

CERTIFICATE OF APPROVAL No 5/6B/10

This is to certify that the pattern and variants of the

Acme Flowmeter

submitted by Acme Oil Equipment Services Pty Ltd, 253 Ingles Street, Port Melbourne, Victoria, 3207,

have been approved under the Weights and Measures (Patterns of Instruments) Regulations as being suitable for use for trade.

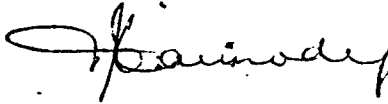
Approval was granted on 31 May 1974.

The pattern and variants are described in Technical Schedule No 5/6B/10, and in drawings and specifications lodged with the Commission.

Approval is granted on condition that:

1. The maximum flow rate is 160 litres per minute.
2. The pump suction operates under a positive liquid head.
3. The liquids measured are of viscosity between 1 and 5 mm²/s only.

Signed



Executive Officer

*Review date 16/79
(DG)*

Issued

31/5/74



NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6B/10

Pattern: Acme Flowmeter

Submittor: Acme Oil Equipment Services Pty Ltd,
253 Ingles Street,
Port Melbourne, Victoria, 3207.

Date of Approval: 31 May 1974

Conditions of Approval:

1. The flow rate is to be limited to a maximum of 160 litres per minute.
2. The pump suction is to operate under a positive liquid head.
3. The liquids measured are to be limited to petroleum products of viscosities between 1 and 5 mm²/s only (that is, kerosene, heating oil, etc.) The liquid for which the flowmeter is calibrated is to be nominated on the instrument data plate.

All instruments conforming to this approval shall be marked "NSC No 5/6B/10".

Description:

The pattern (see Figures 1 and 2) is for a flowmeter to measure heating oil of viscosity between 1 and 5 mm²/s at a maximum flow rate of 160 litres per minute.

The flowmeter comprises the following:

1. Positive displacement pump mounted lower than the minimum height of the liquid in the supply tank.
2. Pressure-control valve set to approximately 15 kPa below pump by-pass pressure.
3. Neptune gas separator incorporating a strainer and float chamber (see Figure 3).

4. Neptune "1½-inch" Type 4 meter (see Figure 4).
5. Neptune register with zero-start ticket-printing head. The indicator is marked "this indicator not in use for trade" (see Figure 5). The ticket printer has 1-litre increments or 0,1-gallon increments. A knob on the reset spindle on the side of the register, when turned to a stop, resets the indicator to zero and prints zero on the ticket after locking it in position by a spike which pierces the ticket. On completion of a delivery, turning the knob back prints the ticket with the quantity delivered, and then unlocks the ticket to permit withdrawal.
6. MLD controller (Meter Locking Device) is a device which minimises hose dilation by ensuring that the pressure in the hose when the delivery starts is virtually the same as when the delivery finishes. The MLD controller, which is attached to the side of the register (see Figure 5), locks the reset spindle of the ticket printer and only allows a ticket to be printed when the pump is running and the nozzle is closed. Thus the zero printed on the ticket at the start of a delivery will be printed at the same hose pressure as the quantity printed at the end of the delivery.

The MLD controller comprises a cylinder in which a spring-loaded piston pulls down a locking link when liquid under pressure acts on it. The pressure required to actuate the locking link is regulated by an adjustable plug which compresses the spring under the piston. The plug when set is locked in position by a pin. At a pressure within 15 kPa of the system pressure set down by the pressure-control valve, liquid from the delivery side of the meter causes the piston to move down and unlock the ticket-printer reset spindle (see **Special Tests**).

A cover is fitted over the MLD controller (see Figure 6).

7. Seals — the following parts of the system are sealed:
 - (a) Register, meter and MLD controller (see Figure 6);
 - (b) pump by-pass valve and pressure-control valve;
 - (c) instrument data plate.

8. Hose — up to 75 m of hose of maximum bore 32 mm, mounted on a hose reel.
9. Nozzle — OPW 1A "1 $\frac{1}{4}$ -inch" automatic hose nozzle as described in Certificate No 5/6D/13.
10. Marking — an instrument data plate sealed to the instrument is marked: "approved for heating oil only".

This approval also includes the use of:

1. A Veeder-Root double or single-handle reset ticket-printing register with MLD controller (see Figures 7 and 8). The indicator is marked "this indicator not in use for trade".
2. A. O. Smith T7 or T11 meters, gas separator, and the above Veeder-Root register (see Figures 9 to 11). The T7 meter is flanged to suit 1 $\frac{1}{2}$ -inch pipework and the T11 meter is flanged to suit 2-inch pipework.
3. A Buckeye 890 "1 $\frac{1}{4}$ -inch" automatic hose nozzle as described in Certificate No 5/6D/6.
4. The flowmeter measuring kerosene, or other liquid petroleum products limited to within a viscosity range of 1 to 5 mm²/s. The instrument data plate will be marked specifically with the commercial product to be used, for example:
 - (a) "approved for kerosene only"; or
 - (b) "approved for heating oil only".

Special Tests:

The instrument should be tested with the liquid for which it will be used and which is marked on the instrument data plate.

Gas Separator. The effect of gas on the quantity delivered should not exceed 0,5% when the supply tank is allowed to run dry during a delivery. It will be necessary to stop the pump, refill the supply tank, and restart the pump to finish the delivery into the proving measure.

MLD Controller. The pressure at which the MLD controller locking link rises to lock the reset spindle should not be more than 15 kPa below the system pressure set by the pressure-control valve. The system pressure should be checked with the pump running and nozzle closed.

Non Flow-dependent Errors

1. The non flow-dependent errors for metric instruments are:

- (a) printing error of one increment, that is, 1 litre; and
- (b) a possible hose-dilation error caused by a maximum pressure change of 15 kPa, that is, up to 0,1 litre for 75 metres of hose.

The minimum delivery on which the relative error from all sources would not exceed 1,5% is 90 litres.

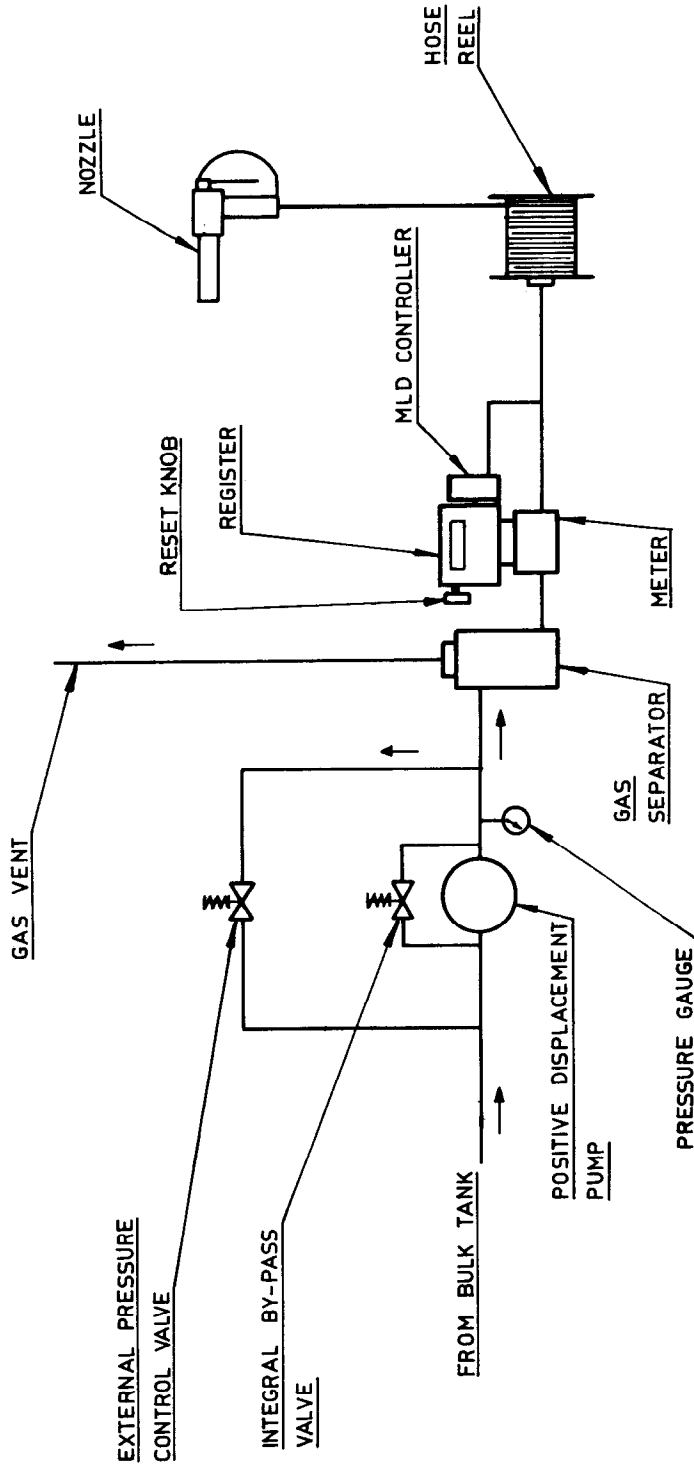
2. The non flow-dependent errors for imperial instruments are:

- (a) printing error of one increment, that is, 0,1 gallon; and
- (b) a possible hose-dilation error caused by a maximum pressure change of 15 kPa, that is, up to 3 fl oz for 75 metres of hose.

The minimum delivery on which the relative error from all sources would not exceed 1,5% is 11 gallons.

3. Hose dilation can be checked by measuring the drainings from 75 metres of hose when the pressure is reduced by 15 kPa.

FIGURE 5/6B/10 - 1



Acme Flowmeter — Schematic Diagram

FIGURE 5/6B/10 - 2



Acme Flowmeter

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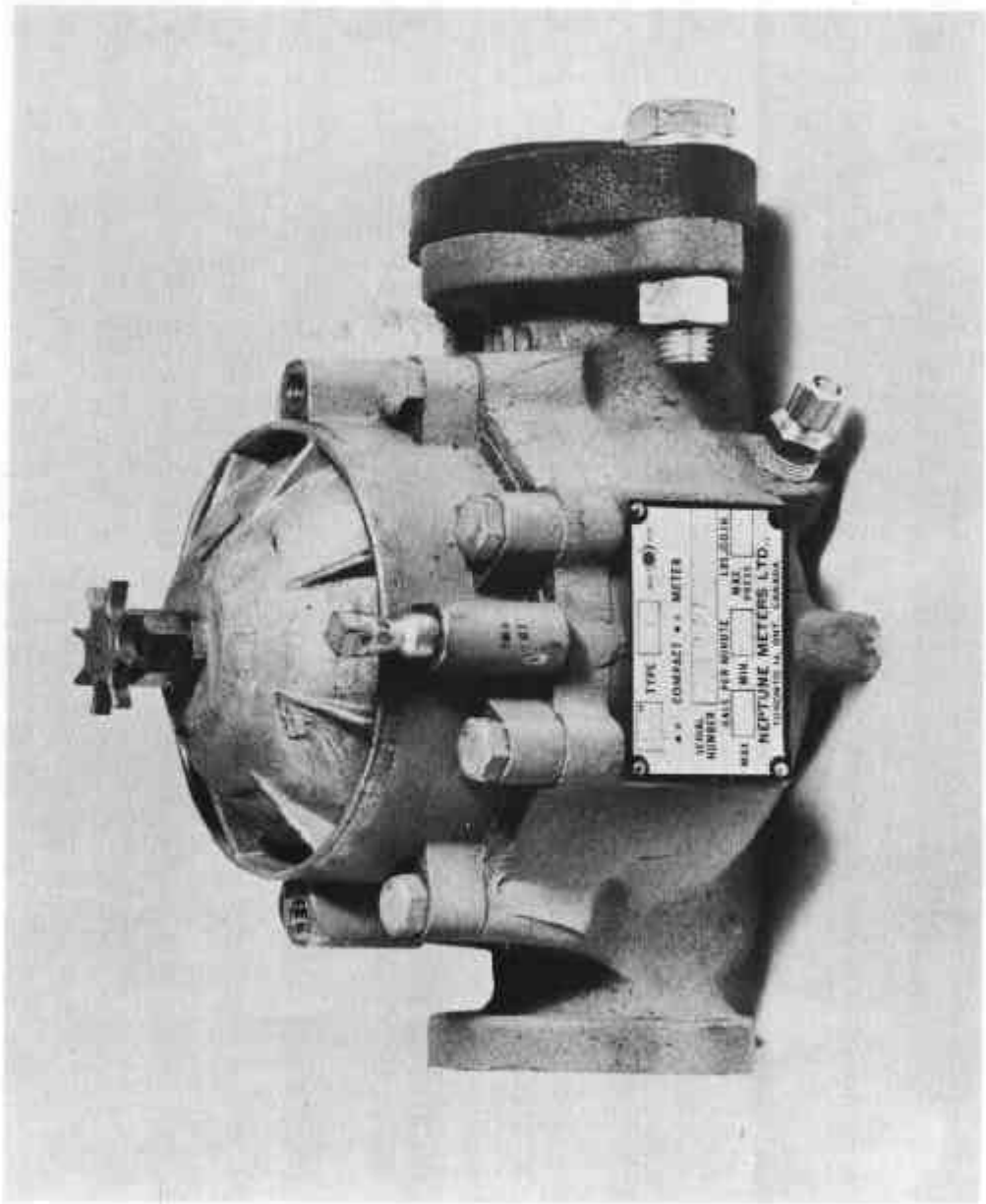
FIGURE 5/6B/10 - 3



Gas Separator for Neptune Meter

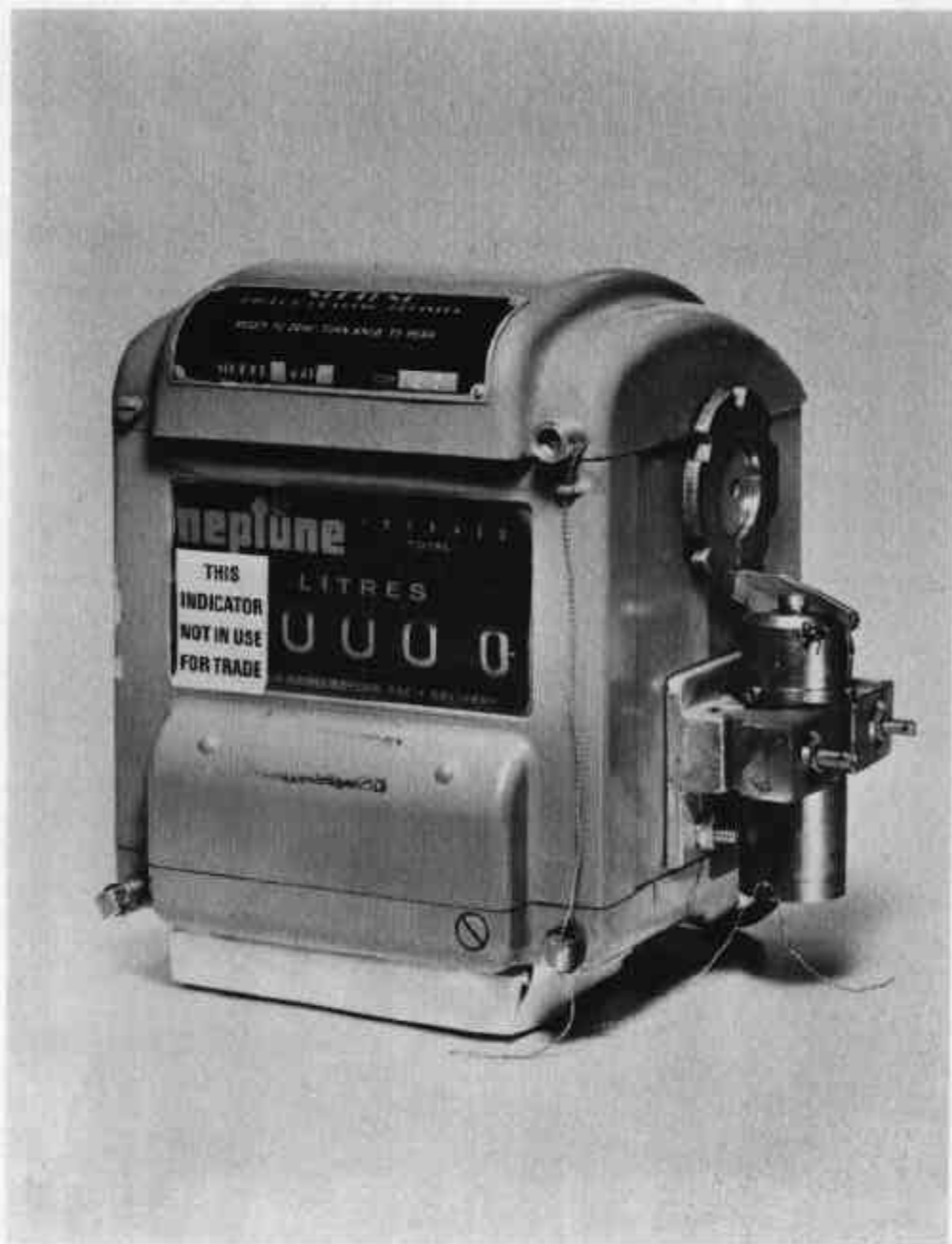
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FIGURE 5/6B/10 - 4



Neptune "1 1/2-inch" Type 4 Meter

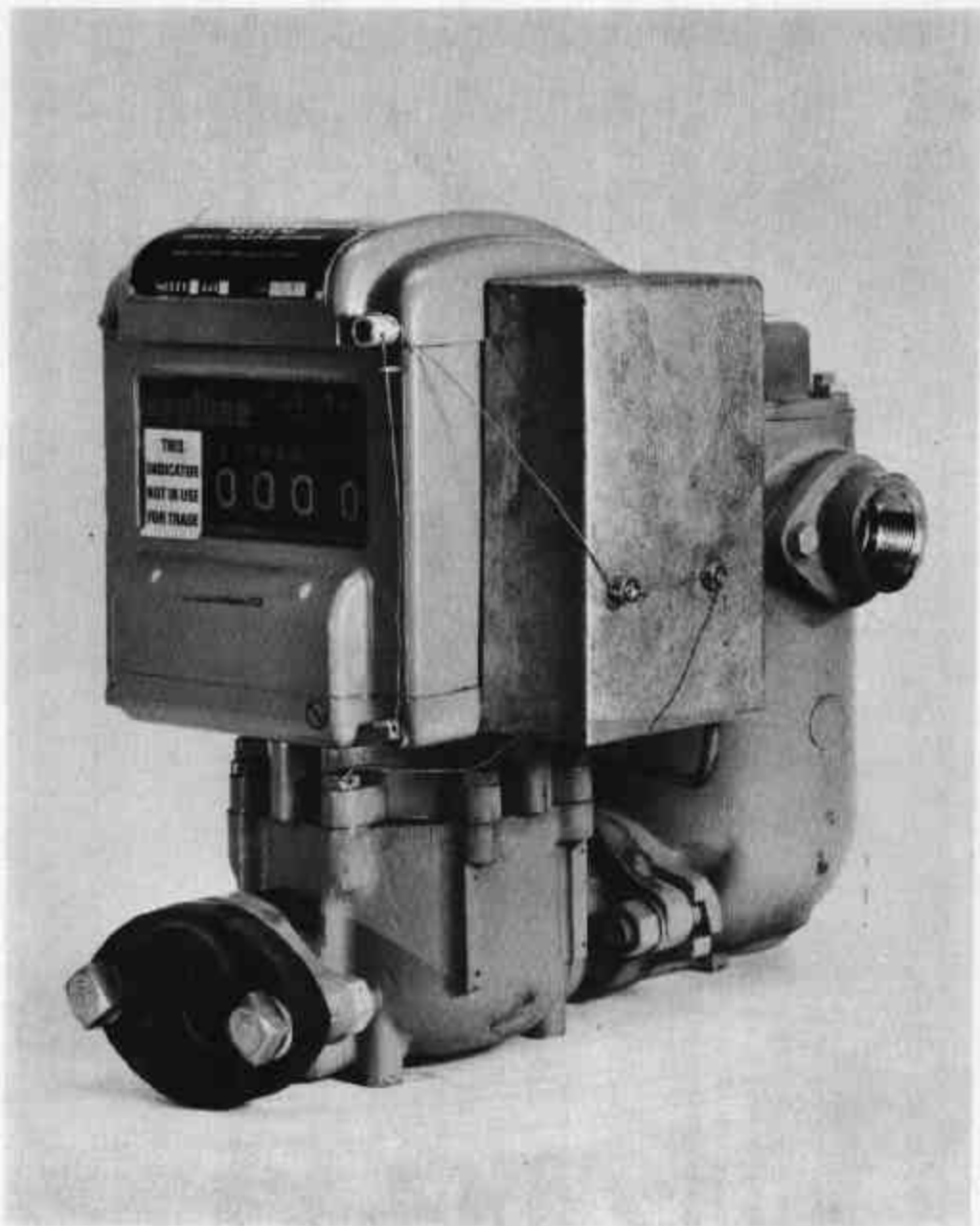
FIGURE 5/6B/10 - 5



Neptune Register with Zero-start Ticket Printer —
with Cover Removed from MLD Controller

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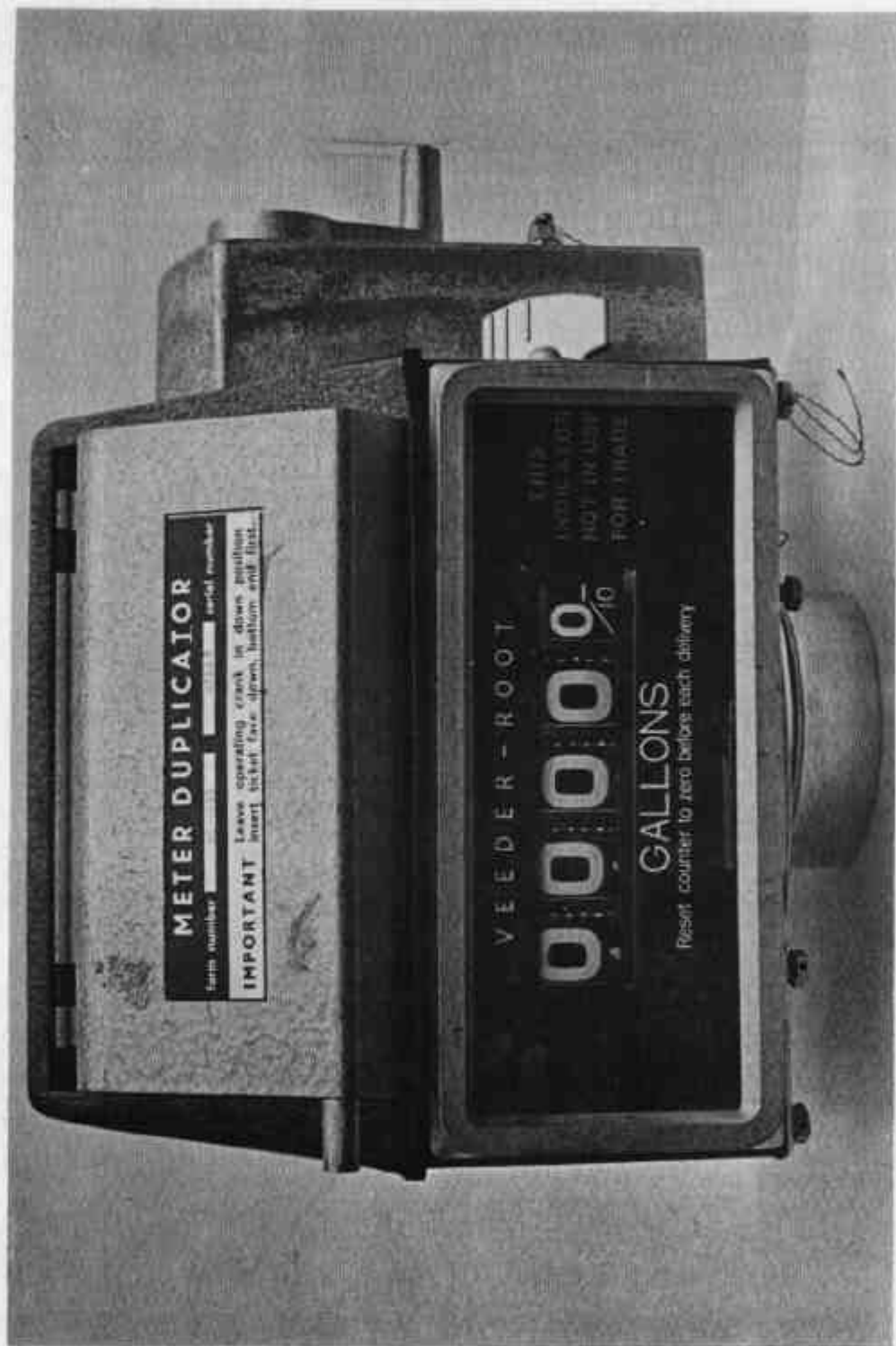
FIGURE 5/6B/10 - 6



Neptune Meter, Gas Separator, and Register,
showing Method of Sealing Cover of MLD Controller

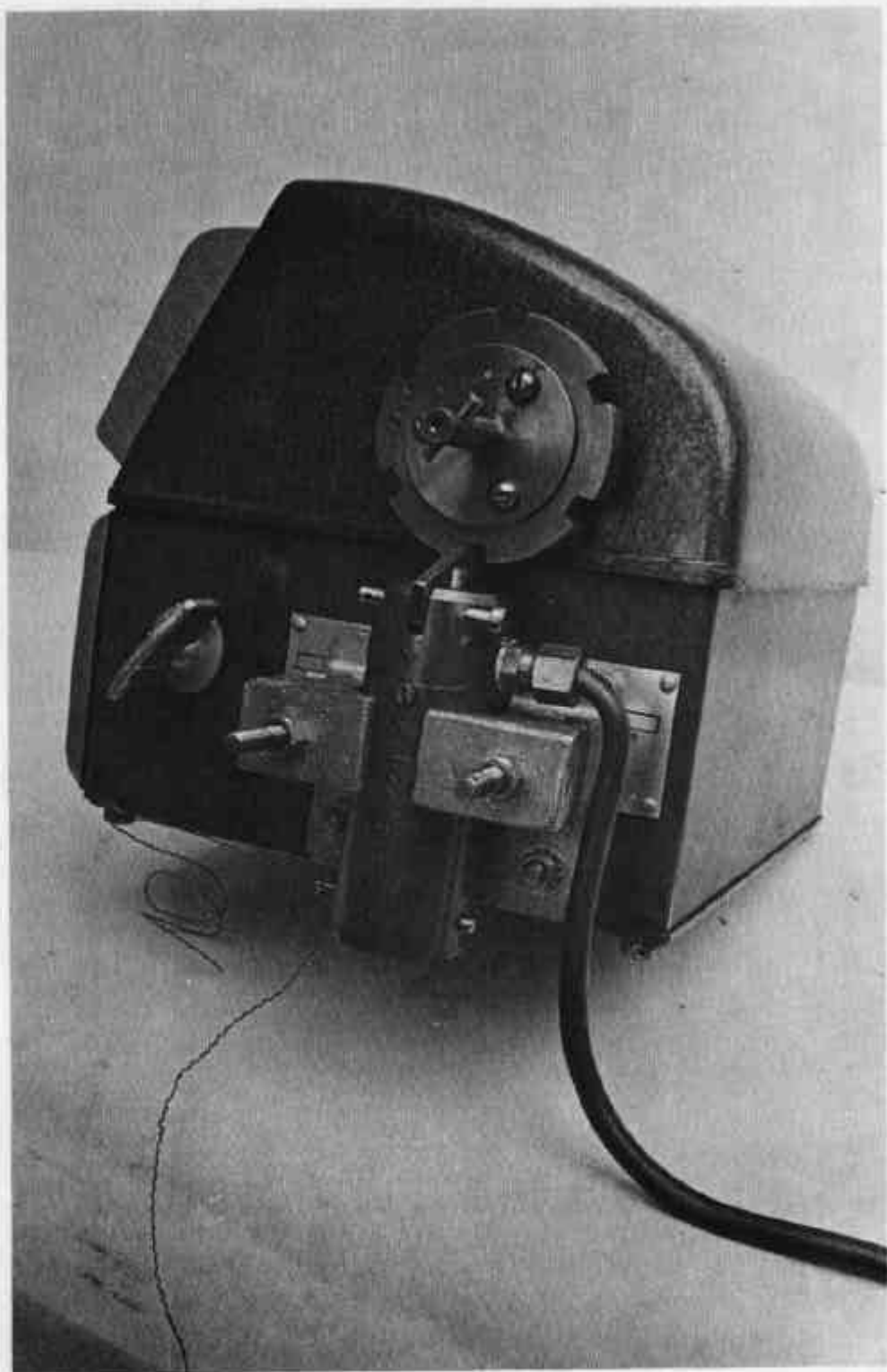
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FIGURE 5/6B/10 - 7



Veeder-Root Indicator and Ticket Printer

FIGURE 5/6B/10 - 8



Veeder-Root Indicator with MLD Controller

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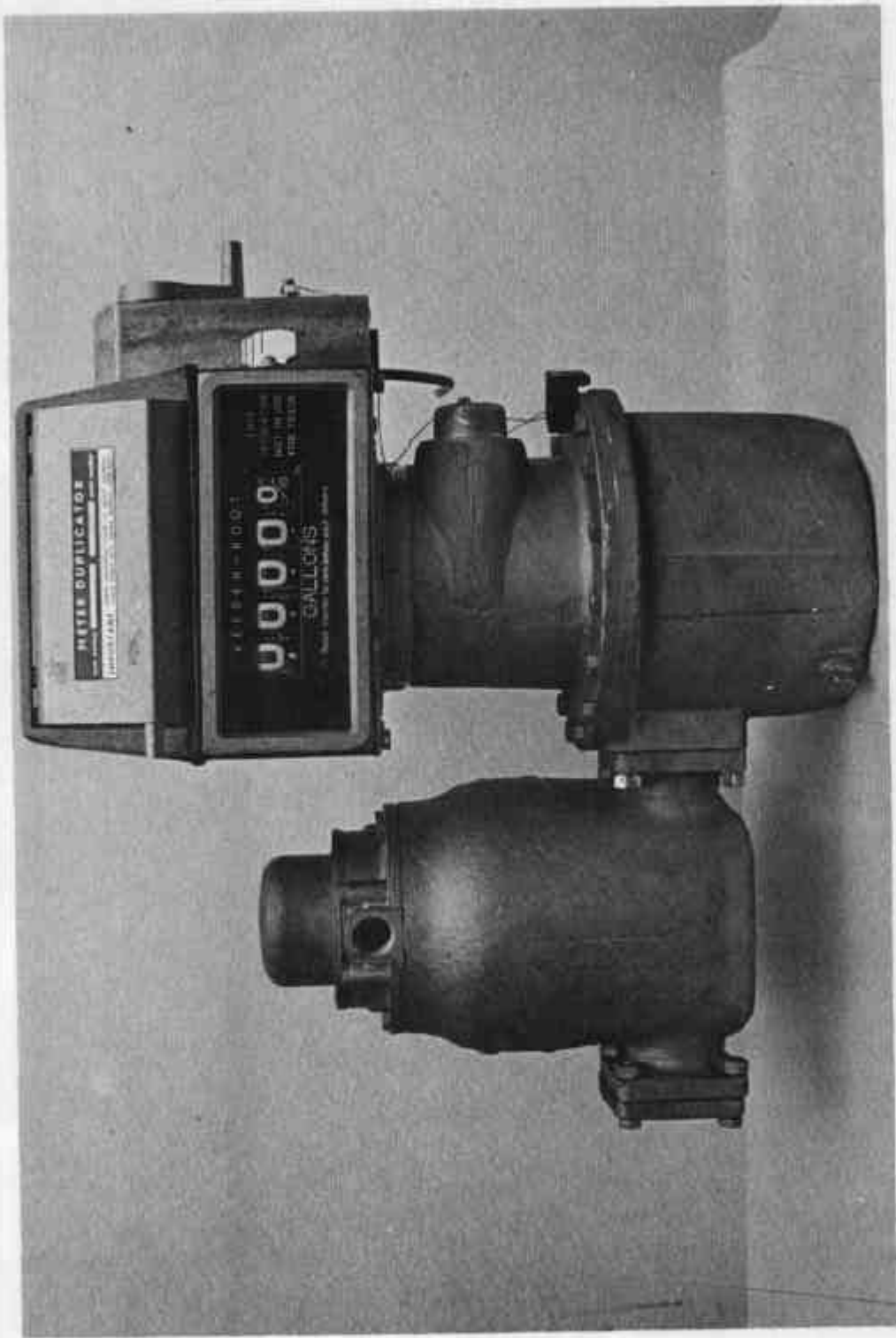
FIGURE 5/6B/10 - 9



Gas Separator for A. O. Smith T7 Meter

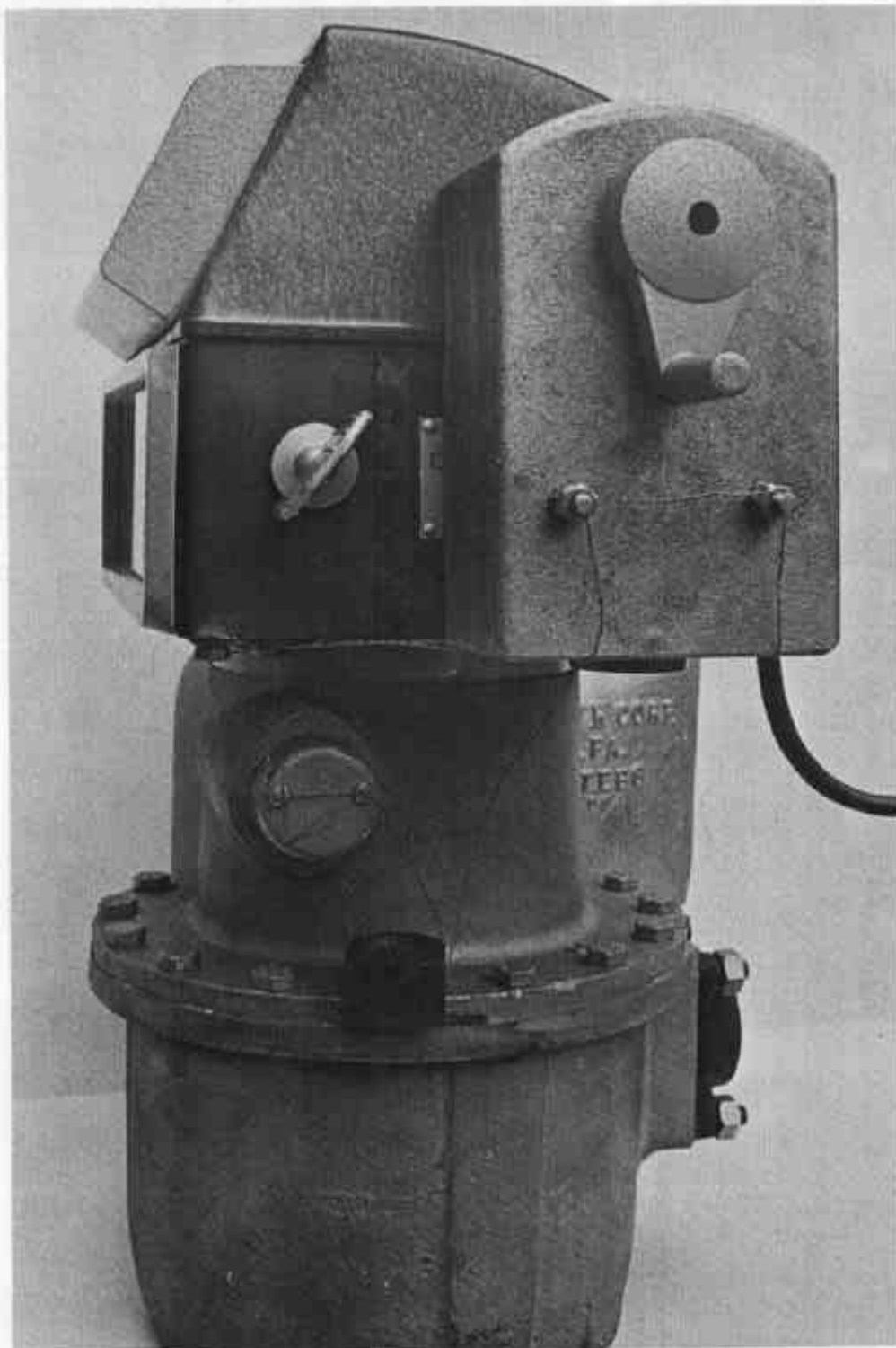
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FIGURE 5/6B/10 - 10



A. O. Smith T7 Meter, Gas Separator and Register with MLD Controller

FIGURE 5/6B/10 - 11



A. O. Smith T7 Meter, and Veeder-Root Register with
MLD Controller and Cover

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