



CANCELLED
COMMONWEALTH OF AUSTRALIA

Cert No. 2

Weights and Measures
(National Standards)
Act 1960-1966

Weights and Measures
(Patterns of Instruments)
Regulations

NATIONAL STANDARDS COMMISSION

Certificate of Approval

CERTIFICATE NUMBER 6/10B/11

This Certificate replaces Certificate No 6/10B/11 dated 28th August 1970. *

In respect of the pattern of

Avery Self-indicating Weighing Instrument of 100-tons Capacity and Variants.

Submitted and
manufactured by: W. & T. Avery (Aust.) Pty. 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 was granted for:

1. The pattern on 8th April 1968, for various limited durations expiring on 20th January 1970;
2. Variants 1 to 5 on 17th August 1970; variant 5 was withdrawn on 23rd May 1972; and

*NOTE: Figures 6/10B/11 - 1 to 19 of the previous issue form part of the Certificate and must be retained.

3. The extension of the service period to six months on 23rd May 1972.

Approval was granted on condition that:

1. all instruments conforming to this Certificate:
 - (a) are appropriately marked NSC No 6/10B/11 and, where required by State legislation, with the State approval number also; and
 - (b) comply with the General Specifications for Measuring Instruments to be Used for Trade, in respect of that part of the instrument which was not previously approved by a State;
2. the Commission is notified[‡] of the location and serial number of the first ten instruments conforming to this Certificate, submitted to State or Territorial Weights and Measures Authorities for verification;
3. the Commission may re-examine any instrument after verification; and
4. the instruments are subject to a service period of six months.

This Certificate comprises:

Pages 1 to 6 dated 31st May 1972.

Figures 6/10B/11 - 1 to 19 dated 28th August 1970.

Pursuant to regulation 12 of the abovementioned Regulations, this Certificate is applicable in all States.

Date of issue 31st May 1972.

Signed



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

‡ Inspectors should not verify any instrument conforming to this Certificate until advised in writing by the Pattern Approval Laboratory that this condition has been complied with.

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***DESCRIPTION OF PATTERN**

The pattern is of an Avery Type 5540 DRB weighing instrument of 100-tons capacity. It comprises a seven-lever basework (see Figure 1) connected to a local spring-resistant headwork which is in turn connected through an electrical servo-system (see Figure 2) to a remote headwork with a ticket printer (see Figure 3).

The basework and local headwork

The platform, located approximately 15 feet from the remote headwork, is supported at the corners by yokes which straddle, and apply the load to, four second-order main levers (see Figure 4). The fulcrum knife-edges of the main levers are supported on bearings in swinging links (see Figure 5), which rest in rocker blocks on four pedestals (see Figures 5 and 6). The swinging links allow longitudinal motion of the platform which is restricted by buffers.

The knife-edges of the nose-ends of the main levers are connected through links and rocker blocks containing bearings to the two first-order transverse levers (see Figure 7); the transverse levers are supported on pedestals (see Figure 8) and independently coupled to the transfer lever (see Figure 9).

The transfer lever, which has its fulcrum knife-edge bearing in an inverted floor-mounted link (see Figure 10), transmits the load through a pullrod to an Avery headwork (see Figure 11) as described in Certificate No 6/9C/10. The pullrod applies the load to the main headwork lever, to which is attached a thermostatic dashpot, balance weights, a balance adjustment, and a pullrod to the CLA resistant mechanism. Four weights equivalent to 10 tons, 20 tons, 30 tons and 40 tons are electrically deposited and removed from the main headwork lever in sequence by cam levers which follow profiled cams keyed to a common cam shaft. One revolution of the cam shaft deposits weights in combinations which provide for a progressive sequence which changes the chart capacity nine times, each differing by 10 tons. The cam shaft is driven by chains through an electro-mechanical clutch from a motor unit. Ten microswitches positioned around the cam shaft

* Approval expired on 20th January 1970.

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determine the correct position for weight deposition.

An analogue generator (see Figure 12), which is a variable resistance whose output is proportional to the amount of turning of its shaft, is mounted on the local headwork indicator spindle. Its output voltage is applied to a servo-motor amplifier in the remote headwork (see Figure 2).

An electrical vibrator is mounted on the frame of the resistant mechanism and mechanically vibrates the mechanism to reduce stick due to friction.

The dial on the local headwork has 399 graduations and is marked "not in use for trade".

The remote headwork

A second analogue generator — whose output voltage is proportional to the position of the remote indicator — is mounted on the spindle of the remote indicator. Its output is applied to the servo-motor amplifier. As the voltage output of the servo-motor amplifier is proportional to the difference between the two input voltages from the two analogue generators, it is proportional to the difference in the angular position of the local and remote indicators. This output voltage is applied to a motor in the remote headwork which drives the remote indicator into synchronism with the local indicator. When both indicators are synchronised the outputs from the two analogue generators are equal, the output from the servo-motor amplifier will be zero and, therefore, the motor will stop.

A false-print protection relay and solenoid is actuated by the output of the servo-motor amplifier and prevents the printer from being operated (see Figure 13) until the output is zero, that is, until the remote indicator is in synchronism with the local indicator. A time delay is included in the relay circuit to prevent operation of the printer until the output of the servo-motor amplifier has remained at zero for 5 seconds.

The remote indicator is driven off-scale, and the false-print protection relay prevents printing, when:

- (a) a unit weight is in process of selection;

(b) a unit weight is incorrectly located; and

(c) the vibrator fails.

A constant voltage transformer provides a stabilized voltage to the analogue generators, the false-print protection relay, the servo-motor amplifier and the test key. Provision is made by a three-pin plug and socket for the insertion of a test unit to simulate supply variations, to the constant voltage transformer (see Figure 14).

A plate held by four screws covers span and balance adjustments in the remote headwork (see Figure 15). The plate is sealed in position by threading a wire through two diagonally opposite screws and securing the ends with a lead seal.

The remote weight indicator chart of capacity 9 tons 19 cwt has 199 graduations. A flash chart operated by the unit-weight selector increases the capacity by 90 tons. The unit-weight selector in the remote headwork electrically controls the deposition of unit weights in the local headwork.

*A printing disc with 399 graduations is mounted on the spindle of the remote indicator. In conjunction with the printing disc an Avery DLB ticket printer prints tickets to 99 tons 19 cwt 2 qr (see Figures 16 to 18). The ticket is illustrated in Figure 19.

The instrument has a manual test facility to verify the performance of the electrical systems. A three-position spring-loaded switch on the front of the remote headwork is labelled in the upper position "span check No 1" and in the lower position "span check No 2 reference weight 9 tons 3.5 cwt". A plate located alongside the switch is marked with the following instructions:

"TO TEST

1. Set scale to first chart range.
2. Hold key up. Adjust indicator to zero balance.
3. Hold key down. Indicator should read span check

* Approved pursuant to regulation 12.

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reference weight.

4. Release test key. Rebalance indicator to zero."

An interlock prevents the printer from being operated during the checking sequence.

DESCRIPTION OF VARIANTS

1. The pattern having the span and balance adjustment sealed by a cup-and-wire seal.
2. Variant 1 having the platform up to 300 feet from the remote headwork.
3. Having the 5540 basework connected to any other Commission-approved headwork.
- *4. Having the 5540 basework connected to any other State-approved headwork.
5. (Refer to General Notes).

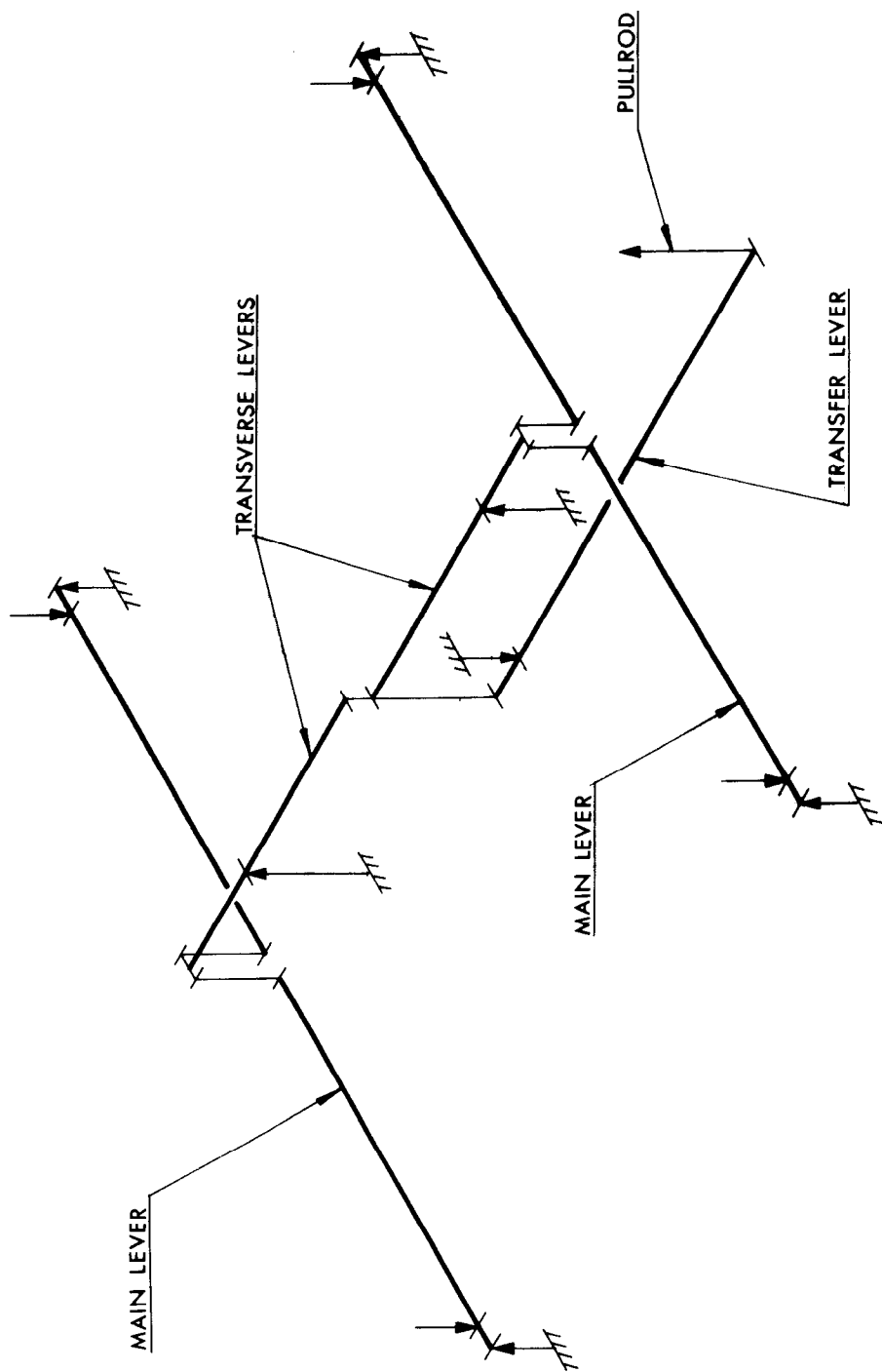
GENERAL NOTES

Variant 5, which referred to the load receptor being fitted with rails, was withdrawn because the type of fittings on a load receptor is not relevant to suitability for use for trade.

* Approved pursuant to regulation 12.

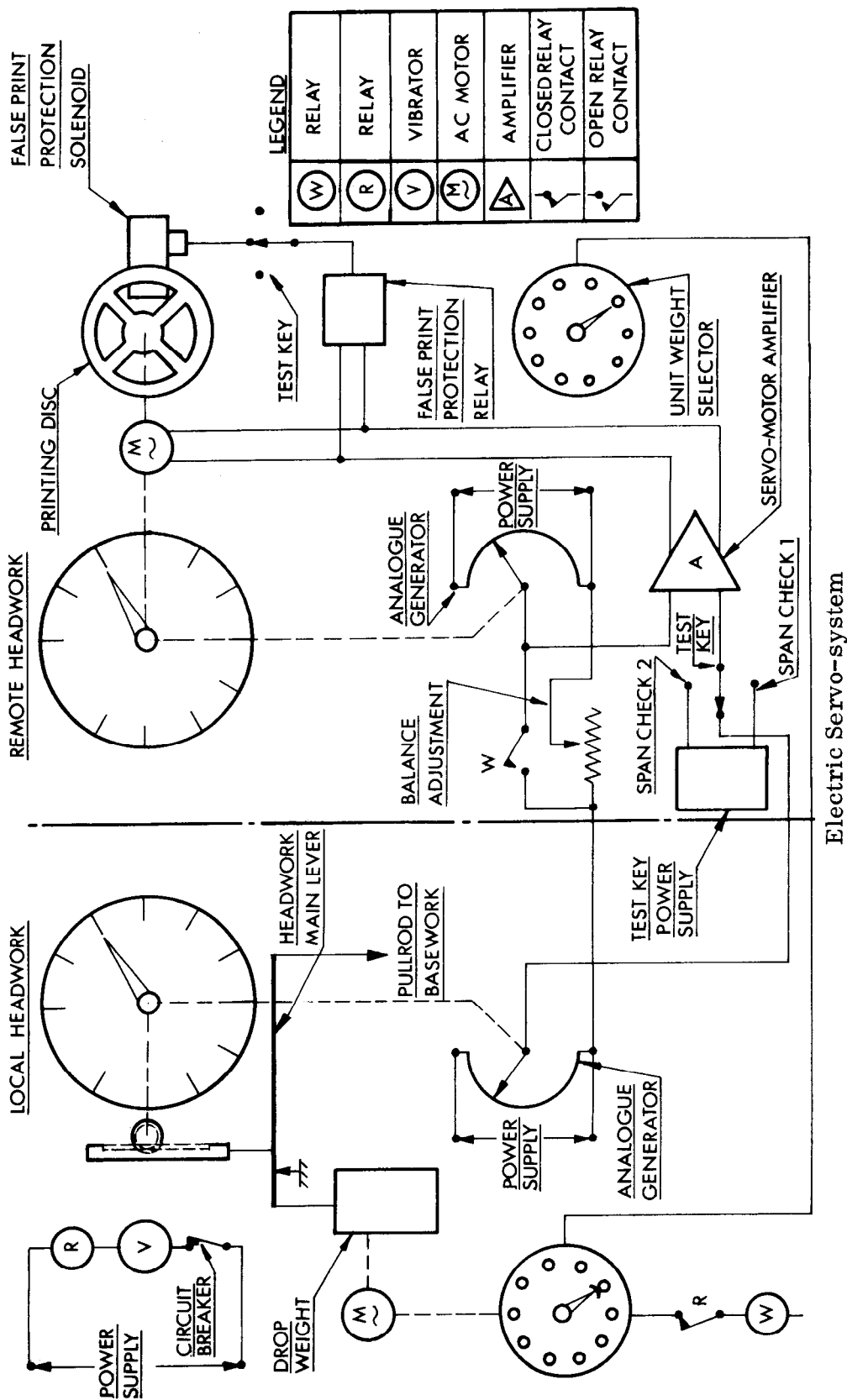
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FIGURE 6/10B/11 - 1



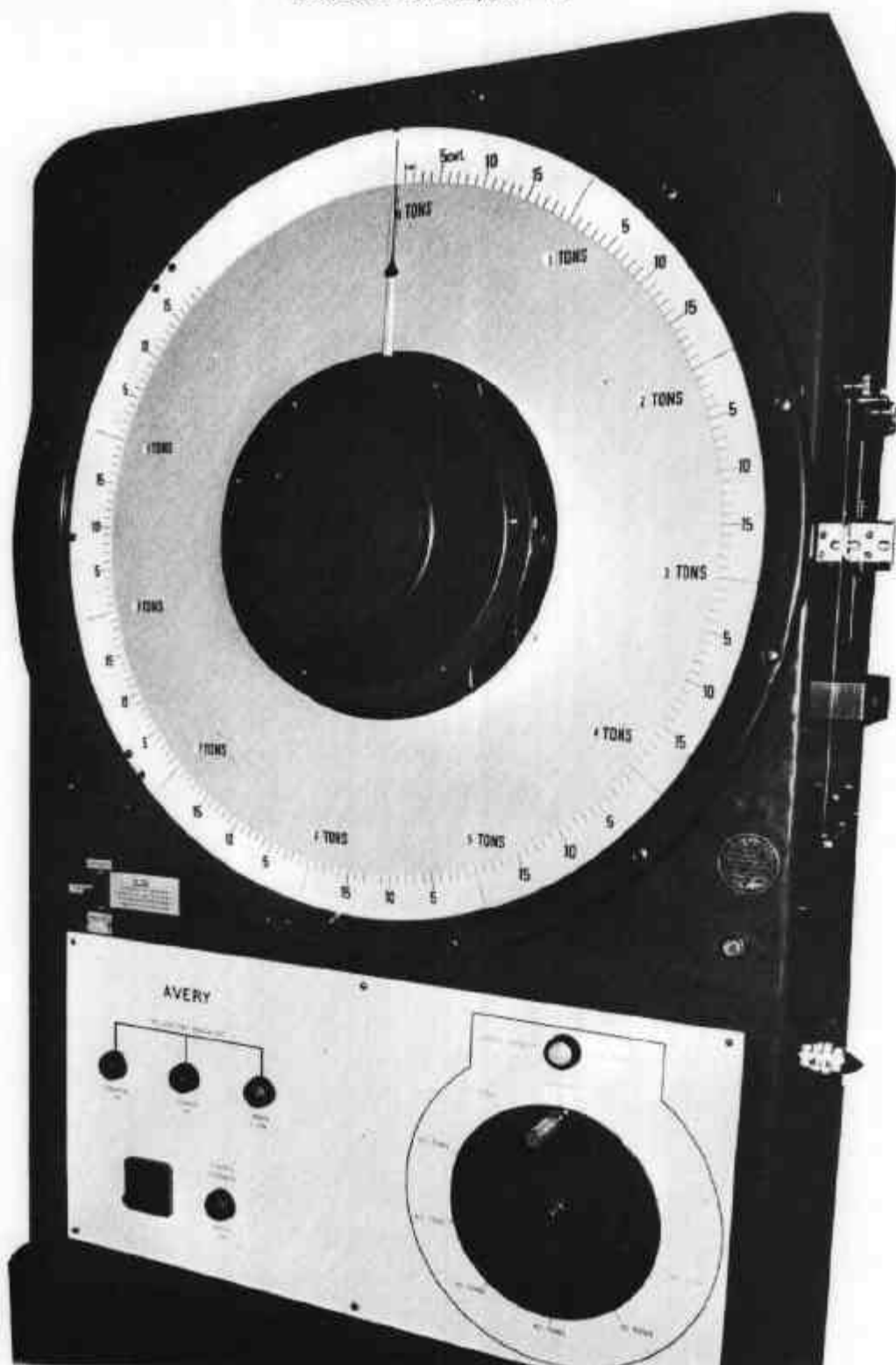
Schematic Diagram of Basework

FIGURE 6/10B/11 - 2



Electric Servo-system

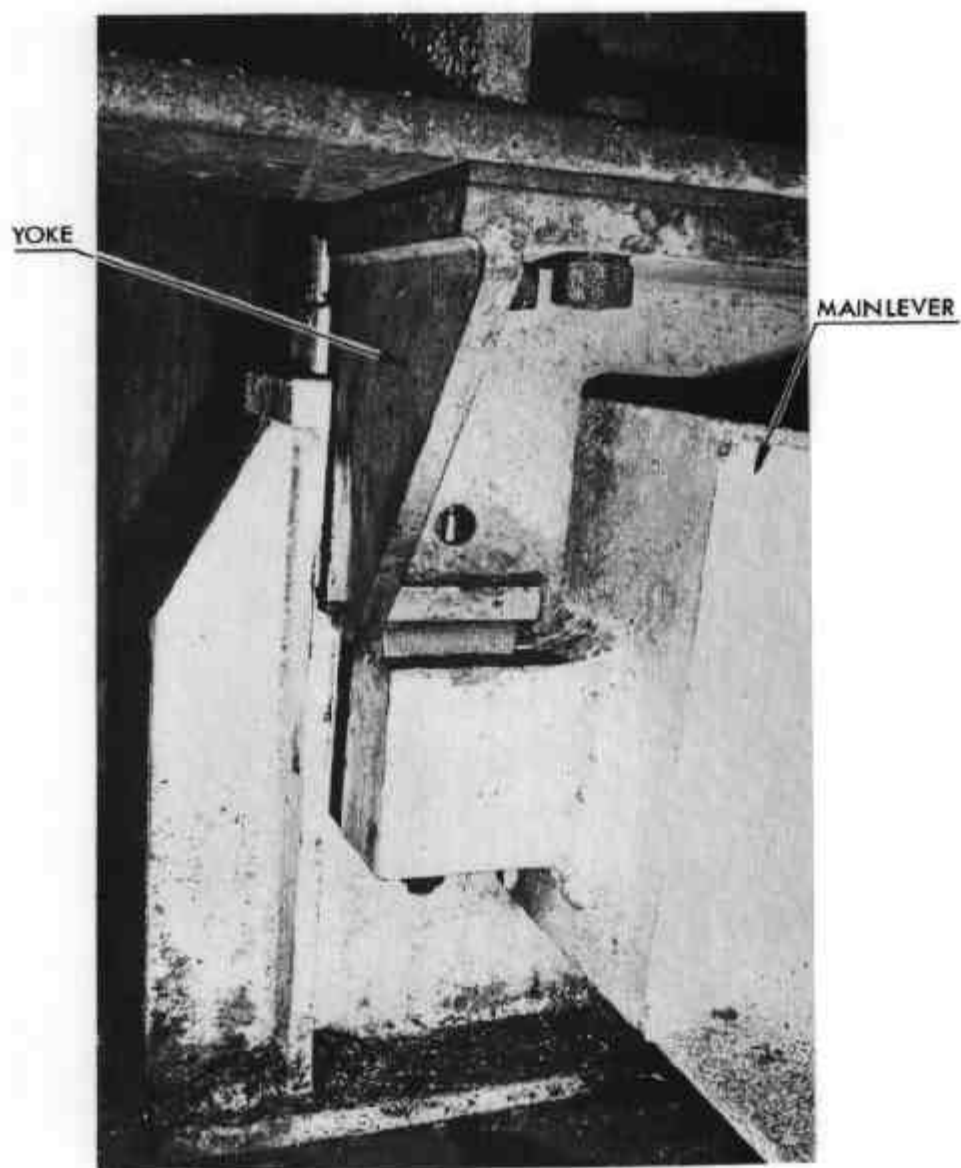
FIGURE 6/10B/11 - 3



Remote Headwork

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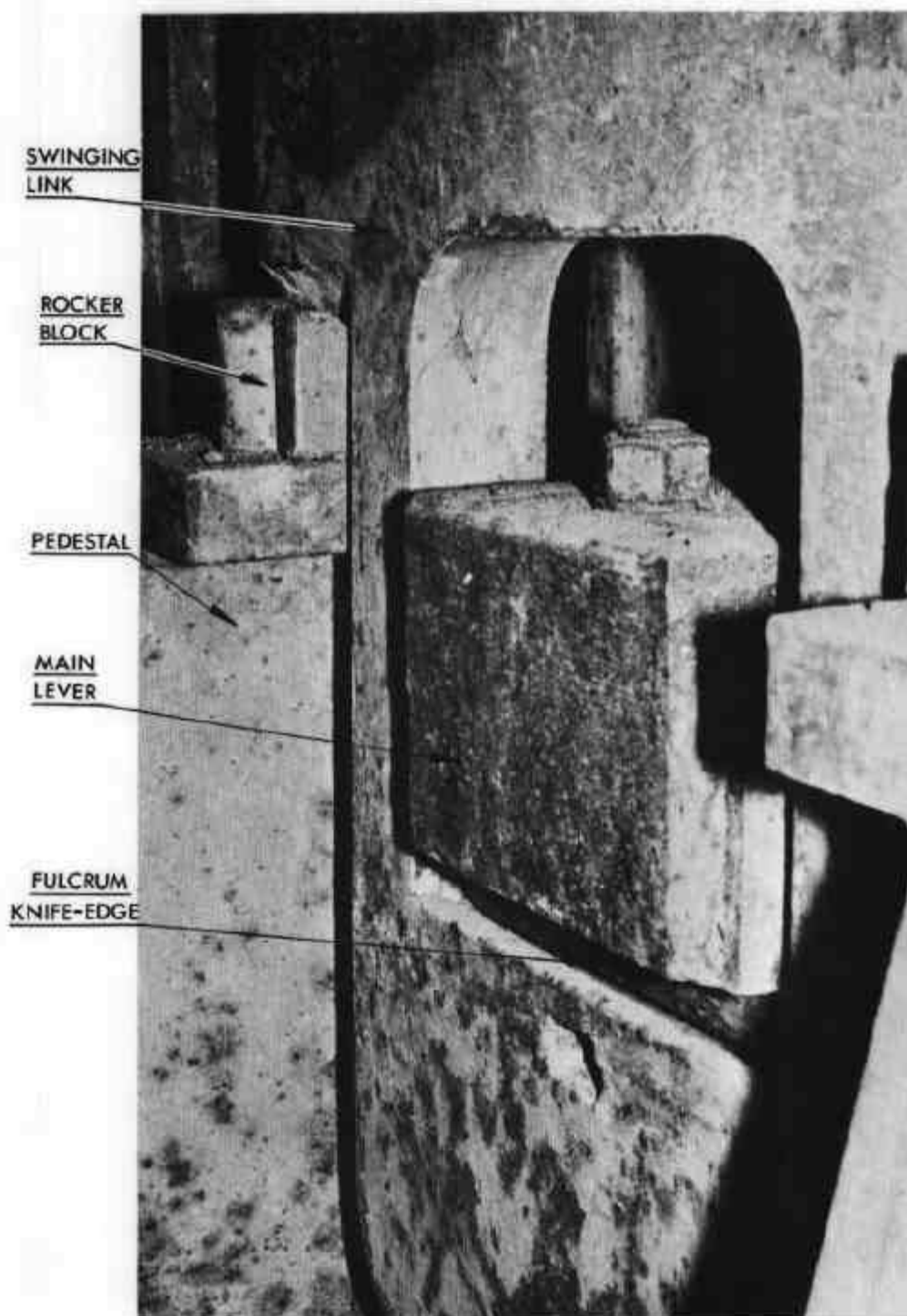
FIGURE 6/10B/11 - 4



Load Knife-edge and Yoke

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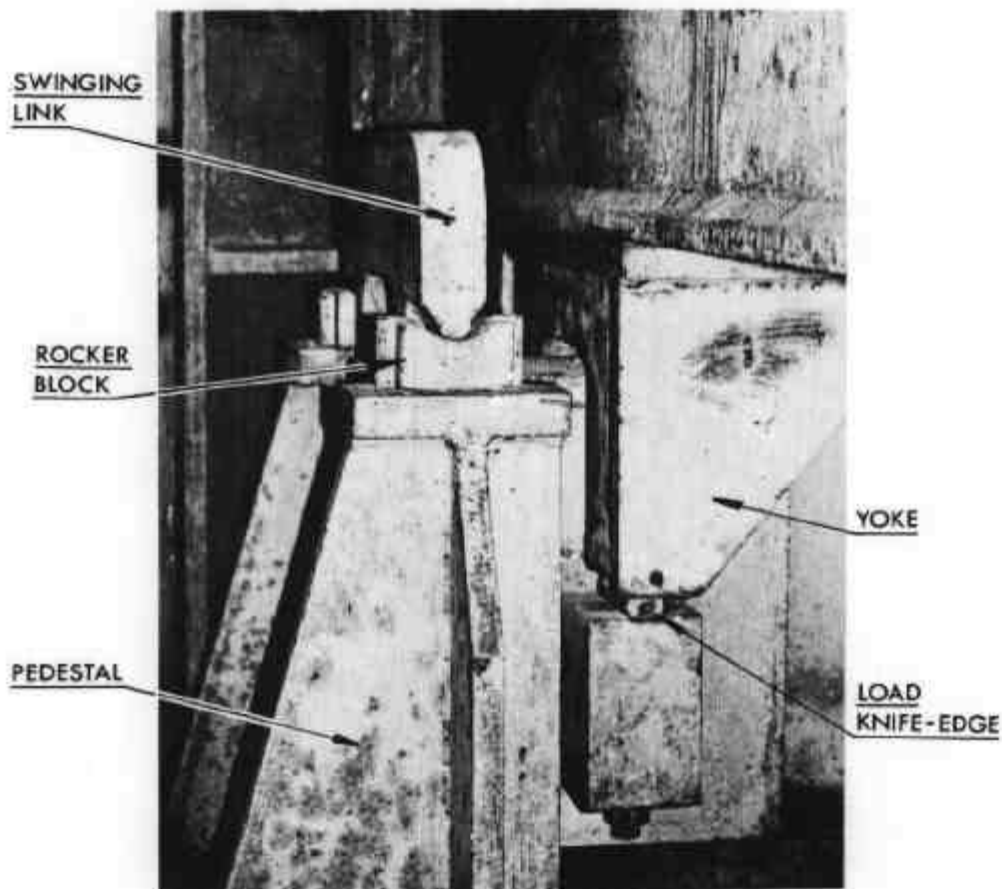
FIGURE 6/10B/11 - 5



Swinging Link and Pedestal

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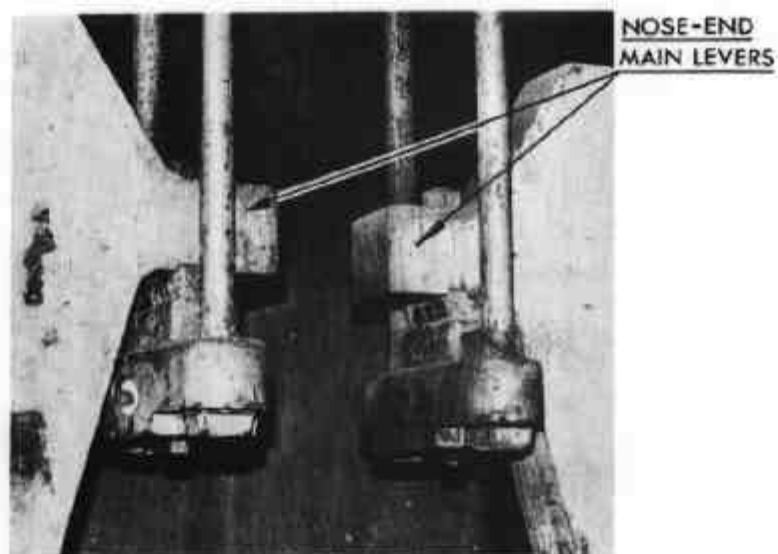
FIGURE 6/10B/11 - 6



Pedestal and Swinging Link

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FIGURE 6/10B/11 - 7



Nose-end of Main Levers and Links to Transverse Lever
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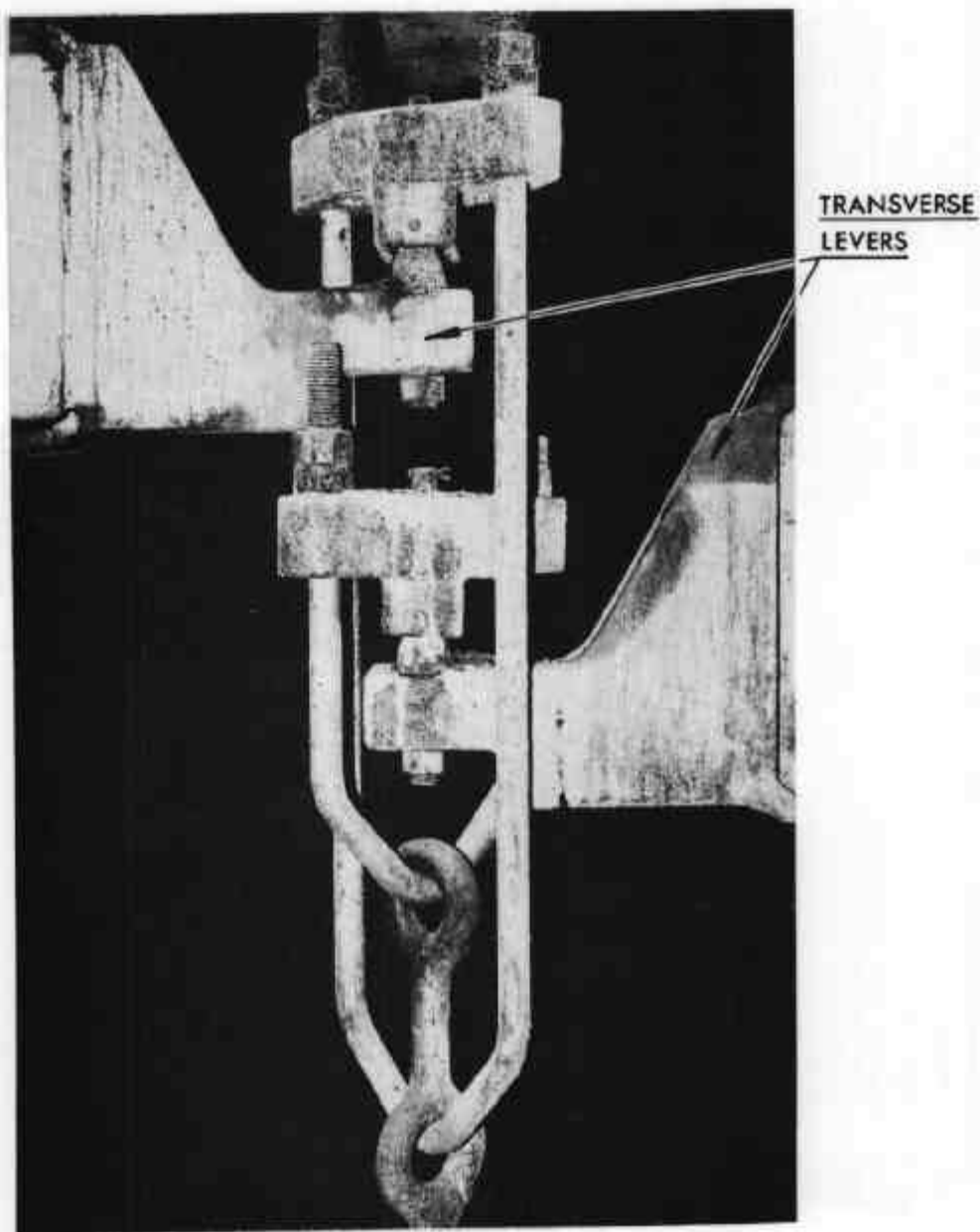
FIGURE 6/10B/11 - 8



Transfer Lever Pedestal

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FIGURE 6/10B/11 - 9

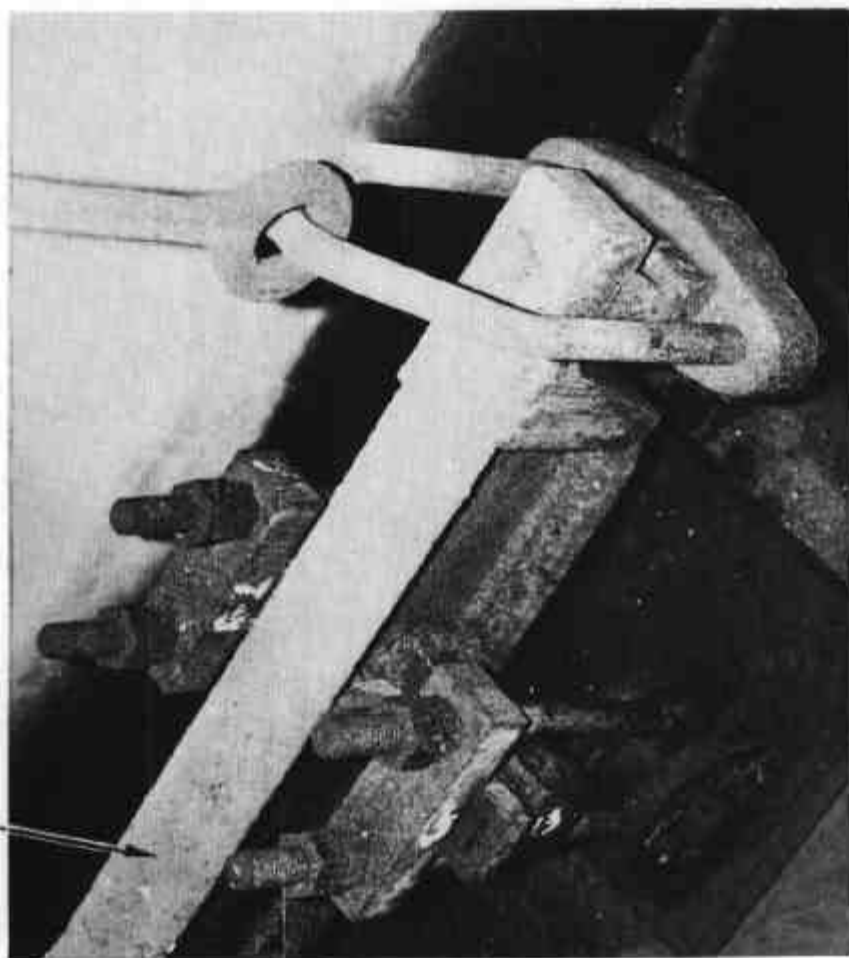


Coupling of Transverse Levers to Transfer Lever

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FIGURE 6/10B/11 - 10

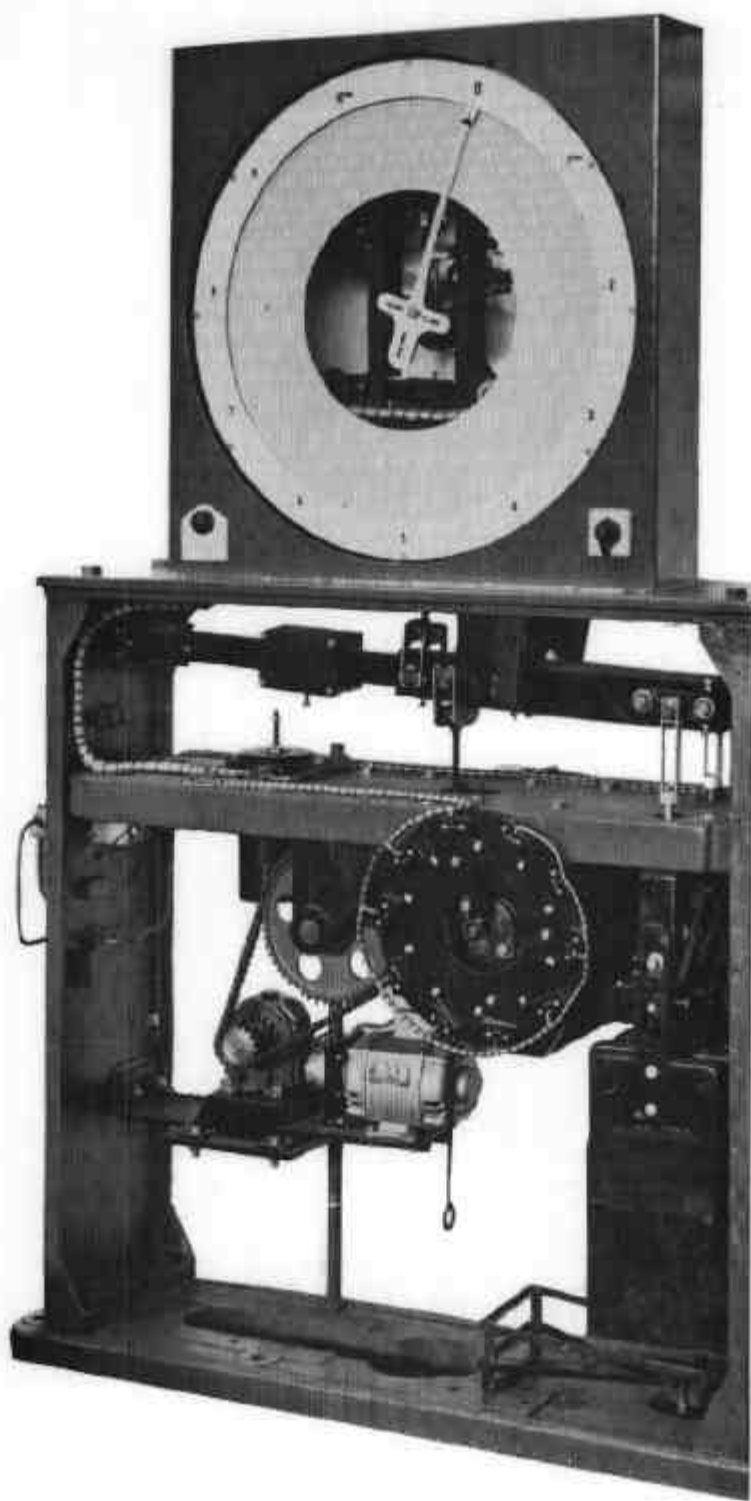
TRANSFER LEVER



Transfer Lever Fulcrum and Inverted Link

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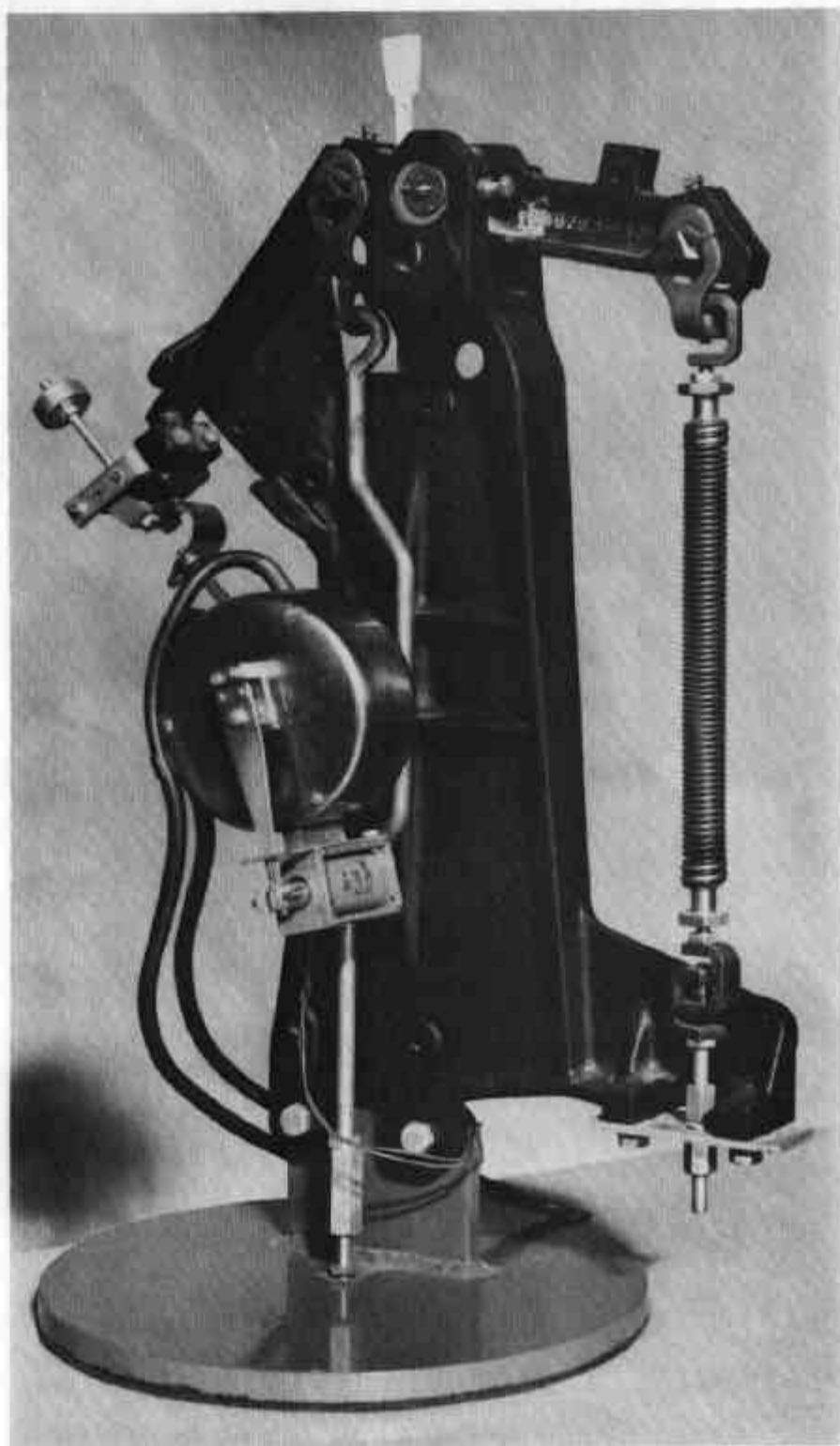
FIGURE 6/10B/11 - 11



Local Headwork

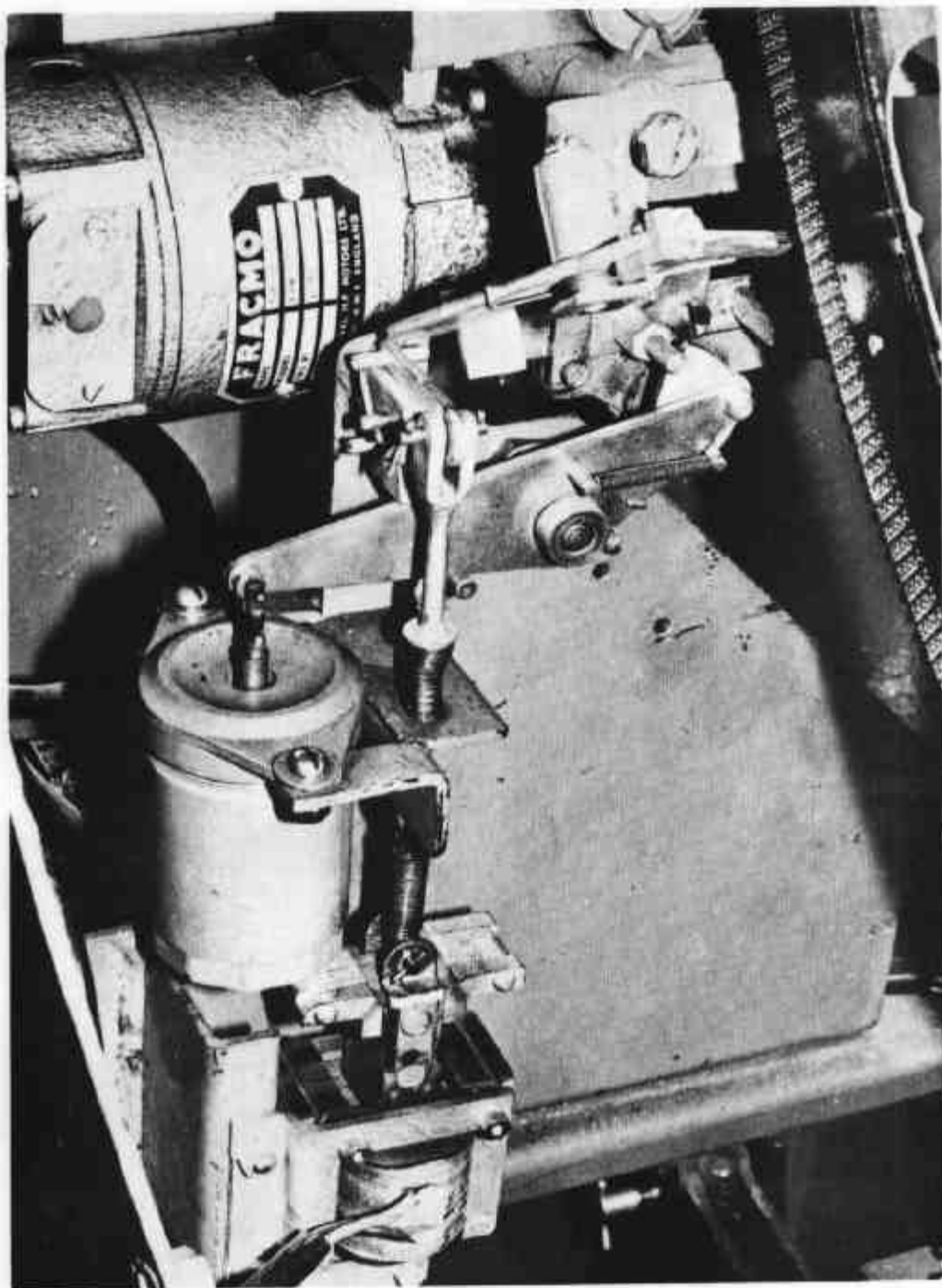
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FIGURE 6/10B/11 - 12



Avery CLA Resistant Mechanism with Analogue Generator
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FIGURE 6/10B/11 - 13

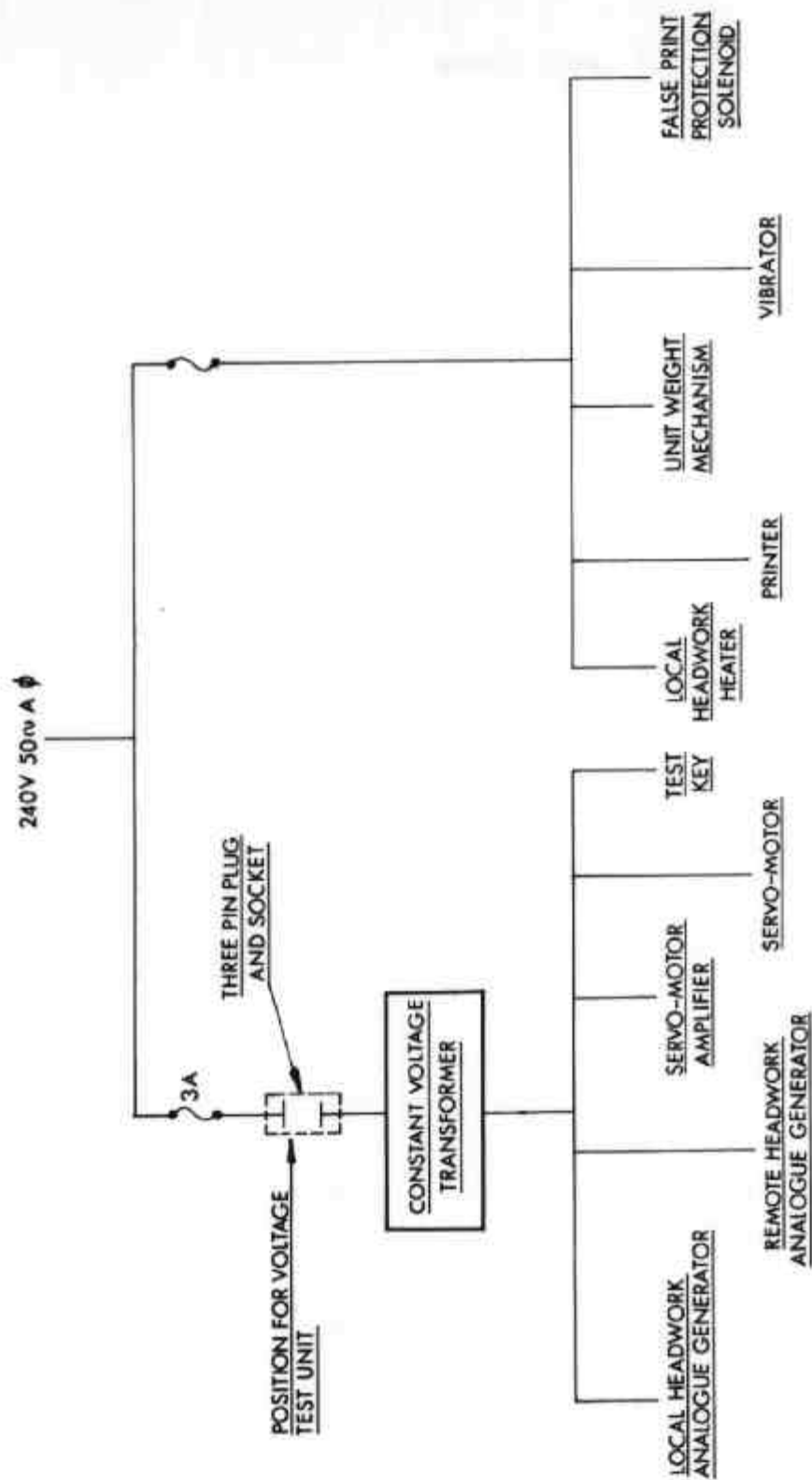


False-print Protection Solenoid

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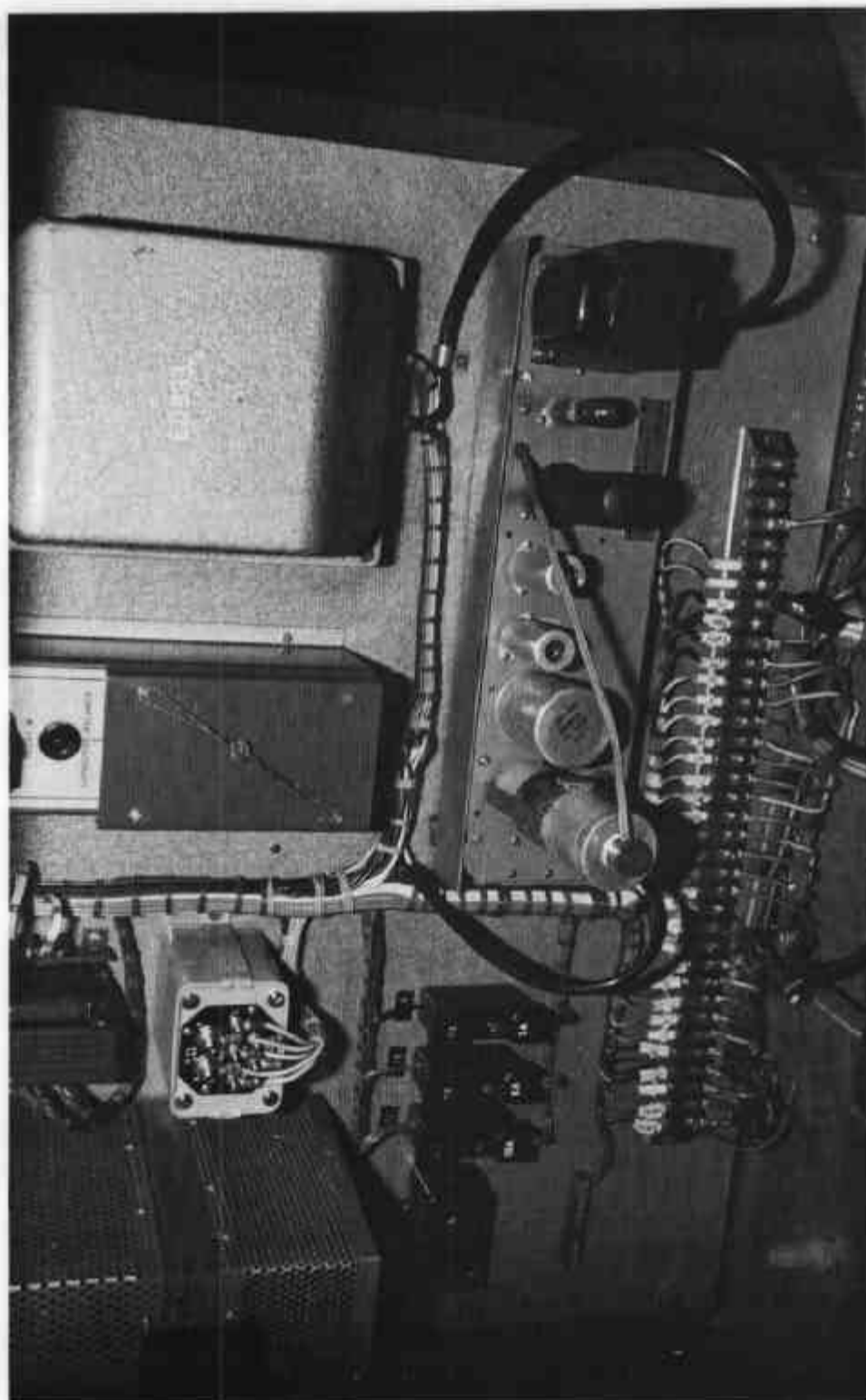
FIGURE 6/10B/11 - 14

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Voltage Distribution - Schematic Diagram

FIGURE 6/10B/11 - 15



Sealing Span and Balance Adjustments

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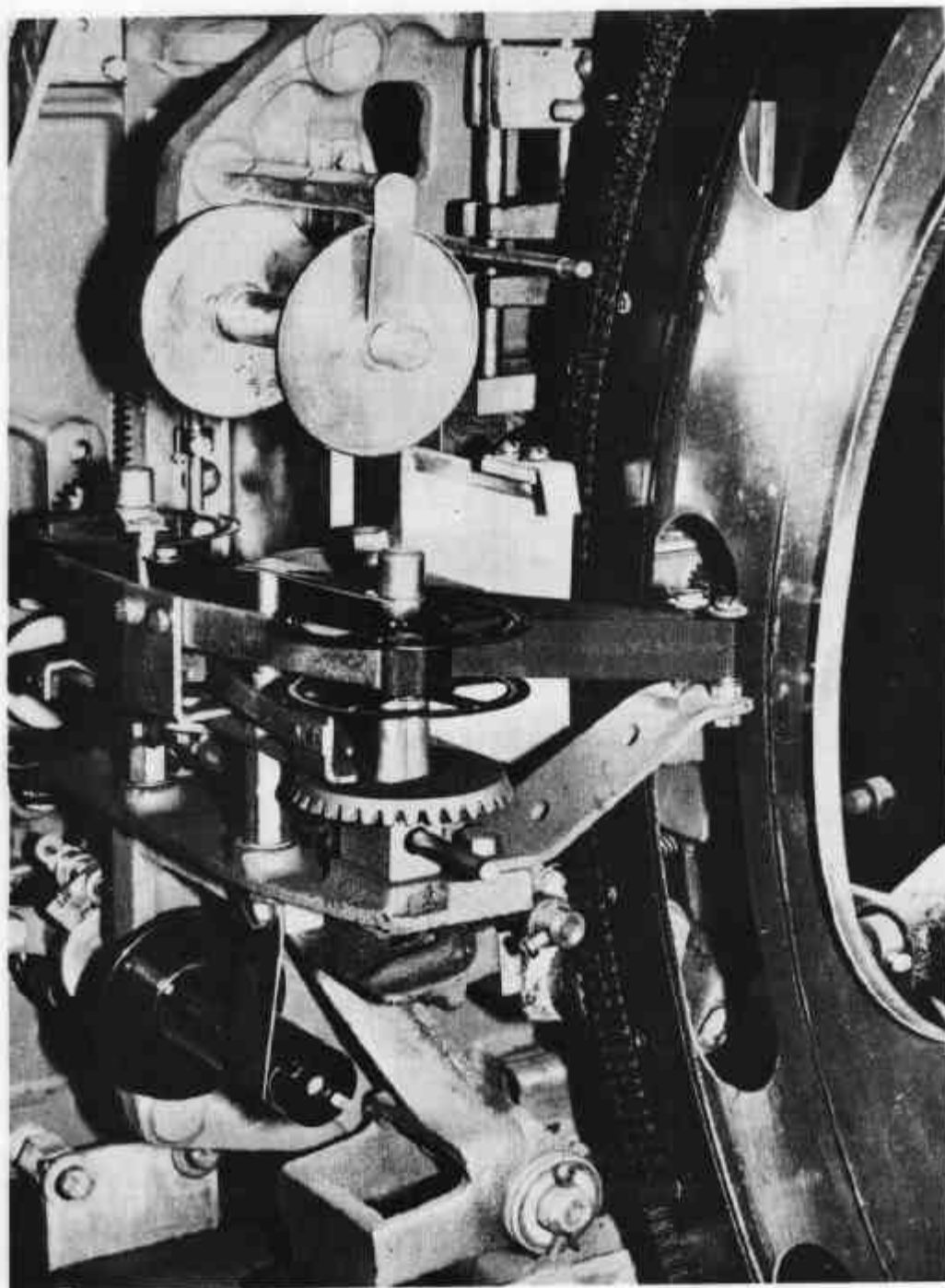
FIGURE 6/10B/11 - 16



Avery DLB Ticket Printer - Front

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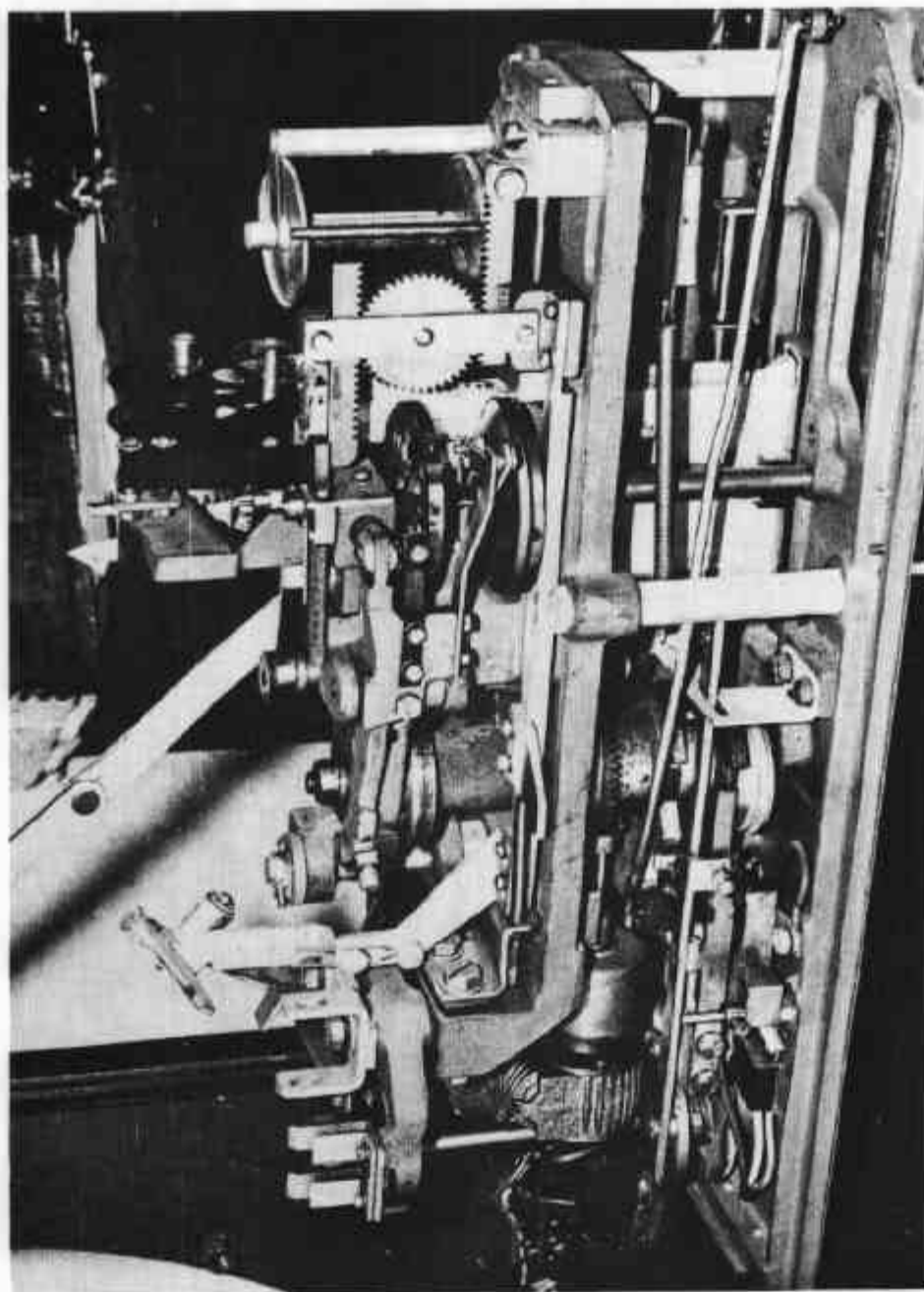
FIGURE 6/10B/11 - 17



Avery DLB Ticket Printer - Back

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FIGURE 6/10B/11 - 18



Avery DLB Ticket Printer - Side

FIGURE 6/10B/11 - 19

THIS END IN

WEIGHBRIDGE DOCKET

MONTH	DAY	WEIGHING No.	TONS	CWT.	QR.
			2	1-19	2
			1	2-18	0
			NET WEIGHT		

FULL

EMPTY

THIS SIDE TO FACE FRONT

21 tons 19cwt 2qr

12 tons 18cwt 0qr

Sample Ticket
(actual size)