FM 3000
FILLER MACHINE

MAINTENANCE MANUAL AND
SPARE PARTS CATALOGUE

We hope that the information provided in the present manual will be helpful to the user. All information is based on the best of our current knowledge and experience. Read the information carefully including all recommendations and suggestions. Refer also to the sales conditions including those governing the guarantee. This manual may not be reproduced or distributed to third parties without previous written authorisation from **Tetra Laval Food Hoyer S.p.A**.

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CHAPTER 1

MACHINE IDENTIFICATION DATA

1.1 INTRODUCTION

Thank you for choosing a machine manufactured by Tetra Pak S.p.A.
We recommend you read this manual carefully as it is indispensable for the installation, checking and maintenance operations required to keep your machine in perfect working order.
The machine contains tables, drawings and layouts which will help you familiarise yourself with all parts of the machine.
We will be pleased to receive your suggestions should you find that any explanation has been omitted or is not exhaustive. We will take them into the greatest consideration in an effort to improve the manual.

1.2 IDENTIFICATION PLATE

For maintenance and overhaul operations not covered by this manual and for all technical problems, our Service Department is at your complete disposal to provide information and to coordinate the necessary action.
When calling our Service Department, please quote the data shown on the identification plate affixed to the machine and shown in Fig. 1.1.

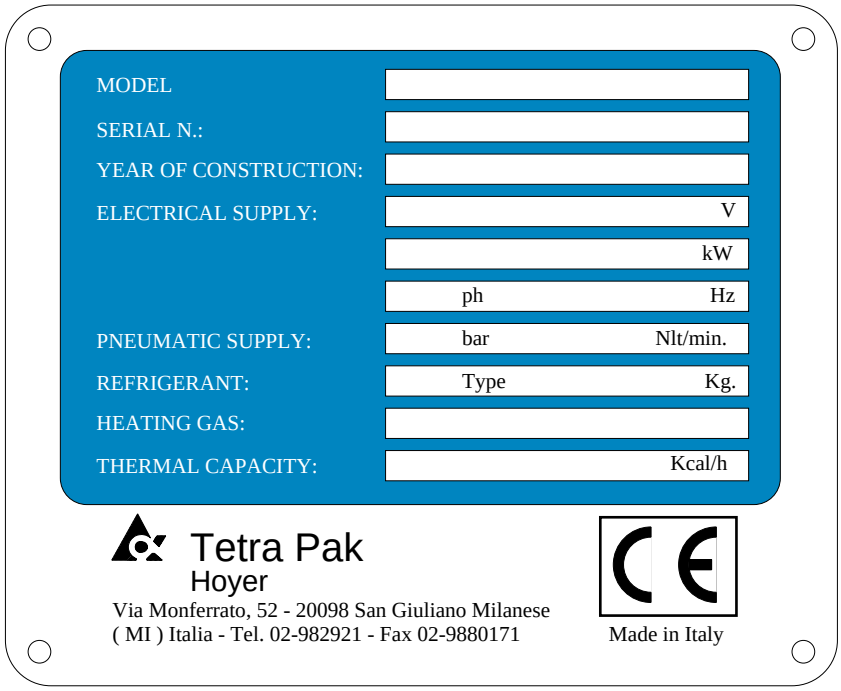

Fig. 1.1 - Identification Plate

1.3 SERVICE CENTRES

For any need or problem requiring our help, please contact one of the following centres authorised to carry out technical assistance under warranty or maintenance to machines manufactured by Tetra Pak S.p.A.

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France
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CHAPTER 2

GENERAL

2.1 PRELIMINARY NOTES 

- The illustrations and drawings of the machine are intended purely for general reference and are not necessarily accurate in every detail;
- the machine dimensions and specifications given in this manual are not binding and may be changed without advance warning;
- the drawings and all other documents provided with this machine remain the property of Tetra Laval Food Hoyer S.p.A. and may not be passed on to third parties without written authorisation from Tetra Laval Food Hoyer S.p.A.
- The manual includes instructions covering all accessories mounted on the standard machine.
- Please refer to the sections regarding the accessories you have purchased.
- **The machine is covered by warranty as specified in the purchase contract. During the warranty period, any repair work not authorised by Tetra Laval Food Hoyer will automatically invalidate the warranty.**

2.2 GENERAL SAFETY STANDARDS 

- THESE SAFETY PRECAUTIONS HAVE BEEN DRAWN UP IN YOUR INTERESTS. Follow the guidelines strictly in order to reduce the risk of accident both to you and to others.
- Do NOT attempt to move, install or operate the machine without having read and understood this manual. If in doubt, ask your superior;
- ensure that all guards and safety covers are in position BEFORE starting the machine;
- NEVER leave tools, mechanical parts or other extraneous material on or inside the machine;
- press the emergency button in the event of a product blockage.
  NEVER PUT YOUR HANDS INSIDE THE MACHINE WHILE IT IS RUNNING;
- take great care even when the main switch is in the "OFF" position, since the power supply cables are still live;
- turn off the air supply before disconnecting any pneumatic part of the machine;
- make sure that all guards and protective covers are correctly installed BEFORE restarting the production cycle after maintenance or repair operations;
- always work with the greatest care and remember that you are responsible for your own safety and for that of your colleagues;
- when moving or lifting the machine, ensure that relevant standards for these operations are followed.

2.3 WARNINGS AND SPECIAL NOTES

- The personnel operating this machine must be aware of and observe strictly the general safety precautions. Failure to observe the precautions may result in injury to personnel or damage to machine components.
- Maintenance must be carried out with the machine turned off. The main switch must be in the "OFF" position, the air valve must be closed and a "work in progress" notice must be fixed to the machine.
- The user must ensure that all the instructions contained in the manual are followed strictly.
- High (Low) temperatures are reached inside the machine. After turning off the electric power supply, wait for the machine to cool (heat) to room temperature before carrying out work on it.
- Any tampering with the safety system for any reason is at the user's own risk and shall be his responsibility.
- Never attempt to turn off the safety switches or make them inoperative.
- The safety of machines used in conjunction with the machine described in this manual, if not supplied directly by Tetra Laval Food Hoyer S.p.A., is the customer's responsibility.
- The pressure, speed, temperature and voltage limits as well as all other indications given are indispensable for the correct running of the machine and must always be observed by the customer.
- For the pneumatic components, dehumidified compressed air must be used at the right pressure and in the prescribed quantities, without any trace of oil.
- The environmental conditions of the installation site must also be taken into consideration.
- The national laws which govern the use of these kinds of machine must also be respected.

SECTION 3

MACHINE DESCRIPTION AND TECHNICAL SPECIFICATIONS

3.1 MACHINE DESCRIPTION

The Hoyer FM 3000 is an extremely reliable and practical machine designed to fill ice-cream cones and tubs comprising the following:

- Elliptic machine design with stepped drive, activated by a mechanical-pneumatic system.
- Adjustable speed by means of a gearmotor unit with belt variator.
- All other operations are pneumatically operated; container infeed, dosing of various ingredients through to product sealing and expulsion . This enables the independent activation and deactivation of stations throughout the line according to the required product and reduces maintenance requirements to a minimum.
- A thermostat and resistance located in the relative tank maintain chocolate topping at the correct temperature.
- The machine is ready for use once connected to the power supply and compressed air system. The Hoyer FM 3000 enables filling of single flavours or ice cream ripples (Hoyer FM 3000 features a facility for the connection of a ripple pump) or double flavours.
- Processing stations:

  The Hoyer FM 3000 carries out operations in sequence in complete autonomy and synchronisation.
- Standard stations:
  1. Container feed
  2. Calibration (cones only)
  3. Chocolate spray (cones only)
  4. Ice cream dispenser
  5. Topping (cones only)
  6. Dry ingredients (cones only)
  7. Lid application/closure
  8. Crimping (cones only)
  9. Expulsion

- Stations available on request:
  1. Topping (tubs)
  2. Dry ingredients (tubs)
  3. Date stamp
  4. Ripple ice cream

3.2 TECHNICAL SPECIFICATIONS

- Power supply voltage available
  On request - 220 V
  - 380 V 50/60 Hz, 3-phase
  - 415 V

- Installed power : 0.5 Kw.

- Air supply pressure : 7 / 8 Bar

- Machine operating pressure : 5 / 6 Bar

- Air consumption (operating speed): 800 Nl/min

- Air line diameter : 3/4"

- Net weight : 200 Kg (approx.)

- Output : up to 3000 items/hour

- Noise level: :

  Equivalent A-weighted sound pressure level in the workplace: 81.5 dBA - Leq (A)

  Equivalent A-weighted sound pressure level one metre: 79.5 dBA - Leq (A)

  Max. C-weighted instantaneous sound pressure level in the workplace: Lower than 130 dB/20µPa

  Max. non-weighted instantaneous sound pressure level in the workplace: Lower than 140 dB/20µPa

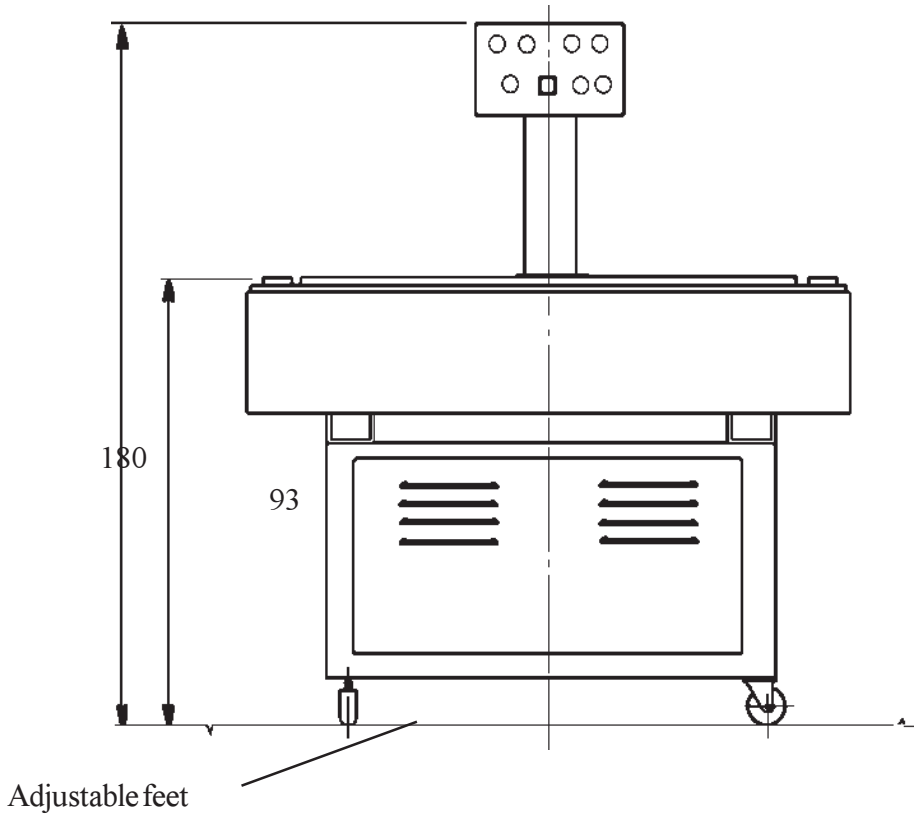
CAUTION

"FM 3000" is fitted with a dryer filter to eliminate humidity from compressed air supplied to the pneumatic circuit.

However, if the machine is installed in particularly humid climates, contact a local specialised firm to fit the machine with a dryer suited to local conditions.

Ensure that condensate formed in the compressor chamber is discharged daily and clean air filters once a week.

Use of clean and dry air is essential to ensure prolonged lifetime of pneumatic components and correct machine operation.



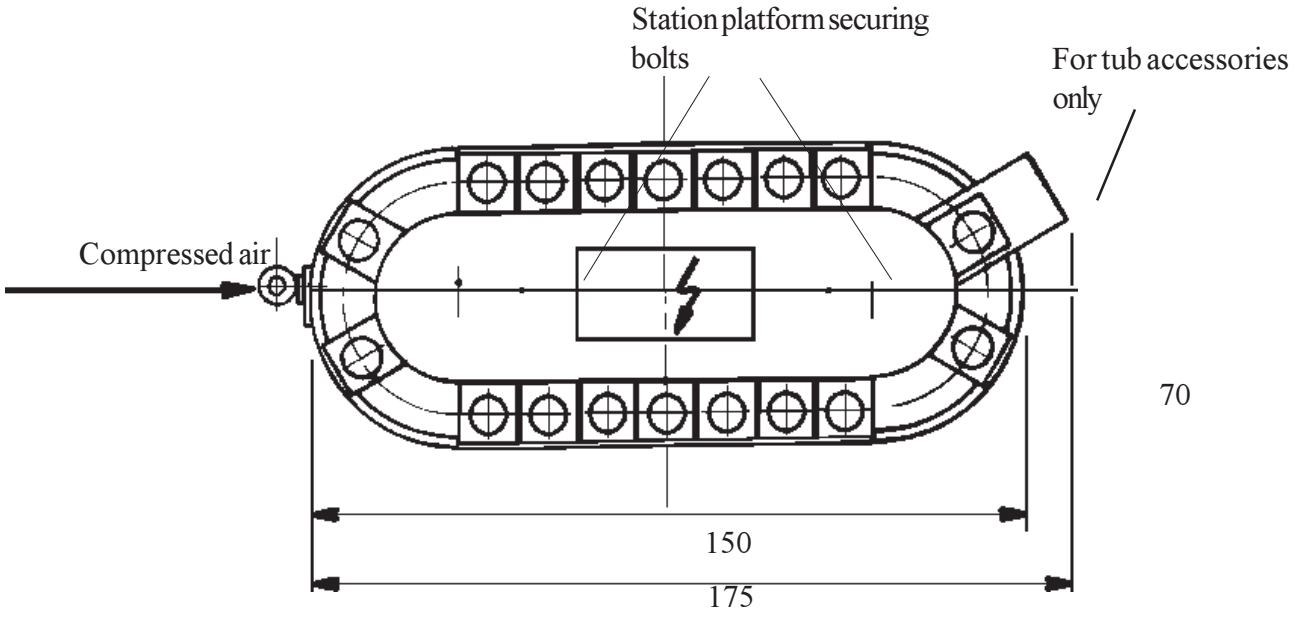
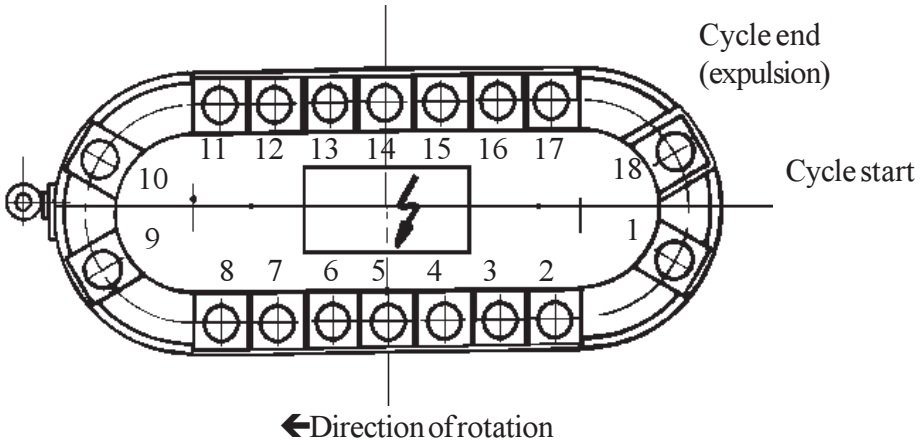


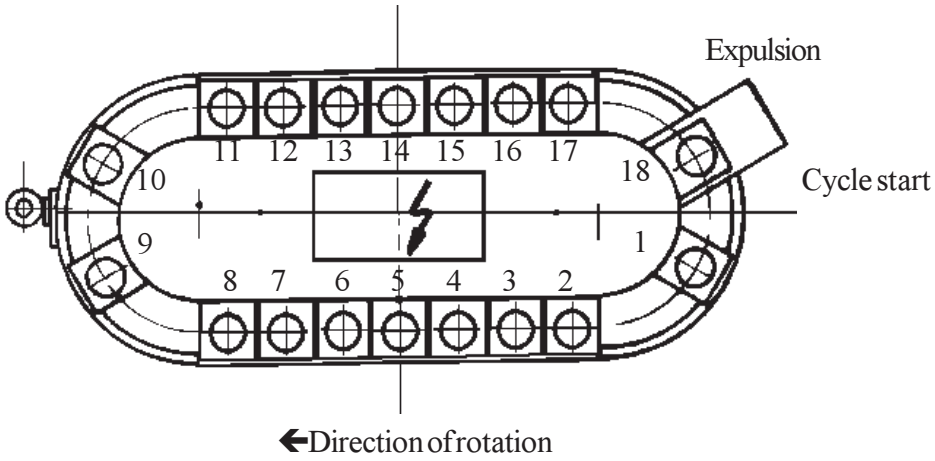
Fig. 3.1 - Dimensions and accessory inlets

3.3 ACCESSORIES



2 cone feeder
5 cone calibrator
6 chocolate spray
7 ice cream dispenser
8 chocolate dispenser
11 dry ingredients dispenser
15 cone lid applicator
17 crimper
18 cone expulsor

Fig. 3.2 - Cone accessories



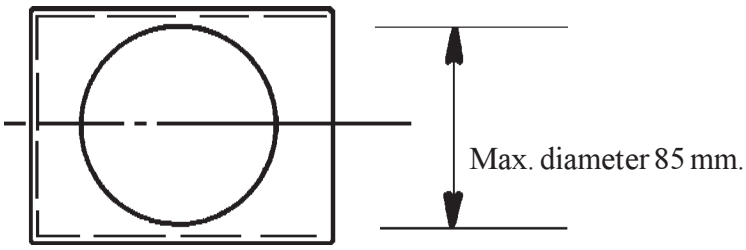
1 tub feeder
7 ice cream dispenser
15 tub lid applicator
17 lid sealer
19 tub expulsor/aligner

Fig. 3.3 - Tub accessories

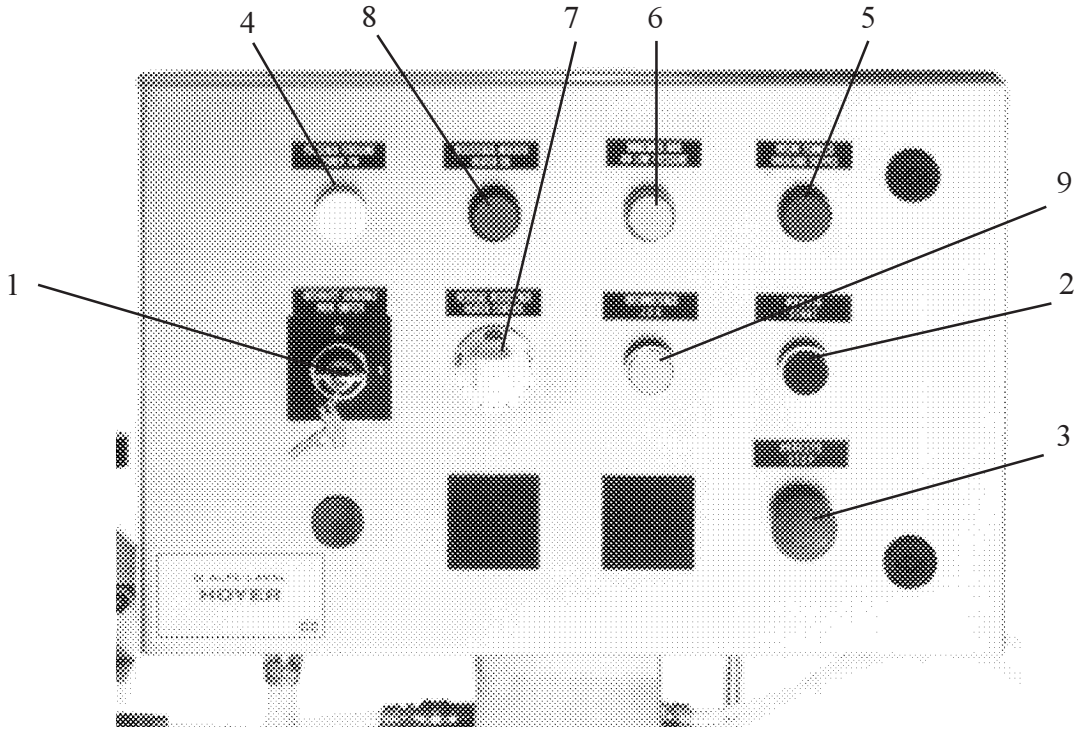
3.4 CONTAINER SEAT SIZE

Maximum seat diameter is 85 mm; product volume must not exceed 200 cc.

Maximum height of tub seats is 120 mm.



3.5 CONTROL PANEL



1 Main switch
2 Start pushbutton
3 Stop pushbutton
4 Power on indicator light
5 Motor overload cutout indicator light
6 Low air pressure indicator light
7 Resistance heating regulator
8 Resistance heating indicator light
9 Jog mode pushbutton

Fig. 3.4 - Control panel

SECTION 4

INSTALLATION

4.1 UNPACKING AND DELIVERY CHECKS

FM 3000 is packed in wooden crates which can easily be transported by means of lift trucks.

On delivery, proceed as follows:

1. Remove nails from the crate top and detach the sides of the crate. Attention: there are reinforcement spacing elements between crate walls.
2. Remove spare parts box and other components from the machine crate.
3. Remove nails from the wooden chocks used for machine transport.
4. Remove protective cellophane.

After unpacking the machine, carry out the following checks:

1. Ensure that the machine has not been damaged during transport.
2. In the event of damage, contact our agent and, if necessary, the relative insurance company. Do not proceed with installation without prior consent of the insurance company or agent.
3. Ensure that all covers and panels are securely fixed to the machine and that no parts are detached or loose.
4. Inspect all electrical components to ensure perfect condition.
5. If all components are present and in perfect condition, proceed with installation.

4.2 POSITIONING AND INSTALLATION

Lift the machine by means of a lift truck and position it in on the work site.

4.2.1 Compressed air connection

Connect the compressed air line to the coupling by means of a flexible hose with minimum 12 mm internal diameter.

Install a shutoff valve on the air delivery line.

4.2.2 Electrical connection

1. Ensure that the power supply voltage corresponds to machine dataplate specifications.
2. Detach the front panel of the base unit and remove the drive belt (see para. 7.6.5).
3. Connect the control panel cable to the power supply.
4. Turn on main switch (1, fig. 9.1) and start the motor by means of start pushbutton (2, fig. 9.1).
5. Check pulley (303, fig. 9.14) to ensure correct direction of rotation as indicated by the arrow (if there is no arrow, direction is clockwise facing the motor pulley).
6. If necessary invert the electrical phase wires.

SECTION 5

ADJUSTMENT PROCEDURES AND SIZE CHANGEOVER

5.1 SETUP

5.1.1 Speed adjustment

Machine production speed can be adjusted by means of the handwheel located on the left side of the machine frame (14, fig. 9.2): rotate clockwise to reduce speed and anticlockwise to increase.

The handwheel controls the rear motor slide, which functions as a drive to vary machine speed via variable pulley transmission (289, fig. 9.14).

5.1.2 Control valve unit timing (Fig. 9.14)

The machine is factory set and therefore does not require timing checks or adjustments; adjustment is only required following replacement of mechanical parts which may alter timing adjustments.

Pneumatic movement of various stations fitted on FM 3000 is carried out as follows.

Two cams (293) are fitted on the protruding section at the bottom of the slow speed shaft on the reduction unit.

Each of the above cams activates a pneumatic spool valve (292-294).

Valve 292 controls the tub feeding cycle.

Valve 294 controls all other stations.

Cam adjustment or timing is carried out with the machine shut down; slacken securing screws and turn the cam through a few degrees around the axis to obtain correct timing.

This operation must be carried out with caution to avoid further timing loss.

The following guidelines are provided for timing adjustments.

Timing operations must be carried out with the electric motor shut off and by turning the pulleys manually; ALWAYS TURN THE PULLEYS CLOCKWISE, as indicated by the arrow.

Ensure that stations are installed as shown in figures 3.2 and 3.3 for cones and tubs respectively (see para. 3.3).

All operating filler and dispenser stations must start the ascent and descent phase when the conveyor has stopped.

Standard timing can be modified according to relative product application.

Following timing operations and prior to machine start-up, ensure that the machine is in perfect working order and that all screws are fully secured.

In any event, check for correct machine operation as follows; manually rotate the pulleys installed on the motor or reduction unit clockwise through two revolutions.

5.1.3 Safety coupling (Fig. 9.14)

The machine is fitted with a safety coupling (296) which is timed during machine testing.

In the case of excessive conveyor chain tension during operation, the safety coupling is disengaged and presses microswitch (300) to shut down the main motor.

In this case, shut off machine air supply, eliminate the cause of safety coupling disengagement and reset the machine as follows:

Hold the fixed pulley with one hand (303), and with the other hand turn plates (d) and (e) until the bearings (f) slot into the relative seats and allow the two plates to move together.

5.2 PRODUCT SIZE CHANGEOVER

5.2.1 Tub/Cone accessory changeover (figs. 3.2, 3.3, 9.5, 9.6, 9.8, 9.9, 9.10 and 9.11)

IMPORTANT

Disassemble and reassemble stations by means of the securing nuts and bolts on pneumatic couplings.

Position the stations according to the indications in figs. 3.2 and 3.3 (See para. 3.3)

1. Remove tub expulsor pad and fit cone version (259, fig. 9.11).
2. Replace tub seats with cone versions.

3. To remove container seats, release the two springs that secure the seats.
4. Replace the tub feeder with a cone version.
5. Close valve (266, fig. 9.11) which shuts off the tub vacuum valve.
6. Install the first chocolate spray (77/78/79, fig. 9.5) and connect it to the chocolate tank (121, fig. 9.6).
7. Install the cone calibrator (76, fig. 9.5).
8. Fit the chocolate dispenser (126, fig. 9.6). Remove the lid calibrator pad and fit the spring-operated crimper (211, fig. 9.9). Replace the lid magazine with the cone version (166, fig. 9.8).
9. Remove the tub aligner and relative slide (Fig. 9.10) and replace it with a cone chute.

IMPORTANT

Chocolate tank or dry ingredient hopper disassembly is not necessary for tub/cone changeover procedures.

5.2.2 Dummy run

When the machine is reset for a different products, carry out dummy run before loading new ingredients. Proceed as follows:

1. Adjust knob (11A, fig. 9.2) on the pressure reducer so that the gauge (12, fig. 9.2) reads a pressure of 6 bar. During operation ensure that constant pressure is maintained at 5/6 bar.
2. A pressure switch is installed inside the machine and shuts down the machine in the event of low pressure (less than 3.5 bar); in this case the relative indicator lamp (6, fig. 9.1) illuminates on the control panel.
3. After making all machine connections and carrying out the above checks, carry out a machine cycle using tubs/cones only (without filling products), and ensure correct operation of all stations starting from the feed station (cycle start). Adjust the speed of the pneumatic cylinders according to processing requirements by turning the adjustment screws gradually (example shown in fig. 9.4, 64).
4. If necessary, proceed with adjustments according to the instructions in the paragraphs below.

IMPORTANT

After the dummy run and adjustment procedures, clean the machine thoroughly according to the relative paragraph in the maintenance section.

5.3 CONE STATION ADJUSTMENT

5.3.1 Cone feeder (Fig. 9.4)

The first filler station is the cone feeder.

This unit comprises:

a. a vertical magazine for empty containers;

b. 4 mobile jaws installed below the magazine (46, 47, 48, 49) which move alternately to drop containers one at a time;

c. an upper pad (56) which guides container descent from the jaws.

To ensure optimal operation, jaws must not exert excessive pressure on the containers and the guide pad must be positioned above the rim of the container.

Jaws are adjusted by means of screws (63) and plates (50, 51); adjust the expulsor pad cylinder by means of screw (59).

Following adjustment, tighten adjustment screws fully down. If guide pad descent speed is too high, tighten screw (64) gradually to obtain the required setting.

During processing, ensure sufficient cone supply to the vertical magazine.

Spool valve (62) enables air supply opening or shut-off and therefore can inhibit or activate the feed station.

5.3.2 Cone calibrator (fig. 9.5)

Cone paper is calibrated by means of a special plastic pad (76), activated by the dispenser group.

5.3.3 Chocolate spray (figs. 9.5 and 9.6)

The spray head is installed immediately before the ice cream dispenser station and is normally used for cone processing.

1. Fill tank (121, fig. 9.6) to approx. three quarters with chocolate topping at the correct temperature.
2. Open valve (133, fig. 9.6).
3. Adjust the spray head by means of screw (96, fig. 9.5), and chocolate quantity by means of cam (109, fig. 9.5).

IMPORTANT

On completion of processing, empty the tank (121, fig. 9.6), remove spray head (78, fig. 9.5) and clean the latter thoroughly.

5.3.4 Ice cream dispenser (Figs. 9.5 and 9.6)

Connect the freezer outlet to the ice cream inlet by means of a flexible hose.

If double flavour doses are required, fit the "double input coupling" on the inlet coupling.

IMPORTANT

As the “FM 3000” ice cream dispenser station operation is timed, ice cream supply from the freezer must be constant to ensure correct machine operation.

At the start of production, set the freezer to the correct operation mode to ensure constant ice cream flow to the machine.

Adjustment of ice cream dispenser station can be carried out as follows:

- By increasing or decreasing filler speed;
- By adjusting the freezer production speed.

Ring nuts (84 and 85, fig. 9.5) are not for dose adjustment but to modify the dose output "shape".

Position 139 in fig. 9.6 indicates the safety valve.

The shape of the dispenser nozzle (80, fig. 9.5) depends on the relative application.

CAUTION

Ensure that the dose tie rod (83, fig. 9.5) has an "opening" travel of at least 1 cm.

5.3.5 Chocolate dispenser (Fig. 9.6)

This device, located in the station after the ice cream dosing station is activated by the descent movement of the dosing station and is used to dispense a small dose of chocolate or thick syrup topping onto the ice cream.

Prior to operation, fill tank (121) to approximately three quarters with the syrup or chocolate as required and ensure correct temperature.

FM 3000 is fitted with a heated chocolate tank, the temperature of which is controlled by a thermoregulator (7, fig. 9.1). Refer also to electrical controls description.

Resistance activation time is increased by moving the regulator progressively from 1 to 4 with consequent temperature increase.

Maximum temperature is obtained with the regulator set to “full”, in which case the resistance remains permanently activated.

During machine operation, adjust knob (135) to rotate plate (124) below, so that screw (125) presses the pushbutton on descent. Adjust the screw according to the required chocolate output quantity.

CAUTION

Never allow the product to dry inside the dispenser head. Before removing the dispenser for cleaning purposes, empty the tank completely.

5.3.6 Dry ingredients dispenser (Fig. 9.7)

This operation is carried out following chocolate or syrup application on the ice cream.

1. Fill hopper (151) with the required amount of dry ingredients (approx. 3/4 of total capacity).
2. Adjust the dry ingredients dose by means of the relative nuts (155, 154).
3. After adjustment, tighten all screws fully down to prevent slackening during processing.
4. Remove the hopper by means of the relative screws and disconnect the two air supply lines connected to the cylinder.

5.3.7 Cone lid applicator (Fig. 9.8)

This unit mainly comprises a vertical lid magazine (166), rotary suction cup (191) and a rack (171).

The lids are loaded between the 4 magazine rods (170) which are adjustable by means of screws (192). Ensure that the rods hold the lid correctly and are aligned with the centre of the suction cup.

The suction cup picks up lids one at a time by movement through an arc and positions them on the relative containers below.

Vacuum inside the suction cup is created by means of a vacuum generator valve (190). On lid release, vacuum switch (187) is shut off when the main valve switches.

The vacuum switch is fitted with a vacuum control device; if the suction cup cannot pick up a lid (or if the lid magazine is empty) suction cup descent is blocked to prevent subsequent contact with ice cream.

5.3.8 Cone lid crimper (fig. 9.9)

After the lid has been positioned, the cone passes under the sealing station for final crimping by means of crimper pad (211).

Remove the pad by slackening knob (208).

5.3.9 Cone expulsor (fig. 9.11)

On completion of product packing, the cone is transferred to the expulsor (259) which pushes it onto the offload chute to the final packing zone.

The expulsor is activated by a pneumatic cylinder (260); adjust speed by means of the relative screws (267).

5.4 TUB STATION ADJUSTMENT

5.4.1 Tub feeder (figs. 9.3, 9.10, 9.11 and 9.14)

Install the tub feeder in position 1 (see para. 3.3, fig. 3.3).

Install the suction cup under the tub feeder (256, fig. 9.11) and connect the vacuum generator tube (264, fig. 9.11). Open valve (266, fig. 9.11) to create vacuum in the suction cup.

Adjust magazine rods (31, fig. 9.3) so that the tubs are held in place and the bottom tub is secured at the rim. Ensure that rod pressure does not prevent the suction cup from picking up the tub.

The magazine rods are adjusted by slackening the screws accordingly (36, fig. 9.3).

The vacuum in the suction cup is released as soon as the tub is positioned in the relative seat; adjust the cam to ensure correct operation (256, fig. 9.11).

To ensure feed of one tub at a time in sychronisation with the suction cup, two grippers (30, fig. 9.3) are activated by opposing pneumatic cylinders (32, fig. 9.3).

Gripper position can be adjusted according to tub size. To adjust according to diameter, slacken screws (240, fig. 9.10) and knurled ring nut (24, fig. 9.3), and re-tighten the screws.

To adjust according to height, slacken lock nut (35, fig. 9.3) and adjust knurled ring nut (20, fig. 9.3).

If gripper opening time is too long or too short, this can cause the release of more than one tub at a time or no release at all. If necessary, adjust opening time by means of cams (293, fig. 9.14).

5.4.2 Ice cream dispenser (Figs. 9.5 and 9.6)

Connect the freezer outlet to the ice cream inlet by means of a flexible hose.

If double flavour doses are required, fit the "double input coupling" to the inlet coupling.

IMPORTANT

As the “FM 3000” ice cream dispenser station operation is timed, ice cream supply from the freezer must be constant to ensure correct machine operation.

At the start of production set the freezer to the correct operation to ensure constant ice cream flow to the machine.

Adjustment of ice cream dosing station can be carried out as follows:

- By increasing or decreasing filler speed;
- By adjusting freezer production speed.

Ring nuts (84 and 85, fig. 9.5) are not for dose adjustment but to modify the dose output "shape".

Position 139 in fig. 9.6 indicates the safety valve.

The shape of the dispenser nozzle (80, fig. 9.5) depends on the relative application.

CAUTION

Ensure that the dose tie rod (83, fig. 9.5) has an "opening" travel of at least 1 cm.

5.4.3 Tub lid applicator (Fig. 9.8)

This unit comprises a vertical lid magazine (166), rotary suction cup (191) and rack (171).

Lids are stored between 4 magazine rods (170) which are adjustable by means of screws (192) Ensure that the rods hold the lid correctly and are aligned with the centre of the suction cup.

The suction cup picks up the lids one at a time by movement through an arc to position them on the relative containers below.

Vacuum inside the suction cup is created by means of a vacuum generator valve (190). When the suction cup releases the lid onto the container, the main valve switches and vacuum switch (187) is shut off.

The vacuum switch is fitted with a vacuum control device; if the suction cup cannot pick up a lid (or if the lid magazine is empty) suction cup descent is blocked to prevent subsequent contact with ice cream.

5.4.4 Tub lid clamp (Fig. 9.9)

Once the lid is positioned, the tub moves on to the sealing station which clamps the lid by means of the relative pad (209).

Remove the pad by slackening knob (208).

5.4.5 Tub expulsor/aligner (Figs. 9.10 and 9.11)

On completion of packing, products are delivered to expulsor (259, fig. 9.11) activated by pneumatic cylinder (260, fig. 9.11); adjust speed by means of screws (267, fig. 9.11).

A small horizontal cylinder operates in synchronisation with the expulsor (239, fig. 9.10).

To avoid tub overturning, adjust ring nut (236, fig. 9.10) which regulates the height of the upper tub contact point (224, fig. 9.10).

Install a sufficiently sized table under slide (234, fig. 9.10) and/or position slide to ensure correct collection procedures.

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SECTION 6

OPERATION

6.1 START-UP

To start the machine, proceed as follows:

1. Turn the main switch (1, fig. 3.4) to “ON”.

> **IMPORTANT.**
>
> The power on indicator light (4, fig. 3.4) illuminates when the machine is switched on; if this is not the case, check electrical connections.

2. Open the compressed air supply by means of slide valve (13, fig. 9.2).
3. Turn regulator (7, fig. 3.4) to heat the chocolate tank resistance.
4. Open valve (133, fig. 9.6).
5. Press JOG mode pushbutton (9, fig. 3.4) for intermittent conveyor movement and to ensure correct machine operation.
6. Start up the freezer and wait for a few minutes for the product to reach the required consistency and temperature.
7. Open slide valve for cone or tub feed (62, fig. 9.4).
8. Press START pushbutton (2, fig. 3.4), to activate the production cycle.
9. Open the slide valves on the dry ingredient dispenser and lid applicator.
10. Open the valve on the lid clamp or cone crimper.

6.2 PRODUCTION CYCLE

The production cycle is mainly automatic and only requires the following manual operations:

1. Check all magazines and fill up if necessary (cone/tub magazines, lid magazines etc.).
2. Check hoppers and top up if necessary (chocolate, dry ingredients).
3. Ensure correct operation of the dosing stations.

6.3 OPERATION CHECK

During operation, check that the correct quantity and shape of ice cream is dosed and that packaging is as required at the end of production.

6.4 SHUTDOWN

1. Shut off slide valves on the various processing stations.
2. Press the stop pushbutton (3, fig. 3.4) to shut down the machine.
3. Shut off the valve on the chocolate tank.
4. Turn the regulator to deactivate chocolate heating.
5. Switch off the freezer and shut off the compressed air valve.
6. Turn the main switch to “OFF”.

SECTION 7

CLEANING AND MAINTENANCE

7.1 CLEANING PRECAUTIONS AND INSTRUCTIONS

- Switch off the machine before carrying out maintenance or repairs. Set the main switch to "OFF" and affix a suitable warning notice on the machine.
- Remember that cables remain live even when the main switch is set to "OFF".
- Never leave tools, objects or other material on or inside the machine.
- PRIOR to production cycle start-up following maintenance or repairs, ensure that all guards and safety covers are installed correctly.

7.1.1 Consumables

The following materials are required for machine maintenance and cleaning operations:

Tab. 7.1 - Cleaning materials

Material	Availability
Standard bearing grease	Commercial
Vaseline grease or similar	Commercial
Neutral detergent	Commercial
Non-corrosive disinfecting detergent	Commercial
Solvent (benzene or similar)	Commercial

7.2 TOOLS AND EQUIPMENT

Special tools and equipment are not required for maintenance or start-up operations.

The machine is supplied with a set of fixed wrenches for standard maintenance.

7.3 CLEANING

Remove the following from the machine:

- chocolate spray (fig. 9.5)
- ice cream dispenser (fig. 9.5)
- chocolate dispenser (fig. 9.6)
- chocolate tank (fig. 9.6)
- dry ingredients hopper (fig. 9.7)

Clean the above items separately.

Clean all components and external machine surfaces thoroughly with hot water and detergent. Dry by means of compressed air. For more thorough cleaning, remove all container seats (34, fig. 9.3) and clean separately.

IMPORTANT

NEVER USE caustic soda or other aggressive products.

Use a disinfecting detergent to clean dispensers, tank and dry ingredient containers (refer to figs. 9.5, 9.6 and 9.7 for disassembly). Before refitting components, lubricate pilot bosses with vaseline (81, fig. 9.5, and 128, fig. 9.6).

On completion, lubricate the vertical guides on the various stations (see para. 7.6.1).

CAUTION

Never direct water jets on the control panel to avoid water penetration.

Keep disassembled dispenser components in a safe place during cleaning and reassemble according to the relevant instructions.

7.4 SCHEDULED MAINTENANCE

AFTER PERIODS OF PROLONGED DISUSE

a) Clean and lubricate all external machine surfaces and all moving parts (see para. 7.3).

DAILY (before production)

a) Check for any leaks from compressed air lines.

b) Clean and lubricate all external surfaces and moving parts (see para. 7.3).

MONTHLY

a) Clean silencers (see para. 7.5.2), dryer filter (see para. 7.5.1), and lid applicator vacuum manifold (see para. 7.5.3.1).

b) Clean and lubricate guides for motor slide (301, fig. 9.14) and crimper (see para. 7.6.2).

c) Lubricate drive chain (304, fig. 9.12), variable pulley (see para. 7.6.7) link block (see para. 7.6.9), articulated joints and chain conveyor lugs (fig. 9.13).

d) Check for wear on station bushings (see para. 7.6.1) and drive belt (see para. 7.6.5).

e) Ensure correct drive chain tension (see para. 7.6.4).

f) Check the clearance of the ratchet cam and conveyor lugs (see para. 7.6.8).

BEFORE PERIODS OF PROLONGED DISUSE

a) Clean and lubricate safety coupling (see para. 7.6.6).

b) Lubricate (in the case of seal replacement only) pneumatic cylinders (see para. 7.5.4).

7.4.1 Checks and replacements

EVERY 1200 HOURS

a) Replace drive belt (see para. 7.6.5).

EVERY 1500/2000 HOURS

a) Check and, if necessary, replace pneumatic cylinder seals (see para. 7.5.4).

EVERY 3000 HOURS

a) Replace station bushings (see para. 7.6.1).

b) Replace control cam (see para. 7.5.6.2).

c) Replace O-rings on the lid applicator vacuum manifold (see para. 7.5.3.2).

d) Replace suction cups (191, fig. 9.8 and 265 fig. 9.11).

e) Replace pneumatic valves (see para. 7.5.5).

7.5 PNEUMATIC CIRCUIT MAINTENANCE

7.5.1 Dryer filter cleaning (fig. 9.2)

a) unscrew bowl (e);

b) remove float (d), by slackening the lock nut;

c) remove internal float;

d) clean all parts with water and detergent and dry using compressed air.

WARNING

DO NOT USE ALCOHOL OR SOLVENTS for cleaning

7.5.2 Silencer cleaning

Unscrew the silencers by hand and clean with hot water only. Dry using compressed air.

7.5.3 Vacuum manifold on lid applicator suction cup shaft (180, fig. 9.8)

7.5.3.1 CLEANING

a) remove the head nut;

b) detach the vacuum tube;

c) inject compressed air into the head aperture.

7.5.3.2 O-RING REPLACEMENT

a) remove suction cup supports (181/182) on shaft (167),

b) remove the circlip locking the manifold and replace the two O-Rings (189).

7.5.4 Pneumatic cylinders (32, fig. 9.3 - 60/61, fig. 9.4 - 111, fig. 9.6 - 157, fig. 9.7 - 186, fig. 9.8 - 207, fig. 9.9, 207 - 239, fig. 9.10 - 260, fig. 9.11)

a) remove securing nuts and bolts;

b) unscrew cylinder head;

c) unscrew cylinder body;

d) check seals and replace if necessary (lubricate new seal before fitting).

7.5.5 Pneumatic valves (Figs. 9.3, 9.14, 9.16)

To check pneumatic control valves (292/294, fig. 9.14) proceed as follows:

a) stop the machine with the station heads lowered;

b) detach the air outlet tube from the valve: air is released from the valve;

c) if no air is released when the needle is pressed, the valve is in perfect condition;

d) otherwise, detach the valve by slackening the relative nuts and bolts and replace.

To check the condition of pneumatic spool valves (33, fig. 9.3 and 331, fig. 10.2) proceed as follows:

a) stop the machine with the station heads lowered;

b) detach the supply tubes from the various station heads; air is released from the relative hole on the valves;

c) activate the control valve manually (294/292, fig. 9.14) to check that air is released from the other hole on the valves;

d) if this is not the case, remove the valve by slackening the relative nuts and bolts and replace.

7.5.6 Control cam (293, fig. 9.14)

7.5.6.1 LUBRICATION

a) apply a film of grease on the contact faces of the cam unit.

7.5.6.2 REPLACEMENT

a) slacken the relative nuts and bolts and withdraw the cams from the shaft,

b) refit new cams and proceed with timing (see para. 5.1.2).

IMPORTANT

Replace both sets of cams at the same time.

7.5.7 Vacuum generator valve cleaning (190, fig. 9.8)

Remove pneumatic couplings and clean air passages with water and compressed air.

7.6 MECHANICAL MAINTENANCE

7.6.1 Lubrication and replacement of station head vertical guides and bushings (18, fig. 9.3 - 95, fig. 9.5 - 104, fig. 9.6 - 172, fig. 9.8 - 205, fig. 9.9 - 229, fig. 9.10 - 252, fig. 9.11)

a) shut off compressed air supply;

b) apply a few drops of oil on the vertical guides;

c) raise and lower the station heads manually without exerting pressure.

Excessive wear of the teflon bushings is noted by excessive play and irregular movement of the station heads.

In this case:

a) remove station heads and replace bushings.

With the exception of bushings (229, fig. 9.10 and 252, fig. 9.11), which are fixed by means of a ring nut, all other bushings lock into their relative seats.

7.6.2 Crimper lubrication (211, fig. 9.9)

IMPORTANT

This operation is only to be carried out if the machine is designed for cone processing.

a) unscrew knob (208) and remove crimper;

b) slacken securing screws on spring support and remove;

c) extract pad (d) and clean all parts;

d) lubricate pad support rod (d);

e) reassemble crimper.

7.6.3 Expulsor unit (Fig. 9.11)

If the expulsor unit comes into contact with containers (34, fig. 9.3), adjust the sprocket (270, fig. 9.12), located on the expulsor side of the machine as follows:

a) turn the fixed pulley manually (303, fig. 9.14) in the direction of the arrow until the container conveyor chain and stations stop;

b) check that the ratchet cam (277, fig. 9.13) is locked between two lugs (280, fig. 9.13) and that the expulsor pad is perfectly centred with respect to the container; if this is not the case, slacken the sprocket securing screws (270, fig. 9.12) and move the chain manually until the expulsor pad is centred correctly;

c) secure all screws before starting the machine.

7.6.4 Conveyor drive chain (for containers) (304, fig. 9.12)

Correct alignment of the container seats depends on correct chain tension.

In the case of misalignment, proceed as follows:

a) slacken the two bolts (see fig. 3.1), lift the machine station support table by maximum 5-6 cm and insert suitable wooden blocks to keep it raised.

CAUTION

This operation must be carried out by at least two persons.

Take care not to damage wiring;

b) slacken sprocket securing screws (270) located on the left side of the machine and slacken bolts (272 a);

c) move the sprocket towards the exterior by means of the tensioner bolt to restore correct chain tension;

d) tighten screws and bolts.

7.6.5 Drive belt (291, fig. 9.14)

Ensure that there are no signs of splitting or wear.

To replace the belt, move the variable pulley (289) back to the minimum distance with respect to the fixed pulley (303).

7.6.6 Safety coupling (296, fig. 9.14)

a) slacken the securing screws on nut (a);

b) remove nut (a), spring (b), spacer (c), plate (d) and (e), bearings (f);

c) clean parts and plate surface (g) with a solvent;

d) lubricate plate surfaces (g) with grease and reassemble the whole unit.

7.6.7 Variable pulley lubrication (Fig. 9.14, 289)

Use a standard grease pump with the relative nozzle to lubricate the variable pulley (289-a).

7.6.8 Ratchet cam and lugs (277 and 280, fig. 9.13)

Check the position of the lug with respect to the cam:

optimal clearance is approx. 1 mm. To obtain this value adjust the length of the connecting rod (298, fig. 9.13).

7.6.9 Link block lubrication (288, fig. 9.13)

Lubricate the contact points between the link block and:

a) shaft flange (299, fig. 9.13),

b) connecting rod coupling pin (287, fig. 9.13).

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SECTION 8

TROUBLESHOOTING

FAULT	PROBABLE CAUSE	REMEDY
The machine does not start	Power supply failure	Check connections and voltage
	Insufficient compressed air	Check connections and pressure
	Safety coupling disconnected (296, fig. 9.14)	Reconnect
	Motor overload relay tripped (316, fig. 10.1)	Open control panel and reset relay. Check that the relay is set for motor absorption plus 10%, or replace if damaged
All station heads are blocked	Cams (293, fig. 9.14)	Check timing (see para. 5.1.2)
	Control valve (294, fig. 9.14)	Check operation (see para. 7.5.5)
	Pneumatic spool valve (331, fig. 10.2)	Check operation (see para. 7.5.5)
One or more stations come into contact with containers during descent	Lug/ratchet cam (277 and 280, fig. 9.13)	Check play (see para. 7.6.3)
	Faulty cams (293, fig. 9.14) for valves (294, fig. 9.14)	Check timing (see para. 5.1.2)
	Sprocket (270, fig. 9.12)	Adjust position (see para. 7.6.3)
The machine does not reach specified max. speed (depending on the product)	Drive belt (291, fig. 9.14)	Check for wear
	Motor slide stop (302, fig. 9.14)	Adjust position
	Motor slide guide fault (301, fig. 9.14)	Clean and lubricate

FAULT	PROBABLE CAUSE	REMEDY
Cones do not drop into seats, more than one drops at a time, or cones break	Cams (293, fig. 9.14) related to valve (394, fig. 9.14)	Check timing (see para. 5.1.2)
	Pneumatic cylinder (61, fig. 9.4)	Check position of air supply tubes (red with red, blue with blue)
	Jaw (46/47/48/49, fig. 9.4)	Ensure correct position by means of adjustment screws (63, fig. 9.4)
No chocolate is delivered from the dispenser head (118, Fig. 9.6) or from the spray head (78, fig. 9.5)	Tank (121, fig. 9.6), chocolate tubes, dispenser and spray	Ensure that chocolate has not hardened
		Check that there are no hard pieces of chocolate and clean if necessary (see para. 7.3)
Lids do not drop or are positioned incorrectly	Magazine rod (170, fig. 9.8)	Ensure correct position
	Suction cup (191, fig. 9.8)	Ensure that the suction cup unit is perfectly vertical in the lower and upper dead centres.
	Manifold (180, fig. 9.8) tubes and suction cup (191)	Ensure sealing efficency as specified
	Vacuum valve (190, fig. 9.8)	Clean the vacuum valve and/or silencer (see para. 7.5.7)
Tubs do not drop into containers or 2/3 drop at a time	Tub magazine (Fig. 9.3)	Check height (see para. 5.4.1)
	Magazine rod fault (31, fig. 9.3) selector jaws (30, fig. 9.3)	Check position: jaws must be positioned to hold the tub stack without dropping or damaging them
	Tubes and suction cup (265, fig. 9.11)	Check sealing efficiency
	Silencer (331, fig. 9.11)	Check that the silencer is not blocked
Tub feeder jaws open	Cams (293, fig. 9.14)	Check timing (see para. 5.1.2)
	Valve (292, fig. 9.14)	Check operation (see para. 7.5.5)

SECTION 9

SPARE PARTS CATALOGUE

SECTION 9

SPARE PARTS CATALOGUE

9.1 ORDERING SPARE PARTS

When ordering spare parts, please quote all data specified on the machine dataplate.

The following information is also required:

1) machine serial number;

2) part position and reference figure;

3) part description.

WARNING

Spare parts available are exclusively those listed with figures 9.1 to 9.14.

Spare parts may be subject to improvements and/or modifications without notice as deemed necessary by Hoyer.

Other parts are described in the relative figures for illustrative purposes only and are not available as spare parts.

Securing nuts and bolts (screws, nuts, washers, etc.) are not available as spare parts.

Example of spare parts order:

For FM 3000

Serial number: 0001

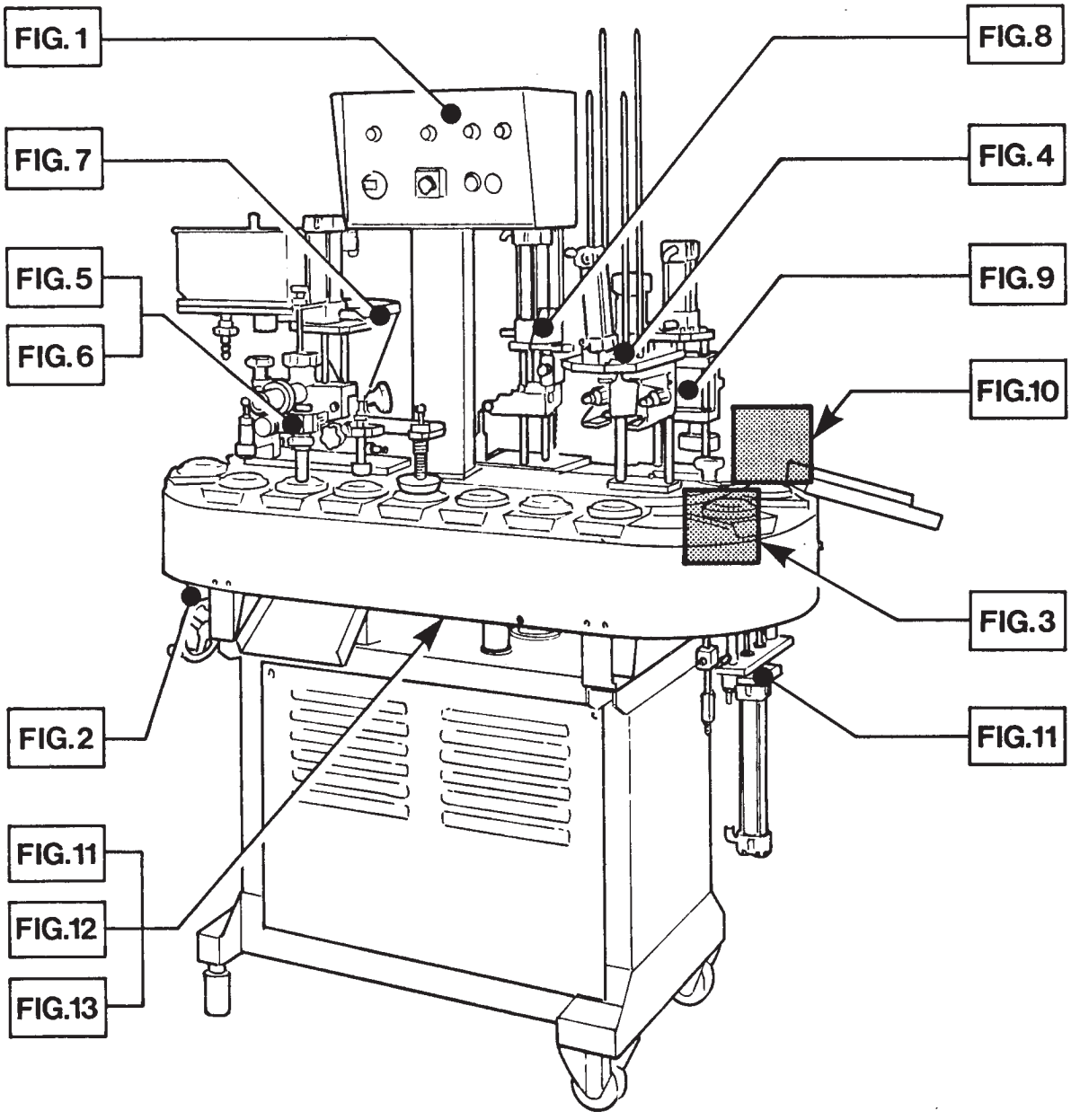
1 part Fig. 3 - position 33:

Pneumatic valve.

9.2 SPARE PARTS SUPPLIED WITH THE MACHINE

STANDARD PARTS		
CODE	**DESCRIPTION**	**Q.TY**
D-FM03A14	L.H. SPRING	1
D-FM03A15	R.H. SPRING	1
D-FM0402A	STRAIGHT SLEEVE ASSEMBLY	1
D-FM0404	SPRING	1
D-FM0826	LID FEEDER SPRING	2
D-FM1005C	SEAT SPRING	1
D-FM1135	SPRING	1
D-FM1136	LUG SPRING	1
D-FM1137	SPRING	1
011045325	BODY 1/8"	1
011045326	QUICK CONNECTOR	1
011045348	STRAIGHT COUPLING 1/8" T6	3
011045439	U-BEND 1/4" T6	3
011045498	U-BEND 1/8" T6	3
017040915	LAMP BA9S 30V	4
018020575	CLAMP SEAL 1"	3
336019805	BELT CV 22x8x850	1
336067048	OR SEAL 3100	1
336067056	OR SEAL 3150	1
336067079	OR SEAL 4081	2
336067082	OR SEAL 4100	1
336069705	SEAL P7-8	1
016070541	PVC HOSE 32x42	6 m
018020577	CLAMP SEAL 1/2"	4
336067038	OR SEAL 121	1
018047194	ADJUSTABLE C-SPANNER	1

STANDARD PARTS		
CODE	**DESCRIPTION**	**Q.TY**
011045990	SUCTION CUP VAS 40-1/4 9251	1
016070913	RILSAN TUBE 6x1 WHITE	5 m
016960009	HOSE CONNECTOR A304 CLAMP 1	2
016060218	CLOSURE A304 1"-1	3
540220001	"Y" JOINT ND25	1
018060963	STAINLESS STEEL CLIP 32-52	4
016070374	PVC HOSE 19x29	5 m
018060961	STAINLESS STEEL CLIP 25-45	2



FM 3000 Assembly

Fig. 9.1 - Control panel

POS.	CODE	DESCRIPTION	Q.TY
1	017035548	MAIN SWITCH	1
2	017060915 017060902	START PUSHBUTTON	1
3	017060904 017060902	STOP PUSHBUTTON	1
4	017060907 017060911 017040915	POWER ON INDICATOR LIGHT	1
5	017060905 017060911 017040915	MOTOR OVERLOAD CUTOUT INDICATOR LIGHT	1
6	017060906 017060911 017040915	LOW AIR PRESSURE INDICATOR LIGHT	1
7	017085153	RESISTANCE HEATING REGULATOR	1
8	011970059 017060911 017040915	RESISTANCE REGULATOR INDICATOR LIGHT	1
9	017060912 017060902	JOG MODE PUSHBUTTON	1

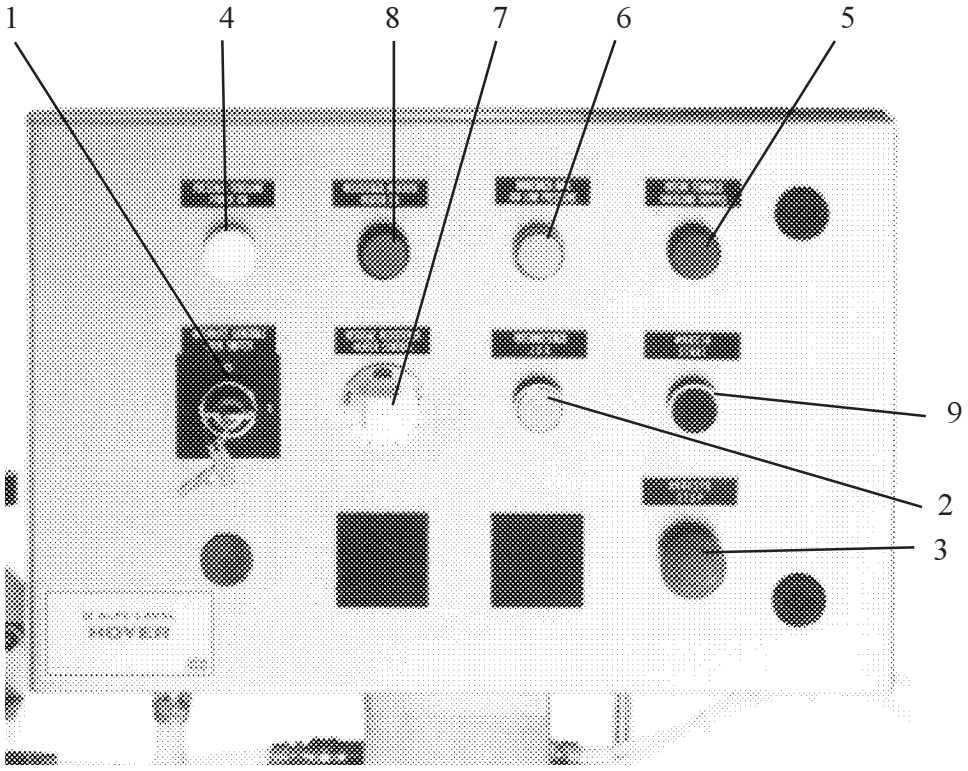


Fig. 9.1 - Control panel

Fig. 9.2 - Pneumatic controls and devices

POS.	CODE	DESCRIPTION	Q.TY
11	333012120	FILTER - REDUCTION UNIT	1
11A		PRESSURE REGULATOR	
11C		AUTOMATIC CONDENSATE DISCHARGE FILTER	
11D		CONDENSATE DISCHARGE	
11E		BOWL	
12	333021011	PRESSURE GAUGE	1
13	333004046	SLIDE VALVE	1
14	340167202	SPEED REGULATION HANDWHEEL	1

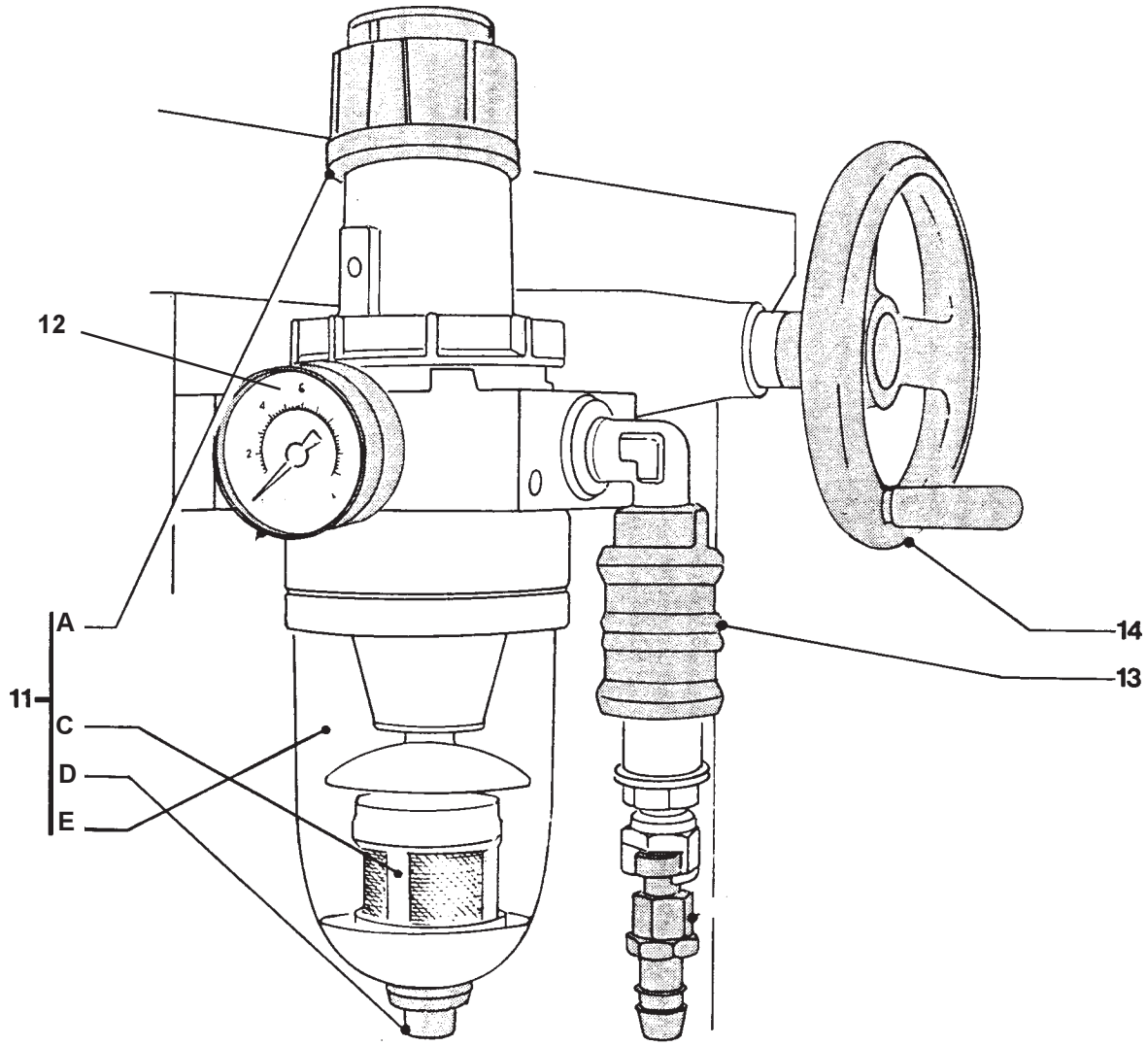


Fig. 9.2 - Pneumatic controls and devices

Fig. 9.3 - Tub feeder

POS.	CODE	DESCRIPTION	Q.TY
15	D-FM03A01	BASE PLATE	1
16	D-FM0302	SUPPORT BLOCK	1
17	D-FM0303	GUIDE ROD	2
18	D-FM0304	BUSHING	2
19A	D-FM0305A	BUSHING	1
19B	D-FM0305B	WASHER	1
20	D-FM0306	KNOB	1
21	D-FO4A07	THREADED ADJUSTMENT ROD	1
23	D-FM0311	UPPER PLATE	1
24	D-FM0312	ADJUSTMENT RING NUT	1
25	D-FM0313	STUD BOLT	1
26	D-FM0314	VALVE SUPPORT PLATE	1
27	D-FM0316A D-FM0316B	ADJUSTABLE SUPPORT (RIGHT + LEFT)	1+1
28	D-FM0317A D-FM0317B	CYLINDER SUPPORT (RIGHT + LEFT)	1+1
29	D-FM0318	JAW SUPPORT	2
30	D-FM0319	JAW	2
31	D-FM0320	ROD	4
32	333001091	DOUBLE ACTING CYLINDER ADV.20/10	2
33	333004094	PNEUMATIC VALVE VL-5-1/8	1

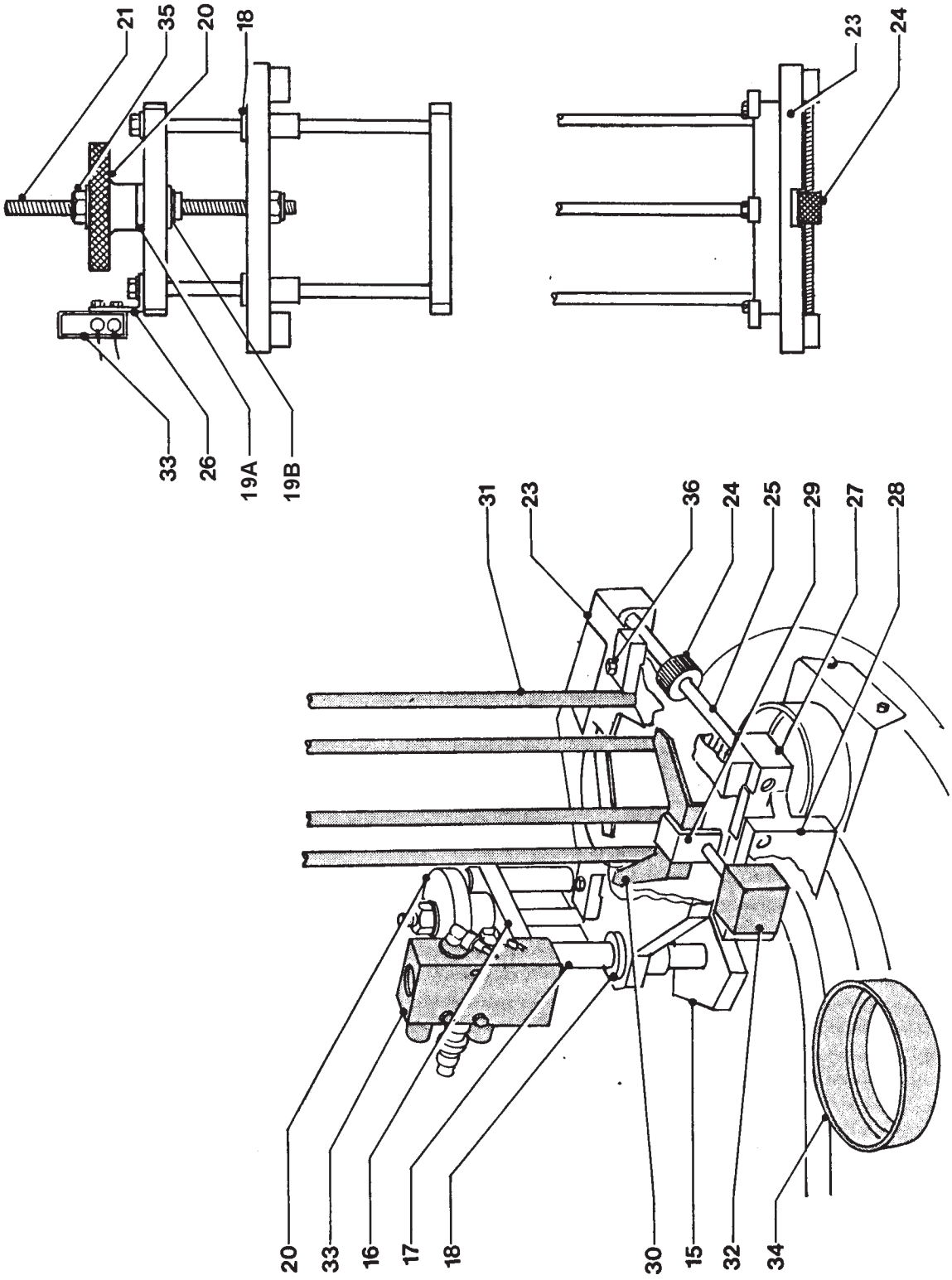


Fig. 9.3 - Tub feeder

Fig. 9.4 - Cone feeder

POS.	CODE	DESCRIPTION	Q.TY
40	D-FM03A01	BASE PLATE	1
41	D-FM03A02	GUIDE RODS	2
42	D-FM03A03	CONE PLATES	1
43	D-FM03A04	VERTICAL PLATE	1
44	D-FM03A05	JAW SUPPORT PINS	2
45	D-FM03A06A D-FM03A06B	STOP PINS	2+2
46	D-FM03A07	LOWER LEFT JAW	1
47	D-FM03A08	LOWER RIGHT JAW	1
48	D-FM03A09	UPPER LEFT JAW	1
49	D-FM03A10	UPPER RIGHT JAW	1
50	D-FM03A11	LOWER PLATE	2
51	D-FM03A12	UPPER PLATE	2
52	D-FM03A13	BUSHING	6
53	D-FM03A14	LEFT SPRING	1
54	D-FM03A15	RIGHT SPRING	1
55	D-FM03A18	DOUBLE WASHER FOR JAWS	1
56	D-FM03A19	CONE PUSHER	1
57	D-FM03A20A D-FM03A20B	CONE GUIDE RODS	2+2
58	D-FM03A21	STOP PLATE	1
59	D-FM03A22	CYLINDER BRACKET	1
60	333001120	CYLINDER 166-70 25x80	1
61	333001249	CYLINDER 167 40x25	1
62	333004045	SLIDE VALVE	1

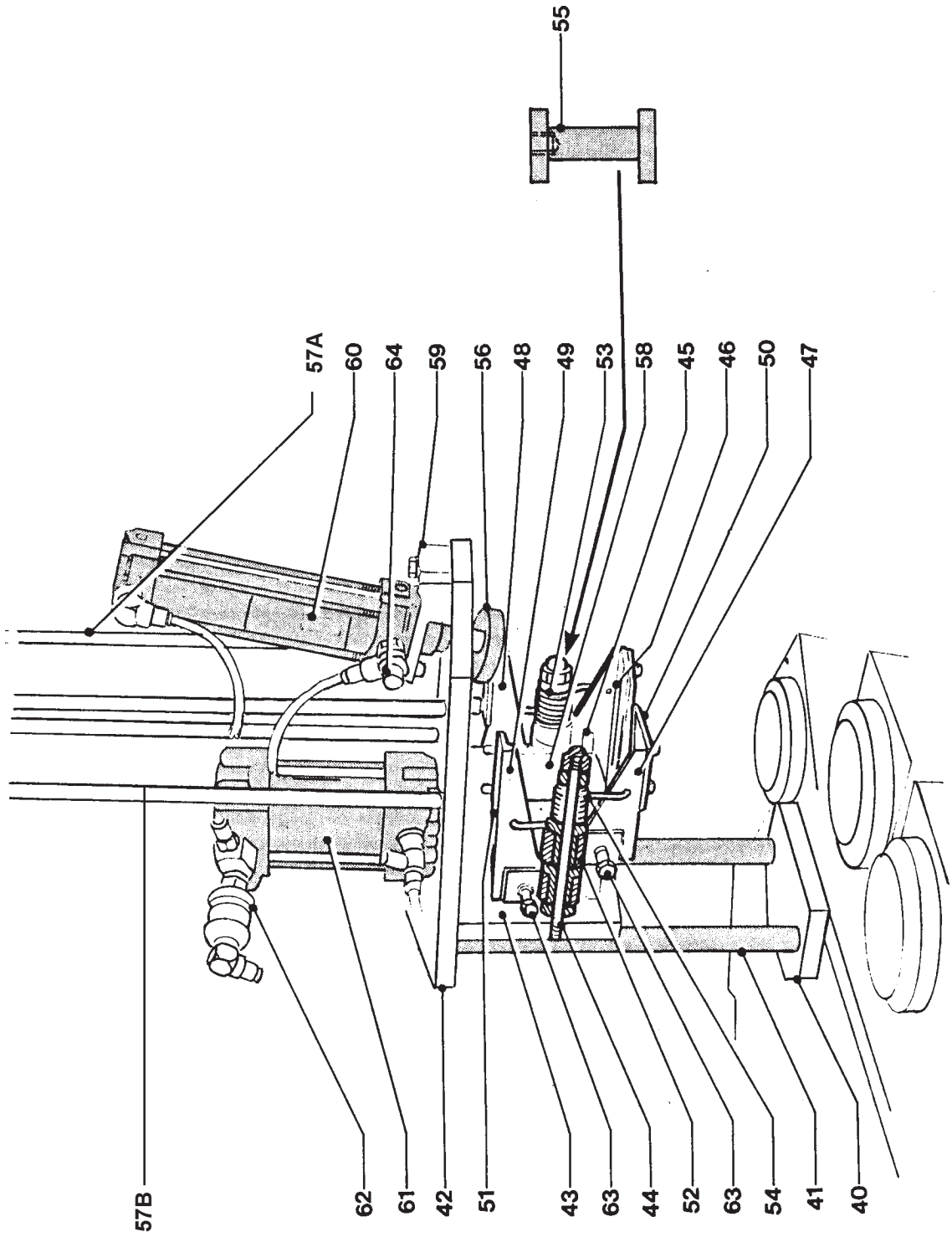


Fig. 9.4 - Cone feeder

Fig. 9.5 - Cone calibrator, Chocolate spray, Ice cream dispenser

POS.	CODE	DESCRIPTION	Q.TY
70	D-FM0601	BRACKET	1
71	D-FM0602	SUPPORT	1
72	D-FM0603	RESISTANCE CLAMP	1
73	D-FM0604	BUSHING	1
74	D-FM0605	TIE ROD	1
75	D-FM0606	SPRING	1
76	D-FM0607	STANDARD CONE CALIBRATOR	1
76	DC01C00007	MAXI CONE CALIBRATOR	1
77	017075166	SINGLE TUBE RESISTANCE	1
78	011070112	SPRAY GUN	1
79	011945001	FLOW REGULATOR	1
80	D-FM0401A	DECORATOR DISPENSER SLEEVE	1
80	D-FM0402A	STRAIGHT DISPENSER SLEEVE	1
81	D-FM0403	DISPENSER ROD	1
82	D-FM0404	SPRING	1
83	D-FM0405	DISPENSER TIE ROD	1
84	D-FM0407	ADJUSTMENT RING NUT	1
85	D-FM0406	ADJUSTMENT LOCK NUT	1
86	D-FM0408	DISPENSER SEAL WASHER	1
87	D-FM0409	DISPENSER T-COUPLING	1
89		SAFETY VALVE	1
89A	146000015	PAD	1
89B	146000019	SPRING	1
89C	146000010	CUP	1

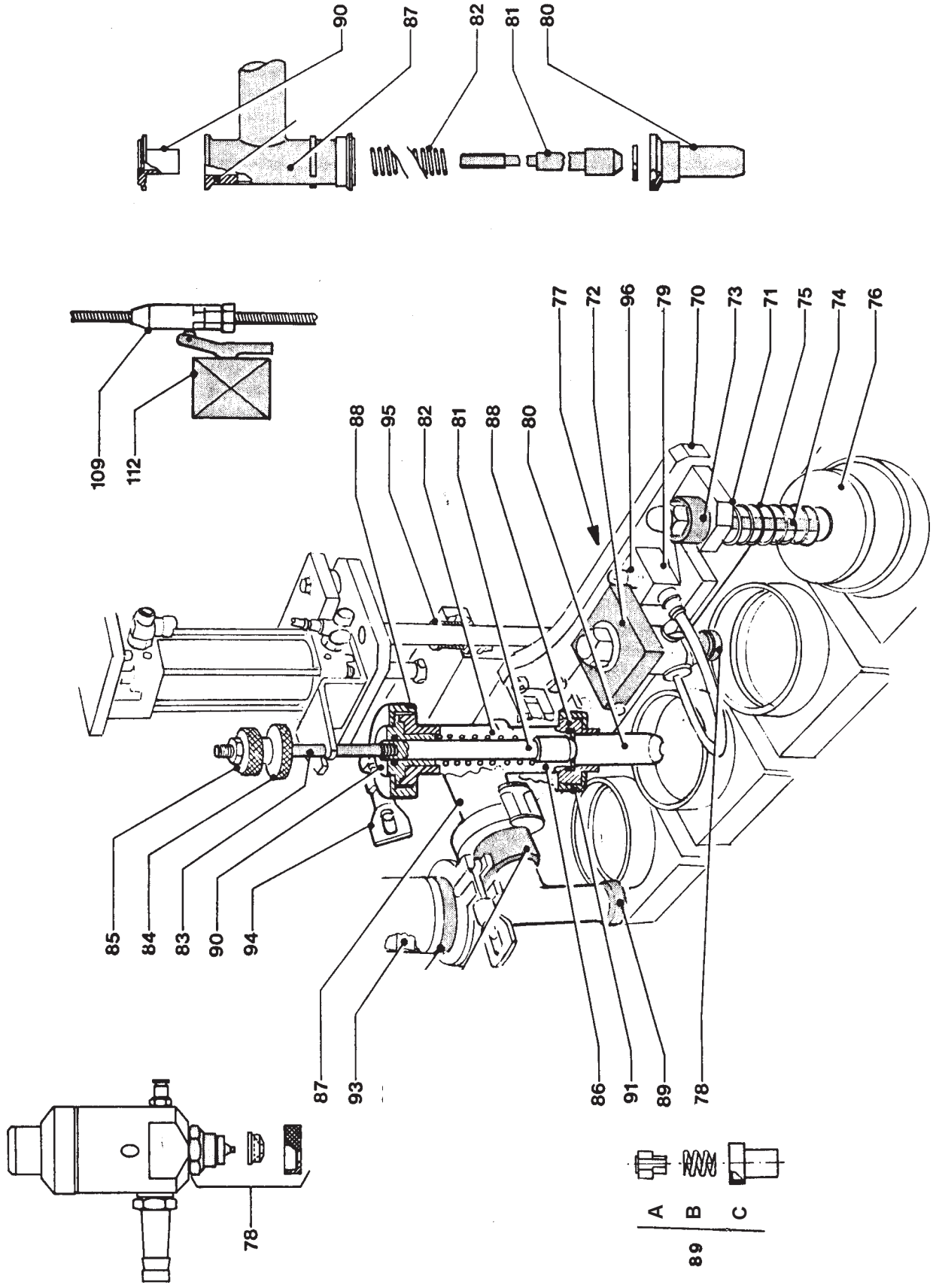


Fig. 9.5 - Cone calibrator, Chocolate spray, Ice cream dispenser

Fig. 9.5 - Cone calibrator, Chocolate spray, Ice cream dispenser (ctd.)

POS.	CODE	DESCRIPTION	Q.TY
90	D-FM0412	DISPENSER GUIDE ROD	1
91	D-FM0413	DISCHARGE RING NUT	1
93	016960007	DISPENSER HOSE CONNECTOR	1
94	016060218	TRI-CLAMP CLOSURE	5
95	D-FM04A05	BUSHING	4
109	D-FM-04A10	CAM	1
112	333004024	PNEUMATIC VALVE	1

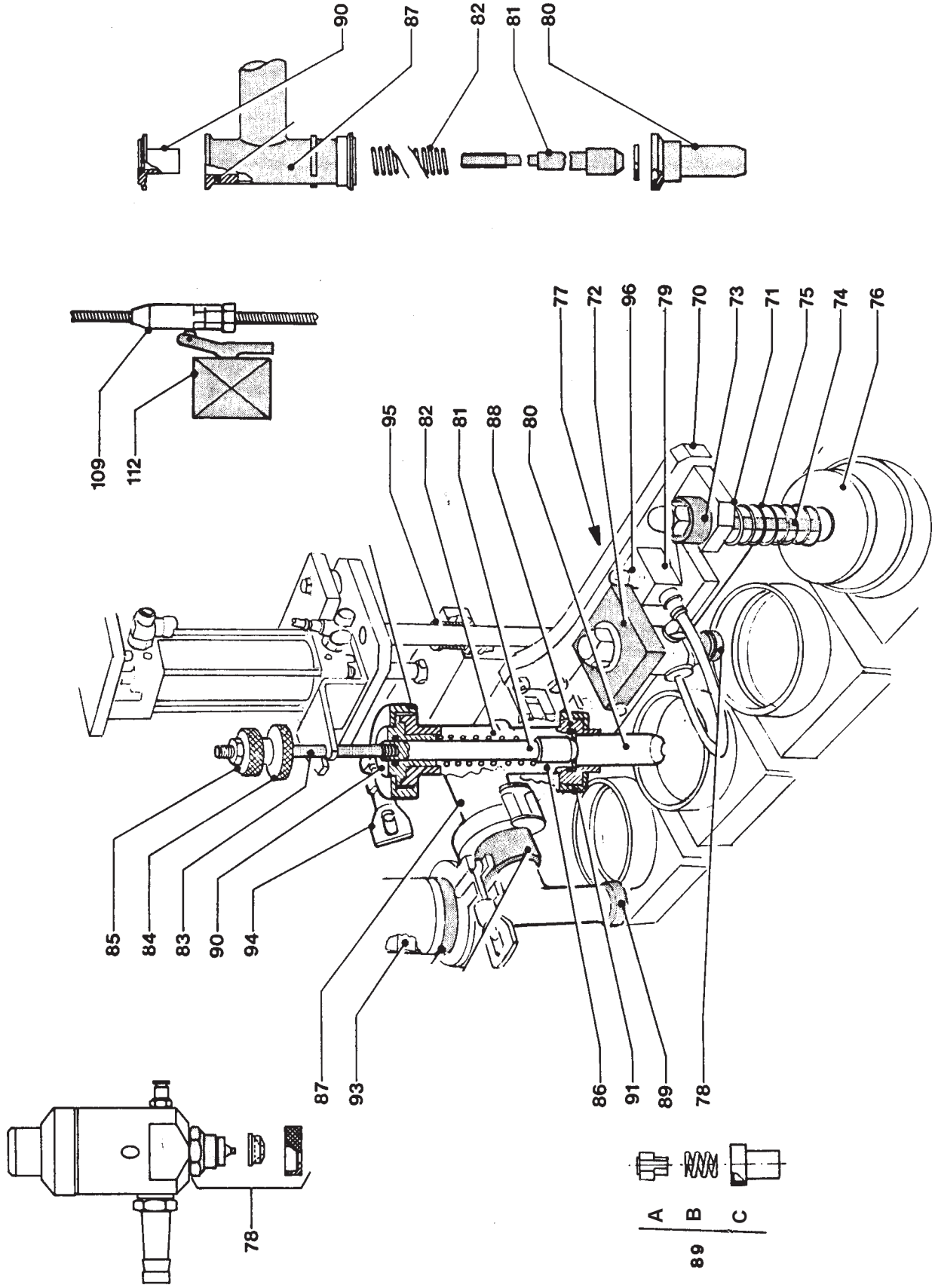


Fig. 9.5 - Cone calibrator, chocolate spray, ice cream dispenser

Fig. 9.6 - Ice cream dispenser and chocolate dispenser

POS.	CODE	DESCRIPTION	Q.TY
100	D-FM04A01	BASE PLATE	1
101	D-FM04A02	SLIDING PLATE	1
102	D-FM04A03	PLATE	1
103	D-FM04B01	DISPENSER SUPPORT	1
104	D-FM04A05	BUSHING	4
105	D-FM04A06	SUPPORT COLUMNS	3
106	D-FM04A07	THREADED ADJUSTMENT ROD	1
107	D-FM04A08	DISPENSER BRACKET	1
111	333001248	CYLINDER	1
113	D-FM0523	TANK SUPPORT PLATE	1
114	D-FM0524	LOWER TANK SUPPORT PLATE	1
115	D-FM0503	ROD CLAMP	1
116	D-FM0504	CABLE PROTECTION TAB	1
118	D-FM0506	DISPENSER HEAD	1
119	D-FM0527	TANK SUPPORT PLATE	3
120	D-FM0508	TANK SUPPORT PLATE	1
121	D-FM0521	TANK AND COUPLINGS	1
122	D-FM0522	TANK COVER	1
123	D-FM0511	PUSHER BRACKET	1
124	D-FM0512	PUSHER PLATE	1
125	D-FM0513	PUSHER	1
126	D-FM0409	DISPENSER T-COUPLING	1
127	D-FM0515	BEARING CARRIER	1
128	D-FM0516	PILOT BOSS	1

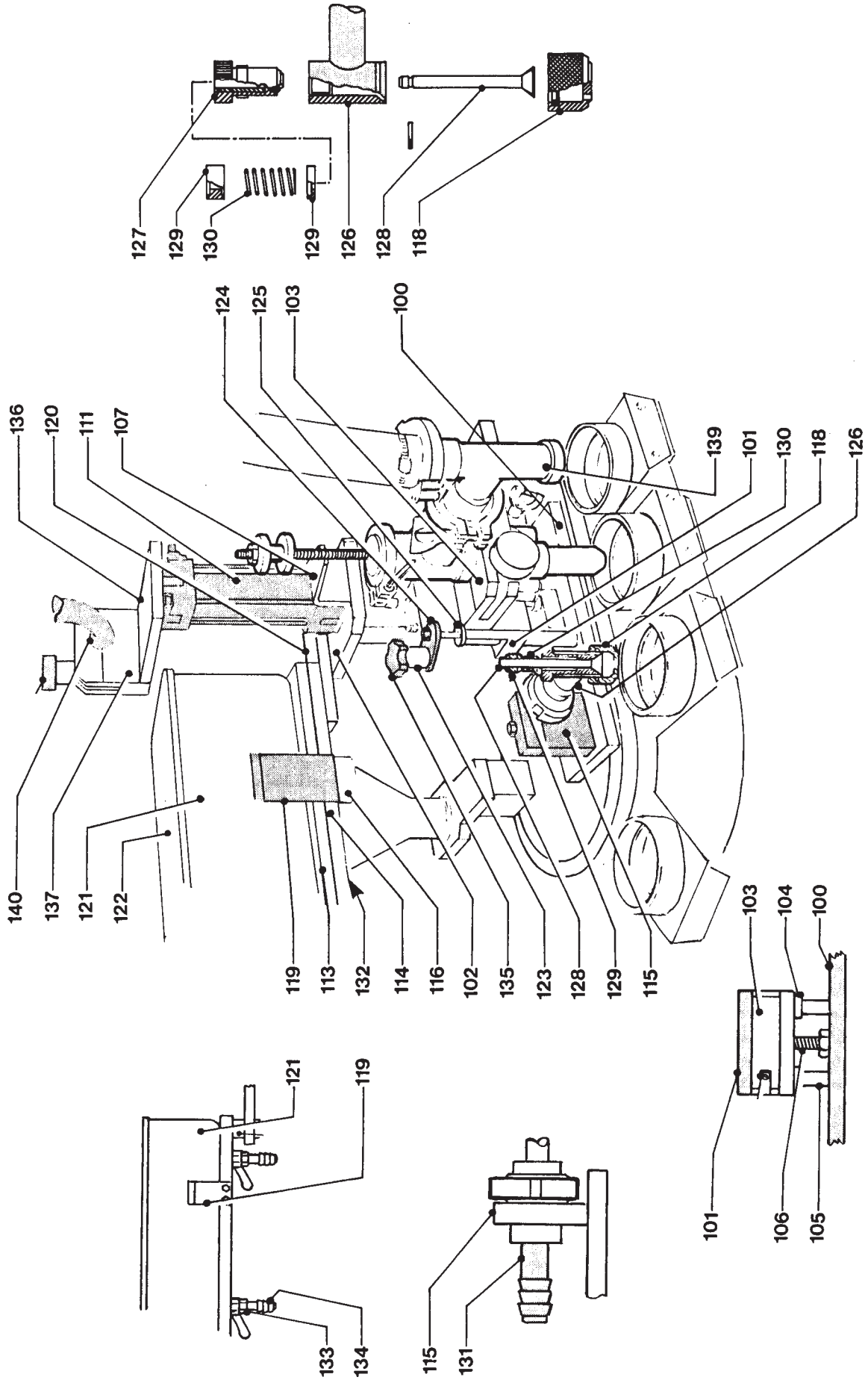


Fig. 9.6 - Ice cream dispenser and chocolate dispenser

Fig. 9.6 - Ice cream dispenser and chocolate dispenser (ctd.)

POS.	CODE	DESCRIPTION	Q.TY
129	D-FM0517A D-FM0517B	DISPENSER ACCESSORY	1
130	D-FM0518	SPRING	1
131	D-FM0520	ROD ATTACHMENT SLEEVE	1
132	011970087	SHEET RESISTANCE 48V 150W WITH BOLTS	1
133	16030062	MINIBALL VALVE	1
134	16061062	HOSE CONNECTOR	2
135	336057054	KNOB	1
136	D-FM04A08	SUPPORT PLATE	1
137	34095050	TUBE SUPPORT	1
139	D-FM04B05	SAFETY T-COUPLING	1
140	141042025	BEND ND25	1

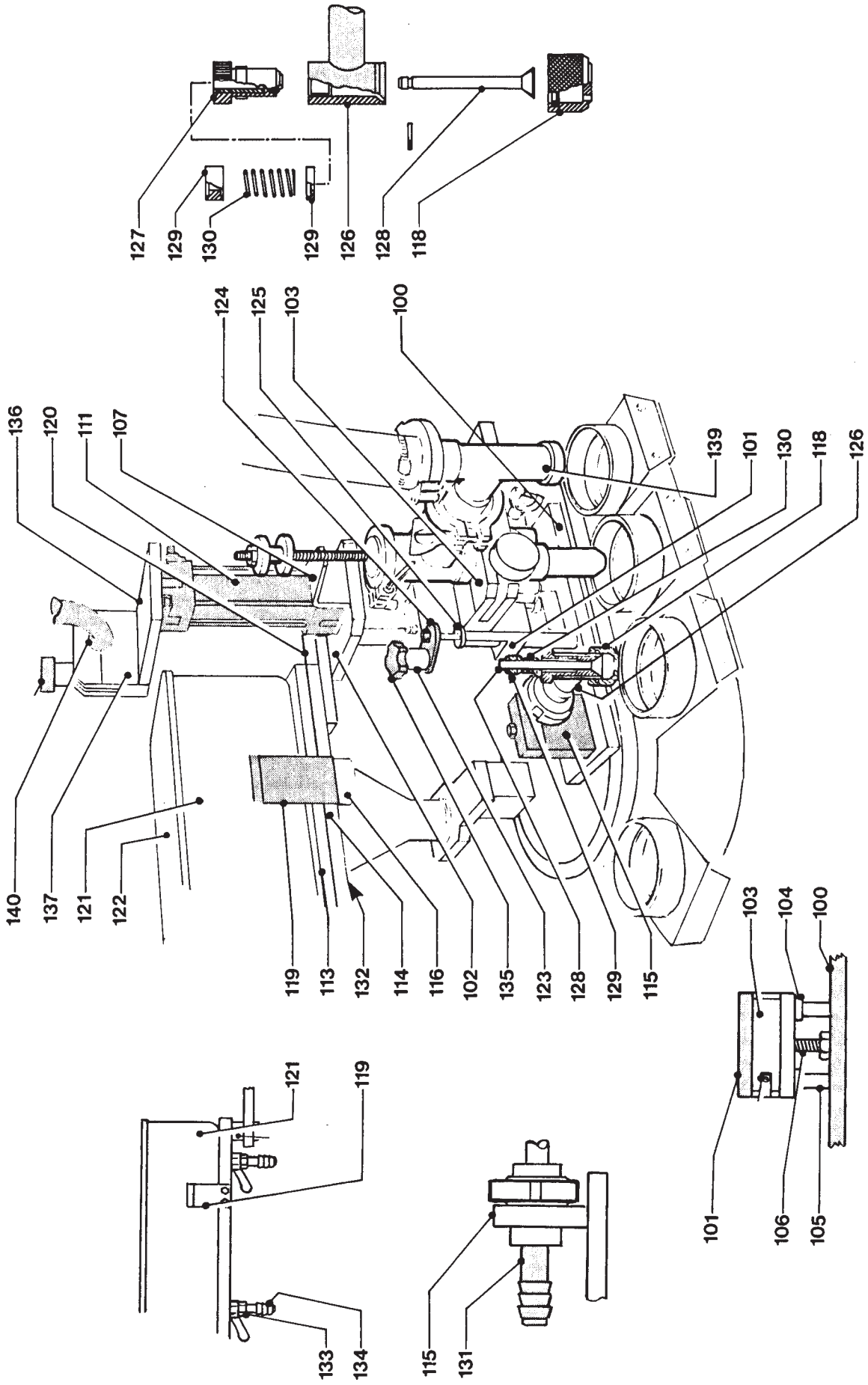


Fig. 9.6 - Ice cream dispenser and chocolate dispenser

Fig. 9.7 - Dry ingredients dispenser

POS.	CODE	DESCRIPTION	Q.TY
145	D-FM0701	WASHER	1
146	D-FM0702	PISTON BRACKET	1
147	D-FM0703	MOUNTING PLATE	2
148	D-FM0704	COUPLING SLEEVE	1
149	D-FM0705	PISTON TAB	1
150	D-FM0706	HOPPER SUPPORT	1
151	D-FM0707	HOPPER	1
152	D-FM0708	TIE ROD	1
153	D-FM0709	CAP	1
154	D-FM0710	LOCK NUT	1
155	D-FM0711	RING NUT	1
156	D-FM0712	SPACER BLOCK	1
157	D-FM0713	CYLINDER 166-71 25x20	1

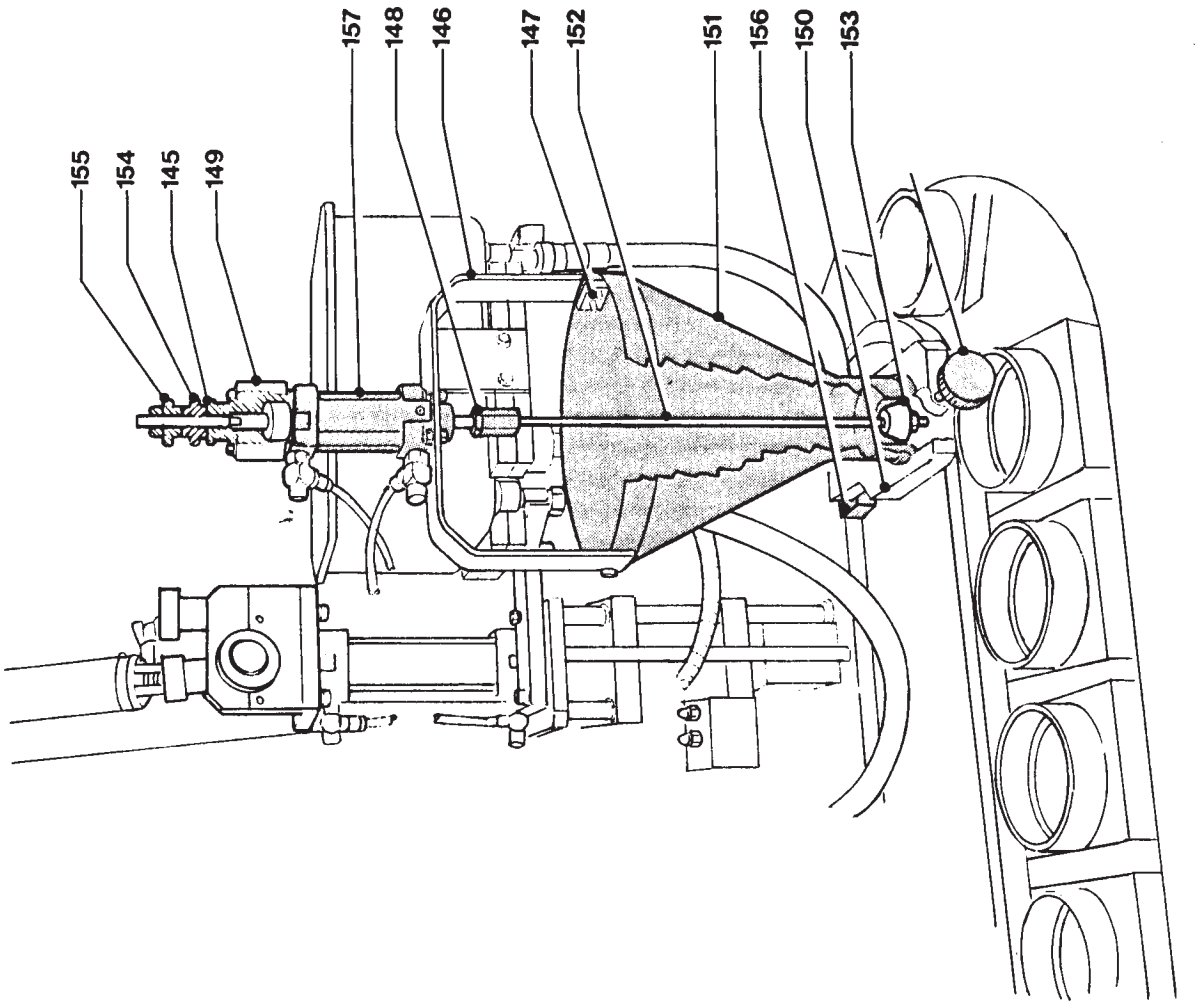


Fig. 9.7 - Dry ingredients dispenser

Fig. 9.8 - Lid applicator

POS.	CODE	DESCRIPTION	Q.TY
165	D-FM0801	LOWER PLATE	1
166	D-FM0802	LID FLANGE	1
167	D-FM0803	LID APPLICATOR SHAFT	1
168	D-FM0804	GUIDE SHAFT	1
169	D-FM0805	SUPPORT COLUMN	2
170	D-FM0806	ROD	4
171	D-FM0807	RACK	1
172	D-FM0808	BUSHING	1
173	D-FM0808A	BUSHING	2
174	D-FM0827	PLATE	2
175	D-FM0826	SPRING	2
176	D-FM0812	UPPER PLATE	1
177	D-FM0813	SLIDE	1
178	D-FM0814	BLOCK	1
179	D-FM0815	BLOCK	1
180	D-FM0816	MANIFOLD	1
181	D-FM0817	SUCTION CUP ATTACHMENT NIPPLE	1
182	D-FM040	LID REDUCTION UNIT	1
183	D-FM0819	WASHER	2
184	D-FM0820	BUSHING	1
185	D-FM0821B	THREADED STOP SCREW	1
186	333001246	CYLINDER 167 40x100	1
187	333004053	VACUUM PILOT SWITCH	1
188	333004015	VALVE	1
189	336067079	O-RING	2
190	333004054	VACUUM GENERATOR	1
191	011045990	SUCTION CUP	1

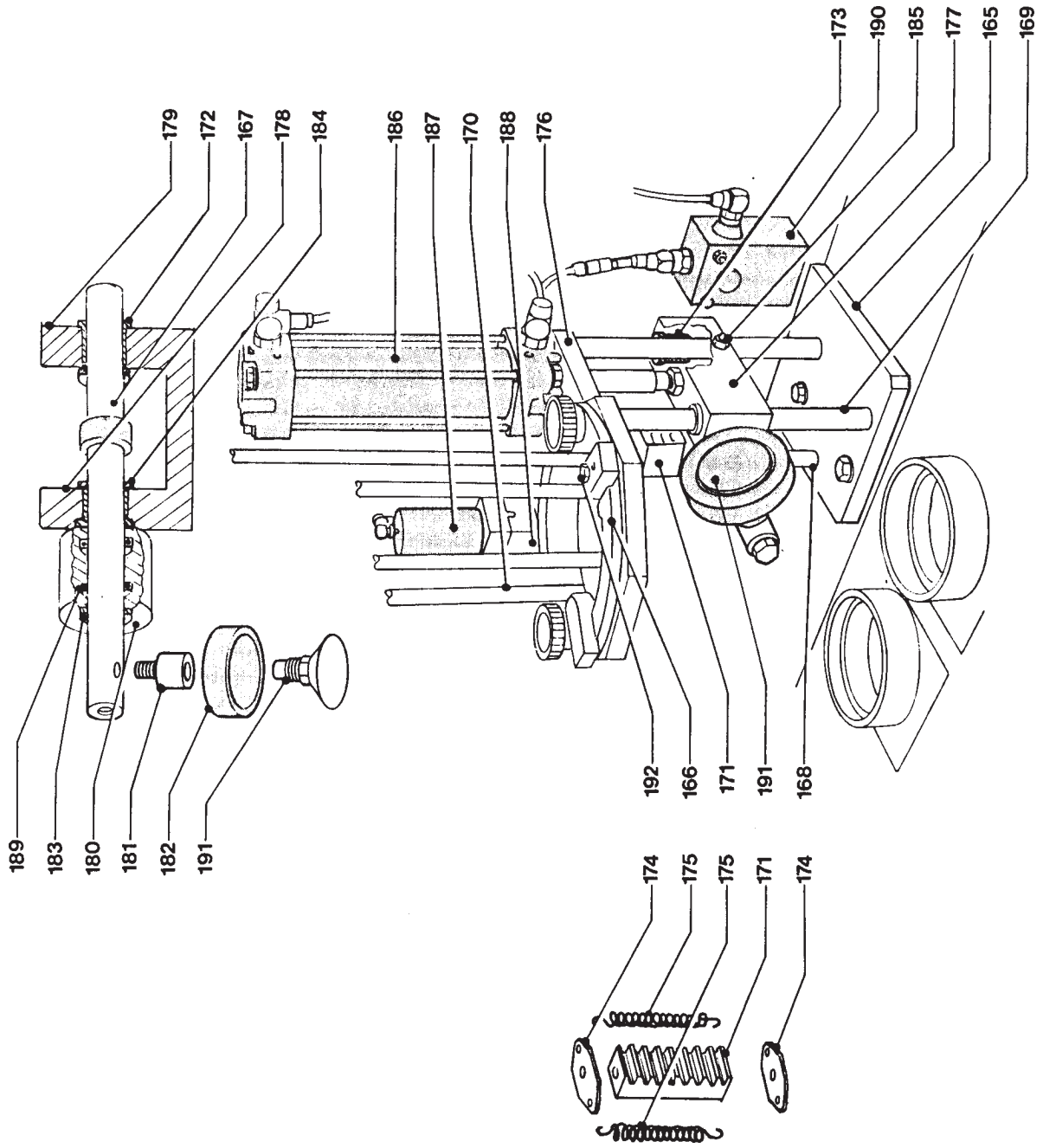


Fig. 9.8 - Lid applicator

Fig. 9.9 - Crimper/Lid clamp

POS.	CODE	DESCRIPTION	Q.TY
200	D-FM0901	BASE PLATE	1
201	D-FM0902	COLUMNS	2
202	D-FM0903	SLIDE	1
203	D-FM0904	UPPER PLATE	1
204	D-FM0905	CRIMPER BRACKET	1
205	D-FM04A05	BUSHING	4
206	D-FM0907	WASHER	1
207	333001247	CYLINDER 167 40x50	1
208	336057047	KNOB	1
209	D-FM0908	TUB LID CLAMP	1
211	D01L00056	STANDARD CONE CRIMPER	1
211	D01L00055	MAXI 1 CONE CRIMPER	1
211	D01L00057	MAXI 2 CONE CRIMPER	1

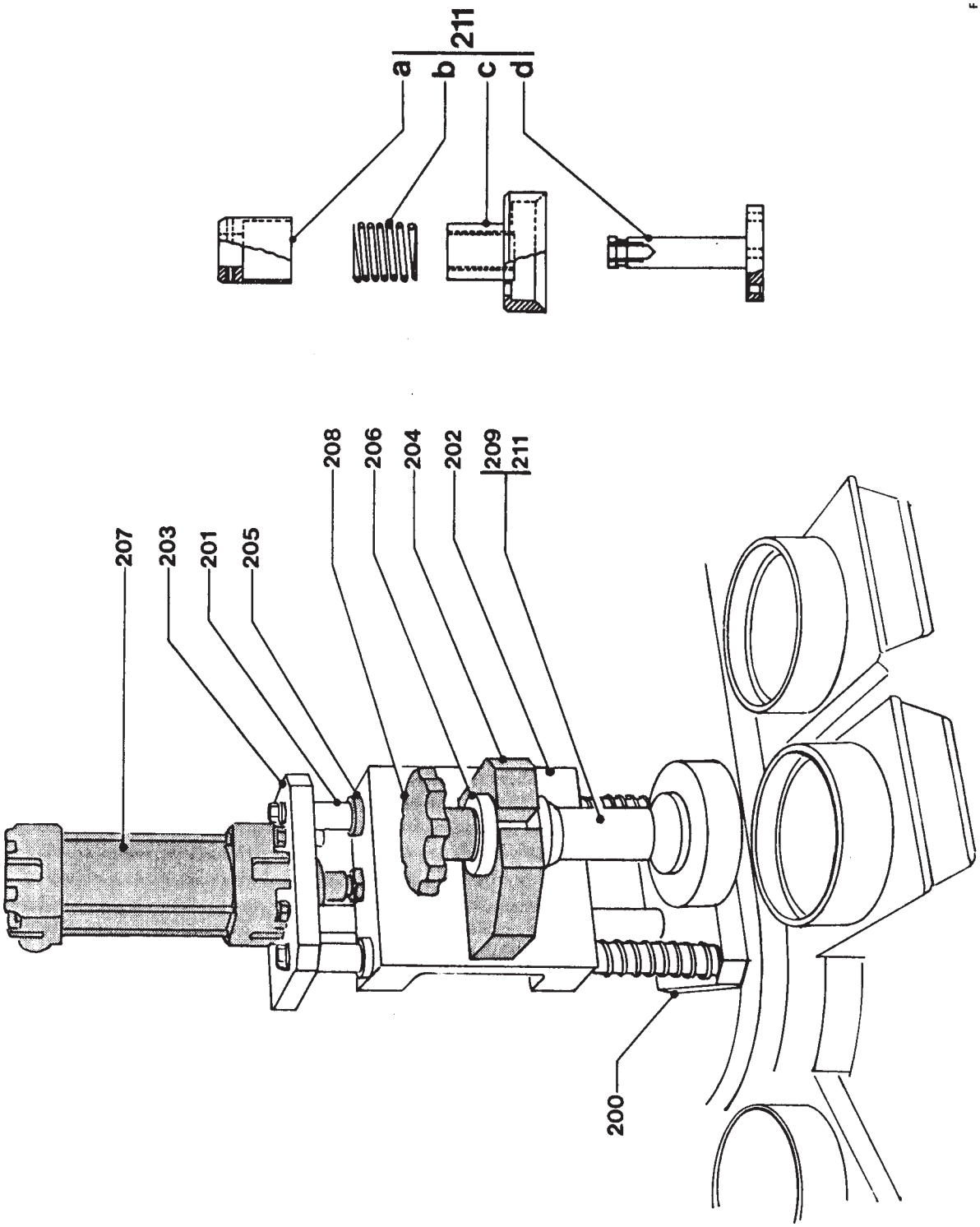


Fig. 9.9 - Crimper/Lid clamp

Fig. 9.10 - Tub aligner

POS.	CODE	DESCRIPTION	Q.TY
220	D-FM9001	UPPER GUIDE PLATE HINGE	1
222	D-FM9003	SPRING	2
223	D-FM9004	ADJUSTABLE PLATE	1
224	D-FM9005	UPPER GUIDE PLATE	1
225	D-FM9006	SUPPORT BLOCK	1
226	D-FM9007	CYLINDER SUPPORT	1
227	D-FM9008	GUIDE ROD	1
228	D-FM9009	EXPULSOR SUPPORT	1
229	D-FM9010	GUIDE BUSHING	1
230	D-FM9011	PUSHER	1
231	D-FM9012	GUIDE	2
232	D-FM9013	HOUSING	1
233	D-FM9014	SLIDE	1
234	D-FM9015	MOBILE SLIDE	1
235	D-FM9028	GUIDE RODS	2
236	D-FM0306	CONTROL KNOB	1
237	D-FM04A07	THREADED ADJUSTMENT ROD	1
238	D-FM9020	SPRING GUIDE	2
239	333001122	CYLINDER 167 25x100	1

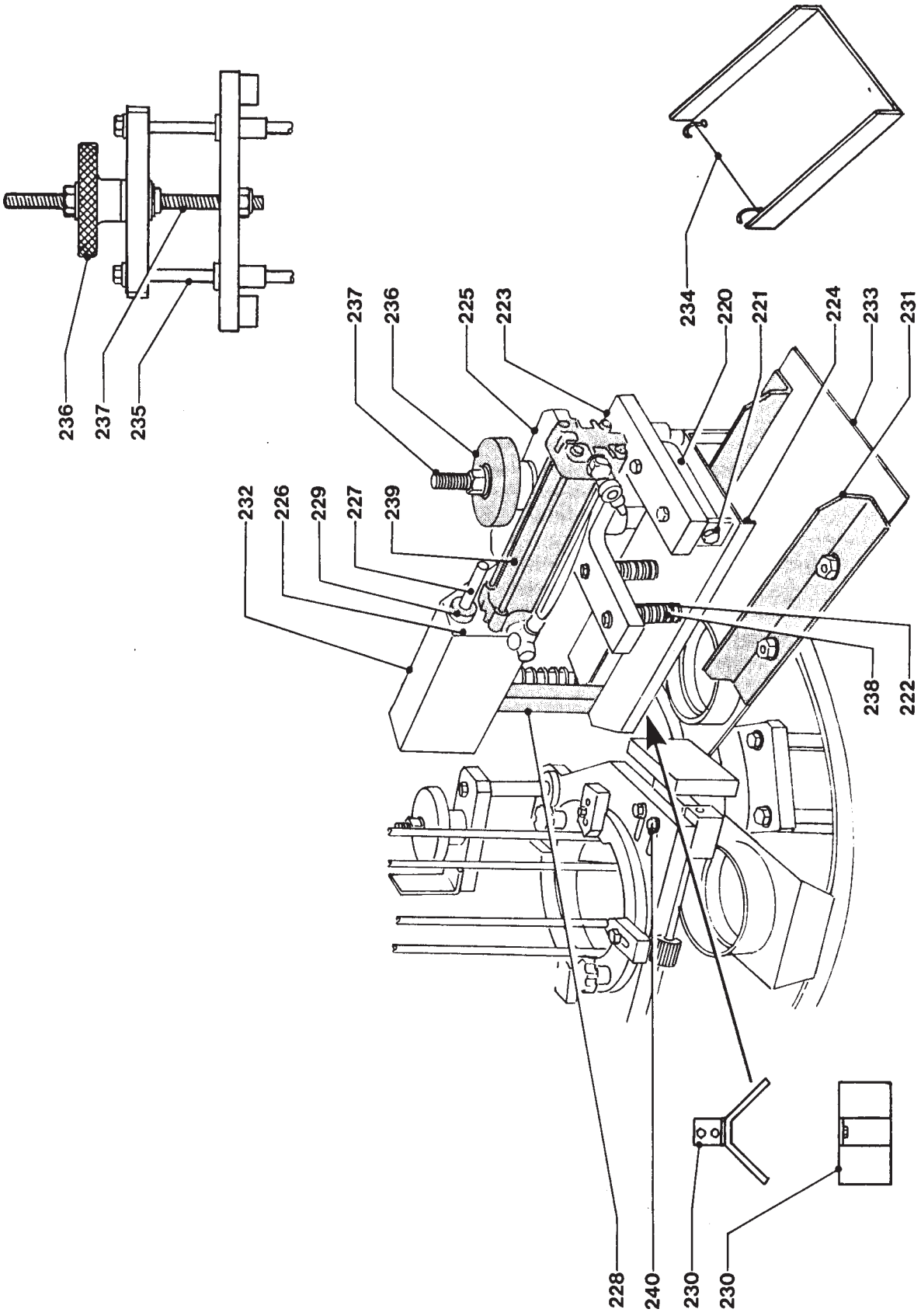


Fig. 9.10 - Tub aligner

Fig. 9.11 - Cone/Tub expulsor

POS.	CODE	DESCRIPTION	Q.TY
245	D-FM8001	SUPPORT PLATE	1
246	D-FM8002	LOWER PLATE	1
247	D-FM8003	SLIDING BRACKET	1
248	D-FM8004	GUIDE COLUMNS	2
249	D-FM8005	VALVE SUPPORT	1
250	D-FM8006	SUPPORT	1
251	D-FM8007	UPPER PLATE	1
252	D-FM8008	SLIDE BUSHING	2
253	D-FM8009	BUSHING RING NUT	2
254	D-FM04A10	EXTRACTION CAM	1
255	D-FM8013	THREADED ROD	2
256	D-FM8014	BLOW CAM	1
257	D-FM8015	VALVE SUPPORT	1
258	D-FM8117	CONE/TUB EXPULSOR SUPPORT	1
259	D-FM8118	CONE EXPULSOR PAD	1
259		TUB EXPULSOR PAD (DEPENDS ON SIZE)	1
260	333001213	CYLINDER 167 32x200	1
261	011045494	RAPID DISCHARGE	1
262	333004106	CAM VALVE	1
264	333004052	VACUUM GENERATOR	1
265		SUCTION CUP (DEPENDS ON SIZE)	1
266	016030062	BALL VALVE	1
268	D-FM0307	SUCTION CUP SUPPORT ROD	1
333	011045900	SILENCER	2

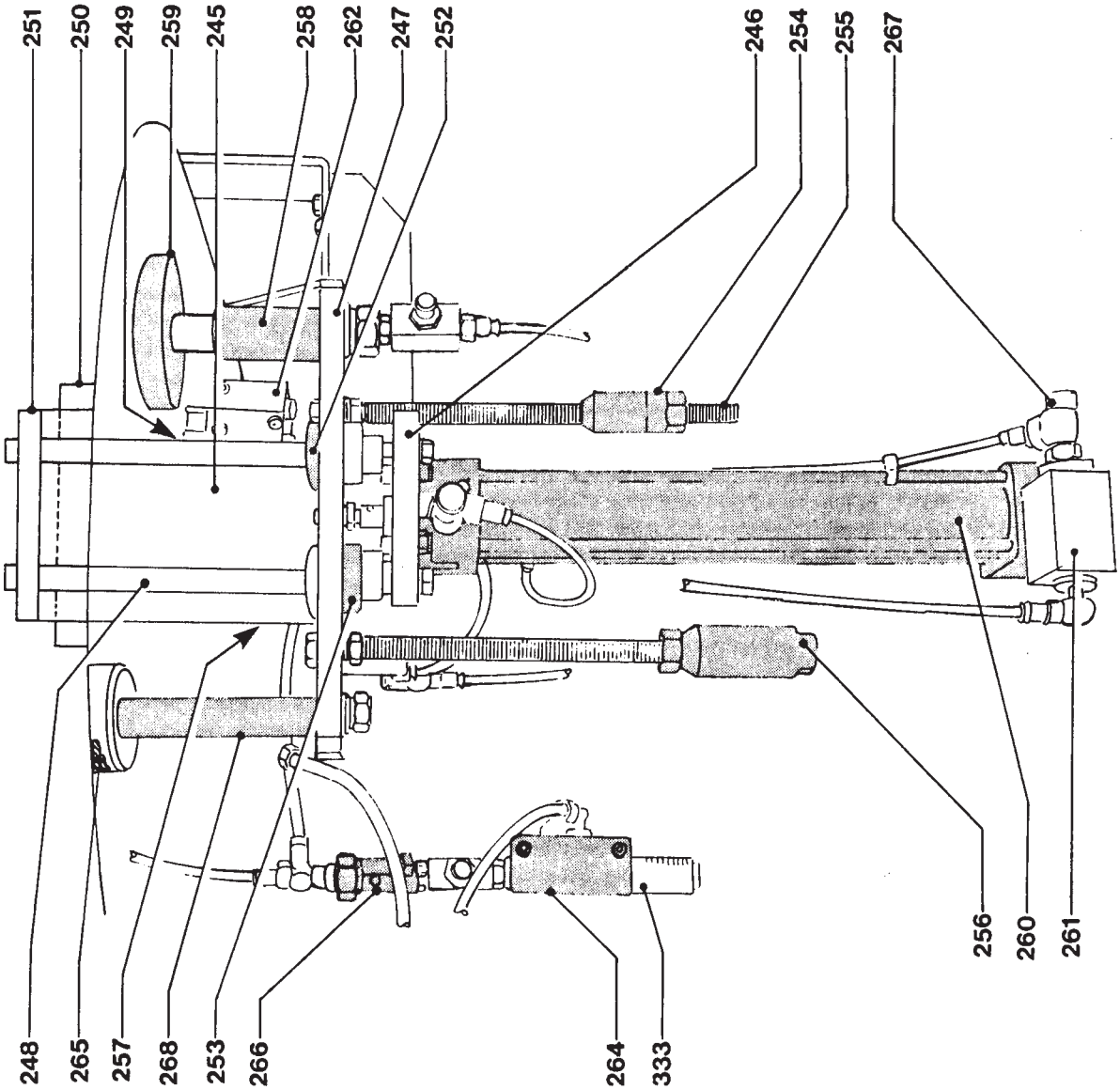


Fig. 9.11 - Cone/Tub expulsor

Fig. 9.12 - Mechanical unit: Drive chain

POS.	CODE	DESCRIPTION	Q.TY
270 B	D-FM1106B	SPROCKET	1
270A	D-FM1106A	SPROCKET	1
272	D-FM1101	REAR BEARING FLANGE	1
273	D-FM1104	CHAIN DRIVE SHAFT	1
274	D-FM1103	DRIVE SHAFT	1
282	D-FM1121	BEARING COVER	1
283	D-FM1122	WASHER ON COVER	1
304	336017060	DRIVE CHAIN	1

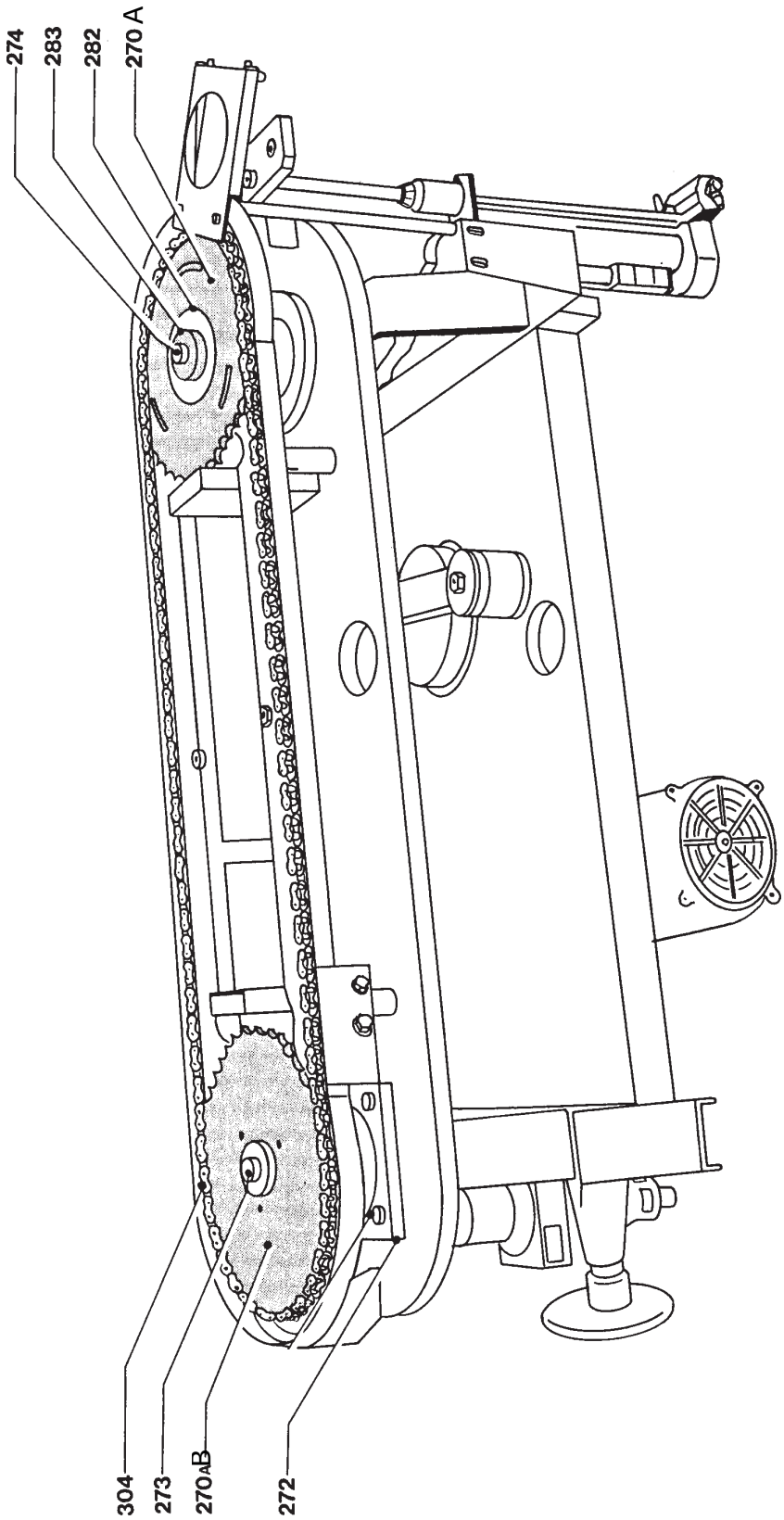


Fig. 9.12 - Mechanical unit: Drive chain

Fig. 9.13 - Mechanical unit: Feed

POS.	CODE	DESCRIPTION	Q.TY
271	D-FU181	LINK BLOCK BUSHING	2
275	D-FM1107	SPROCKET HUB	1
277	D-FM1108	RATCHET CAM	2
278	D-FM1109	CAM SPACER	1
279	D-FM1111A	SPROCKET LUG	1
280	D-FM1111B	LUG	1
281	D-FM1112	LUG CONTROL LEVER	1
284	D-FM1135	NON-RETURN (LONG) LUG SPRING	1
285	D-FM1136	NON-RETURN LUG SPRING	1
286	D-FM1137	MOVEMENT LUG SPRING	1
287A	336078054	ARTICULATED JOINT JAM12 A	1
287B	336078069	ARTICULATED JOINT JAM12 B	1
287C	D-FM3143	LEVER/CONNECTING ROD COUPLING PIN	1
288	D-FM3140	LINK BLOCK	1
298	D-FM3148	CONNECTING ROD	1
299	D-FM3141A	SHAFT FLANGE	1

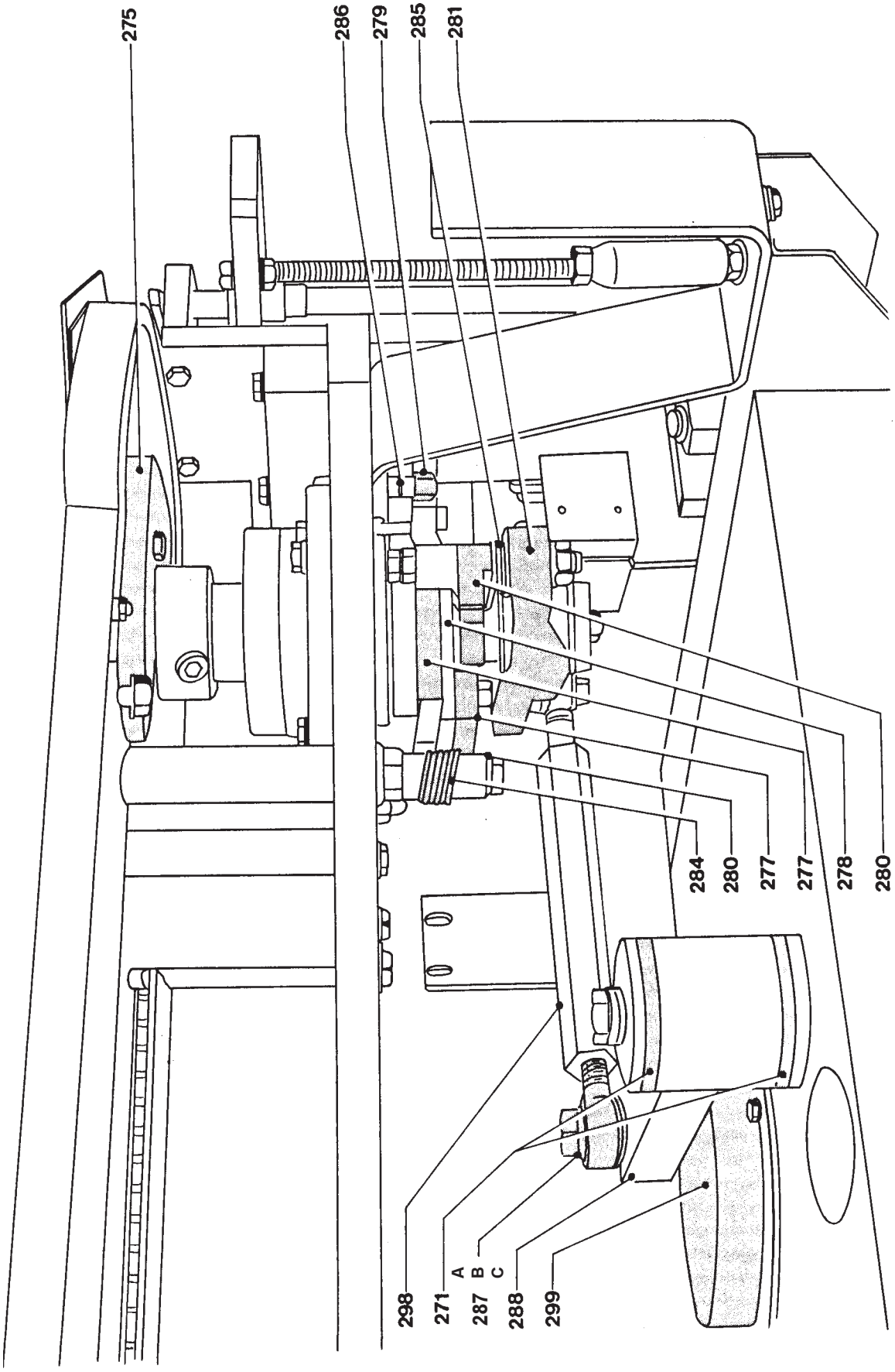


Fig. 9.13 - Mechanical unit: Feed

Fig. 9.14 - Mechanical unit: Transmission

POS.	CODE	DESCRIPTION	Q.TY
289	336027001	VARIABLE PULLEY	1
290	014045033	MOTOR 0.5 HP	1
291	336019805	DRIVE BELT	1
292	333004002	TUB CONTROL VALVE	1
293	341310001	CONTROL CAMS	8
294	333004106	MACHINE CONTROL CAM	1
296	D-FM3145B	SAFETY COUPLING (SOLD AS ASSEMBLY ONLY)	1
297	336010065	SPEED REDUCTION UNIT	1
300	017035938	SAFETY MICROSWITCH	1
301	336059002	MOTOR SLIDE	1
303	D-FM3145A	FIXED PULLEY	1

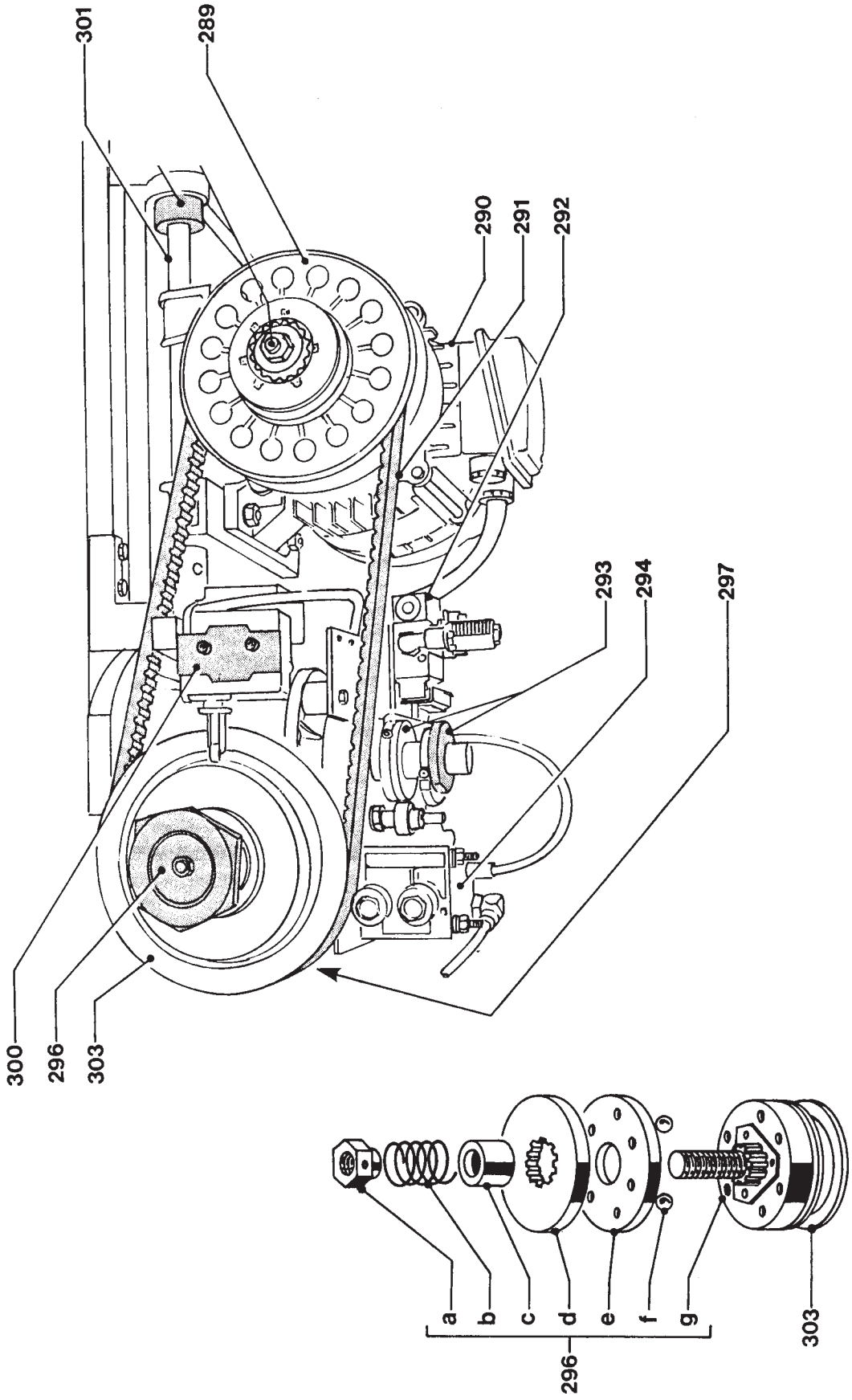


Fig. 9.14 - Mechanical unit: Transmission

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