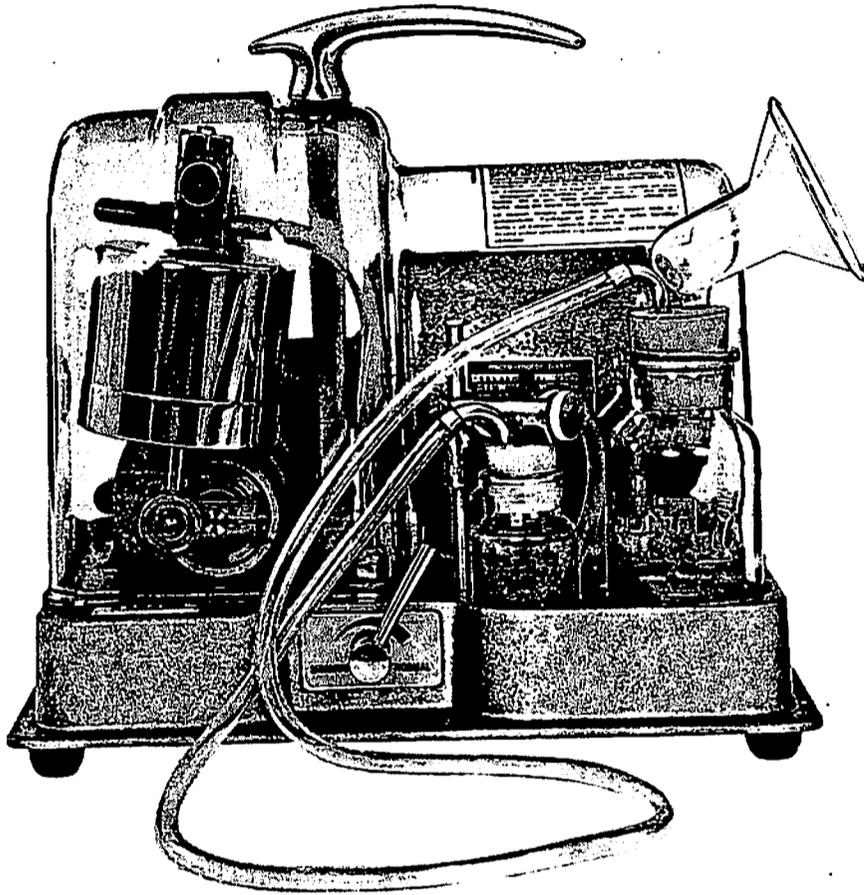


# INSTRUCTION MANUAL

800-323-8750  
800-323-4060

## THE EGNELL BREAST PUMP



C# 1618  
model 50

HOLESTEN CORP.



# EGNELL

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WELLAND, Ontario L0R 1G0

# CONTENTS

## **Operating instructions, page 5**

A general presentation and instructions for operating the pump in practice. Further copies of the operating instructions can be ordered free of charge from Egnell.

## **Technical description, page 7**

A description of the design and function of the pump including technical data and a wiring diagram. The gatefold illustration in Section Replacement parts shows details of the mechanical design.

## **Maintenance, page 9**

Instructions for periodical servicing and function check with detailed instructions for the care of the individual parts. Special equipment is also described. The figures in this section refer to the gatefold illustration in Section Replacement parts.

## **Extra equipment, page 13**

A description of extra equipment available for the pump.

## **Replacement parts, page 14**

List of replacement parts with position numbers. The illustration in this section is also of great assistance when the pump is being disassembled or assembled.

## **Four separate models**

There are four separate models of the Egnell Breast Pump which have designations Model 20, Model 30, Model 40 and Model 50. (Model 40 is no longer in production but has been superseded by Model 50.)

All these models are covered by the instructions. A marginal marking indicates variations compared with Model 20 – the basic form of the pump.

The design of the various models is described in detail in Sections Technical Description and Replacement Parts.

# OPERATING INSTRUCTIONS

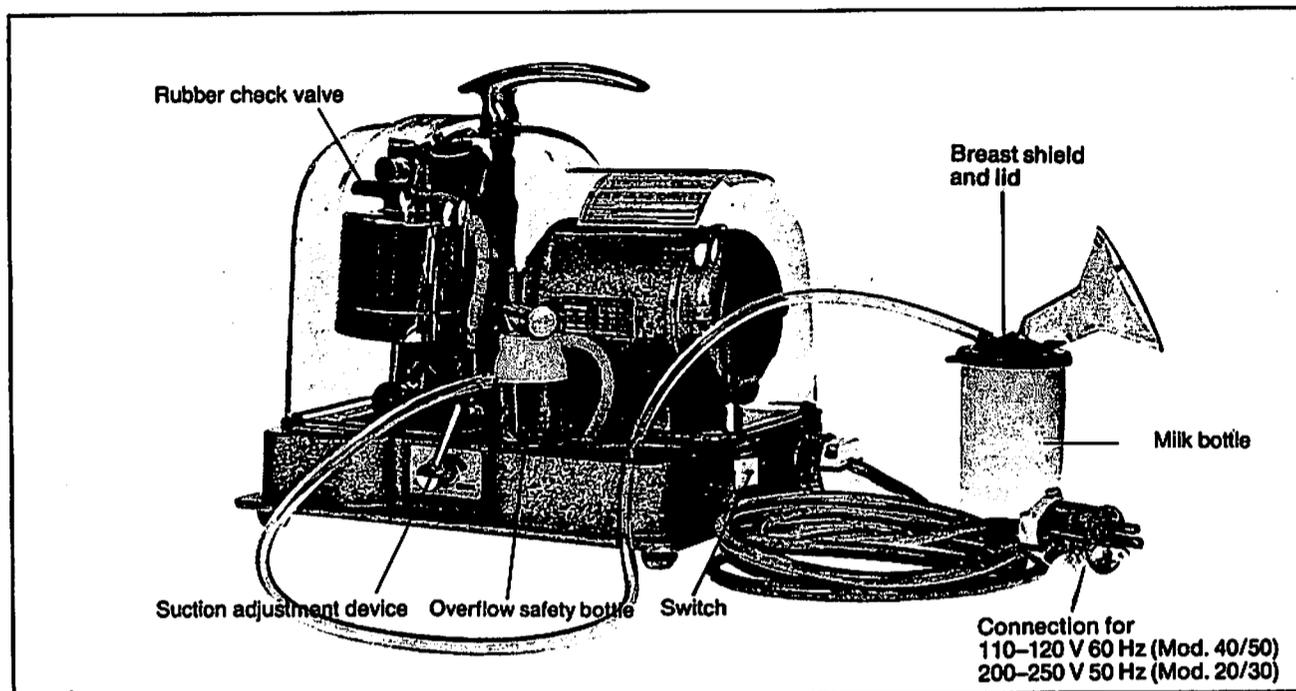
## The Egnell Breast Pump

The Egnell Breast Pump is of Swedish design and has been in use for more than 30 years in Maternity Wards and Infant Care Departments of hospitals not only in Sweden but all over the world. It has been found to be the most effective and gentle means of assisting mothers experiencing breast feeding difficulties because of the following reasons: too much milk, too little milk, milk retention, sore nipples, inverted or flat nipples. The pump is also of great assistance when an infant is unable to suck and during a temporary illness of either mother or child.

The Egnell Breast Pump operates in an outstandingly physiological way, its action being very similar indeed to that of a child, this ensuring that the flow of milk is painless and even pleasant.

The pump can be used with accessories of plastic or glass. The picture here shows plastic accessories, the front cover glass accessories.

There are four separate models of the Egnell Breast Pump which have designations Model 20, Model 30, Model 40 and Model 50. All these models are covered by the instructions. A marginal marking indicates variations compared with Model 20 - the basic form of the pump.



### The correct breast cup

Two breast shield sizes are available. Choose one that fits the breast well. It is important not to choose a shield that is too small.

### Operation

Connect the electric cord to a grounded 110-120 V AC 60 Hz outlet and turn on the switch. Connect the electric cord to a 200-250 V AC 50 Hz outlet and turn on the switch.

### Connecting up the milk bottle

**GLASS:** Press the breast shield into the rubber stopper on the bottle so that the glass tube of the shield protrudes from the bottom of the stopper. The glass tube slides in more easily if it is moistened first.

Insert the curved pipe into the rubber stopper.

Push the rubber stopper very firmly into the neck of the milk bottle and make sure that it seals properly.

The curved pipes on the two bottles are then connected together by using the plastic tubing as shown in the illustration on the front cover.

**PLASTIC:** Press the bottle lid against the bottle until it snaps on and push the breast shield firmly into position.

To remove the lid, the easiest way is to hold the bottle with both hands and push the tongue of the lid carefully upward with the thumb.

Connect the plastic tubing as indicated in the picture. Be sure to choose the lower connector on the overflow safety bottle.

### Regulating the suction effect

The suction effect can be regulated from MINIMUM to NORMAL by using the suction adjustment lever. Suction is most effective in the NORMAL position.

To start with - and particularly in the case of sensitive nipples - the MINIMUM setting can be used for a minute or so before the lever is turned to NORMAL.

### Extracting the milk

The breast shield should be located exactly over the nipple and held firmly against the breast. The breast can be lifted to help the flow of milk which should start after a few seconds. Avoid exerting pressure on the breast as this can be harmful.

Hold the bottle upright and as still as possible to prevent milk from being sucked into the tubing.

Never fill the bottle to more than two-thirds.

A small overflow safety bottle prevents the milk from being sucked directly into the pump. If this should occur in spite of the safety bottle being used, then the pump must be stopped and the tubing and safety bottle must be cleaned immediately.

## If the pump is not providing sufficient suction

Since the action of the pump is so smooth and gentle, it is possible that the suction is believed not to be fully satisfactory.

If the flow of milk does not start, check:

- that the suction adjustment lever is set at **NORMAL**
- that the rubber stoppers are firmly pressed into position/that the plastic lids have snapped on properly.
- that the plastic tubings are firmly attached without leaks.

If the action of the pump is still unsatisfactory, check the following:

- that the rubber check valve (fitted to the top of the cylinder) is working properly. This valve is of the split type and must open and close while the pump is operating. Dirt in the valve can prevent it from working properly since it will then not open or close fully. The valve must then be cleaned or replaced.
- that the milk has not run from the safety bottle into the pump system and clogged the tube or tube connections. If milk has penetrated into the pump system, then the entire assembly must be cleaned and overhauled by an expert.

## Cleaning

After each occasion when the pump has been used, all the accessories should be sterilized. If it should be necessary to clean the inside of the pump, the plastic cover has to be removed. **This may be done by qualified service personnel only.**

The securing nut on the handle rod is loosened by using the spanner attached to the baseplate of the pump. The handle rod is then removed from above and the cover can be lifted off.

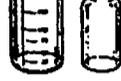
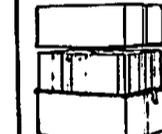
The pump cannot operate unless the cover is firmly in position. The cover closes a switch inside the pump through the action of a leaf spring.

When replacing the cover, make sure that the upright edge of the leaf spring is inserted into the corresponding slot in the side of the cover.

Use only original accessories



## Replacement parts

	Order no	Part no	
	4430	20573	Holder for 8 milk bottles
	4110	16212/1	Breast shield, normal size. Glass
	4120	16212/2	Ditto, large size
	4111	1259/1	Breast shield, normal size. Glass suitable for autoclave treatment
	4121	1259/2	Ditto, large size
	4130	1259/3	Ditto, extra large size
	4317	16204	Curved pipe. Metal
	4310	SMB-10	Rubber stopper for milk bottle
	4305	SMB-7	Rubber stopper for safety bottle
	4020	16216	200 ml milk bottle, graduated in ml. Approx. diam. 58x128 mm. Glass
	4010	20224	50 ml safety bottle. Approx. diam. 38x85 mm. Glass
	4420	59/15	Cork pad for milk bottle
	4410	39/15	Cork pad for safety bottle
	4241	40086	Breast shield, normal size, of plastic
	4242	40087	Breast shield, large size, of plastic
	4243	20142	Milk bottle, 200 ml, graduated in ml, of plastic
	4244	20143	Lid for milk bottle, of plastic
	4260	0386/9	Overflow safety bottle, of plastic
	4280	90/1	Plastic tubing, single pack
	4281	90/50	Ditto, multi pack of 50 tubings
	4285	10 H	Plastic tubing, Ø 5/8 mm
	4290	20238	Plastic cover
	4712		Switch
	4718		Socket
	4720		Electric cord, hospital grade <b>617349</b>
	4708		Switch
	4714		Socket
	4722		Electric cord
	4701	1282	Rubber check valve
	4706	145 A	Rubber pad
	4750	74/58/9	Leather piston packing
	4789	46228	Test vacuum gauge
	4295	0481	Carrying container
	4296	0485	Filling for carrying container

There is a complete list of replacement parts on page 14.

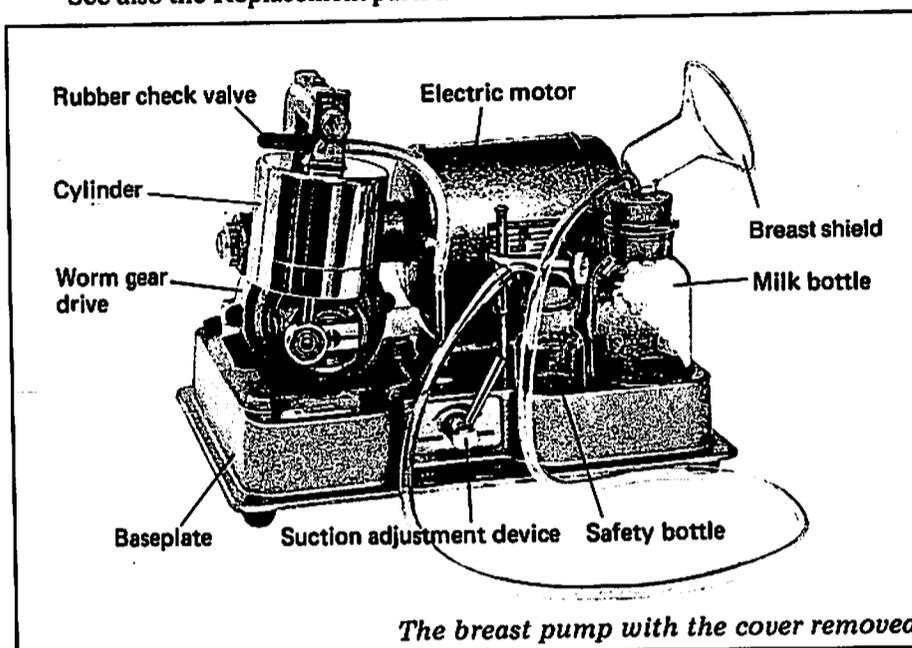
# TECHNICAL DESCRIPTION

## Design

The Egnell Breast Pump is a piston type pump with the following main components:

- Baseplate
- Electric motor with worm gear drive system
- Cylinder and piston
- Suction adjustment device

See also the Replacement parts illustration.



*The breast pump with the cover removed*

The various component parts are fitted to the baseplate which also includes a casing for the switch and other electrical components.

The pump is protected by means of a plastic cover which is secured to the baseplate by the handle rod which is secured by means of a nut under the baseplate. The spanner to fit this nut is held by a clip under the baseplate.

Mod 30  
When the cover is removed, this actuates a micro-switch in the baseplate casing which cuts off electric current to the pump.

The electric motor is a single-phase asynchronous unit, phase-compensated by means of a capacitor fitted in the baseplate casing.

The electric motor and worm gear drive make up one integral unit which is insulated from the baseplate by means of a sheet of silicone rubber. The worm gear drive reduces the motor speed so that the pump operates at about 48 cycles per minute.

The cylinder is flexibly attached to the worm gear housing and the piston is fitted with two leather packings.

The excess pressure resulting from the upward travel of the piston is released by a check valve fitted to the cylinder head.

When the suction adjustment lever is moved to the left an aperture in the suction line is uncovered and the suction effect becomes reduced.

The safety bottle prevents any milk accidentally splashed from the milk bottle from entering the suction tubing, the suction adjustment system and the pump cylinder.

Under the pump baseplate there is a plastic box containing the following units: a spare rubber check valve and a tube of grease for the piston packings.

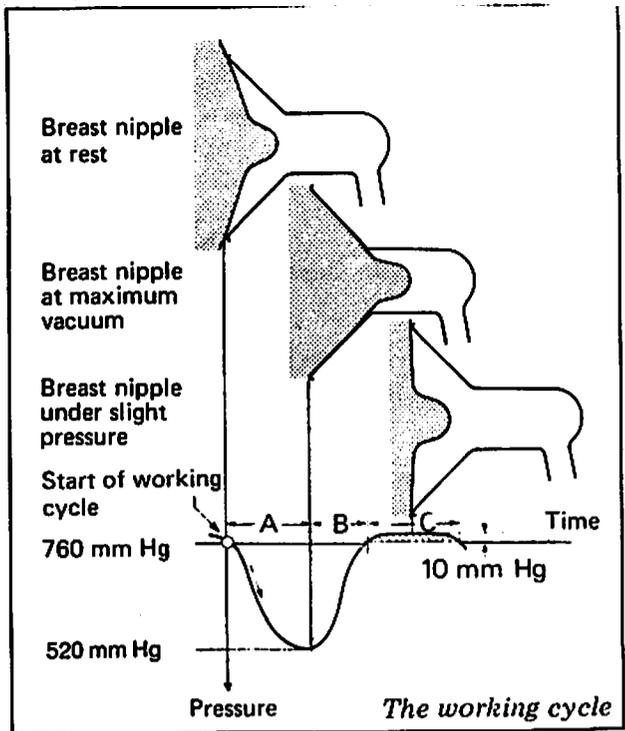
# Working cycle

The working cycle of the breast pump can be sub-divided into three phases:

- A A short suction phase during which the pressure decreases from atmospheric pressure (760 mm Hg = 100 kPa) to 520 mm = 69 kPa, in other words a negative pressure of 240 mm Hg = 31 kPa.
- B A short relief phase back to atmospheric pressure.
- C A resting phase under slight overpressure, about 10 mm Hg = 1.3 kPa.

When the suction adjustment lever is turned to the MINIMUM position, the maximum value of the suction phase is reduced to a negative pressure of about 120 mm = 16 kPa.

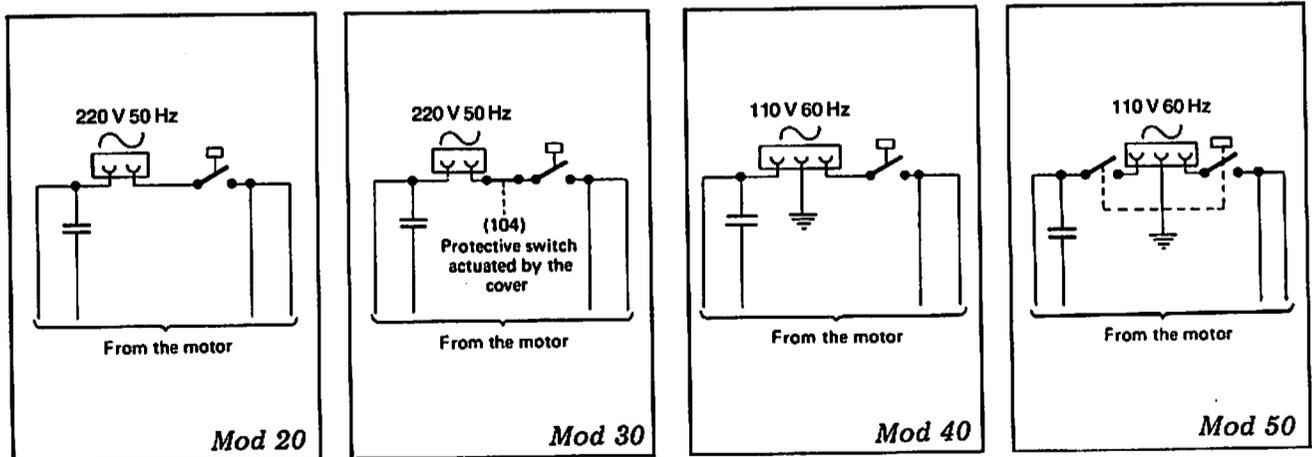
All the above figures are approximate and refer to a pump with empty milk bottle.



# Technical data

Type designation	SMB Model 20	SMB Model 30	SMB Model 40	SMB Model 50
Electrical design	<input checked="" type="checkbox"/> Double insulated	<input checked="" type="checkbox"/> Double insulated Protective switch interrupting current to pump when cover is removed.	Grounded	Grounded
Approval markings	Ⓢ ⓓ Ⓝ Ⓢ ⓕ	Ⓚ ⓔ Ⓜ ⓔ Ⓤ Ⓡ Ⓢ ⓐ Ⓡ ⓔ Ⓢ Ⓢ Ⓢ	Ⓢ ⓕ Ⓤ Ⓛ	Ⓢ ⓕ Ⓤ Ⓛ
Power supply	200-250 V, 50 Hz	200-250 V, 50 Hz	110-120 V, 60 Hz	110-120 V, 60 Hz
Power consumption	50-60 W	50-60 W	50-60 W	50-60 W
Motor speed	approx. 1350 rpm	approx. 1350 rpm	approx. 1550 rpm	approx. 1550 rpm
Suction rhythm	Approx. 48 periods per minute Periodical pressure variation of about -240 mm Hg = -31 kPa to about +10 mm Hg = 1.3 kPa (milk bottle empty)			
Suction effect	Adjustable between -240 mm = -31 kPa (NORMAL) and -120 mm = -16 kPa (MINIMUM)			
Dimensions length x width x height	300x235x275 mm (12"x9 1/4"x 11")			
Weight	Approx. 9 kg (20 lbs)			

# Wiring diagram



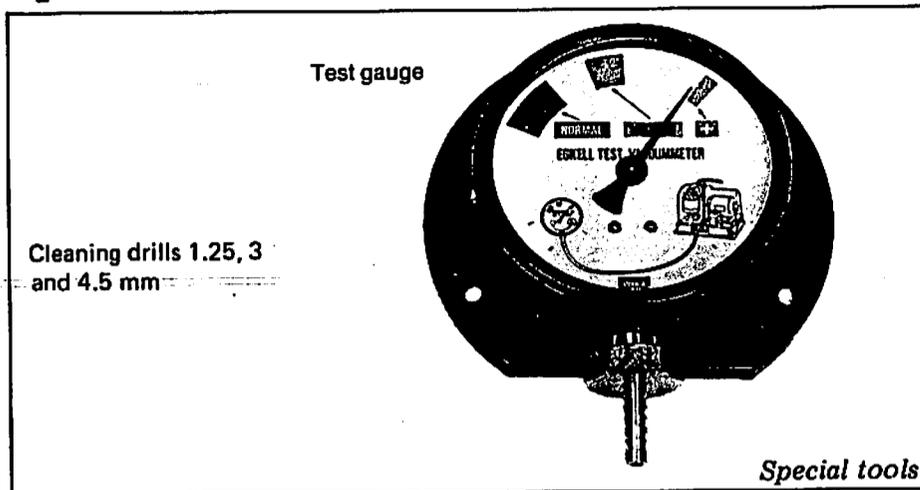
# MAINTENANCE

In order to ensure satisfactory function, the pump should be given a thorough overhaul by qualified service personnel once a year.

This overhaul includes:

- Function check
- Cleaning and inspection of the various parts subject to wear, and replacement where necessary.
- New function check.

## Special tools



## Function check

- Suction:  
The Test Gauge should be kept vertical. Ideally, the gauge should be affixed to a wall. The tubing from the Test Gauge should be attached to the small transparent connecting pipe of the overflow safety bottle, as indicated in the drawing on the Test Gauge.  
Set the suction regulator to the "NORMAL" position. The stroke of the needle should then reach into, but not beyond, the blue sector.  
Then set the suction regulator to the "MINIMUM" position. The stroke of the needle should then reach into, but not beyond, the yellow sector.  
In both settings the return stroke of the needle should pass zero and just reach into the small blue-striped sector.
- Switch (74, 202 or 302):  
Check that the switch clicks distinctly on and off.
- Protective switch (104)  
Check to ensure that the pump stops when the plastic cover is removed.
- Noise level:  
The pump must run quietly and smoothly with a low hum (not a grating noise) from the motor and worm gear drive.

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## Electrical components

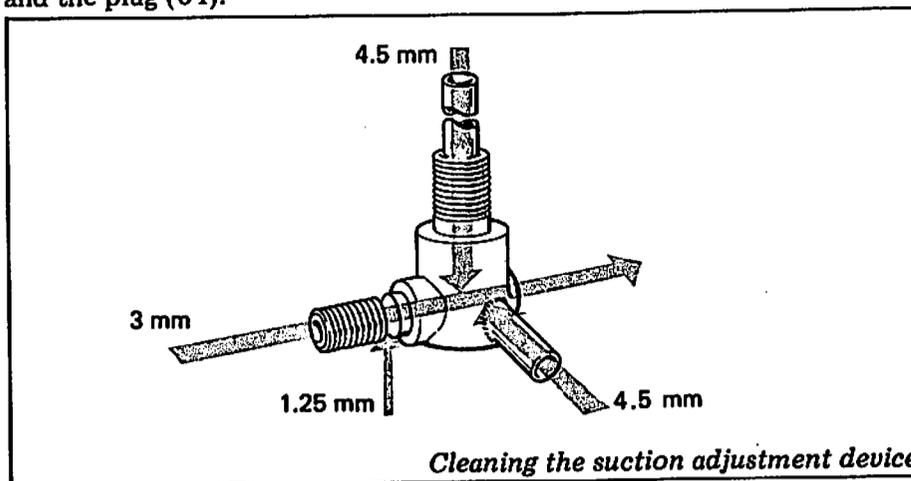
If the switch (74, 202 or 302) or the socket (attachment plug cap) (72, 201 or 301) need replacing, the insulating cover (81 or 207) must be removed, the spade contacts (quick connect tabs) disconnected and the screws (71) loosened. The opposite order is used during re-assembly.

Check with the wiring diagram during re-assembly.

## Suction adjustment device

It is only necessary to disassemble the suction adjustment device for cleaning purposes if the function check is unsatisfactory or if milk has run into it. In such cases the tubing (25) between the adjustment device and the cylinder is dirty.

Clean the inside of the adjustment device and the aperture using the cleaning drills. It is sufficient to remove the lever (57), the sleeve (58) and the plug (64).



If it is necessary to disassemble the entire suction adjustment device, be very careful to ensure during re-assembly that the brake spring (63) is correctly fitted.

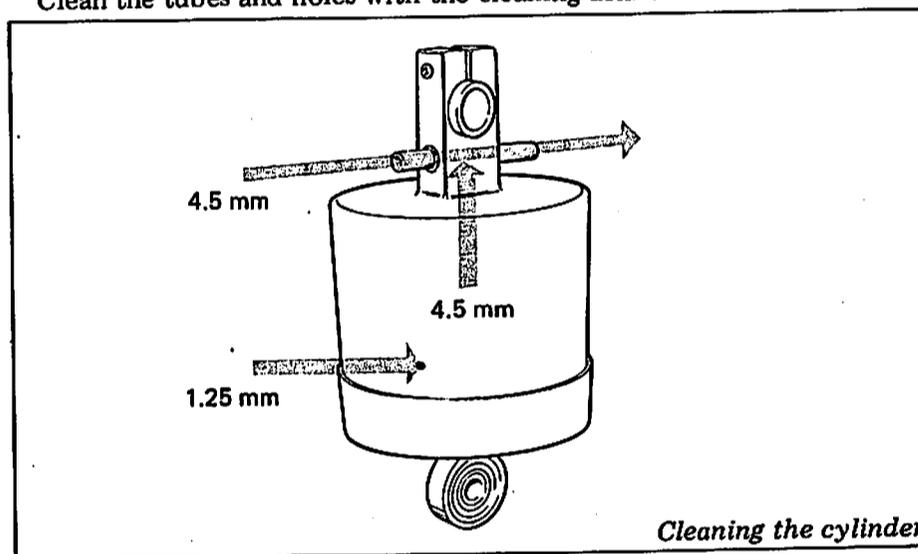
Screw the sleeve (58) firmly in position and then fit the lever so that it is in the NORMAL position (the aperture closed).

## Cylinder and piston

Check that the split type rubber check valve is clean and undamaged. Make sure that the lips along the slit seal properly together.

Loosen the screw (13) and remove the cylinder pin (24). The cylinder (26) and piston can now be pulled out parallel with the worm gear housing. Remove the piston and check the leather packings, replace if worn. Grease the packings lightly with piston grease.

Clean the tubes and holes with the cleaning drills.



Before re-assembly, check that the three screws (33) on the underside of the piston are tightened. Insert the piston into the cylinder.

Oil or grease the crank pin (37) slightly and insert into the connecting rod. Also oil or grease the cylinder pin (24) and insert it through the cylinder bearing (23) and a short distance into the worm gear housing. If assembly has been correctly carried out, it is possible to slide the cylinder and piston assembly in and out on the crank pin and the cylinder pin. If this is not the case, adjust by rotating the piston and connecting rod (34) in the cylinder until the correct position is reached.

After this check, push the cylinder pin fully into position and secure with the screw (13). Do not tighten this screw too much since the thread in the housing may be damaged.

## **Worm gear drive**

The worm gear drive is filled with lubricant and normally requires no maintenance. The lubricant can be checked by removing the worm gear housing cover (7).

Insufficient maintenance of the pump can result in wear on the gear teeth.

The part of the gearwheel in mesh with the worm during the suction phase will be subjected to greater wear than the rest of the gearwheel. This can cause noisy operation.

Loosen the screw (36) rotate the crank (38) 120° on the crank shaft and tighten the screw (36) again. If the play has been sufficiently reduced, the pump will run quietly again.

## **Separate accessories**

Wash used bottles, rubber stoppers, curved pipes and tubings. Replace worn parts. Wipe the whole pump clean.

## EXTRA EQUIPMENT

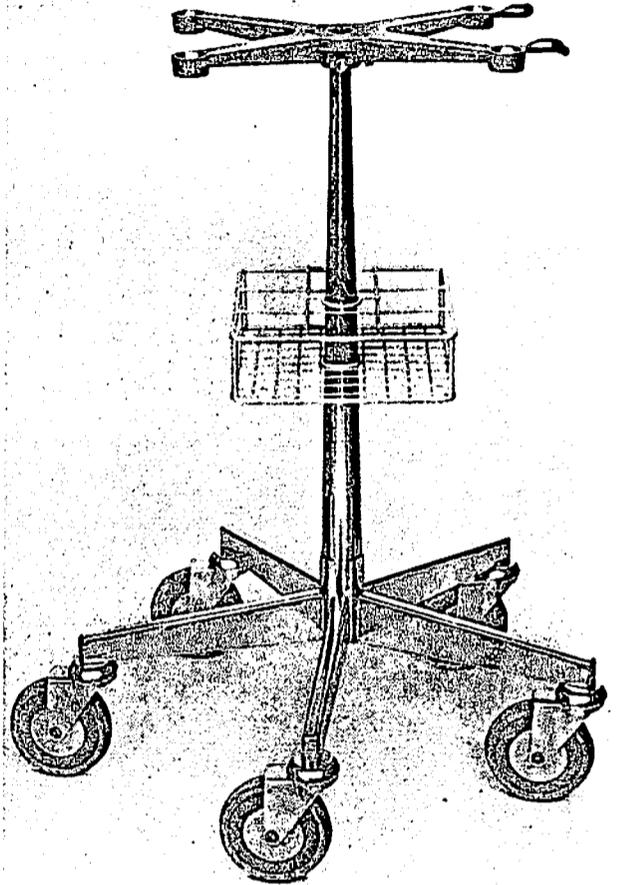
### Floor stand

Type designation R.

The breast pump is attached directly to the cross-member by means of a special bolt.

The stand is fitted with five castors, 100 mm diameter.

There is also a holder for eight milk bottles.



# REPLACEMENT PARTS

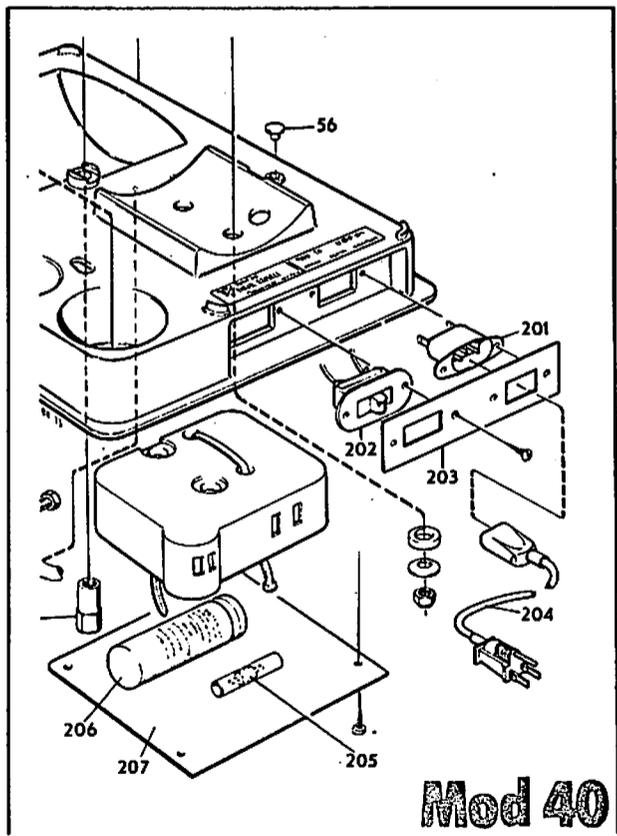
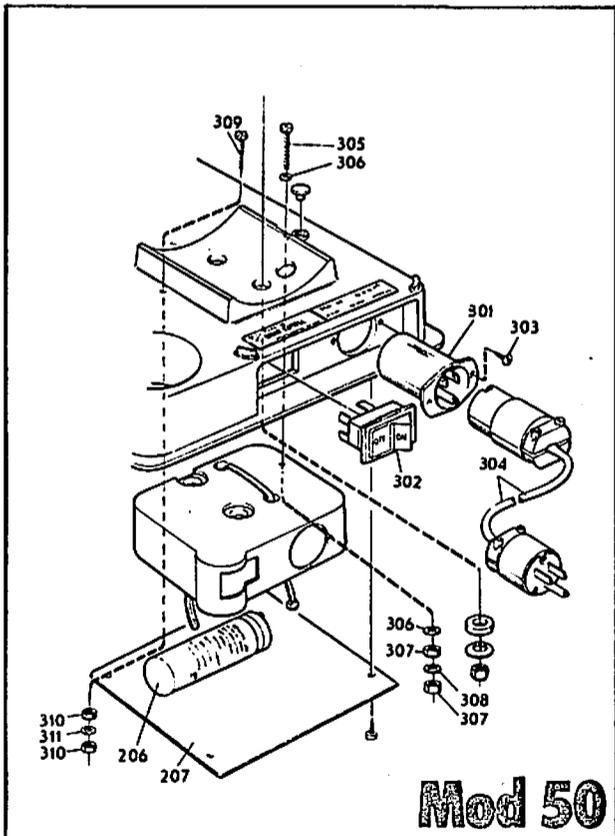
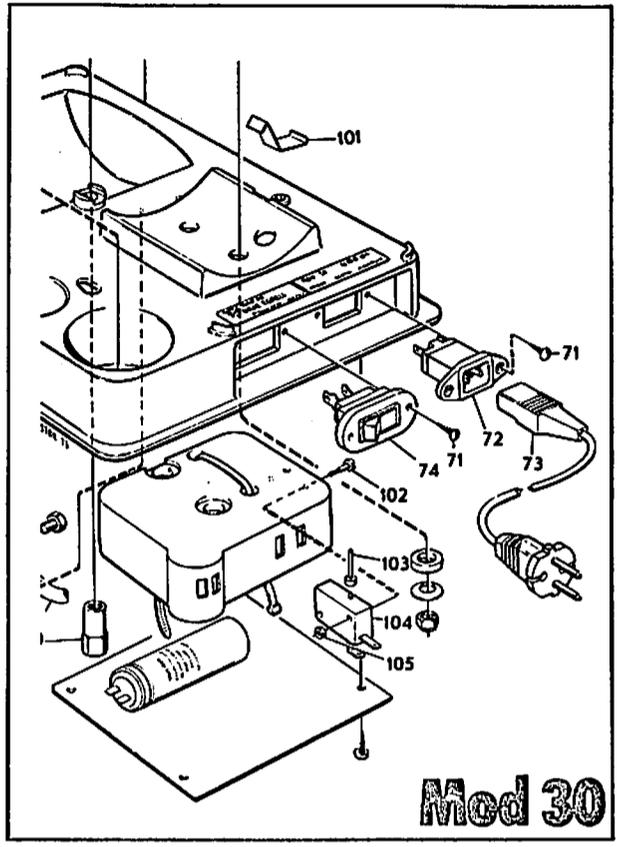
Design subject to change without previous notice.

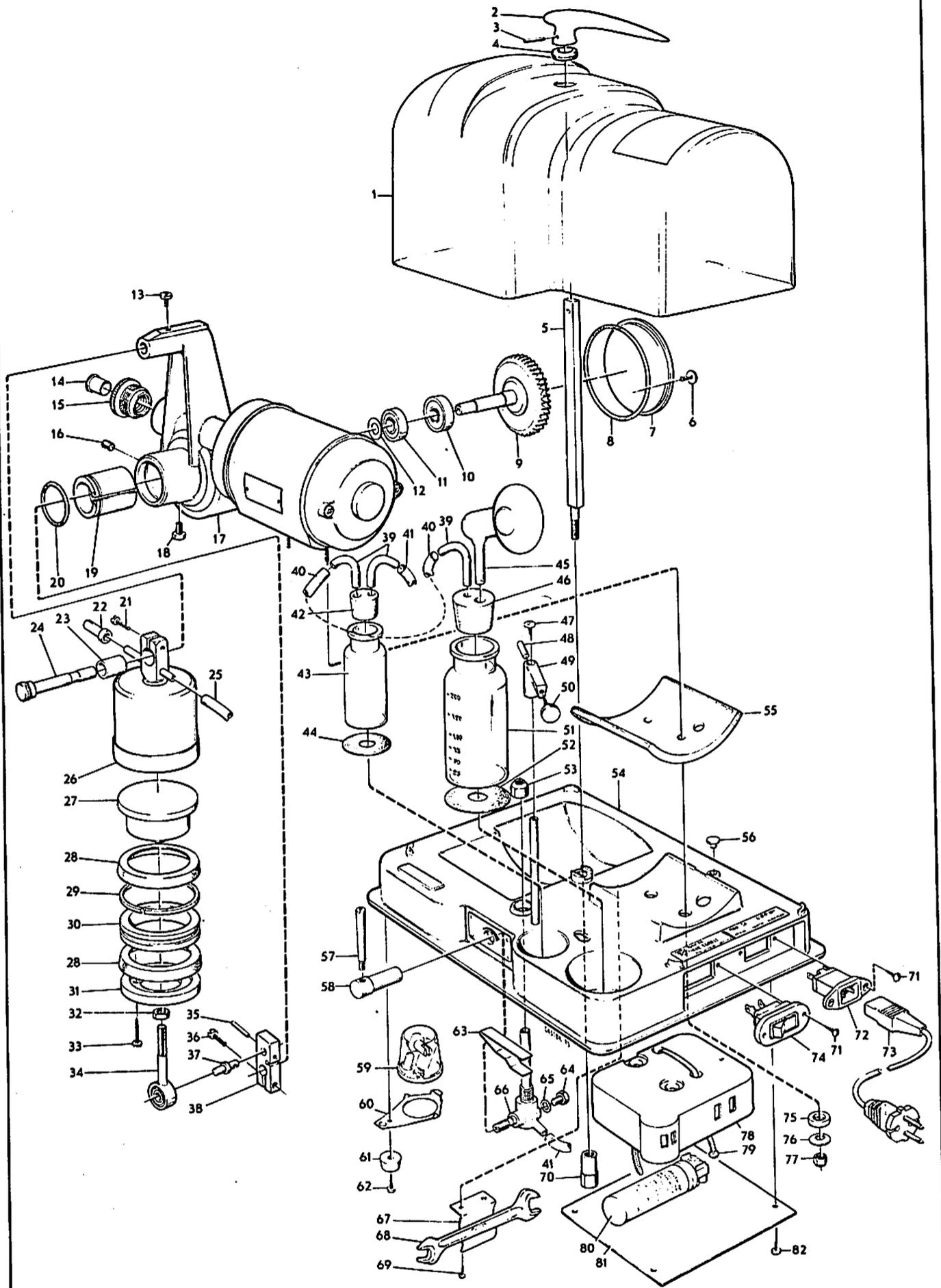
No. in illustr.	Description	No. in illustr.	Description
SMB-1	Plastic cover	SMB 51	Milk bottle
SMB 2	Handle	SMB 52	Cork pad for milk bottle
SMB 3	Spring pin for handle	SMB 53	Securing nut for suction adjustment device
SMB 4	Grommet for handle	SMB 54	Baseplate
SMB 5	Handle rod (with shrunk-on plastic sleeve)	SMB 55	Motor pad (silicone rubber)
SMB 6	Screws (2) for worm gear housing cover	SMB 56 <sup>1)</sup>	Plastic plug
SMB 7	Worm gear housing cover with trademark	SMB 57	Lever for suction adjustment device
SMB 8	O-ring seal for worm gear housing cover	SMB 58	Sleeve for suction adjustment device
SMB 9	Fibre gearwheel for worm	SMB 59	Plastic box with service accessories
SMB 10	Ball bearing for crankshaft, 12 mm	SMB 60	Spring clip for 59
SMB 11	Ball bearing for crankshaft, 10 mm	SMB 61	Rubber pads (4)
SMB 12	Washer for crank/eccentric	SMB 62	Screws for rubber pads (4)
SMB 13	Securing screw for cylinder pin	SMB 63	Brake spring
SMB 14	Plastic plug (for worm gear housing)	SMB 64	Plug for suction adjustment device
SMB 15	Threaded bushing	SMB 65	Washer for plug 64
SMB 16	Locking screw for eccentric bushing (side)	SMB 66	Suction adjustment device
SMB 17	Worm gear housing with motor	SMB 67	Spring clip for spanner
SMB 18	Locking screw for eccentric bushing (lower)	SMB 68	Spanner for 53, 64 and 70
SMB 19	Eccentric bushing	SMB 69	Screws (2) for 67
SMB 20	O-ring seal for eccentric bushing	SMB 70	Nut for handle rod
SMB 21	Clamping screw for cylinder bearing	SMB 71	Screws (4) for switch and socket
SMB 22	Rubber check valve	SMB 72 <sup>2)</sup>	Socket (attachment plug cap)
SMB 23	Cylinder bearing	SMB 73 <sup>2)</sup>	Electric cord, 2.5 m
SMB 24	Cylinder pin with head	SMB 74 <sup>2)</sup>	Switch with attaching plate
SMB 25	Portex tubing for cylinder/suction adjustment device	SMB 75	Plastic spacers (2) for motor attaching screws
SMB 26	Cylinder with cylinder head and tube connection	SMB 76	Washers (2) for motor attaching screws
SMB 27	Piston, upper section	SMB 77	Nuts (2) for motor attaching screws (self-locking)
SMB 28	Piston packings (2)	SMB 78	Plastic casing
SMB 29	Spring ring	SMB 79	Attaching strap for capacitor
SMB 30	Piston, central section	SMB 80 <sup>2)</sup>	Capacitor
SMB 31	Piston, lower section	SMB 81 <sup>2)</sup>	Insulating cover for casing
SMB 32	Locking nut for connecting rod	SMB 82	Screws (4) for 81
SMB 33	Screw (3) for piston	Model 30	
SMB 34	Connecting rod with ball bearing 626-A2Z	SMB 101	Leaf spring for micro-switch
SMB 35	Spring pin for crank pin	SMB 102	Plastic screws (2) for micro-switch
SMB 36	Clamping screw for crank	SMB 103	Thrust pin for micro-switch
SMB 37	Crank pin with spacer ring	SMB 104	Micro-switch
SMB 38	Crank	SMB 105	Plastic nuts (2) for 102
SMB 39	Curved pipe	Model 40	
SMB 40	Plastic tubing for safety bottle/milk bottle	SMB 201	Socket (attachment plug cap), grounded
SMB 41	Portex tubing for suction adjustment device/safety bottle	SMB 202	Switch
SMB 42	Rubber stopper for safety bottle	SMB 203	Attaching plate
SMB 43	Safety bottle	SMB 204	Electric cord with ground lead, 8 ft = 2.5 m
SMB 44	Cork pad for safety bottle	SMB 205	Connector
SMB 45	Breast cup, normal size	SMB 206	Capacitor
	Breast cup, large	SMB 207	Insulating cover for casing, fiberglass reinforced
SMB 46	Rubber stopper for milk bottle		
SMB 47	Stop screw for retainer rod		
SMB 48	Pressure pin for retainer		
SMB 49	Retainer		
SMB 50	Locking screw for retainer		

<sup>1)</sup> Only on Model 20 and Model 40

<sup>2)</sup> Only on Model 20 and Model 30

No. in illustr.	Description
Model 50	
SMB 301	Socket (attachment plug cap) grounded
SMB 302	Switch
SMB 303	Screw
SMB 304	Electric cord with ground lead, 8 ft. <b>617349</b>
SMB 305	Screw
SMB 306	Washer
SMB 307	Nut
SMB 308	Spring washer
SMB 309	Screw
SMB 310	Nut
SMB 311	Spring washer





Mod 20