Correspondence: Executive Officer
P.O. Box 282 NORTH RYDE
N.S.W. 2113
Telegrams: NATSTANCOM SYDNEY
Telephone: 888 3922

CERTIFICATE OF APPROVAL No 6/14D/4

VARIATION No 1

This is to certify that the following modification of the pattern of the

Avery ELY Belt Conveyor Weighing Instrument

approved in Certificate No 6/14D/4 dated 28 May 1973

submitted by Avery Australia Ltd,
3-5 Birmingham Avenue,
Villawood, New South Wales, 2163,

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

Date of Approval: 28 July 1976

The approval, described in Technical Schedule No 6/14D/4 - Variation No 1 and in drawings and specifications lodged with the Commission, provides for an additional instrument Serial Number 76/0/7066 located at Geraldton, Western Australia.

The instrument conforming to this approval shall be marked with the approval number "NSC No 6/14D/4".

Approval is granted on condition that:

1. The headwork remains sealed until the instrument has operated within tolerance and without adjustment for a continuous period of twelve months during which the Weights and Measures Authority test the instrument at three-monthly intervals.

2. The effect of ambient temperature changes does not cause the maximum error at any flow rate from 33⅓% to 100% of full-flow rate to be more than the maximum permissible error, that is, 0,5% at verification and 1% in service.

3. Any modification relating to the temperature sensitivity of the clutch or other mechanisms required by the Commission will be made by the submittor.

4. The conveyor belt is of a uniform weight per metre, that is, of single construction without repaired or replaced sections.

5. The service period is three months.

6. Satisfactory test facilities for pre or post-weighing the material used for testing the belt conveyor weighing instrument are provided.

Signed

Executive Officer

16/8/76

CANCELLED

COMMONWEALTH OF AUSTRALIA

NATIONAL STANDARDS COMMISSION

Weights and Measures (National Standards) Act 1960-1966

Weights and Measures (Patterns of Instruments) Regulations

Certificate of Approval

CERTIFICATE NUMBER 6/14D/4

This Certificate replaces Certificate No 6/14D/4 dated 19 June 1972. *

In respect of the pattern of

Avery ELY Belt Conveyor Weigher and Variants.

Submitted and manufactured by:

Avery Australia Ltd,
3-5 Birmingham Avenue,
Villawood,
New South Wales. 2163.

This is to certify that the pattern and variants 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.

Approval for the pattern and variants was granted, on a restricted basis, on 13 June 1972, subject to modification at the Commission's discretion.

Approval was granted for an increase in the pattern's capacity from 1000 to 1200 tons per hour on 23 May 1973.

* NOTE: Figures 6/14D/4 - 1 to 9 of the previous issue form part of the Certificate and must be retained.

28/5/73

Cont'd over

The pattern and variants are marked "NSC No 6/14D/4" and comply with the requirements of the General Specifications for Measuring Instruments to be Used for Trade, waiving those requirements regarding positive and negative integration and temperature stability.

The approval is limited to two instruments, Serial No 67-0-4176 located at CS & BP, Kwinana, and Serial No 71-0-5245 located at Western Titanium, Bunbury, Western Australia.

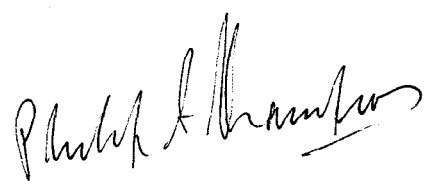
The instruments are limited to a service period of three months and are to be tested in accordance with the test procedure described in this Certificate.

This Certificate comprises:

Pages 1 to 5 dated 28 May 1973.
Figures 6/14D/4 - 1 to 9 dated 19 June 1972.

Date of issue 28 May 1973.

Signed



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

DESCRIPTION OF PATTERN

The pattern (see Figure 1) is of a belt conveyor weigher which totalizes in discrete intervals the load carried on the belt. It comprises a weigh-frame suspended from levers supported on a framework, a spring resistant and a totalizing mechanism; the weigh-frame is used as part of the belt support. The total weight indicated is the sum of the weights registered on each successive weigh-length.

The lever system (see Figure 1) consists of two first-order main levers and a first-order transfer lever. The main and fulcrum knife-edges fit into machined grooves in the levers and are held in position by set bolts which pass through the levers.

The load and fulcrum bearings are all self-aligning. The fulcrum bearings are fitted to fulcrum stands fixed to the top of the framework (see Figure 2). The load bearings are fitted to long swinging links. The weigh-frame is suspended from the levers on the long links and is provided with stays to prevent longitudinal or transverse movement (see Figure 1).

The headwork, which is also mounted on the framework, comprises an intermediate balancing lever and an Avery CLA double-spring-resistant mechanism similar to the single-spring-resistant mechanism described in Certificate No 6/9C/10, to which is fitted a totalizing mechanism. The dial, which indicates the full-scale deflection of the resistant, is used for initial calibration purposes, for setting zero and to indicate the flow rate (see Figure 3). The headwork is sealed.

A belt-speed transmitter is mounted on the weigh-frame and is driven by a pulley in contact with the underside of the loaded belt. The transmitter is electrically coupled to a synchronised slave motor in the headwork where, through a train of gears, it rotates a pair of contact wipers at the rate of one revolution per weigh-length of the belt (see Figures 4, 5 and 6). The contact wipers are connected to an electronic control unit through a pair of slip-rings and brushes.

A fine wire contact is mounted on an extension of the flow-rate indicator spindle and another is mounted on the gear-train framework above the wiper contacts (see Figure 7). Each fine wire makes contact with one of the rotating contact wipers.

28/5/73

On an extension of the intermediate shaft of the gear train an electric clutch is mounted, which drives the input shaft of a second gear train. This input shaft is fitted with an electric brake (see Figures 6 and 7). The second gear train drives an analogue indicator wheel and a semi-digital numerical indicator (see Figure 8).

The contact wipers driven by the first gear train control the clutch and the brake between the two gear trains by means of an electronic control unit (see Figure 9). When the circuit is closed the control unit causes the brake to be released and the clutch to engage almost simultaneously; the opposite occurs when the circuit re-opens. With the circuit closed, the second gear train turns the analogue totalizer wheel until the circuit is re-opened.

The angular displacement between the two fine wires is directly proportional to the load on the weigh-frame and determines the amount added to the totalizer each revolution of the wiper contacts, that is, per weigh-length.

In the event of clutch or brake failure, an interlock stops the belt and an alarm is sounded. The belt-drive motor is not reversible.

Because there is a time delay in brake and clutch operation, the pattern cannot totalize in the zero-load region. Therefore, to prevent damage to the clutch, a fine wire cut-out stops the totalizing mechanism below 2% maximum capacity.

Because the pattern cannot integrate in the vicinity of zero load, zero-load setting is obtained as directed by an inscription on the dial face (see Figure 3), which reads:

> "Set zero by adjusting the balancing lever so that the estimated mean position of the flow-rate indicator at no load is zero, for a period of not less than 10 minutes.
>
> Do not use totalizer for checking zero."

The pattern is approved for use between $33\frac{1}{3}\%$ and 100% capacity. The flow-rate indicator is marked by a red line between 0 and $33\frac{1}{3}\%$ capacity and an inscription which reads "not to be used in the range indicated by the red line" (see Figure 3).

The capacity of the pattern is 1200 tons per hour with a belt speed of

430 ft/min. The response time of the weigher is 0.5 seconds and the graduation value on the totalizer indicator is 0.01 ton.

DESCRIPTION OF VARIANTS

Having other capacities up to 1200 tons per hour and belt speeds up to 480 ft/min.

GENERAL NOTES

Test Procedure

1. Set zero in manner described in Certificate.

2. Apply small loads to weigh-frame until totalizer starts to operate. (This should not operate below 2% maximum flow rate.) Remove weights.

3. Apply test load at 33⅓% maximum capacity, of at least 2000 totalizer increments, three times.

4. Checkweigh* each load.

   Amount totalized should be within ± 0.5% of actual load.

5. Repeat 3 and 4 at 60 and 100% maximum capacity.

General

1. By decision of the 10th Formal Conference of Weights and Measures Authorities, the requirement for integration is waived because previous State approvals of this pattern were issued before such requirements were applied in pattern approval examinations.

2. The pattern has not been tested for temperature stability, because the instruments installed at Kwinana and Bunbury are located in conditions where the ambient temperature is reasonably stable.

---

* The checkweigher should be an instrument which has been accurately calibrated within ± 0.1% at the test load.

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 6/14D/4

VARIATION No 1

Pattern: Avery ELY Belt Conveyor Weighing Instrument

Submittor: Avery Australia Ltd,
3-5 Birmingham Avenue,
Villawood, New South Wales, 2163.

Date of Approval of Variation: 28 July 1976

The modification described in this Schedule applies to the patterns described in Certificate No 6/14D/4 dated 28 May 1973.

Conditions of Approval:

1. The headwork remains sealed until the instrument has operated within tolerance and without adjustment for a continuous period of twelve months during which the Weights and Measures Authority test the instrument at three-monthly intervals.

2. The effect of ambient temperature changes does not cause the maximum error at any flow rate from 33⅓% to 100% of full-flow rate to be more than the maximum permissible error, that is, 0,5% at verification and 1% in service.

3. Any modification relating to the temperature sensitivity of the clutch or other mechanism required by the Commission will be made by the submittor.

4. The conveyor belt is of a uniform weight per metre, that is, of single construction without repaired or replaced sections.

5. The service period is three months.

6. Satisfactory test facilities for pre or post-weighing the material used for testing the belt conveyor weighing instrument are provided.

7. The instrument conforming to this approval is marked with the approval number "NSC No 6/14D/4".

Description:

The approved modification provides for an additional instrument

Serial Number 76/0/7066 located at Geraldton, Western Australia. The maximum flow rate (Q Max) is 1200 $t.h.^{-1}$, the belt speed (V) is 2,38 $m.s.^{-1}$, the weigh length (L) is 9 m and the maximum capacity of the weighing unit (Max) is 140 $kg.m^{-1}$.

The instrument is marked adjacent to the totalizer:

Q Max	=	1200 $t.h.^{-1}$
Min	=	10 t
d	=	0,01 t
V	=	2,38 $m.s^{-1}$
L	=	9 m
Max	=	140 $kg.m^{-1}$

Special Tests:

1. With no load on the belt, set zero by adjusting the balancing lever so that, when estimated over the whole of a period of operation equal to that which would give minimum delivery at 33⅓% flow rate (providing this is not less than 10 minutes, or the time for one complete belt circuit), the mean position of the flow-rate indicator is zero. Do not use the totalizer for checking zero.

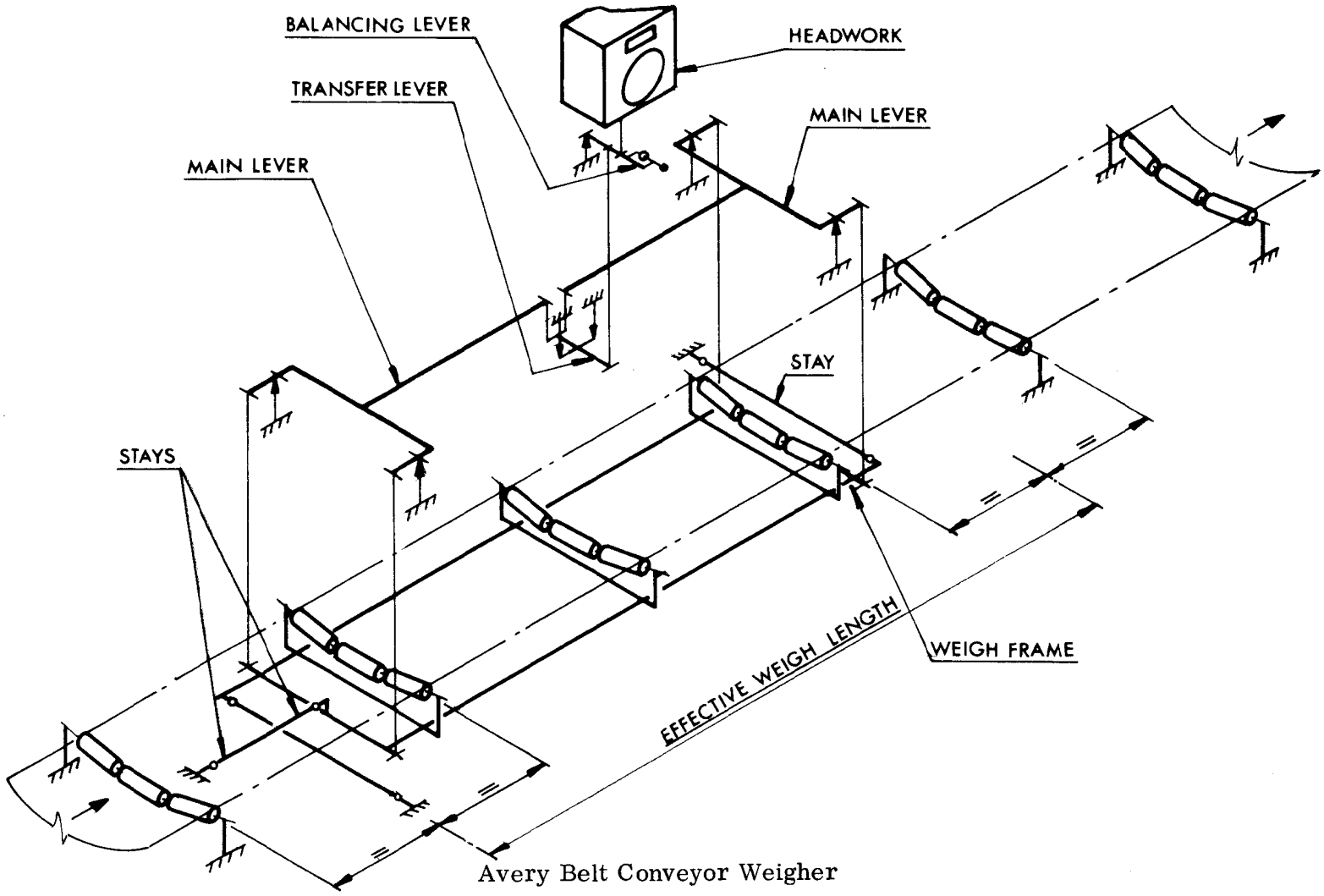
2. After the instrument has been adjusted to zero at no load, the maximum error either positive or negative, when tested with a "live load"* equal to the minimum delivery, shall not be more than 0,5% at initial verification and 1% in service.

   Not less than three tests should be done at each of the following flow rates:

   100%, 80%, 50%, and 33⅓% of Q Max

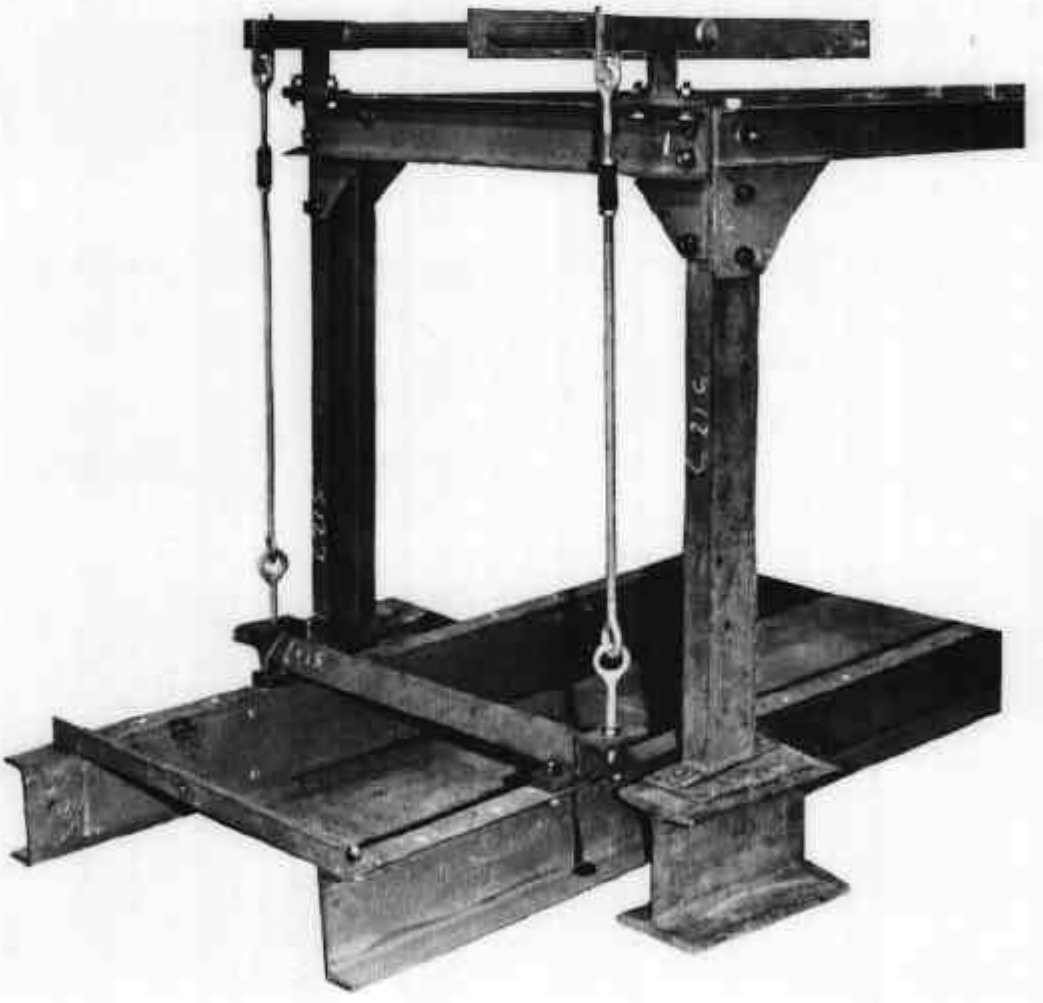
* The checkweigher should be an instrument which has been accurately calibrated within ± 0,1% of the test load.

FIGURE 6/14D/4 - 1



Avery Belt Conveyor Weigher

FIGURE 6/14D/4 - 2



Fulcrum Stands and Weigh-frame Suspension

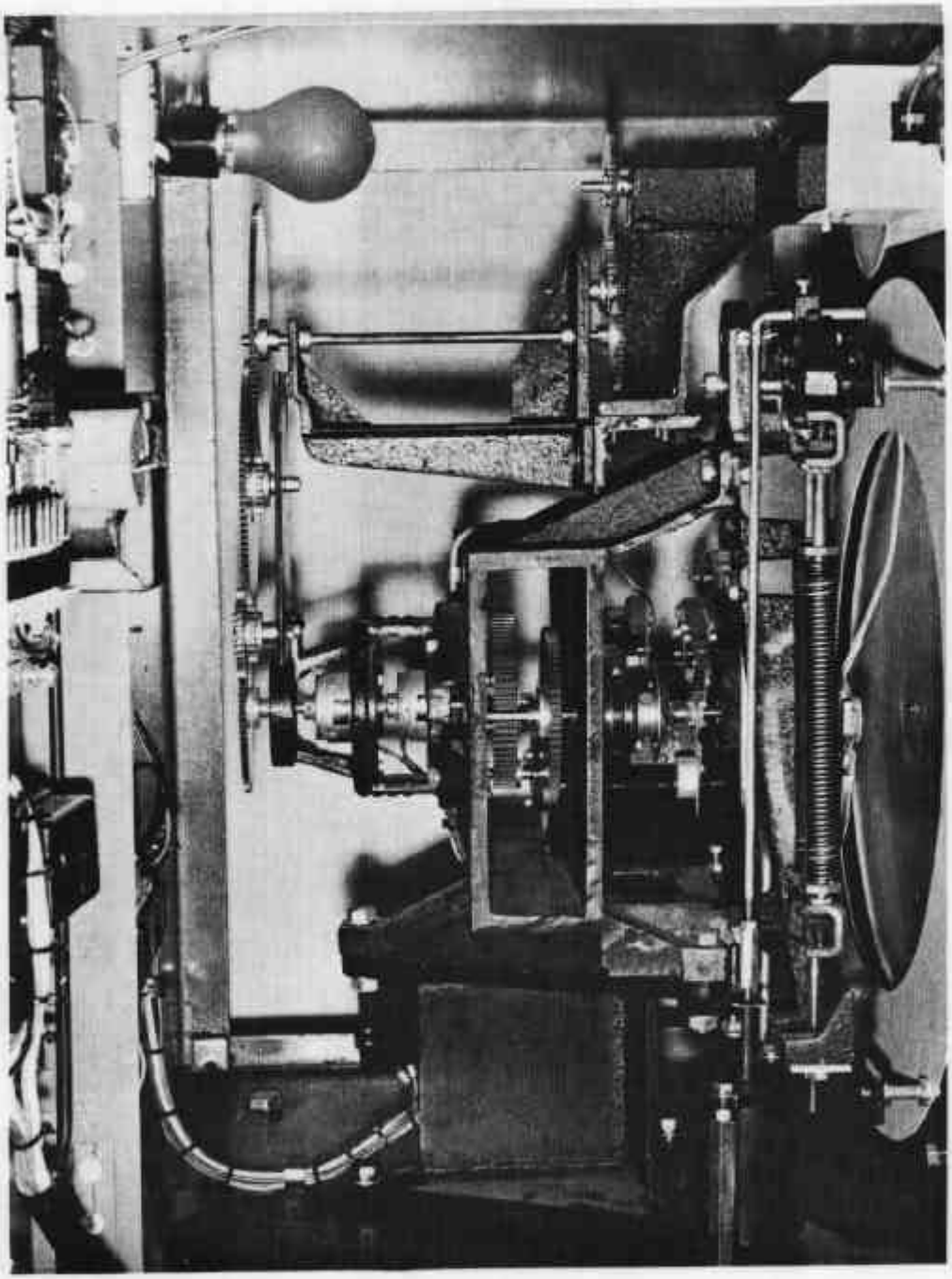
19/6/72

FIGURE 6/14D/4 - 3

The Headwork

19/6/72

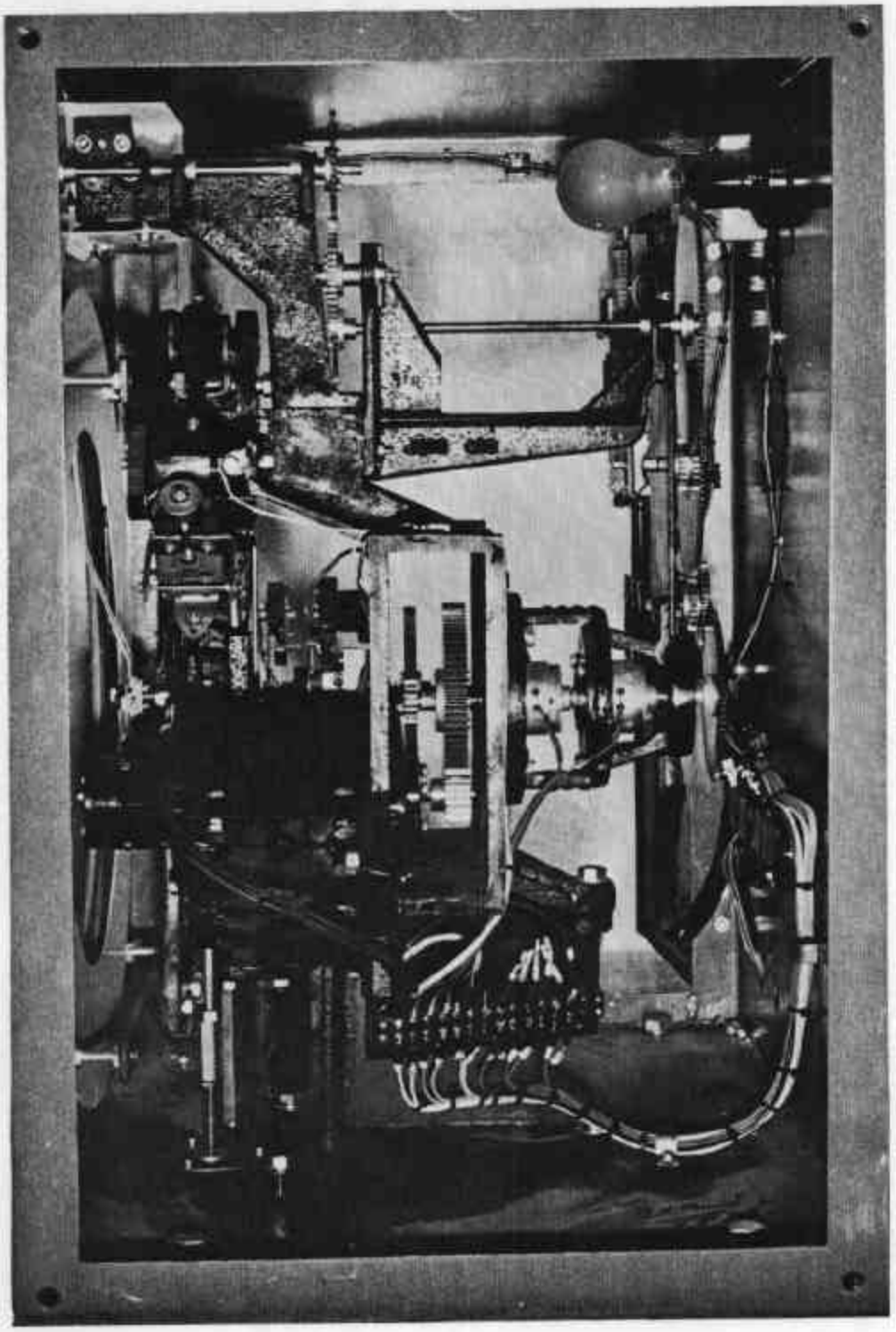
FIGURE 6/14D/4 - 4



Headwork Mechanism — Left-hand Side

19/6/72

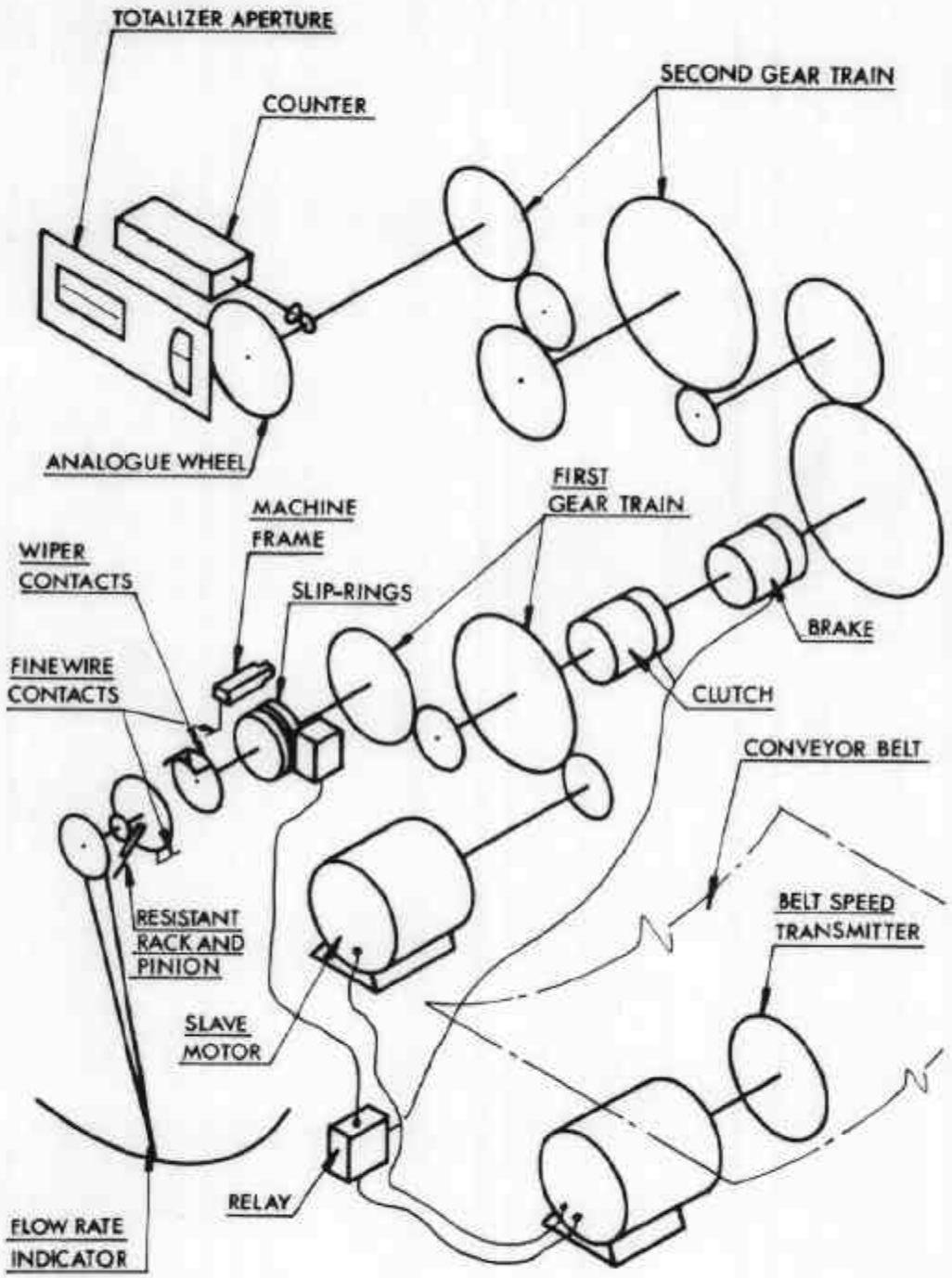
FIGURE 6/14D/4 - 5



Headwork Mechanism — Right-hand Side

19/6/72

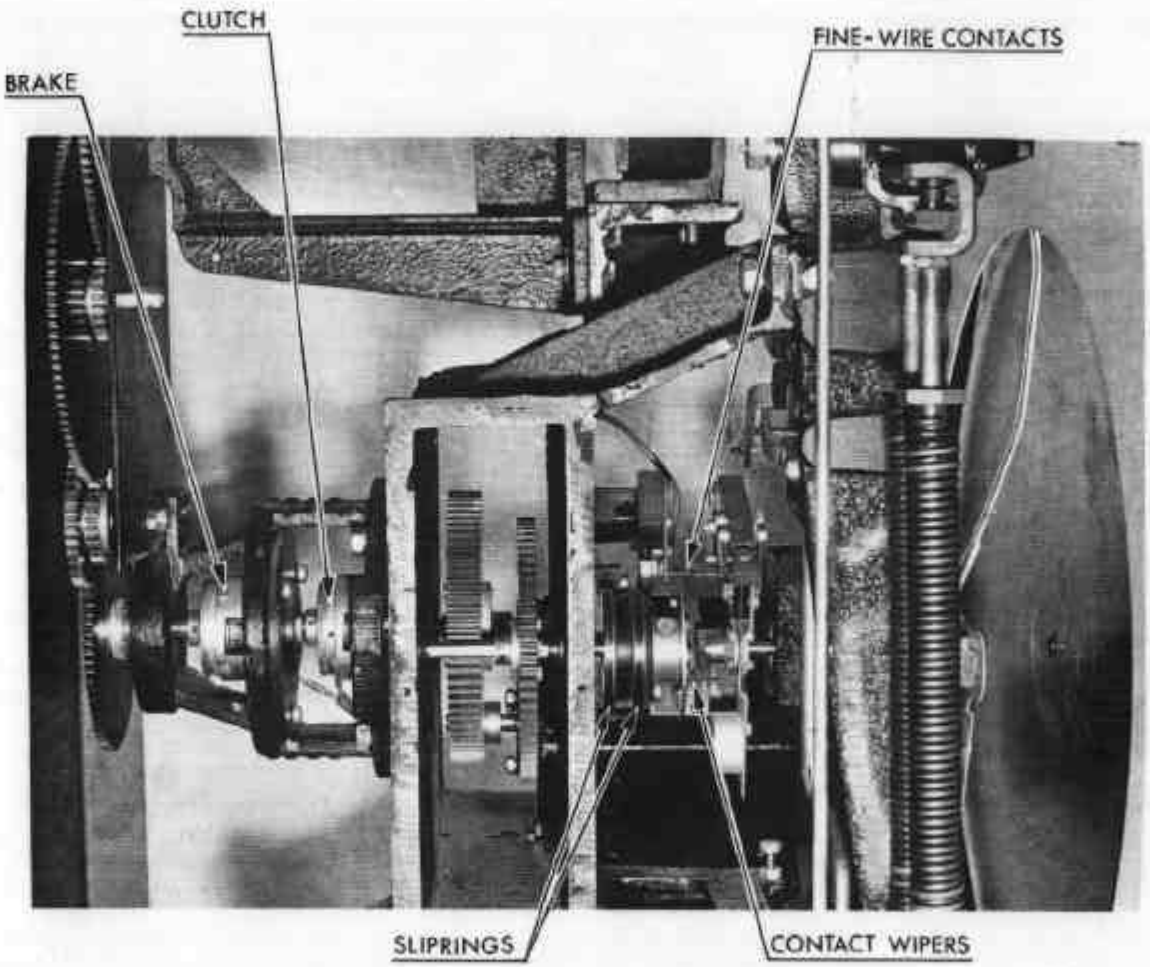
FIGURE 6/14D/4 - 6



Headwork Mechanism — Schematic Diagram

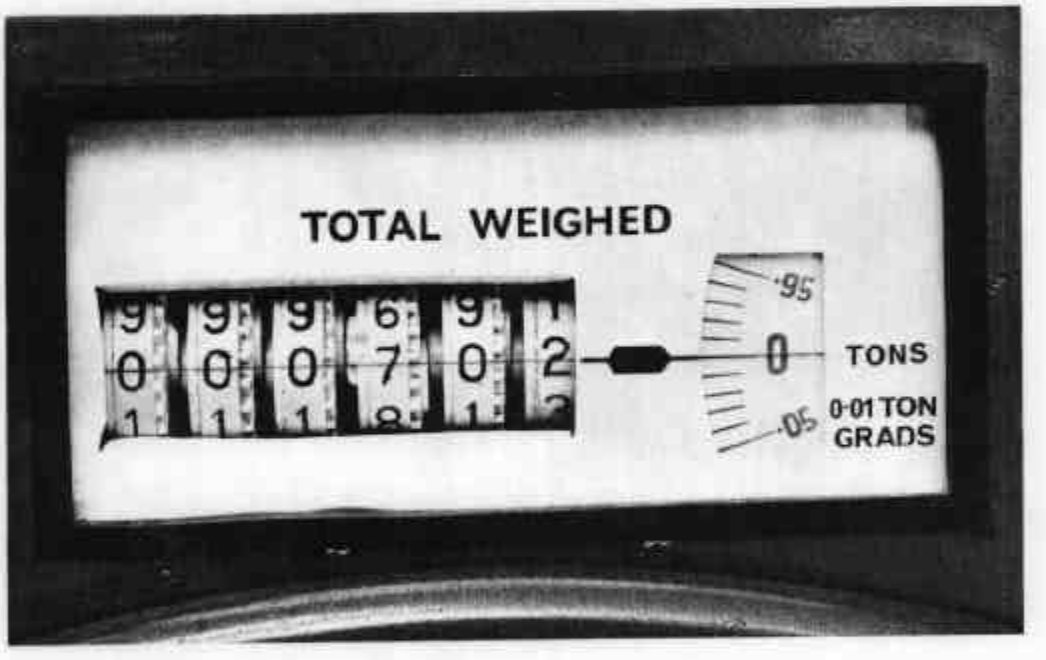
19/6/72

FIGURE 6/14D/4 - 7



Brake, Clutch, Fine-wire Contacts, Contact Wipers and Slip-rings

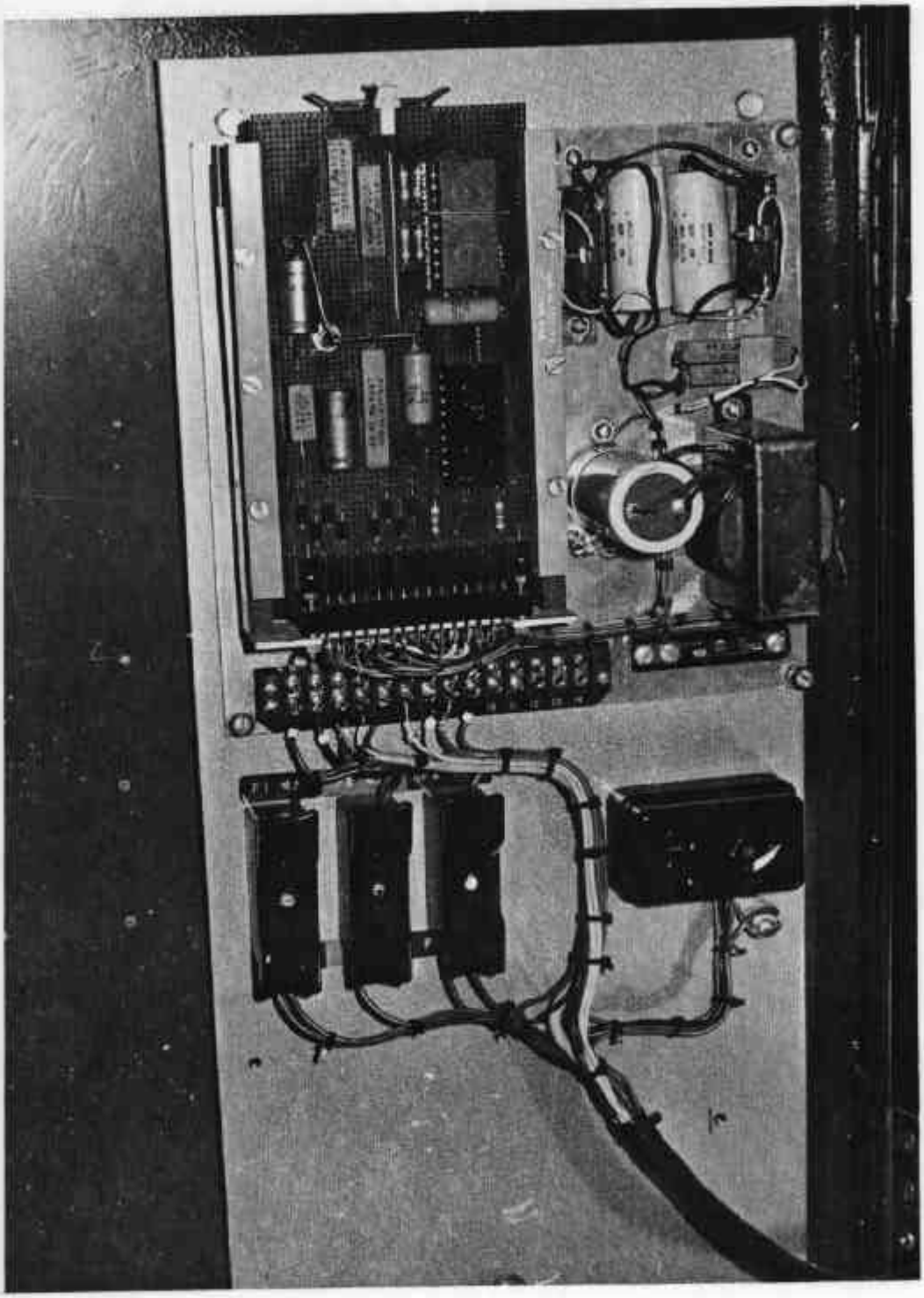
FIGURE 6/14D/4 - 8



Totalizer

19/6/72

FIGURE 6/14D/4 - 9



Electronic Control Unit

19/6/72