

MMW

MACHINERY WORLD

**WESTFALIA
SEPARATOR**

INSTRUCTION MANUAL AND PARTS LIST

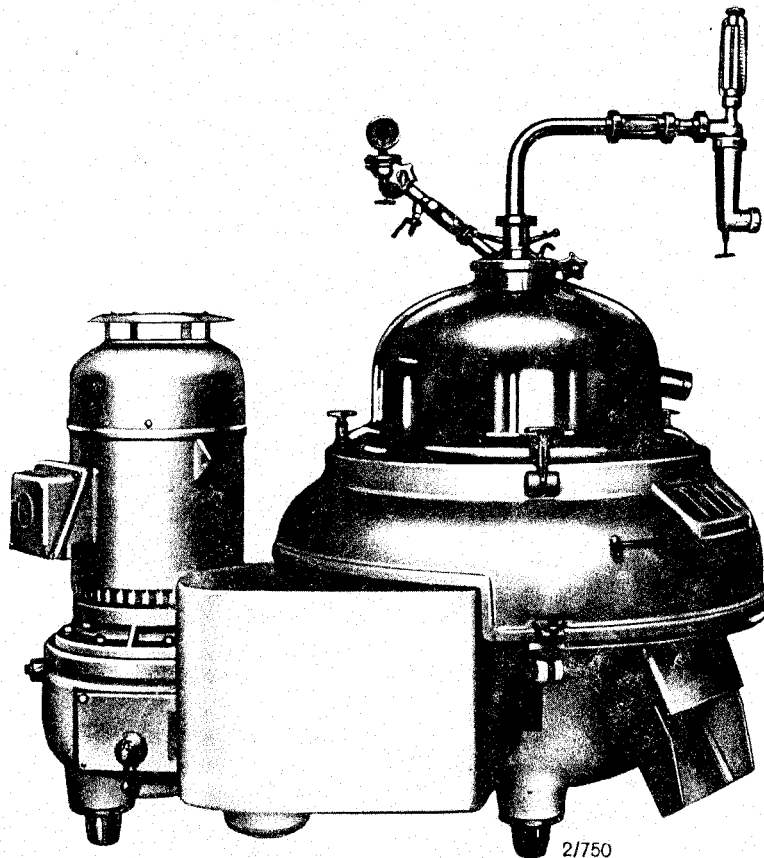
No. 3190 - 9001 - 010

WESTFALIA

Quark Separator

KDA 16-02-177 NEW

Model SIH 10007 OLD



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

CABLES: WESTFALIA OELDE - PHONE: OELDE 22 22 - TELEX: 89 215 74 / 89 215 75

Vertical Section

WESTFALIA Quark Separator SIH 10007

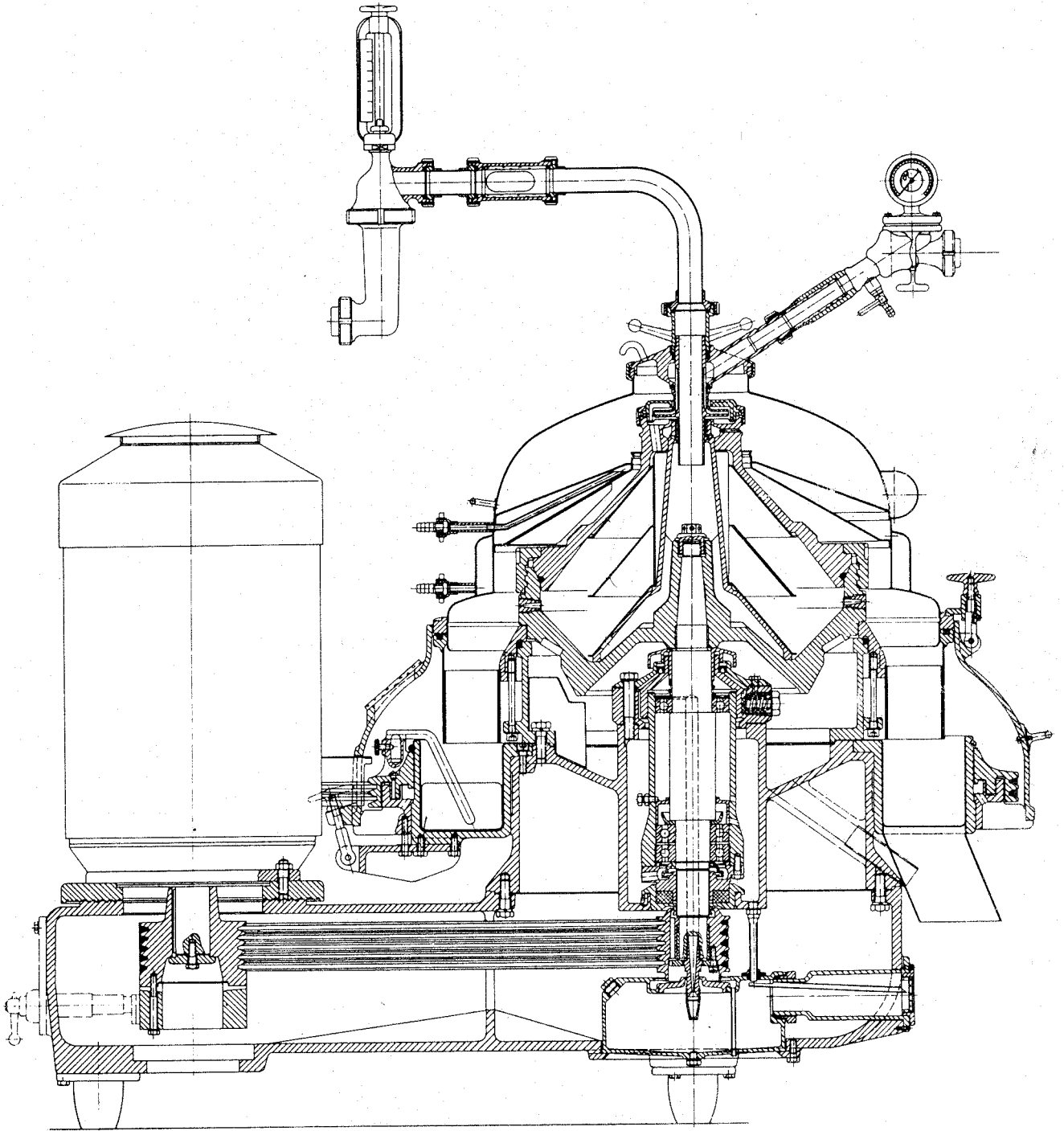
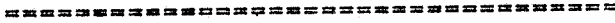


Fig. 1

WORKING INSTRUCTIONS

1. FLOW DIAGRAM OF A QUARK PRODUCING PLANT

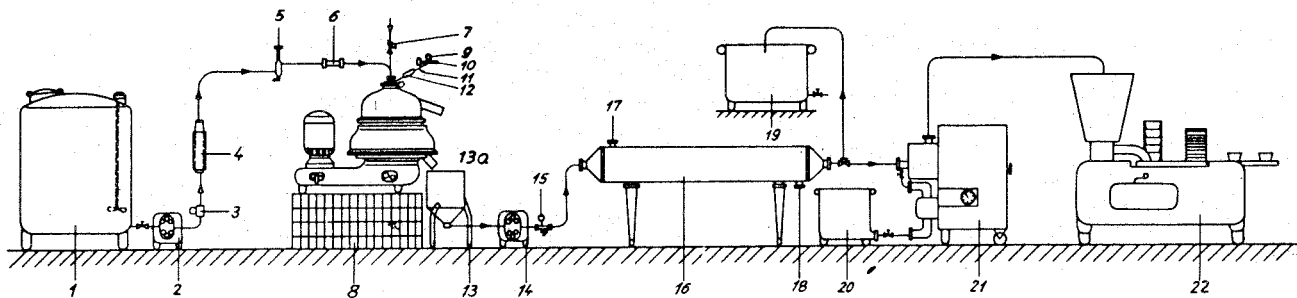


Fig. 2

Continuous production of normal quark and of cream-containing quark
with WESTFALIA Quark Separator SIH 10 007 and WESTFALIA Quark Mixer MIB 600.

- | | | |
|--|---|--|
| <p>1 Tank with low-speed agitator</p> <p>2 Positive displacement pump for cheese curd conveyance</p> <p>3 Pressure gauge</p> <p>4 WESTFALIA tubular strainer</p> <p>5 Flowmeter</p> <p>6 Sight glass</p> <p>7 Water feed for starting and flushing</p> <p>8 WESTFALIA Separator SIH 10 007</p> <p>9 Pressure gauge</p> <p>10 Valve</p> <p>11 Sampling cock</p> <p>12 Sight glass</p> | <p>} installed in vertical line</p> <p>} for whey discharge</p> | <p>13 Quark funnel</p> <p>13a Protecting sheet (to be placed on funnel during start-up and shut-down of separator)</p> <p>14 Positive displacement pump</p> <p>15 Pressure gauge with vent cock</p> <p>16 WESTFALIA quark cooler</p> <p>17 Ice-water outlet</p> <p>18 Ice-water feed
Temperature: +1°C (33,8°F)
Throughput: 25,000 litres/h (5,500 imp. gls.)</p> <p>19 Emergency vat (for normal quark)</p> <p>20 Cream vat</p> <p>21 WESTFALIA quark mixer MIB 600</p> <p>22 Packing machine</p> |
|--|---|--|

Production of normal Quark or cream-containing Quark

After having been well stirred in tank 1 by means of a low-speed agitator, the coagulated skim milk is fed to the separator through positive displacement pump 2. The separator is preceded by tubular strainer 4 which retains the coarse solids liable to clog the nozzles of the separator. Flowmeter 5 indicates the hourly flowrate, and sight glass 6 permits visual inspection of the coagulated skim milk. In the bowl quark and whey are separated instantaneously. The whey is discharged from the bowl foamless and under pressure by means of a built-in centripetal pump. The specifically heavier quark flows towards the bowl periphery, from where it is discharged through the nozzles. The nozzles are interchangeable. The horizontally ejected quark is directed by a baffle into a catch chamber which rings the bowl. A separately driven set of scraper blades pushes the concentrated quark into the discharge chute leading into funnel 13. The positive displacement pump 14 conveys the quark from funnel 13 via WESTFALIA quark cooler 16 into WESTFALIA quark mixer 21, from where it finally gets into packing machine 22.

I M P O R T A N T H I N T S

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- 1) During starting and braking time, feed bowl with water to avoid clogging of the nozzles.
- 2) When machine is new, make first oil change after 3 to 4 weeks. When broken in, change oil every 3 months. Use oil as specified on page 48.
- 3) Clean oil pan once a year (see sect. 10.4).
- 4) Check oil circulation daily at sight glass 12c (fig. 15). Should the oil circulation be interrupted, stop the separator at once and clean the lubrication system.
- 5) Check regularly for water in oil.
- 6) Do NOT loosen any part before the bowl has stopped completely!
- 7) Do NOT place bowl parts on stone floor. Put them on a rubber mat or wooden surface. Never place bowl top into bowl lock ring.
- 8) After removing bowl bottom, place splash cover 25 (fig. 24) over worm spindle. Do NOT flush inside of upper section of the frame with water hose, wash by hand.
- 9) Prior to mounting the bowl bottom, put two or three drops of oil on upper end of spindle (thread, cone, and cylindrical guide surface for spindle cap). It must be possible to move the spindle cap easily 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.
- 10) Prior to assembling the bowl, carefully clean and wipe dry threads of bowl bottom and bowl lock ring as well as contact surfaces. Apply thin film of molybdenum disulfide paste (MoS_2) to prevent galling.
- 11) After about 3 weeks of operation, add the numbered spare disc.
- 12) After about 5,000 operating hours, replace ball bearings of spindle. At the same time, check holes of spindle and of suction pipe for cleanness.
- 13) To prevent damage to bearings, do NOT run separator without bowl for more than one minute (see sect. 3). Prior to starting the separator without bowl on spindle, remove spindle cap 1b and spring 1c (fig. 14) since spindle cap may slip off the rotating spindle and create serious accidents.
- 14) After having mounted a spare bowl or new drive parts, check height of bowl for re-adjustment (see sect. 14).
- 15) Never use blow-torch on bowl or expose bowl to heat of direct fire.

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3. LUBRICATION

All bearings, except those of the motor, are automatically lubricated from a central oil bath. The oil is sucked in through the central hole of the drive spindle and directed to the upper and lower bearings. The return of the oil can be seen through sight glass 12c (fig. 15).

For lubrication use only well refined mineral oils with a viscosity of

3,8°E = 28 cSt (SAE 20) at 50°C.

Do NOT use mixed oils, since they have a tendency to precipitate. The precipitated matter will contaminate the oil pan and settle in the small suction pipe and in the holes of spindle 1a (fig. 14), thus hindering the oil circulation.

Prior to the first start of the separator, remove front cover from lower section of frame, undo oil fill plug 2 (fig. 15) and use oil funnel 23 (fig. 24) to fill pan 1 (fig. 15) with approx. 5 litres of oil. The oil level must be 5 mm (13/64") above middle of sight glass. It must never drop below middle of sight glass. Be sure to refill oil in time.

Prior to the first start and after a long-term shut-down of the separator, run the machine without bowl on spindle for 1 minute to allow the oil to get to all bearings. Stop the motor as soon as oil discharges from the return pipe (to be seen through sight glass 12c). Never run machine, without bowl on spindle, for more than 1 minute, since otherwise the spindle will be lifted by the centrifugal force of the balls of angular contact ball bearing 1q (fig. 14) and the balls will no longer run properly in their raceway - which may result in damage to bearings.

ATTENTION: Prior to starting the separator without bowl on spindle, remove spindle cap 1b and pressure spring 1c (fig. 14) to prevent these parts from slipping off the rotating spindle and creating serious accidents.

Make first oil change after 3 to 4 weeks. Then change oil completely every 2 to 3 months. To drain the oil, remove screw 20 (fig. 15).

After several oil changes, or if an additional oil change becomes necessary because water or dirt has seeped into the drive, the oil pan must be cleaned (see sect. 10.4).

The oil circulation must be watched daily at sight glass 12c (fig. 15). As soon as the circulation decreases, the drive parts must be disassembled for cleaning (see sect. 10.4).

The motor bearings should be greased according to the instructions of the motor supplier. The greasing intervals and the required amount of grease are stated on a plate attached to the motor. As a rule, refill motor bearings every 2,000 working hours with 20 to 25 grams of lithium base high melting point grease (pour point 180°C). A one pound can of grease is furnished with each machine.

Drive ring 21 (fig. 11) and tightener pulley 57a (fig. 13) should be greased at least once a week with grease gun 26 (fig. 24).

4. MOTOR CONNECTION

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4.1. Three phase AC motor (20 hp)

The separator SIH 10007 is powered by a totally enclosed special type three phase AC motor which is rated to stand up to the conditions during starting and in actual operation. The motor is to be started by a star-delta switch.

The starting time in star connection is about 9 minutes. Do NOT switch over to delta connection before this period has elapsed. A second start is only permissible after 30 minutes. The starting current amounts to approximately twice the value of the rated current. This should be considered when dimensioning switchgear, lead-in wires, and fuses.

If motor protection against overloading and single-phase run during operation is required, this should be ensured by installing a slow-acceleration control for star-delta connection. The release of this control, set to the rated current of the motor, is bridged during the starting time.

4.2. Direction of rotation and speed of the bowl

IMPORTANT! The bowl must turn clockwise, when looked at from above. The direction of rotation is reversed by interchanging two lead-in wires in the star-delta switch (see wiring diagram in terminal box of motor).

The bowl speed is 5,500 rpm.

4.3. Three phase AC motor for the drive ring

The drive ring is powered by a geared motor of 1 hp which is designed for across-the-line starting.

5. BOWL, - FEED AND DISCHARGE CONNECTIONS

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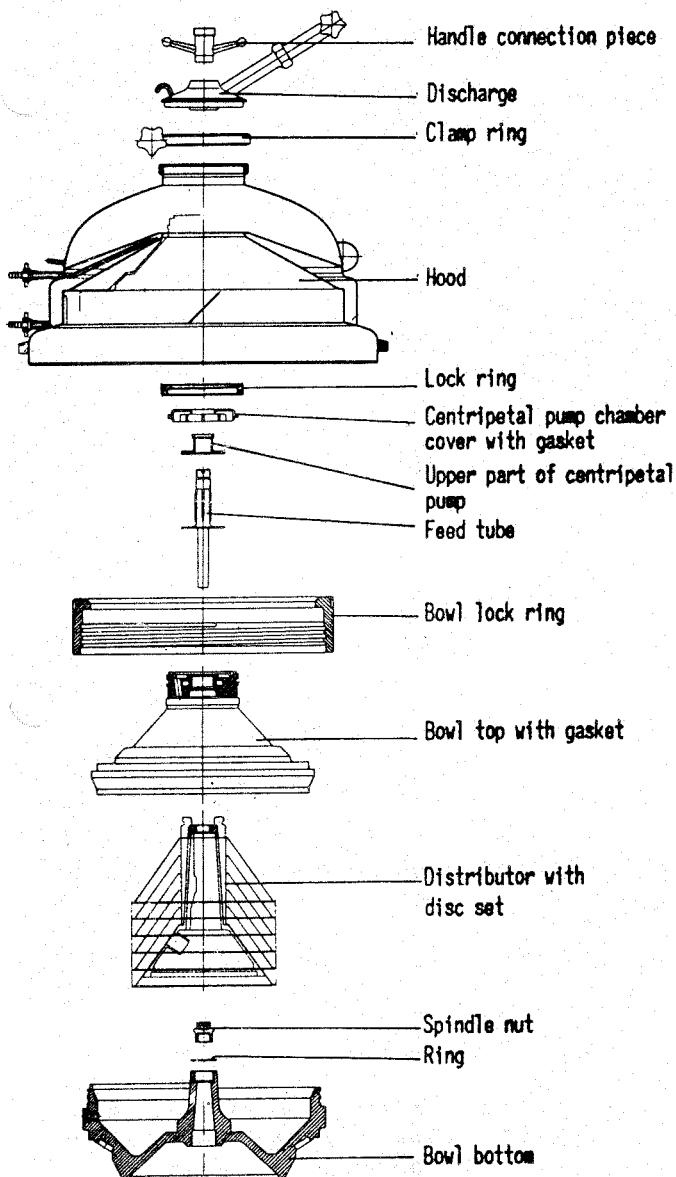
5.1. General

- 1) If the plant consists of several separators, make sure not to interchange bowl parts, since each bowl has been balanced individually. The main parts of each bowl are marked with the three last digits of the serial number of the separator.
- 2) Prior to assembling the bowl, make sure that contact surfaces of bowl parts are clean. All bowl parts must be properly located. This is done when the "0" marks of all bowl parts are aligned.
- 3) Worn gaskets have to be replaced in time.

5.2. Assembling the bowl (fig. 4). For tools refer to fig. 24.

- 1) Oil the upper part of the spindle (thread, cone, and cylindrical contact surface for the spindle cap). It must be easily possible to move the spindle cap up and down 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 tool 21 to place the bowl bottom on the spindle.
- 3) Use tool 6 to tighten spindle nut and ring thoroughly.

- 4) Make sure that the nozzle bores are open and that nozzle gaskets 11a (fig. 17) are in good condition.
- 5) Use wrench 16 to screw nozzles 11 (fig. 17) into bowl bottom. Make sure that the front surface of the nozzles is flush with the bowl bottom. Do NOT screw in any further! The fitting slots of the nozzles will thus be in vertical position and the discharge openings will be directed backwards.
- 6) Use tool 14 to place the distributor into the bowl bottom. Make sure that the three locating pins of the distributor fit into the grooves of the bowl bottom. "0" marks of both parts must be aligned.
- 7) Place discs on neck of distributor in numerical order, beginning with No.1.
- 8) Mount compensating disc 8a (fig. 17).
- 9) Insert gasket 10 (fig. 17) into its groove of bowl top.



- 10) Place bowl top on bowl bottom, using tool 17.
- 11) Carefully clean threads of bowl bottom and of bowl lock ring as well as the contact surfaces. Apply thin film of molybdenum disulphide paste to prevent galling of threads. Then screw bowl lock ring on bowl bottom, hand-tight only (left-hand thread).
- 12) With the aid of wrench 6 screw bolt A (fig. 5) into distributor; make sure to screw down completely.
- 13) Place disc B (fig. 5) on bowl top.
- 14) Grease thread of bolt A. Then screw hex nut C on bolt and tighten it with ratchet wrench 11 until bowl lock ring can be tightened as stated under item 15. When tightening the hex nut, secure bowl with wrench 1.
- 15) With the aid of wrench 1 continue to tighten the bowl lock ring by hand (left-hand thread) until "0" marks on ring and on bowl top are aligned. If necessary, rap wrench handle with mallet 12.
- 16) Loosen hex nut with ratchet wrench.

Fig. 4

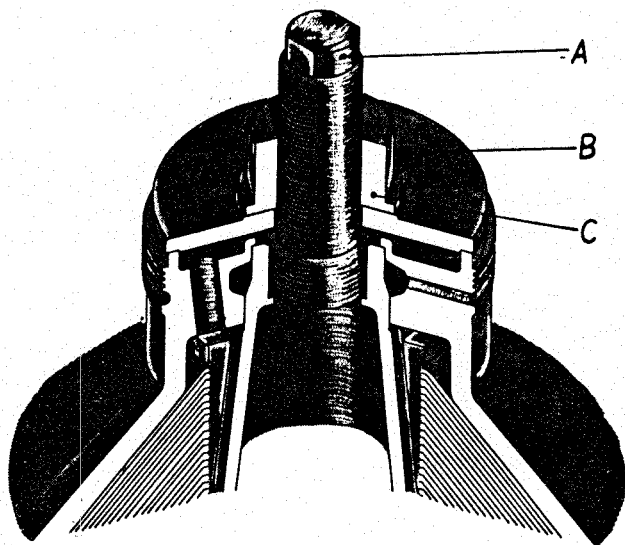


Fig. 5

- 17) Unscrew bolt and remove it together with disc and hex nut.
- 18) Introduce feed tube through the opening of the bowl top and place it into neck of distributor.
- 19) Mount upper part of centripetal pump.
- 20) Insert gasket into groove of centripetal pump chamber cover.
- 21) Mount centripetal pump chamber cover.
- 22) Tighten centripetal pump chamber lock ring by lightly rapping handle of wrench 15 (left-hand thread).
- 23) Mount the hood and fasten it with hinge screws 30a-f (fig. 11). Connect ice-water pipe line.
- 24) Mount discharge and fasten it with clamp ring.

- 25) Tighten handle connection piece, while holding feed tube with wrench 19.
- 26) Connect the feed and discharge lines.

5.3. Disassembling the feed and discharge connections and the bowl (for tools refer to fig. 24).

ATTENTION! To avoid accidents, do NOT loosen any part before the bowl has stopped completely!

During disassembly of bowl, place bowl parts on a rubber or wooden surface. Never place bowl top on stone floor or into bowl lock ring.

Worn gaskets should be replaced in time.

When disassembling the bowl, proceed in reverse order of assembly (see sect.5.2) and bear in mind the following:

Prior to opening the bowl, release brakes by turning both handles 45c (fig. 12) clockwise. After having removed the centripetal pump, apply the disc stack compressing device as described under sect. 5.2, para. 12 - 14, in order to facilitate loosening of the bowl lock ring (left-hand thread) by rapping wrench handle with mallet. Remove lock ring. Then remove disc stack compressing device (refer to sect. 5.2, para. 16 - 17).

Use tool 17 to push bowl top off bowl bottom and to remove it.

After unscrewing the spindle nut, use tool 21 to push bowl bottom off the spindle cone and to lift it out.

If the bowl is to be removed as complete assembly, proceed as follows: Unscrew upper lock ring, remove centripetal pump, and unscrew spindle nut by means of wrench 4. Then screw tool, 9 into bowl bottom. Turn threaded spindle to push bowl off the spindle cone. Use a hoist to lift out the bowl.

6. TREATMENT OF THE SKIM MILK

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A good quality quark can only be obtained from properly treated skim milk. For renneting, the skim milk should have a temperature of at least 26 to 28°C.

Normally 0,5 - 1 % of starter and 1 cm³ of liquid rennet (concentration 1 : 10 000) or 0,5 - 1 % of starter and 1 gramme of dry rennet dissolved in 1/4 litre of water (concentration 1 : 100 000) are added to 100 litres of skim milk.

After 16 to 18 hours, when the desired coagulation has taken place, the acidity of the milk will be 25 - 28 SH which corresponds to a pH-value of 4.5 - 4.4. The curd is then stirred by means of an agitator and fed to the separator through a positive displacement pump. During the whole time of separation, the agitators in the tanks must be kept working to ensure that the dry matter percentage in the quark remains constant.

The separation temperature must never be below 24° C.

7. DETERMINATION OF THE NOZZLES

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The quark, having been concentrated in the bowl, is continuously discharged through nozzles in the bowl bottom. The bowl can be operated with either 4 or 6 or 8 nozzles which are available with a diameter of 0,5 mm, 0,6 mm or 0,7 mm. The nozzles in the bowl must be evenly spaced.

The diameter of the nozzle bore and the number of nozzles to be fitted depend on the feed rate, on the percentage of dry matter in the coagulated skim milk, and on the desired percentage of dry matter in the discharging quark. To ensure equal concentration of the discharging quark, the feed rate and the solids content of the incoming coagulated skim milk must be kept constant.

The content of dry substance in the quark can be increased by increasing the feed rate. If necessary, screw in nozzles with a smaller diameter.

If the content of dry substance in the quark is too high and the discharging whey is turbid, the feed rate will have to be reduced.

If the whey then still contains albumin, larger diameter nozzles will have to be fitted.

Example: At a feed rate of 3,500 litres/h of coagulated skim milk, approx. 600 kgs of quark with a solids content of 20 % dry basis are obtained. In this case, the bowl has to be equipped with 4 nozzles of 0,6 mm diameter with a total sectional area of

$$F_D \text{ total} = \frac{D^2 \cdot \pi}{4} \cdot X$$

D = Nozzle diameter
X = Number of nozzles

$$= \frac{0,6^2 \cdot \pi}{4} \cdot 4 = 1,1308 \text{ mm}^2$$

By substituting the values of the before-mentioned example (4 nozzles, 0,6 mm diameter, quark output 600 kgs), the quark output Q obtained from 6 nozzles of 0,6 mm diameter is calculated as follows:

$$F_D \text{ total} = \frac{0,6^2 \cdot \pi}{4} \cdot 6 = 1,6962 \text{ mm}^2$$

$$Q = \frac{600 \cdot 1,6962}{1,1308} = \text{approx. } 900 \text{ kgs/h quark}$$

The feed rate necessary to obtain this quark output is approx. 5,200 litres/h.

When operating with 4 nozzles of 0,7 mm diameter, the output is calculated as follows:

$$F_D \text{ total} = \frac{0,7^2 \cdot \pi}{4} \cdot 4 = 1,5392 \text{ mm}^2$$

$$Q = \frac{600 \cdot 1,5392}{1,1308} = \text{approx. } 815 \text{ kgs/h quark}$$

The feed rate necessary to obtain this quark output is approx. 4,750 litres/h.

Depending on local conditions, slight variations from the above mentioned values may occur, since the feed rate - quark output ratio depends on the solids content of the coagulated skim milk and on the desired solids content in the quark.

8. THE SEPARATOR IN OPERATION

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IMPORTANT!

During start-up and braking of the bowl, vibrations may occur while passing through the critical speed of rotation. These vibrations can be excessively strong if albumin deposits have built up unevenly in the bowl as a result of nozzle clogging. In order to attenuate these vibrations be sure to feed the bowl with water during start-up and braking.

8.1. Starting the separator

- 1) Make sure that
 - a) Oil level is 5 mm above middle of sight glass,
 - b) all nozzles are open,
 - c) knurled screws 20 (fig. 11) for scraper blades are tightened thoroughly,
 - d) handle nuts 24 and 30a (fig. 11), handle 1a (fig. 18), and handle connection piece 1m (fig. 19) are tightened thoroughly,
 - e) V-belts are in good condition and tightened for proper tension.
- 2) Open water feed valve and adjust it so that water discharges from the concentrate outlet only.
- 3) Start the motor.
- 4) Increase water feed until a small amount of water discharges from the whey outlet as well.

- 5) As soon as the bowl has come up to its rated speed (after about 9 minutes) disinfect pipe lines between tank and separator and flush with water.
Open discharge cock of one tank and start positive displacement pump.
Stop water supply.
- 6) Throttle valve in whey discharge line until slight overflow occurs at overflow pipe of hood. The pressure indicated by the pressure gauge as soon as overflow occurs is considered as maximum pressure.
Now open valve again to get a pressure which is about 4 to 7 psig. lower than the maximum pressure. This very pressure must be kept during separation.
It is recommended that the separator be run for 1 to 2 minutes at a relatively high throughput capacity in order to get the bowl quickly filled with albumin, thereby obtaining the desired concentration within a short period. The discharging whey must not contain albumin solids.
If the whey still contains albumin solids, reduce hourly throughput capacity.
- 7) Feed cooling jacket in hood (fig. 18) with approx. 500 litres/h of ice-water. Maximum inlet pressure 7 psig.
- 8) Watch sight glass 12c (fig. 15) to be sure that oil circulates. If even 5 minutes after starting the motor, no oil is seen to flow out of the return pipe, stop the machine and clean oil circulating system (see sect. 10.4).

8.2. Stopping the separator

- 1) Open water valve and close product feed valve simultaneously.
- 2) Stop the motor and apply brakes by turning handles 45c (fig. 12) counter-clockwise.
- 3) Stop water feed only after bowl has stopped completely to avoid clogging of nozzles and wobbling of bowl.
- 4) Stop motor for scraper drive ring.

IMPORTANT! Do NOT loosen any part of the separator or of the feed and discharge connections before the bowl has come to a complete stop!

9. CALCULATION OF THE QUARK YIELD

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According to the well known formula which is used to determine the cream volume when separating milk, the percentage of quark with reference to the coagulated skim milk can be found out as follows:

$$Q = \frac{100 (T_{MM} - T_{MO})}{T_{MQ} - T_{MO}} \%$$

T_{MM} = dry substance of the skim milk (%)

T_{MO} = dry substance of the whey (%)

T_{MQ} = dry substance of the quark (%)

Example:

When $T_{MM} = 8,5\%$, $T_{MO} = 5,9\%$, $T_{MQ} = 20\%$, 100 litres of skim milk will yield the following amount of quark:

$$Q = 100 \frac{8,5 - 5,9}{20 - 5,9} = 18,45 \text{ kg}$$

If 100 litres of skim milk are required to obtain 18,45 kg of quark with 20 % dry substance, $\frac{100}{18,45} = 5,43$ kg of skim milk are required to produce 1 kg of quark with 20 % of dry substance.

The actual percentage of dry substance depends on the conditions prevailing in each dairy. Therefore, this above example cannot be generalized.

Amount of Skim Milk required to produce 1 kg of Quark based on the percentage of Dry Substance in the Quark.
 =====

Percentage of Dry Substance in the Quark	Amount of Skim Milk (kg) necessary to produce 1 kg of Quark
18,0 %	4,77 kg
18,5 %	4,85 kg
19,0 %	5,05 kg
19,5 %	5,23 kg
20,0 %	5,43 kg
20,5 %	5,62 kg
21,0 %	5,80 kg
21,5 %	6,02 kg
22,0 %	6,20 kg
22,5 %	6,38 kg
23,0 %	6,57 kg
23,5 %	6,76 kg
24,0 %	6,98 kg

The above table proves that the skim milk consumption per 1 kg of quark depends on the dry matter content of the quark.

In addition to determining the yield theoretically, the actual amount of coagulated skim milk and the actual amount of the quark produced should be measured precisely. Approximation of theoretically and practically obtained values will only be achieved by high accuracy of measurement.

10. CLEANING

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0.1. Cleaning the bowl and the concentrate catch chamber.

thoroughly clean the bowl and the concentrate catch chamber at the end of each separating process. In addition, the bowl must be cleaned as soon as the nozzles are clogged.

Disassemble the bowl according to the instructions of sect. 5.3.

Prior to cleaning, remove gaskets from bowl parts. Clean grooves and gaskets to avoid corrosion. Damaged or very swollen gaskets have to be replaced.

thoroughly clean the individual discs and bowl parts with the scrapers and brushes furnished with the separator.

Do NOT use metal scrapers or metal brushes!

thoroughly clean threads of bowl bottom and of bowl lock ring as well as all contact surfaces, and grease them.

Make sure that all nozzles are open and that no albumin particles remain in the bowl to avoid nozzle clogging when re-starting the separator.

Worn gaskets should be left to dry in a warm place. It is recommended to alternately use several gaskets.

For thorough cleaning of the concentrate catch chamber (fig. 6), the scraper blades, and of the guide cylinder, loosen handle nuts 24 (fig. 11) and remove hood. Then lift out guide cylinder, loosen knurled screws 20 (fig. 11) and withdraw the scraper blades from the drive ring.

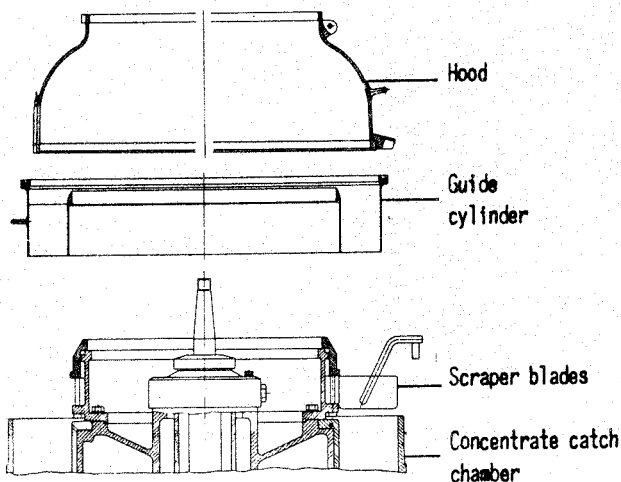


Fig. 6

0.2. Cleaning the upper section of frame

From time to time the inside of the upper section of the frame should be cleaned in the area below the bowl. After removing the bowl, prior to cleaning, place splash cover 25 (fig. 24) over the spindle to prevent wash liquid from seeping into the drive and rendering the lubricating oil unserviceable.

0.3. Cleaning the drive ring

Should the machine be running every day, remove drive ring 21 (fig. 11) every 4 to 6 weeks in order to clean the running and bearing surfaces from old grease. To remove the ring, proceed as follows: Remove gasket 18 (fig. 11), turn screw 62 (fig. 13) of belt tightener 57a (fig. 13) counter-clockwise in order to slacken belts 51 (fig. 11). Then remove drive ring.

10.4. Cleaning the oil pan, the spindle, and the suction pipe

Clean the oil pan after several oil changes but at least once a year, or if an additional oil change becomes necessary because water or dirt has seeped into the drive. If the oil circulation decreases (to be seen at sight glass 12c fig.15) the drive must be cleaned as well.

After removing the drive (see sect. 12), unscrew plug 20 (fig. 15) and let oil drain.

Remove oil pan (see sect. 11). Clean oil return housing and sight glass.

Use wrench 32 (fig. 24) to remove cover 5 (fig. 15) from the oil pan. Clean oil pan with kerosene or trichlorethylene. Do NOT use fluffy cloths or cotton waste! Then flush the pan with kerosene. Tightly screw in hex head screw 20 and cover 5. Be sure to fit gaskets!

Then re-install oil pan.

Prior to re-assembling the drive, check the holes of the small suction pipe and of spindle 1a (fig. 14) for cleanness. If necessary, clean them with brushes 28 (fig. 24).

Assemble drive according to the instructions of sect. 13.1 and re-install it.

Put oil funnel 23 (fig. 24) into opening for plug 2 (fig. 15) and fill in fresh lubricating oil (approx. 5 litres).

11. REMOVING THE OIL PAN (Fig. 15)

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- 1) Undo screw 20 and drain oil.
- 2) Undo screws 11 and remove sight glass assembly 12a-d.
- 3) Use wrench 5 (fig. 24) to undo screw 15, loosen countersunk screws 13 and pull out oil return housing 14.
- 4) Undo screws 16 and remove oil pan.

12. DISASSEMBLING THE DRIVE

=====

(For tools refer to fig.24)

12.1. Removing the V-belts and disassembling the drive parts

- 1) Remove the bowl (see sect. 5.3).
- 2) Remove covers 51 and 40 (fig. 12).
- 3) Loosen screw 52 (fig. 12) so that the motor can be pushed back to limit.
- 4) Push motor back to limit.
- 5) Remove V-belts from pulleys.
- 6) Undo hex head screws 2a (fig. 14).
- 7) Screw lifting device 8 onto spindle. Use a hoist to lift the complete drive with neck bearing bridge assembly carefully out of the separator frame. Make sure that the V-belts do not get between V-belt pulley and frame thereby causing damage.

If the neck bearing bridge is stuck in upper section of frame, use screws 2f to push it off the upper section of frame. Before doing this, remove washers 2g and 2h (fig. 14).

12.2. Removing the V-belt pulley from the spindle (see fig. 14)

- 1) Remove drive parts (see sect. 12.1).
 - 2) Loosen screws 11 with wrench 3 and slacken clamp disc 12.
 - 3) Loosen conical clamp rings 8 by rapping with a rubber hammer against the V-belt pulley until they separate from the spindle.
- DO NOT USE A PULLER SINCE THIS WOULD CAUSE THE CLAMP RINGS TO JAM!
- 4) Remove from the spindle: V-belt pulley 6 with conical clamp rings 8, clamp disc 12, screws 11 and lock washers 10.

12.3. Disassembling the spindle (see fig. 14)

- 1) Remove V-belts (see sect. 12.1) and disassemble drive parts.
- 2) Remove V-belt pulley from spindle (see sect. 12.2).
- 3) Remove pressure ring 3 with cushion 5 from spindle.
- 4) Use wrench SW 27 to screw the suction pipe (1w and 1x) out of the spindle. Remove gasket 1v.
- 5) Undo screws 1s and remove bearing cover 1u.
- 6) Loosen threaded pin 1y. Unscrew threaded ring 1t and remove it together with ring 1r from the spindle.
- 7) Undo hex head screw 1i.
- 8) Screw spindle nut 6 (fig. 17) on the spindle 1a.
- 9) Turn spindle upside down and tap it lightly on a block of wood to separate bearing housing 1g from the spindle.
- 10) Pull ball bearings off the spindle and remove oil slinger ring 1m and ring 1k.

13. ASSEMBLING THE DRIVE PARTS

1.1. General

To assemble the drive, proceed in reverse order of disassembly (see sect. 12). The following should be kept in mind:

- 1) The holes in the spindle 1a (fig. 14) and in the suction pipe must be perfectly clean.
- 2) Inspect the bearings before re-fitting. They must be replaced when they show the slightest wear. In general, the bearings have to be replaced after 5,000 working hours at the latest.

IMPORTANT! Use bearings with increased accuracy of running only (see List of Parts).

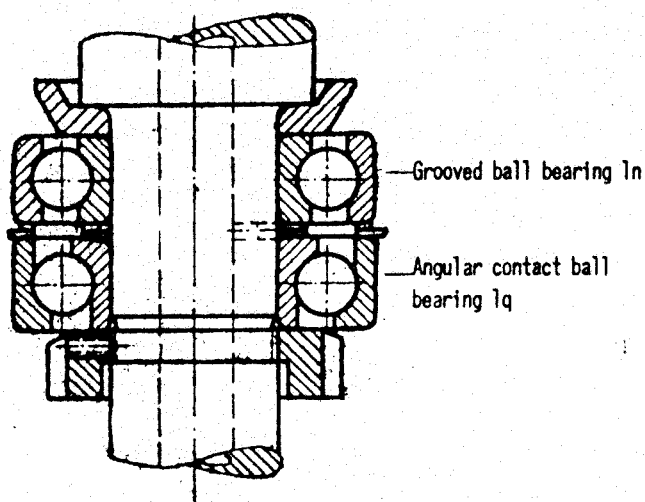


Fig. 7

Mounting the angular contact ball bearing

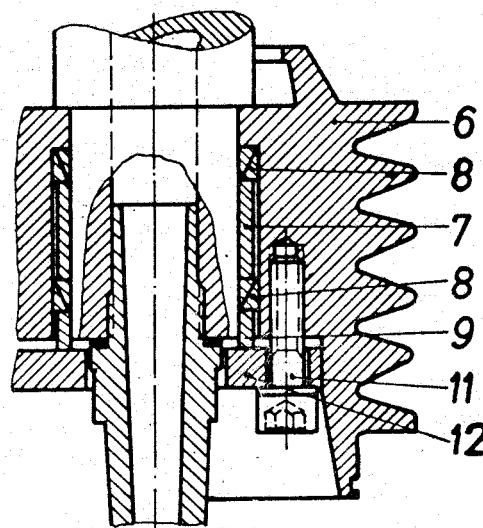


Fig. 8

Mounting the conical clamp rings

- 3) Angular contact ball bearing 1q (fig. 7) may be loaded axially in one direction only. It must be mounted as shown in fig. 7. Faulty mounting will inevitably result in damage to bearing. The narrow rim of the outer ring of the bearing must be on top.
- 4) Screw in suction pipe (1w and 1x, fig. 14) tightly. Be sure to fit gasket.
- 5) Be sure to mount conical clamp rings 8 (fig. 8) properly. The inner ring of each set of conical clamp rings must be mounted first. Then fit the outer ring into the V-belt pulley (fig. 8). Slip V-belt pulley 6 (fig. 8) on the spindle and slide it on until it rests against the shoulder of the spindle. Clamp pulley to spindle by tightening clamp disc 12 with screws 11 evenly and firmly, giving each screw single consecutive turns.

IMPORTANT! When mounting the conical clamp rings, be sure to follow the correct sequence. Faulty mounting of the inner and outer rings will result in damage to the V-belt pulley while disassembling.

- 6) Use a micrometer clock-gauge to check whether the V-belt pulley runs centrically. Permissible deviations: $3/100$ mm.

13.2. Assembling the neck bearing bridge (see fig. 14)

The top of the bearing housing, which includes the upper grooved ball bearing, is contained in pressure ring 2t which is held by 8 radially arranged, evenly distributed springs 2n.

- 1) Insert pressure ring into neck bearing bridge 2s in such a manner that the recesses of the pressure ring face the tapholes of the neck bearing bridge.
- 2) Grease spring pistons 2p thoroughly. Insert neck bearing springs 2n into the spring pistons and fit the spring pistons into threaded plugs 2m.
- 3) Screw threaded plugs with neck bearing springs and spring pistons into the 8 tapholes of the neck bearing bridge. Then tighten threaded plugs.
- 4) Slip neck bearing bridge 2s together with parts 2m-p,t, over bearing housing 1g and install it into the upper section of frame. Make sure that gaskets 2k and 2r are in good condition.
- 5) Fit grooved ring 2c, with its sealing lips pointing downwards, on neck bearing pressure ring 2t.

Place neck bearing protection cap 2d on the neck bearing bridge.

- 7) Screw in hex head screws 2a with gaskets 2b, and screws 2f with washers 2g and 2h.
Then insert spindle spring 1c and mount spindle cap 1b.

13.3. Replacing the V-belts

The V-belts are supplied as a bundled set.

If any of the V-belts needs replacement, the whole set must be replaced, for all belts of a set have exactly the same length.

Remove the oil pan (see sect. 11). Then remove the V-belts according to the instructions of sect. 12.1, para. 2 - 5.

The V-belts must be pre-tensioned to avoid slippage. Tension is correct if V-belts can be pressed in with the thumb by about 1".

To tighten the V-belts, turn screw 52 (fig. 9) clockwise. This will change the distance between the V-belt pulleys. Spring 53 maintains the tension of the belts during operation.

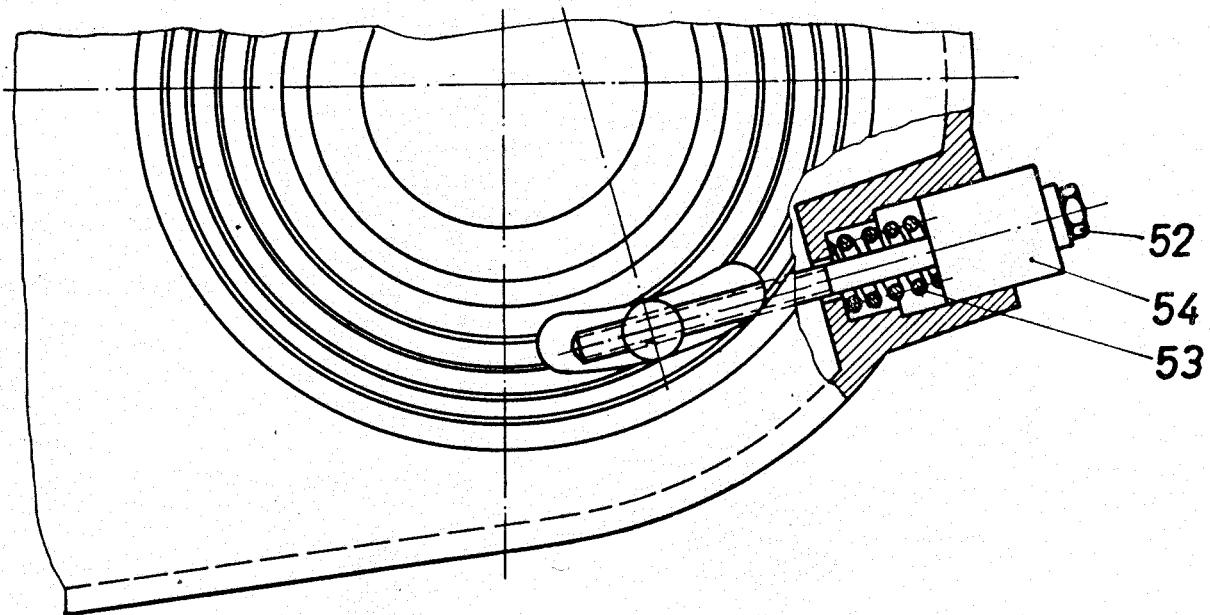


Fig. 9

Tightening the V-belts

14. RE-ADJUSTMENT OF BOWL HEIGHT

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The height of the bowl has been adjusted at the factory prior to shipment of the separator. It must be checked for possible re-adjustment after each replacement of the spindle, of the drive parts, and of the bowl.

After installing the bowl, the distance between the lower edge of the bowl bottom and the upper edge of the brake ring must be 1.5 to 2 mm at the narrowest point while the V-belts are tight (fig. 10).

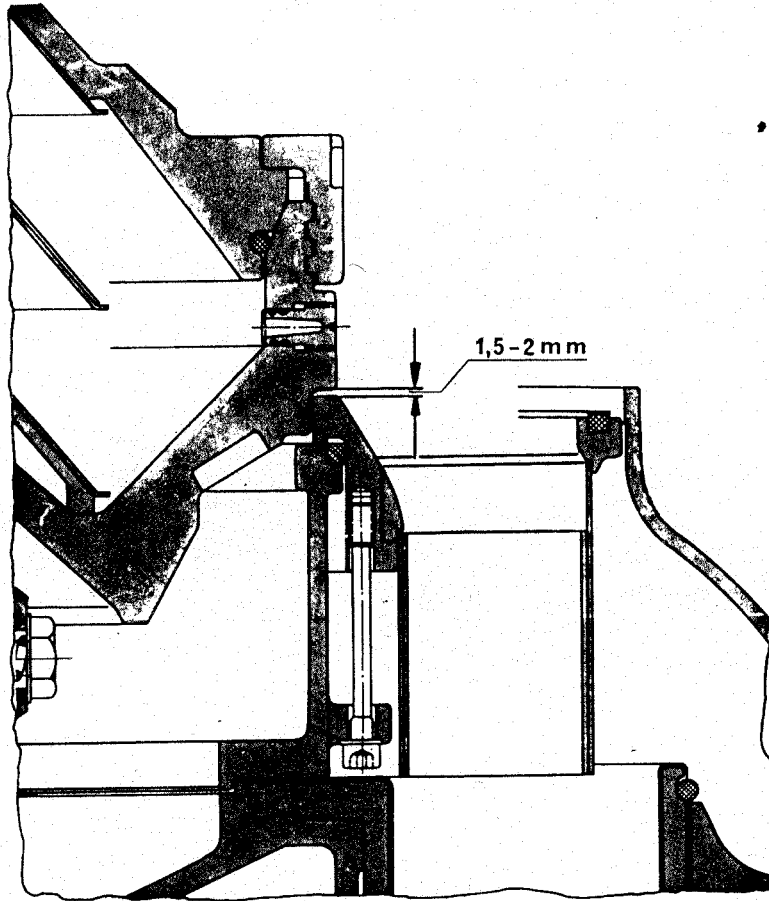


Fig. 10

If the distance is less than 1.5 mm, place a shim of the proper size between upper section of frame and pressure ring 3 (fig. 14) in order to correct the height adjustment of the bowl.

For this purpose, the following shims can be supplied with the separator:

Shim 139/157 ϕ x 0.5, Part - No. 0026-0646-000

Shim 139/157 ϕ x 1.0, Part - No. 0026-0647-000

15. OPERATING TROUBLES, - THEIR CAUSES AND REMEDIES

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Troubles	Causes	Remedies
<p>15.1. The bowl does not come up to rated speed or takes too long to do so (see sect. 4.2).</p>	<p>1) Motor is incorrectly connected.</p>	<p>See wiring diagram.</p>
	<p>2) The bowl is placed too low and rubs against brake ring 4. (fig. 11).</p>	<p>Adjust to proper bowl height (see sect. 14).</p>
	<p>3) The frame drain is clogged. Liquid or quark has collected in the upper section of frame, resulting in slowing-down of the bowl.</p>	<p>Clean frame drain and upper section of frame.</p>
	<p>4) Clamp disc is not tight. V-belt pulley slips on spindle.</p>	<p>Remove spindle (see sect. 12.1) and tighten screws in clamp disc evenly and <u>firmly</u> (see sect. 13.1, para. 5).</p>
	<p>5) V-belts slip because they are oily or have slackened.</p>	<p>Change V-belts (see sect. 13.3)</p>
<p>15.2. The separator runs unevenly.</p>	<p>1) One or several nozzles are clogged.</p>	<p>Clean the bowl (see sect. 10.1).</p>
	<p>2) The bowl is incorrectly assembled, or parts of different bowls (if plant consists of several separators) have been interchanged.</p>	<p>Assemble bowl properly (see sect. 5.2).</p>
	<p>3) Pressure of disc stack has slackened.</p>	<p>Make sure that bowl lock ring is tight (see sect. 5.2). Check disc count. If necessary, add spare disc.</p>

Troubles	Causes	Remedies
15.2. The separator runs unevenly (contd.)	4) Bowl is damaged and, therefore, out of balance.	Send bowl to factory or authorized factory repair shop. Do NOT attempt to make your own repairs. Never weld or solder. Bowl is made of heat-treated steels!
	5) Neck bearing springs are weak or broken.	Replace all 8 neck bearing springs.
	6) V-belt pulley does not run centrally.	Check central running of V-belt pulley with micrometer clock-gauge.
	7) Angular contact ball bearing or grooved ball bearings are worn through normal use.	Replace damaged bearings. <u>IMPORTANT!</u> Use only bearings with increased accuracy of running as per List of Parts
	8) Angular contact ball bearing or grooved ball bearings have become damaged due to insufficient lubrication which may be caused by: a) Clogging of the frame drain, resulting in water and dirt collection in upper section of frame and seeping, through neck bearing, into lubricating system. b) Clogging of suction pipe (lw and lx) through dirt deposits (fig. 14).	Replace damaged bearings (see sect. 13). Clean lubricating system (see sect. 10.4). Change the oil. Clean frame drain (see sect. 10.2).
	9) Contact surface of bearing cover lu (fig. 14) has worn rough. Cover is stuck in pressure ring 3.	Smooth the surfaces and grease them with molybdenum disulfide paste. Replace bearing cover and pressure ring, if necessary.

16. POSSIBLE CAUSES OF INEFFICIENT SEPARATION

Troubles	Causes
Insufficient concentration	<ol style="list-style-type: none"> 1) Temperature of coagulated skim milk is too low. 2) Skimmilk has not been renneted. 3) Feed rate is too low. 4) Too large a nozzle diameter or too high a number of nozzles.
Whey is not pure	<ol style="list-style-type: none"> 1) Temperature of coagulated skim milk is too low. 2) Acidity degree of whey is too low. 3) Feed rate is too high. 4) Nozzles are clogged. Solids content of quark increases. 5) Rising channels in disc stack are clogged. 6) At certain times during the year the temperature of the heated milk should not exceed 168,8° F. Holding time: 40 seconds.

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LIST OF PARTS

IMPORTANT

When ordering parts, please state the following:

- 1) Model
- 2) Serial - No.

of the Separator:

Both designations are shown on the name-plate. The Serial-No. also appears on the rim of the concentrate catch chamber.

- 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.

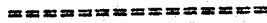
- 5) Bowl Serial - No.

(only required when ordering bowl parts):

The Bowl Serial-No. appears, in large figures, on bowl lock ring and on bowl bottom.

List of Parts shown in Fig.11,12,13.

Item No.	Part Description	QTY	Part - No.
-	Quark separator, complete	1	3190-0002-
-	Frame, complete	1	3157-1100-040
1	Drive assembly (see fig. 14)	1	see page 34
2	Top section of frame	1	3157-1009-000
3	Packing cord 10x10x1780	1	0004-2365-758
4	Brake ring	1	3157-1064-020
5	Guide cylinder	1	3157-1240-010
6	Packing cord 10x10x2620	1	0004-2365-758
7	Allen screw M 12x120 WSN 19-1626/00	6	0019-1280-300
8	Lock washer	6	0026-1328-170
9	Hex head screw M16x55 DIN 931	8	0019-6607-090
10	Lock washer	8	0026-1330-170
10a	Plate	2	3157-1470-010
11	Lock washer	4	0026-1328-170
12	Allen screw M12x35 DIN 912	4	0019-6166-120
13	Concentrate catch chamber	1	3157-1019-000
14	Upper section of frame	1	3157-1005-000
15	Hex head screw M16x70 DIN 931	8	0019-6610-090
16	Lock washer	4	0026-1330-170
17	Scraper blade	4	3157-1245-000
18	Gasket 880/10 ϕ	1	0007-2196-700
19	Ball oiler	4	0021-4560-650
20	Knurled screw M10x25 WSN 19-476/00	4	0019-0212-300
21	Drive ring	1	3157-1235-000
22	Bearing ring	1	3157-1238-000
23	Motor protection cover	1	3157-1190-010
24	Handle nut	3	0013-2896-640
25	Hinge screw M12x105	3	0019-1165-640
26	Cylindrical pin 10x45 DIN 7	3	0026-1115-300
27	Supporting piece	3	3157-1126-000
28	Hex head screw M10x50 DIN 933	6	0019-6941-090
29	Hex head screw M10x25 DIN 933	12	0019-6935-090
-	Hood assembly (30a-m)	1	3157-8800-020
-	Hinge screw assembly (30a-f)	3	3157-1127-000
30a	Handle nut	3	0013-2896-640
30b	Clamp	3	3157-1130-000
30c	Cylindrical pressure spring	3	0006-4138-500
30d	Threaded pin M6x8 DIN 417	3	0019-3792-640
30f	Hinge screw	3	0019-1167-640
30g	Cylindrical pin 10x8x55	3	0026-1116-400
30h	Hood	1	3157-8808-000
30k	Handle	2	0026-0015-690
30m	Hex head screw M6x20 DIN 931	4	0019-6452-550
31	Set of 2 V-belts 17x3350 DIN 2215	1	0021-4402-800
32	Tube	1	0018-2327-400
33	Lower section of frame	1	3157-1006-000
34	Set of 5 small V-belts 12,5x2150 DIN 7753	1	0021-4492-800
35	Oil pan (see fig. 15)	1	see page 35
36	Foot (see fig. 16)	4	see page 37
-	Sight glass	1	3190-8852-000
-	Winged screw M 6x15 DIN 316	2	0019-3702-640



see also fig. 12 and 13

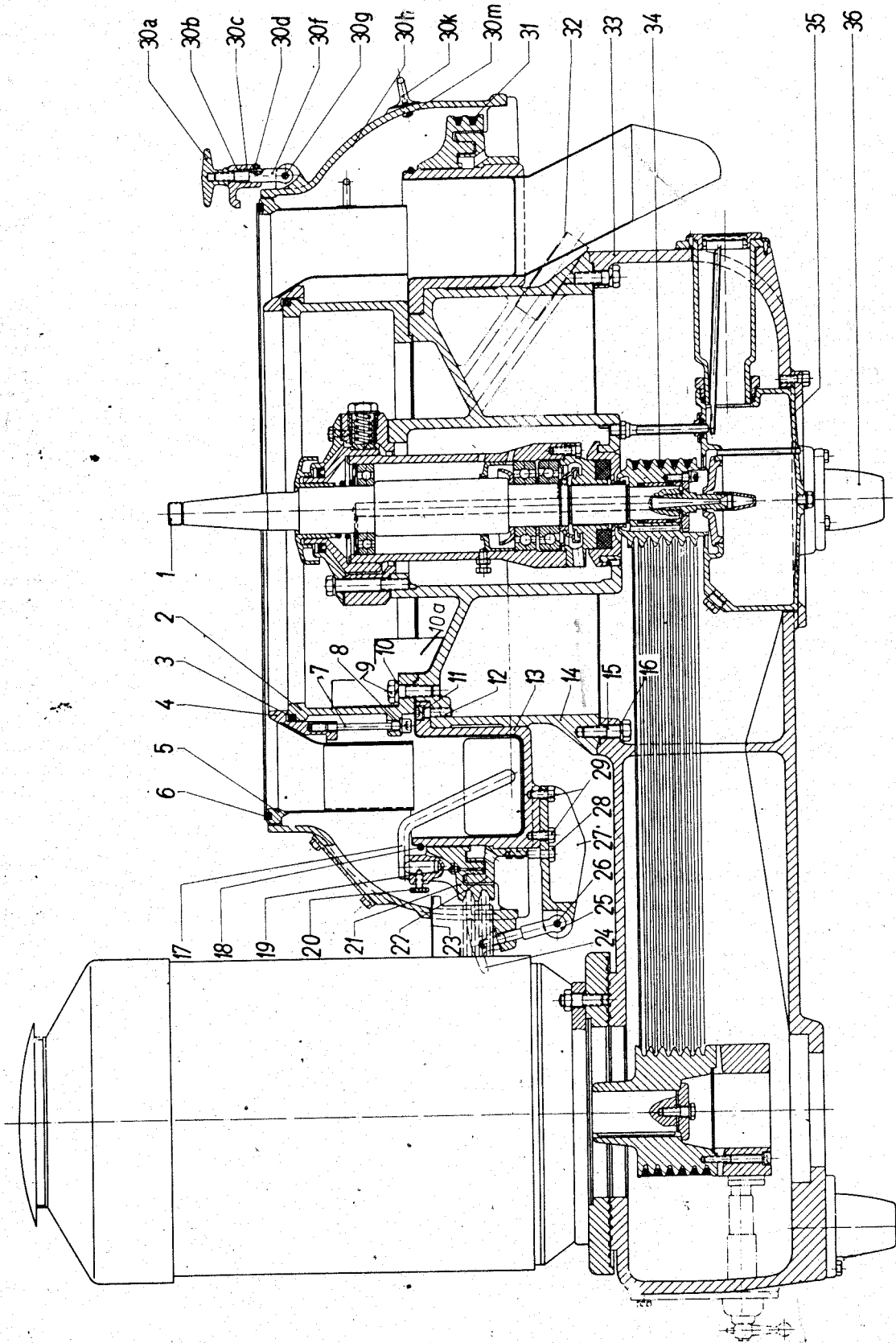


Fig. 11

List of Parts shown in Fig. 11,12 and 13

Item No.	Part Description	QTY	Part - No.
-	Flange assembly (37a-h)	1	1079-1021-000
37a	Cylindrical pin 8h8 x 55 DIN 7	2	0026-1005-030
37b	Flange	1	1079-1028-000
37c	Bolt	1	2315-1209-010
37d	Hex nut M16 DIN 934	8	0013-0282-030
37f	Lock washer	8	0026-1330-190
37g	Stud M16x35 DIN 939	8	0019-7725-090
37h	Bolt	1	2315-1104-010
38	* Cylindrical pin	4	0019-1114-300
39	* Bearing sleeve	1	2315-1377-000
40	Cover (for brake)	1	3157-1004-010
41	Washer 14,5/60x10	1	0026-1985-030
42	Hex head screw M12x30 DIN 931	1	0019-6532-090
43	Guide bolt	1	2315-1309-010
44	Threaded bush	2	0019-1088-300
-	Brake assembly (45a-g)	2	1079-1043-000
45a	Brake housing	2	0021-3538-640
45b	Cylindrical pressure spring	2	0006-4354-160
45c	Handle	2	0021-3514-690
45d	Brake bolt	2	1079-1031-000
45f	** Countersunk rivet 4x13 DIN 661	4	0026-1262-550
45g	** Brake lining	1	0021-4110-880
-	V-belt pulley assembly (46a-d)	1	1079-3355-000
46a	Lock washer	4	0026-1328-170
46b	Allen screw M12x80 DIN 912	4	0019-6175-150
46c	Brake ring	1	1079-3371-000
46d	V-belt pulley (for motor speed n = 2900 rpm)	1	1079-3354-000
47	Centering disc	1	0026-1666-000
48	Hex head screw M12x35 DIN 931	1	0019-6533-090
49	Washer	6	0026-1348-300
50	Hex head screw M10x30 DIN 931	6	0019-6510-550
51	Cover (for brake)	1	3157-1004-000
-	Cover	1	2315-1004-000
52	Hex head screw M16x255 WSN 19-1092/00	1	0019-1110-160
53	Cylindrical pressure spring	1	0026-4363-160
54	Guide sleeve	1	2315-1355-010
55	Washer	1	2315-3466-010

* This part is included in lower section of frame, 33, but it is also available as separate item.

** This part is included in brake bolt, 45d, but it is also available as separate item.

Frame SIH 10007

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see also fig. 11 and 13

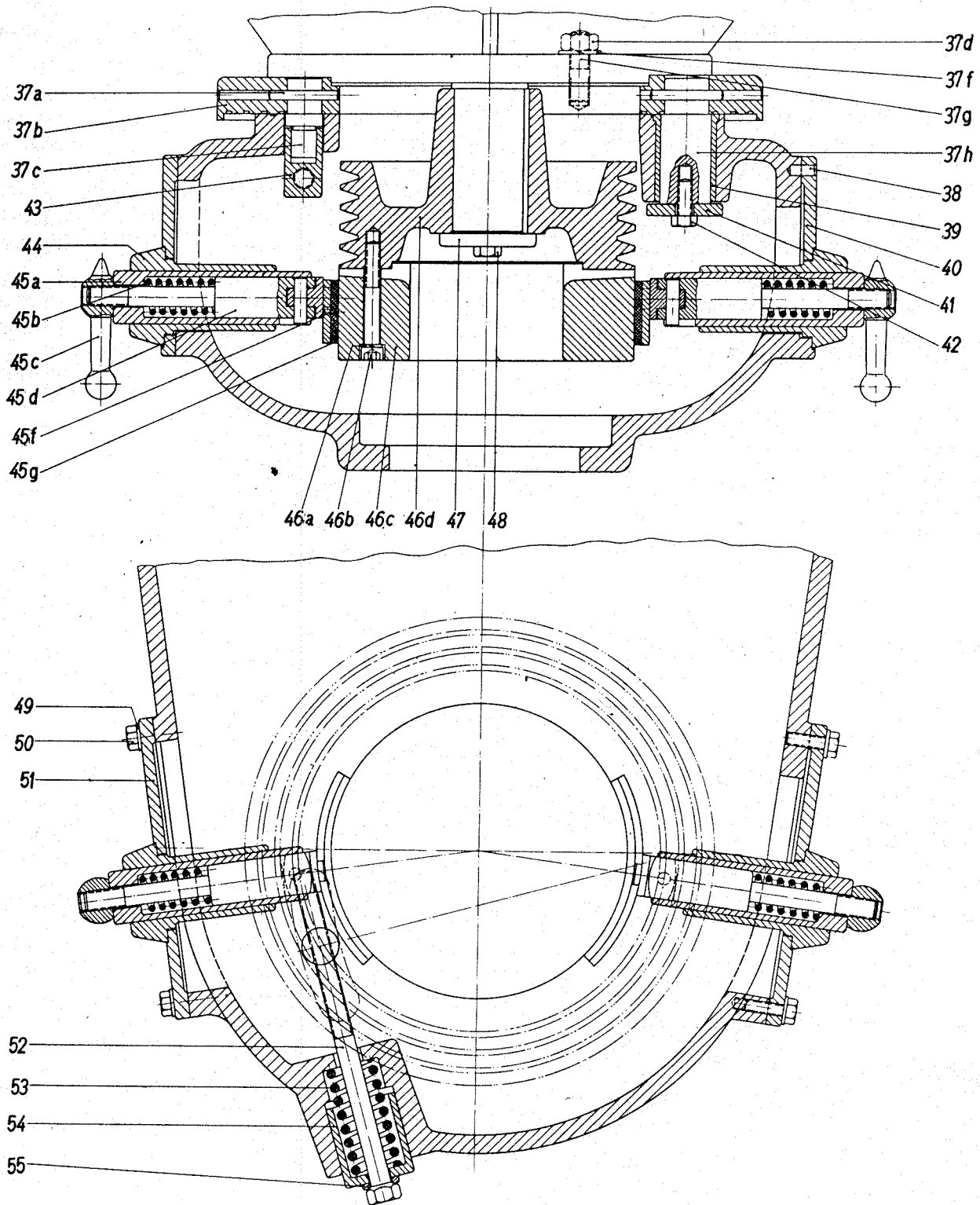


Fig. 12

List of Parts shown in Fig. 11,12, and 13

Item No.	Part Description	QTY	Part - No.
-	Belt tightener assembly (57a-c)	1	3157-3573-010
-	Shaft	1	3157-3398-000
57a	Pulley	1	3157-3480-010
57b	Washer	1	0026-1353-030
-	Lock washer	1	0026-1330-190
57c	Hex nut M16 DIN 934	1	0013-0282-030
-	Motor plate assembly (58a-g)	1	3157-1007-000
58a	Base plate	1	3157-1008-010
58b	Cylindrical pin 16h8 x260 WSN 26-2/90	1	0026-5720-090
58c	Motor plate	1	3157-1008-000
58d	Hex nut M12 DIN 934	4	0013-0280-550
58f	Washer	8	0026-1371-640
58g	Hex head screw M12x50 DIN 931	4	0019-6536-550
-	Threaded pin M6x10 DIN 553	1	0019-5041-300
59	V-belt pulley	1	3157-3354-010
60	Hex head screw M10x30 DIN 931	4	0019-6510-550
61	Washer	4	0026-1348-300
62	Handle screw M16x120	1	0019-1016-300
63	Winged screw M6x15 DIN 316	4	0019-3702-640

see also fig. 11 and 12

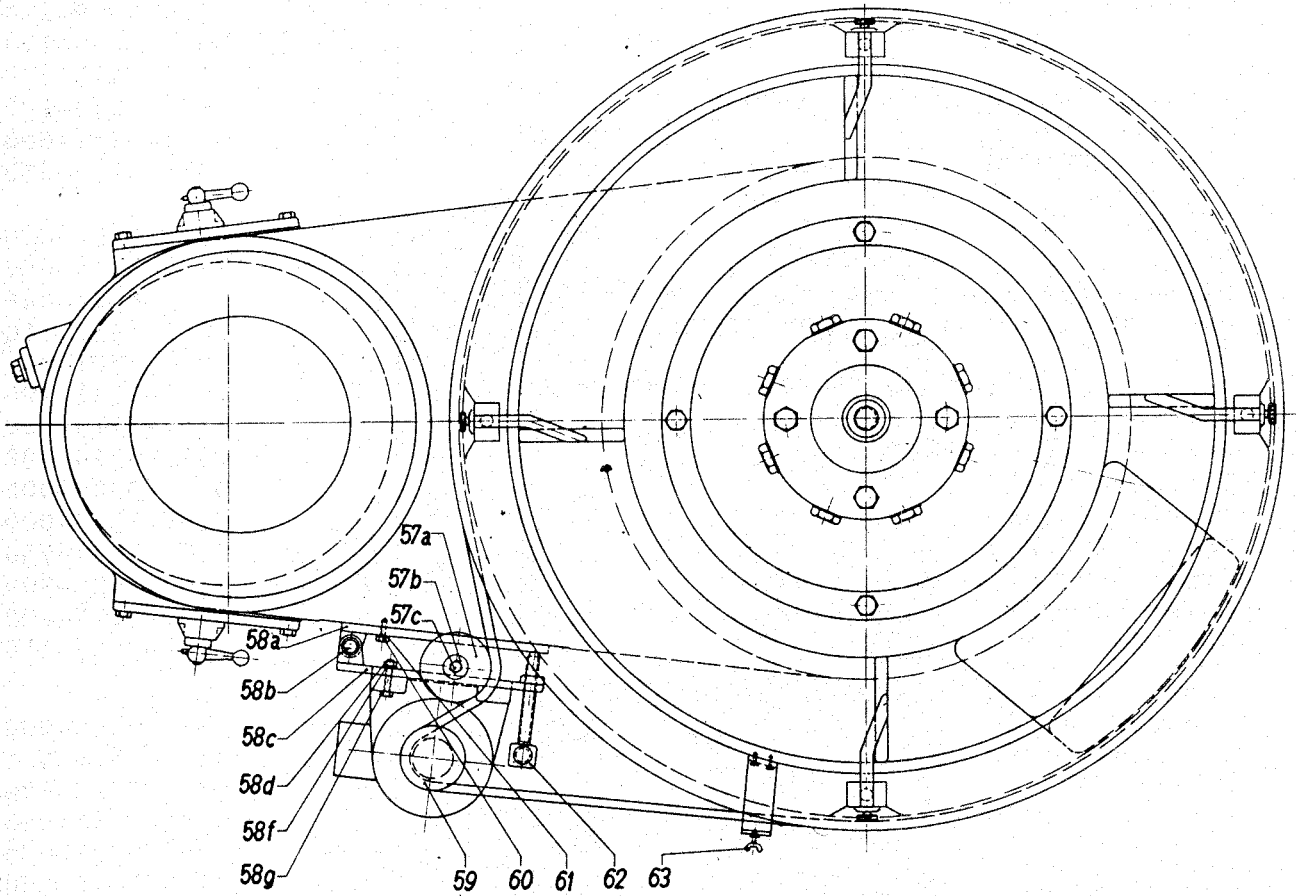


Fig. 13

Drive SIH 10007
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List of Parts shown in Fig. 14

Item No.	Part Description	QTY	Part - No.
-	Drive assembly	1	3157-3300-000
-	Spindle assembly (1a-y)	1	3157-3429-000
1a	Spindle with suction pipe	1	3157-3411-000
1b	Spindle cap	1	0008-6501-570
1c	Spindle spring	1	0006-4309-160
1d	Securing ring	1	0026-5845-170
1e	Oil control ring	1	3157-3419-030
1f	Grooved ball bearing 6213/MA/P63 DIN 625	1	0011-6213-180
1g	Bearing housing	1	3157-3131-000
1h	Hex nut M10 DIN 934	1	0013-0279-030
1i	Hex head screw AM 10x30 DIN 561	1	0019-5196-030
1k	Ring	1	3157-3419-020
1m	Oil slinger ring	1	0008-6511-040
n	Grooved ball bearing 6311/MA/P63 DIN 625	1	0011-6311-180
1p	Washer	1	0026-5801-000
1q	Angular contact ball bearing 7311/BM/P6 DIN 628	1	0011-7311-100
1r	Oil control ring	1	3157-3419-000
1s	Hex head screw M10x30 DIN 931	4	0019-6510-090
1t	Threaded ring	1	3157-3308-000
1u	Bearing cover	1	3157-3375-000
1v	Gasket 22/29 ϕ x 3	1	0004-1877-750
1w	Upper part of suction pipe	1	3157-3422-000
1x	Lower part of suction pipe	1	3157-3427-000
1y	Threaded pin AM 6x15 DIN 914	1	0019-8967-150
-	Neck bearing bridge assembly with covering (2a-t)	1	0008-6520-000
2a	Hex head screw M16x100 DIN 931	4	0019-6616-090
2b	Gasket M16	4	0004-5925-800
2c	Grooved ring 90/115 ϕ x 12	1	0004-5748-840
2d	Neck bearing protection cap	1	0008-6502-050
2f	Hex head screw M10x80 DIN 933	4	0019-6520-090
2g	Washer	4	0026-5673-170
2h	Washer	4	0026-5723-020
2k	Gasket 185/260 ϕ x 0,3	1	0004-5479-770
-	Neck bearing bridge assembly (2m-p, 2s, 2t)	1	0008-6510-000
2m	Threaded plug	8	0019-1426-150
2n	Set of neck bearing springs	1	0006-4240-080
2p	Spring piston	8	0026-5724-110
2r	Gasket 175/240 ϕ x 0,3	1	0004-5478-770
2s	Neck bearing bridge	1	0008-6506-050
2t	Neck bearing pressure ring	1	0008-6507-050
3	Pressure ring	1	3157-3349-000
4	Gasket 138/157 ϕ x 1	1	0004-5100-710
5	Rubber cushion	1	0021-3020-750
6	V-belt pulley (for motor speed n = 2900 rpm)	1	2315-3352-060
7	Distance sleeve (long)	1	0026-5972-060
8	Set of conical clamp rings	2	0026-5983-060
9	Distance sleeve (short)	1	0026-5971-060
10	Lock washer	3	0026-1337-170
11	Allen screw M10x40 DIN 912	3	0019-6147-120
12	Clamp disc	1	0026-2062-060

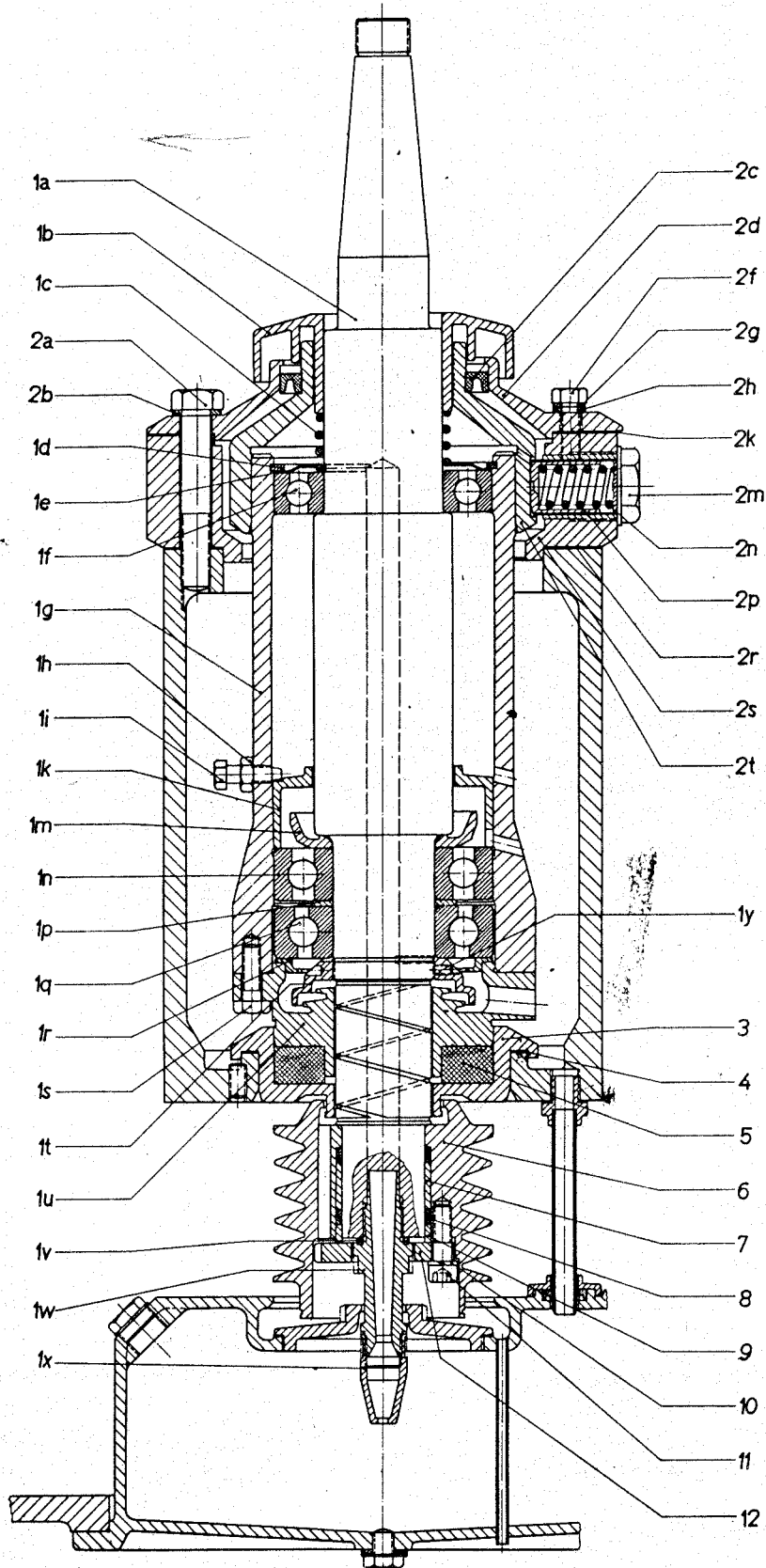
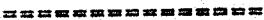


Fig. 14

Oil Pan SIH 10007

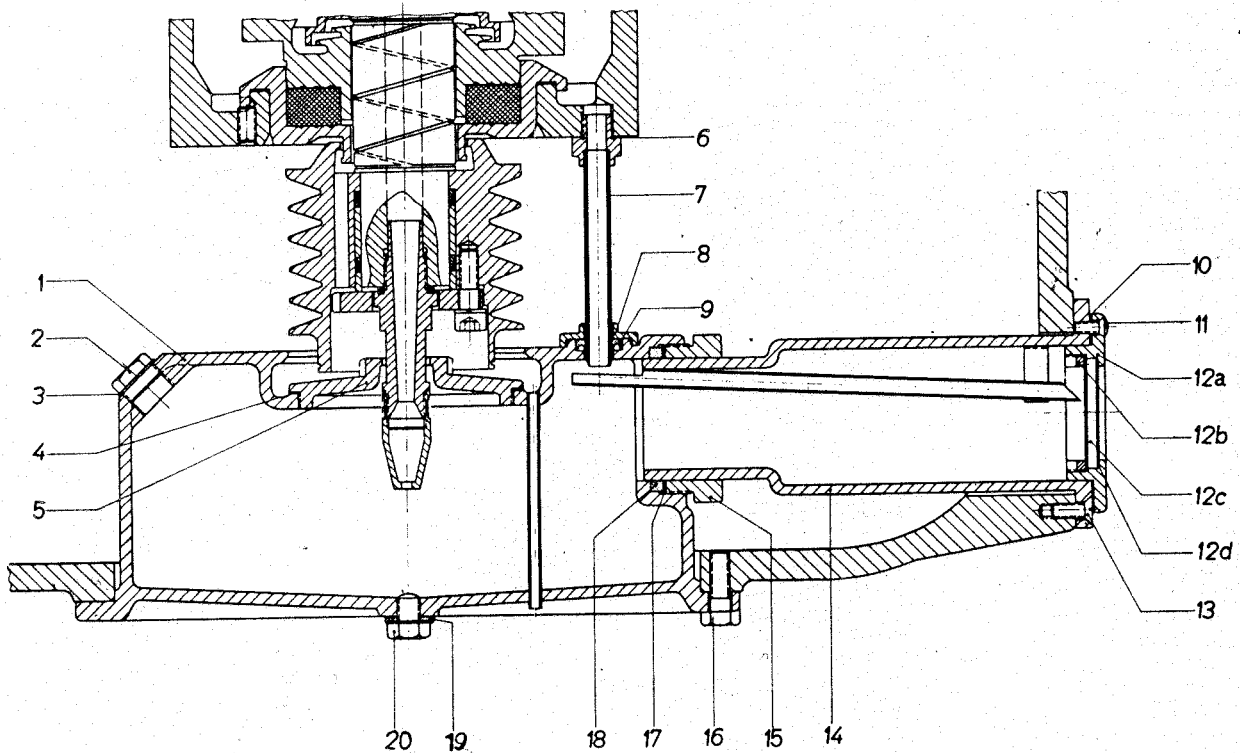


Fig. 15

Item No.	Part Description	QTY	Part - No.
-	Oil pan assembly (1-20) (see also fig. 11, item 35)	1	2315-1040-000
1	Oil pan with overflow pipe	1	2315-1041-000
2	Oil fill plug	1	0019-1442-030
3	Gasket 22/26 ϕ	1	0004-5276-710
4	Gasket 110,6/124,2 ϕ x 1	1	0004-5074-700
5	Cover	1	2315-1125-010
6	Gasket 12/3 ϕ	1	0007-2502-750
7	Return pipe	1	2315-1122-000
8	Cap	1	2315-3347-000
9	Grooved ring 13/24 ϕ x 6	1	0004-5716-840
10	Gasket 70/102 ϕ x 0,3	1	0004-5346-770
11	Lens head screw M6x15 DIN 88	3	0019-3250-300
-	Sight glass assembly (12a-d)	1	0001-0007-640
12a	Frame	1	0001-0021-690
12b	Threaded ring	1	0019-1620-600
12c	Sight glass	1	0001-0046-820
12d	Gasket 48/57 ϕ x 1	2	0004-5041-740
13	Countersunk screw M 8x15 DIN 63	2	0019-2112-300
14	Oil return housing	1	2315-1080-000
15	Screw M 78x2 WSN 19	1	0019-1180-500
16	Hex head screw M10x30 DIN 931	4	0019-6510-090
17	Washer	1	0026-5800-500
18	Gasket 63/75 ϕ x 6	1	0007-2163-750
19	Gasket 13/25 ϕ x 2	1	0004-1872-720
20	Hex head screw M12x15 WSN 19-12/1, 40	1	0019-0133-000

Foundation Frame and Foot SIH 10007

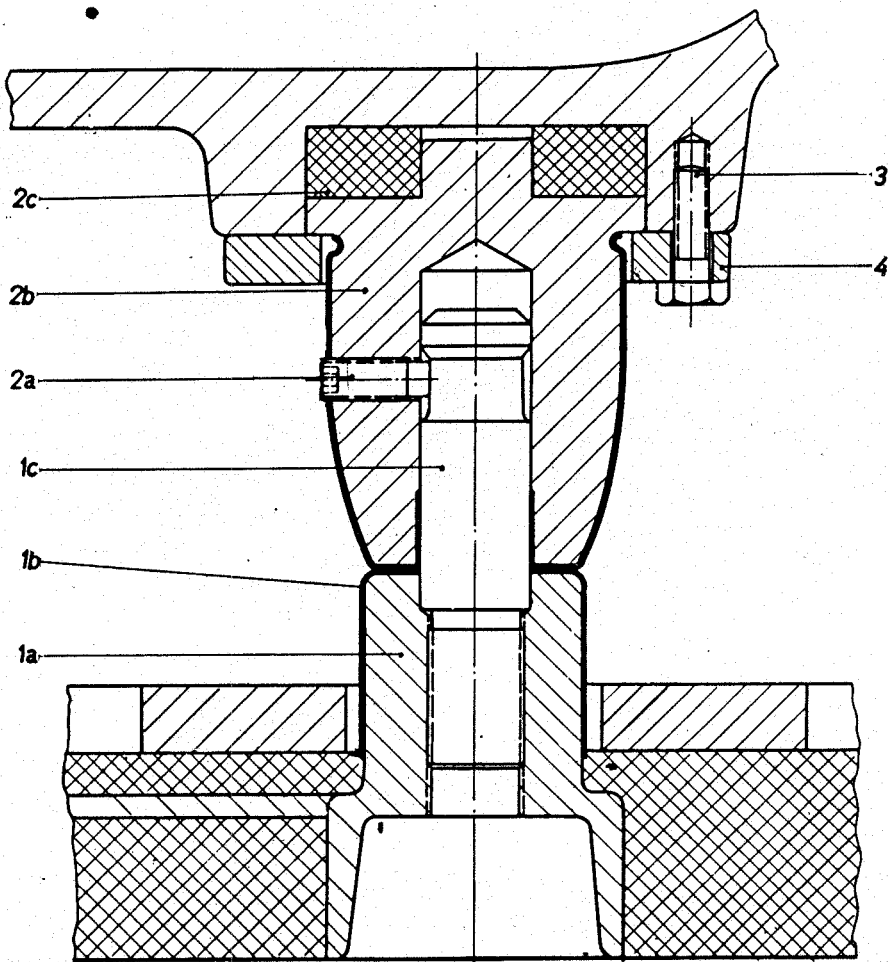


Fig. 16

Item No.	Part Description	QTY	Part - No.
-	Foundation frame assembly (1a-c)	1	3157-1020-000
1a	Foundation frame	1	3157-1003-000
1b	Cap	4	0026-2034-300
1c	Bolt	4	3157-1033-000
-	Foot assembly (2a-c) (see also fig. 11, item 36)	4	2315-1015-010
2a	Threaded pin AM 12x28 DIN 915	4	0019-6387-400
2b	Foot, stainless steel coated	4	2315-1011-000
2c	Rubber cushion	4	0021-3018-750
3	Hex head screw M 10x30 DIN 931	12	0019-6510-550
4	Flange	4	0001-0516-040

Bowl SIH 10007

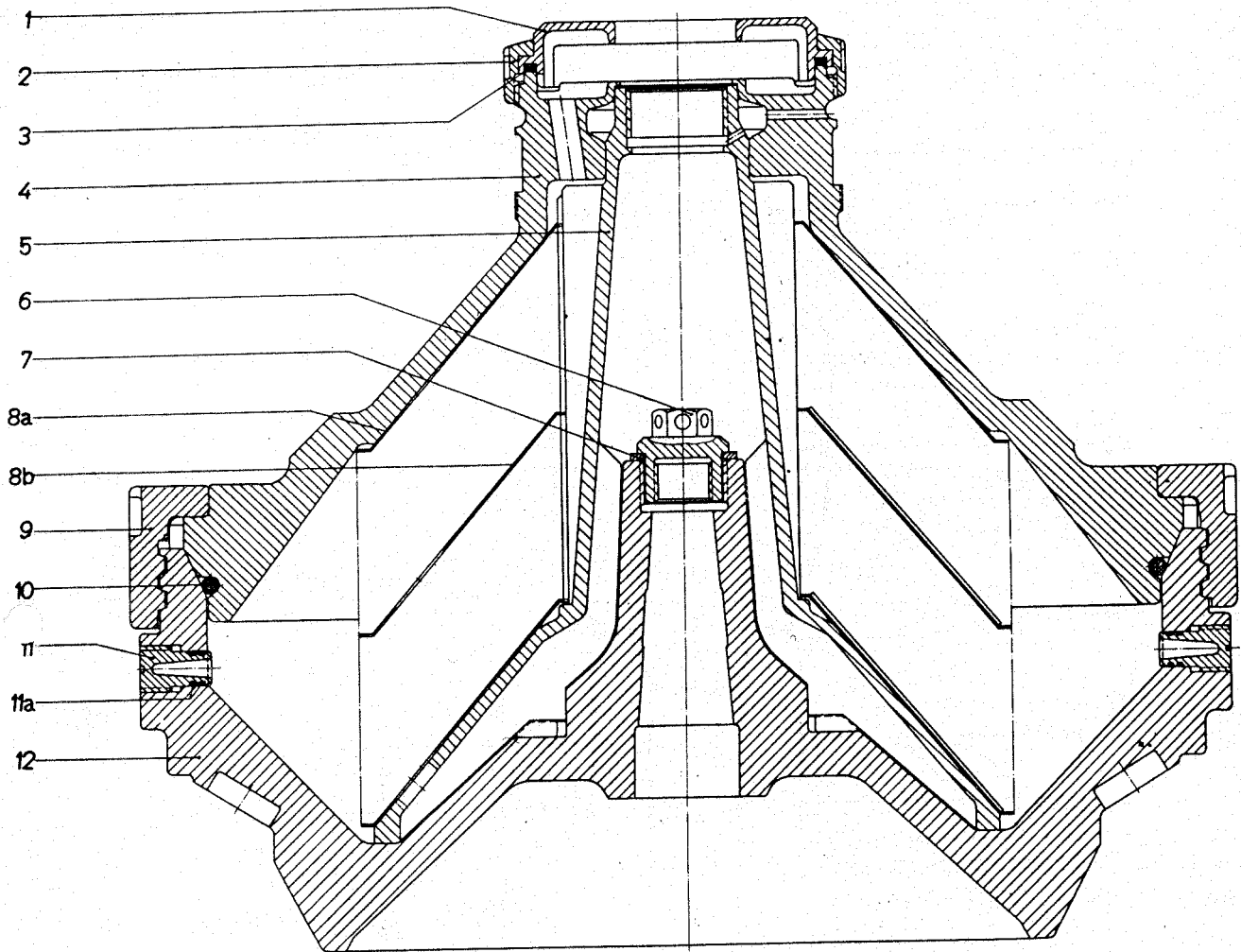


Fig. 17

Item No.	Part Description	QTY	Part - No.
-	Bowl, complete (1-12)	1	3190-6600-010
1	Centripetal pump chamber cover	1	0947-6642-080
2	Lock ring (for centripetal pump chamber cover)	1	1072-6631-030
3	Gasket 140/152 ϕ x 4	1	0007-2133-750
4	* Bowl top	1	3190-6610-010
5	* Distributor	1	3190-6620-010
6	Spindle nut	1	0013-3153-400
7	Ring	1	0026-5534-400
-	* Disc set assembly (8a-b)	1	3122-6660-060
8a	Compensating disc	1	2229-6666-040
8b	Disc	51	3122-6663-030
9	* Bowl lock ring	1	3110-6631-000
10	Gasket 465/9 ϕ	1	0007-2194-750
11	Nozzle	4	0983-6710-040
11	Plug	4	0983-6706-000
11a	+) Gasket 13,3/2,4 ϕ	16	0007-2505-750
12	* Bowl bottom	1	3122-6601-000

* This part can only be replaced by a WESTFALIA service engineer, 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 nozzle, item 11 (2 for each nozzle), but it is also available as separate item.

Hood (with Clamp Ring) SIH 10007
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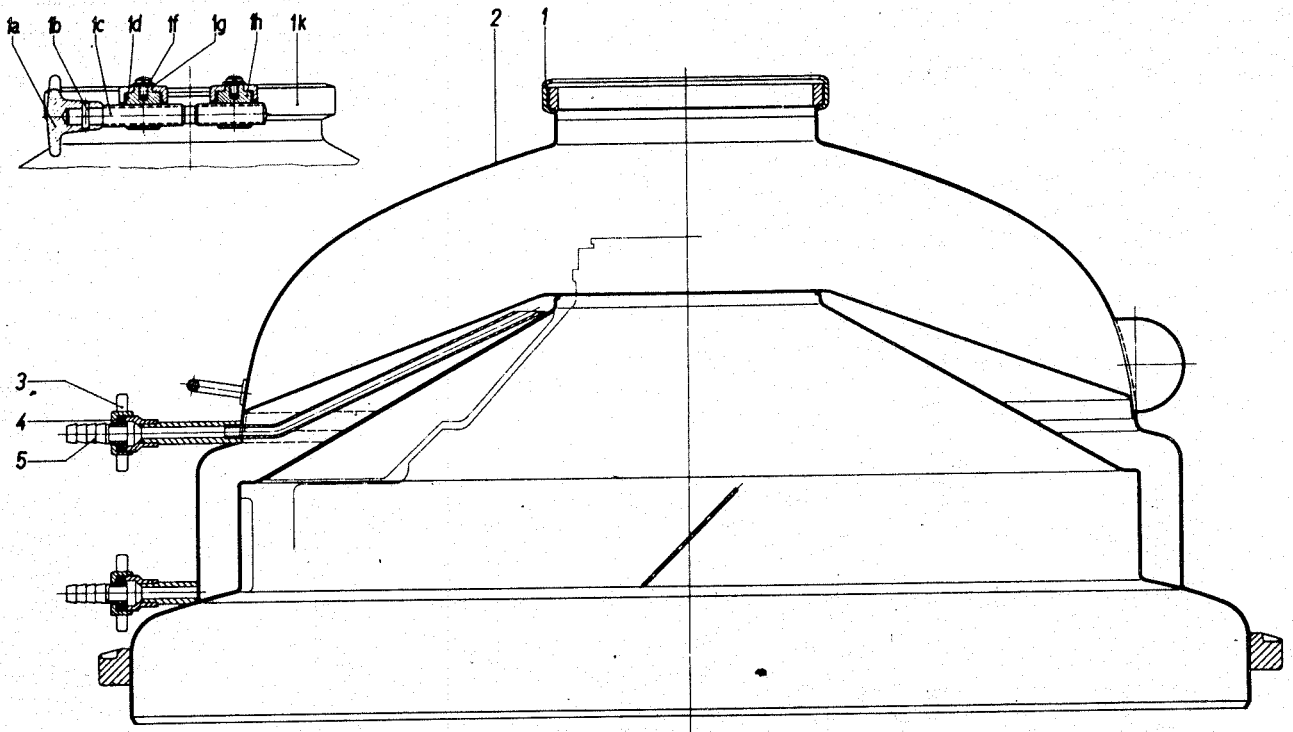


Fig. 18

Item No.	Part Description	QTY	Part - No.
-	Hood assembly (1-5)	1	3157-7759-040
1	Clamp ring assembly (1a-k)	1	1033-7719-010
1a	Handle	1	0021-3122-640
1b	Cylindrical pin 5h8 x 24 DIN 7	1	0026-1075-400
1c	Threaded bolt	1	1033-1129-000
1d	Threaded piece (left-hand thread)	1	1033-7717-000
1f	Lens head screw AM 6x10 DIN 85	1	0019-2507-640
1g	Washer	1	0026-1343-300
1h	Threaded piece (right-hand thread)	1	1033-7717-010
1k	Clamp ring	1	1033-7718-000
2	Hood	1	3157-7765-020
3	Coupling nut R 3/4"	2	0013-3282-640
4	Gasket 15/22 Ø x 3	2	0007-2184-750
5	Hose connection	2	0018-1822-610

Feed and Discharge Connections, Centripetal Pump SIH 10007
=====

List of Parts shown in Fig. 19

tem No.	Part Description	QTY	Part - No.
-	Feed line assembly (1a-m)	1	3190-2296-000
1a	Flowmeter, complete (see fig. 20)	1	see page 42
1b	+) Connecting pipe	1	1033-2166-030
1c	Gasket 42/52 ϕ x 5	1	0007-2210-750
1d	Gasket 40/50 ϕ x 5	2	0007-2245-750
1f	Cylindrical sight glass	1	0001-0097-820
1g	Cylindrical sight glass housing	1	1033-2196-000
1h	Bend	1	3190-2197-000
1k	Gasket 54/64 ϕ x 5	1	0007-2211-750
1m	Handle connection piece	1	1328-2190-010
-	Cone connection	1	0018-3949-300
-	Grooved coupling nut	1	0013-2844-300
-	Discharge system (2a-4)	1	3190-2299-000
-	Discharge assembly (2a-y)	1	3190-2295-000
2a	Snap ring	1	0026-5556-300
2b	Washer	1	0026-5659-300
2c	Gasket 50/62 ϕ x 6	1	0007-2247-750
2d	Discharge	1	3190-2285-000
2f	Gasket 53/61 ϕ x 5	1	0007-2124-750
2g	Hexagon coupling nut	1	0013-2817-540
2h	Gasket 25,5/33,5 ϕ x 4	2	0007-2299-750
2k	Cylindrical sight glass	1	0001-0090-820
2m	Gasket 19/26 ϕ x 1	1	0004-5277-850
2n	Hose cock	1	0018-1526-400
2p	Cone connection	1	0018-3955-300
2r	Gasket 54/64 ϕ x 5	1	0007-2211-750
2s	Grooved coupling nut	1	0013-2845-300
2t	Valve housing	1	3190-2291-000
-	Valve cone assembly (2u-y)	1	1073-2272-030
2u	Valve cone	1	1073-2278-000
2v	Grooved ring 18/30 ϕ x 6	1	0004-5718-840
2w	Distance sleeve	1	0026-5998-840
2x	Adjusting screw	1	1033-2276-000
2y	Hat nut	1	0013-2852-640
-	Gasket } for pressure gauge	1	0007-2210-750
-	Washer }	1	0026-5538-300
-	Centripetal pump assembly (3a-b)	1	3190-2213-000
3a	Upper part of centripetal pump	1	3190-2253-000
3b	Feed tube	1	0947-2245-060
4	Pressure gauge	1	8918-2000-000

+) On special order, valve assembly 1 - 10 (fig. 21a) can be supplied instead of connecting pipe 1b.

Feed and Discharge Connections, Centripetal Pump SIII 10007

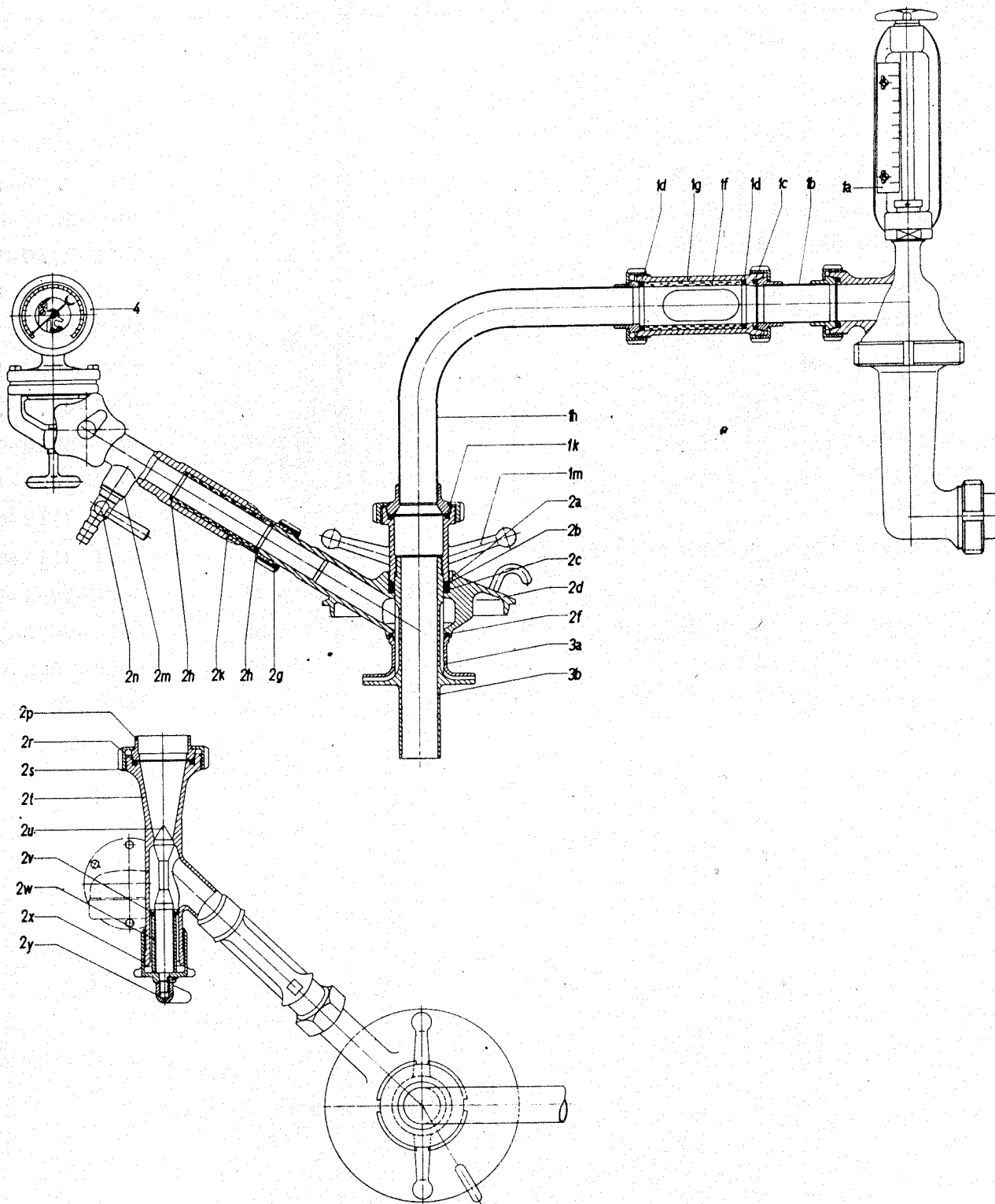


Fig. 19

Flowmeter SIH 10007

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Measuring Range: 2000 - 10000 litres/h

List of Parts shown in Fig. 20

Item No.	Part Description	QTY	Part - No.
-	Flowmeter, complete (1-16)	1	8021-2100-090
1	Handle screw	1	0019-1731-300
2	Gasket 13,5/22 ϕ x 10	2	0007-2298-750
3	Cylindrical sight glass	1	0001-0083-820
4	Threaded bush	1	0019-1380-300
5	Washer	1	0026-1375-300
6	Nut M 35 x 1,5	1	0013-3010-300
7	Outlet pipe	1	8021-2003-120
8	Gasket 56/68 ϕ x 6	1	0007-2279-750
9	Grooved coupling nut	1	0013-2846-300
10	Inlet cup	1	8021-2001-150
11	Float	1	8021-2112-010
12	Scale: 2000 - 10000 litres/h	1	8021-2117-000
13	Gasket 4,5/8,5 x 1	2	0004-5261-720
14	Lens head screw AM 4x8 DIN 85	2	0019-2478-300
15	Intermediate piece	1	8020-2002-000
16	Gasket 42/52 ϕ x 5	2	0007-2210-750

Flowmeter SIH 10007

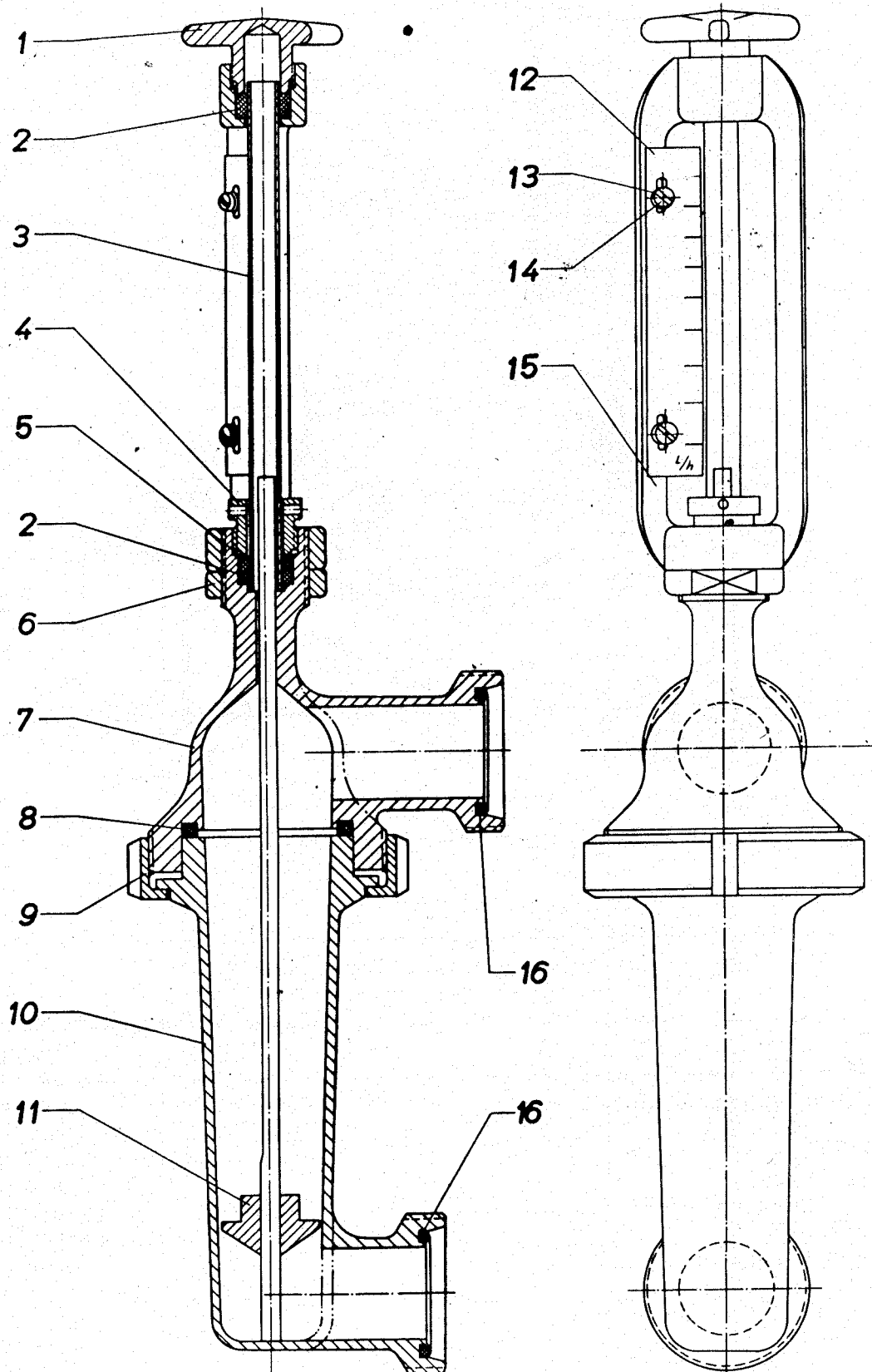


Fig. 20

Pressure gauge (with connecting pipe) SIH 10007

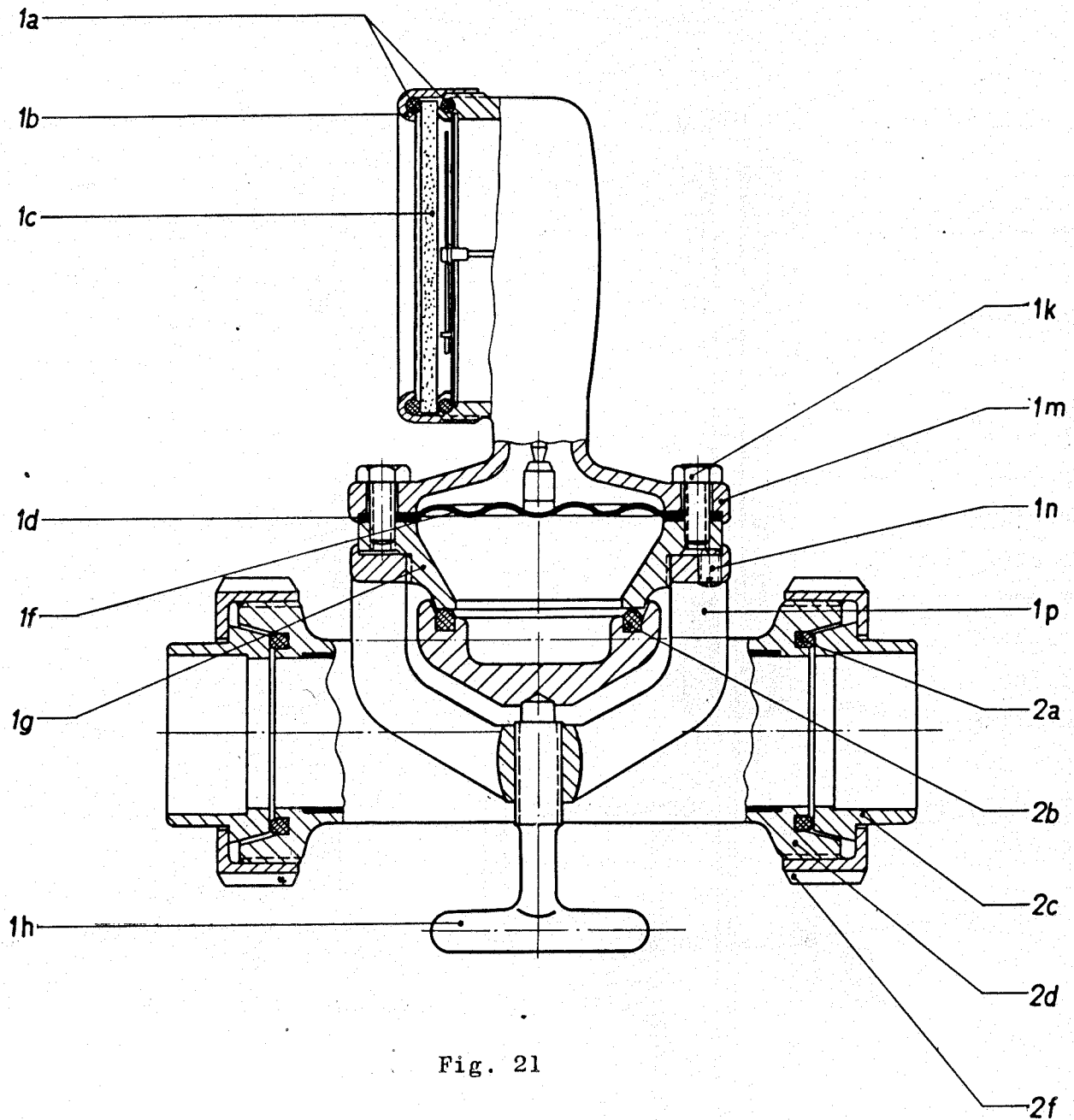


Fig. 21

Item No.	Part Description	QTY	Part - No.
-	Pressure gauge, complete (1a-p)	1	8918-2000-070
1a	Gasket 71/4,5 ϕ	2	0007-2057-750
1b	Lock ring	1	8470-3315-010
1c	Sight glass	1	0001-0050-820
1d	Gasket 64/89 ϕ x 0,3	2	0004-2745-850
1f	Diaphragm	1	8915-2790-060
1g	Threaded ring	1	8918-2704-040
1h	Handle screw	1	0019-0002-640
1k	Hex head screw M6x15 DIN 933	6	0019-6841-550
1m	Housing	1	8915-2001-000
1n	Threaded pin M6x8 DIN 438	1	0019-3965-630
1p	Clamp	1	8918-2831-000
-	Connecting pipe assembly (2a-f)	1	8918-2166-010
2a	Gasket 54/64 ϕ x 5	1	0007-2211-750
2b	Gasket 42/52 ϕ x 5	1	0007-2210-750
2c	Cone connection	1	0018-3955-400
2d	Pipe	1	0018-0619-400
2f	Grooved coupling nut	1	0013-2845-300

Valve SIH 10007

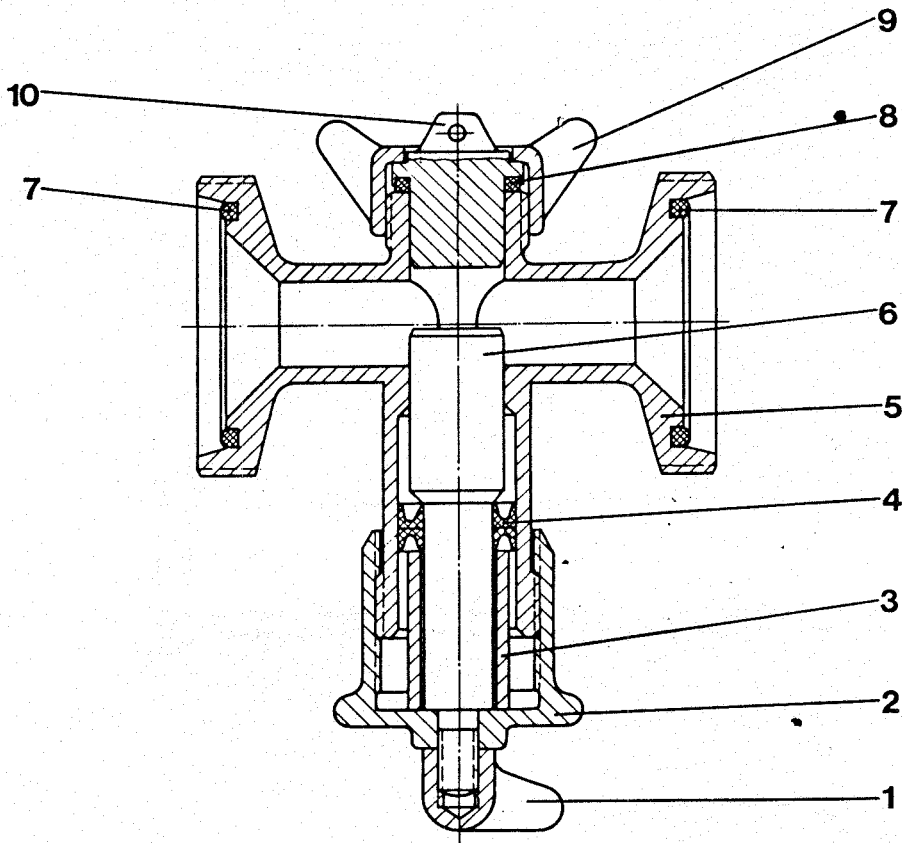


Fig. 21a

Item No.	Part Description	QTY	Part - No.
-	Valve assembly (1-10)	1	8121-2225-030
1	Hat nut	1	0013-2852-640
2	Adjusting screw	1	8121-2276-000
3	Distance sleeve 18,5 x 26 x 41	1	0026-0517-840
4	Grooved ring 18/ 30 ϕ x 6	2	0004-5718-840
5	Valve housing	1	8121-2226-010
6	Slide	1	8121-2229-020
7	Gasket G 50 DIN 11851	2	0007-2211-700
8	Gasket 23/31 ϕ x 4	1	0007-2218-750
9	Coupling nut	1	0013-2834-690
10	Plug	1	1033-2223-000

Tubular Strainer SIH 10007

The separator is supplied either with tubular strainer No. 3157-2330-000 or dual strainer No. 8020-7000-040.

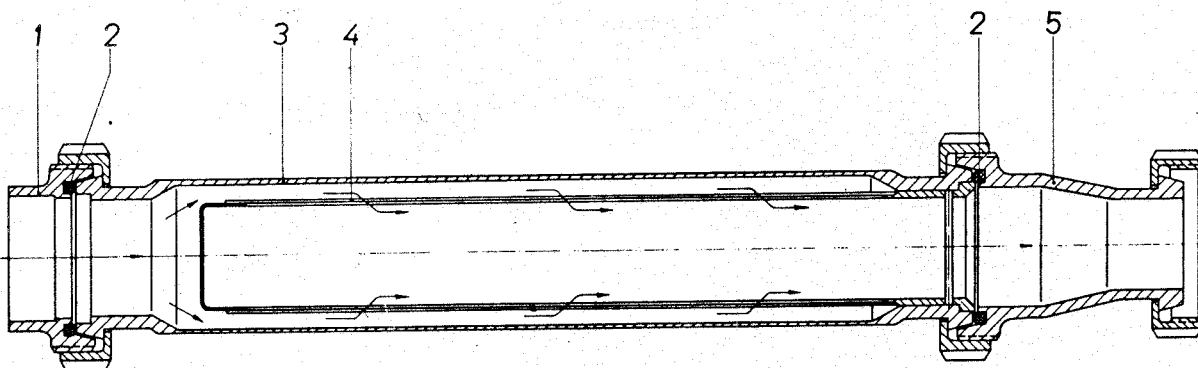


Fig. 22

Item No.	Part Description	QTY	Part - No.
-	Tubular strainer, complete	1	3157-2330-000
1	Threaded connection	1	0018-4119-300
2	Gasket 54/64 ϕ x 5	2	0007-2211-700
3	Housing	1	3157-2331-000
4	Strainer	1	3157-2332-000
5	Reducing socket	1	0018-0515-300

Dual Strainer SIH 10007

The separator is supplied either with tubular strainer No. 3157-2330-000 or with dual strainer No. 8020-7000-040.

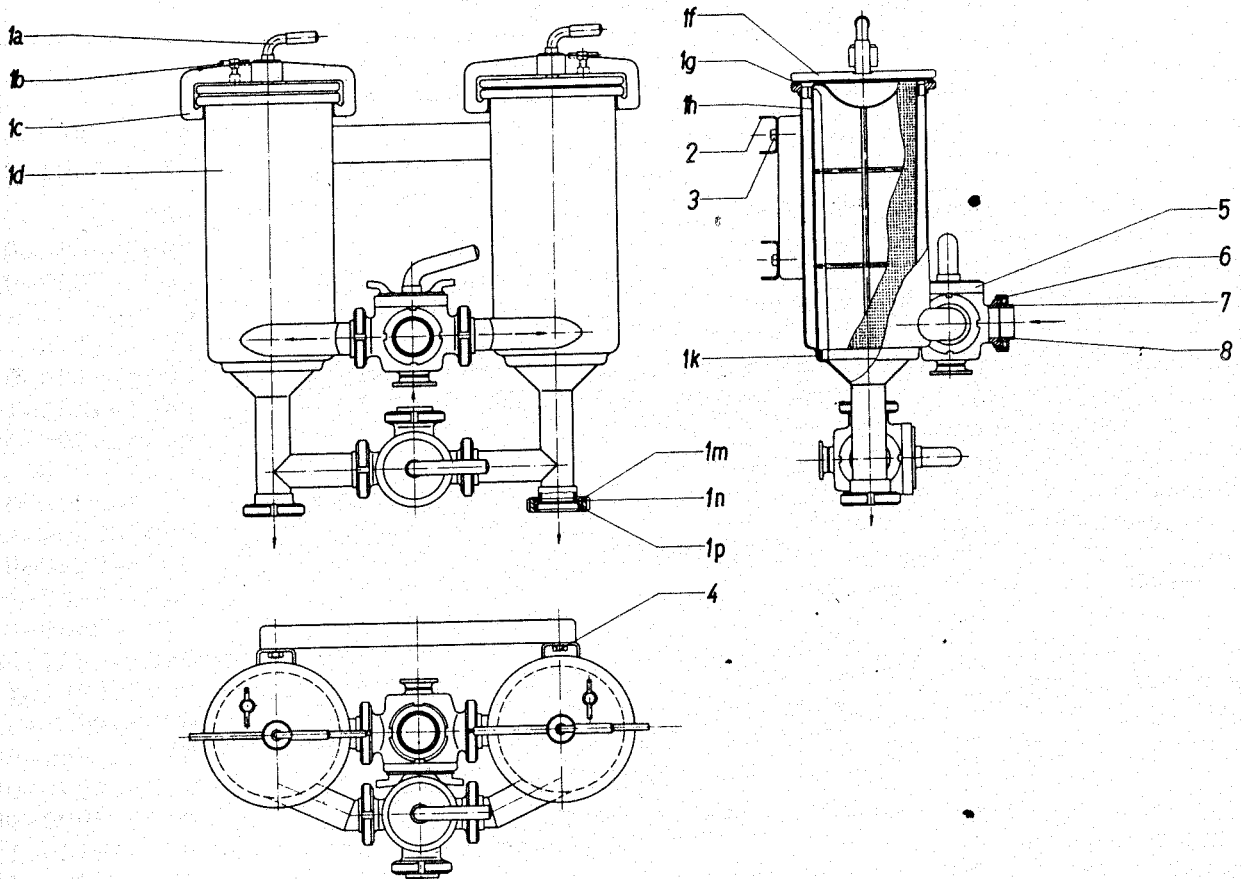


Fig. 23

Item No.	Part Description	QTY	Part - No.
-	Dual strainer, complete(1a-8)	1	8200-7000-040
-	Strainer (right side) (1a-p)	1	8200-7700-040
-	Strainer (left side) (1a-p)	1	8200-7700-050
1a	Clamp screw	1	0019-0541-160
1b	Handle screw	1	0019-1301-400
1c	Clamp	1	8200-7065-010
1d	Strainer (right side)	1	8200-7740-020
-	Strainer (left side)	1	8200-7740-030
1f	Cover	1	8200-7773-010
1g	Gasket 200/216 ϕ x 8	1	0007-2457-750
1h	Strainer insert (for strainer on right side and left side)	2	8200-7720-020
1k	Gasket 130/7 ϕ	1	0007-2080-750
1m	Grooved coupling nut	1	0013-2845-640
1n	Gasket 54/64 ϕ x 5	1	0007-2211-850
1p	Blind cap	1	0001-0264-400
2	U-iron joint bar	2	8200-7013-000
3	Hex head screw M12x25 DIN 933	4	0019-6968-090
4	Hex nut M12 DIN 934	4	0013-0280-030
5	Three-way cock	2	0018-3873-300
6	Grooved coupling nut	2	0013-2845-640
7	+) Gasket 54/64 ϕ x 5	6	0007-2211-700
8	Cone connection	2	0018-3955-400

+) This part is contained in three-way cock, item 5, but it is also available as separate item.

Tools and Accessories SIH 10007

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

List of Parts shown in Fig. 24

Item No.	Part Description	QTY	Part - No.
-	Set of tools	1	3190-9000-000
-	Set of accessories	1	3190-9001-000
1	Annular wrench (for bowl lock ring)	1	0003-4064-030
2	Screwdriver 5x125	1	0003-4636-050
	Screwdriver 10x160	1	0003-4637-050
3	Allen wrench 6 DIN 911 (for foot)	1	0003-3776-100
	Allen wrench 10 DIN 911 (for brake ring)	1	0003-3778-100
4	Hexagon socket wrench (for spindle nut)	1	0003-4195-030
5	Single-ended wrench 75 DIN 894 (for screw, item 15, fig. 15)	1	0003-4225-110
6	Double-ended wrench 12x13 DIN 3110	1	0003-4202-320
	Double-ended wrench 17x19 DIN 3110	1	0003-4205-320
	Double-ended wrench 22x27	1	0003-4208-320
	Double-ended wrench 24x30	1	0003-4209-320
	Needle holder (1 package of nozzle gauges 3157-9818-000)	1	0003-0420-000
	Lifting device for spindle	1	3157-9862-000
9	Jack (for bowl)	1	3190-9930-010
10	Lifting bar	1	3121-9857-000
11	Ratchet wrench	1	0003-4291-110
12	Mallet	1	0003-0200-000
13	Lifting device (for hood)	1	3190-9840-000
14	Lifting device (for distributor)	1	3121-9970-000
15	Annular wrench (for centripetal pump chamber lock ring)	1	0003-3992-000
16	Nozzle wrench	1	0003-4180-110
17	Lifting device (for bowl top)	1	3190-9930-000
18	Compressing device	1	3190-9820-000
19	Wrench (for centripetal pump)	1	0003-0133-000
20	Oil gun	1	0003-0256-890
21	Jack (for bowl bottom)	1	3124-9915-010
22	Oil cup	1	0003-0274-000
23	Oil funnel	1	0003-0161-010
24	Cover	1	3157-9888-000
25	Splash cover	1	0003-0296-000
26	Grease gun	1	0952-9985-000
27	Brush 70x100x500 (for distributor)	1	0003-4695-960
28	Cylindrical brush 15 \emptyset x 85 x 285	1	0003-4544-960
	Cylindrical brush 20 \emptyset x 100 x 800	1	0003-4551-800
	Cylindrical brush 45 \emptyset x 110 x 270	1	0003-4552-960
29	Brush 50x125x285 (for discs)	1	0003-4690-960
30	Small scraper	1	0003-0210-950
31	Big scraper	1	0003-0211-950
32	Wrench SW 41 (for oil pan cover)	1	0003-4296-110
-	Eyebolt	4	0019-5384-000
-	Can containing 5 litres of lubricating oil 30 Viscosity at 50°C: 28 - 34 cSt - 3,8 - 4,5E (SAE 20)	2	0015-0001-090
-	50 grams tube of molybdenum disulfide paste	1	0015-0103-000
-	0,5 kg can of lithium-base ball and roller bearing grease Minimum pour point 180°C	1	0015-0106-060

Tools and Accessories SIH 10007

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

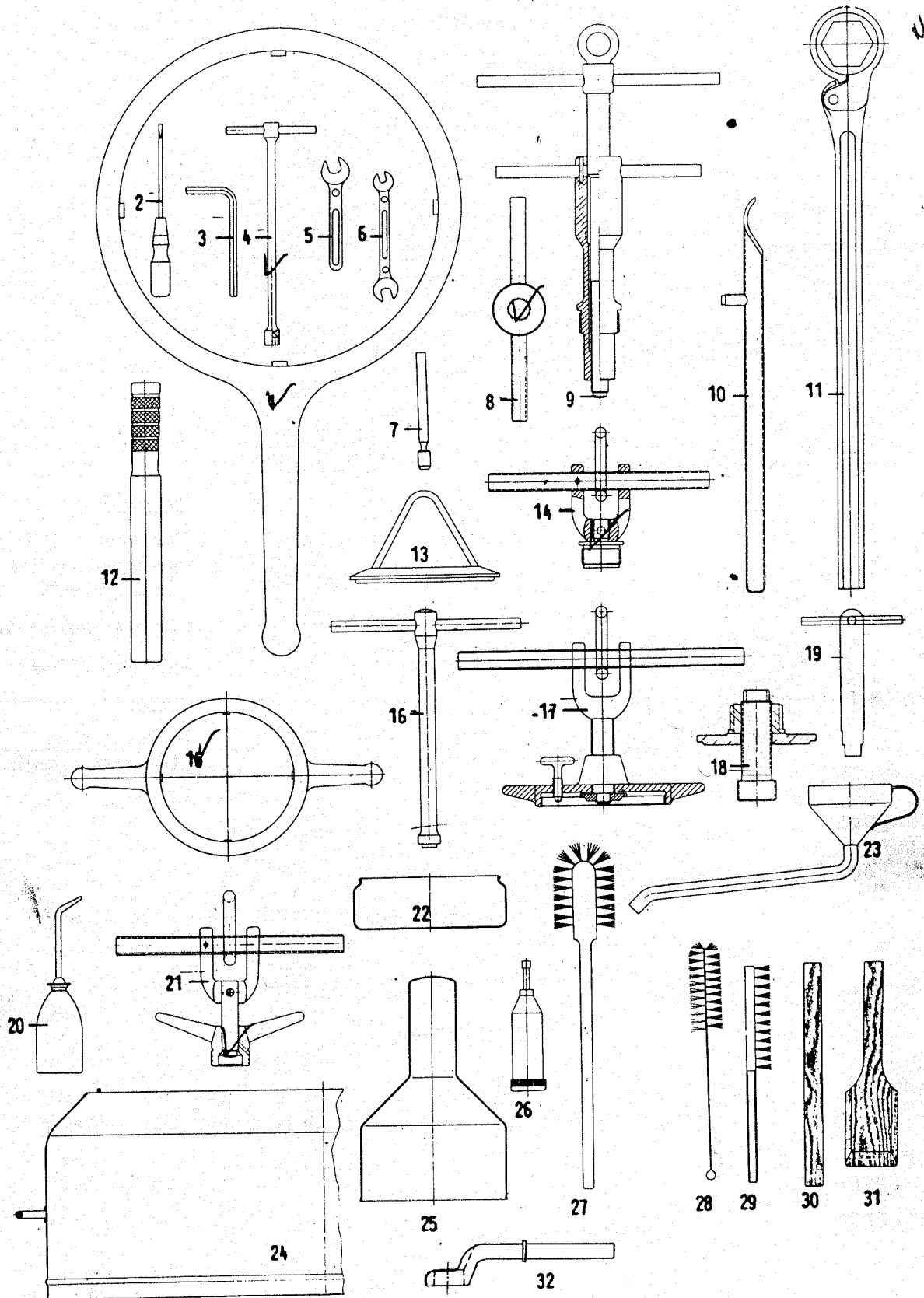
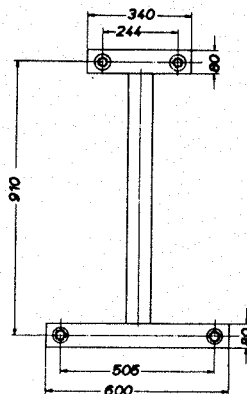
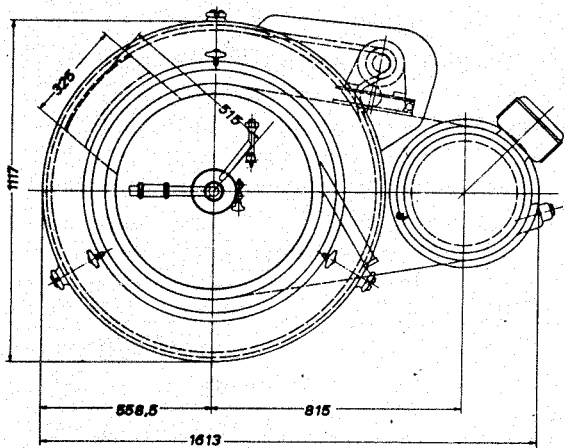
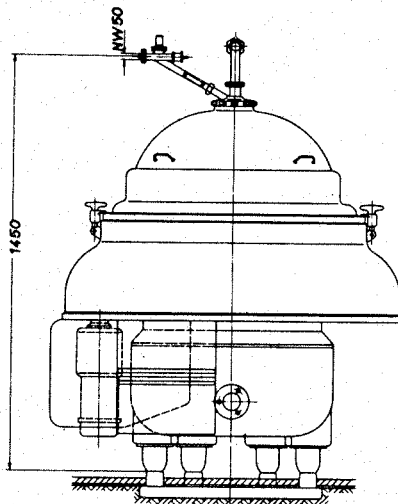
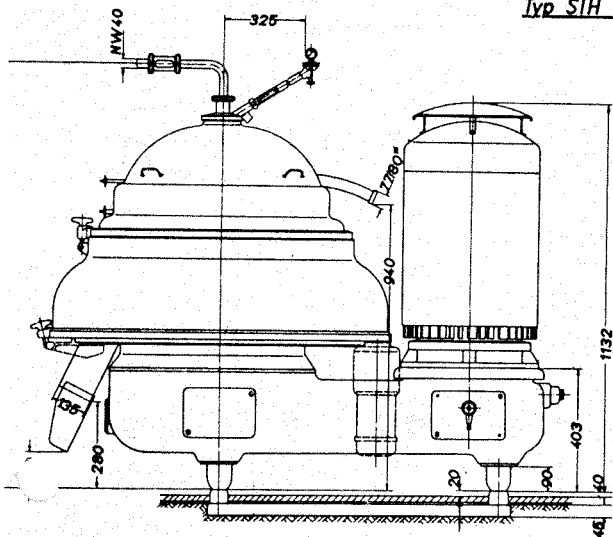


Fig. 24

**Installation Plan for WESTFALIA Quark Separator
Model SIH 10007**

Aufstellungsplan WESTFALIA Quarkseparator

Typ SIH 10007



Technical Data:

- Motor rating: 20 HP
- Power consumption: 16 HP
(at 5000 litres/h)
- Motor speed: 3000 rpm (50 cycles)
- Bowl speed : 5500 rpm

Weights:

- Separator, complete
(with motor and bowl): 1530 kg
- Bowl: 240 kg

Fig. 25

Quark Cooler C 1000
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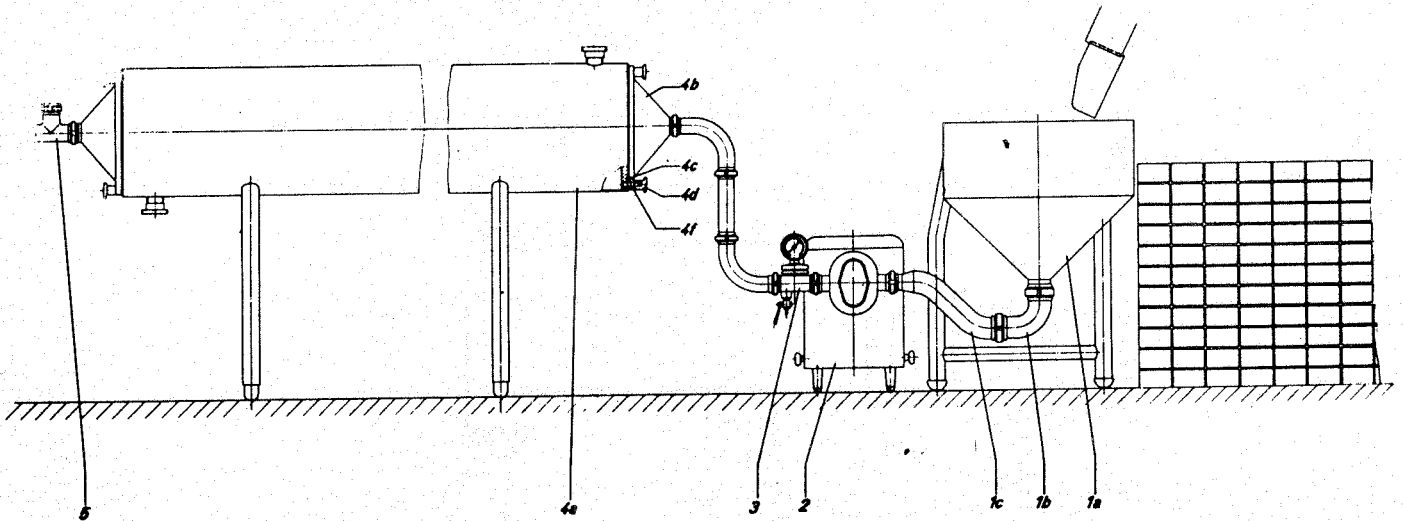


Fig. 26

Item No.	Part Description	QTY	Part - No.
-	Funnel, complete (1a-c)	1	8235-7500-010
1a	Funnel	1	8235-7505-010
1b	Bend	1	8235-2196-020
1c	Bend	1	8235-2196-030
-	Gasket 71/81 ϕ x 5	1	0007-2212-700
2	Positive displacement pump (depending on order)		
3	Feed line assembly (see fig. 27)	1	see page 52
-	Quark cooler, complete	1	8238-2000-010
4a	Quark cooler	1	8238-2100-010
4b	Cover	1	8238-1125-000
4c	Gasket 312/336 ϕ x 6	2	0007-2795-750
-	Gasket 248/262 ϕ x 6 (for quark cooler C 800)	2	0007-2155-750
-	Gasket 228/244 ϕ x 4 (for quark cooler C 600)	2	0007-2781-700
4d	Handle M 16	24	0021-3094-640
4f	Stud M16x55 DIN 938	24	0019-7729-400
5	Discharge line	1	8235-2171-010

Feed Line for Quark Cooler C 1000

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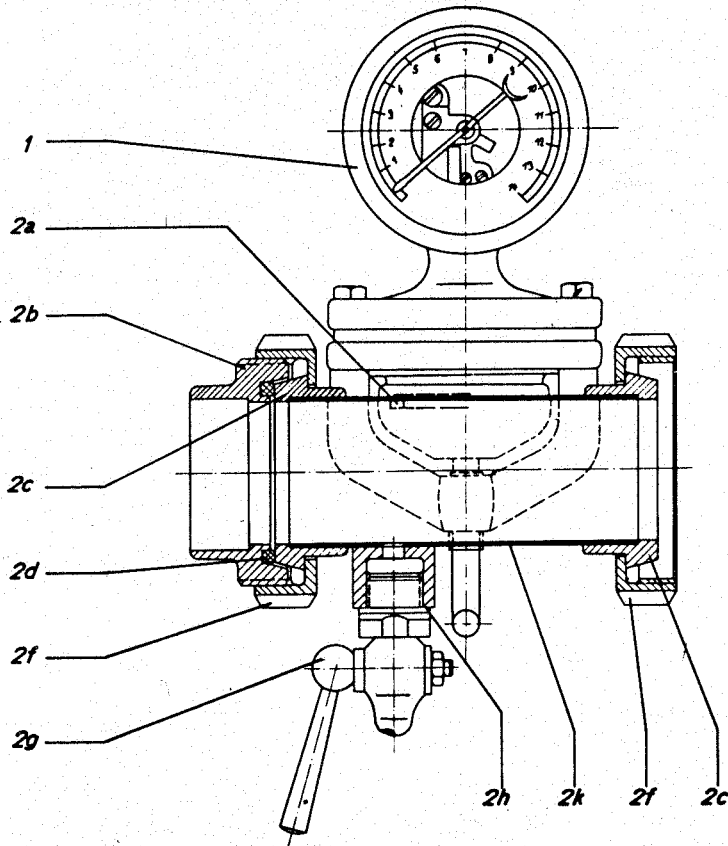


Fig. 27

Item No.	Part Description	QTY	Part - No.
	Feed line assembly (1-2k) (see also fig. 1, item no. 3)	1	8235-2215-010
1	Pressure gauge	1	8918-2000-260
-	Connecting pipe assembly (2a-k)	1	8235-2166-010
2a	Gasket 54/64 ϕ x 5	1	0007-2210-750
2b	Threaded connection	1	0018-4119-300
2c	Cone connection	2	0018-3955-300
2d	Gasket	1	0007-2211-750
2f	Grooved coupling nut	2	0013-2845-300
2g	Hose cock	1	0018-1526-400
2h	Gasket 19/26 ϕ x 1	1	0004-5277-850
2k	Connecting pipe	1	8235-2167-000

Air Gun and Deflector Cover
for Quark Cooler C 600, C 800, and C 1000

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Maximum Pressure of de-oiled compressed air: 114 psig.

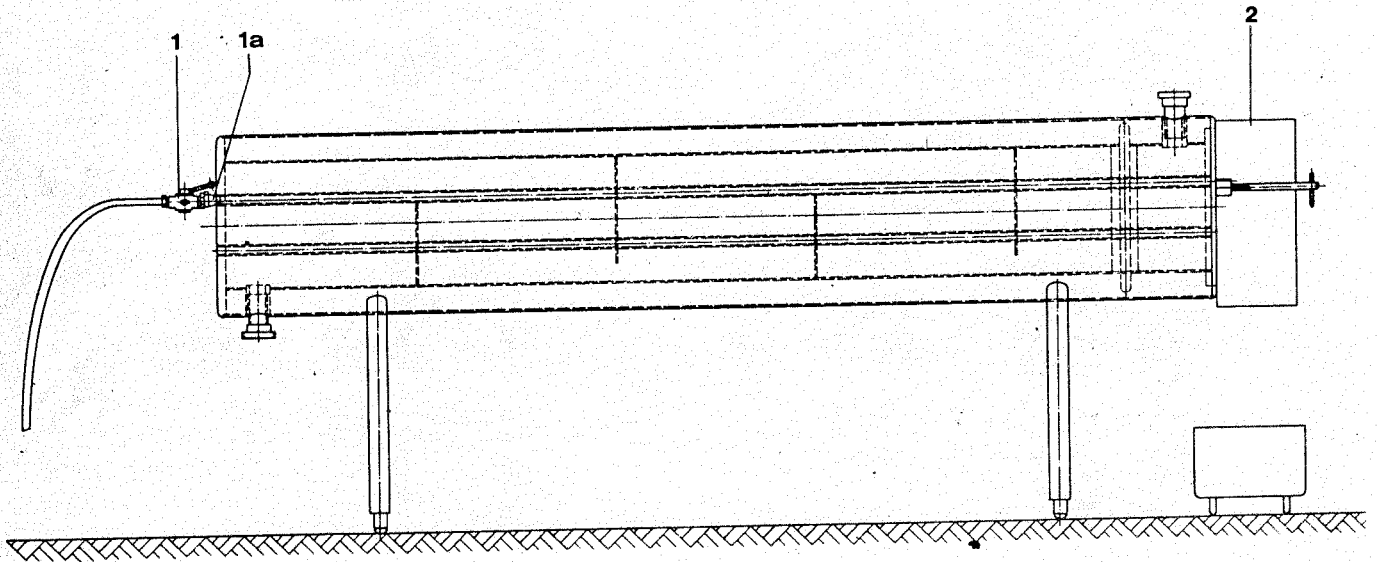


Fig. 28

Item No.	Part Description	QTY	Part - No.
1	Air gun	1	8235-2200-010
1a	* Rubber cone 24/20 x 45	1	0003-3654-750
2	Deflector cover (for C 600 and C 800)	1	8235-7765-000
2	Deflector cover (for C 1000 with 8 nuts)	1	8238-7765-000
2	Deflector cover (for C 1000 with 12 nuts)	1	8238-7765-010

* This part is included in air gun, item 1, but it is also available as separate item.

WESTFALIA CLARIFIER
with self-cleaning belt

Westfalia Klärsparator
mit selbstreinigender Trommel

Typ. SAMR 15036

Nennleistung 1650 R.P.M.

Motor Daten

Typ. AEG AM 180-LC

22 Kw, nr. 465

380 Volt, 50 Hz

47 Amp

420 Volt, 50 Hz



Trommelrotz BvL Speed

Leistungsbedarf W Power Consumption

Stromaufnahme Current intake/Amp

Stromaufnahme Current intake/Amp

Ordn. den 12.2.64

Zeit, t in Minuten

