



Weights and Measures
(National Standards)
Act 1960-1966
Weights and Measures
(Patterns of Instruments)
Regulations

COMMONWEALTH OF AUSTRALIA

NATIONAL STANDARDS COMMISSION

Certificate of Approval

CERTIFICATE NUMBER 5/6D/15

In respect of the pattern of

Expec Liquid-measuring Instrument and Variant.

Submitted and
manufactured by:

Engineering Products Pty Ltd,
418-428 Burnley Street,
Burnley,
Victoria. 3121.

This is to certify that the pattern and variant of the instrument illustrated and described in this Certificate have been examined by the National Standards Commission under the provisions of the abovementioned Regulations and have been approved as being suitable for use for trade.

The pattern and variant were approved on 22 March 1973.

The pattern and variant are marked "NSC No 5/6D/15" and comply with the General Specifications for Measuring Instruments to be Used for Trade.

The submitter shall notify the Commission[‡] of the location and serial number of the first 25 instruments conforming to the pattern or variant which are submitted to the State or Territorial Weights and Measures Authorities for verification.

‡ Inspectors should not verify any instrument conforming to this Certificate until advised in writing by the Pattern Approval Laboratory that the Commission has been notified of these details.

The Commission reserves the right to examine the abovementioned instruments after verification.

Instruments purporting to conform to this Certificate shall be tested in accordance with the procedure specified in the General Notes.

This Certificate comprises:

Pages 1 to 7 dated 27 March 1973.

Figures 5/6D/15 - 1 to 16 dated 27 March 1973.

Date of issue 27 March 1973.

Signed



A person authorized by the Commission to sign Certificates under the abovementioned Regulations.

DESCRIPTION OF PATTERN

The pattern is of a liquid-measuring instrument known as the Epex Bulk Lubricating Oil Dispensing Unit and comprises the components tabulated in Column 5 of Figure 1. The hydraulic diagram is shown in Figure 3. (Figure 2 shows five meters mounted on a vehicle, each meter being connected to one compartment of the tank.)

DESCRIPTION OF VARIANT

A variant of the pattern comprises the components tabulated in Column 6 of Figure 1.

DESCRIPTION OF COMPONENTS

1. Supply tank — the tank is mounted so that all components between the tank outlet valve and the non-return valve after the meter are below the low liquid level of the tank (see Figure 3).
2. Float switch (see Figures 4 and 5) — the float mounted in the bottom of the tank operates a pneumatic valve described in the control system (Component No 16) to stop the pump when a low liquid level is reached. The switch prevents air being metered due to an empty tank.
3. Suction filter (see Figure 6) — the filter element is removed through a top cover which is held in place by a screw clamp and sealed to prevent rotation of the clamp.
4. Pump — the pump is a positive displacement type.
5. Pump hydraulic-drive motor — the motor is direct-coupled to the pump and is driven from a hydraulic power unit through a two-position manually operated valve (see Figure 2) and a valve controlled by a pneumatic-hydraulic control system described in Component No 16.
6. Pump by-pass valve (see Figure 7) — the valve is mounted in a return line from the delivery to the suction side of the pump and is sealed as shown.
7. Liquid Controls M7 flowmeter (see Figure 8) — the meter is

described in Certificate No 5/6B/5. It is approved for use with liquids of viscosities from 60 cSt to 1400 cSt, the nameplate being marked with the viscosity range. The maximum approved flow rate with these liquids is 26 gallons per minute and the minimum is 4 gallons per minute. The meter calibration is sealed as shown in Figure 8; the calibration adjuster is shown in Figure 12.

8. Visual indicator (see Figure 8) — the indicator is a Veeder-Root Model 6234, described in Certificate No 5/6B/5, except that the aperture for the right-hand analogue wheel has been widened to show two numbered graduation lines.
9. Non-return valve — the valve is placed in the outlet port of the meter between the meter flange and the flange of the pipe to the hose reel.
10. Accumulator (see Figure 2) — this consists of a two-compartment chamber with a diaphragm separating the compartments. One side is connected to the meter outlet pipe, while the other side is subjected to air pressure from the pneumatic control system. Liquid is allowed to flow into the accumulator when the hose is being rewound and is forced out of the accumulator into the hose when it is being unwound.
11. Hose reel and swivel coupling (see Figure 9) — the meter outlet pipe is connected to a swivel coupling integral with one hose-reel bearing. The pneumatic control line to the nozzle is also connected through the swivel coupling but is separate from the liquid line.
12. Hose — this is a $1\frac{1}{4}$ -inch Nylex PR hose up to 50 feet long. A pneumatic control line consisting of a small-bore nylon tube is mounted within the hose and is connected to special fittings at the swivel coupling (Component No 11) and the nozzle.
13. Nozzle (see Figures 10 and 11) — the nozzle is a modified Scully Type COM $1\frac{1}{4}$ inch. The anti-drain valve is set to give a residual hose pressure of 10 psig and the manual ball valve and handle have been removed. The pneumatic control line is connected through a special fitting to an orifice normally open to atmosphere. A spring-loaded lever can be depressed so that

a nylon pad can seat on and close the orifice.

14. Hose-reel hydraulic drive motor — the motor is direct-coupled to the hose reel and is driven from a hydraulic power unit through a two-position manually operated valve (see Figure 2).
15. Liquid Controls preset mechanism and stop valve (see Figures 12, 13 and 14) — the valve is located downstream of the meter and non-return valve and is controlled by a link connected to the preset mechanism mounted between the meter and the visual indicator. The preset mechanism indicator has four digit wheels, each being set by a separate push button to give a preset quantity up to 9999 gallons. The indicator moves backwards from the preset quantity to zero. When the indicator is reading 0003, the link is released, partially closing the valve and reducing the rate of flow to one-third of full flow rate. When the indicator is reading 0000, the link is released a further step, completely closing the valve. The visual indicator will indicate the preset quantity.

A "stop" button can be used to close the valve manually during the delivery of the preset quantity. A handle on the valve is used to open the valve before delivery of the preset quantity is commenced.

16. Pneumatic-hydraulic control system (see Figure 15) — the control system prevents errors in the delivered quantity due to dilation of the hose by maintaining the same pressure before and after a delivery. The system is divided into two parts:
 - (a) Pump control system — the pump hydraulic-drive motor can only be operated by the handle on the nozzle through a system of pneumatic and hydraulic valves. As the nozzle does not contain a shut-off valve, the pressure in the hose is always equal to the anti-drain valve pressure setting of 10 psig before and after a delivery. The procedure for operating the pump is as follows:
 - (i) the hydraulic power unit is started; the pneumatic supply, consisting of 40 psig regulated and 120 psig unregulated air pressure, is connected by the same control;

- (ii) the two-position manual hydraulic valve (see Figure 2) is moved to the "pump" position; this action also connects the 40-psig air supply to the nozzle;
- (iii) by depressing the nozzle handle to block the air escaping from the orifice, pneumatic and hydraulic valves are positioned to supply hydraulic power to the pump motor, thus starting the pump;
- (iv) the procedure is reversed to stop the pump.

One of the pneumatic valves (Component No 2) in the pump control system is operated by a float mounted in the supply tank so that, when liquid level falls to a position indicated as zero gallons on the tank dipstick, the valve is closed, stopping the pump and the delivery of liquid. 120 psig air pressure, which is higher than product pump pressure, is also applied to one side of the accumulator diaphragm while the pump is running, forcing all of the liquid in the accumulator into the hose. A non-return valve holds the pressure in the accumulator after the pump is stopped.

- (b) Hose-reel drive control system — the hose-reel drive motor is controlled by the two-position manual hydraulic valve (see Figure 2). When the valve is moved to the "rewind" position, a pneumatic valve releases the pressure in the accumulator, allowing excess liquid from the contraction of the hose during rewinding to flow into the accumulator. When the rewind motor is stopped, the pneumatic valve applies air pressure regulated to 8 psig to the accumulator to almost balance the 10 psig anti-drain-valve pressure.

A restricted by-pass is provided in the hose-reel drive so that, in emergency, rewinding of the hose can be stopped manually without shutting off the control valve.

To maintain the control-system pressures, the 40 psig and 8 psig regulators and the adjustable restrictor in the control line to the nozzle are sealed (see Figure 16).

GENERAL NOTES

Test Procedure

1. Carry out normal delivery tests with the hose fully extended.

2. Rewind the hose and check that no liquid flows from the nozzle during rewinding.
3. Repeat at least one delivery test with hose fully extended.
4. Carry out at least one delivery test by delivering half the test quantity before the low liquid-level switch is actuated and the other half after the tank has been refilled. Check that the low liquid level corresponds to the zero mark on the dipstick.
5. If the preset stop valve is fitted, carry out test deliveries using alternately the manual nozzle and the preset device to terminate the delivery.

All the above deliveries should be within tolerance.

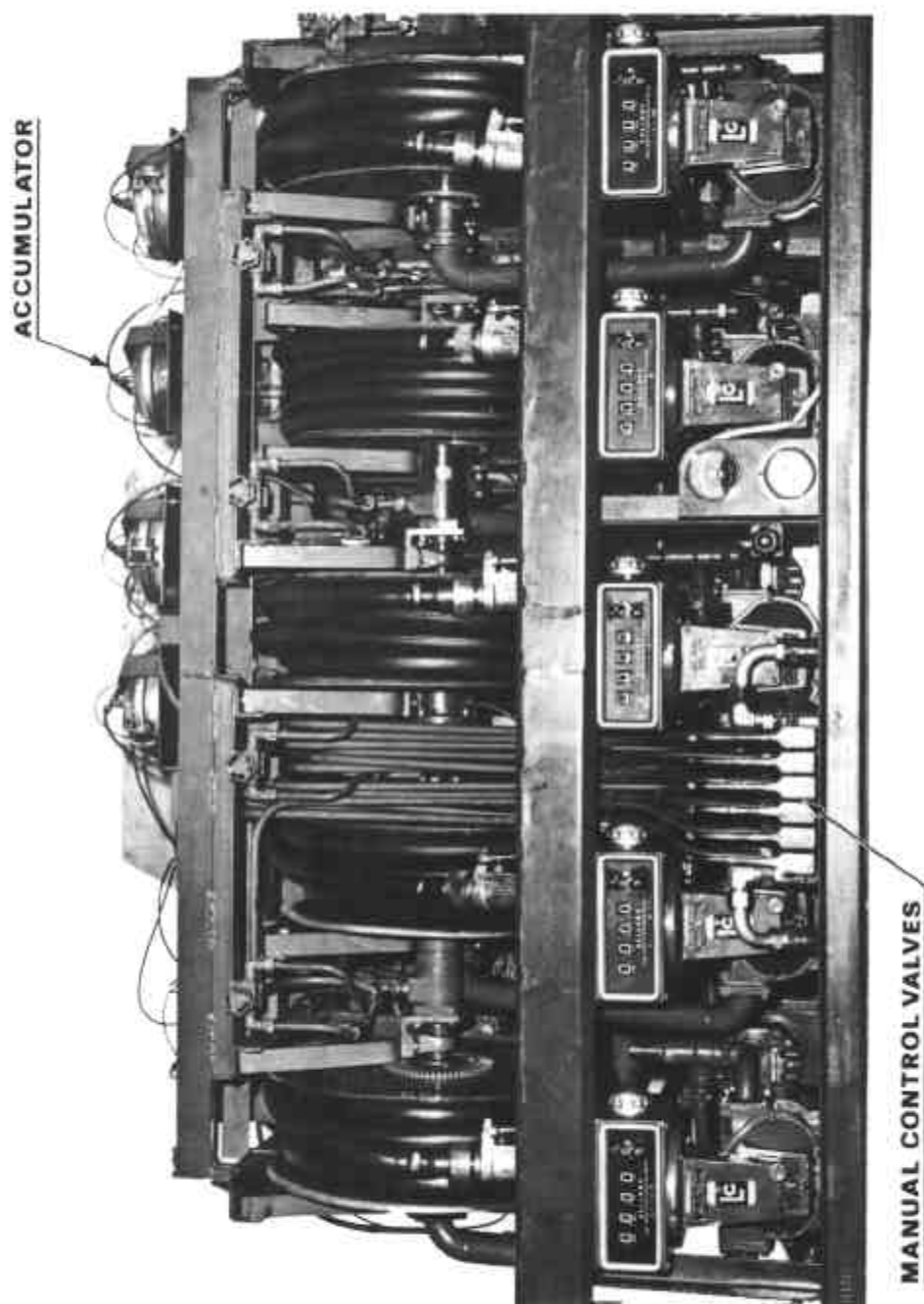
FIGURE 5/6D/15 - 1

1	2	3	4	5	6
	COMPONENTS	DATE APPROVED	FOOT-NOTES	PATTERN	VARIANT
1	Supply tank	22 MAR 73		*	*
2	Float switch (Figures 4 & 5)	22 MAR 73		*	*
3	Suction filter (Figure 6)	22 MAR 73		*	*
4	Pump	22 MAR 73		*	*
5	Pump hydraulic-drive motor	22 MAR 73		*	*
6	Pump by-pass valve (Figure 7)	22 MAR 73		*	*
7	Liquid Controls M7 flowmeter (Figure 8)	22 MAR 73		*	*
8	Visual indicator (Figure 8)	22 MAR 73		*	*
9	Non-return valve	22 MAR 73		*	*
10	Accumulator	22 MAR 73		*	*
11	Hose-reel and swivel coupling (Figure 9)	22 MAR 73		*	*
12	Hose	22 MAR 73		*	*
13	Nozzle (Figures 10 and 11)	22 MAR 73		*	*
14	Hose-reel hydraulic drive motor	22 MAR 73		*	*
15	Liquid Controls preset mechanism and stop valve (Figures 12, 13 & 14)	22 MAR 73		*	*
16	Pneumatic-hydraulic control system (Figures 15 & 16)	22 MAR 73		*	*

* - indicates required components

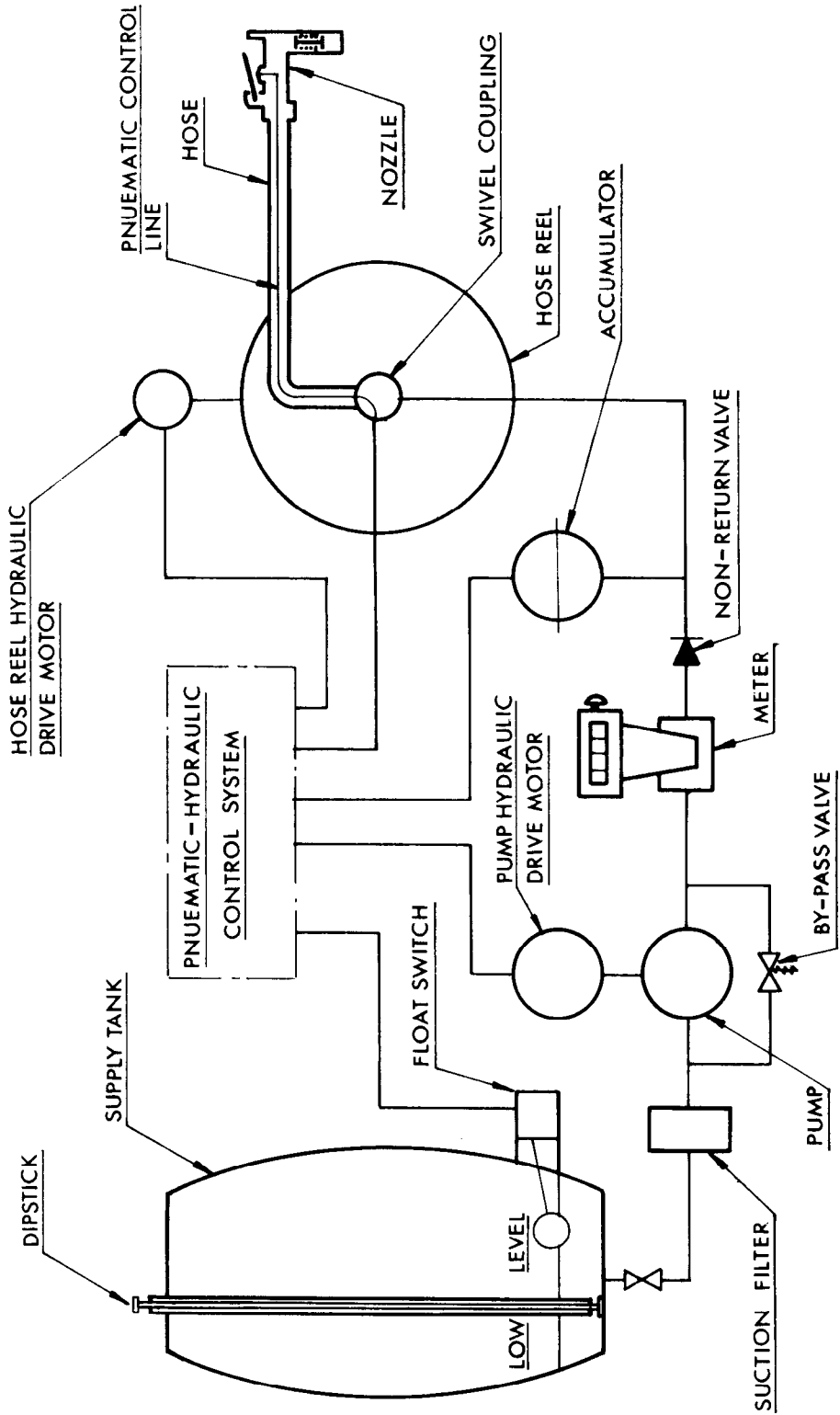
Compatibility Table for Components Described
in this Certificate

FIGURE 5/6D/15 - 2



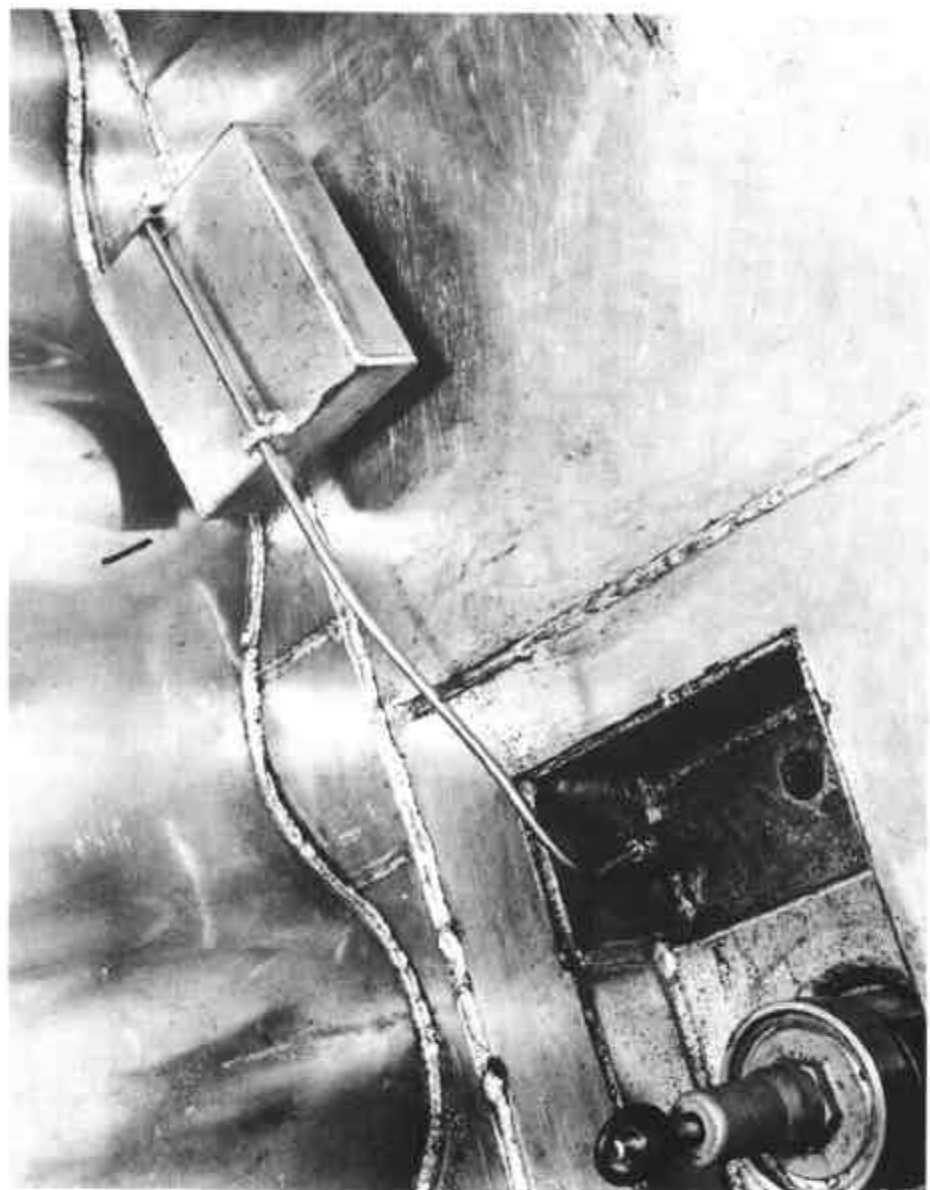
Bulk Lubricating Oil Dispensing Unit

FIGURE 5/6D/15 - 3



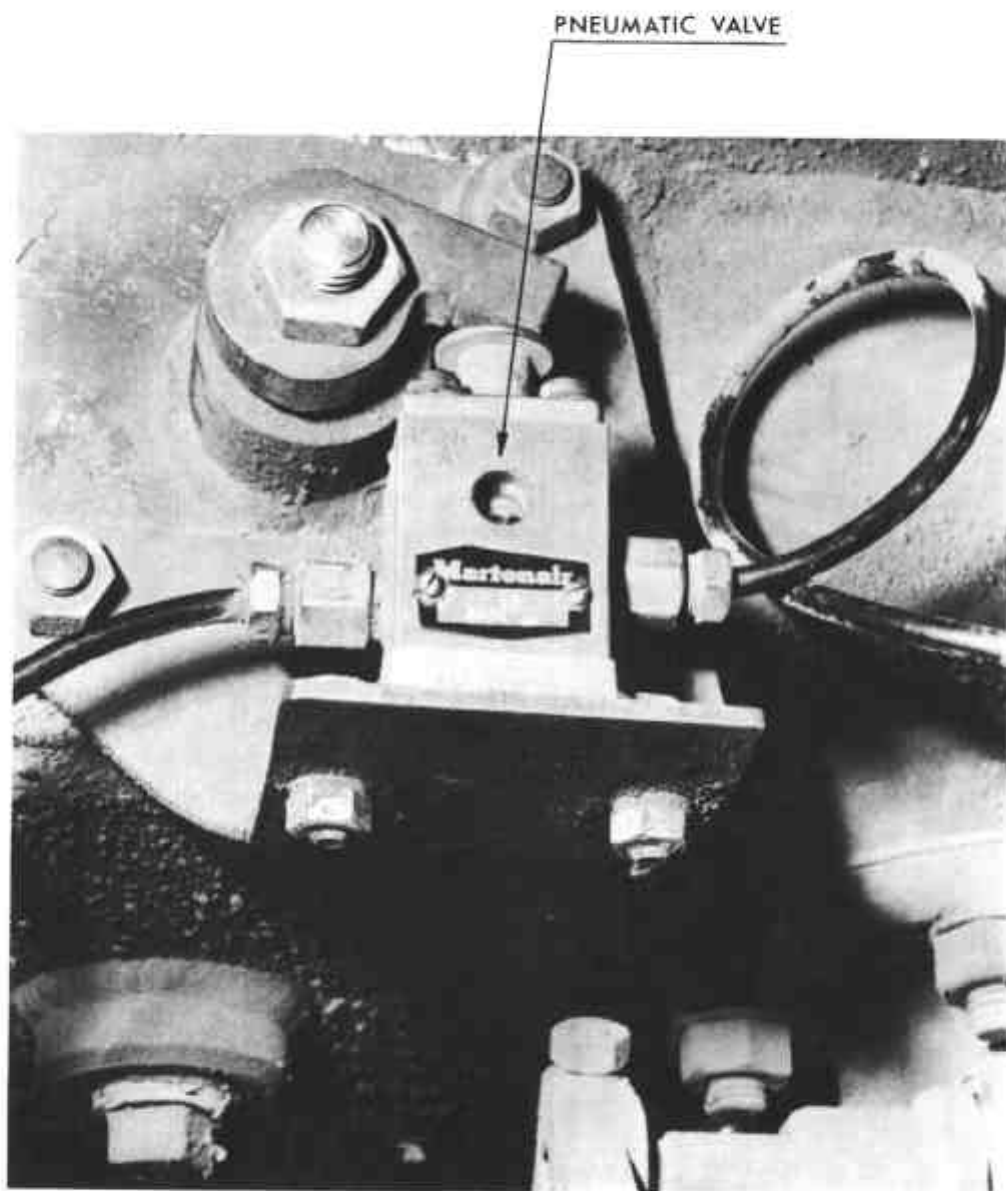
Hydraulic Diagram

FIGURE 5/6D/15 - 4



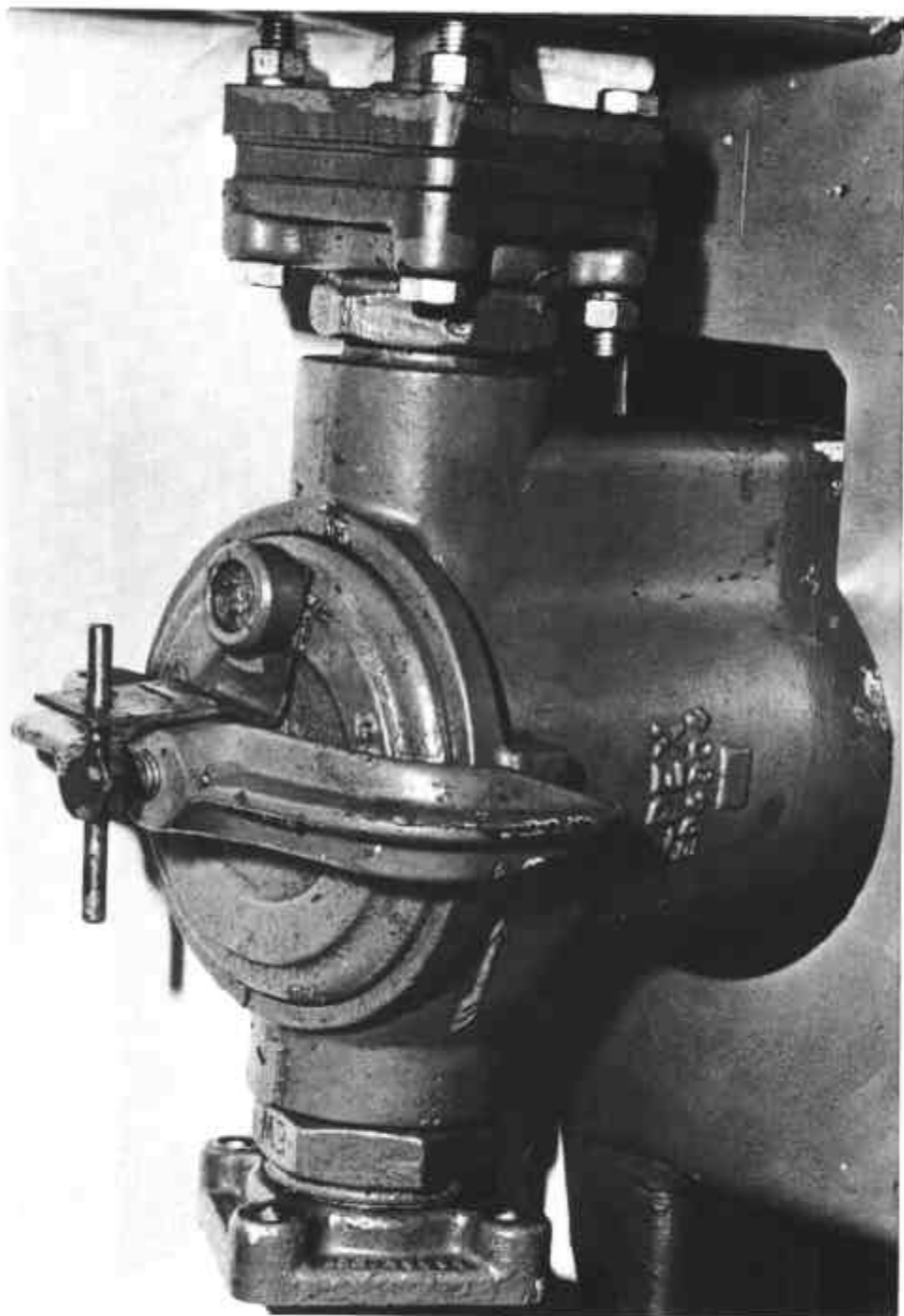
Float of Low-level Float Switch — Inside Tank

FIGURE 5/6D/15 - 5



Pneumatic Valve of Low-level Float Switch — Outside Tank
27/3/73

FIGURE 5/6D/15 - 6



Suction Filter

FIGURE 5/6D/15 - 7



Pump By-pass Valve

27/3/73

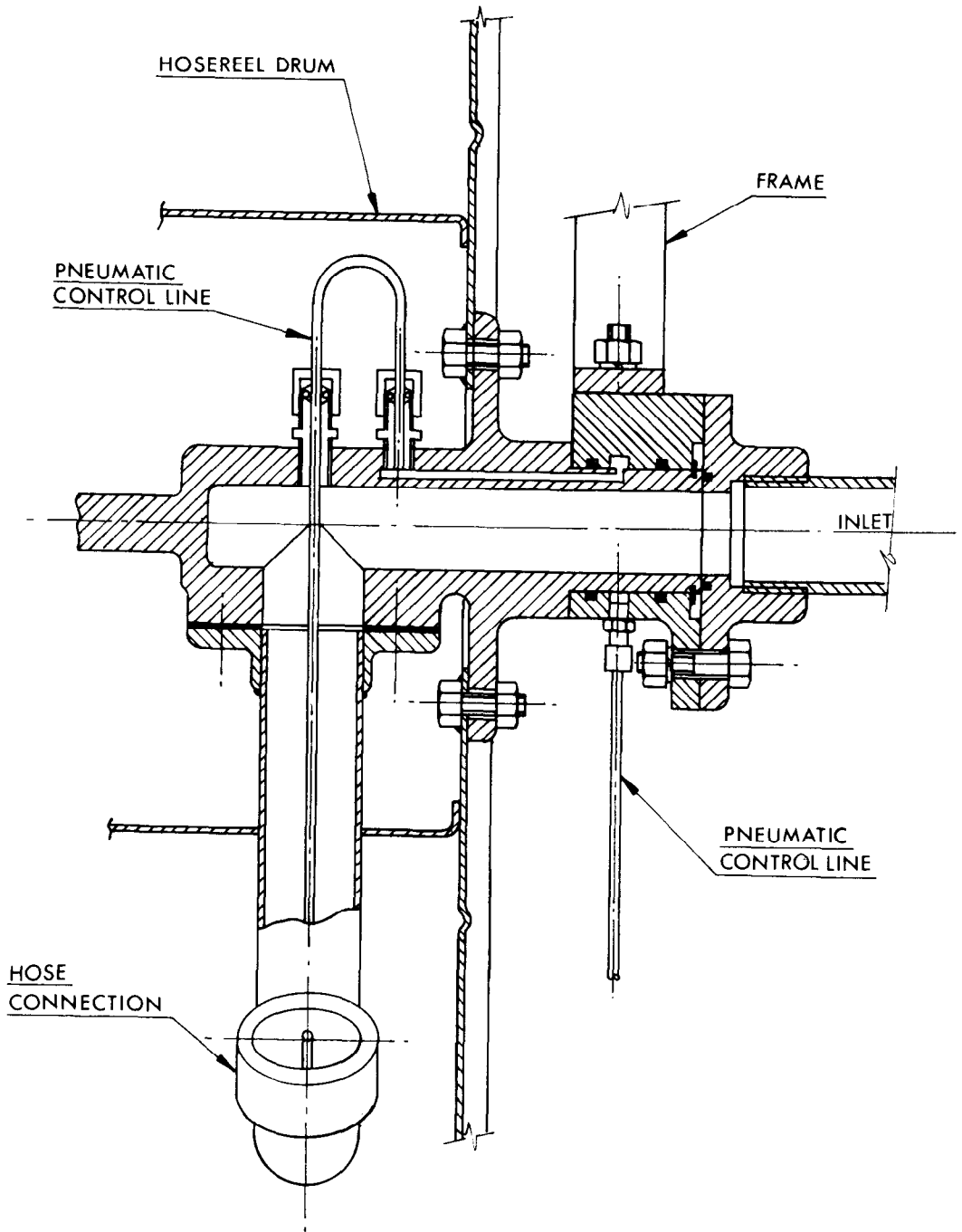
FIGURE 5/6D/15 - 8



Liquid Controls M7 Meter

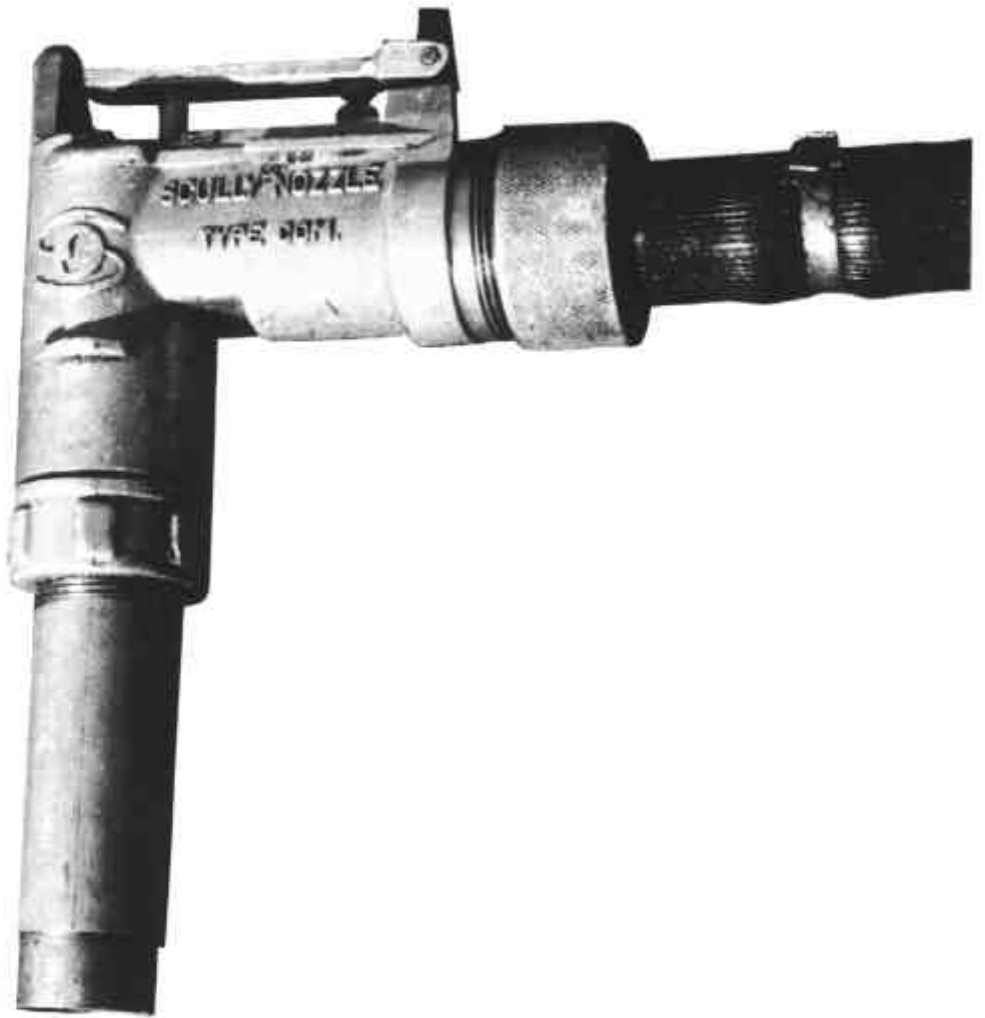
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FIGURE 5/6D/15 - 9



Cross-section through Hose-reel and Swivel Coupling

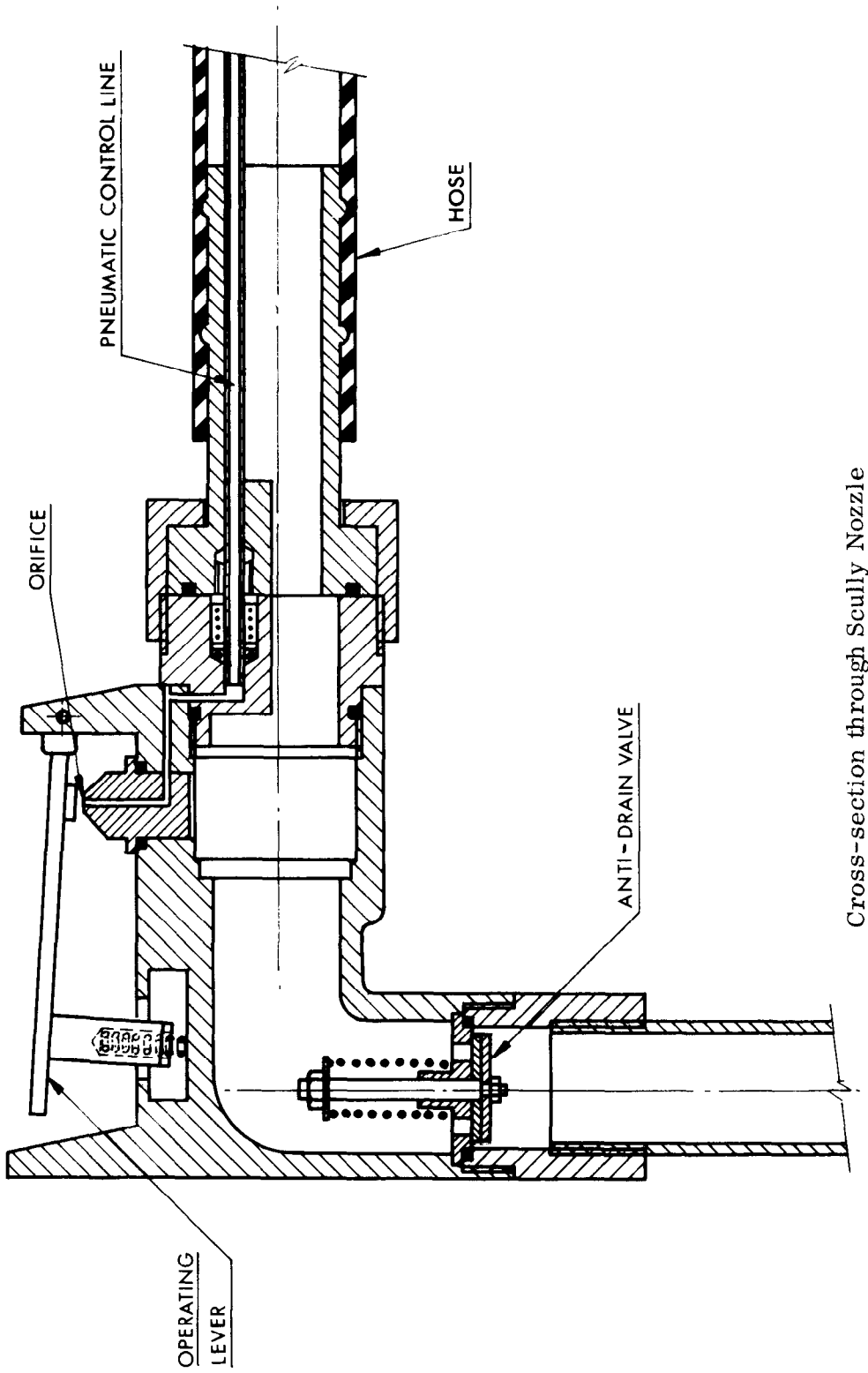
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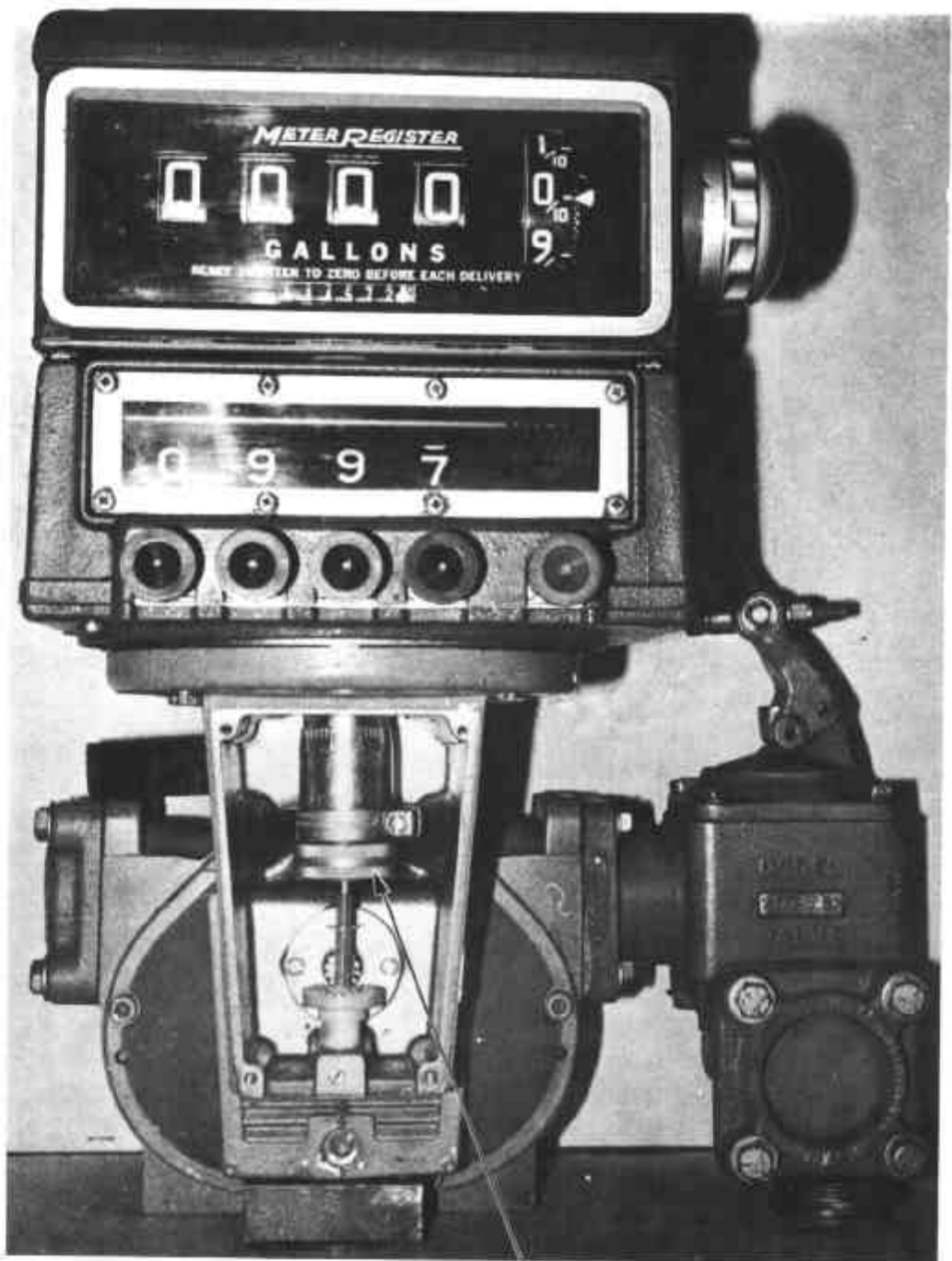
Scully Nozzle

FIGURE 5/6D/15 - 11



Cross-section through Scully Nozzle

FIGURE 5/6D/15 - 12



CALIBRATION ADJUSTER

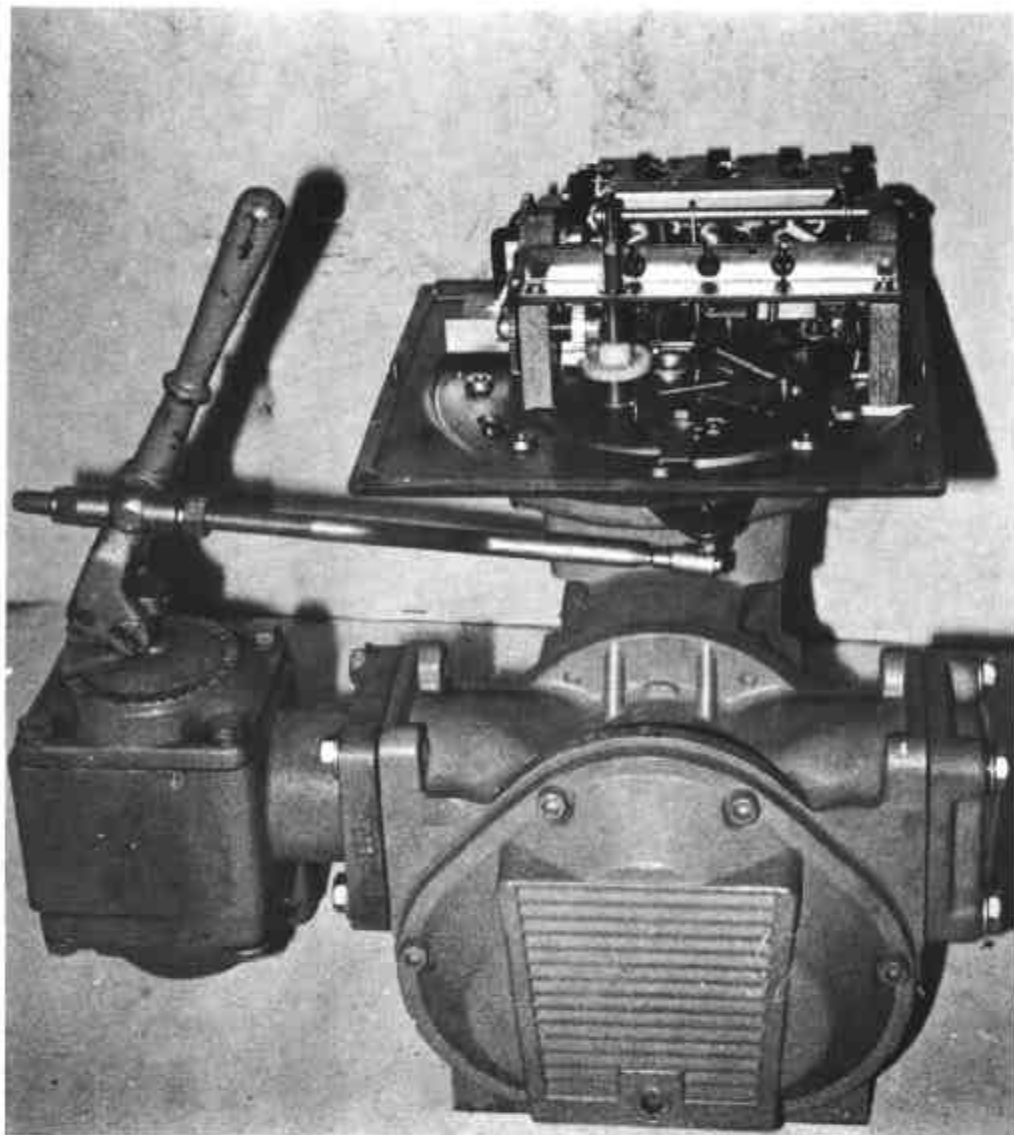
Liquid Controls M7 Meter, Preset Mechanism
and Stop Valve

27/3/73

FIGURE 5/6D/15 - 13



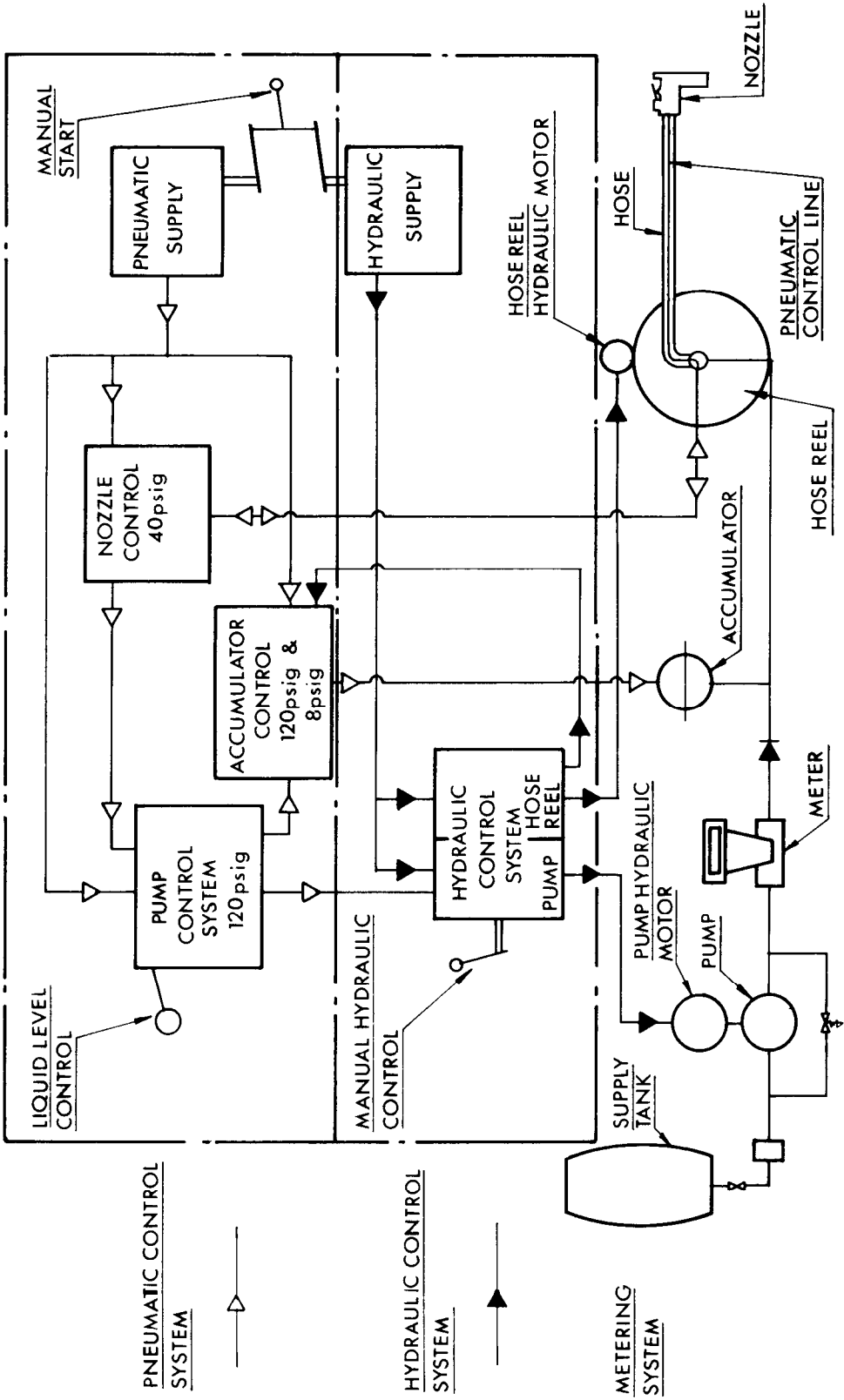
Front View — Liquid Controls Preset Mechanism
with Cover Removed, and Stop Valve



Rear Valve — Liquid Controls Preset Mechanism
with Cover Removed, and Stop Valve

27/3/73

FIGURE 5/6D/15 - 15

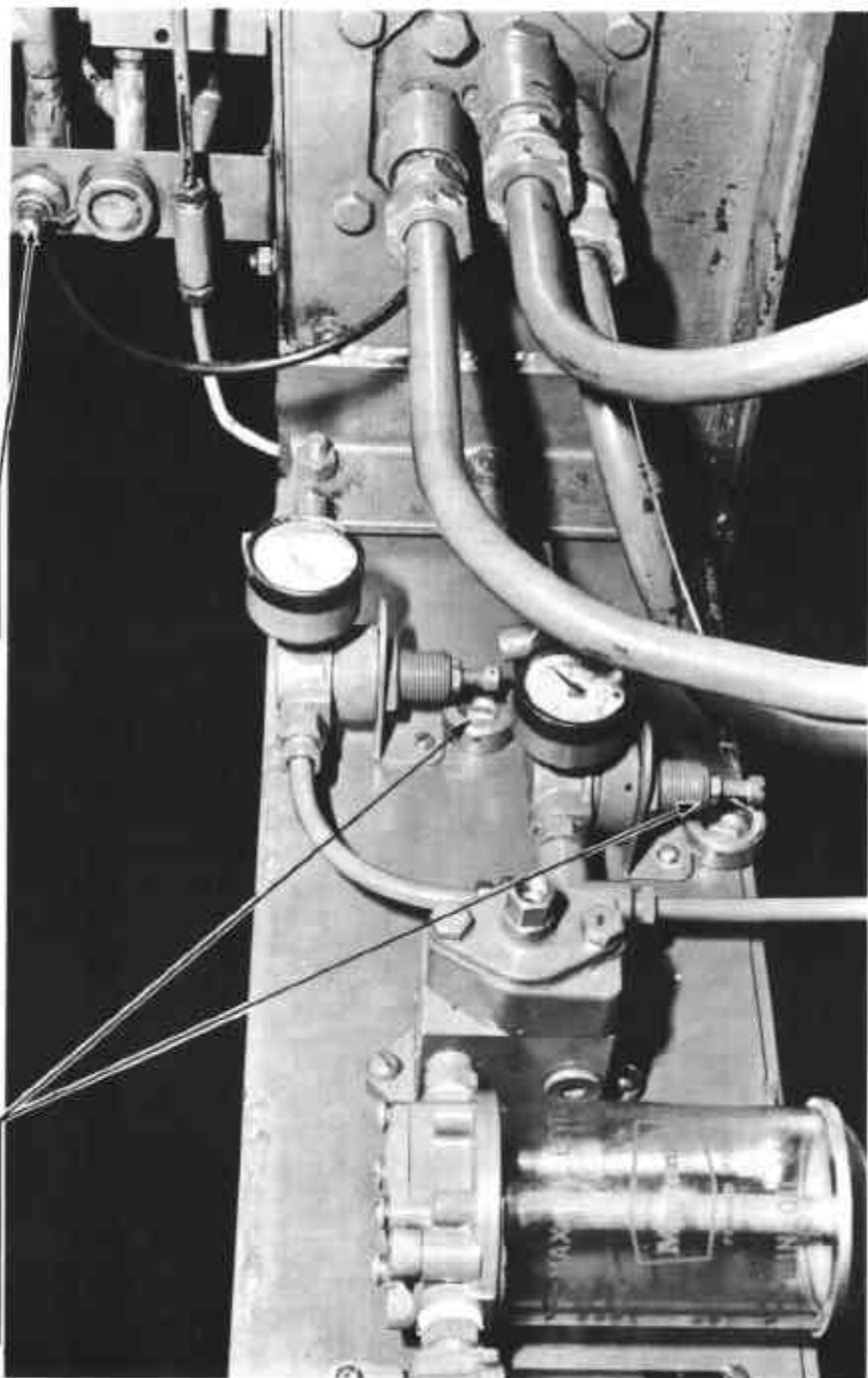


Pneumatic-hydraulic Control System — Schematic Diagram

FIGURE 5/6D/15 - 16

PRESSURE REGULATORS AND
SEALING CUPS

NOZZLE RESTRICTOR
AND SEAL



Pneumatic System Pressure Controls and Sealing Arrangement