CERTIFICATE OF APPROVAL No 5/6D/22

This is to certify that the pattern and variants of the

Wayne (A. O. Smith) T40 Flowmeter

submitted by Wayne Pumps Australia Pty Ltd,
29 Anzac Highway,
Keswick, South Australia, 5035,

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

Date of Approval: 10 September 1974.

The pattern and variants are described in Technical Schedule No 5/6D/22, and in drawings and specifications lodged with the Commission.

The approval is subject to review on or after 1 September 1976.

All instruments conforming to this approval shall be marked with the approval number "NSC No 5/6D/22".

Approval is granted on condition that:

1. The flow rate be limited to a maximum of between 350 and 650 litres per minute.

2. A pump is not fitted to the measuring system.

3. The liquids measured to be limited to viscosity between 0,5 and 2,5 mm^2/s only. The liquid for which the flowmeter is calibrated is to be nominated on the instrument data plate.

Signed

Executive Officer

Indexed

10/9/74

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 5/6D/22

Pattern: Wayne (A. O. Smith) T40 Flowmeter

Submittor: Wayne Pumps Australia Pty Ltd,
29 Anzac Highway,
Keswick, South Australia, 5035.

Date of Approval: 10 September 1974

All instruments conforming to this approval shall be marked "NSC No 5/6D/22".

Conditions of Approval:

1. The flow rate is to be limited to between 350 and 650 litres per minute.

2. A pump is not to be fitted to the measuring system.

3. The liquids measured are to be limited to viscosities between 0,5 and 2,5 mm^2/s only (that is, petrol, kerosene, etc.) The liquid for which the flowmeter is calibrated is to be nominated on the instrument data plate.

Description:

The pattern (see Figures 1 and 2) is a gravity-feed vehicle-mounted flowmeter for the delivery of commercial kerosene of viscosities between 0,5 and 2,5 mm^2/s at flow rates from 350 to 650 litres per minute. *

The flowmeter comprises:

1. A. O. Smith T-4A gas separator (see Figures 1 and 2) with a float-operated pilot valve and a pneumatically operated butterfly valve

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* The liquid head must be such that during a delivery the flow rate is between 350 and 650 litres per minute.

and vent valve; the vent is connected to the shut-off valve downstream of the meter.

2. Adjustable air regulator with pressure gauge, Model R04-100-RGK-AU (see Figure 3). The air regulator is connected to the vehicle air-brake reservoir without any shut-off valve in the pipe. The brake air system must be of sufficient capacity and volume to maintain the compressed air to the pilot valve at 275 ± 35 kPa (40 ± 5 psi) during any delivery.

3. Meter, A. O. Smith T40 (see Figures 1 and 4). The meter is kept full of liquid at all times as the inlet to the gas separator and the outlet from the shut-off valve are located higher than the meter.

4. Preset stop, A. O. Smith 343A-40 (see Figures 1 and 4), between the meter and indicator, closes the G4 shut-off valve when a nominal preset quantity has been delivered. The quantity delivered will be indicated by the indicator and ticket printer.

5. Zero-start single-handle reset Veeder-Root 7085 indicator and ticket printer (see Figures 1 and 4). The ticket printer has 1-litre increments and the indicator has 1-litre graduations. The right-hand indicator wheel is graduated and numbered 0 to 9.

6. Shut-off valve, A. O. Smith G4 (see Figures 2 and 4), which is shut manually or by the preset device. A dashpot restricts the speed at which the valve closes.

7. Marking — an instrument data plate sealed to the instrument is marked "approved for kerosene only" (see Figure 5).

8. Sealing — the following parts of the system are sealed (see Figure 5):

   (a) meter;

   (b) preset stop; and

   (c) instrument data plate.

The approval includes the following:

1. With or without the A. O. Smith 343A-40 preset stop. When the

preset stop is not fitted the Veeder-Root indicator is sealed to the meter.

2. A zero-start Veeder-Root 1624 indicator replacing the Veeder-Root 7085 indicator and ticket printer (see Figure 6).

3. The flowmeter measuring kerosene or other liquid petroleum products limited to within a viscosity range of 0,5 and 2,5 mm^2/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 petrol only".

Method of Operation:

The quantity of air measured by the meter is minimised by the pneumatically operated butterfly valve and vent valve in the gas separator.

Referring to Figure 2:

Before the delivery starts the pipe which connects the meter to the selected supply tank may be empty. As the air in this pipe enters the gas separator it will cause the float operating the pilot valve to drop, thus opening the pilot valve. This allows the compressed air to operate the pneumatic valve which closes the butterfly valve between the gas separator and the meter, and opens the vent valve allowing the air to vent to the shut-off valve downstream of the meter. When the air has vented the rise of the liquid level in the gas separator will cause the float to rise and close the pilot valve. The pneumatic valve will then close the vent valve and open the butterfly valve allowing liquid to enter the meter.

The delivery may be stopped by the operator closing the shut-off valve or may stop due to the selected supply tank emptying.

When the delivery is stopped by the operator the system will be full of liquid and the pneumatic valve will not need to operate. In this case, the delivery hose must be disconnected at the shut-off valve first to avoid

spillage and to allow the liquid in the hose to drain to the purchaser's storage tank.

However, when the delivery stops due to the supply tank emptying, the float will drop as air enters the gas separator and open the pilot valve and thus operate the pneumatic valve. In turn, the pneumatic valve will close the butterfly valve and open the vent valve. This stops the further flow of liquid into the meter, and the open vent valve connected to the shut-off valve allows the hose to drain into the purchaser's supply tank without siphoning liquid and air through the meter.

Note: The supply of compressed air to the pneumatic valve in the gas separator is essential for the correct operation of the system. Failure of the pneumatic valve to operate will allow air in the system between the supply cut-off valve and the meter to be measured as liquid at the start of a delivery; at the end of a delivery the meter would also register a volume of air equivalent to the volume of the delivery line beyond the meter.

Special Tests:

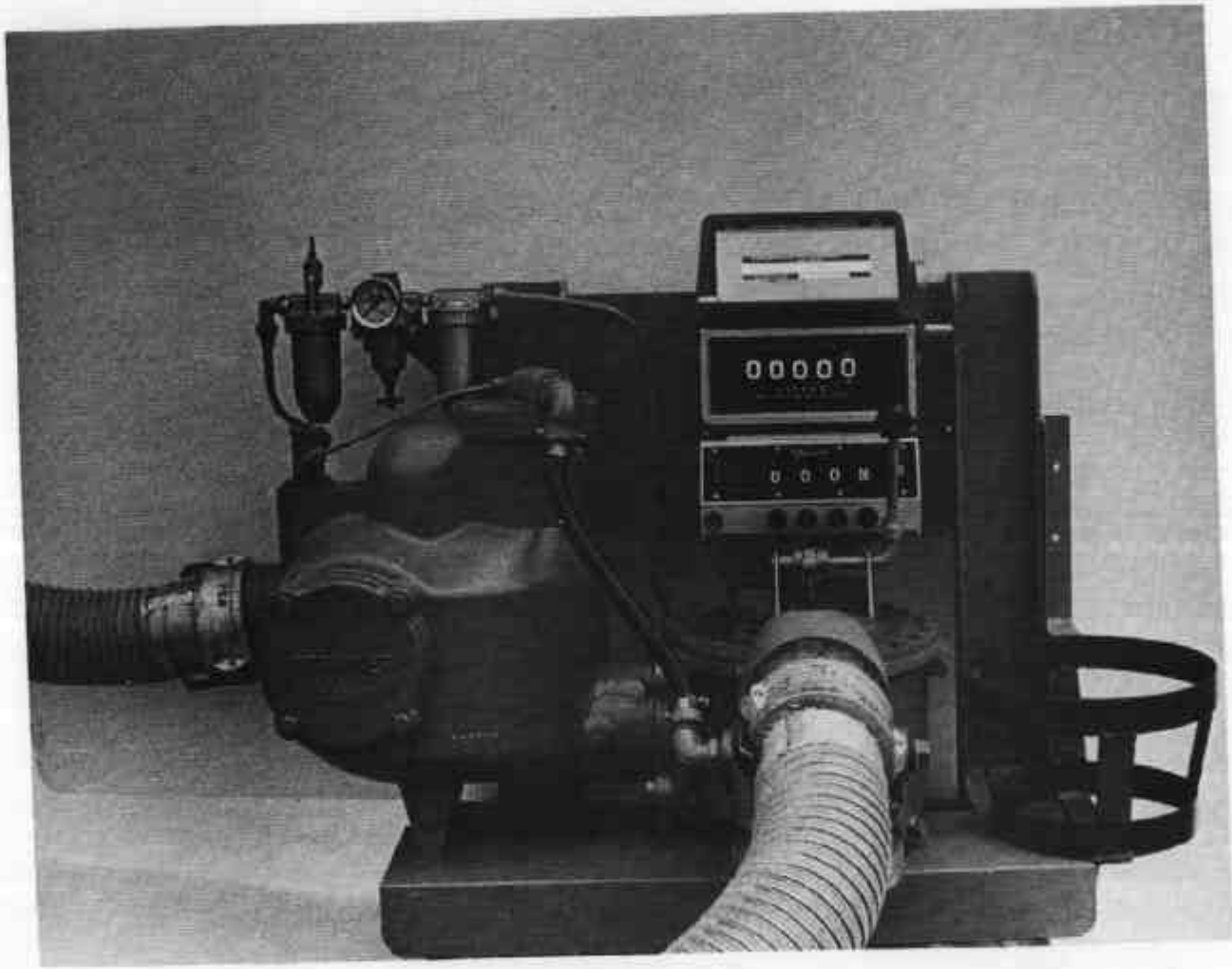
1. The instrument should be tested with the liquid for which it will be used and which is marked on the instrument data plate.

2. The non flow-dependent errors are 1 litre if a ticket printer is fitted, 0,2 litre if only an indicator is fitted, and up to 1,5-litre gas-purging error which will occur when the supply tank runs dry during a delivery or when the pipe between the meter and the supply tank is dry at the start of a delivery.

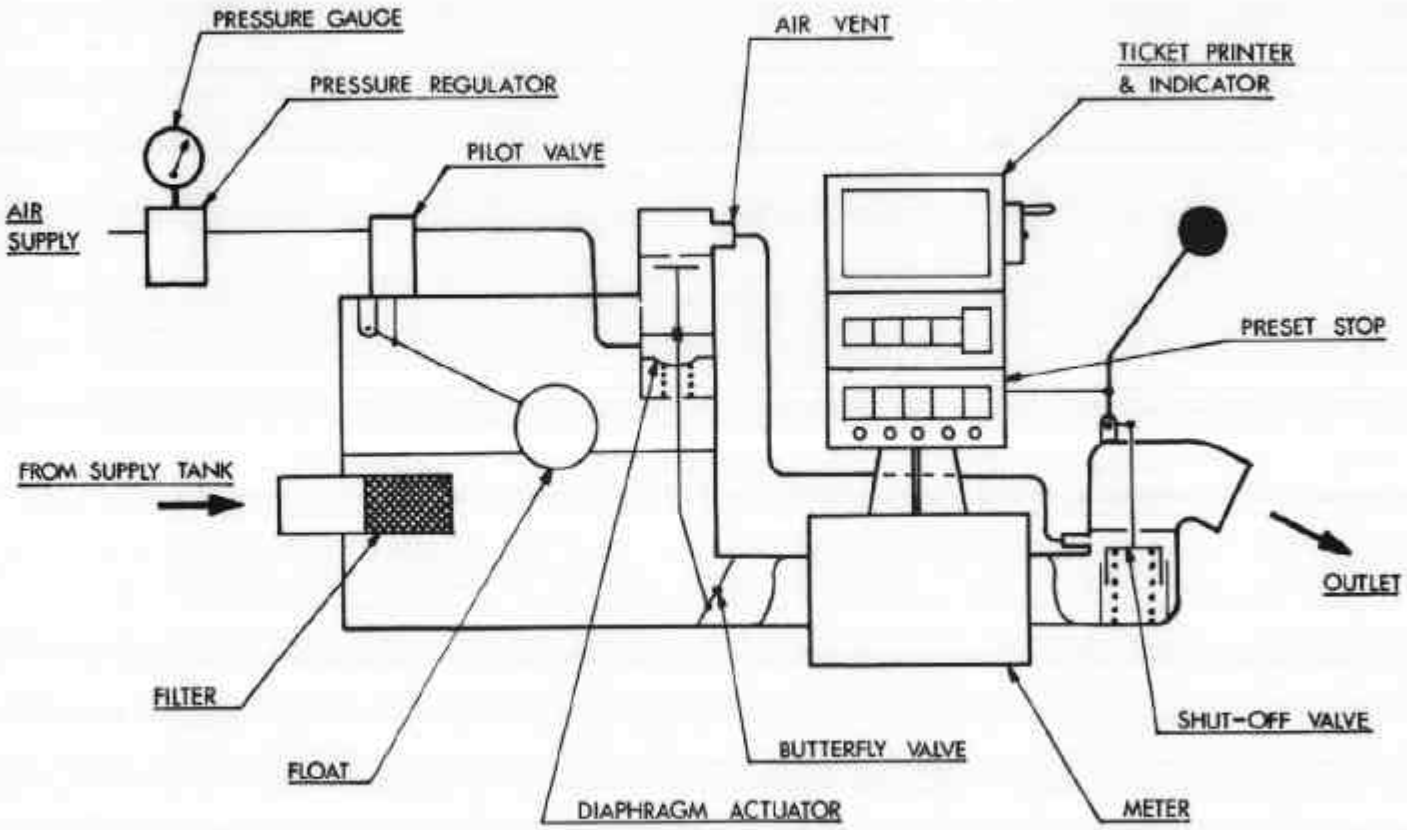
   The minimum delivery for which the relative error from all sources, including the 1,5-litre gas-purging error, would not exceed 1,5% is 200 litres.

3. Gas purging — The effect of gas on the quantity delivered should not exceed 1,5 litres when the pipe between the meter and the supply tank is allowed to run dry during a delivery, or allowed to run dry during a delivery and the delivery continued by, for example, changing supply tanks. To test this it will be necessary to allow the supply tank to run dry during a test delivery and to refill or change the supply tank to allow the delivery into the proving measure to be completed.

FIGURE 5/6D/22 - 1

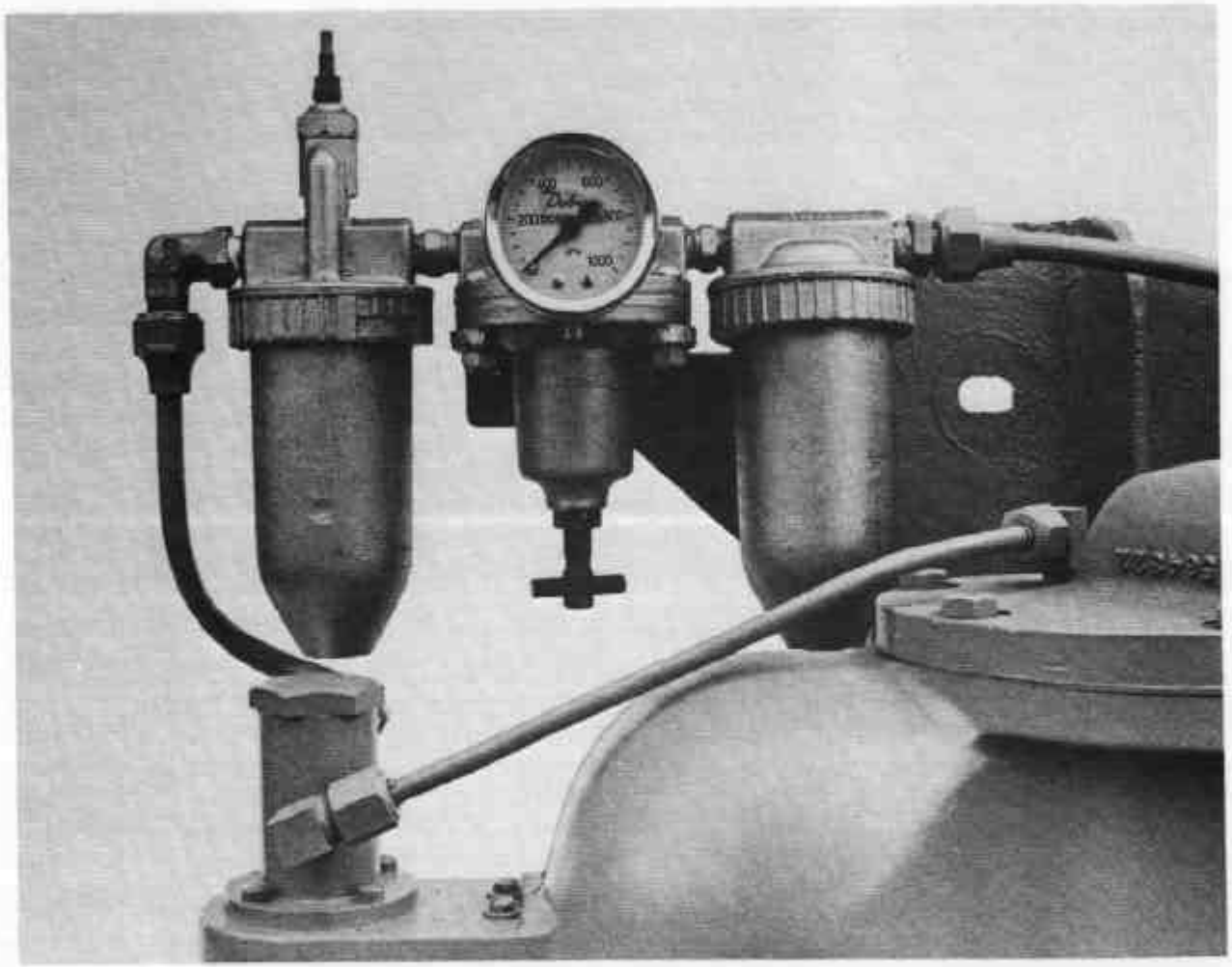


T40 Flowmeter



T40 Flowmeter — Schematic Diagram

FIGURE 5/6D/22 - 3



Air Regulator

FIGURE 5/6D/22 - 4

Veeder-Root 7085 Indicator, Preset Stop and G4 Valve

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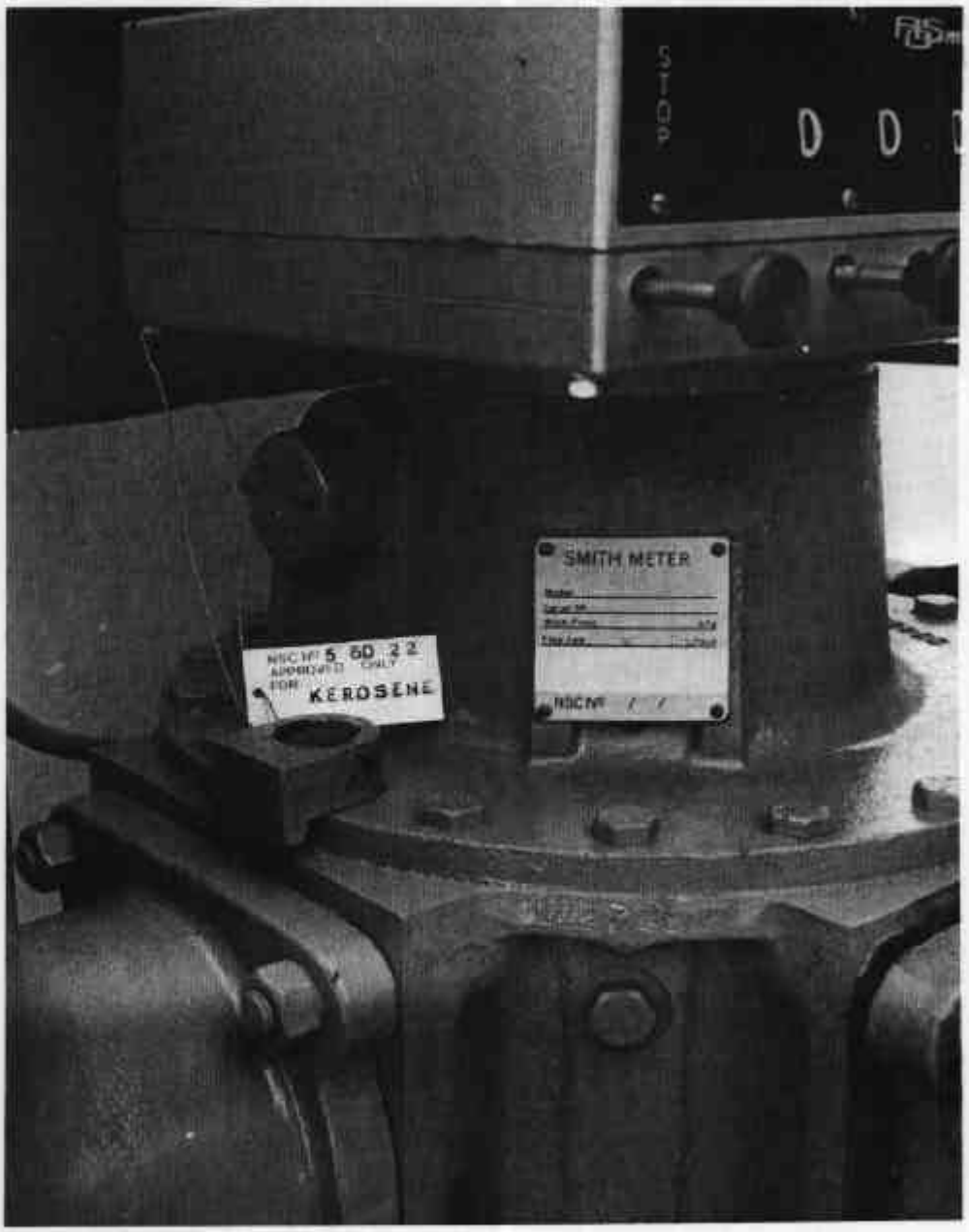
FIGURE 5/6D/22 - 5



A Method of Sealing

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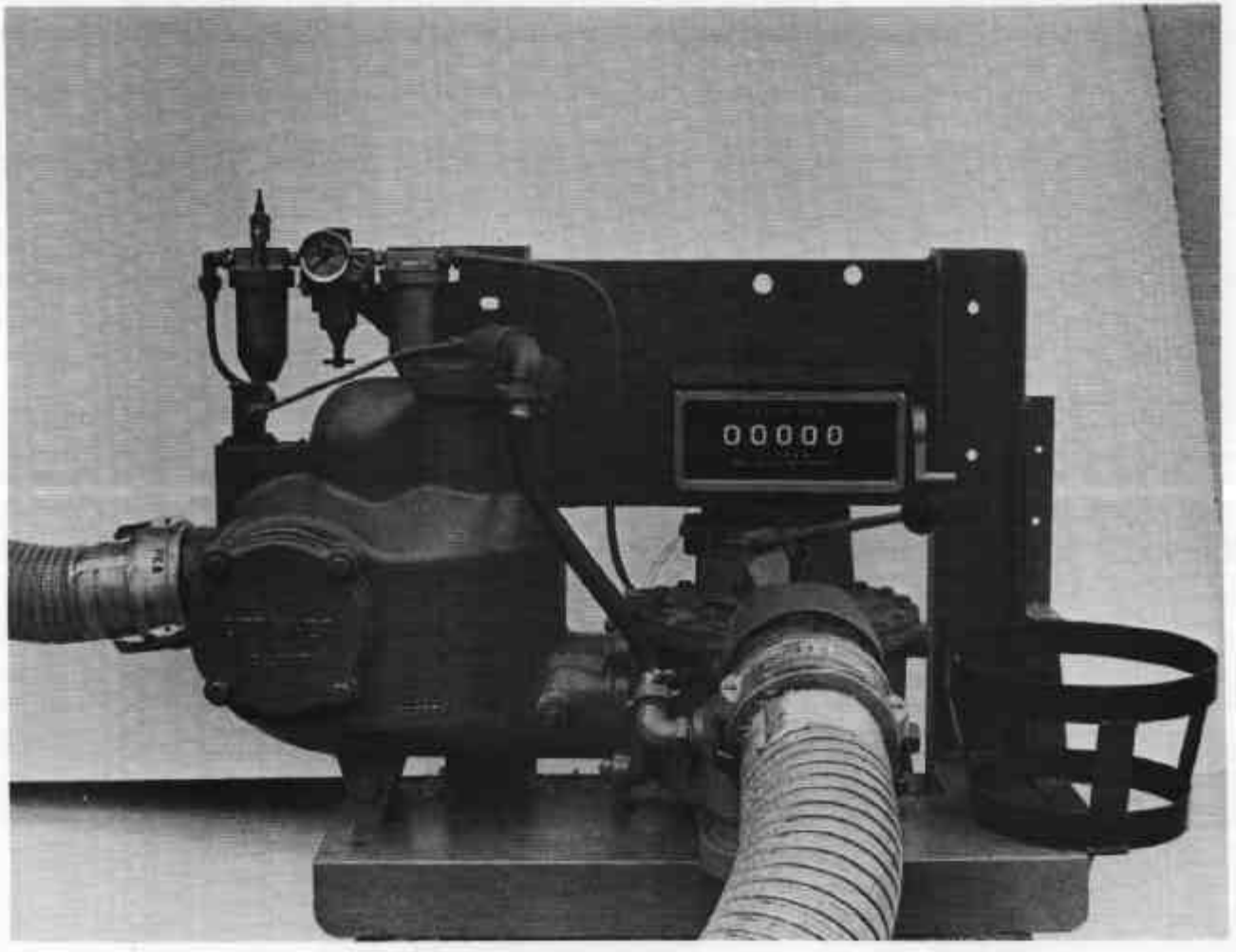
FIGURE 5/6D/22 - 6



T40 Flowmeter with VR 1624 Indicator