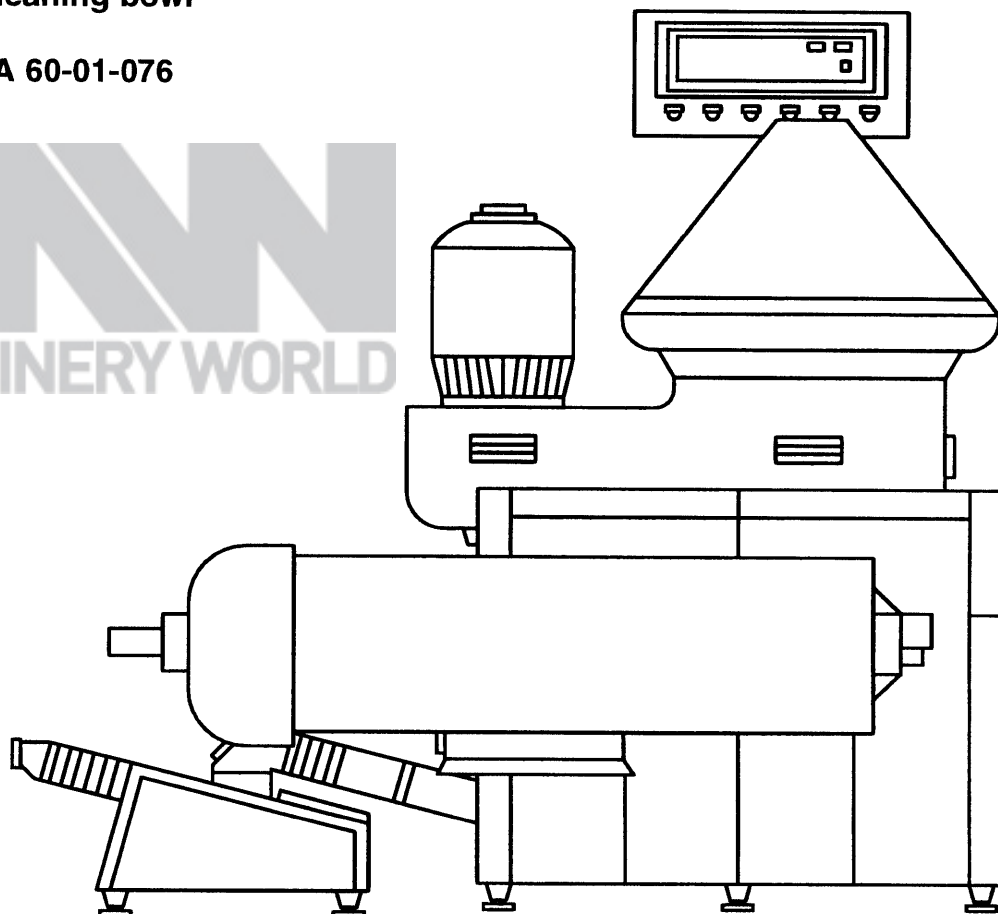
No. 1169-9001-000

Edition 1074

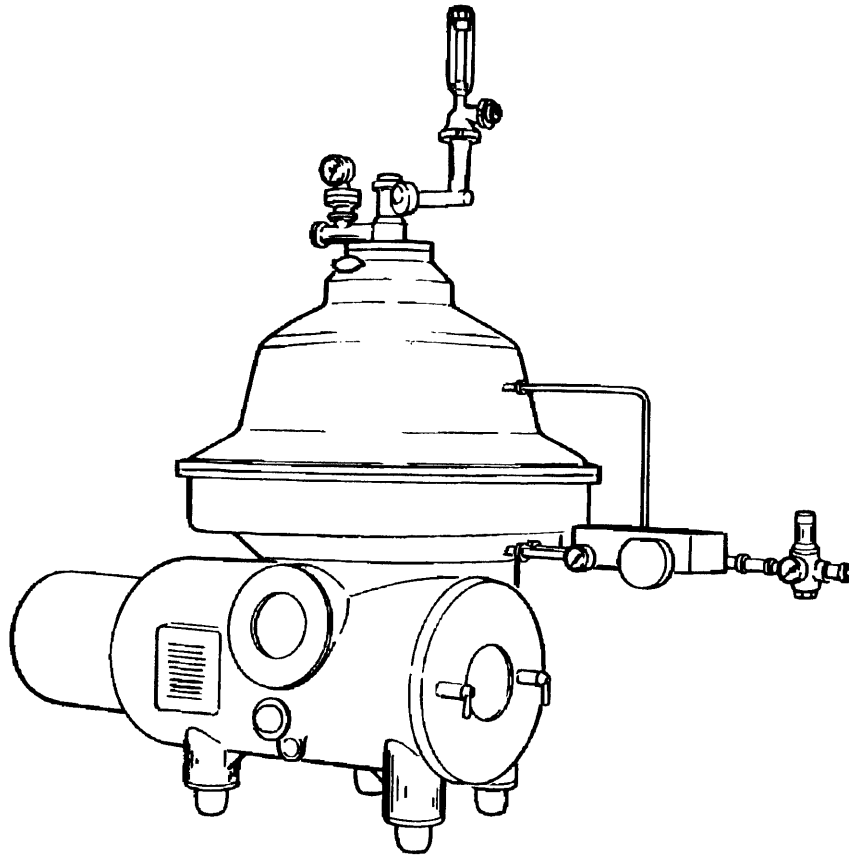
**Milk-Separator
with self-cleaning bowl**

Model MSA 60-01-076

NNN
MACHINERY WORLD



Subject to modification!



Westfalia Separator AG			
D-59302 Oelde (F. R. Germany)			
Type	<input type="text"/>	No.	<input type="text"/>
built in	<input type="text"/>	inner Ø of bowl mm	<input type="text"/>
Rpm of bowl			<input type="text"/>
Permissible density of product to be treated			<input type="text"/>
heavy liquid kg/dm ³	<input type="text"/>	solids kg/dm ³	<input type="text"/>

For your safety



- **Strictly adhere to instructions marked with this symbol**

This avoids damage to the machine and other units.



- **Take special care when carrying out operations marked with this symbol -**

otherwise danger to life.

- **Observe accident prevention regulations**

The local safety and accident prevention regulations apply unconditionally to the operation of the separator.

- **Instruction manual**

Follow only the instructions given in this manual

- **Operate the separator only in accordance with agreed process and operating parameters**

- **Maintain the separator as specified -**

in this manual

- **Carry out safety checks on the separator -**

as described in chapter "Safety precautions" in this manual

- **Liability for the function of the machine passes to the owner**

Liability for the function of the machine passes unconditionally to the owner or operator irrespective of existing warranty periods in so far as the machine is improperly maintained or serviced by persons other than Westfalia Separator service personnel or if the machine is not applied in accordance with the intended use.

Westfalia Separator AG shall not be liable for damage which occurs as a result of non-observance of the above. Warranty and liability conditions in the Conditions of Sale and Delivery of Westfalia Separator AG are not extended by the above.

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Correct usage

The separator is designed

- in accordance with the chemical and physical properties of the product specified by the customer and
- in accordance with the method of application of the separator agreed with Westfalia Separator AG.

In particular, products not conforming to the specifications the nameplate may not be used.

Any mode of operation deviating herefrom is not proper and correct.

Prior to any intended deviation from the agreed operating mode, it is therefore imperative to obtain the consent of Westfalia Separator AG.

Safety stickers on the machine

The following warnings must be attached to the machine as self-adhesive stickers. The stickers must always be in perfect condition.

- Clean dirty stickers.
- Replace damaged stickers.

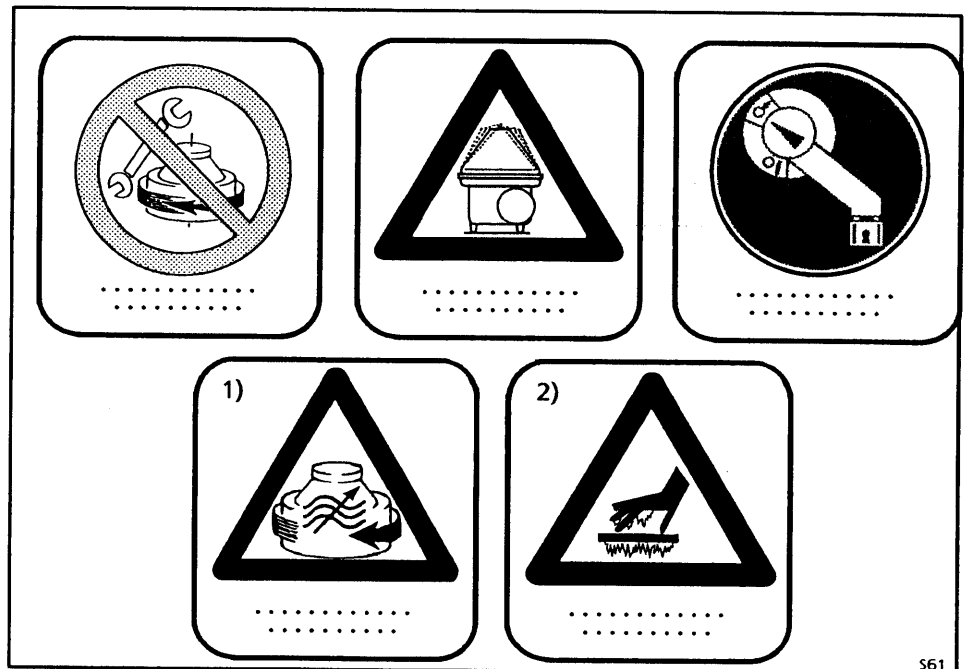


Fig.1

- 1) Only in case of operation with frequency converter
- 2) Only in case of hot operation



Basic operating principles Separators are used for the separation of liquid mixtures or for the separation of solids out of liquids or liquid mixtures.

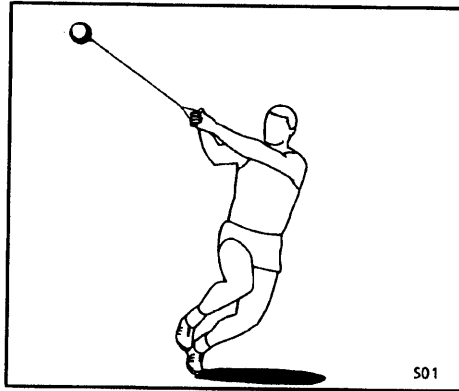


Fig. 2

High centrifugal forces are produced in the rotating bowl.

Under the influence of the centrifugal forces, separation of the liquid mixture and/or ejection of the solids particles takes place most rapidly.

The specifically heavier components are displaced to the bowl periphery, whereas the specifically lighter components are displaced towards the centre of the bowl.

The high centrifugal force is produced by very high bowl speeds. On the one hand, high bowl speeds signify high efficiency, while on the other hand, they signify high material stressing of the separator.

Bowl speed and product The max. permissible bowl speed is an important parameter when rating the separator. It depends on the chemical and physical properties of the product such as

- temperature (if higher than 100 °C or lower than 0 °C),
- density of the fluid and solid components,
- aggressiveness of the product as regards corrosion and erosion (has influence on the selection of the bowl material).

The bowl speed is determined on the basis of these parameters allowing for an adequate safety margin.

Before using a product with properties different from those stated when placing the order, it is imperative to obtain the manufacturer's approval.

Operations on the separator

The separator works reliably, provided that it is operated and looked after in accordance with our operating Instructions.

Special attention must be given to:

- assembly
- starting
- shutting-down
- maintenance and servicing



Assembly

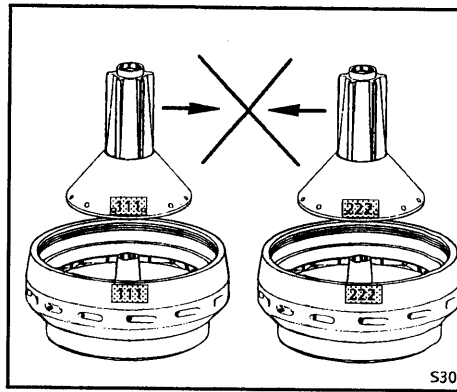


Fig. 3

- If the plant has several centrifuges, be careful not to interchange parts of different bowls since each bowl has been balanced individually. The bowl parts are marked with the serial-number of the machine or with the last three digits of the serial-number.

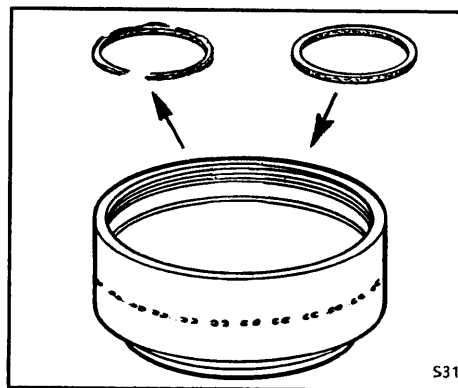


Fig. 4

- Damaged parts must be replaced immediately by new parts.

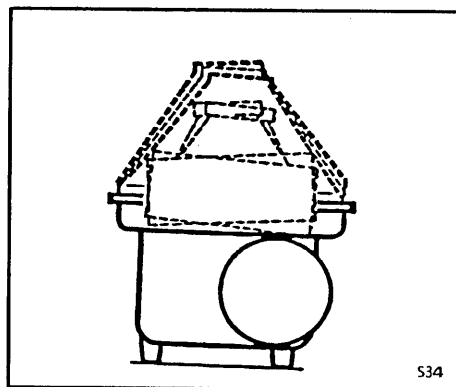


Fig. 5

- After installing spare bowl parts, the bowl must be re-balanced.

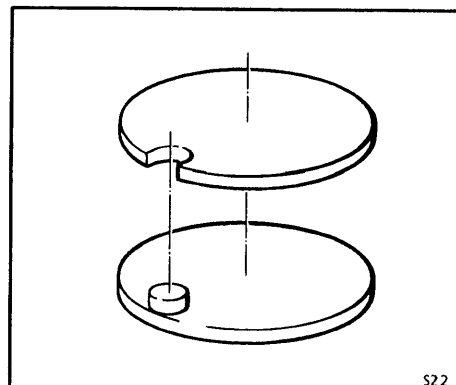


Fig. 6

- The bowl parts are arranged in fixed positions relative to one another.
- Locking devices and alignment marks must be in perfect condition. The bowl must not be operated if these locking devices and alignment marks are not in perfect condition.



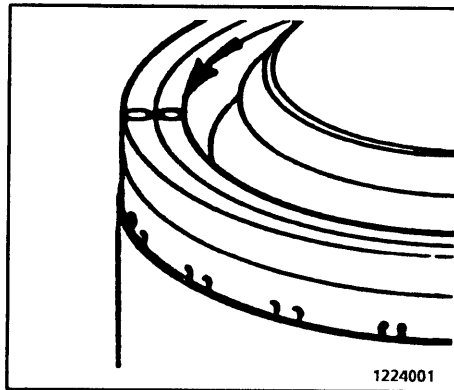


Fig. 7

- When assembling the bowl, be sure to strictly adhere to the instructions given in chapter "bowl", in order to avoid undue unbalance.
- Before starting the bowl, be sure to fit all parts.
- Tighten the bowl lock ring securely: the "O" marks on the bowl bottom or bowl top and on the lock ring must be in line with each other.

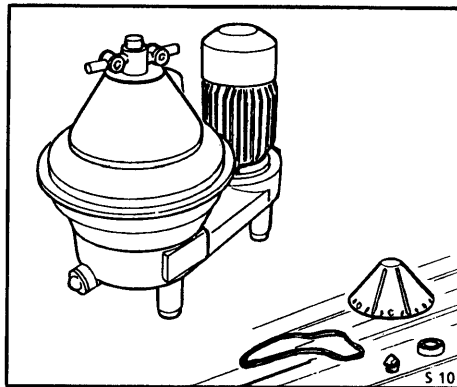


Fig. 8

- Check if the machine is completely assembled and properly installed.

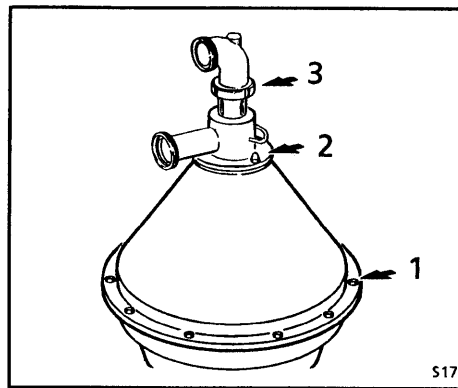


Fig. 9

- Carefully fasten hood 1, feed and discharge housing 2 and centripetal pump 3.

Electrical appliances

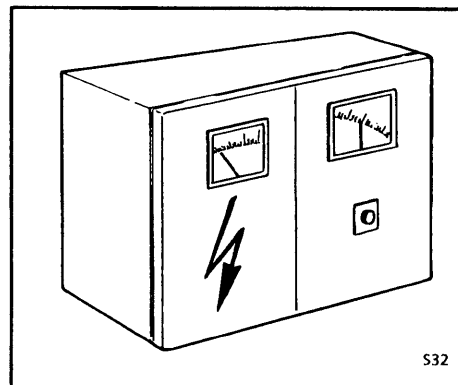


Fig. 10

- The governing accident prevention regulations apply for the electrical appliances and installations.
- The frequency and voltage of the power supply must correspond to the machine specifications.
- Carry out potential equalization.
- Observe legal regulations; e.g. in the EU:
 - Low-voltage guideline 73/23/EWG
 - Electro-magnetic compatibility 89/336/EWG.



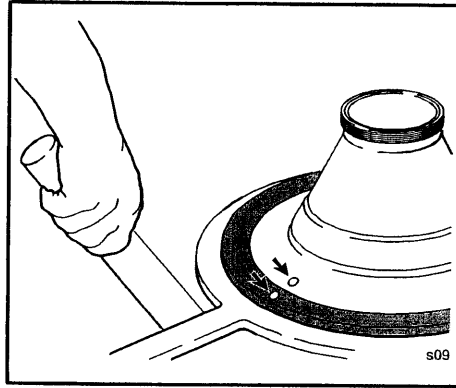
Before start-up

Fig. 11

- Check that the bowl lock ring has been firmly tightened.
- The "O" marks on bowl bottom or bowl top and on the lock ring must be aligned.

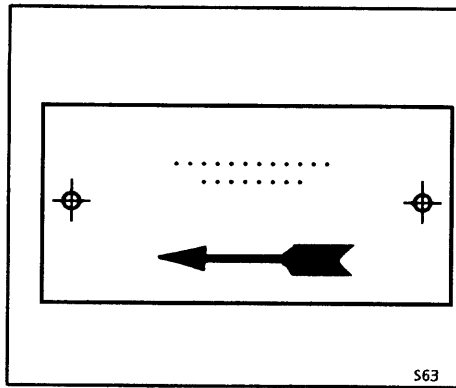


Fig. 12

- The bowl must rotate in clockwise direction (see arrow on frame or solids collector).



Fig. 13

- The separator may only be operated with protection devices conforming to EN 294.
Equip solid and liquid discharges accordingly.

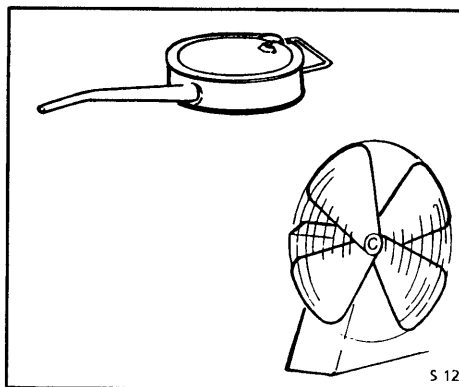


Fig. 14

- Check that the lubrication and cooling systems are serviceable.



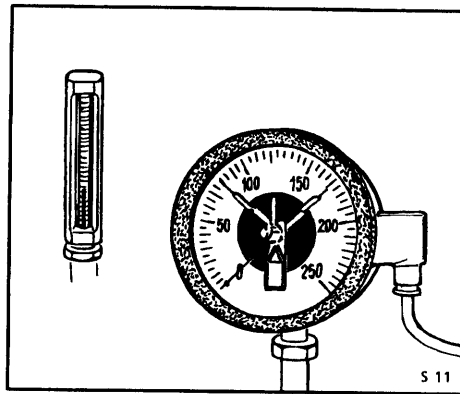


Fig. 15

- Check whether the supervisory equipment is operational and the correct limit values are adjusted.
- When hoods, concentrate collectors and vessels are pressurized, e.g. by
 - inert gas,
 - cooling,
 - steam sterilization etc.
 the pressures stated on the name-plate must not be exceeded.

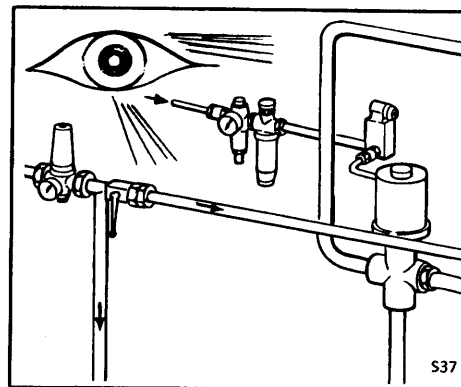


Fig. 16

- Check that the product lines are set to operation.
- Regularly check hoses for signs of ageing.
- Check sight glasses for mechanical damage.
- Replace damaged parts by parts which are as good as new.

Operation

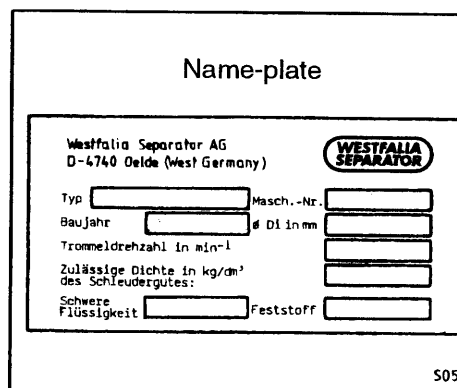


Fig. 17

- Refer to chapter »operation«.
- Note nameplate. The values for
 - bowl speed
 - density of the heavy liquid,
 - density of solids (centrifugally dry)
 are max. values and must not be exceeded.



Fig. 18

- Wear ear protection.





Fig. 19

In case of frequency converter operation:

- Do not under any circumstances manipulate the frequency converter to exceed the permissible bowl speed (see maker's nameplate).
- The separator may only be operated with an independent device for speed limiting.



Fig. 20

- Do not feed product which is categorised as explosive.
- The separator must not be used in areas where explosion protection is required.



Fig. 21

- When processing products harmful to persons, observe the pertinent safety regulations.
- Refer to the safety data sheet of the product.
- Wear protective clothing.

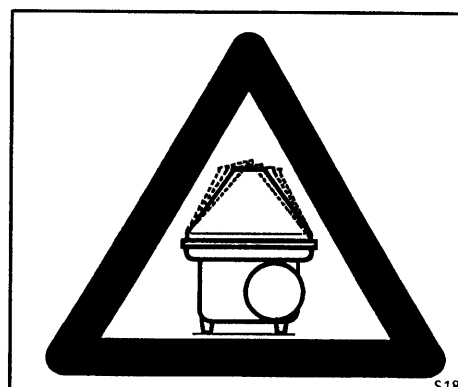


Fig. 22

- Stop the separator immediately if unusual noises or vibrations occur.





Fig. 23

Only in case of hot operation:

- Product-contacting parts such as
 - pipes and hoses,
 - hood,
 - solids collector
 reach temperatures over 80 °C.

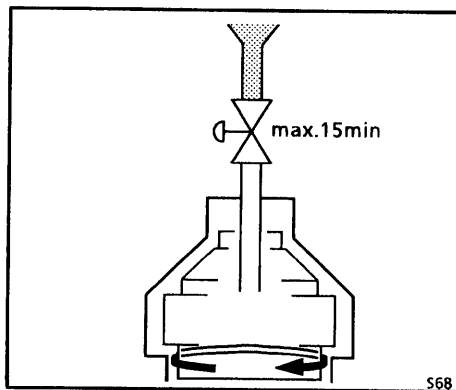


Fig. 24

- The bowl is not allowed to run without liquid supply for more than 15 minutes, as otherwise it would result in overheating of the bowl material.

Shut-down and »Emergency-Off«

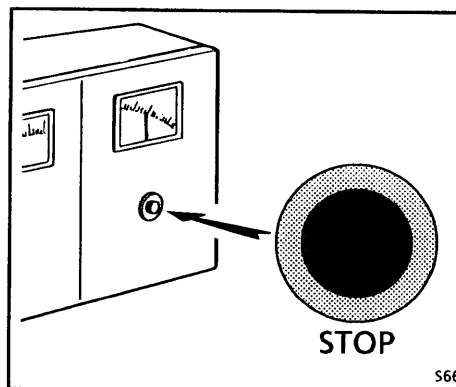


Fig. 25

- For shut-down refer to the chapter "operation".



Maintenance and repair

Unfavourable operating conditions may require shorter maintenance intervals. The factors listed below are unfavourable because they either attack the separator material directly or impair the lubrication/cooling system:

- aggressive product (chemical or physical)
- high product temperature
- product with grease decaying properties
- environment: temperature, dust and vapours

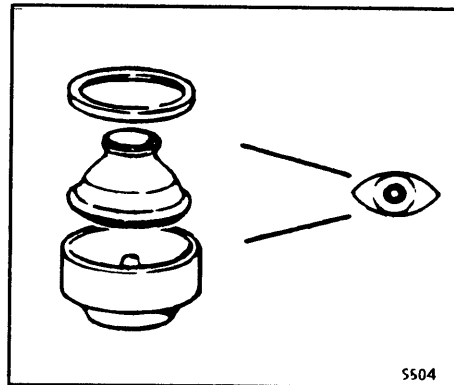


Fig. 26

Particularly stressed parts such as bearing hub, bowl hub and other bowl parts with a large outer diameter must be checked on a regular basis to ensure safe and efficient operation.

Timely maintenance and replacement of worn or damaged machine parts is essential for safe operation of the machine.



Maintenance and repair work may only be carried out by the customer to the extent as described in this instruction manual.



Maintenance and repair work not described in this manual may only be carried out by the manufacturer or by "repair shops" authorized by the manufacturer.

We, therefore, recommend in your own interest to have your separator inspected by our service engineers at regular intervals. Such inspections will keep your separator working reliable and prevent undesirable shut-downs.

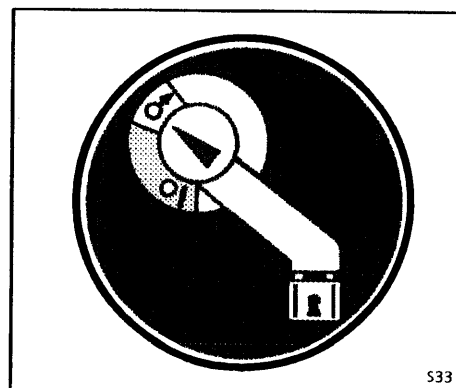


Fig. 27

Before maintenance and servicing:

- switch off all electrical appliances via the main switch,
- secure installation against unintended re-starting with locking devices.



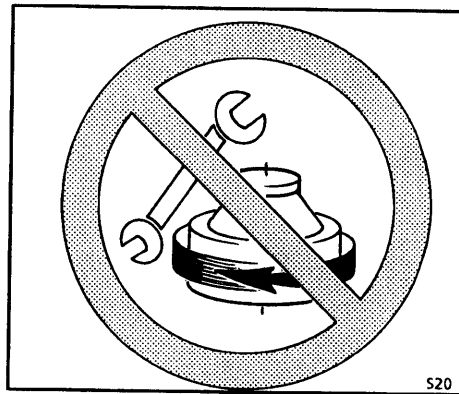


Fig. 28

- Do not loosen any part before the bowl has come to a standstill.
- For checking standstill refer to chapter "bowl".



Fig. 29

- Do not climb onto or stand on the machine or parts of the machine.
- Make provision for and use a sturdy working platform.

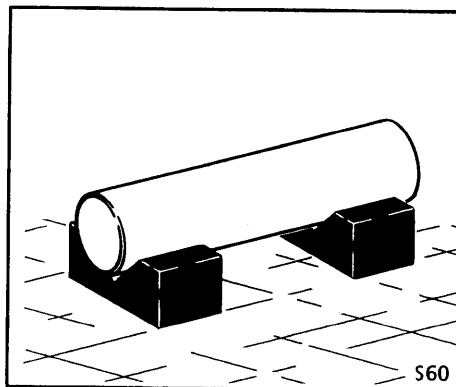


Fig. 30

- Place dismantled machine parts on a suitable base, e.g. rubber mat.
- Take steps to prevent machine parts from overturning and rolling away.

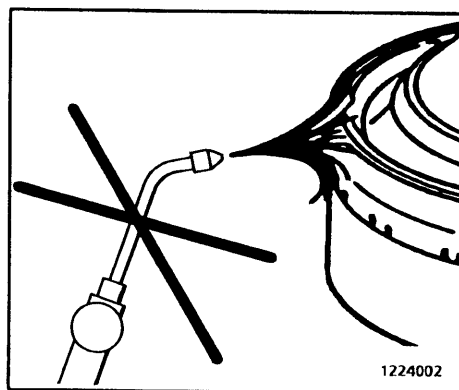


Fig. 31

- Do not heat bowl parts with the naked flame.
- Bowl parts must never be welded. This also applies for hood and solids collector parts of steam-sterilizable separators.
- Even during cleaning the bowl parts the temperature must not exceed 100 °C.



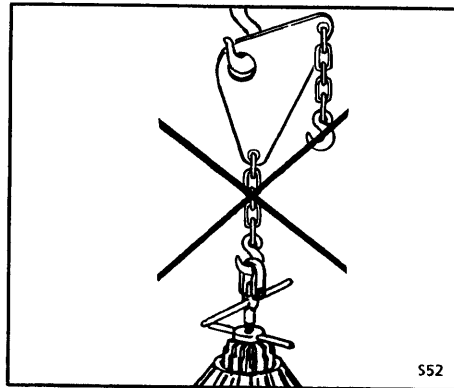


Fig. 32

- Load-carrying equipment such as lifting devices for
 - bowl or distributor,
 - chains etc.may only be used for work routines as described in this instruction manual.
- Do not use damaged or incomplete load carrying equipment.

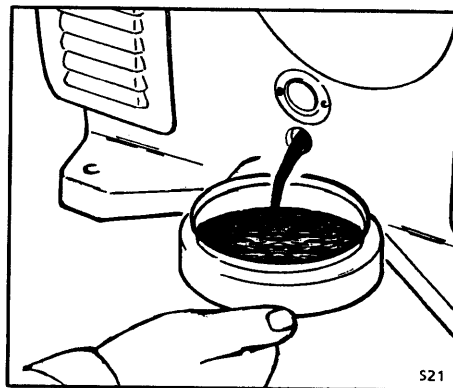


Fig. 33

- Collect dripping oil to prevent danger of slipping or product infection.
- When handling waste oils note:
 - They can be injurious to health, depending on their chemical composition.
 - Waste oil must be disposed of in accordance with local regulations.



Corrosion

Corrosion can also affect bowl parts made of stainless steel. This corrosion can be flat-spread or pit- or crack-shaped and merits special attention.

Corrosion on stainless steel bowl material should be examined thoroughly and documented.

Flat-spread corrosion can usually be measured (reduction of wall thickness)

Pit- or crack-shaped corrosion cannot be measured without the risk of damage. At the initial stage pit-shaped corrosion is generally caused by chlorine ions.

Depending on the stressing of the part, pit-shaped corrosion can result in crack-shaped corrosion.

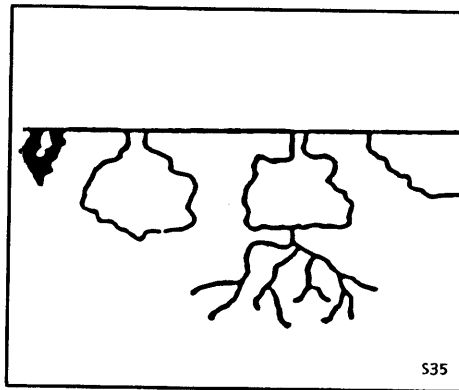


Fig. 34

Possible formation of pit-shaped corrosion.

Such pittings can only be investigated by a materials expert.

In case of crack-shaped corrosion attack with or without superposed flat-spread and pit-shaped corrosion on main bowl components, **the machine must be shut down immediately.**

Contact your nearest Westfalia Separator AG representative for a thorough examination.

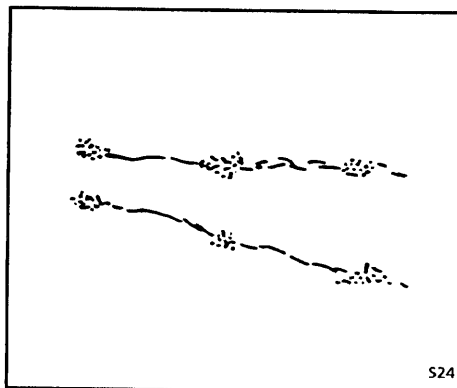


Fig. 35

Pittings

Pittings which are close together or form a linear pattern can signify crack formation beneath the surface.

Such pittings should be investigated by a materials expert.



Erosion

Erosion is caused by solid particles in the process liquid. These solid particles grind marks into the surfaces with which they come into contact.

The following factors favour the occurrence of erosion:

- hard solids particles
- high throughput capacities

The first signs of erosion should be carefully observed and documented. Erosion can deepen rapidly, thereby weakening the bowl material.

Contact your nearest Westfalia Separator representative for a thorough examination. Information on the nature of the damage can be provided by photos, plaster casts or lead molds.

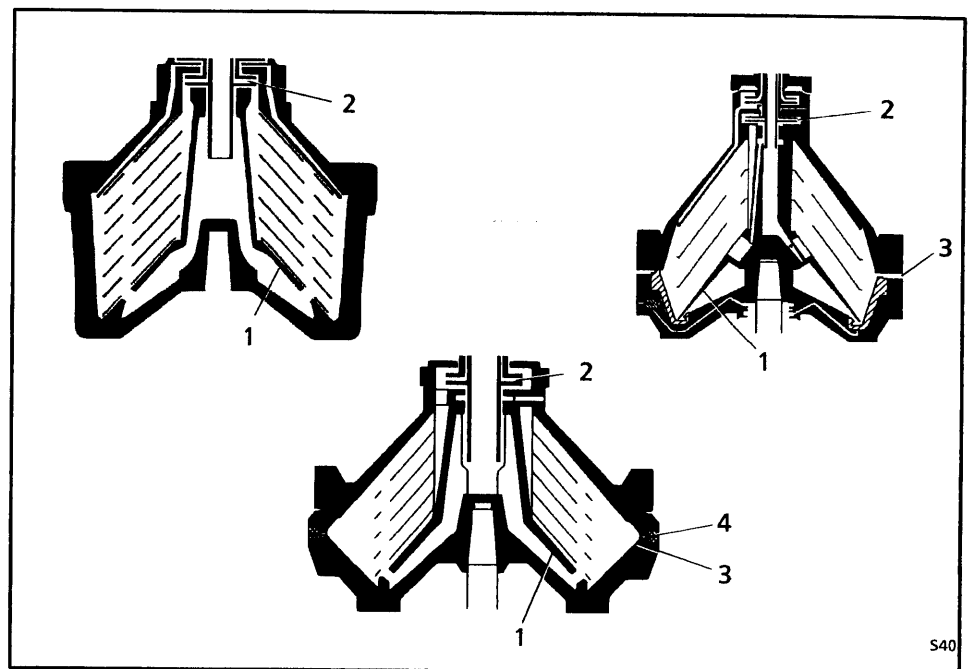


Fig.36

The surfaces most susceptible to erosion are:

- 1) the bottom of the distributor, the rising channels and the ribs,
- 2) the centripetal pump (cavitation),
- 3) all surfaces in the area of the solids discharge ports,
- 4) the nozzles.



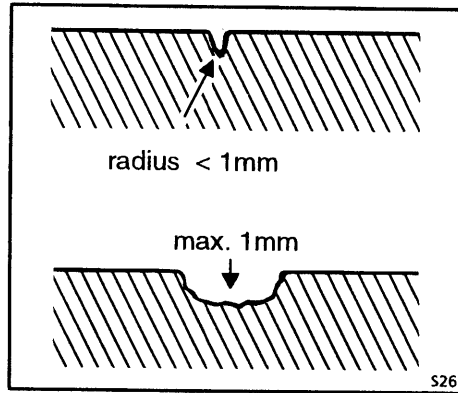


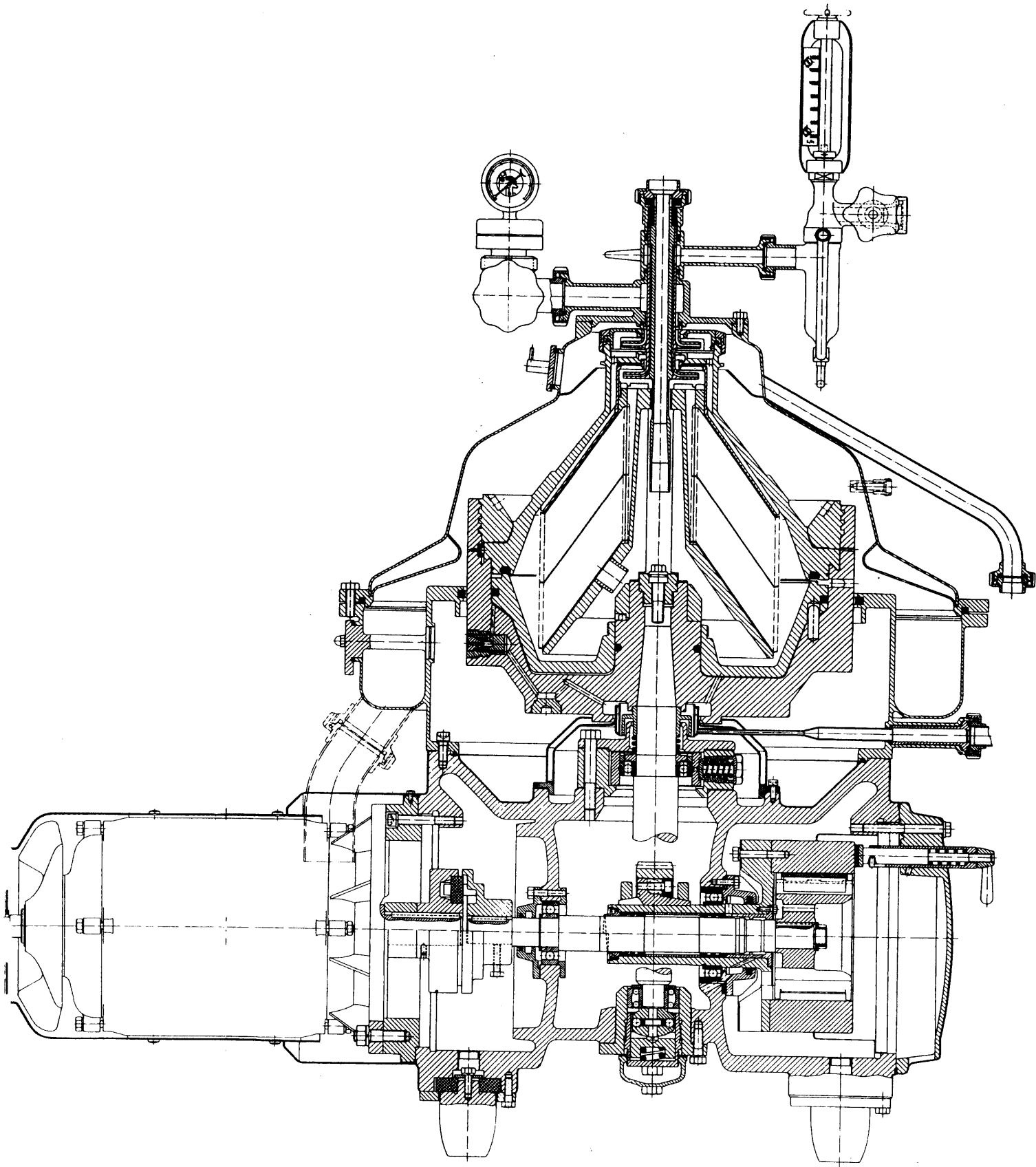
Fig. 37

Signs of erosion which you should immediately report to your nearest Westfalia Separator representative:

- The bottom of the erosion mark has a radius smaller than 1 mm (large notch effect).
- The depth of erosion mark exceeds 1 mm at the deepest point.



Sectional view of the separator



Note
Notes
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Anotaciones
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Note

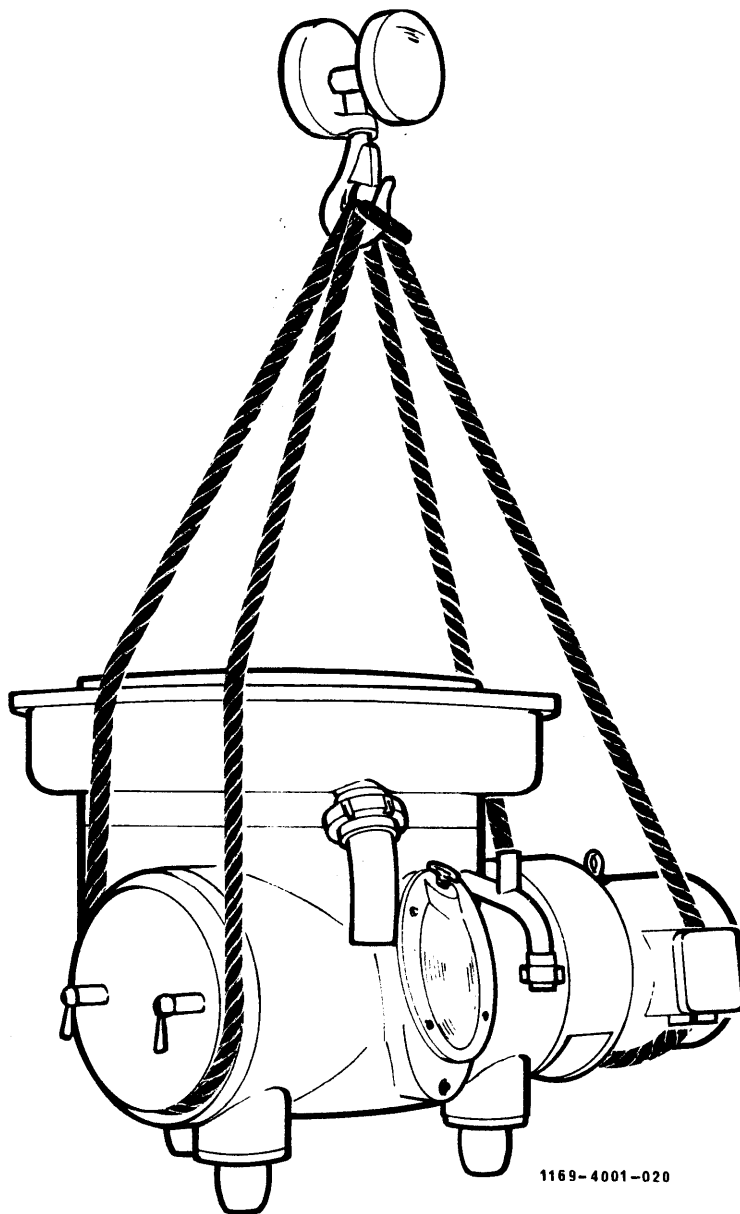
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WORKING INSTRUCTIONS
=====

1. Installation
=====

1.1. Transport

Suspend the separator as shown in fig. 1/1. To prevent ropes from slipping, wind part of a rope around the crane hook. When lowering the separator, make sure it touches down gently.



Weight: 750 kg

Fig. 1/1

1.2. Installation

For dimensions of the separator refer to page 0/7. For the installation of separator and of flow constrictor refer to page 23/2.

When installing the separator make sure that sufficient room is available (at least 15") for mounting and removing the motor and for removing the horizontal drive shaft which is to be pulled out towards the motor side.

Do NOT install a shut-off device in the line which will be connected to the operating-water discharge line 9 (fig. 13/2). The line should have 1 1/2" I.D. It should have sufficient fall and must NOT be too long to allow the discharging operating-water to flow off freely, since otherwise the water will rise and enter the upper section of the frame, resulting in slowing-down of the bowl.

The supply line to the operating-water connection should have 1" I.D., the operating-water pressure should be approx. 21 psi.

For mounting and removing the bowl parts, a 250 kg hoist (minimum lifting height 1900 mm; see installation plan) will be indispensable. On request a WESTFALIA Swing Crane can be supplied.

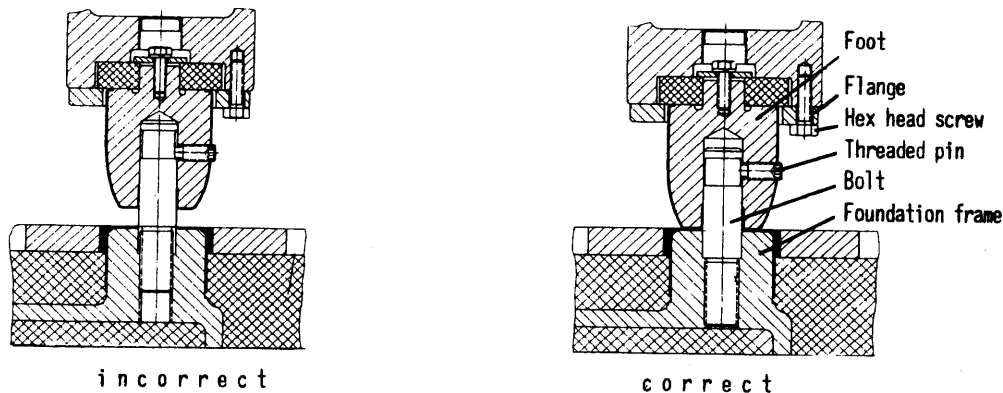


Fig. 1/2

Screw bolts into the three mounting blocks of foundation frame; make sure they are tight. Embed the foundation frame in the floor so that the mounting blocks of the frame protrude above the plane of the floor by about 5 mm = 0.2". Fill up the space below the foundation frame with concrete. Make sure that the mounting blocks are absolutely level. Fit caps on mounting blocks. Grout the frame with concrete, inside and outside. To accelerate setting of cement, commercial rapid binding agents may be used.

By means of flanges and hex head screws fasten feet 2a-g (fig. 13/3) to separator frame. Then lift the separator frame with its feet onto the bolts of the foundation frame and tighten the threaded pins with wrench 401 (fig. 20).

2. Lubrication

=====

2.1. Lubricating the separator

All bearings and gear parts of the separator are splash lubricated from a central oil bath.

Before the initial start-up of the separator fill the gear chamber with oil until oil level is slightly above middle of sight glass. The separator requires about 5,5 litres of well refined lubricating oil with mild acting non-corrosive EP additives, of the viscosity range

15 - 17E = 115 - 130 cSt at 50°C.

We strongly recommend to use the EP oil with the WESTFALIA designation M91 on orange label. For the order number refer to page 20/1.

If the recommended EP oil is not available, use only a well refined lubricating oil in the viscosity range stated above, adding 3% of Molykote (high pressure additive M55, fluid).

The oil level must never be allowed to sink below middle of sight glass; be sure to refill oil, whenever necessary.

Make first oil change after 3 to 4 weeks. When gear parts are broken in, make regular oil change every 2 to 3 months.

When making oil change, remove gear chamber cover and clean gear chamber thoroughly with kerosene. All metal particles should carefully be removed from walls and corners. Do NOT use fluffy cleaning rags or cotton waste. Also clean sight glass. To remove it use wrench 418 (fig. 20).

Check from time to time if oil contains water. To do this, loosen oil drain screw and allow a small amount of oil to drain.

2.2. Lubrication of the motor bearings

The motor bearings are of the permanent lubrication type. They have been packed at the factory with lithium saponified grease and need not be repacked until several years later, provided that the machine works under normal conditions. It is, however, recommended to remove the bearings once a year for cleaning. For this purpose, the motor will have to be removed (see 8.5.1) and dismantled.

Apart from the bearings the windings and the other parts should be cleaned as well.

For thorough cleaning of the bearings use cleaning benzine or benzene. When the cleaning agent has evaporated, the bearings are to be re-packed with the ball and roller bearing grease supplied (see page 20/1) or with high grade lithium-saponified ball bearing grease having a pour point of at least 180°C. The cavities between the rolling elements and the tracks have to be filled entirely with grease whereas the grease chambers may only be half packed with grease to prevent the bearings from overheating.

The shaft entries in the endshields are to be coated with grease.

3. Motor Connection

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3.1. 'Loher' Three-phase AC motor Type A160 LA-4, 15 kW

The separator is driven by a totally enclosed three-phase AC flange-type motor via a centrifugal clutch. This motor is started by means of an automatic star-delta switch according to wiring diagram 8134-0002-0381. Switching over from star to delta takes place after 3 - 4 seconds.

Motor protection is ensured by PTC resistor type temperature feelers incorporated in the winding of the motor. These PTC resistor type temperature feelers have to be connected to an appropriate tripping device. External voltage higher than 2.5 volts must not be applied to the terminals of the temperature feelers. When testing for continuity, do NOT use a test lamp but only a conventional ohmmeter.

The starting current of the motor can reach 1.7 times the value of the rated current. Therefore, dimensioning of switches, wiring and fuses should be based upon the starting current and NOT on the rated current.

50 Cycles		Minimum Section of lead-in-wires mm ²	Rated Current of Fuses Amps
Voltage V	Rated Current Amps		
220	52	16	80
380	30	6	50

3.2. Direction of rotation of the bowl

The bowl must turn in clockwise direction when looked at from above. The direction of rotation of the bowl is correct when square-headed screw 9a (fig. 13/1) on front side of motor protection cover rotates in direction of arrow. The direction of rotation is reversed by interchanging two lead-in wires.

3.3. Speed and starting time of the bowl

The bowl speed is 6500 rpm and is indicated by the tachometer.

The starting time of the bowl ranges between 8 - 10 minutes, depending on the condition of the clutch shoes.

Make sure that the bowl reaches its rated speed (as per name-plate of the separator) within its starting time and that this speed is maintained during operation (see 10.1.1 - 10.1.2).

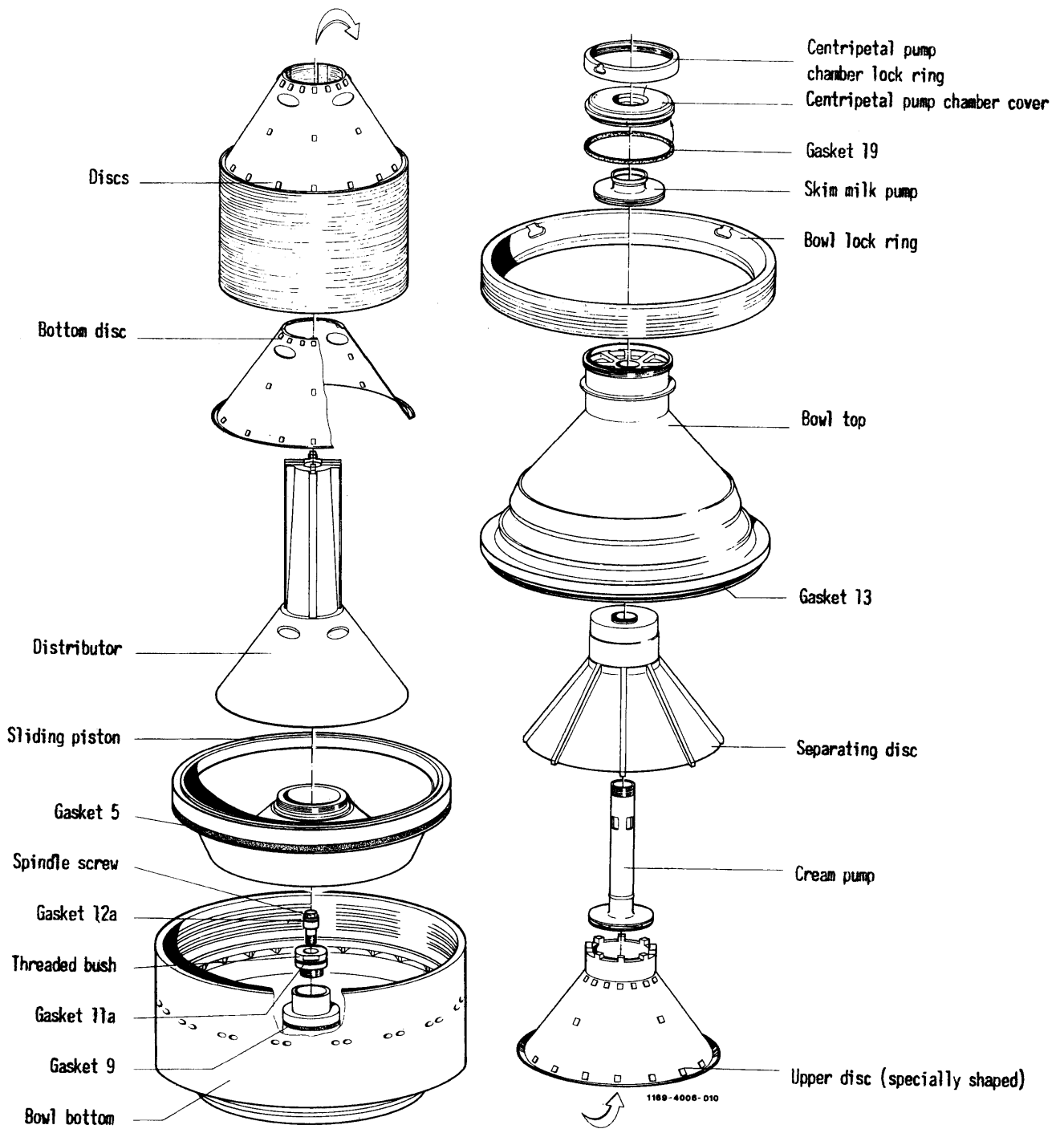


Fig. 4/1
 Component Parts of the Bowl in the
 Order of Assembly

4. Bowl, - Feed and Discharge Connections

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4.1. Assembly of the bowl

(for tools refer to page 20/2)

Before assembling the bowl, make sure that all contact surfaces of the bowl parts are clean.

When assembling the bowl, make sure that the "0" marks of all bowl parts are in line.

If the plant has several centrifuges, be careful not to interchange parts of different bowls, since each bowl has been balanced individually. The main parts of the bowl are marked with the last three digits of the Serial-Number of the separator.

- 1) Oil the upper part of the worm spindle (thread, cone and cylindrical guide surface for spindle cap). It must be possible to move the spindle cap easily up and down on the spindle. Then clean and wipe dry the conical part of the spindle with a smooth rag. Carefully clean the inside of the bowl hub as well to assure proper fitting.
- 2) Use jack 436 to place bowl bottom onto spindle.
- 3) Use socket wrench 422 to screw threaded bush with inserted gasket 11a into bowl bottom (left-hand thread).
- 4) Thread spindle screw with inserted gasket 12a tightly into worm spindle (left-hand thread).
- 5) Insert gasket 9 in hub of bowl bottom.
- 6) Thoroughly clean groove in sliding piston for gasket 5 and apply a thin film of grease.

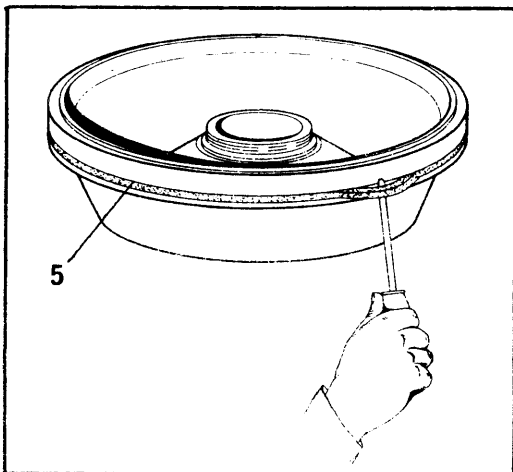


Fig. 4/2

In case the gasket is new and a bit too tight, stretch it out equally all the way around until its perimeter is almost equal to the perimeter of the groove in the sliding piston.

Then put the gasket into the groove of the sliding piston. Stick a screwdriver under the gasket and run it around the sliding piston two or three times (see fig. 4/2). Then tap the gasket back into its groove with a rubber hammer.

The gasket is now equally stretched all the way around and assures best sealing effect during operation.

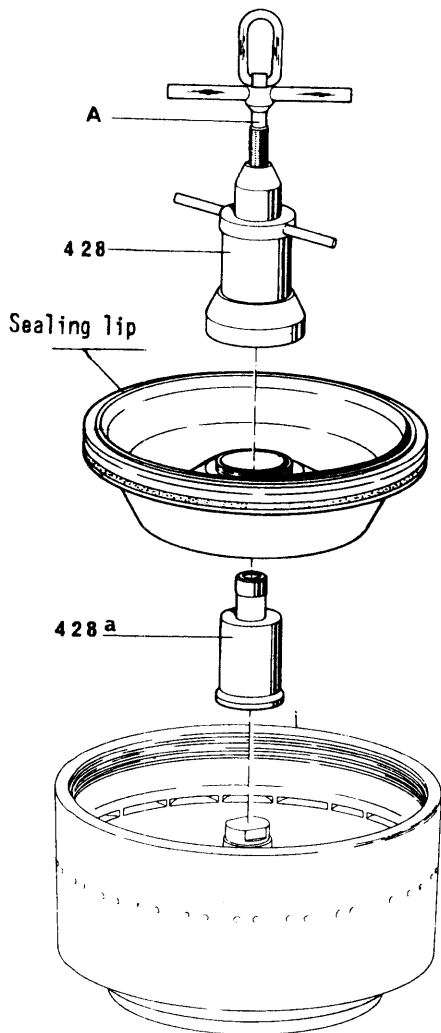


Fig. 4/3a

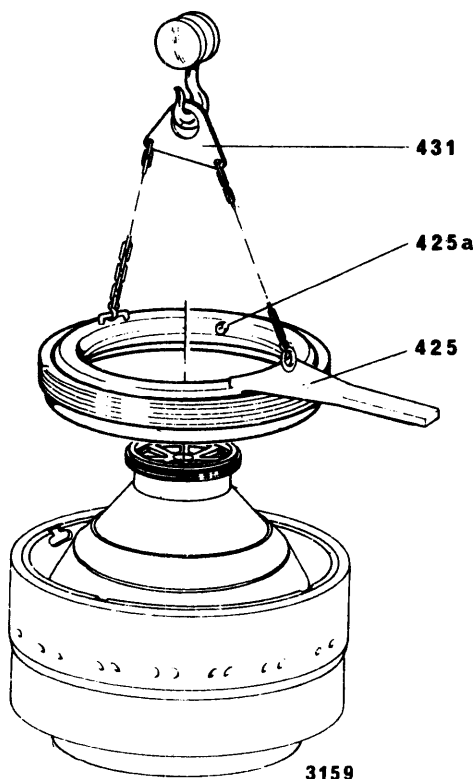
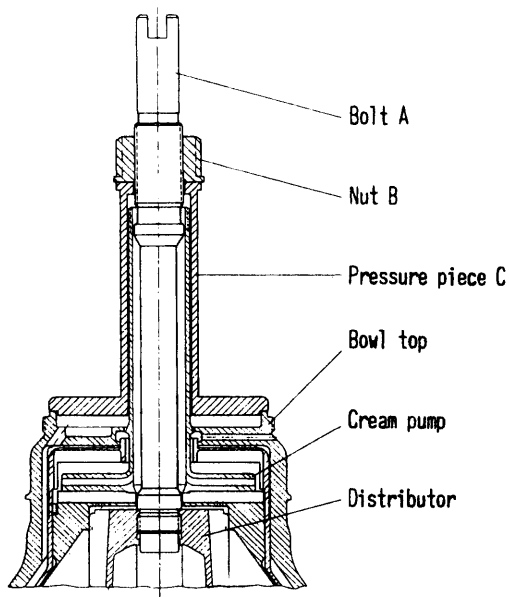


Fig. 4/3b

- 7) Lightly grease contact surfaces of sliding piston and of bowl bottom with the special lubricating paste provided. Place pressure piece 428a onto hub of bowl bottom in such a manner that grooves in pressure piece fit over arresting pins of bowl bottom. Then install sliding piston with the aid of jack 428. The "0" marks must be aligned. By turning threaded spindle "A" in counter-clockwise direction, lower sliding piston slowly until arresting pins of bowl bottom catch into grooves of sliding piston.

IMPORTANT: Be careful not to damage sealing lip of sliding piston!

- 8) Install distributor into bowl bottom, using lifting device 434. Make sure that the three arresting pins of bowl bottom fit into recesses of distributor. The "0" marks of both parts must be aligned.
- 9) Stack discs on neck of distributor in numerical order, beginning with No. 1.
- 10) Place on upper disc (specially shaped).
- 11) Install cream pump.
- 12) Place on separating disc. Make sure that the "0" marks on separating disc and on bowl bottom are in line.
- 13) Use lifting tongs 420 to place bowl top with inserted gaskets 13 and 14 onto bowl bottom. Make sure that the arresting piece of bowl bottom fits into groove of bowl top. The "0" marks of both parts must be aligned.
- 14) Thoroughly clean and wipe dry threaded areas on bowl bottom and on bowl lock ring as well as contact surfaces and apply a thin film of special lubricating paste.
- 15) Arrest annular wrench 425 (fig. 4/3b) by threading hex head screw 425a into groove of bowl lock ring. By means of lifting device 431 place lock ring and annular wrench onto bowl bottom. Then screw in lock ring lightly (left-hand thread), using annular wrench.



- 16) To facilitate tightening of the bowl lock ring, compress disc set with compressing device 430 in the following manner (see fig. 4/4):
- a) Put pressure piece C over centripetal pump tube onto bowl top.
 - b) Screw hexagon nut B back to run-out of bolt thread.
 - c) Screw bolt A all the way down into the distributor neck.
 - d) Tighten hexagon nut B with wrench 421 until bowl lock ring can be screwed on without great effort.

Fig. 4/4

Disc stack compressing device 430
placed on bowl top

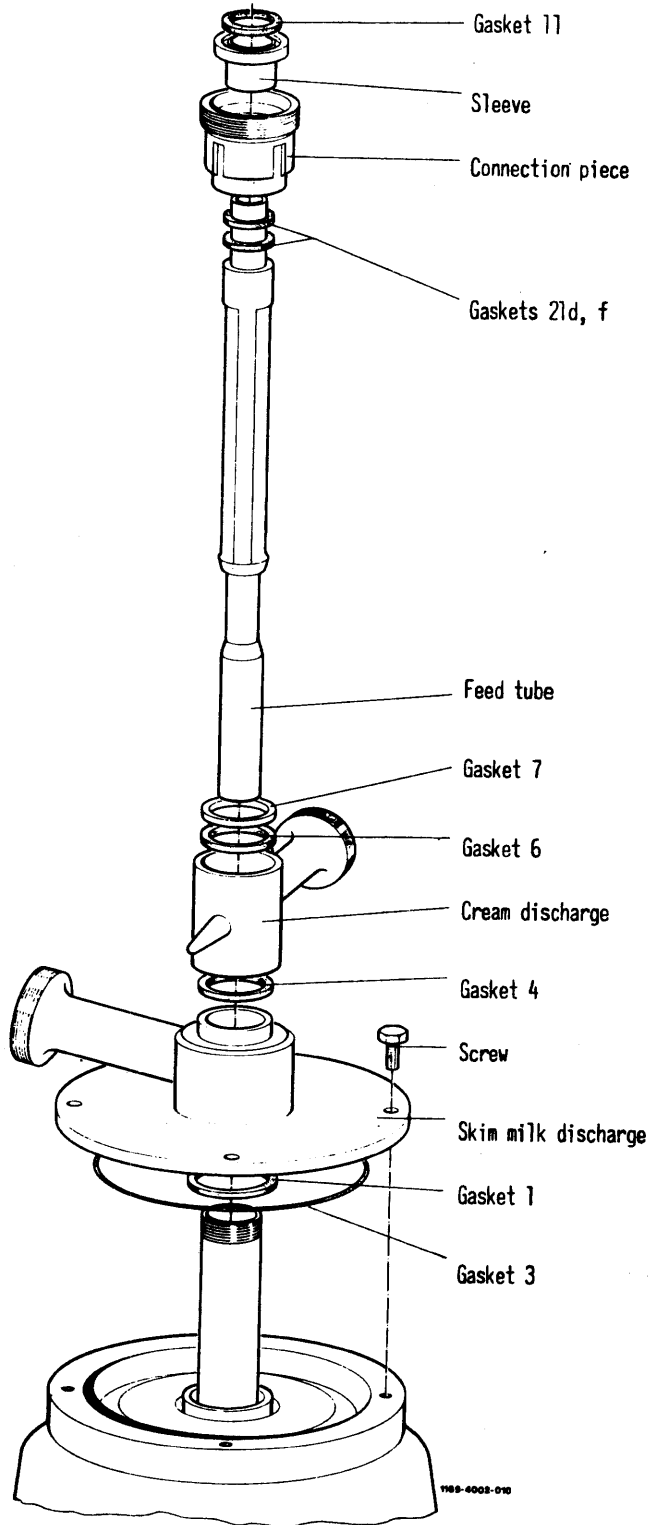
- 17) Now tighten the lock ring with annular wrench 425 until the "O" marks on bowl bottom and on lock ring will be about a few inches apart. Final tightening for "O" mark alignment will have to be done by hitting the wrench handle with mallet 405. Only a few blows with the mallet on the wrench handle will be sufficient to align the parts.

If the disc pressure has slackened so that tightening of the lock ring with annular wrench can be done by hand, a spare disc has to be added.

- 18) Remove disc stack compressing device (see fig. 4/4):
- a) Loosen hexagon nut B with wrench 421.
 - b) Screw bolt A out of the distributor neck and remove it together with pressure piece C and hexagon nut B.
- 19) Install skimmilk pump.
- 20) Insert gasket 19 in centripetal pump chamber cover.
- 21) Place on centripetal pump chamber cover. Watch for proper arresting.
- 22) Tighten pump chamber lock ring (left-hand thread) using annular wrench 426. Tighten it thoroughly by hitting wrench handle with mallet.
- 23) Check if bowl can be turned by hand.

4.2. Assembling the feed and discharge connections

- 1) By means of hex head screws fasten lifting device 435 (fig. 20) to hood. With the aid of hoist place hood onto sediment collector in such a manner that "O" mark on sediment collector is in line with "O" mark on hood. Connect flush lines. Fasten hood to sediment collector by means of head head screws.



- 2) Place skim milk discharge with inserted gaskets 1 and 3 onto hood and fasten with hex head screws.
- 3) Slip cream discharge (with gaskets 4 on bottom and gaskets 6-7 on top) over pipe of cream pump and place onto skim milk discharge.
- 4) Install feed tube with fitted-on gaskets 21d and f into pipe of cream pump.
- 5) Screw on connection piece (left-hand thread) and tighten it with hook wrench 404. While doing so, block cream pump with wrench 429 to prevent it from rotating.
- 6) Fit sleeve with inserted gasket 11 into connection piece.
- 7) Connect feed and discharge lines.

Fig. 4/5

4.3. Removing the feed and discharge connections, Dismantling the bowl

IMPORTANT: To avoid accidents, do NOT loosen any part of the separator or of the feed and discharge connections before the bowl has come to a complete stop. Note that the bowl has NOT stopped before square-headed screw 9a (fig. 13/1) on front side of motor protection cover has ceased rotating.

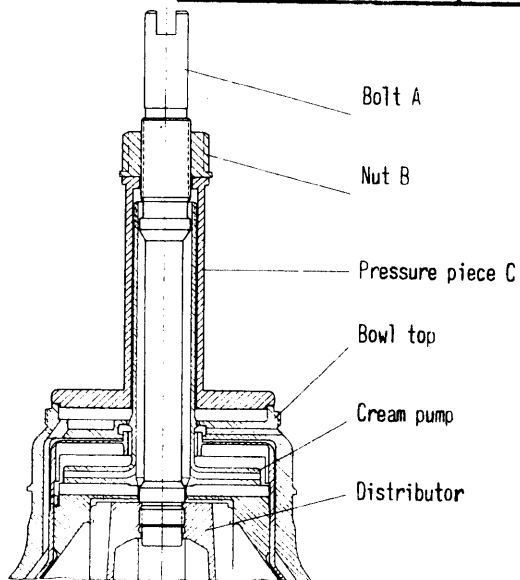


Fig. 4/6a

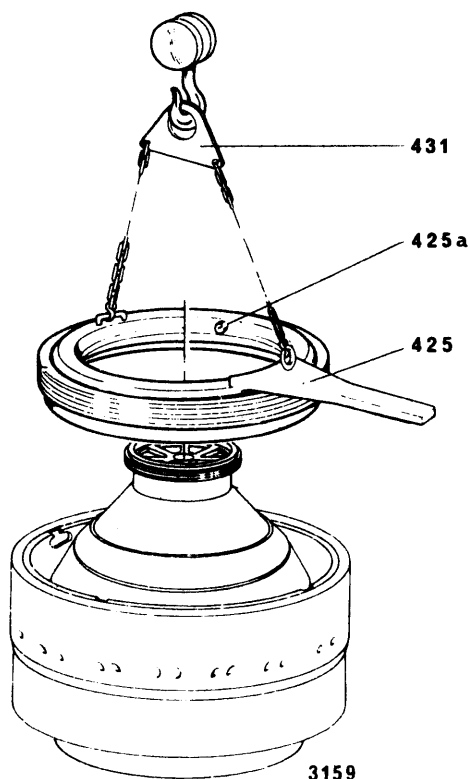


Fig. 4/6b

For dismantling proceed in reverse order of assembly (see 4.1 and 4.2) and bear in mind the following:

Place bowl parts on a rubber mat or wooden surface. Never place bowl top on a stone floor.

Be sure to replace gaskets when worn.

Before opening the bowl, release brakes by turning the two handles in clockwise direction.

To facilitate loosening of the bowl lock ring, compress disc set with disc stack compressing device 430 in the following manner (see fig. 4/6a):

Put compressing device over centripetal pump tube onto bowl top.

Screw hexagon nut B back to runout of bolt thread and screw bolt A all the way down into distributor neck. Then tighten hexagon nut B with wrench 421.

Unscrew bowl lock ring (left-hand thread) by rapping with mallet 405 against handle of annular wrench 425. Then remove disc stack compressing device.

IMPORTANT: If the bowl lock ring is jammed tight, unscrewing can be facilitated by warming up the upper rim of bowl bottom with steam or hot water.

Fig. 4/6b

Secure annular wrench 425 to bowl lock ring by screwing hex head screw 425a into groove of bowl lock ring. Then lift up annular wrench and lock ring with the aid of lifting device 431.

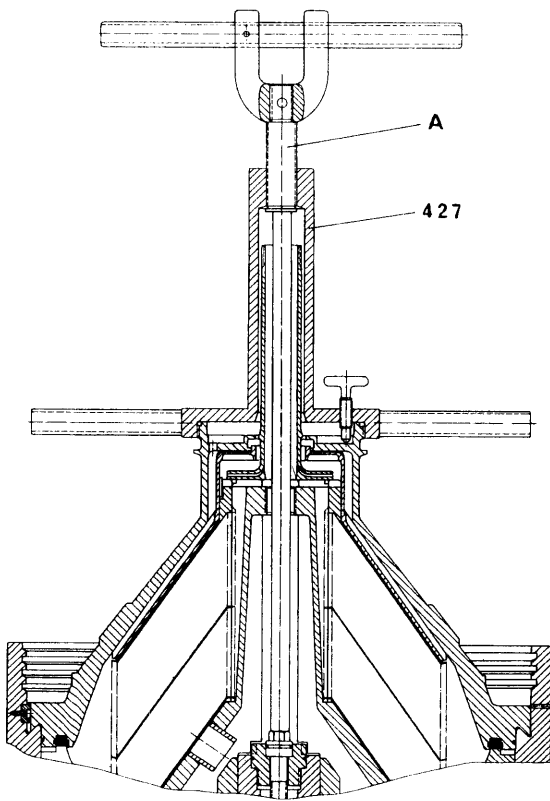


Fig. 4/7a

Screw jack 427 onto bowl top. By tightening threaded spindle A of jack press bowl top off the bowl bottom. Then lift it up by means of a hoist.

If the separating disc is stuck in the bowl top, hammer with a copper or a light metal hammer on the bowl top until the separating disc comes loose. Do NOT let the disc drop on the floor.

Should it not be possible to detach the separating disc in this way, then put the bowl top down and introduce a mandrel through the outer holes in the bowl top. By lightly hammering on the mandrel, the separating disc will come off. Never place mandrel on inner rim of separating disc.

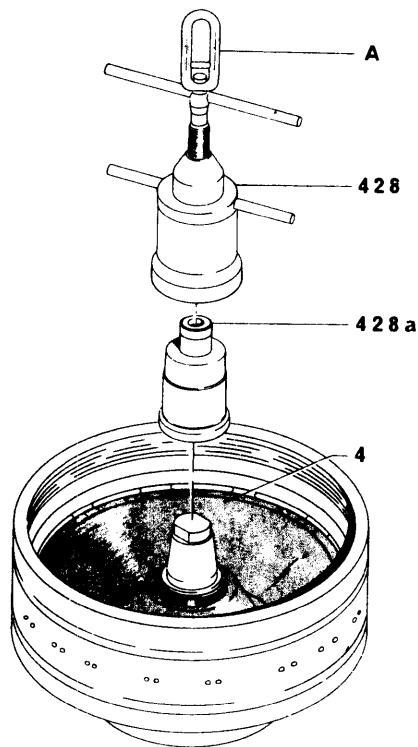


Fig. 4/7b

Place pressure piece 428a onto bowl bottom in such a manner that grooves in pressure piece fit over arresting pins of bowl bottom. Then screw jack 428 onto sliding piston. By turning threaded spindle of jack in clockwise direction force the piston off the bowl bottom. Then lift sliding piston out of the bowl bottom by means of the jack.

4.4. Removal and Installation of Polyamid Gasket 14 (fig. 19)

4.4.1. Removing Polyamid gasket from bowl top

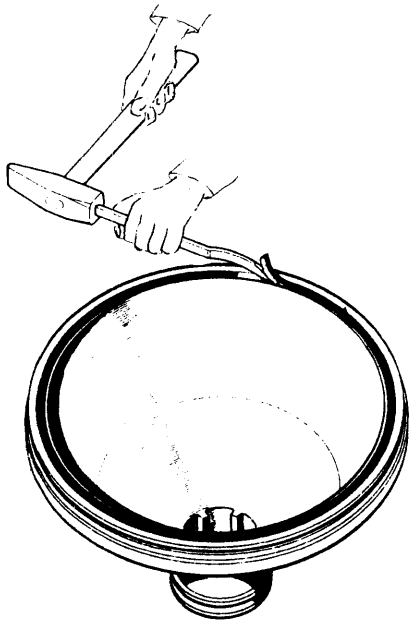


Fig. 4/8a

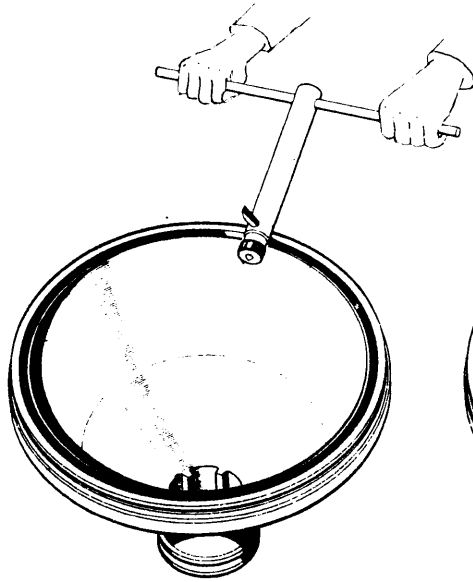


Fig. 4/8b

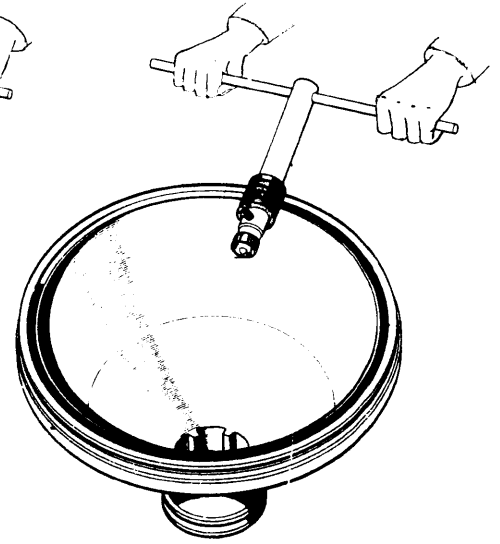


Fig. 4/8c

- 1) For about 10 minutes warm up gasket with a jet of hot water or steam (70 - 100°C).
- 2) Carefully cut the gasket with chisel 432 and lift a few inches of the gasket out of the groove (fig. 4/8a).
- 3) Put the end of the gasket through the hole of tool 419 (fig. 4/8b). By means of this tool roll up the gasket as shown in fig. 4/8c.

4.4.2. Installing the Polyamid gasket into bowl top

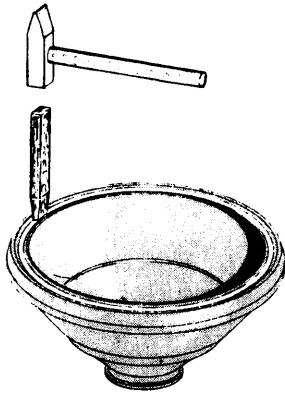


Fig. 4/9a

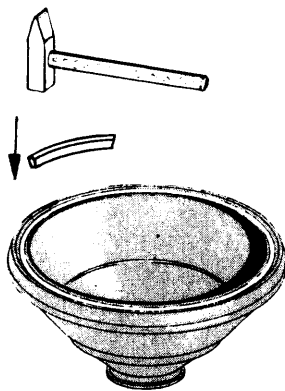


Fig. 4/9b

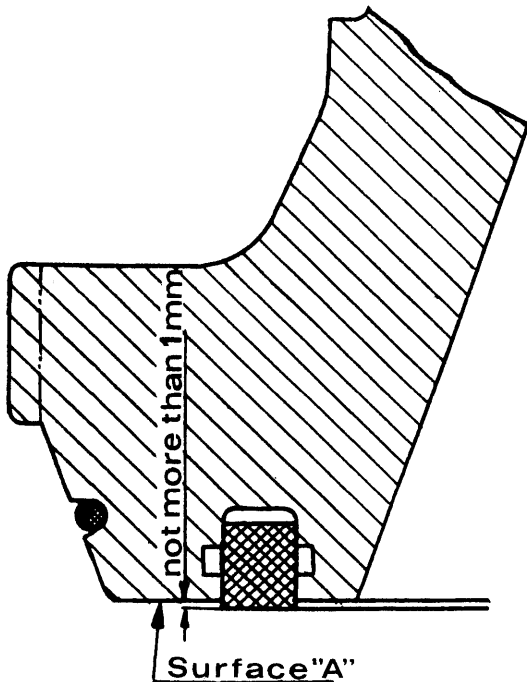


Fig. 4/9c

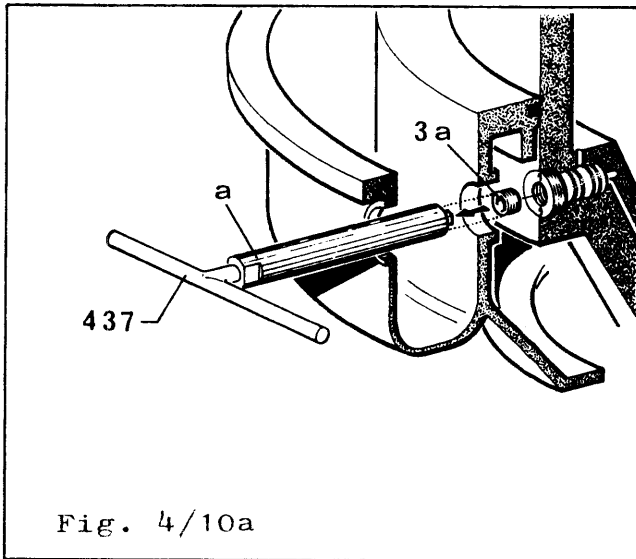
- 1) Keep gasket in 176^oF water for about 5 minutes to warm it up.
- 2) Dry gasket with a rag.
- 3) Insert gasket (with its small side towards the bowl top) into the clean groove of bowl top. Place a piece of hard wood (fig. 4/9a) or a 5" long piece of the old gasket (fig. 4/9b) on the new gasket and hammer the gasket evenly into the groove until it protrudes from surface "A" of bowl top by not more than 1 mm (fig. 4/9c). If the gasket protrudes by more than 1 mm, it will be quite difficult to properly close the bowl lock ring so that its "O" mark is in line with the "O" mark on bowl bottom.
- 4) After assembly of the separator, prevent air circulation in the separator by
 - a) closing the sediment discharge,
 - b) closing the feed line (by means of a cock or a blind cap),
 - c) closing the skim milk and cream valves.

Frame drain and air vent on frame drain must NOT be closed.

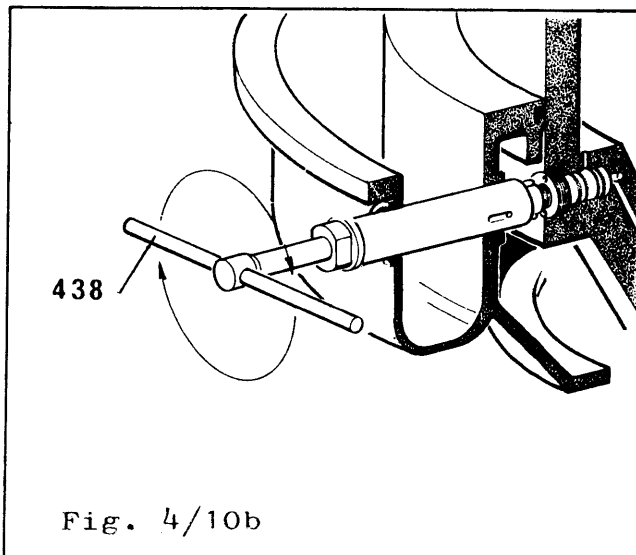
- 5) Run the separator for about one hour while the operating-water feed is closed. During this time, the bowl material will heat up through air friction to about 176^oF at which temperature the Polyamid gasket will become pliable.
- 6) Now close the bowl by feeding operating water. Through the upward movement of the piston the warmed-up gasket will be pressed into the anchor grooves.
- 7) About 15 minutes after closing the bowl feed cold water to the bowl.
- 8) Be sure to re-open sediment discharge before sediment ejection takes place.

4.5. Removing the valve from the bowl bottom

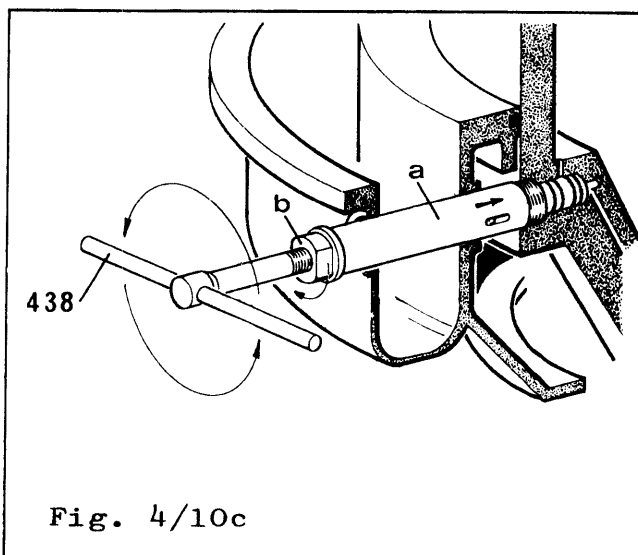
Remove the valve from the bowl bottom once a month for cleaning. On this occasion, check condition of gaskets 3c, f and g and of sealing disc 3d and replace them, if necessary.



By means of wrench 437 screw plug 3a out of the valve; while unscrewing press threaded bush "a" against the valve to make the plug enter the bush with which it will then be removed.



Screw socket wrench 438 into the valve.



Introduce pins of bush a of wrench 438 in holes of valve. Tighten nut b. Then screw valve out of bowl bottom.

Before re-installing the valve, moisten gaskets 3f and 3g and grease threaded area. Then screw in valve entirely, but do NOT tighten it firmly.

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5. Technical Information

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5.1. Functioning of the hydraulic system of the bowl

The self-cleaning bowl is equipped for ejecting the sediment without interruption of operation. Dirt particles accumulate in the conical sediment space of the bowl. Ports on the bowl circumference are closed during operation by sliding piston 3. The sliding piston is hydraulically actuated to open and close the bowl ports, that means the water pressure created in filled sealing chamber 2 keeps the bowl closed. When the operating water drains out of the sealing chamber after closing solenoid valve 14, the product pressure above the piston pushes the piston down and opens the bowl ports. Opening valve 14 again and the booster bowl valve fills the sealing chamber fast with water. The water pressure in the sealing chamber pushes sliding piston 3 upwards and presses it against gasket 9, thus sealing the bowl.

During processing, the operating water flows through channel 4 into the valve 5 and pushes against sealing disc 6 from the outside. Sealing disc 6 thus seals water discharge channel 8 and keeps water trapped in sealing chamber 2.

Since a small amount of water continuously discharges through nozzle 7 of the valve, be sure to feed during processing sufficient operating water to maintain pressure against sealing disc. Otherwise bowl will open or amount of ejected sludge will vary, resulting in milk losses.

When solenoid valve 14 is closed for sediment ejection, sealing disc 6 in the bowl valve opens channel 8, and the water contained in sealing chamber 2 flows out through channel 11 of the valve.

After sediment ejection, sealing water is fed to the bowl, controlled by solenoid valve 14 and an additional solenoid valve as a booster, latter opens for a short period only to effect quick closing of the bowl.

All valves initiating the de-sludging process are controlled by the automatic timing unit supplied with the machine.

Sectional Diagram illustrating Sealing of the Bowl and Removal of Solid Matter

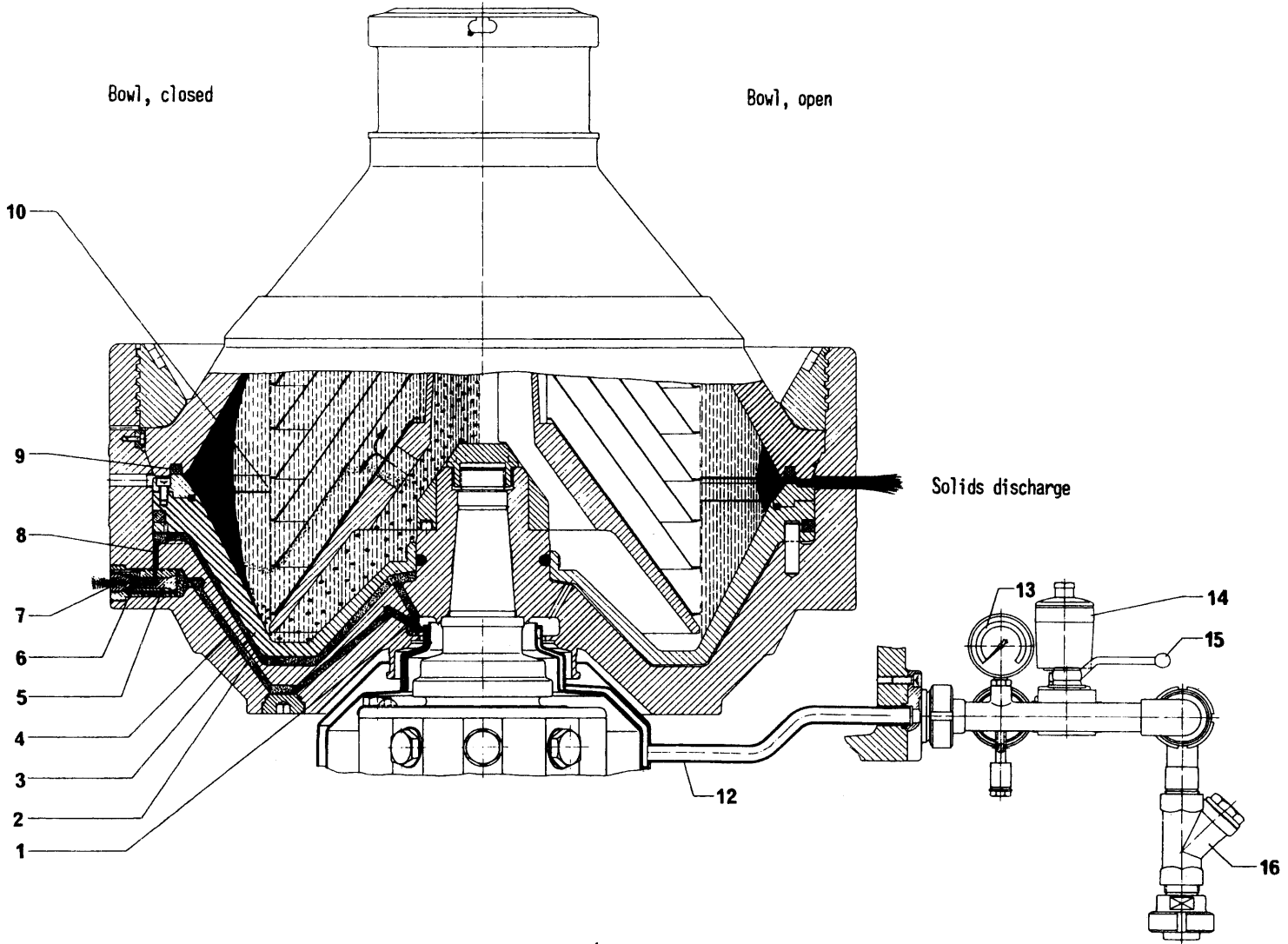
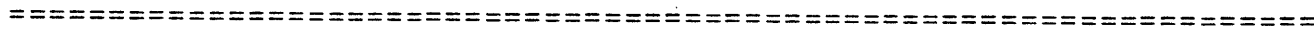


Fig. 5/1a

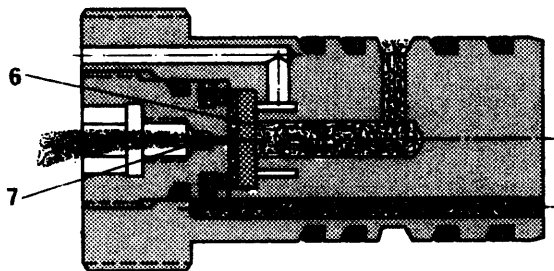


Fig. 5/1b
Functional diagram showing valve during clarification.

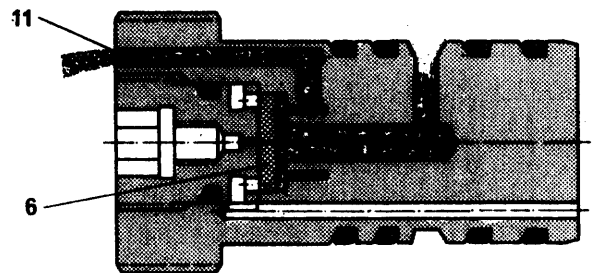


Fig. 5/1c
Functional diagram showing valve during solids ejection.

5.2. Control System

5.2.1. General

The control system consisting of a timing unit TVA 2-M and the operating-water connection is used to program automatic partial sediment ejections of the bowl during milk processing.

When apart from the periodic partial sediment ejections the chemical circulation cleaning of the separator and the pasteurizers is to be carried out automatically, then a timer of the type TVA 4-ER is to be used.

5.2.2. Timing Unit TVA 2-M

For operating principles of this unit refer to sect. 6.2.1. Circuit diagram, list of component parts, and dimension sheet are furnished with the timing unit.

The circuit elements necessary for programme-setting and for the control of the unit are numbered from 1 to 10 in fig. 5/2:

1 = Timing Relay "Separation"

With the aid of the small knob, the timing relay can be set to five different time ranges. The big knob allows setting to any separating period between 0 and 3 hours. During separation, the red trailing pointer runs down the time scale from the point indicating the selected time of separation to zero.

When the separation time has elapsed, partial sediment ejection takes place. This procedure is automatically repeated at regular intervals. The timing relay "Separation" works only when selector switch 8 is set to "Automatic".

2 = Timing Relay "Partial De-sludging"

The small knob serves to adjust the time range, e.g. 3s = 3 sec. The big knob allows setting the pointer to the desired duration of partial sediment ejection. During partial sediment ejection the red trailing pointer runs down the time scale from the point indicating the selected duration of set partial ejection to zero. Timing relay "Partial De-sludging" works only when selector switch 8 is set to "Automatic".

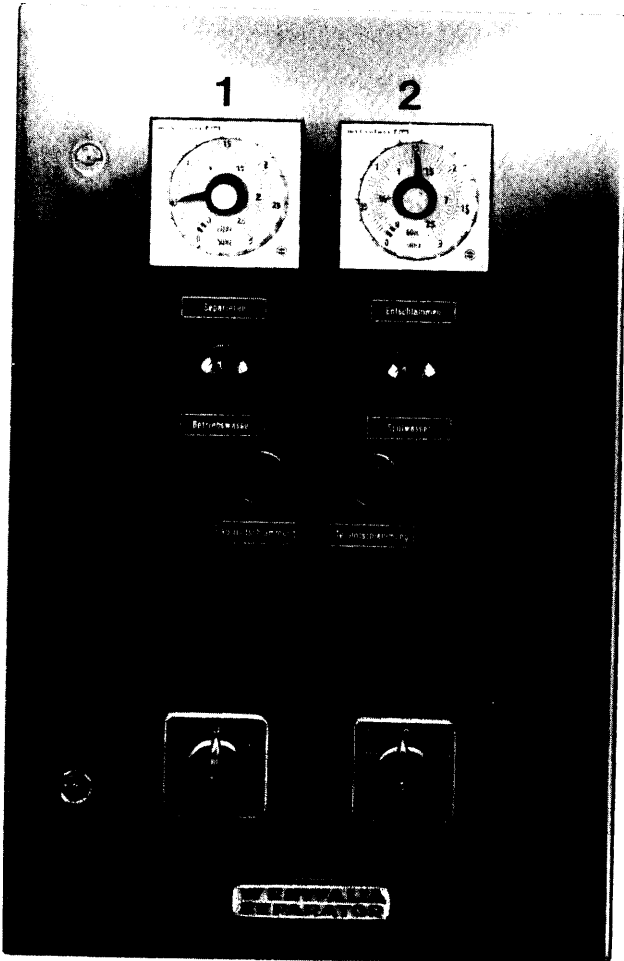


Fig. 5/2

3 = Pilot Lamp "Operating Water"

When this lamp lights up, the solenoid valve for operating water is open and the bowl is closed.

4 = Pilot Lamp "Flush Water"

When this lamp lights up, the solenoid valve for flushing of hood and sediment collector is open.

5 = Push button "Partial De-sludging"

By pressing this button, the programme in action can be interrupted and an automatic partial ejection can be initiated immediately. Upon termination of this "irregular" de-sludging process, the following partial ejections will take place again at the pre-set intervals.

6 = Push button "Complete De-sludging" (only to be actuated during chemical circulation cleaning)

By pressing this button, complete sediment ejection of the bowl takes place immediately. Feed pump(s) is (are) stopped automatically and put again into operation approx. 1 minute after complete ejection.

7 = Main Switch

To start the timing unit, set main switch to "1".

8 = Selector Switch "Hand-O-Automatic"

When the switch is set to "Hand" position, the operating-water valve on the separator is open and the bowl is closed. In this position the flush-water valve is open and the pilot lamp "Flush Water" lights up.

When the switch is set to "Automatic", partial ejections take place at pre-set intervals. If the selector switch has first been set to "Hand" to start the system under manual control, then be sure to switch over to "Automatic" when changing over to milk processing or to chemical circulation cleaning.

When switch is set to "0", the operating-water valve is closed. About 15 minutes after stopping the separator, set switch to "0" in order to close the operating-water valve. While bowl is at standstill, operating-water is not allowed to come in.

9 = Timing Relay "Pre-flushing" (housed in the control cabinet)

This relay is set to the period of time during which the solenoid valve for the flushing of hood and sediment collector is to be open before partial ejection.

The period of time the bowl is open for complete ejection (see no. 6) is the same as the time set for pre-flushing.

10 = Timing Relay "Subsequent flushing" (housed in the control cabinet)

Timing relay "Subsequent flushing" can be adjusted to the period of time the solenoid valve for flushing the hood and sediment collector is to remain open after a partial or complete ejection.

During subsequent flushing, the sealing-water valve for rapid closing of the bowl is open. After complete ejection, upon termination of flushing, the feed pump is re-started automatically.

5.2.2.1. Setting the Timing Relays

1) Timing relay "Separation"

Adjust the small knob to the time range 3h. By means of the big knob set pointer

for milk separation to 1 hour,
for whey separation to 15 - 30 minutes.

2) Timing relay "Partial de-sludging"

Set small knob to time range 3s. By means of the big knob adjust pointer for partial ejection period.

The duration of partial ejection (1 - 3 seconds) varies with the amount of ejected solids and must therefore be determined by running tests which can be carried through with water. When making the test, close manually-operated valve d (fig. 5/3). Adjust duration of partial ejection so that during milk processing approx. 3 litres and during whey processing approx. 5 litres will be ejected from the bowl.

3) Timing relay "Pre-flushing" (housed in the control cabinet)

has been set at the factory to 10 - 12 seconds.

4) Timing relay "Subsequent flushing" (housed in the control cabinet)

has been set at the factory to 30 seconds.

5.2.3. Operating-water connection

The inner diameter of the supply line to be connected to the operating-water system should be 1", and the pressure in this line should be approx. 21 psi. During separation, throttle valve b (fig. 5/3) so that approx. 450 - 500 litres/h of operating water will be fed to the separator.

The operating water must be clean so that at temperatures of up to 80°C no precipitations will occur.

During complete ejection operations, the operating water may become contaminated. This should be considered when re-using the operating water.

Provisions have to be made that during the CIP-process the operating water is sent off to the sewer.

The strainer in filter G has to be cleaned from time to time.

IMPORTANT: Cold or warm water may be used as operating water. However, the water must NOT be too warm, since evaporation would result in pressure drop in the sealing chamber of the bowl.

5.2.3.1. Arrangement of the solenoid valves

In addition to the three solenoid valves A, B, and D the operating-water connection comprises the rapid closing valve C connected in parallel with valves A and B, and four manually-operated valves a, b, d, and f. This arrangement assures continuance of operation since, in the event of failure of one of the three solenoid valves or of the timing unit, it allows changing over to manual operation.

For manual operation proceed as follows:

Open rapid-closing valve C.

Close manually-operated valves a and b.

Partial sediment ejection, initiated manually

- 1) Shut off rapid-closing valve C in order to open the bowl.
- 2) As soon as de-sludging noises can be heard, open rapid-closing valve all the way in order to close the bowl.
- 3) Throttle rapid-closing valve C to the extent (approx. 7 psi) that about 450 litres/h of operating-water discharge from the frame drain.

Complete sediment ejection, initiated manually

- 1) Shut off rapid closing valve.
- 2) When de-sludging noises have stopped, re-open rapid-closing valve to close the bowl.

5.2.3.2. Pressure switch

For closing the bowl, a minimum operating-water pressure of about 9 psi is required.

A lower pressure may result in unintended opening and de-sludging of the bowl. For this reason, the operating-water line is provided with pressure switch K which stops the milk supply and causes a klaxon to sound when the pressure drops below the minimum value.

A detailed description of the pressure switch is furnished with the timing unit.

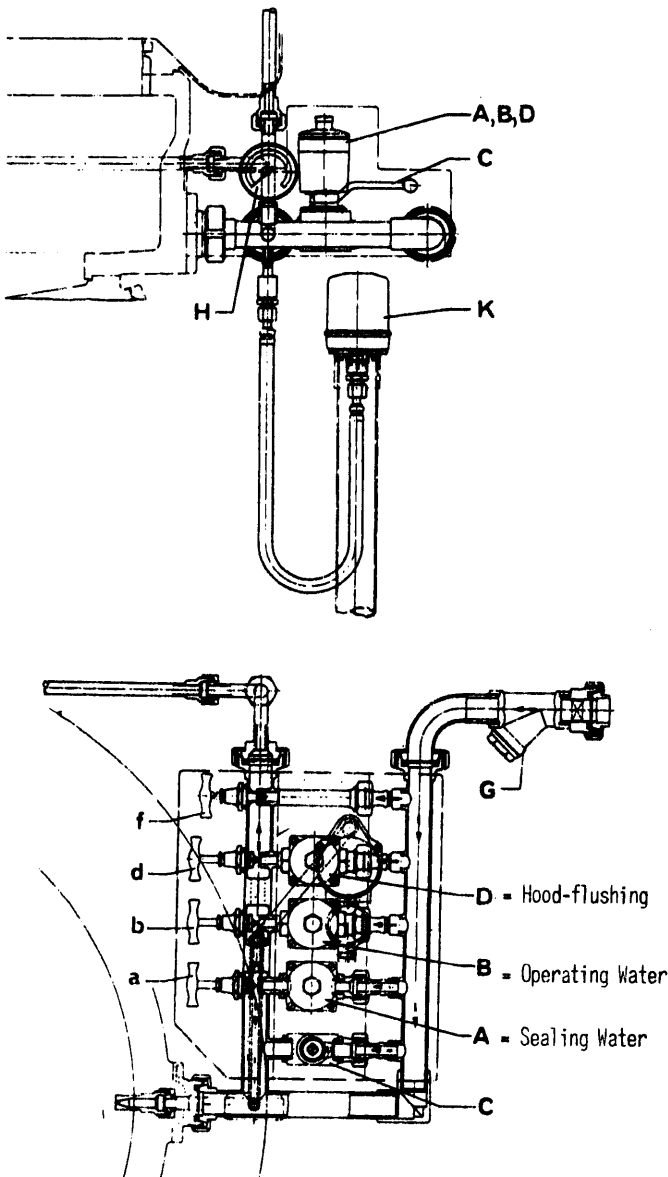


Fig. 5/3

Arrangement of the solenoid valves

5.2.3.3. How the solenoid valves function (fig. 17/2)

The solenoid valve (straight-way diaphragm valve) has its own pilot system. When the solenoid is de-energized, i.e. when the pilot valve is closed, the water passing from the feed side of the valve through a bore into the chamber above diaphragm 2 cannot escape so that a pressure equivalent to the line pressure builds up above the diaphragm. Since the area of the upper side of the diaphragm exposed to water is by the flow area of the valve seat larger than the underside of the diaphragm exposed to the same liquid pressure, the diaphragm is pressed on the valve seat, thus keeping the valve closed.

Upon energizing of solenoid coil 15, core 10 is pulled upwards, and plug 9 is lifted from the valve seat, so that the water is able to escape towards the discharge side of the valve.

Since the diameter of the outlet opening of the chamber above the diaphragm is larger than the diameter of the inlet opening, the water flows out more quickly than it flows in, - resulting in pressure drop above the diaphragm. Through the higher pressure acting on the underside of the diaphragm, the latter is lifted off its seat, thus opening the valve.

When the current is cut off, spring 11 pushes down the magnet core, thus closing the pilot valve. Liquid pressure builds up again above the diaphragm, and the main valve closes.

To prevent impurities from getting into the pilot system, cover 5 has been fitted with filter ring 6 which should be cleaned occasionally.

5.2.3.4. Maintaining the valves

The solenoid valves do not require special maintenance. However, care should be taken that the magnet heads are always screwed tightly to the top of the valve body to ensure perfect sealing action of the gaskets.

Filter ring 6 in cover 5 of the straight-way diaphragm valve should be ridded occasionally of ferrous or calcareous deposits precipitated from the water, in order to ensure satisfactory functioning of the valve. These deposits will easily dissolve in a bath of hydrochloric acid where the filter should be left to soak for a short time only. The filter has to be flushed thoroughly with water before re-installation.

5.2.3.5. Locating the electric troubles

Electric troubles may originate from various sources.

If it has been found that the control cabinet functions properly and that voltage is present at the valve terminals of the terminal strip while the corresponding timing relay is operating, the trouble will have to be ascribed either to a defective solenoid coil, or to open circuit between terminal strip and valve, or to poor connection.

To repair a defective solenoid coil, pull the magnet housing off the valve top after having removed the cover screw. Before doing so, make sure that power is turned off and cannot be turned on during repair.

The solenoid coil is cast integral with the magnet housing. Therefore, if the coil needs replacement, the complete assembly (magnet head, Part-No. 0018-4446-830, page 17/3) will have to be replaced.

After having mounted the magnet head on the valve, firmly screw on the cover (provided with a rubber gasket) and tighten the gland. The gland should, in addition, be sealed with putty.

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6. Operation

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6.1. Starting the separator

- 1) Check if
 - a) brakes are released,
 - b) oil level is slightly above middle of sight glass,
 - c) hex head screws for fastening the hood and the discharge as well as the connection piece for fastening the centripetal pump are tightened securely,
 - d) skim milk- and cream valves are open,
 - e) main valve in operating-water line is open.

2) Switch on the motor.

- 3) After a starting time of 3 minutes set the main switch embodied in the timing unit from "0" to "1" and the selector switch from "0" to "manual" or to "automatic". If the selector switch has first been set to "manual" to start the system under manual control, then be sure to switch over to "automatic" when changing over to milk processing.

Adjust valve b (fig. 5/3) so that operating water is fed to the separator at a rate of 450 litres/h. Measure amount of water flowing out of the frame drain.

- 4) As soon as the bowl has reached its operating speed, which is after about 10 minutes, water can be circulated as it is usually done in dairies. Throttle skim milk valve so as to produce the approximate skim milk pressure and adjust cream valve to approximately the desired cream flow rate.

- 5) After switching over to milk processing proceed as follows:

Set selector switch of timing unit to "automatic". After having opened the milk feed cock, throttle skim milk valve and, at the same time, adjust cream valve to desired cream flow rate. Continue throttling skim milk valve, while maintaining the desired cream flow rate, until slight overflow occurs. For checking the overflow of the bowl, open inspection cover on the hood only a little. The pressure indicated by the pressure gauge at the moment when overflow occurs, is to be considered as the maximum pressure. Now open skim milk valve again to obtain a pressure of 4 to 7 psi lower than the maximum pressure. This discharge pressure must be maintained during separation.

If the separator is equipped with a constant pressure valve, the maximum pump pressure and consequently the operating pressure will be adjusted by means of this valve. Daily re-adjustment will thus be eliminated.

For the maximum back pressure in the connected processing equipment, permissible for the different centripetal pump sizes, refer to page 18/1.

To fully utilize the discharge pressure of the cream pump, e.g. when the separator is used for milk clarification where cream and skim milk are re-combined after separation, adjust the skim milk valve to the highest possible discharge pressure.

When clarifying milk, it may happen that cream with too high a b.f. content emerges from the machine although the cream valve is open

and there is a maximum pressure in the skim milk line. To overcome this difficulty, a cream pump with a larger diameter has to be installed. If, however, the separator is already equipped with the largest dia. cream pump, the counter-pressure of the equipment following the separator has to be reduced or a booster pump has to be installed.

Bear in mind that cream with a very high b.f. content i.e. extremely viscous cream can lead to incorrect flowmeter reading inasmuch as it lifts the measuring rod to a higher level than that indicated by normal cream flow.

If overflow occurs while the valves are open, the diameters of the built-in centripetal pumps prove to be too small. In this case, check with the factory for larger diameter centripetal pumps and reduce the feed rate for the time being. For centripetal pump dimensions refer to page 18/1.

If there is constant overflow in spite of a low skim milk discharge pressure, check condition of gaskets in centripetal pump chamber cover and in skim milk discharge and check whether overlapping edges of centripetal pump chamber cover and of skim milk discharge are damaged at the sealing points.

In some cases, especially when using heaters with a low back pressure, it may be suitable to install in the line after or ahead of the heater a throttling valve and set it to about 22 psi in order to ensure foamfree operation of the separator.

The separating temperature should be about 40°C (104°F). If the milk has a tendency to precipitate too great an amount of albumin, a separating temperature of about 35°C (95°F) may be more suitable.

Possible causes for inefficient separation:

- 1) Unfavourable pre-treatment of the milk (pumps, agitator, high temperature),
- 2) Variations in temperature, in bowl speed or in throughflow capacity,
- 3) Leakage at separating disc,
- 4) Leakage in discharge lines and at cream pump tube,
- 5) Re-mixing of cream and skim milk after separation, e.g. caused by leaking cocks in pipe lines connected for drink milk production. During separation, the drain valve in the connection line must be open.

Skim milk samples should be taken at the screwed union of the skim milk discharge.

If the trouble cannot be found with the separator or with the equipment ahead of the separator, check condition of chemicals used to analyse the skim milk. To make a test, fill water instead of skim milk into butyrometers.

6.2. Solids ejection (de-sludging)

6.2.1. Partial solids ejection (partial de-sludging)

Partial solids ejection means partial emptying of the sediment space of the bowl. The milk supply to the bowl is not cut off during partial ejection.

For partial ejection, the operating-water inflow is interrupted briefly. The bowl is opened for so short a period of time that only part of the solids is ejected from the sediment space. The duration of operating-water feed interruption (= duration of partial ejection) depends on the amount of solids to be removed (see 5.2.2.1, no. 2).

The partial sediment ejections are performed with the timing unit (see 5.2) at pre-determined intervals.

After having changed over to milk treatment, the selector switch has to be set to "Automatic". When the time adjusted at the timing relay "Separation" has elapsed, the first partial ejection takes place. The timing relay "Pre-flushing" is to be set so as to assure opening of the solenoid valve D "Flush-water" 10 seconds before partial ejection takes place. At the same time solenoid valve B "Operating water" closes and solenoid valve A "Sealing water" opens.

The water injected into the sediment collector will prevent the sediment from becoming baked-on.

Timing relay "partial de-sludging" is to be adjusted so as to ensure closing of solenoid valve A "sealing water" for about 2 seconds. This causes the bowl to open and to eject 3 litres of sediment. Then sealing-water valve A opens again. Solenoid valve D for flush-water supply remains open during solids ejection and closes about 30 seconds after the ejection process. The period of time this valve is to remain open after solids ejection is adjustable by means of timing relay "subsequent flushing". When solenoid valve D for flush-water supply closes, solenoid valve B for operating-water opens and solenoid valve A for sealing water closes.

The liquid obtained from a partial ejection process (3 litres of sediment and 20 litres of flush water) is collected in the sterilizing tank. The tank is capable of holding the liquid obtained from three partial ejections.

After giving 1 kg of alkaline detergent into the sterilizing tank, the liquid is heated up with steam to 95°C and kept at this temperature for 10 minutes. The liquid can then be sent to the sewer.

Thanks to partial ejection, the milk processing time of the separator is virtually unlimited. The bowl should however be dismantled once a month for a regular check-up. On this occasion, the guide surfaces and threaded areas are to be cleaned and wiped dry and then lightly greased with the lubricating paste supplied.

6.2.2. Complete solids ejection (complete de-sludging)

For automatic chemical circulation cleaning upon completion of milk treatment a special type timing unit is needed. If this type is not available, complete ejections can be initiated manually with the Unit TVA 2-M. For this purpose, selector switch "Hand-O-Automatic" is to be set to "Automatic".

Complete sediment ejections during chemical circulation cleaning are to be initiated by pressing push button "Complete de-sludging".

Provided that the electrical installation is properly carried out (see circuit diagram of timing unit) the feed pump(s) is (are) automatically switched off during complete ejection initiated by pressing push button "complete de-sludging" and put again into operation approx. 30 sec. after complete solids ejection. Interruption of the liquid supply to the bowl by stopping the feed pump is necessary for the recovery of the bowl speed which drops during complete ejection.

After the bowl is re-filled (check rising of discharge pressure), a further complete ejection can be performed by pressing again push button "complete de-sludging".

Should the feed pump(s) not be switched off automatically during complete ejection, switch off pump(s) manually and re-start it (them) one minute after complete ejection.

7. Cleaning-in-Place

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The self-cleaning separator is included in the C-I-P system of the plant. Its cleaning frequency is adapted to that of the pasteurizers.

After milk processing, the residual milk is displaced and the whole equipment thoroughly flushed with water. The flushing is followed by two sediment ejection procedures, accomplished by pushing the button "Complete de-sludging" at the timing unit TVA 2-M.

Both the caustic solution circulation and the acid solution circulation are followed by flushing with water and subsequently by two "Complete de-sludgings" each.

During the C-I-P process, the constant pressure valve incorporated in the skim milk line should be throttled repeatedly by actuating the push button "overflow". This will cause the centripetal pump chamber of the separator to overflow, resulting in thorough flushing of the hood and the sediment collector. If the separator is not equipped with a constant pressure valve, the skim milk valve should be throttled several times by hand.

8. The Gear

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8.1. Removing the vertical gear parts

8.1.1. Removing the bottom bearing

- 1) Remove the bowl.
- 2) Loosen oil drain screw 6 (fig. 13/2) and let oil drain into oil cup.
- 3) Screw hex head screws 2 out of the gear chamber cover 4.
- 4) Remove the gear chamber cover.
- 5) Unscrew bottom bearing cap 5 (fig. 14) and remove gasket 4.
- 6) Unscrew bottom bearing threaded piece 7f and remove it together with the remaining parts of the bottom bearing.

If the bottom bearing housing 2 has to be removed, proceed as follows: Unscrew hex head screws 9. Then force bottom bearing housing out of the separator frame by threading two of the hex head screws - opposite each other - into the tap holes of the housing.

8.1.2. Removing the spindle

- 1) Remove operating-water connection and take out bush 22 (fig. 13/1). Undo Allen screws 17 and remove operating-water feed 16 and spindle cap 1b (fig. 14).
- 2) Undo hex head screws 6c (fig. 14) of neck bearing. Remove protection cap 6a and spindle spring 1c.
- 3) Fasten spindle lifting device 424 with screw 12 (fig. 19) to the worm spindle and pull out spindle along with neck bearing bridge.
IMPORTANT: Be careful NOT to damage gaskets 6d and 6n during disassembly. If necessary, replace gaskets.
- 4) Separate neck bearing bridge from worm spindle by tapping spindle top on a wooden surface.

8.2. Re-assembly of the vertical gear parts (fig. 14)

For re-assembly proceed in reverse order of removal (see 8.1) and bear in mind the following:

- 1) Before re-assembly clean gear chamber thoroughly.
- 2) Check condition of ball bearings 1f and 1h before fitting them on the worm spindle.
IMPORTANT: Be sure to use only high-speed precision ball bearings (see Parts List).
- 3) Before fitting new ball bearings and ball bearing protection rings heat them in oil to approx. 80°C (176°F).
- 4) The worm spindle, with ball bearings attached, must be installed without having to hit on the upper end, and, must fit so as to be axially movable by hand. The outer ring of the pendulum ball bearing 1h must fit snug in the bottom bearing housing. If this is not the case, smooth inside of bottom bearing housing with an fine emery cloth.
- 5) When mounting a new worm spindle the entire worm wheel assembly with clamp plates, 10, (fig. 15/1) should be replaced at the same time since the latter is no longer in perfect condition either and could thus lead to premature wear of the new worm spindle.
- 6) When installing the neck bearing bridge assembly 6f-m, make sure that the gaskets 6d and 6n are in good condition.
- 7) IMPORTANT: After re-assembly of the vertical gear parts, check bowl height for possible re-adjustment (see 8.3).

8.3. Bowl Height

8.3.1. Checking the bowl height

The bowl height is adjusted at the factory before the separator is shipped. It must be checked for re-adjustment before the first start of the separator, after re-assembling the vertical gear parts, after installing a different bowl or a different centripetal pump or when the centripetal pump shows any grinding marks.

Prerequisite to correct bowl height adjustment is that

- a) the bowl is properly closed (the "0" marks on bowl lock ring and on bowl top must be in line),
- b) the hood is properly seated on the frame rim and the fastening screws of the hood are tightened securely,
- c) the centripetal pump is tightened by means of connection piece.

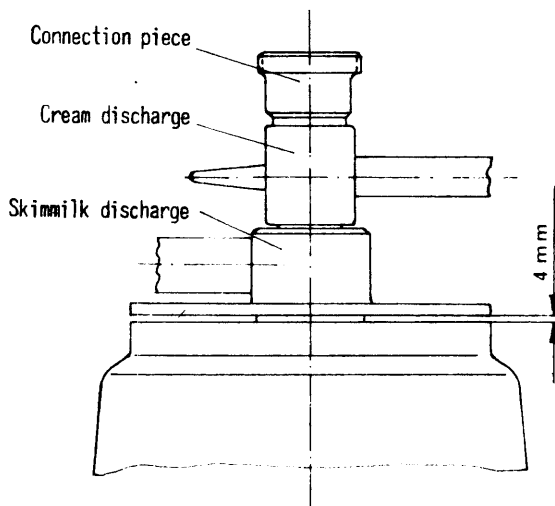


Fig. 8/3

The bowl height is correct when after loosening of the hex head screws, the skim milk discharge together with the cream discharge and the connection piece can be raised so far that there is a distance of 4 mm between upper rim of hood and contact surface of skim milk discharge (fig. 8/3). If the distance does not conform to this measurement, the bowl height has to be re-adjusted.

8.3.2. Re-adjusting the bowl height

For re-adjustment of bowl height proceed as follows:

Unscrew bottom bearing cap 5 (fig. 14). Adjust bowl height by turning bottom bearing threaded piece 7f (fig. 8/3). A full turn of the bottom bearing threaded piece to your Right or to your Left raises or lowers the bowl by 2 mm.

If the distance shown in fig. 8/3 is greater than 4 mm, the bowl is too high. Lower the bowl by turning the bottom bearing threaded piece in counter-clockwise direction.

If the distance shown in fig. 8/3 is less than 4 mm, the bowl is too low. Raise the bowl by turning the bottom bearing threaded piece in clockwise direction.

If the bowl has to be raised by more than 1 mm, then the bowl has to be removed (see 4.3). Remove operating-water connection and take out bush 22 (fig. 13/1). Undo screws 17 and remove operating-water feed 16. Take off spindle cap 1b (fig. 14).

Undo screws 6c and remove neck bearing protection cap 6a. Then turn bottom bearing threaded piece in clockwise direction until bowl is adjusted to proper height.

After adjustment replace bottom bearing cap 5 including gasket 4 and close tightly. Bottom bearing cap serves as a lock nut.

Every time the bowl has been lowered or raised, remove bowl, spindle cap, and protection cap, unless these parts have already been removed before raising the bowl.

Check if the cams of the distance ring are flush with the upper surface of the neck bearing pressure ring 6f or only slightly below it (not more than 2 mm).

If the cams of the distance ring exceed the upper surface of the neck bearing pressure ring, file them off to proper dimension. If they are by more than 2 mm below the upper surface of the pressure ring, increase height of cams by welding-on or check with the factory for a new distance ring with properly sized cams.

After checking the clearance between distance ring and neck bearing bridge re-install the removed parts. When installing the operating-water feed, check to be sure that gasket 21 (fig. 13/1) is in perfect condition.

8.4. The Centrifugal Clutch

8.4.1. General

The centrifugal clutch gradually brings the bowl up to its rated speed, eliminating premature wear on gear parts and on motor. The motor power is transmitted onto the clutch drum and thereby onto the gear parts of the separator by six clutch shoes (fig. 8/6b) fitted in the slits of the clutch driver.

The condition of the clutch shoes has to be checked every 4 weeks. Make sure that the linings will be replaced before they are worn down to the rivet heads, since otherwise the rivet heads will cause damage to the contact surface of the clutch ring 1b (fig. 15/2) which again will lead to premature wear of the clutch shoes. When one clutch shoe lining is worn be sure to replace all six linings (see 8.4.4) or rather the complete clutch shoes in order to avoid unbalance.

8.4.2. Removal of the clutch shoes

- 1) Undo screws 26 (fig. 13/1) and remove protection cap 29.
- 2) By means of socket wrench 417 unscrew nut 24 (fig. 15/1) from worm wheel shaft. While doing this, block worm wheel shaft by putting a screwdriver into one of the holes of the clutch drum 1a (fig. 15/2).
- 3) By means of pulling device 423a-c and screws 26 (fig. 13/1) withdraw clutch driver 3 (fig. 15/2) together with clutch shoes 2 from the worm wheel shaft. This is done in the following manner:
 - a) With nut b facing the clutch side, attach the pulling device a-c as illustrated in fig. 8/7a and fasten it to the clutch driver by means of screws d (see also no. 26 in fig. 13/1).
 - b) Thread in spindle a (fig. 8/7a) by hand. Make sure that its conically-shaped end fits into the centering hole of the worm wheel shaft.
 - c) Remove clutch driver together with clutch shoes from worm wheel shaft by turning threaded spindle in clockwise direction. While turning the spindle, block nut b (SW 27).
- 4) Remove clutch shoes from clutch driver.

8.4.3. Fitting the clutch shoes

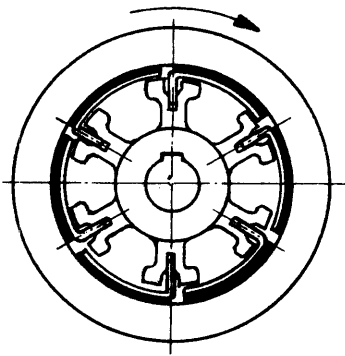


Fig. 8/6a

Clutch driver with six clutch shoes.

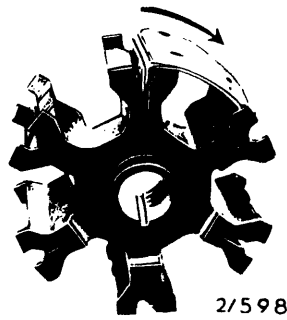


Fig. 8/6b

Clutch driver with one clutch shoe.

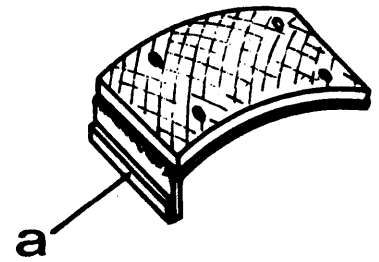


Fig. 8/6c

Clutch shoe

- 1) Put the six clutch shoes into the slits of the clutch driver in such a manner that they will be pushed by the driver and not pulled (see fig. 8/6a and b). Make sure that the clutch shoes are loosely seated in the slits of the clutch driver.
- 2) Slip clutch driver - by hand - onto the worm wheel shaft and push it to limit. Driving the clutch driver onto the shaft can be facilitated by putting a wooden block against the clutch driver and hitting it with a hammer.
- 3) By means of wrench 417 screw nut 24 (fig. 15/1) onto worm wheel shaft. Final tightening of the nut is accomplished by rapping against handle of wrench. While doing this, block the worm wheel shaft by putting a screwdriver through the clutch driver and clutch drum as far as to the bearing cover.
- 4) Fasten protective cover 29 (fig. 13/1) by means of screws 26.
- 5) In case disturbing noises come from the clutch during the acceleration period, apply a very thin layer of grease to the lips "a" of the clutch shoes (fig. 8/6c). If too thick a layer of grease is applied, small particles of the paste might be centrifugally thrown on the friction surfaces, thus causing clutch slippage!

8.4.4. Replacing of the clutch shoe linings

When riveting new linings be careful not to deform the clutch shoes.

8.4.5. Removal of the clutch drum

- 1) Remove clutch shoes: see 8.4.2.
- 2) Remove gear chamber cover 4 (fig. 13/2).
- 3) Loosen screws 10c (fig. 15/1) in clamp plates of worm wheel and slacken clamp plates 10a and b.
- 4) Introduce wrench 416 through holes of clutch drum to undo screws 22 (fig. 15/1).
- 5) Use pulling device 423 to withdraw clutch drum assembly 1a-t (fig. 15/2) from the worm wheel shaft in the following manner (see fig. 8/7a):

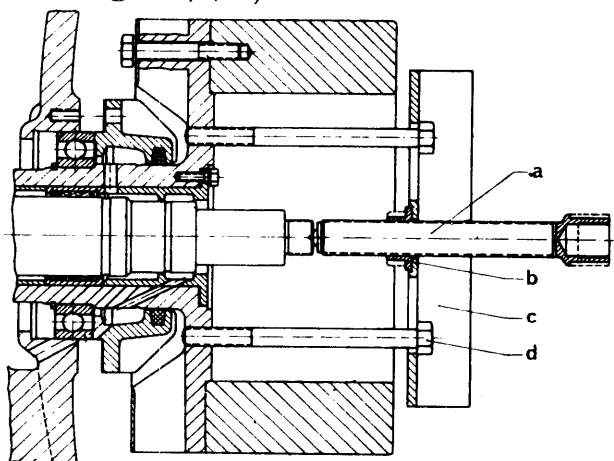


Fig. 8/7a

Removal of clutch drum.

- a) Attach pulling device a-c as illustrated in fig. 8/7a (with nut b towards the clutch side) and fasten it to clutch drum by means of screws d (M12x140).
 - b) Thread in spindle a by hand. Make sure that its tapered end enters the centering hole of the worm wheel shaft.
 - c) By turning threaded spindle in clockwise direction remove clutch drum from worm wheel shaft. While doing so, block nut b (SW 27).
- 6) Remove bearing housing 11 (fig. 15/1) from ball bearing 20.

8.4.6. Installation of the clutch drum

- 1) Install bearing housing 11 (fig. 15/1) together with gasket 12 so that the milled slot for the oil return is directed downwards. Align the bearing housing with screws 22 so that its through bores lie exactly before the tap holes of the frame. Then press the bearing housing into the frame.
- 2) Use puller 423 to install clutch drum assembly 1a-t (fig. 15/2) in the following manner (see fig. 8/7b):

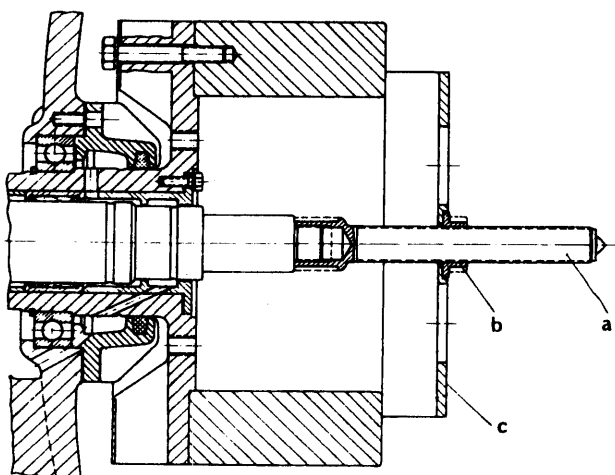


Fig. 8/7b

Installation of clutch drum

- a) Carefully fit clutch drum assembly 1a-t together with the parts 20, 21, 23 and 13 (fig. 15/1) onto the worm wheel shaft.
 - b) Attach pulling device a-c as illustrated in fig. 8/7b (nut b being in front of the pulling device) and screw threaded spindle a onto the worm wheel shaft.
 - c) Tighten nut b until ball bearing 20 on neck of clutch drum is completely seated in the bearing housing. While tightening, block threaded spindle (SW 27).
- 3) Then proceed in reverse order of removal (see 8.4.5, no. 1 - 4).

8.5. Removal of the horizontal gear parts

8.5.1. Removing the motor (fig. 13/1)

- 1) Remove lead-in wires from motor terminals.
- 2) Undo screws 10d and move cover 10a aside.
- 3) Suspend motor to hoist.
- 4) Unscrew nuts 10f and remove lock washers 10g.
- 5) By means of hoist lift off the motor.

8.5.2. Removal of worm wheel shaft (fig. 15/1)

- 1) Remove the motor: see 8.5.1.
- 2) Remove clutch shoes: see 8.4.2.
- 3) Undo screws 6 and remove bearing cover 5.
- 4) Drive out worm wheel shaft 19 towards motor side by rapping with a rubber hammer against the shaft end. Then pull out shaft by hand.

8.5.3. Removal of the worm wheel (see fig. 15/1)

- 1) Remove clutch drum: see 8.4.5.
- 2) Remove worm wheel shaft: see 8.5.2.
While pulling out the shaft, hold the worm wheel to prevent damage to the teeth.
- 3) Take worm wheel assembly with clamp plates, 10, out of the gear housing.

8.5.4. Removal of ball bearing 8 (motor side, fig. 15/1)

- 1) Remove the motor.
- 2) Remove clutch shoes: see 8.4.2.
- 3) Loosen screw 16 and withdraw hub of Eupex-coupling from worm wheel shaft.
- 4) Undo screws 6 and remove bearing cover 5.
- 5) Place a hard wood block against worm wheel shaft and rap it lightly with a hammer to drive out shaft together with parts 8, 17, 18 towards motor side. Then pull it out by hand.
- 6) Use pliers 415 to press securing ring 17 out of the groove of worm wheel shaft.
- 7) Remove ring 18.
- 8) Remove ball bearing 8 from the worm wheel shaft.

8.5.5. Removal of ball bearing 20 (brake side, fig. 15/1)

- 1) Remove clutch drum: see 8.4.5.
- 2) Use pliers 415 to press securing ring 1p (fig. 15/2) out of the groove of the clutch drum.
- 3) Remove ball bearing 20 from the neck of clutch drum.

8.6. Re-assembly of the horizontal gear parts

When re-assembling the horizontal gear parts, proceed in reverse order of removal (see 8.5) and bear in mind the following:

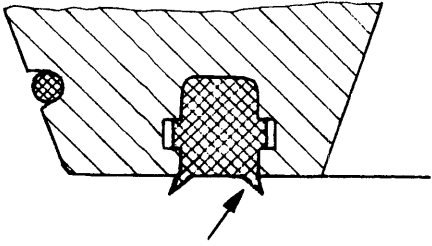
- 1) The worm wheel assembly with clamp plates 10 (fig. 15/1) has been balanced in the factory as complete assembly. The component parts of the assembly must NOT be replaced individually, since this would lead to unbalance.
- 2) When mounting the worm wheel assembly with clamp plates, push the worm wheel towards clutch side until it rests against the shoulder of the clutch drum. This will assure correct positioning of the toothed rim with reference to the worm spindle.
- 3) The worm wheel must be firmly tightened to the neck of the clutch drum, accomplished by tightening screws 10c in both clamp plates. Tighten screws crosswise, by single turns, to make sure clamp plates are drawn together evenly. While doing this, block the clutch drum by putting a screwdriver through one of the holes in the clutch drum as far as to the bearing cover.
- 4) When toothed rim is worn and needs replacement, the entire worm wheel assembly with clamp plates has to be replaced. Since the old worm spindle 1a (fig. 14) is no longer in perfect condition either and can thus lead to premature wear of the new worm wheel assembly, it is recommended to replace the worm spindle as well.
- 5) Before running in new gear parts, apply a thin film of molybdenum disulfide paste to the tothing. Then turn worm spindle - by hand - in clockwise direction for about 5 minutes to make the paste penetrate into the surfaces of the teeth.
- 6) Fill gear chamber with the oil specified in sect. 2 until oil level is slightly above middle of sight glass.
- 7) To run in new gear parts (worm wheel, worm spindle) let separator run - without bowl - for about one hour.
- 8) For reasons of safety, replace ball bearings fitted on worm wheel shaft and worm spindle every 5,000 working hours.

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10. TROUBLE SHOOTING
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10.1. General

Troubles	Causes	Remedies
10.1.1. The bowl does not come up to rated speed or takes too long to do so (see 3.5.).	1) Brakes are on.	Release the brakes by turning the handles in clockwise direction.
	3) Motor is incorrectly connected.	See wiring diagram.
	4) Friction surfaces of clutch shoes are oily.	Wipe friction surfaces dry. Do NOT use benzine, nor trichlorethylene, nor any other solvent!
	5) Linings of clutch shoes are worn.	Replace clutch shoes (see 8.4.2. and 8.4.3).
	7) Bowl is too high or too low and, therefore, rubs against centripetal pump.	Adjust to proper bowl height (see 8.3).
	8) Liquid or sludge has collected in the concentrate collector, resulting in slowing-down of the bowl.	Check frame drain; liquid must run out freely (see sect. 1). Clean concentrate collector underneath the bowl.
	9) Clamp plates are not tight; worm wheel slips on shaft.	Tighten long hex head screws on worm wheel evenly and <u>firmly</u> . Tighten crosswise, by single turns.
10.1.2. The bowl speed drops during operation.	1) Friction surfaces of clutch shoes are oily.	Wipe friction surfaces dry. Do NOT use benzine, nor trichlorethylene, nor any other solvent!
	2) Motor speed drops during operation.	Inspect motor and line voltage!

Troubles	Causes	Remedies
<p>10.1.4. Uneven run of the clarifier.</p>	<p>1) Incomplete solids ejection of the bowl. The remaining solids have deposited unevenly in the bowl.</p> 	<p>De-sludge the bowl several times. If that does not improve conditions, close the bowl and fill it with water in order to attenuate vibrations which occur during slowing-down of the bowl.</p> <p>Stop the separator and apply brakes. If bowl leaks, leave feed open. Clean the bowl thoroughly.</p> <p>Remove the protruding edges of the bowl gasket with a knife (see opposite sketch).</p>
	<p>2) The bowl is not properly assembled, or if the plant has several separators, parts of different bowls may have been interchanged.</p>	<p>Assemble bowl correctly (see 4.1).</p>
	<p>3) Disc pressure has slackened.</p>	<p>Check if bowl lock ring is screwed in firmly (see sect. 4.1, no. 17).</p> <p>Check disc count.</p> <p>If necessary, add spare disc.</p>
	<p>4) Bowl is damaged and, therefore, out of balance.</p>	<p>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!</p>
	<p>5) Neck bearing springs are weak or broken.</p>	<p>Replace all six neck bearing springs.</p>
	<p>6) Ball bearings are worn.</p>	<p>Replace damaged bearings. IMPORTANT: As spindle bearings use only ball bearings with increased accuracy of running (see List of Parts).</p>

Troubles	Causes	Remedies
<p>10.1.4. Uneven run of the separator (cont'd).</p>	<p>7) Gear parts are in bad condition as a result of</p> <ol style="list-style-type: none"> 1. normal wear, 2. premature wear caused by <ol style="list-style-type: none"> a) lack of oil, b) oil of too low a viscosity, c) metal abrasives present in the oil due to the following possible causes: <ul style="list-style-type: none"> - viscosity of oil is too low, - oil has not been changed in time, - gear chamber has not been cleaned, d) replacement of one gear part only, instead of both parts, e) water breaking-in because operating-water pressure is too high or because operating-water valve was open for a longer period after shut-down of the separator. 	<p>Clean gear chamber thoroughly (see 7.4).</p> <p>Replace damaged gear parts: see 8.2 para.5 and 8.5 para.4.</p> <p>Replace oil (see sect. 2).</p> <p>If necessary, change oil more often.</p> <p>Regarding water <u>breaking-in</u>, the following should be kept in mind:</p> <p>Make sure that operating-water valve is always closed during shut-down of the separator. If necessary provide a second shut-off device.</p>
<p>10.1.5. Bowl lock ring is difficult to loosen.</p>	<p>Bowl has not been dismantled regularly (see page 0/3, para. 9).</p>	<p>Block the bowl by putting small wooden wedges between bowl and sediment collector.</p>

10.2. Bowl performance

Troubles	Causes	Remedies
10.2.1. The bowl does not close at all.	1) The amount of operating-water fed to the bowl is insufficient because <ul style="list-style-type: none"> a) the water pressure in the supply line to the operating-water connection is too low, b) the water discharge holes in the top of the operating-water feed 16 (fig. 13/1) are clogged with scale. 	a) Check water pressure in the supply line which should be at least 18,5 psi. Throttle valve b (fig. 5/3) to the effect that about 450 litres/h of operating water are fed to the separator. For a short period of time after each partial ejection the flow rate of the water passing through the valve for sealing water must total 900 litres/h. Measure amount of water discharging from the frame drain. b) Clean discharge holes.
	2) The valve 3 in bowl bottom (fig. 19) is leaky or clogged.	Remove valve (see 4.5). Replace damaged gaskets and clean the valve.
	3) Strainer G (fig. 5/3) in the filter is dirty.	Clean the strainer.
	4) Gasket 5 (fig. 19) in the sliding piston is damaged or its edges have been frayed through the up and down movement of the piston.	Replace damaged gasket. If, however, only the edges of the gasket are frayed and the gasket is not damaged otherwise, it can be re-used after grinding it off with an emery wheel.
	5) Gasket 21 (fig. 13/1) is damaged or has not been inserted.	Replace or insert gasket.
	6) The operating-water feed is clogged.	Clean operating-water feed or replace it.
10.2.2. The bowl does not close and open properly.	1) Gasket in sliding piston does not fit properly at all points of the guide surfaces, thus failing to seal properly.	If necessary, stretch gasket. Before installing the gasket, <u>lightly</u> grease groove in sliding piston (see 4.1., no. 6).
	2) Gasket 14 (fig. 19) in bowl top is damaged.	Replace gasket (see 4.4).

Troubles	Causes	Remedies
<p>10.2.2. The bowl does not close and open properly (cont'd.).</p>		
	<p>4) Gasket 9 (fig. 19) has not been inserted in hub of bowl bottom.</p>	<p>Insert gasket in hub of bowl bottom.</p>
	<p>5) Gasket 5 (fig. 19) in sliding piston is uneven in height.</p>	<p>Replace gasket. The differences in height on a gasket must not exceed 0.25 mm.</p>
	<p>7) The solenoid valve does not function properly because the diaphragm has become brittle and, therefore, fails to seal properly.</p>	<p>Install a new diaphragm. Make sure that hole on outer rim of diaphragm lies over hole of valve housing.</p>
<p>10.2.3. The bowl does not open at all or not completely.</p>	<p>1) Dry dirt or rubber particles have settled between sliding piston and bowl bottom.</p>	<p>Clean bowl parts. Round off edges of gaskets. Replace damaged gaskets. Grease guide surfaces with the special lubricating paste supplied.</p>
	<p>2) The sealing chamber 2 (fig. 5/1c) is soiled.</p>	<p>Remove sliding piston 3 and clean sealing chamber.</p>
	<p>3) Valve in bowl bottom is clogged.</p>	<p>Remove valve (see 4.5) and clean it.</p>
	<p>4) The solenoid valve does not function properly because the diaphragm has become brittle and, therefore, fails to seal properly.</p>	<p>Install a new diaphragm. Make sure that hole on outer rim of diaphragm lies over hole of valve housing.</p>

L I S T O F P A R T S
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IMPORTANT!

When ordering parts, please state the following:

- | | |
|--------------------|---|
| 1) Model | |
| 2) Serial-No. | of the Separator: |
| | Both designations are shown on the name-plate of the separator. The Serial-No. also appears on the rim of the sludge collector. |
| 3) Description | |
| 4) Part-No. | of the part to be replaced: |
| | For details, see List of Parts. The Part-No. is also shown on all major parts. |
| 5) Bowl Serial-No. | (only required when ordering bowl parts): |
| | The Bowl Serial-No. appears, in large figures, on bowl lock ring and on bowl bottom. |

Part-Nos. ending with letter "L" (e.g. 3158-1021-L) designate parts which are available in different designs for the separator concerned. To ensure correct delivery of these parts, Model and Serial-No. of the Separator MUST be stated.

Frame Parts
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No. in Fig.	Part - No.	Qty.	Part Description	
1	1169-1018-000	1	Sediment collector	
2	0007-2320-750	1	Gasket 45/55x5	
3	0013-0404-400	2	Cap nut M8 DIN 1587	
4	1169-1183-000	1	Plug	
5	0017-2580-750	1	Gasket 42/2,5	
6	0007-2212-750	1	Gasket G65 DIN 11851	
7	0013-2846-300	1	Grooved coupling nut F 65 DIN 11851	
8	1169-1177-010	1	Bend	
-	3182-3090-L	1	* Motor with protective cover (9a-d) (depending on operating voltage)	
9a	0019-0205-300	1	Square-headed screw M12x15 (on motor shaft) * Loher 3-phase AC motor, Type A160LA-4 B5, 15 kW, 50 cycles Lens-head screw AM 8x15 DIN 85 Protective cover	
9b	5990-7155-L	1		
9c	0019-2523-400	6		
9d	3182-1260-000	1		
-	1169-1021-000	1	Flange assembly (10a-k)	
10a	1169-1475-030	1	Cover Allen screw M 12x80 DIN 912 Lock washer A12 DIN 127 Hex head screw M 6x10 DIN 933 Hexagon nut M 16 DIN 934 Lock washer A 16 DIN 127 Stud M 16x45 DIN 939 Flange	
10b	0019-6175-150	6		
10c	0026-1328-190	6		
10d	0019-6839-300	4		
10f	0013-0282-400	4		
10g	0026-1330-190	4		
10h	0019-7727-090	4		
10k	1089-1028-010	1		
11	see page 13/4	1		Foot assembly (see fig. 13/3)
12	1169-1006-000	1		Lower section of frame
13	0019-6165-400	8	Allen screw M 12x30 DIN 912	
14	0004-2286-400	8	Gasket 12,7x18x1,5	
15	0007-2693-750	1	Gasket 562/572x5	
16	1169-1219-000	1	Operating-water feed	
17	0019-6124-400	8	Allen screw M 8x25 DIN 912	
18	0026-1325-190	8	Lock washer A8 DIN 127	
19	0007-2035-750	1	Gasket 280/3	
20	0007-2808-840	1	Gasket 545/563x9,8	
21	0007-2507-750	1	Gasket 16/3,5	
22	1169-1074-000	1	Bush	
23	0007-2208-750	1	Gasket G25 DIN 11851	
24	0006-4115-160	3	Cylindrical pressure spring	
25	0026-1371-400	3	Washer 13 DIN 125	
26	0019-6985-300	3	Hex head screw M 12x10 DIN 933	
-	1087-1043-010	2	Brake assembly (27a-h)	
27a	0021-3536-300	2	Brake housing Gasket 13/25x2 Brake bolt Handle Cylindrical pressure spring ** Cylindrical pin 6h8x14 DIN 7 ** Brake lining ** Countersunk rivet 4x13 DIN 661 (for 27h)	
27b	0004-1872-720	2		
27c	1087-1031-000	2		
27d	0021-3515-300	2		
27f	0006-4337-160	2		
27g	0026-1086-030	2		
27h	0021-4101-880	2		
-	0026-1262-550	8		
28	0019-3973-060	2		Threaded pin M 8x10 DIN 438
29	1087-1166-000	1		Protective cover
30	1159-1118-000	1	Baffle	

* When ordering this part, please state also voltage and frequency.

** This part is included in brake bolt 27c, but it is also available as separate item.

Frame Parts

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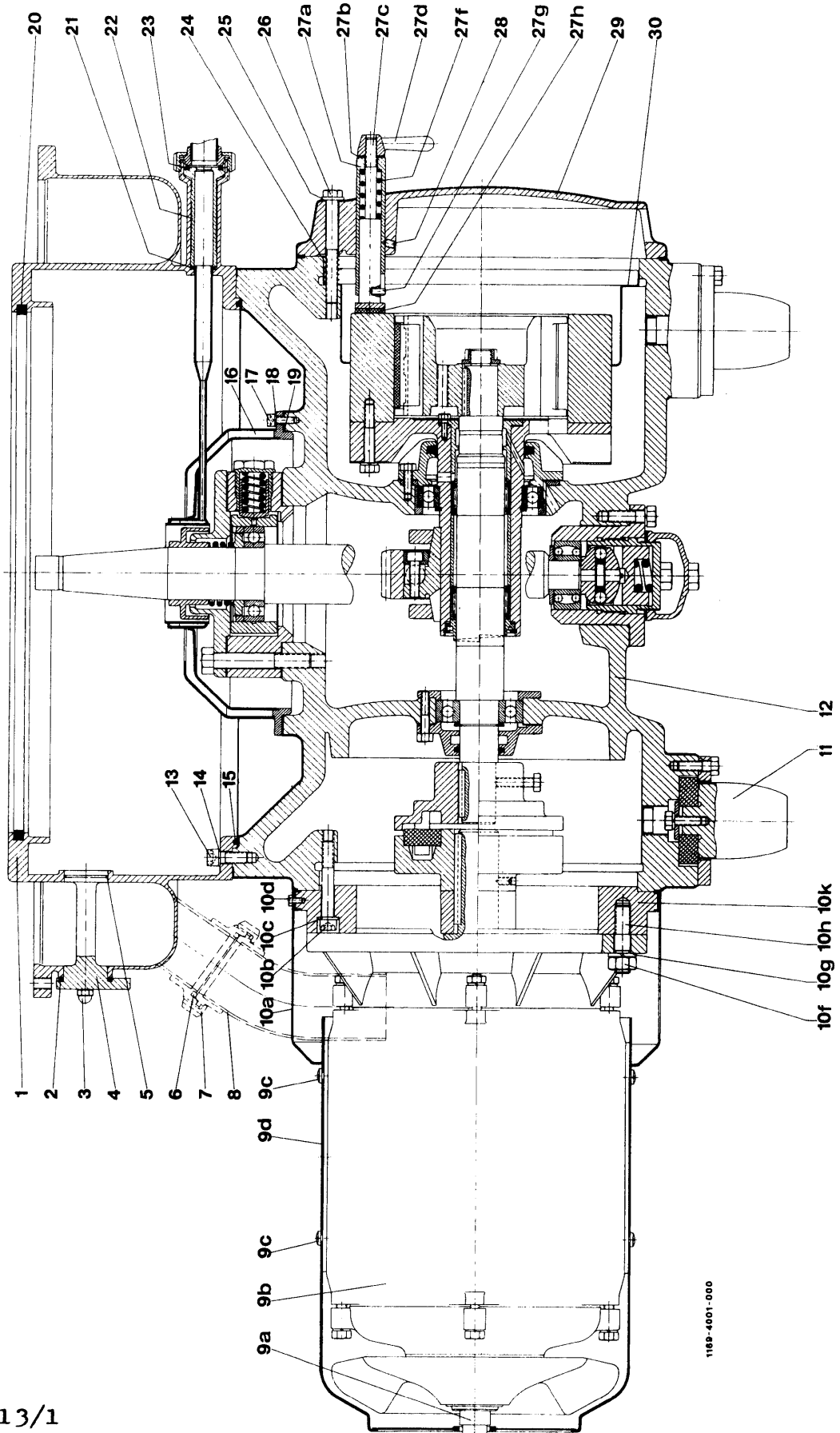


Fig. 13/1

1169-4001-000

Frame Parts

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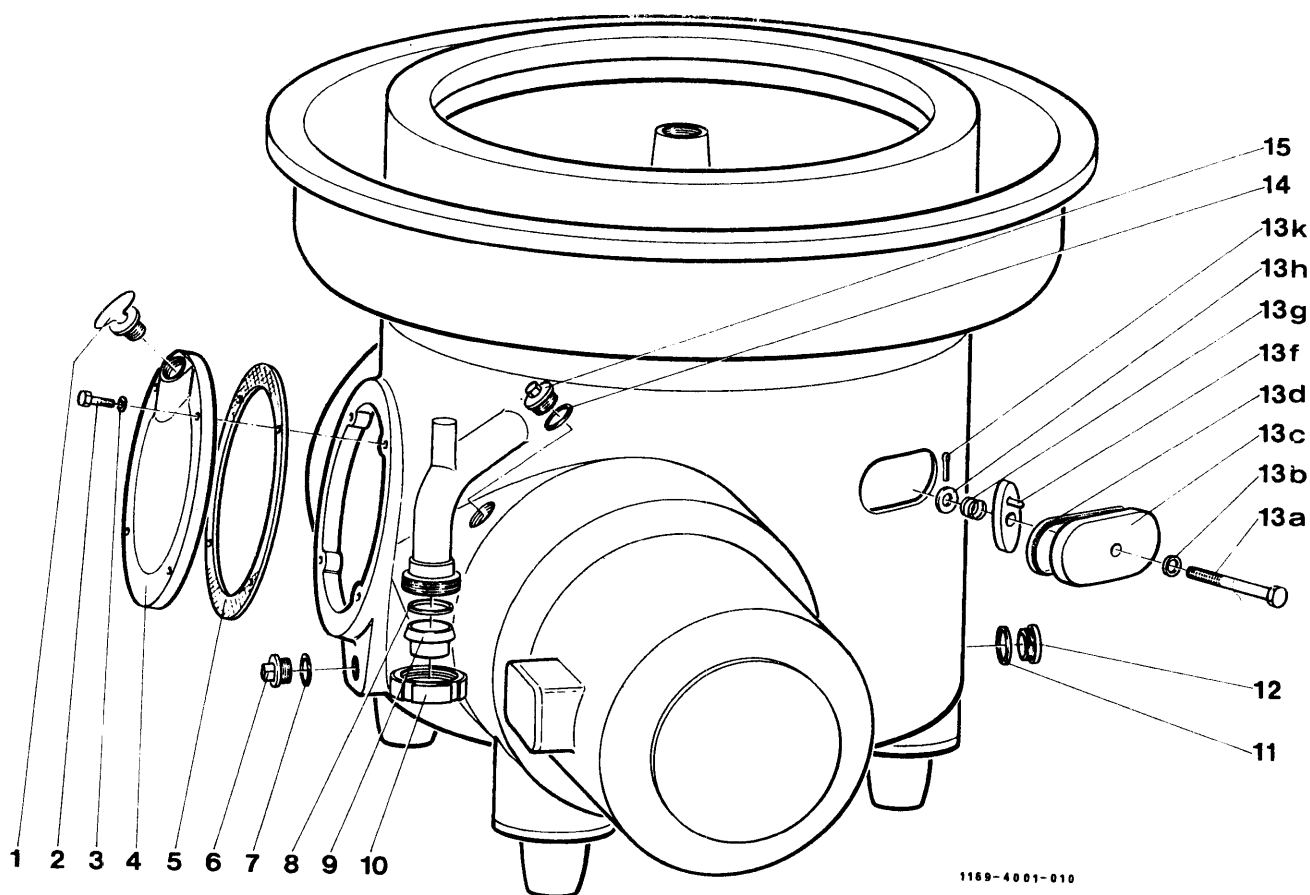


Fig. 13/2

No. in Fig.	Part - No.	Qty.	Part Description
1	0019-1741-800	1	Oil fill screw
2	0019-6971-400	4	Hex head screw M 12x35 DIN 933
3	0026-1371-400	4	Washer 13 DIN 125
4	1087-1004-010	1	Gear chamber cover
5	0004-5631-700	1	Gasket 188x294x1
6	0019-0291-640	1	Oil drain screw
7	0004-1874-710	1	Gasket 17/28x2
8	0007-2210-750	1	Gasket G 40 DIN 11851
9	0018-3949-300	1	Cone connection D 40 DIN 11851
10	0013-2844-300	1	Grooved coupling nut F 40 DIN 11851
11	0004-5034-760	1	Gasket 35/44x1,5
12	0001-0006-640	1	Sight glass
-	1087-1060-010	1	Inspection cover (13a-k)
13a	0019-0075-550	1	Hex head screw M 10x75
13b	0004-1868-710	1	Gasket 10/18x1
13c	1087-1061-010	1	Inspection cover
13d	0004-2360-918	1	Packing cord 5x5x335
13f	1087-1071-000	1	Locking bar
13g	0006-4112-160	1	Cylindrical pressure spring
13h	0026-1369-000	1	Washer
13k	0026-1003-000	1	Split pin
14	0007-2229-750	1	Gasket 40/48x5
15	0019-1548-400	1	Lock screw (Eupex coupling)

Foundation Frame and Foot

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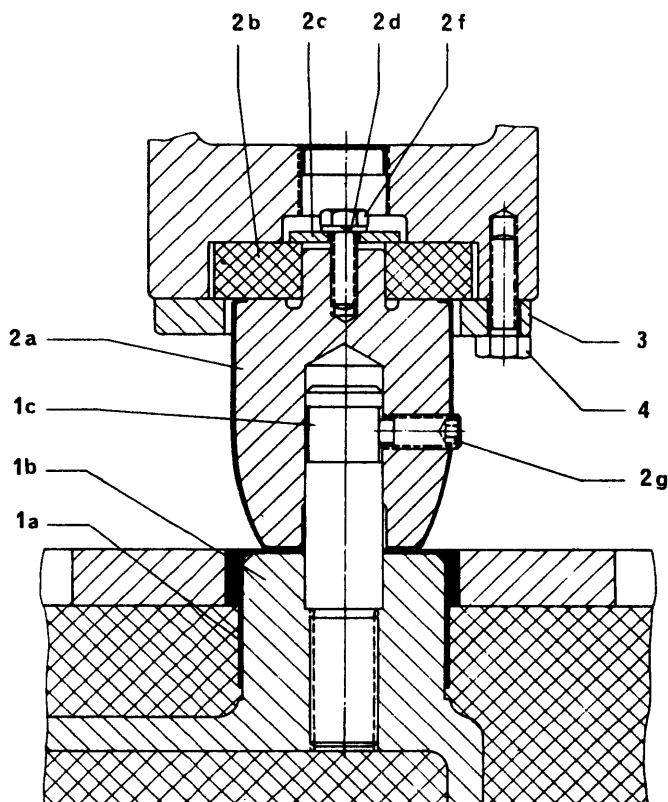


Fig. 13/3

No. in Fig.	Part - No.	Qty.	Part Description
-	1087-1020-000	1	Foundation frame assembly (1a-c)
1a	0026-2031-300	3	[Cap Foundation frame Bolt
1b	1087-1003-000	1	
1c	1087-1033-000	3	
-	1087-1015-000	3	Foot assembly (2a-g) (see also fig. 13/1, no. 11)
2a	1087-1011-000	3	[Foot, stainless steel coated Rubber cushion Washer Lock washer Hex head screw M 10x30 DIN 933 Threaded pin AM 12x28 DIN 915
2b	0021-3018-750	3	
2c	0026-5500-030	3	
2d	0026-1337-170	3	
2f	0019-6937-400	3	
2g	0019-6387-400	3	
3	0001-0516-300	3	
4	0019-6937-400	9	Hex head screw M 10x30 DIN 933

Vertical Gear Parts

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No. in Fig.	Part - No.	Qty.	Part Description
-	1169-3429-000	1	Worm spindle assembly (50 cycles) (1a-h)
1a	1169-3420-000	1	* [Worm spindle Spindle cap Cylindrical pressure spring Ball bearing protection ring 55 Grooved ball bearing 6211 P6 DIN 625 Ball bearing protection ring 30 Pendulum ball bearing 2306 M/P6 DIN 630
1b	0008-5501-610	1	
1c	0006-4255-160	1	
1d	0008-5508-050	1	
1f	0011-6211-110	1	
1g	0008-3008-010	1	
1h	0011-2306-030	1	
2	1087-1112-000	1	
3	0004-1830-770	1	Gasket 104/150 x 0,3
4	0004-5313-740	1	Gasket 72/92 x 2
5	0010-5803-200	1	Bottom bearing cap
-	0008-5500-030	1	Neck bearing bridge assembly with covering (6a-n)
6a	0008-5502-200	1	[Neck bearing protection cap Distance ring Hex head screw M 16x100 DIN 931 Gasket 135/218 x 0,3 Neck bearing bridge assembly (6f-m) Neck bearing pressure ring Threaded plug Set of neck bearing springs Spring piston Neck bearing bridge Gasket 148/218 x 0,3
6b	0008-5509-050	1	
6c	0019-6616-150	3	
6d	0004-5190-770	1	
-	0008-5510-090	1	
6f	0008-5507-090	1	
6g	0019-1426-150	6	
6h	0006-4382-060	1	
6k	0026-5724-130	6	
6m	0008-5506-080	1	
6n	0004-5191-770	1	
-	0010-5800-030	1	Bottom bearing assembly (7a-f)
7a	0010-5810-040	1	[Set of bottom bearing running parts Snap ring Bottom bearing pressure piece Cylindrical pressure spring Bottom bearing threaded piece
7b	0026-1480-170	1	
7c	0010-5801-200	1	
7d	0006-4272-160	1	
7f	0010-5802-020	1	
8	0026-1328-190	3	Lock washer A 12 DIN 127
9	0019-6972-400	3	Hex head screw M 12x40 DIN 933

* When worm spindle needs replacement, it is recommended that the entire worm wheel assembly with clamp plates, no. 10, (fig. 15/1) be replaced at the same time, since the latter will no longer be in perfect condition either and can thus cause premature wear to the new worm spindle.

Vertical Gear Parts

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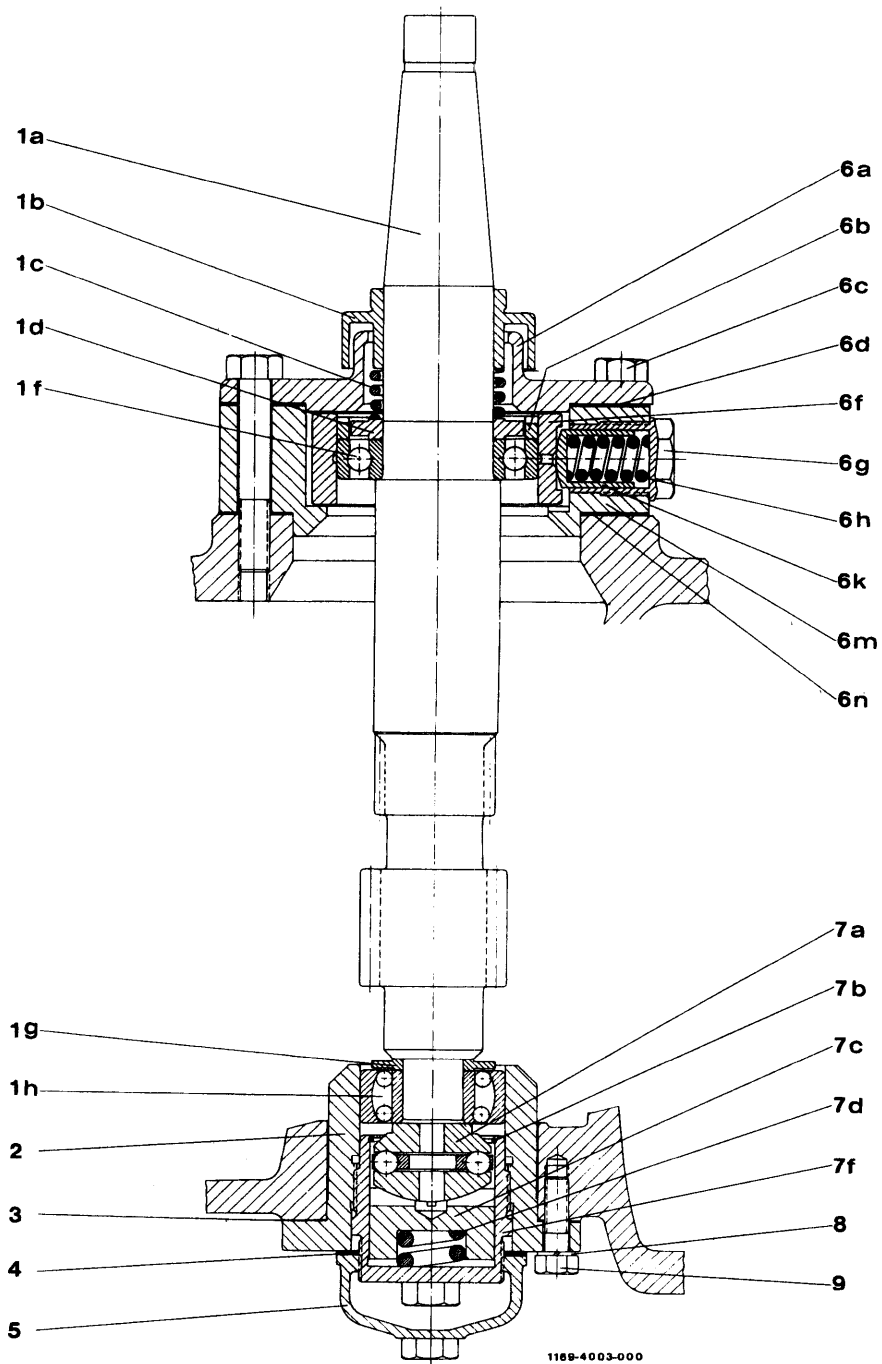


Fig. 14

Horizontal Gear Parts

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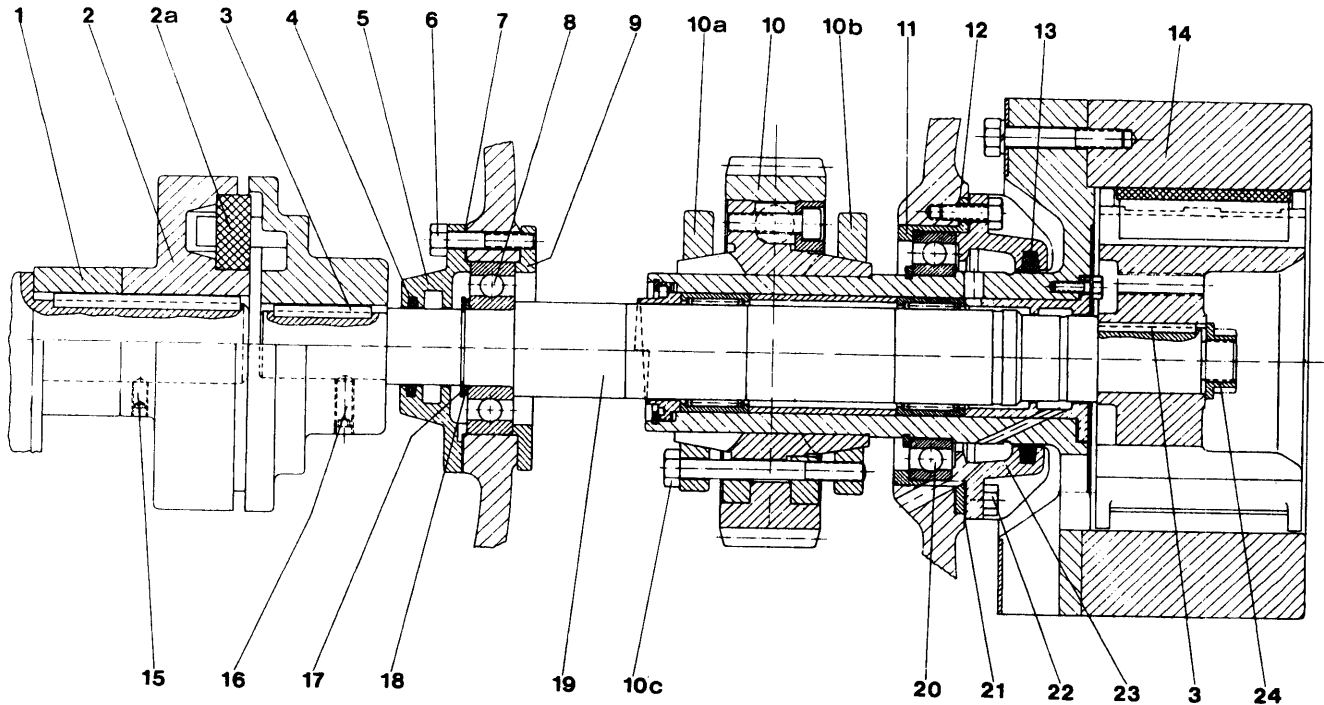


Fig. 15/1

1169-4003-010

No. in Fig.	Part - No.	Qty.	Part Description
1	1169-3403-000	1	Distance ring
2	1169-3390-000	1	Eupex Coupling
2a	2308-3393-010	6	* Driver
3	0026-1741-160	2	Key
4	0004-1953-830	1	Felt ring 40/DIN 5419
5	1089-3375-000	1	Bearing cover
6	0019-6910-150	3	Hex head screw M 8x45 DIN 933
7	0004-2503-770	1	Gasket 91/129 x 0,3
8	0011-6308-000	1	Grooved ball bearing 6308 DIN 625
9	1089-3433-000	1	Pressure ring
10	1087-3449-060	1	Worm wheel assembly with clamp plates
10a	1087-3446-000	1	** Clamp plate (without thread)
10b	1087-3447-000	1	** Clamp plate (with thread)
10c	0019-6523-150	4	** Hex head screw M10x95 DIN 931
11	1087-3131-000	1	Bearing housing
12	0004-2662-770	1	Gasket 136/166x0,3
13	0004-1967-830	1	Felt ring 90/111x9,5
14	see page 15/2	1	Centrifugal clutch (see fig. 15/2)
15	0019-8974-150	1	Threaded pin AM 8x15 DIN 914
16	0019-8984-150	1	Threaded pin AM 10x25 DIN 914
17	0026-5869-170	1	Securing ring 40x1,75 DIN 471
18	0026-2911-000	1	Ring
19	1089-3400-000	1	Worm wheel shaft
20	0011-6017-110	1	Grooved ball bearing 6017 P6 DIN 625
21	0004-2660-740	1	Gasket 130/170 x 1
22	0019-6906-150	4	Hex head screw M 8x25 DIN 933
23	1087-3375-000	1	Bearing cover
24	0013-3135-110	1	Nut M 22x1,5 (SW 27)

* This part is included in Eupex coupling, no. 2, but it is also available as separate item.

** This part is included in worm wheel assembly with clamp plates, no. 10, but it is also available as separate item.

When worm wheel is worn and needs replacement, it is recommended that worm spindle 1a (fig. 14) be replaced at the same time (refer to sect. 8.6, no. 4).

Centrifugal Clutch

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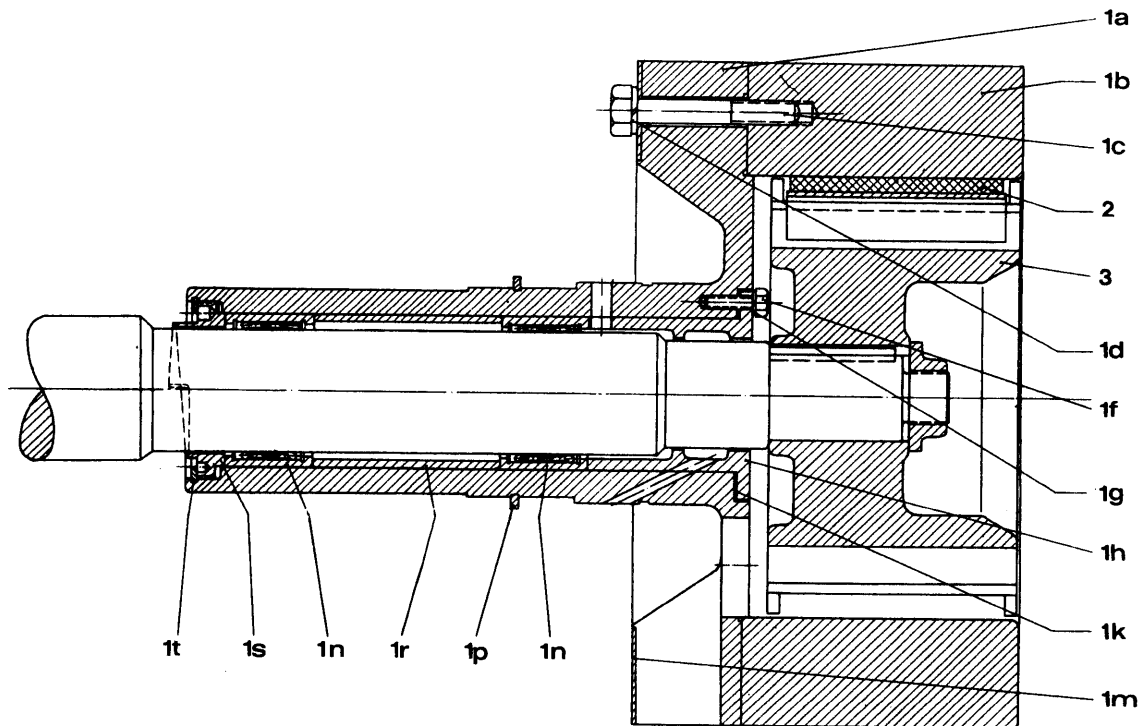


Fig. 15/2

No. in Fig.	Part - No.	Qty.	Part Description
-	1087-3385-000	1	Centrifugal clutch, complete (1a-3) (see also fig. 15/1, no. 14)
-	1087-3370-000	1	Clutch drum assembly (1a-t)
1a	-	1	* Clutch drum
1b	-	1	* Ring
1c	0019-6517-150	8	Hex head screw M 10x65 DIN 931
1d	0026-1337-170	8	Lock washer
1f	0019-6452-150	3	Hex head screw M 6x20 DIN 931
1g	0026-1324-170	3	Lock washer
1h	1087-3404-000	1	Sleeve
1k	0004-2461-700	1	Gasket 62,5/85,5 x 1
1m	-	1	* Washer
1n	0011-5053-150	2	Needle bearing NK 50/35 C 14 (without inner ring)
1p	0026-5878-170	1	Securing ring (for ball bearing)
1r	0026-5995-060	1	Distance sleeve
1s	1087-3373-000	1	Threaded ring
1t	0026-5839-170	1	Securing ring
2	1087-3397-000	6	Clutch shoe
-	0021-3172-890	6	** Clutch lining
-	0026-5591-550	24	** Rivet C 5x10 DIN 7338
3	1087-3468-000	1	Clutch driver

* This part is not available individually, but only assembled with the parts 1a-t.

** This part is included in clutch shoe, no. 2, but it is also available as separate item.

Tachometer Drive and Tachometer
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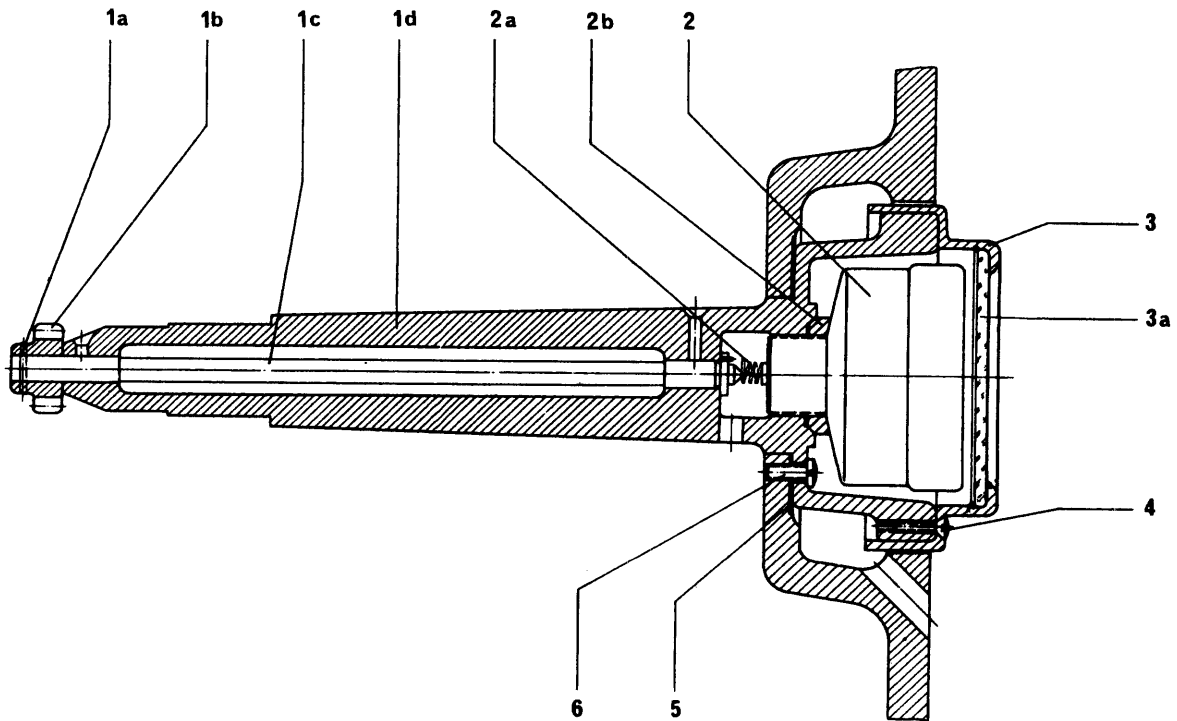


Fig. 15/3

No. in Fig.	Part - No.	Qty.	Part Description
1	1087-3490-000	1	Tachometer drive assembly (1a-d)
1a	0026-1561-120	1	Cylindrical notched pin 2,5x16 DIN 1473
1b	3037-3483-000	1	
1c	1087-3485-000	1	
1d	1087-3493-000	1	
2	8473-3000-050	1	Tachometer, complete
2a	0006-4013-160	1	* Cylindrical pressure spring
2b	0004-1974-830	1	* Felt ring 29/40 x 10
-	0001-0050-820	1	* Sight glass
3	1087-3494-000	1	Cap, complete
3a	0001-0058-800	1	* Sight glass
4	0019-3220-630	3	Lens head screw AM 4x12 DIN 91
5	0004-5212-700	1	Gasket 58/82 x 1
6	0019-2250-030	3	Cylindrical screw AM 6x18 DIN 84

* This part is included in the previous "complete" part, but it is also available as separate item.

Hood

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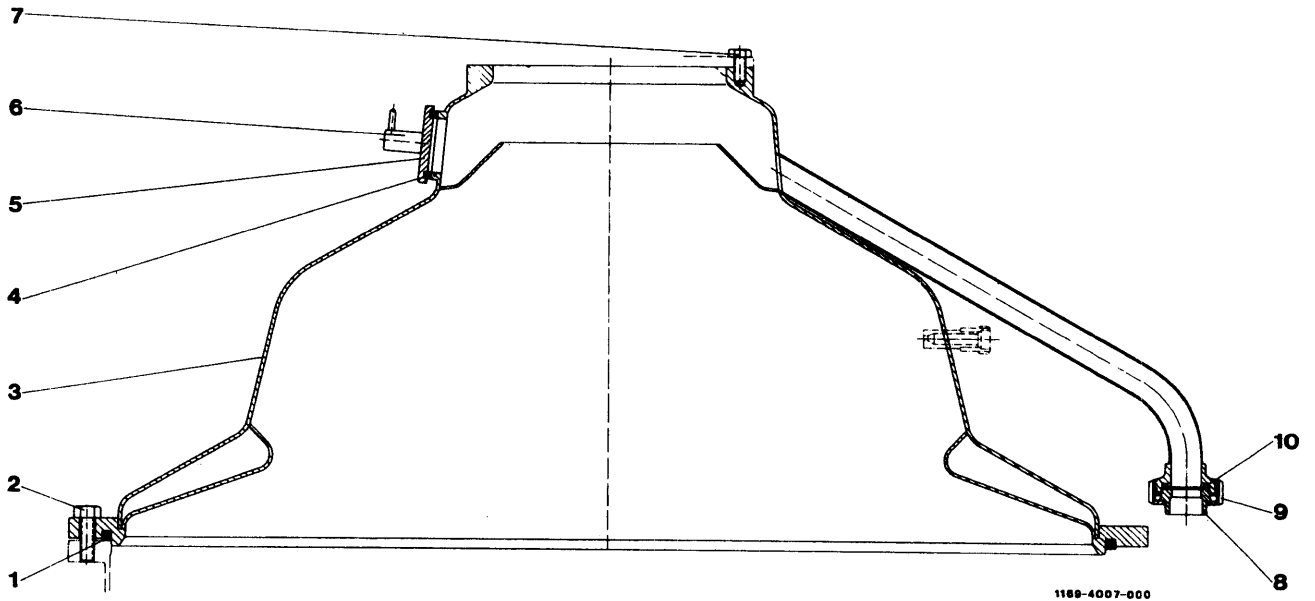


Fig. 16/1

No. in Fig.	Part - No.	Qty.	Part Description
-	1169-7759-000	1	Hood assembly (1-10)
1	0004-2364-758	1	Packing cord 8x8x2620
2	0019-6970-400	8	Hex head screw M 12x30 DIN 933
3	1169-7765-000	1	Hood
4	0007-2262-750	1	Gasket 45/57x6
5	1165-1061-000	1	Inspection cover
6	0013-2646-300	2	Cap nut M10
7	0019-6933-400	4	Hex head screw M 10x20 DIN 933
8	1165-2775-000	1	Siphon
9	0013-2842-300	1	Grooved coupling nut F 25 DIN 11851
10	0007-2208-750	1	Gasket G 25 DIN 11851

Operating-water connection

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No. in Fig.	Part - No.	Qty.	Part Description	
-	1165-2350-000	1	Pressure switch assembly (1-2)	
1	0005-0675-900	1	[Pressure switch F5 Low-pressure hose 6x600 Gasket 13/19 Ø x 1,5 Hex head screw R 1/4"x12] for closing the pipe, if no pressure switch is to be installed	
2	0018-1870-000	1		
-	0004-5268-880	1		
-	0019-0137-300	1		
-	8134-2100-210		Operating-water connection with Protecting case (3-31)	
3	8134-2355-010	1	Protecting case Pipe clamp Hex head screw M 6x15 DIN 933 Washer Hexagon nut M 6 DIN 934 Pipe line Gasket 17/23x3 Operating-water connection, complete (6-29f) Pressure gauge Gasket 13/19x1,5 Hex head screw R 1/4" x 12 Threaded connection R 3/4" / R 3/8" Plug 3/8" - T9 DIN 2950 Plug 1/2" - T9 DIN 2950 Connection piece Double nipple 3/8" Gasket 17/23,5x1 Upper part of valve 1/2" DIN 3519 Gasket 17/24x2 Reducing nipple 1/2" / 3/8" Threaded plug R 3/4" x 12 Ball-type valve 1/2" Threaded connection R 3/4" - R 1/2" Threaded connection R 3/4" - R 3/8" Gasket 15,5/21,5x1,5 Connection piece 10/R 3/8" Hexagon coupling nut R 3/4" Straight-way diaphragm valve Connection piece Threaded connection 25/R1" Gasket G 25 DIN 11851 Pipe line assembly (29a-f) Bend 25/R1" Sediment collector Threaded connection 25/R1" Gasket G 25 DIN 11851 Grooved coupling nut F 25 DIN 11851 Grooved coupling nut F 25 DIN 11851 Cone connection D 25 DIN 11851	
-	1165-2210-000	4		*
-	0019-6841-400	8		*
-	0026-1343-300	8		*
-	0013-0276-300	8		*
4	8134-2201-030	1		
5	0007-2402-750	1		
-	8134-2099-050	1		
6	0001-0298-640	1		
7	0004-5268-880	4		
8	0019-0137-300	2		
9	0018-4645-300	1		
10	0018-0989-300	2		
11	0018-0990-300	1		
12	8134-2193-030	1		
13	0018-0961-640	3		
14	0004-5285-760	4		
15	0018-1299-640	3		
16	0007-2024-750	3		
17	0018-1786-640	1		
18	0019-0641-400	1		
19	0018-1710-640	1		
20	0018-4646-300	1		
21	0018-4645-300	3		
22	0007-2188-750	4		
23	0018-3854-300	4		
24	0013-2818-400	4		
25	see page 17/3	3		
26	8134-2194-020	1		
27	0018-4086-400	1		
28	0007-2208-750	1		
-	8134-2201-010	1		
29a	0018-1609-300	1		
29b	0018-2525-630	1		
29c	0018-4502-300	1		
29d	0007-2208-750	1		
29f	0013-2842-300	1		
30	0013-2842-300	1		
31	0018-3939-300	1		

* This part is included in protecting case 3, but it is also available as separate item.

Operating-water connection

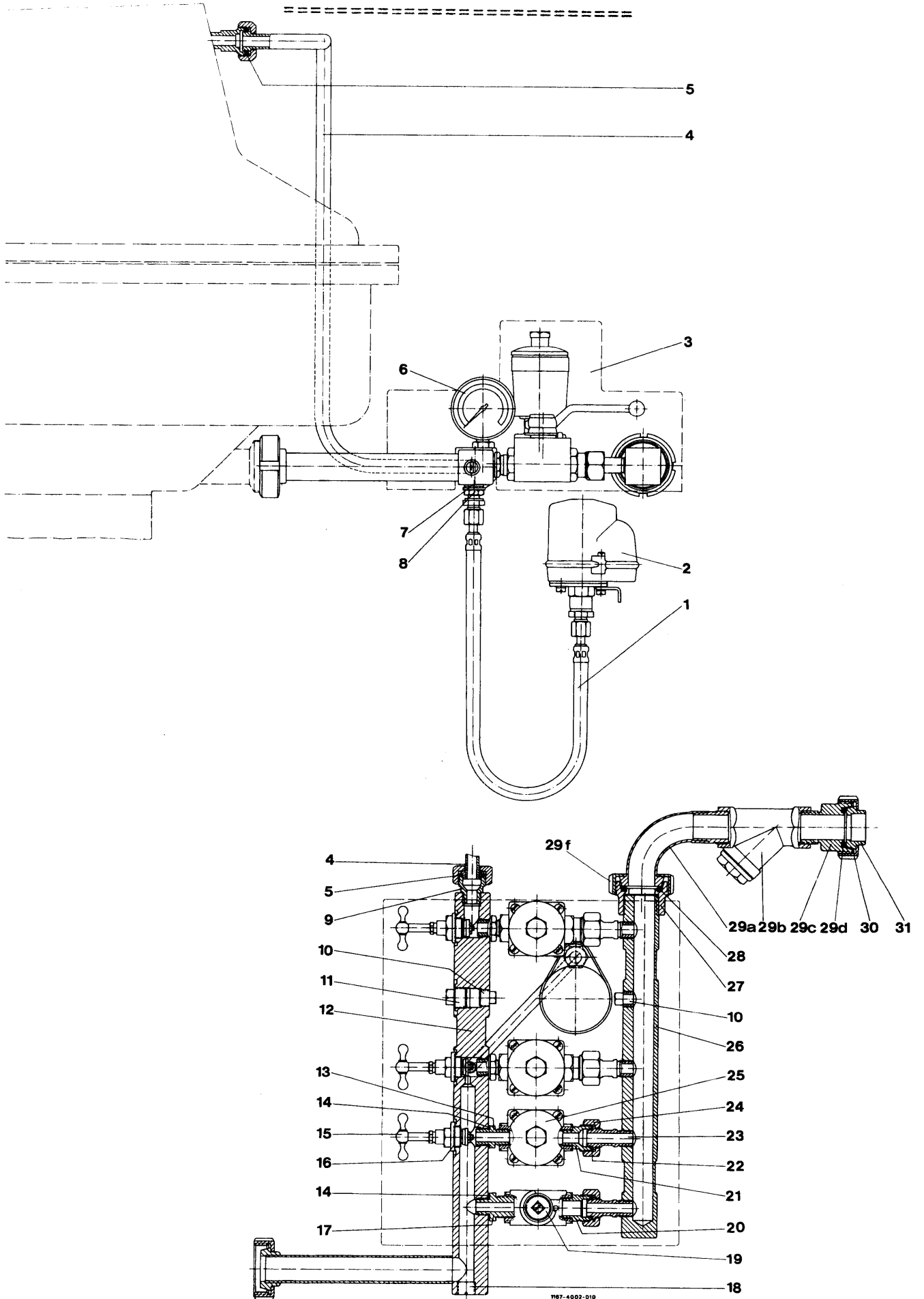
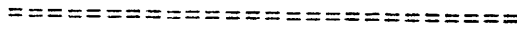


Fig. 17/1

Straight-way Diaphragm Valve 3/8"
 =====

No. in Fig.	Part - No.	Qty.	Part Description
-	0018-4445-500	1	Straight-way diaphragm valve, complete, 3/8" (1-19)
1	0018-1988-500	1	Valve housing
2	0018-1989-500	1	Diaphragm
3	0018-1990-500	1	Pilot valve seat
4	0018-1991-500	1	Supporting disc
5	0018-1992-500	1	Valve housing cover
6	0018-1993-500	1	Filter ring
7	0007-2408-750	1	Gasket 22/25 ϕ x 1,5
-	0018-1982-000	1	Magnet core assembly (items 8-9-10)
8	0026-1577-120	1	Notched pin 2,5 x 10
9	0018-2542-750	1	Plug
10	0018-1982-410	1	Magnet core
11	0006-4080-400	1	Pressure spring
12	0018-1980-510	1	Bush
-	0018-4446-830	1	Magnet head, compl., (50 cycles)
-	0018-4446-840	1	Magnet head, compl., (60 cycles)
			Items 13-14-15 } Optional, depending on frequency
13	0005-0202-630	1	Cable gland
14	0018-1954-510	1	Set of two terminals
15	0018-1985-530	1	* Magnet coil (50 cycles)
15	0018-1985-540	1	* Magnet coil (60 cycles)
16	0007-2257-750	1	Gasket 48/51 ϕ x 115
17	0018-1987-500	1	Magnet housing cover
18	0018-1955-520	1	Lock nut
19	0007-1932-750	1	Gasket 12/1,5 ϕ
			} Optional, depending on frequency

* The magnet coil is cast integral with the magnet housing. Therefore, if the coil needs replacement, the complete magnet head assembly (items 13-14-15) will have to be replaced.

Straight-way diaphragm valve R 3/8"
=====

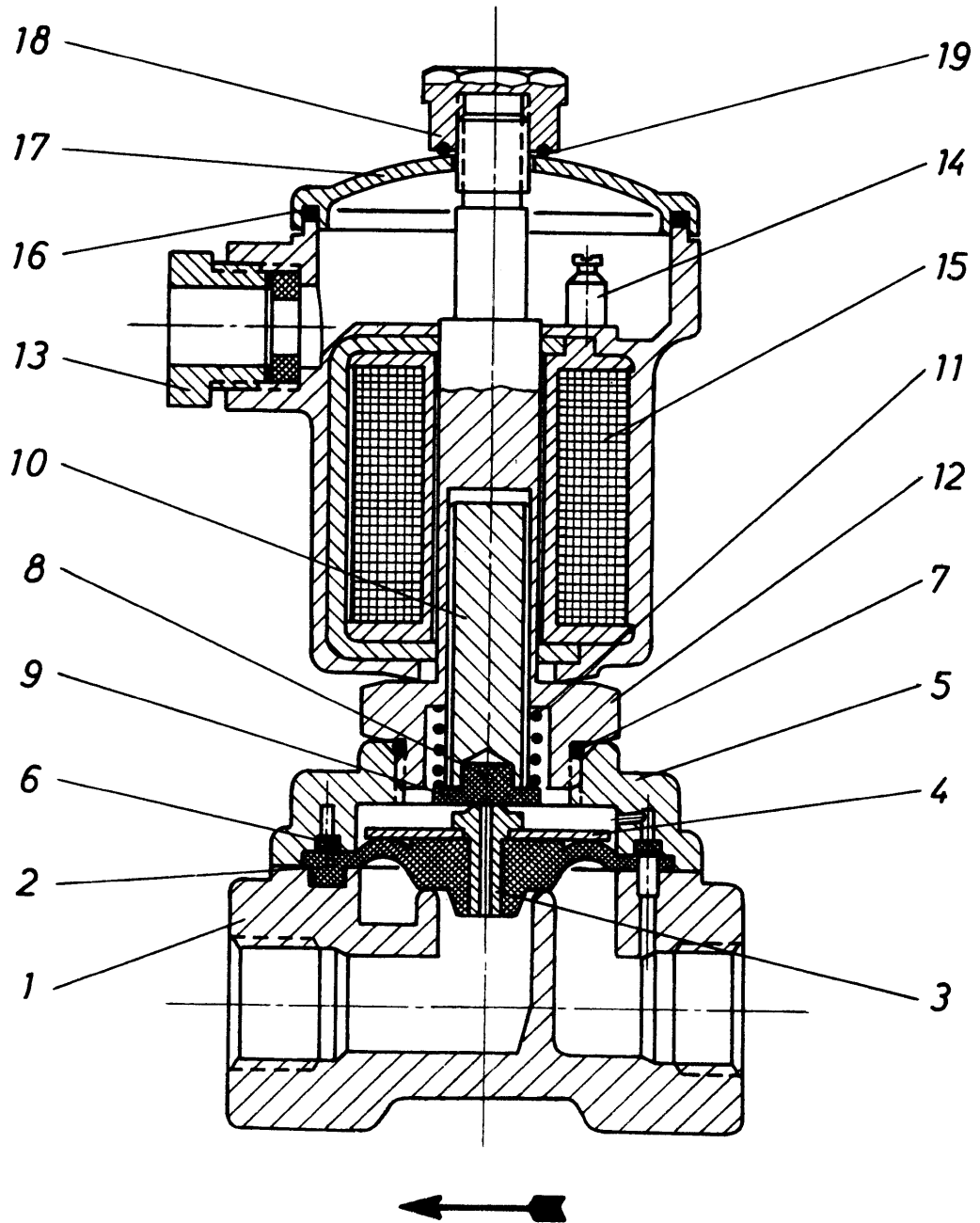
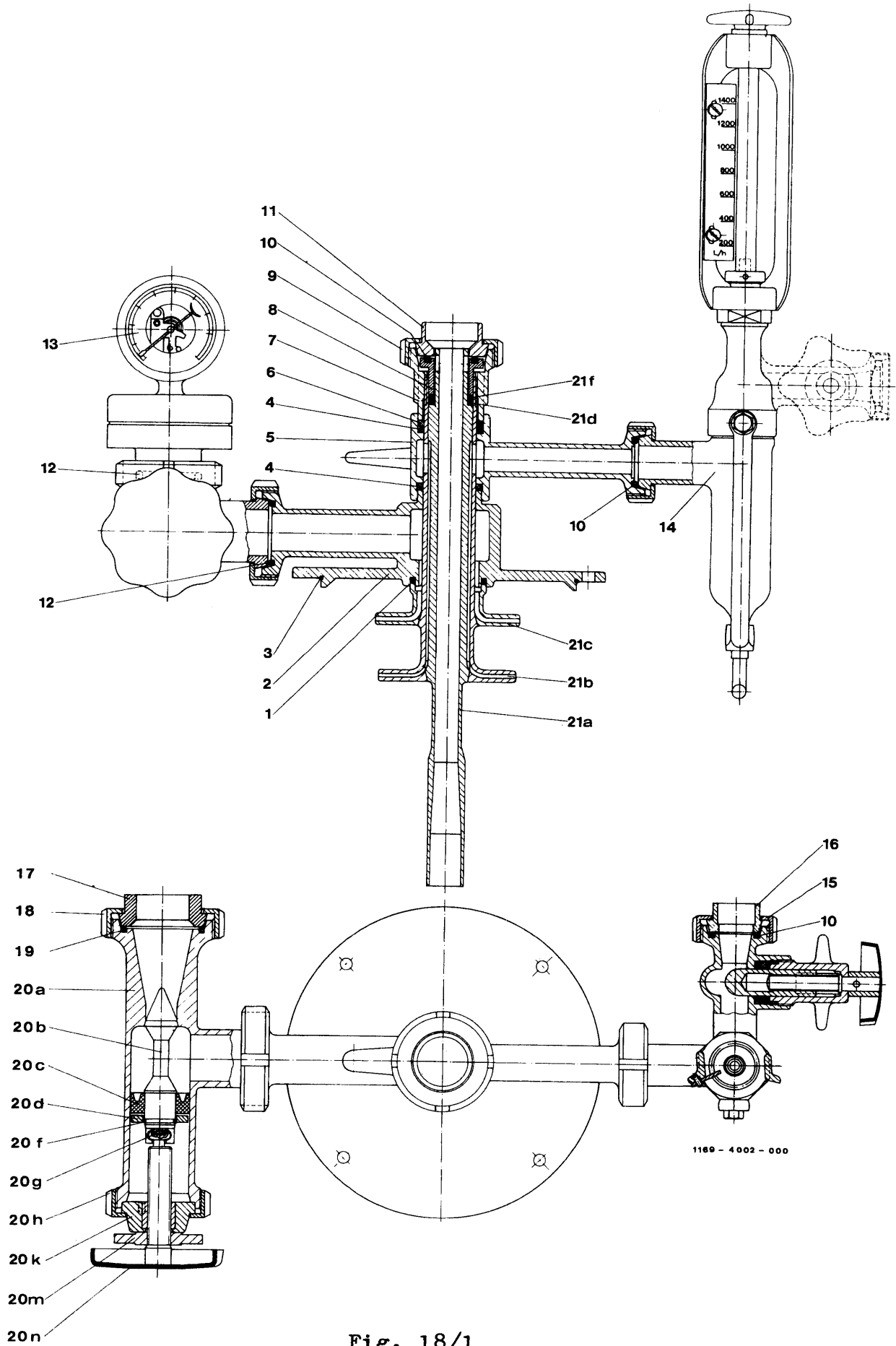


Fig. 17/2

Feed and Discharge Connections and Centripetal Pump
 =====

No. in Fig.	Part - No.	Qty.	Part Description
-	1169-2296-000	1	Feed and discharge connections, complete (1-20n)
1	0007-2226-750	1	Gasket 50/58x5
2	1169-2285-000	1	
3	0007-2555-750	1	
4	0007-2245-750	2	
5	1169-2286-000	1	
6	0007-2245-850	1	
7	1180-2189-000	1	
8	1180-2239-000	1	
9	0013-2844-300	1	
10	0007-2208-750	3	
11	0018-4371-300	1	
12	0007-2210-750	2	
13	8918-2100-050	1	
14	see page 18/3	1	
15	0013-2842-300	1	
16	0018-3939-300	1	
17	0018-3958-400	1	
18	0013-2845-300	1	
19	0007-2211-750	1	
-	1182-2290-000	1	
20a	1182-2291-000	1	
-	1182-2272-000	1	
20b	1182-2278-000	1	
20c	0004-5720-840	1	
20d	1166-2268-000	1	
20f	0026-2118-300	1	
-	1166-2202-000	1	
20g	0026-0057-850	1	
20h	0013-2844-300	1	
20k	1166-2217-000	1	
20m	0013-0085-300	1	
20n	1166-2276-000	1	
-	1169-2213-000	1	Double centripetal pump assembly (21a-f)
21a	1169-2246-000	1	Feed tube
21b	1169-2241-000	1	
21c	1102-2252-140	1	
21d	0007-2651-750	1	
21e	0007-2651-750	1	
21f	0007-2651-850	1	

Feed and Discharge Connections and Centripetal Pump
 =====



1169 - 4 002 - 000

Fig. 18/1

Creammeter (with regulating valve)

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All milk contact parts are made of stainless steel.

Measuring range: 200 - 1400 litres/h

No. in Fig.	Part - No.	Qty.	Part Description
-	8020-2240-010	1	Creammeter assembly (1-23f) (see also fig. 18/1, no. 17)
1	0019-1732-300	1	Handle screw
2	0007-2298-750	2	Gasket 13,5/22 x 10
3	0001-0083-820	1	Cylindrical sight glass
4	0019-1380-300	1	Threaded sleeve
5	0026-1375-300	1	Washer
6	0013-3010-300	1	Nut M 35x1,5
7	8020-2003-170	1	Outlet pipe
8	0007-2209-750	1	Gasket G 32 DIN 11851
9	8020-2001-110	1	Inlet cup
10	8020-2206-010	1	Measuring tube
11	8020-2012-000	1	Float cone
12	0019-0002-640	1	Handle screw
13	8020-2217-000	1	Scale 200-1400 litres/h
14	0004-5261-720	2	Gasket 4,5/8,5 x 1
15	0019-2478-300	2	Cylindrical lens head screw AM 4x8 DIN 85
16	8020-2002-000	1	Intermediate piece
17	0019-0171-640	2	Hex head screw M 12x15
18	8020-2004-000	1	Clamp
19	0007-2208-750	1	Gasket G 25 DIN 11851
20	0007-2285-750	2	Gasket 22/32 x 5
21	0026-5508-300	1	Washer
22	0026-1445-300	1	Snap ring
-	1072-2273-020	1	Valve cone assembly (23a-f)
23a	1072-2279-020	1	Round-slide valve
23b	0019-1590-610	1	Threaded bolt
23c	1072-2284-000	1	Stuffing box housing
23d	0026-1062-400	1	Cylindrical pin 4h8x30
23f	0021-3096-300	1	Handle

Creammeter (with regulating valve)
 =====

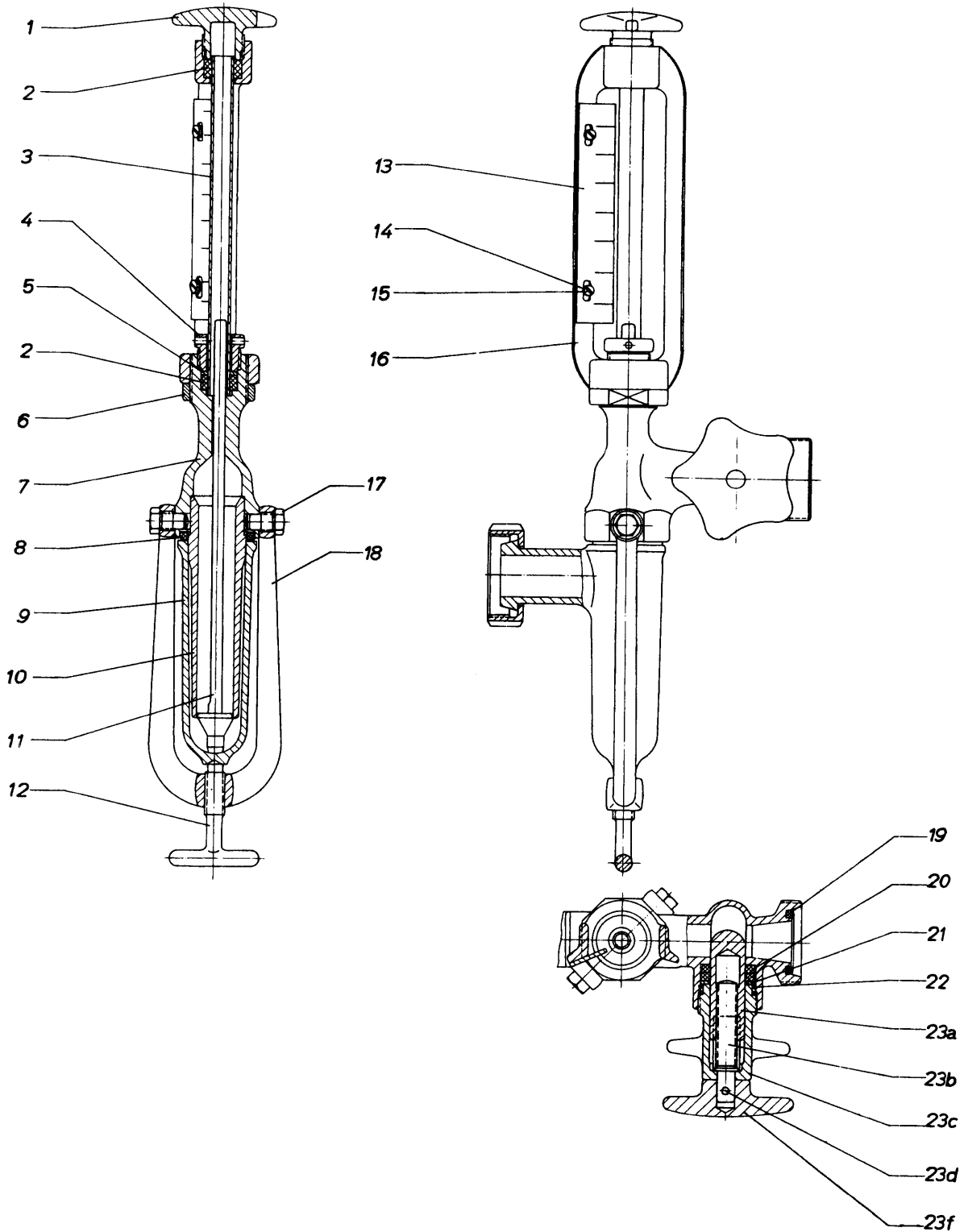


Fig. 18/2

B o w l
=====

No. in Fig.	Part - No.	Qty.	Part Description
-	1169-6600-000	1	Bowl, complete (1-20)
1	0019-1450-400	1	Threaded plug M 42
2	0007-1970-690	1	Gasket 26,5/35x5,25
3	1169-6280-000	1	Valve in bowl bottom (3a-g)
3a	1169-6279-000	1	Plug
3b	1169-6281-000	1	Valve housing
3c	0007-2503-750	1	Gasket 11,3/2,4
3d	0004-5497-280	1	Gasket 16,5h6x2,5
3f	0007-1900-750	2	Gasket 31/2,5
3g	0007-2920-750	2	Gasket 23,3/2,4
4	1169-6501-000	1	* Sliding piston
5	0007-2478-750	1	Gasket 445/465x10
6	1169-6604-000	1	* Bowl bottom, complete
6a	3117-6609-010	1	** Arresting piece
6b	0019-2233-400	1	** Cylindrical screw AM 5x12 DIN 84
7	1169-6631-000	1	* Lock ring
-	1169-6660-000	1	* Set of discs (8a-c)
8a	1169-6662-000	1	Bottom disc
8b	1169-6663-000	10	Disc
8c	1066-6663-120	108	Disc
9	0007-2079-750	1	Gasket 100/10
10	1169-6620-000	1	* Distributor
11	0019-1685-300	1	Threaded bush, complete
11a	0007-1944-750	1	** Gasket 44,2/3
12	0019-0305-400	1	Spindle screw, complete
12a	0007-2392-750	1	** Gasket 19,2/3
13	0007-2631-750	1	Gasket 440/4
14	0007-2967-840	1	Gasket 428,5x11
15	1169-6610-000	1	* Bowl top
16	1033-6670-010	1	Upper disc (specially shaped)
17	1033-6650-000	1	Separating disc
18	1072-6642-130	1	Centripetal pump chamber cover
19	0007-2133-750	1	Gasket 140/152x4
20	1072-6631-070	1	Lock ring

* This part can only be replaced by WESTFALIA or by a special repair shop authorized by WESTFALIA, because of special re-fitting to machine and possible re-balancing of bowl.

** This part is included in the previous "complete" part, but it is also available as separate item.

B o w l

=====

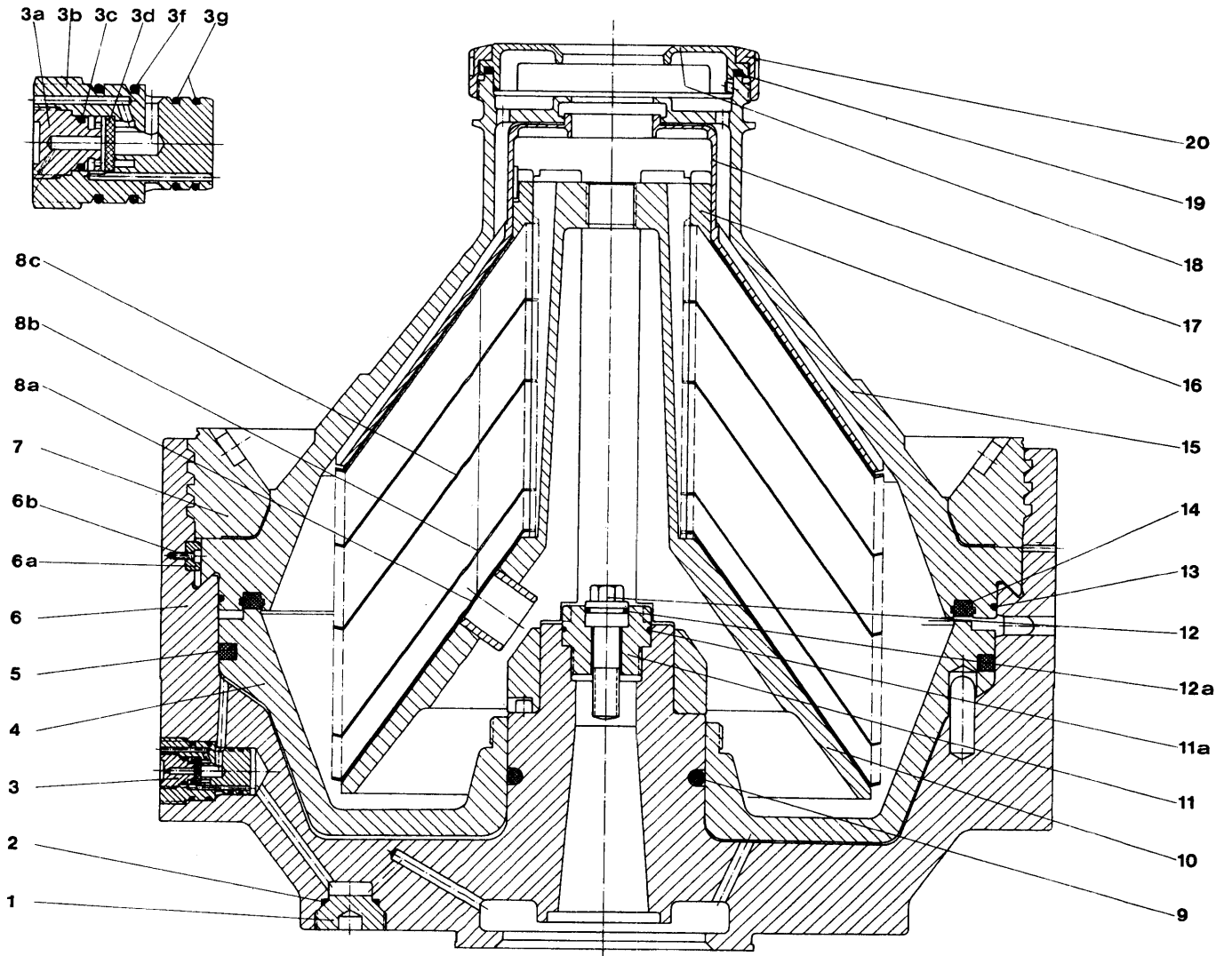


Fig. 19

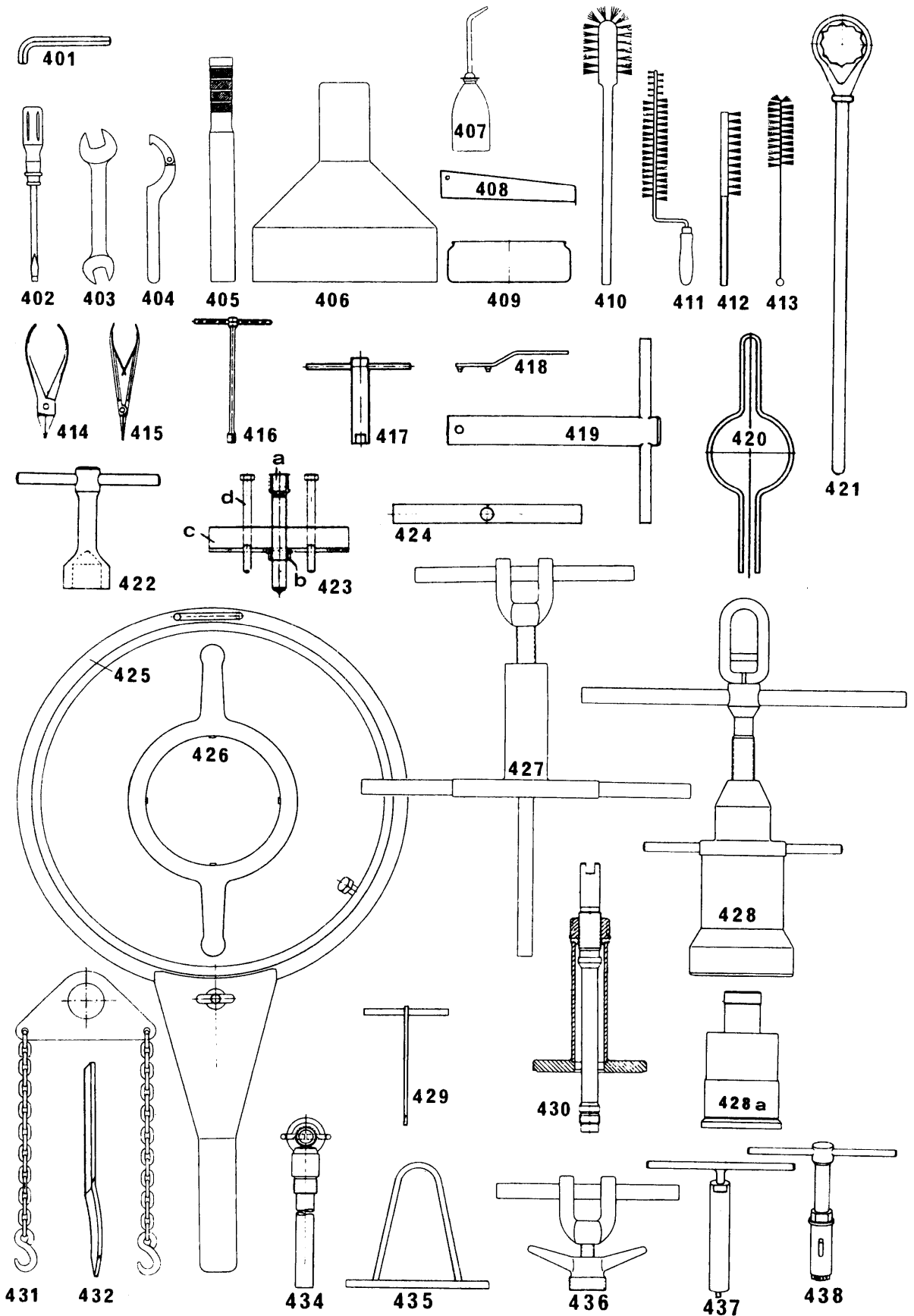
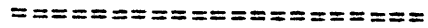
Tools and Accessories
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All the parts mentioned in the packing list furnished with the separator should be found in the packing case.

No. in Fig.	Part - No.	Qty.	Part Description
401	0003-3774-320	1	Allen wrench 4 DIN 911
-	0003-3775-320	1	Allen wrench 5 DIN 911
-	0003-3776-320	1	Allen wrench 6 DIN 911
-	0003-3777-320	1	Allen wrench 8 DIN 911
-	0003-3778-320	1	Allen wrench 10 DIN 911
-	0003-3780-320	1	Allen wrench 14 DIN 911
402	0003-4636-050	1	Screwdriver 5x125
-	0003-4637-050	1	Screwdriver 8x150
403	0003-4202-320	1	Double-ended wrench 10x13 DIN 3110
-	0003-4205-320	1	Double-ended wrench 17x19 DIN 3110
-	0003-4208-320	1	Double-ended wrench 22x27 DIN 3110
-	0003-4209-320	1	Double-ended wrench 24x30 DIN 3110
404	0003-3846-000	1	Pivoted hook wrench
405	0003-0200-000	1	Mallet
406	0003-0298-000	1	Splash cover
407	0003-0256-890	1	Oil gun
408	0003-0400-000	1	Oil filler
409	0003-0277-800	1	Oil cup
410	0003-4695-960	1	Brush 70x100x500
411	0003-4667-800	1	Rotary brush 41/26x213
412	0003-4690-960	1	Brush 50x125x285
413	0003-4544-960	4	Cylindrical brush 15x85x285
-	0003-4552-960	1	Cylindrical brush 45x110x270
414	0003-3710-000	1	Pliers for securing rings
415	0003-3704-000	1	Pliers for securing rings
416	0003-4240-030	1	Hexagon socket wrench 13 DIN 3112
417	0003-4172-030	1	Socket wrench 27
418	0003-4585-000	1	Wrench (for sight glass)
419	3185-9873-000	1	Rolling-up device (for bowl gasket)
420	0003-3466-170	1	Lifting tongs 157 (for bowl top)
421	0003-4297-110	1	Wrench 60 (for disc stack compressing device)
422	0003-4173-030	1	Socket wrench 46,5 (for spindle nut)
423	1087-9910-020	1	Pulling device (423a-d) (for clutch drum and clutch driver)
423a	0019-1840-090	1	[Threaded spindle M 22x1,5x150 Nut M 22x1,5 (SW 27) Puller Hex head screw M 12x140 DIN 601
423b	0013-3135-060	1	
423c	1087-9911-020	1	
423d	0019-5478-050	2	
424	1169-9886-000	1	Pipe (for removal of worm spindle)
425	0003-3003-000	1	Annular wrench (for large lock ring)
426	0003-3992-000	1	Annular wrench (for small lock ring)
427	1169-9930-000	1	Jack (for bowl top)
428	1169-9960-000	1	Jack (for sliding piston)
428a	1169-9805-000	1	* Pressure piece
429	0003-0124-000	1	Wrench (for feed tube)
430	1169-9820-000	1	Disc stack compressing device
431	2301-9970-000	1	Lifting device (for annular wrench)
432	0003-0217-030	1	Chisel
434	1169-9970-000	1	Lifting device
435	1165-9840-010	1	Lifting device (for hood)
436	1169-9930-010	1	Jack (for bowl bottom)
437	1169-9855-000	1	Wrench (for valve in bowl bottom)
438	1169-9895-000	1	Wrench (for valve in bowl bottom)
-	0015-0014-080	5	2,5-litre can of lubricating oil M91 Viscosity at 50°C: 16,5E=125cSt
-	0015-0113-000	2	100-gram tube of lubricating paste (for threaded areas of bowl)
-	0015-0106-060	1	0,5-kg can of ball and roller bearing grease

* This part is included in jack 428, but it is also available as separate item.

Tools and Accessories



1169-4009-000

Fig. 20

Sterilizing Tank
=====

No. in Fig.	Part - No.	Qty.	Part Description
-	1169-9200-000	1	Sterilizing tank assembly (1-31)
1	0013-2845-300	1	Grooved coupling nut F 50 DIN 11851
2	0018-3955-300	1	Cone connection D 50 DIN 11851
3	0007-2211-750	1	Gasket G 50 DIN 11851
4	0013-2842-300	2	Grooved coupling nut F 25 DIN 11851
5	0018-4269-400	1	Cone connection R 1/2"
6	0007-2208-750	2	Gasket G 25 DIN 11851
7	0001-0675-400	1	Angle thermometer
8	1165-9462-000	1	Bush
9	1169-9210-000	1	Sterilizing tank
10	0026-1102-400	6	Cylindrical pin
11	0019-1363-300	6	Hinge screw
12	0021-3128-300	6	Handle screw
13	0007-2121-750	1	Gasket 118/130x7
14	0007-2483-750	1	Gasket 65/10
15	0006-4081-400	1	Cylindrical pressure spring
16	1169-9698-000	1	Funnel
17	1169-9277-000	1	Cap
18	0019-6966-400	3	Hex head screw M 12x20 DIN 933
19	0026-2108-400	1	Cap
20	0019-2507-300	1	Lens head screw AM 6x10 DIN 85
21	0026-1382-400	1	Washer 6,4 DIN 125
22	1169-9208-000	1	Cover
23	0007-2399-750	1	Gasket 92/112x10
24	0004-2364-758	1	Packing cord 8x8x2200
25	0001-0261-300	1	Blind cap
26	1169-9205-000	1	Flush pipe
27	0018-3949-300	1	Cone connection D 40 DIN 11851
28	0007-2210-750	1	Gasket G 40 DIN 11851
29	0013-2844-300	1	Grooved coupling nut F 40 DIN 11851
30	0007-2209-750	1	Gasket G 32 DIN 11851
31	0021-3155-700	3	Foot

Sterilizing Tank

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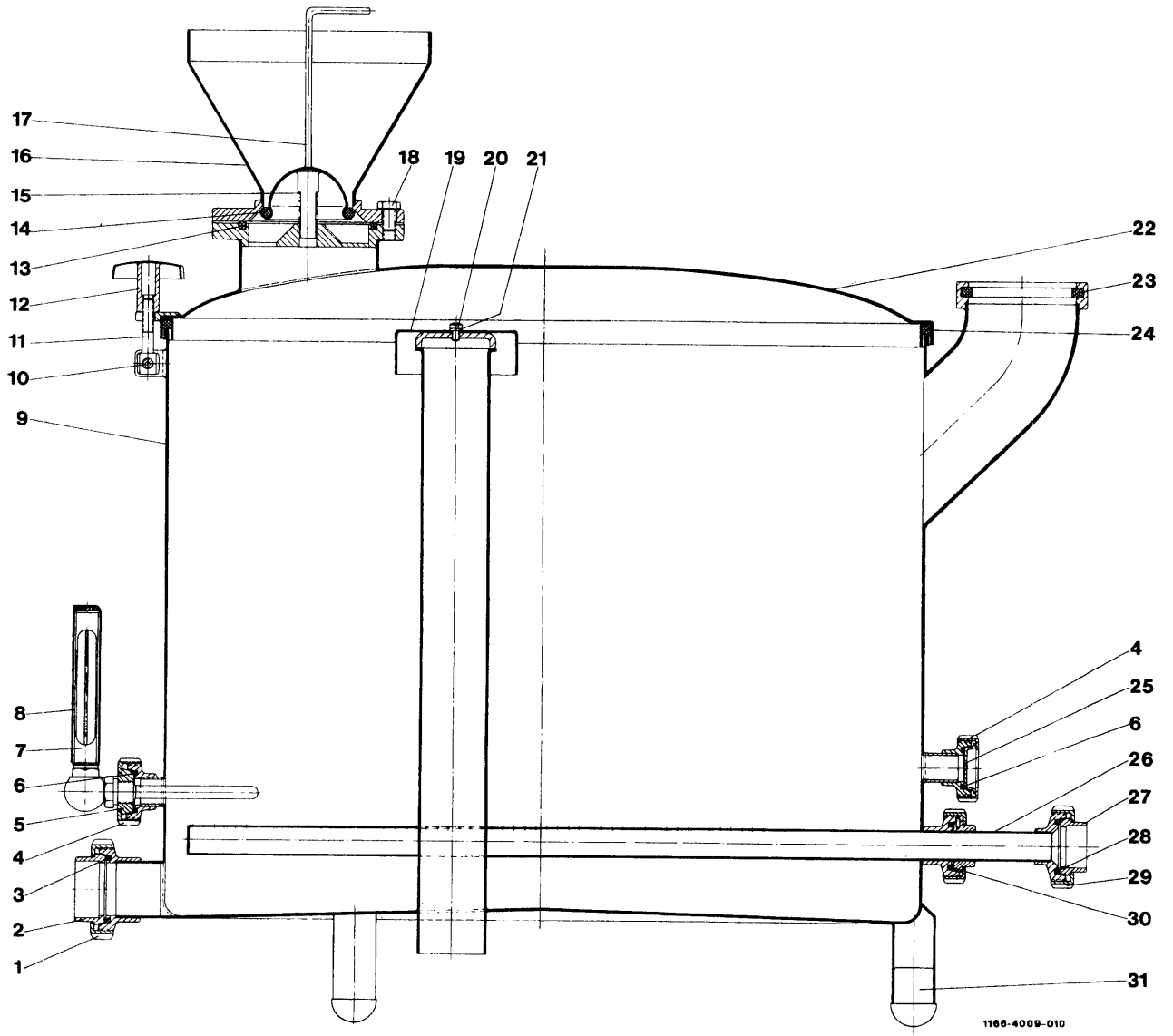


Fig. 21

Flowmeter (for Feed)

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All milk contact parts are made of stainless steel.

(Supplied on special order only)

Measuring range: 4,000-14,000 l/h

No. in Fig.	Part - No.	Qty.	Part Description
-	8021-2200-000	1	Flowmeter, complete (1-16)
1	0019-1731-400	1	Handle screw
2	0007-2298-750	2	Gasket 13,5/22x10
3	0001-0083-820	1	Cylindrical sight glass
4	0019-1380-300	1	Threaded bush
5	0026-1375-300	1	Washer
6	0013-3010-300	1	Nut M 35x1,5
7	8021-2003-120	1	Outlet pipe
8	0007-2279-750	1	Gasket 56/68 x 6
9	0013-2846-300	1	Grooved coupling nut F 65 DIN 11851
10	8021-2001-150	1	Inlet cup
11	8021-2212-000	1	Float cone
12	8021-2217-000	1	Scale 4,000-14,000 litres/h
13	0004-5261-720	2	Gasket 4,5/8,5 x 1
14	0019-2478-300	2	Cylindrical lens head screw AM 4x8 DIN 85
15	8020-2002-000	1	Intermediate piece
16	0007-2210-750	2	Gasket G 40 DIN 11851

Flowmeter (for Feed)

=====

(on special order)

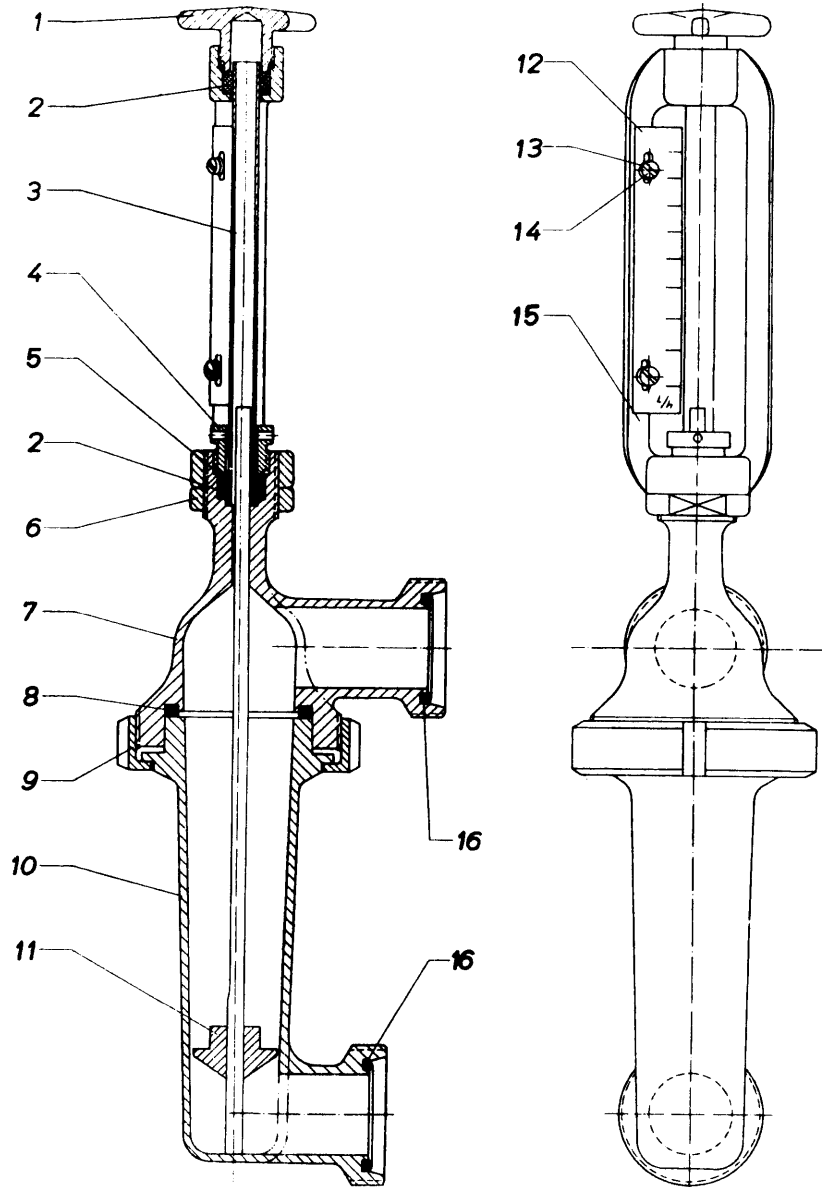


Fig. 22

Flow Constrictor
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(Supplied on special order only)

Maximum throughput capacity: 7,000 l/h

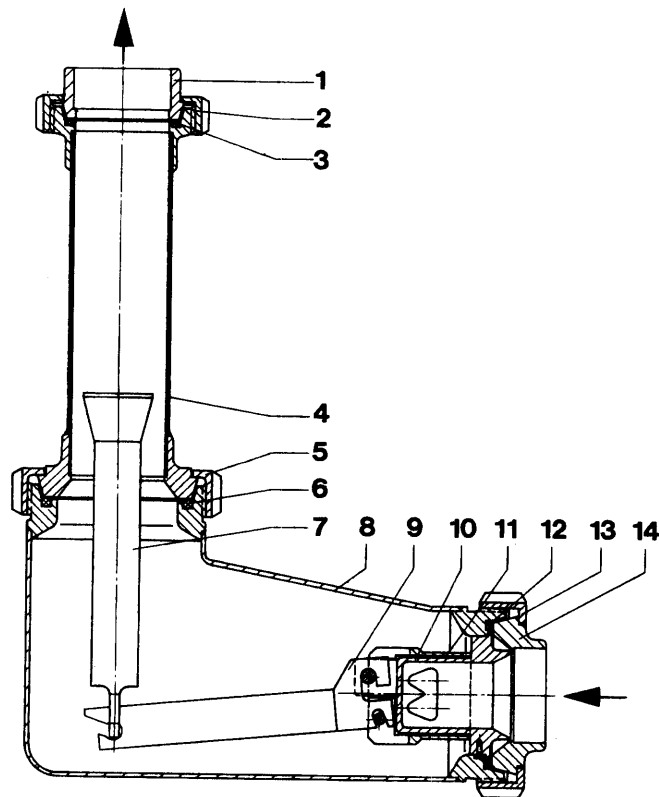


Fig. 23

No. in Fig.	Part - No.	Qty.	Part Description
-	8250-2070-090	1	Flow constrictor, complete (1-14)
1	0018-3955-300	1	Cone connection D 50 DIN 11851
2	0013-2845-300	1	Grooved coupling nut F 50 DIN 11851
3	0007-2211-750	1	Gasket G 50 DIN 11851
4	-	1	* Pipe
5	0013-2846-300	1	Grooved coupling nut F 65 DIN 11851
6	0007-2212-750	1	Gasket G 65 DIN 11851
7	-	1	* Float
8	-	1	* Housing
9	-	1	* Throttling lever
10	-	1	* Throttling housing
11	-	1	* Regulating piece
12	0007-2212-750	1	Gasket G 65 DIN 11851
13	0013-2846-300	1	Grooved coupling nut F 65 DIN 11851
14	0018-4636-300	1	Reducing cone connection NW 65/50

* This part can only be exchanged by a WESTFALIA factory engineer or in a special repair shop authorized by WESTFALIA, because the replacement of this part requires re-adjustment of the flow constrictor. For replacement of any of these parts, the flow constrictor has to be returned to the supplier.

Installation of the Flow Constrictor in the Piping of a Milk Processing Plant

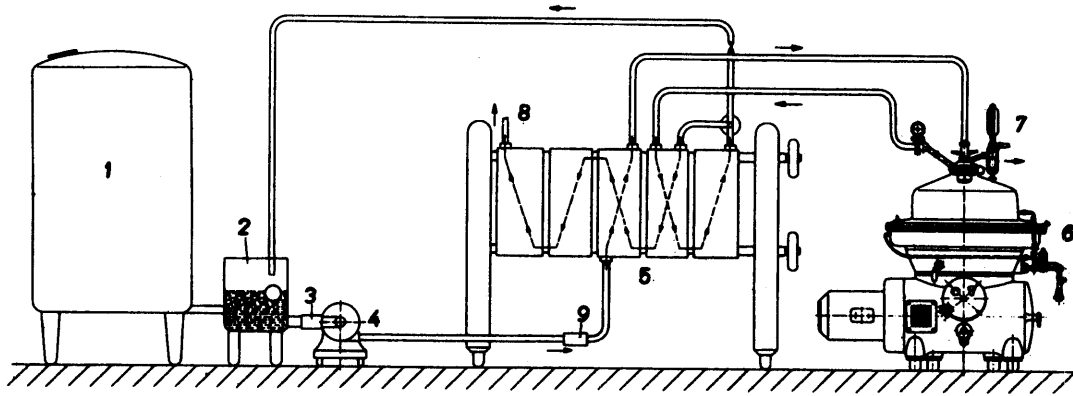


Fig. 1 Flow Constrictor between Pump and first Exchanger

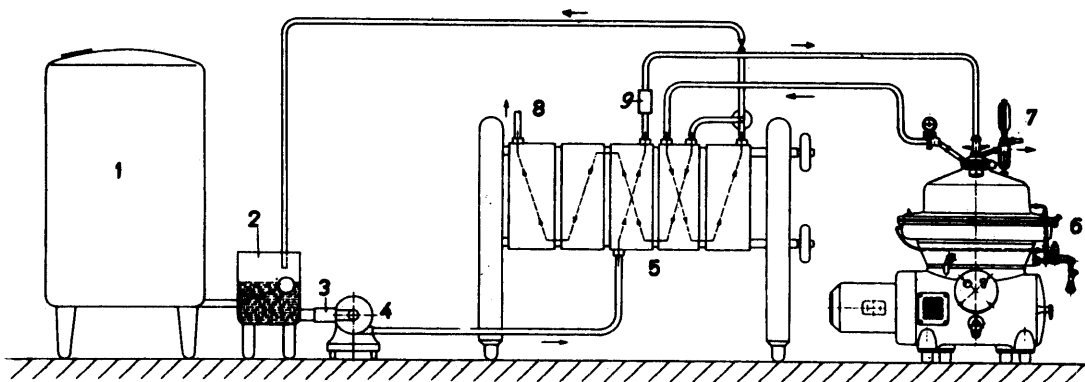


Fig. 2 Flow Constrictor between first Exchanger and Separator

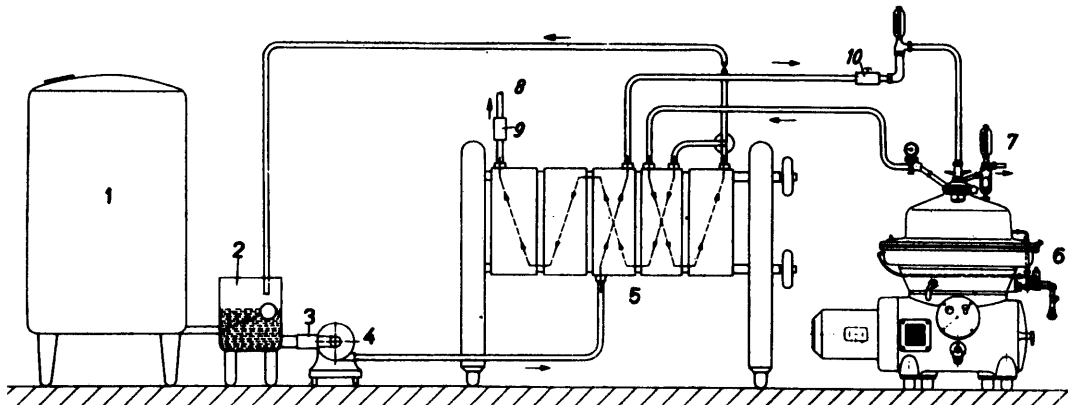


Fig. 3 Flow Constrictor behind the Cooler

Adjustable Flow constrictor and Flowmeter ahead of the Separator

- | | |
|---------------------|--------------------------------|
| 1 Storage tank | 6 Separator |
| 2 Balance tank | 7 Cream discharge |
| 3 Strainer | 8 to Storage tank |
| 4 Milk pump | 9 Flow constrictor |
| 5 Heater and cooler | 10 Adjustable flow constrictor |

Note! When installing the flow-constrictor make sure its cylindrical part is in upright position so that the milk flows through it from below.



Unternehmensbereich
Prozeßtechnik

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