CERTIFICATE OF APPROVAL No 6/10B/1

VARIATION No 1

This is to certify that the following modifications of the pattern and variants of the

Howe Richardson W-type Weighing Instrument

approved in Certificate No 6/10B/1 dated 11 May 1971

submitted by Howe Richardson Scale Co. Pty Ltd, Denney Street, Broadmeadow, New South Wales, 2292,

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

The approved modifications are:

(a) fitting a Model 31000 self-indicating headwork;

(b) fitting a Model A self-indicating headwork with circular dial and flash dial;

(c) fitting a W-type lever three-section basework of maximum capacity 140 tonnes;

(d) fitting an O-type lever three-section basework of maximum capacity 95 tonnes;

(e) fitting a G-type lever three-section basework of maximum capacity 50 tonnes;

(f) fitting a Model CP teleprint ticket printer; and

(g) converting all weighing instrument models to indicate in metric units in accordance with Appendix 8 of the General Specifications for Measuring Instruments to be Used for Trade.

Approval was granted on 17 May 1974.

This variation is described in Technical Schedule No 6/10B/1, Variation No 1, and in drawings and specifications lodged with the Commission.

The approval is subject to review on or after 1 June 1979.

All instruments conforming to this approval shall be marked with the approval number "NSC No 6/10B/1".

Signed

Executive Officer

17/5/74

DESCRIPTION OF PATTERN

The pattern is of a 4-section self-indicating weighbridge (see Figure 12) of 80 tons capacity. The headwork has a dial face which is graduated to 9 tons 19 cwt by $\frac{1}{2}$ cwt graduations (see Figure 15). The instrument is fitted with a ticket-printing device, a photo-electric sensor for weight control (see Figure 15) and a unit-weight selector (see Figures 15 and 16). The instrument is known as the Howe Richardson W-type Weighbridge and comprises the components tabulated in Column 5 of Figure 1.

DESCRIPTION OF VARIANTS

The components tabulated in Columns 6 to 8 of Figure 1 make up variants 1 to 3, known as the Howe Richardson W, O or G-type 2, 4 or 6-section Weighbridge; the variants are of capacities up to:

	6-section	4-section	2-section
W-type levers	200 tons	160 tons	120 tons
O-type levers	135 tons	110 tons	80 tons
G-type levers	65 tons	55 tons	40 tons

DESCRIPTION OF COMPONENTS

*1. W-type levers (see Figure 2) — the W-type main levers are of fabricated construction with the knife-edges mounted in holders supported between the side plates of two forks, one at each end of the main lever. The fulcrum knife-edge holder is fixed by two set screws and the main load knife-edge is adjustable, the holder being rotated and locked in position by offset screws shown in Figure 3. The nose-end knife-edge shank of the main levers and each other knife-edge holder of the longitudinal and transfer levers is a force-fit in its socket and is held by two 5/16 inch socket-head set screws.

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* Approval expired 31st July, 1968.

All fulcrum and load bearings are self-aligning and there are self-aligning bearings and shackle assemblies at the nose-end of each main lever (see Figure 4). The nose-end knife-edges at the connections between the longitudinal levers and the transfer lever (see Figure 5) and transfer lever to the headwork pullrod are adjustable. Figure 6 shows the connection between a pair of longitudinal levers.

*2. O-type levers (see Figure 7) — the O-type main levers are constructed with the fulcrum and load knife-edge holders fitted directly into bosses in the main beam with the knife-edges projecting from either side of the beam. The load knife-edge holder is adjusted by two lock-nutted set screws tapped into the top of the main beam of the lever. The nose-end knife-edge arrangement is similar to the W-type lever.

*3. G-type levers (see Figure 8) — the G-type main levers are constructed with the fulcrum and load knife-edge holders fitted directly into bosses in the main beam with the knife-edges projecting from either side of the beam. The load knife-edge holder is adjusted by means of adjusting screws bearing against a stud tapped into the bottom of the holder and projecting down through a hole with a large clearance at the bottom of the main beam. The stud is clamped by a lock-nut and washer (see Figure 9). The nose-end knife-edge arrangement is similar to the W-type lever.

4. Modified lever knife-edge locking screws — having all levers of the W, O and G-type baseworks modified by replacing the 5/16 inch socket-head set screws locking the knife-edges or holders with hardened cup-pointed square-head set screws. Cantilever knife-edges with holders $1\frac{1}{2}$ inches and $1\frac{1}{4}$ inches in diameter are locked by two 7/16 inch hardened cup-pointed square-head set screws tightened to a torque of 30 lb/ft (see Figure 10); knife-edges with shanks supported between two side plates $1\frac{1}{4}$ inches and 1 inch in diameter are locked by two 5/16 inch hardened cup-pointed square-head set screws tightened

* Approval expired 31st July, 1968.

to a torque of 20 lb/ft. Each knife-edge is adjusted to within ± 1/32 inch of the vertical through the centre of the shank.

5. 2-section basework (see Figure 11) — consists of 4 main levers, 2 lontigudinal levers and a single transfer lever.

6. 4-section basework (see Figure 12) — consists of 8 main levers, 4 longitudinal levers and 2 transfer levers.

7. 6-section basework (see Figure 13) — consists of 12 main levers, 8 longitudinal levers and 2 transfer levers.

8. Platform support (see Figure 14) — the platform is supported on the load knife-edges of G and O-type main levers by ball-bearing-type support units (see Figures 8 and 14), each of which comprises a pad piece and a yoke member between which contact is made through two hardened steel balls. The yoke member straddles the levers and is fitted with two self-aligning bearings.

   The support unit for the W-type lever has the same ball-bearing suspension, but the member holding the single self-aligning load bearing fits between the side plates of the lever forked ends (see Figures 2 and 4).

9. Transfer levers — the headwork may be located in any reasonable position in relation to the basework, in which case one or more transfer levers may be used.

*10. Headwork cabinet, type A (see Figure 15) — the basework lever system is coupled to the headwork through a pullrod which is connected to the main headwork lever in the upper section of the cabinet. The main headwork lever is connected to a smaller intermediate lever, which is connected by a pullrod and steel tapes to the pendulum resistant. Attached to the main headwork lever is a system of unit weights, an adjustable oil dashpot — both of which are located in the lower section of the cabinet — and a balance box which is fitted to one end of the lever. Attached

* Approval withdrawn 30th April, 1971.

to the intermediate lever is a screw-operated zero adjustment accessible through a hole in the side of the cabinet. A hand-operated device locks the main headwork lever by turning a knob protruding from the upper section of the cabinet. Also within the cabinet is a unit-weight selector which deposits and removes unit weights by the manual rotation of a crank handle in the front of the cabinet. Each turn of the handle repositions a cam shaft so as to select a combination of unit weights, one step higher or lower, depending upon the direction of rotation. The weights are raised from or lowered on to a single rod supported from the main headwork lever by forked levers actuated by the cam system (see Figure 16). Associated with the selector cams is a cable drive extending into the dial housing to rotate a flash chart which indicates through a window in the dial the weight to be added for the appropriate weight range selected (see Figure 15). The resistant mechanism is as described in Certificate No 6/9C/3.

11. Tare bars — the main headwork lever may be fitted with 1 or 2 tare bars.

12. Printer (see Figure 17) — the printer motor is started by a push-button (provided the indicator is at rest), which releases a mechanical lock on the printer mechanism. The locking pawl (see Figure 18) mates with the steps of a serrated wheel mounted with the printer index cams on the indicator shaft of the analogue dial indicator. Once the cam system is locked in position, a series of index fingers make contact with the appropriate steps of the index cams, thus positioning the print sectors in the corresponding positions.

The print sector, which prints a digit determined by the position of both the indicator and the unit-weight selector, is moved by two index fingers, one contacting an index cam on the indicator shaft and the other contacting a cam on a separate shaft driven from the unit-weight selector by chain and sprockets (see Figures 17 and 18). The two index fingers are connected to the lever attached to the print sector by a parallel equal-arm linkage so that the position of the print sector is determined by

the relative positions of the two cams (see Figure 18).

Print sectors which print digits determined only by the position of the unit-weight selector are moved by an index finger in contact with other cams on the shaft driven from the unit-weight selector (see Figure 18).

A movable platen on the printing table hammers the printing tape or the ticket against the typewriter ribbon and the typeset of the print sectors to produce a printed record of the weight. Tare, gross or net columns of the ticket can be printed by selecting the ticket-guide setting (see Figure 19). The weight value only is printed by the type sectors with the weight denominations being preprinted on the ticket; Figure 20 is a sample ticket. If a ticket is printed while the dial indication is in the blank space between full-scale and zero, a series of dashes is printed on the ticket.

The motion detector (see Figure 21) has a small lever which carries a pair of contacts and is centred by a pair of return springs; when the lever is centred both contacts are open. When the main lever is oscillating the action of the dashpot attached to the motion detector causes the motion-detector lever to lag behind the movement of the main lever, closing the contacts alternately. A time delay in the print motor-switching circuit allows the motor to be started 4 seconds after the last closing of the motion-detector contacts.

13. Weight-control unit (see Figure 15) — is a photo-electric device which can be set to a predetermined position on the dial. When the light beam is interrupted by a flag attached to the indicator, a warning light or buzzer allows the operator to take control of the loading process and adjust the final load to the required weight. The indicated weight must be read from the instrument pointer and not from the presetting device.

14. The full-capacity steelyard is described in Certificate No 6/10A/1.

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15. The weatherproof cabinet is described in Certificate No 6/10A/1.

GENERAL NOTES

1. Notice of approval of the pattern and some variants described in this Certificate was given in Memoranda of Approval No 67 dated 22nd May, 1967, and No 117 dated 29th April, 1968.

2. Notice of approval of the full-capacity steelyard and the weatherproof cabinet approved in Certificate No 6/10A/1, referred to in Component Nos 14 and 15, was given in Memoranda of Approval No 51 dated 4th January, 1967, and No 89 dated 26th October, 1967.

3. Approval of Component No 10 has been withdrawn because the form of the flash chart does not comply with the General Specifications.

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 6/10B/1

VARIATION No 1

Pattern: Howe Richardson W-type Weighing Instrument

Submittor: Howe Richardson Scale Co. Pty Ltd,
Denney Street,
Broadmeadow, New South Wales, 2292.

Date of Approval of Variants: 17 May 1974

The modifications described in this schedule apply to the pattern and variants described in the following pages and figures of Certificate No 6/10B/1 dated 11 May 1971:

Pages 3 to 8 dated 11 May 1971
Figures 6/10B/1 - 1 to 21 dated 11 May 1971

All instruments conforming to this approval shall be marked "NSC No 6/10B/1".

Description:

The pattern and variants may include the following modifications:

1. A Model 31000 self-indicating headwork comprising:

   (a) headwork cabinet with a manual or automatic unit-weight selector as described in Certificate No 6/9C/4;

   (b) double-pendulum resistant mechanism as described in Certificate No 6/9C/3; and

   (c) circular dial and flash dial with horizontal figures as described in Certificate No 6/9C/4.

2. A Model A self-indicating headwork (see Figure 22) with the circular dial and flash dial with horizontal figures as described in Certificate No 6/9C/4.

3. W-type main levers in a 3-section basework of maximum capacity 140 tonnes (see Figure 23).

4. O-type main levers in a 3-section basework of maximum capacity 95 tonnes (see Figure 23).

5. G-type main levers in a 3-section basework of maximum capacity 50 tonnes (see Figure 23).

6. Model CP teleprint ticket printer (see Figure 24). The printer is similar to the M-R ticket printer as described in Certificate No 6/10B/1, with the linkage between the index fingers and the print sectors replaced by a cable drive.

7. Conversion to indicate in metric units in accordance with Appendix 8 of the General Specifications for Measuring Instruments to be Used for Trade.

FIGURE 6/10B/1 - 1

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1	2	3	4	5	6	7	8
	COMPONENTS	DATE APPROVED	FOOT-NOTES	PATTERN	VARIANTS		
					1	2	3
	BASEWORK COMPONENTS						
1	W-type levers (Figure 2)	19 MAY 1967	1	*	*		
2	O-type levers (Figure 7)	19 MAY 1967	1			*	
3	G-type levers (Figure 8)	19 MAY 1967	1				*
4	Modified W, O and G-type levers — knife-edge locking screws (Figure 10)	26 APR 1968			*	*	*
5	2-section lever basework (Figure 11)	19 MAY 1967			A	A	A
6	4-section lever basework (Figure 12)	19 MAY 1967		*	A	A	A
7	6-section lever basework (Figure 13)	19 MAY 1967			A	A	A
8	Platform support (Figure 14)	19 MAY 1967		*	*	*	*
9	Additional transfer levers	19 MAY 1967			‡	‡	‡
	HEADWORK COMPONENTS						
10	A-type cabinet with manual unit-weight selector, single dial, pendulum resistant (Figures 15 & 16)	19 MAY 1967	2	*	B	B	B
11	Tare bars — 1 or 2	19 MAY 1967			‡	‡	‡
12	Printer and motion detector (Figures 17 & 21)	19 MAY 1967		*	‡	‡	‡
13	Weight-control unit (Figure 15)	19 MAY 1967		*	‡	‡	‡
14	Full-capacity steelyard	19 MAY 1967			B	B	B
15	Full-capacity steelyard with weatherproof cabinet	30 APR 1971			B	B	B

* - indicates required components
‡ - indicates optional components
A, B - indicates alternative components, one of which is required

FOOTNOTES
1 - approved 19 MAY 1967 for limited duration expiring on 31 OCT 1967.
Approval extended on 26 APRIL 1968 for limited duration expiring on 31 JULY 1968
2 - approval withdrawn 30 APRIL 1971

Compatibility Table for Components Described in this Certificate

FIGURE 6/10B/1 - 2

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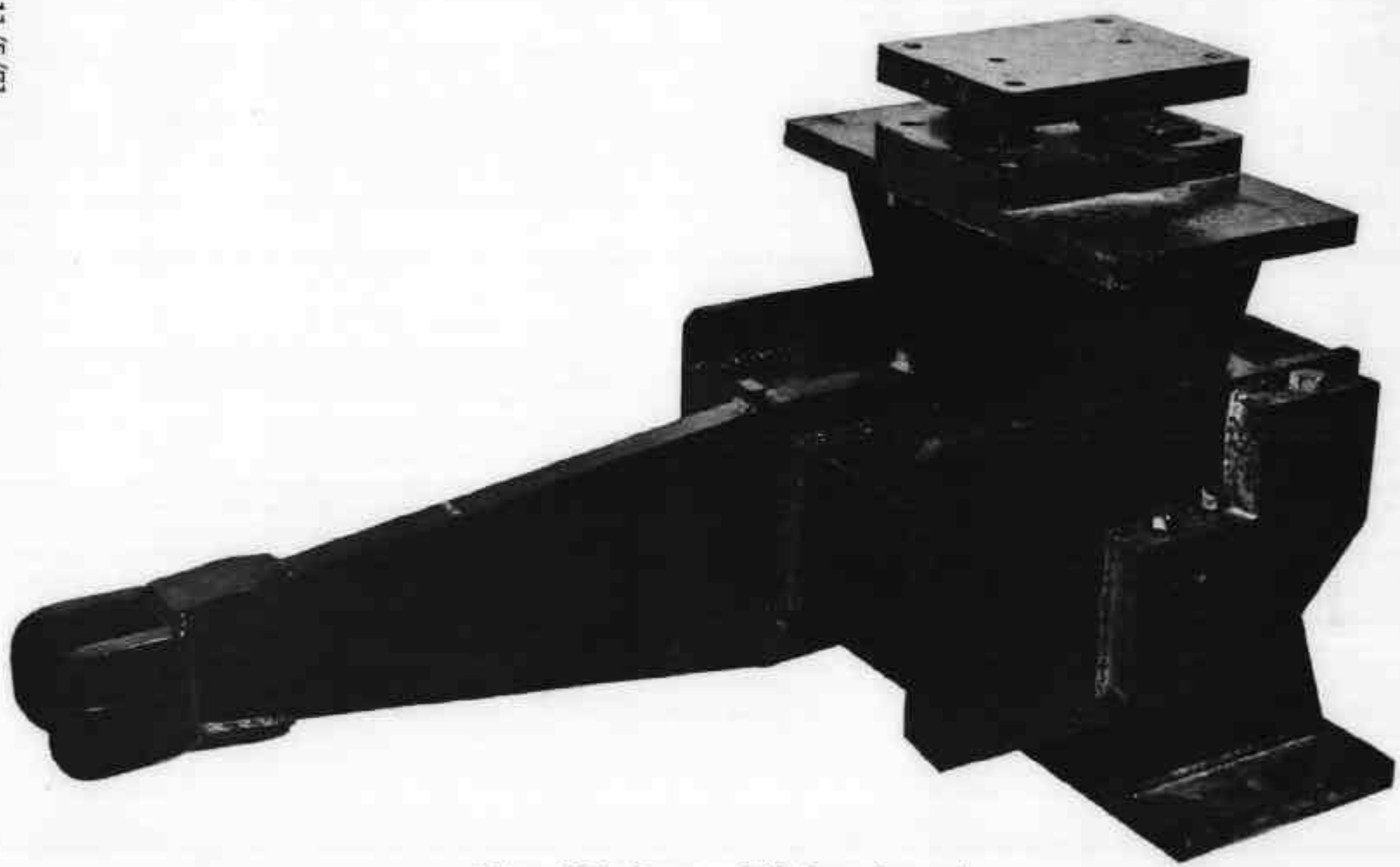
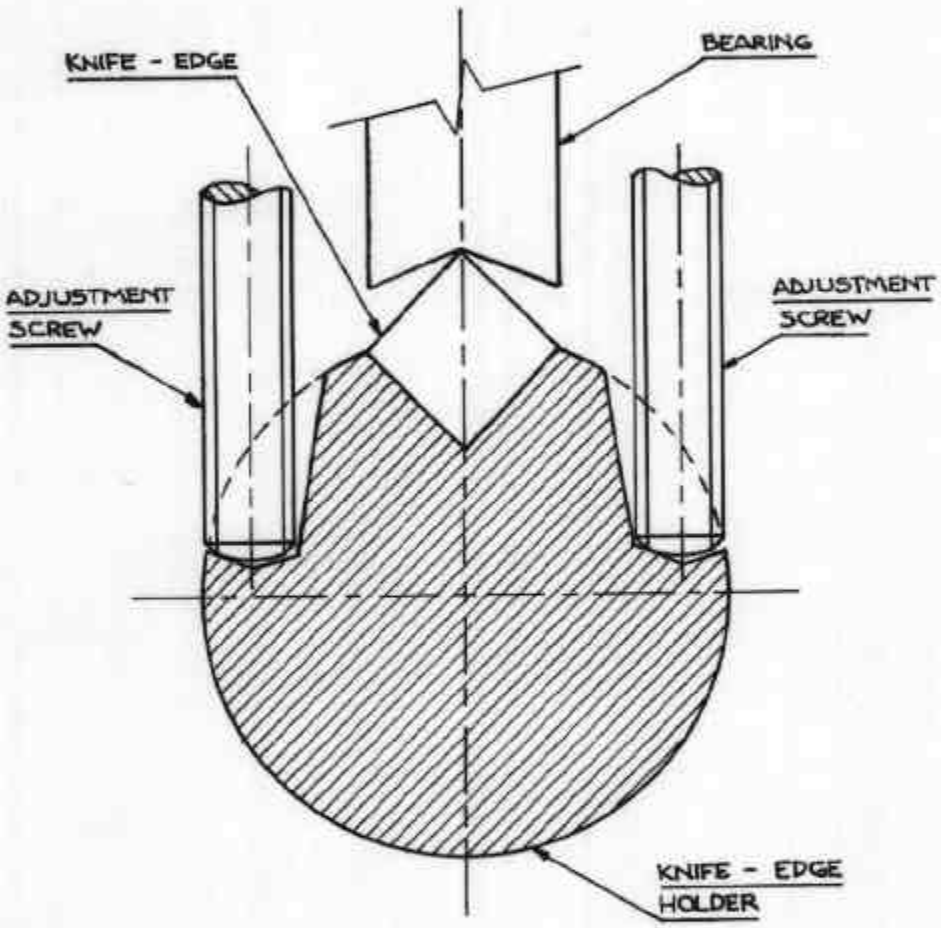


W-type Main Lever and Platform Support

FIGURE 6/10B/1 - 3



Adjustment of Load Knife-edge, O and W-type Main Levers

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FIGURE 6/10B/1 - 4

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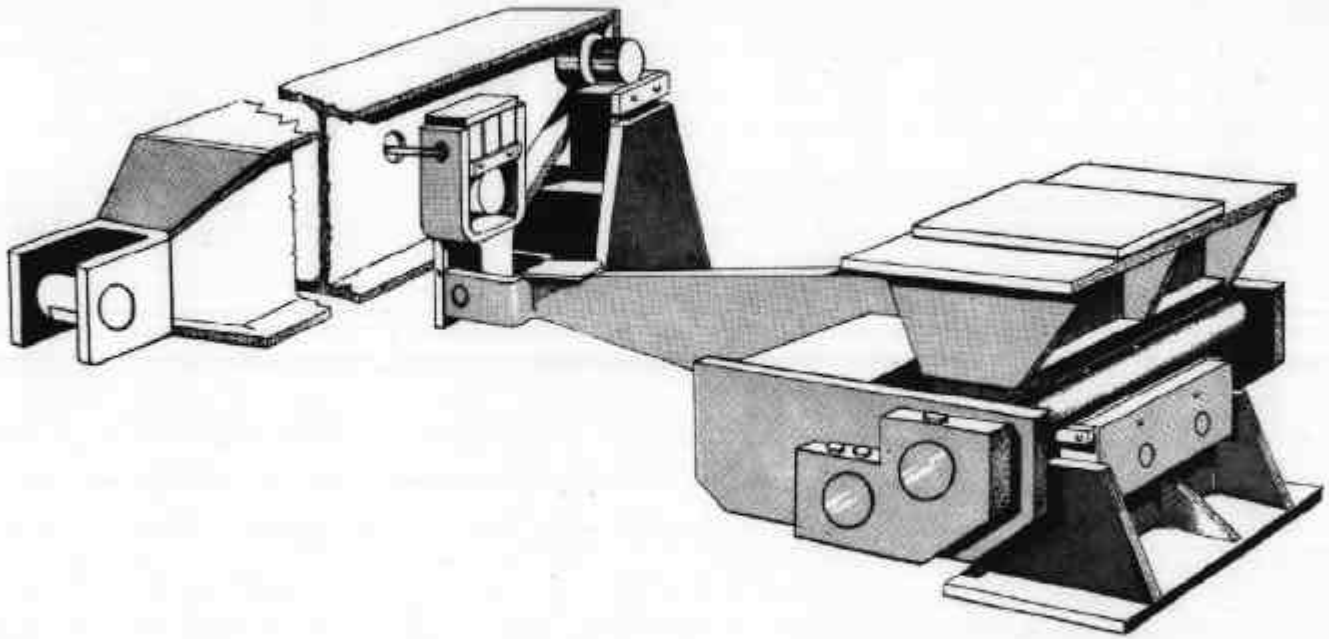

W-type Main Lever and Connection to Longitudinal Lever

FIGURE 6/10B/1 - 5

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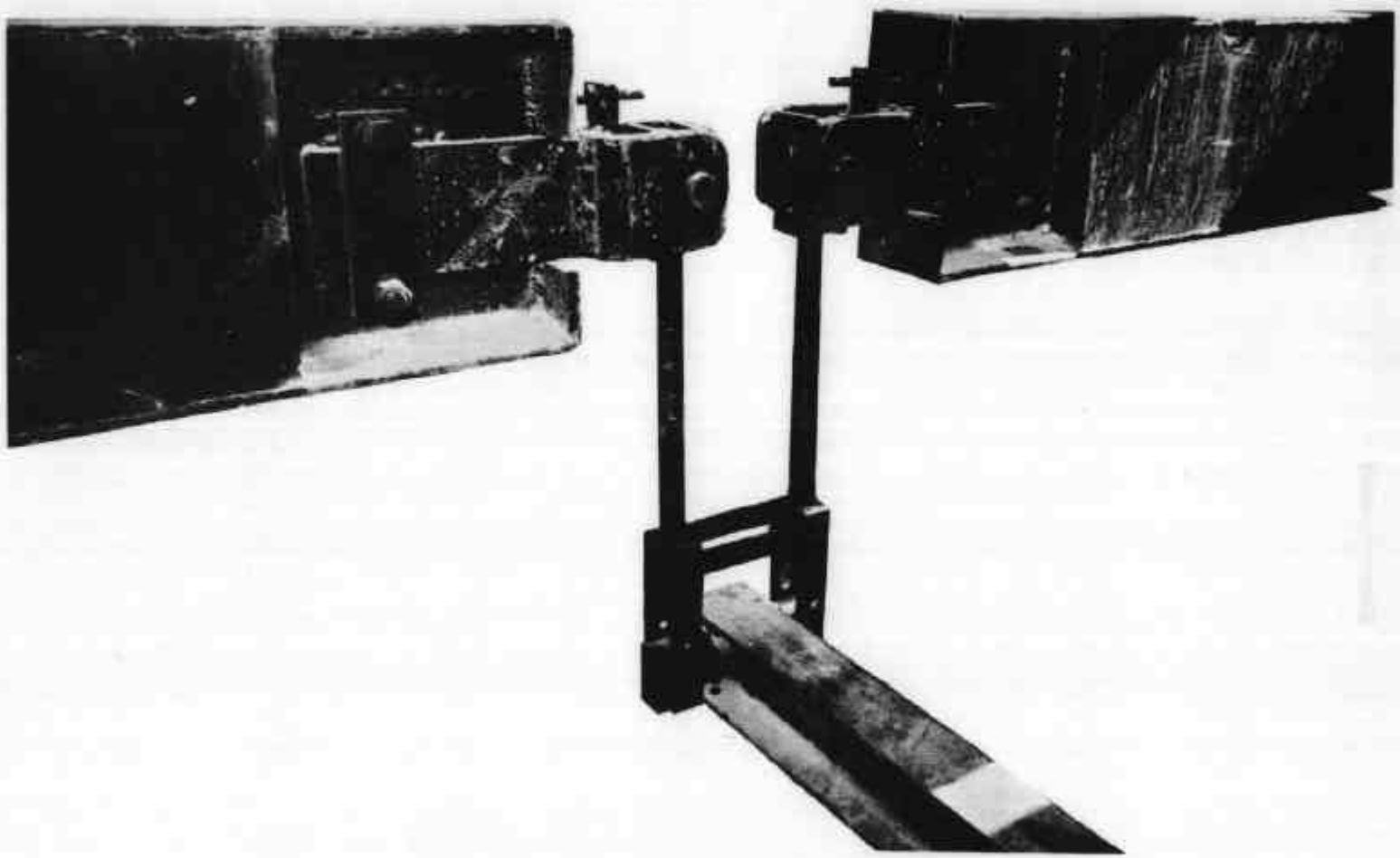
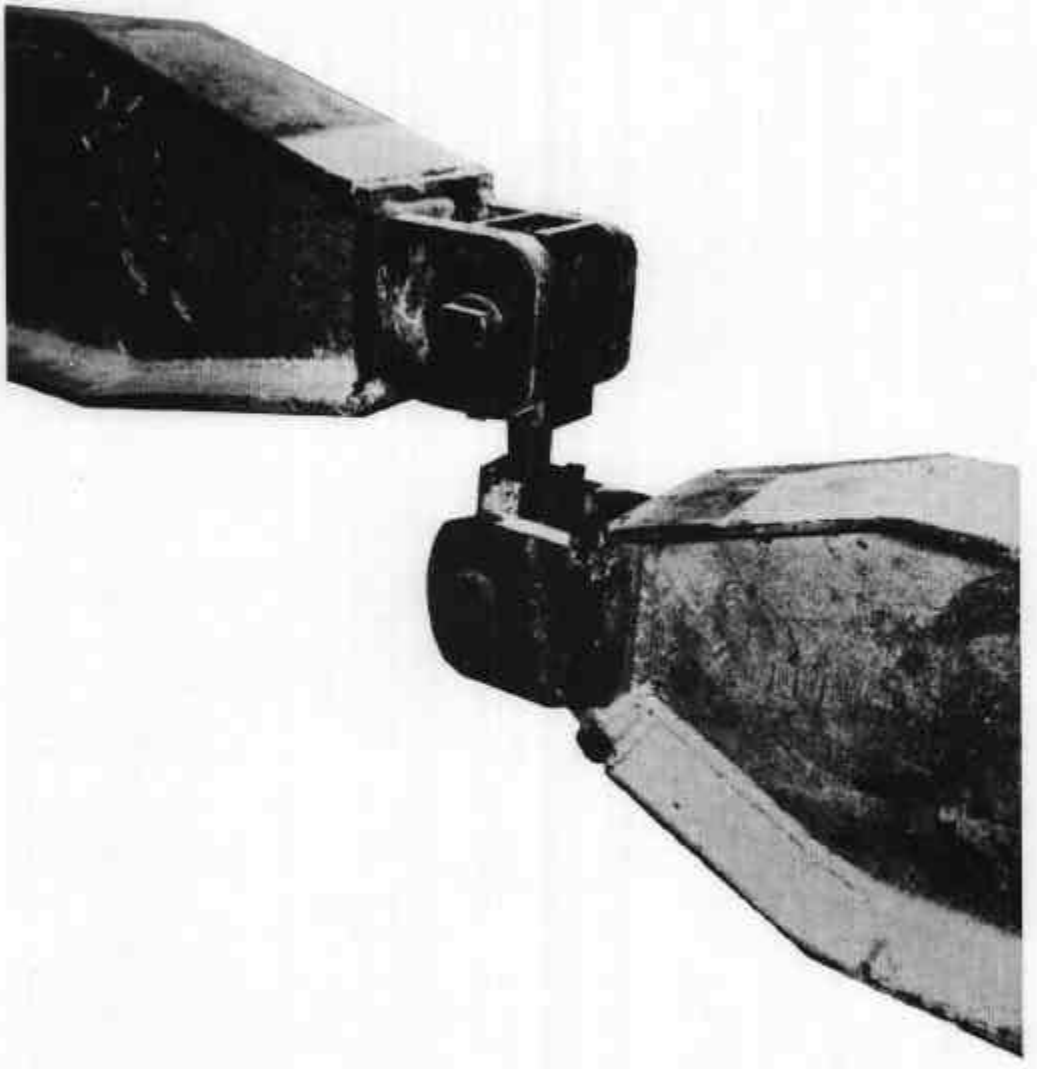


Connection of Longitudinal Levers to Transfer Lever

FIGURE 6/10B/1 - 6



Connection of Longitudinal Levers

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FIGURE 6/10B/1 - 7

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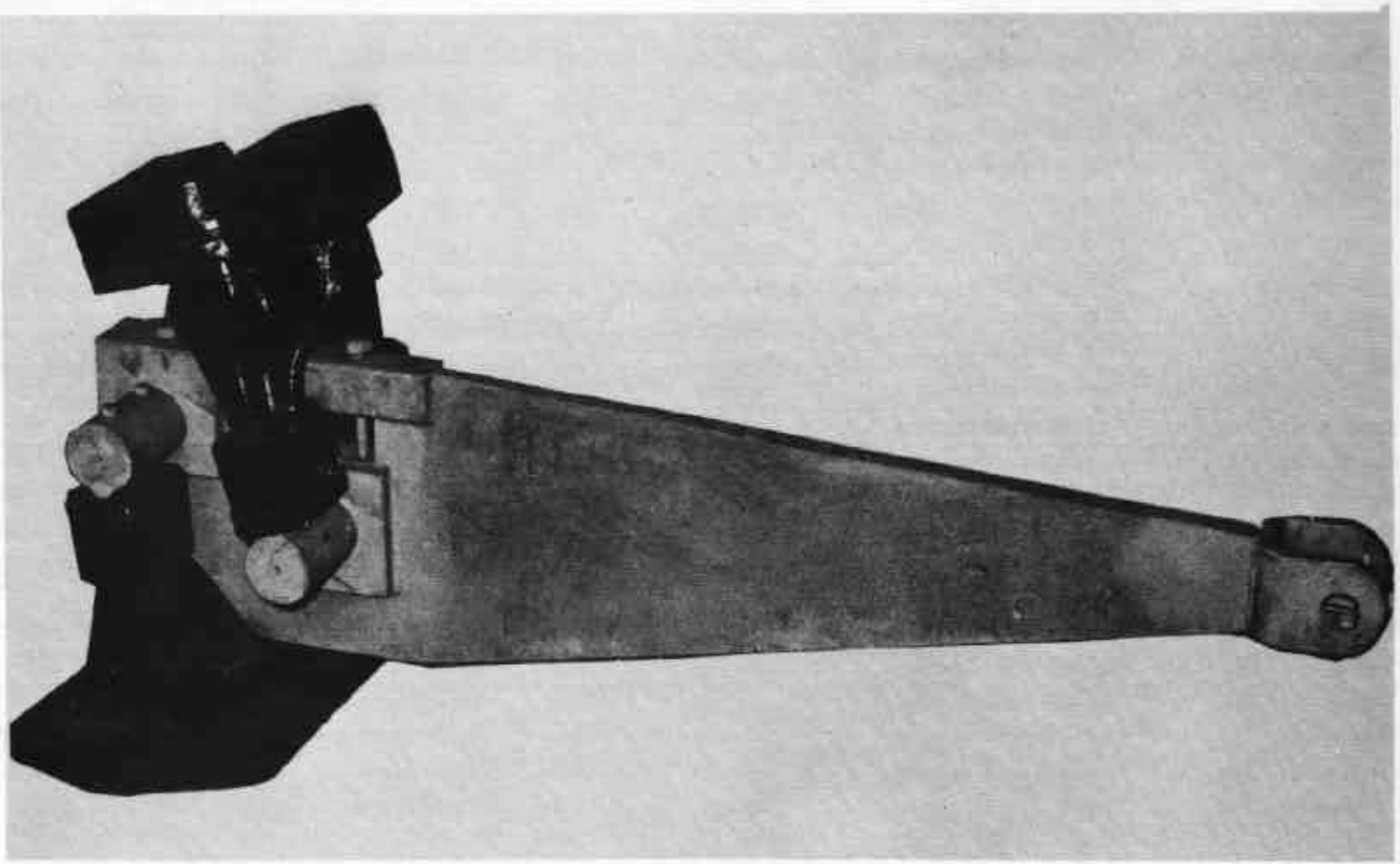

O-type Main Lever

FIGURE 6/10B/1 - 8

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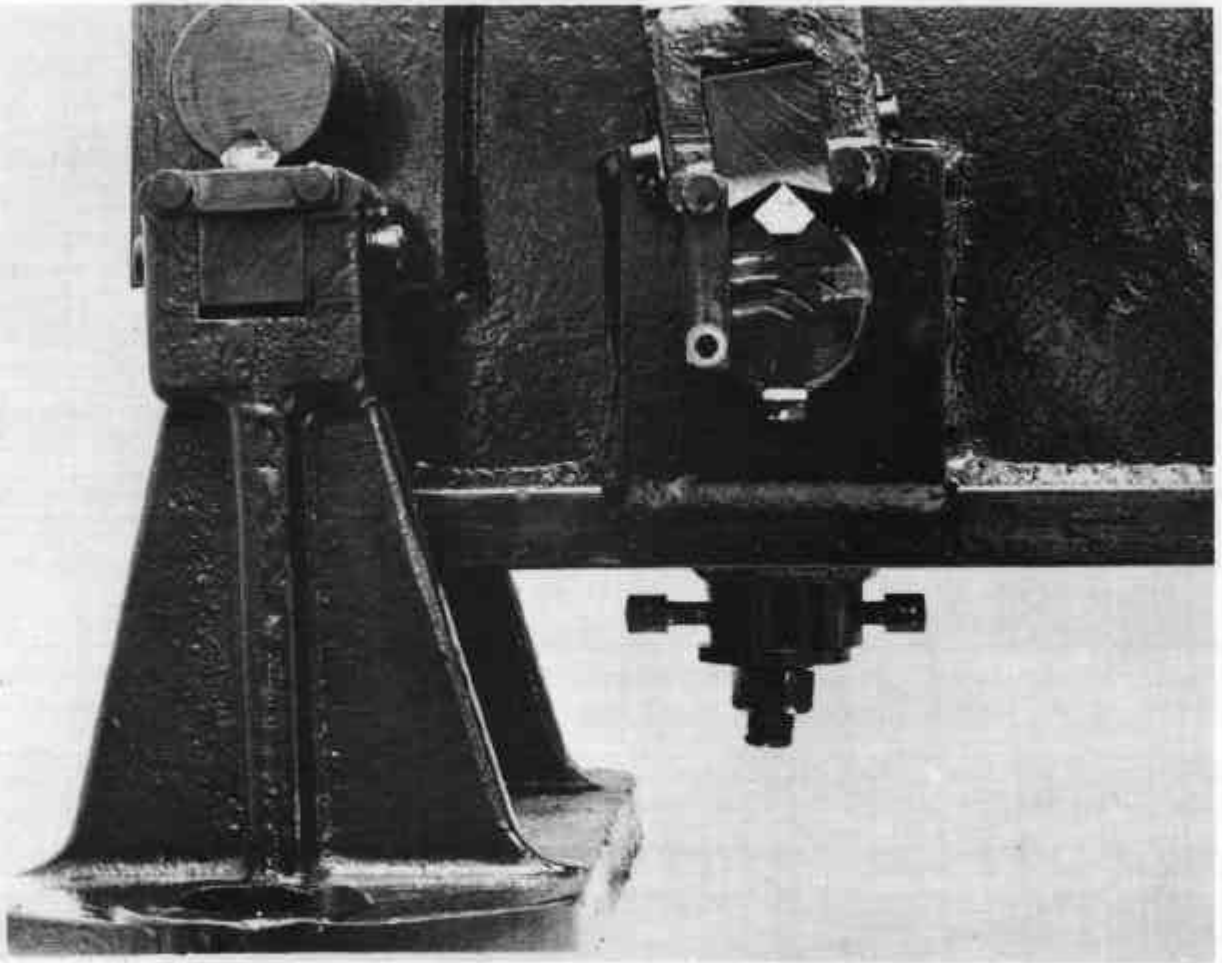
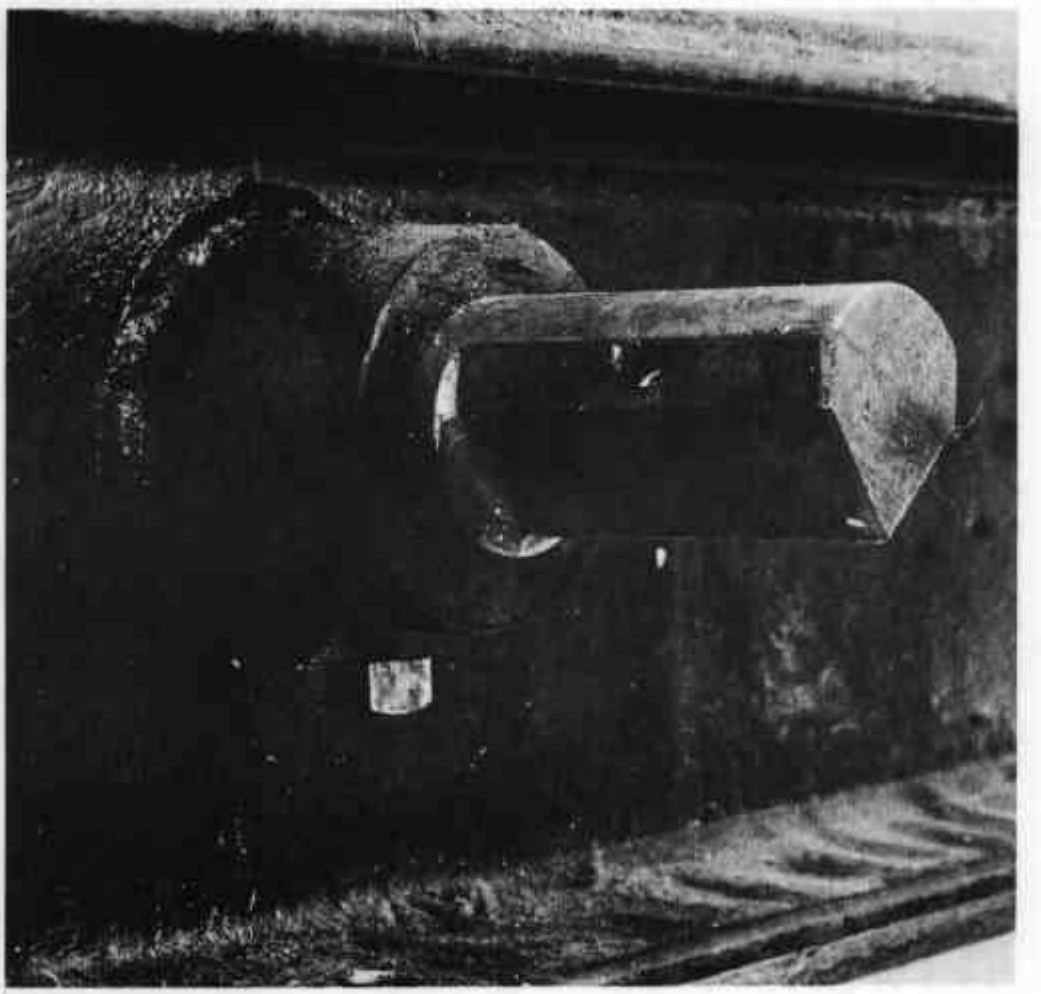
G-type Main Lever

FIGURE 6/10B/1 - 9



Knife-edge Adjustment, G-type Main Lever

FIGURE 6/10B/1 - 10



Modified Knife-edge Locking Screws

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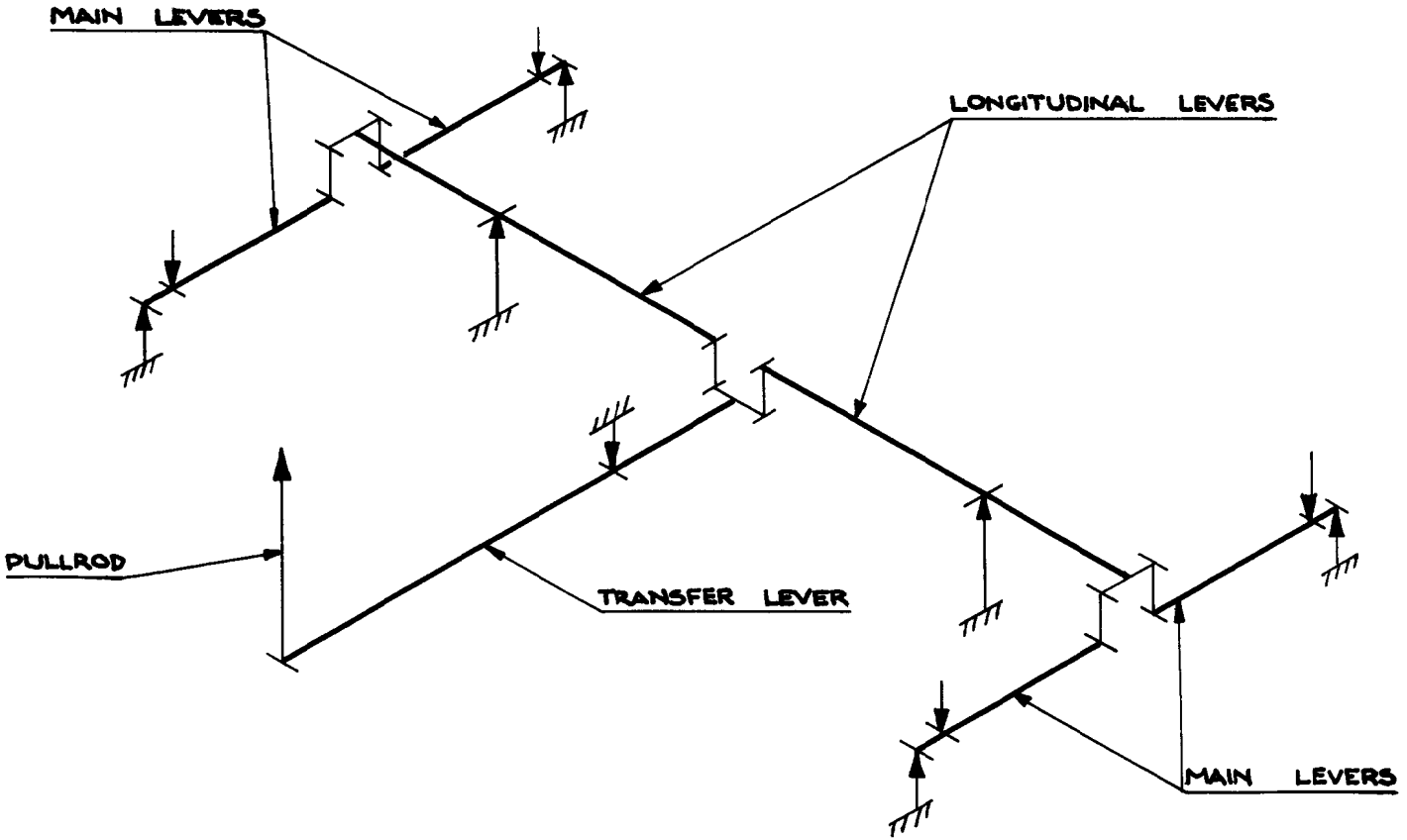
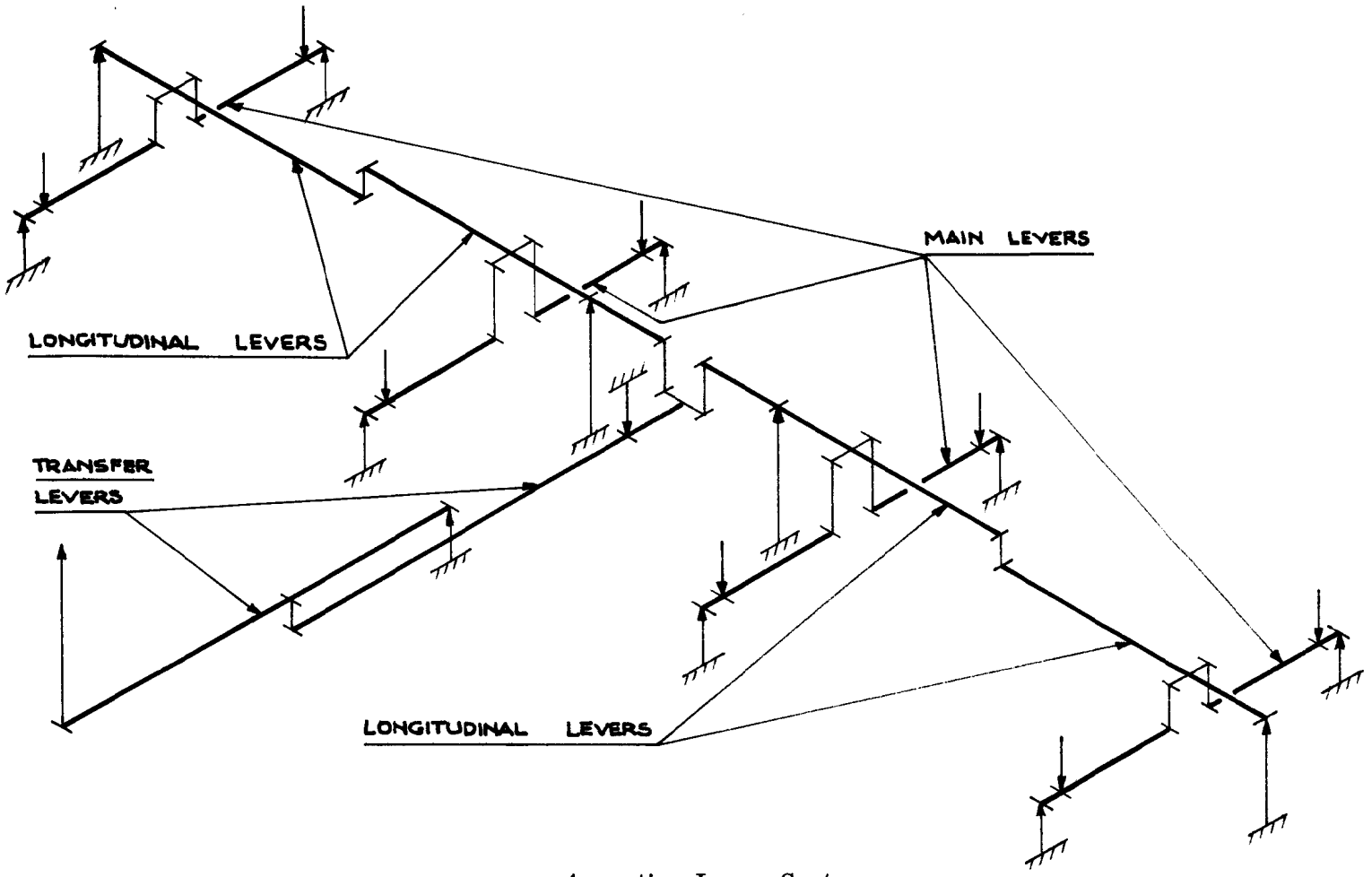
FIGURE 6/10B/1 - 11



2-section Lever System

FIGURE 6/10B/1 - 12



4-section Lever System

FIGURE 6/10B/1 - 13

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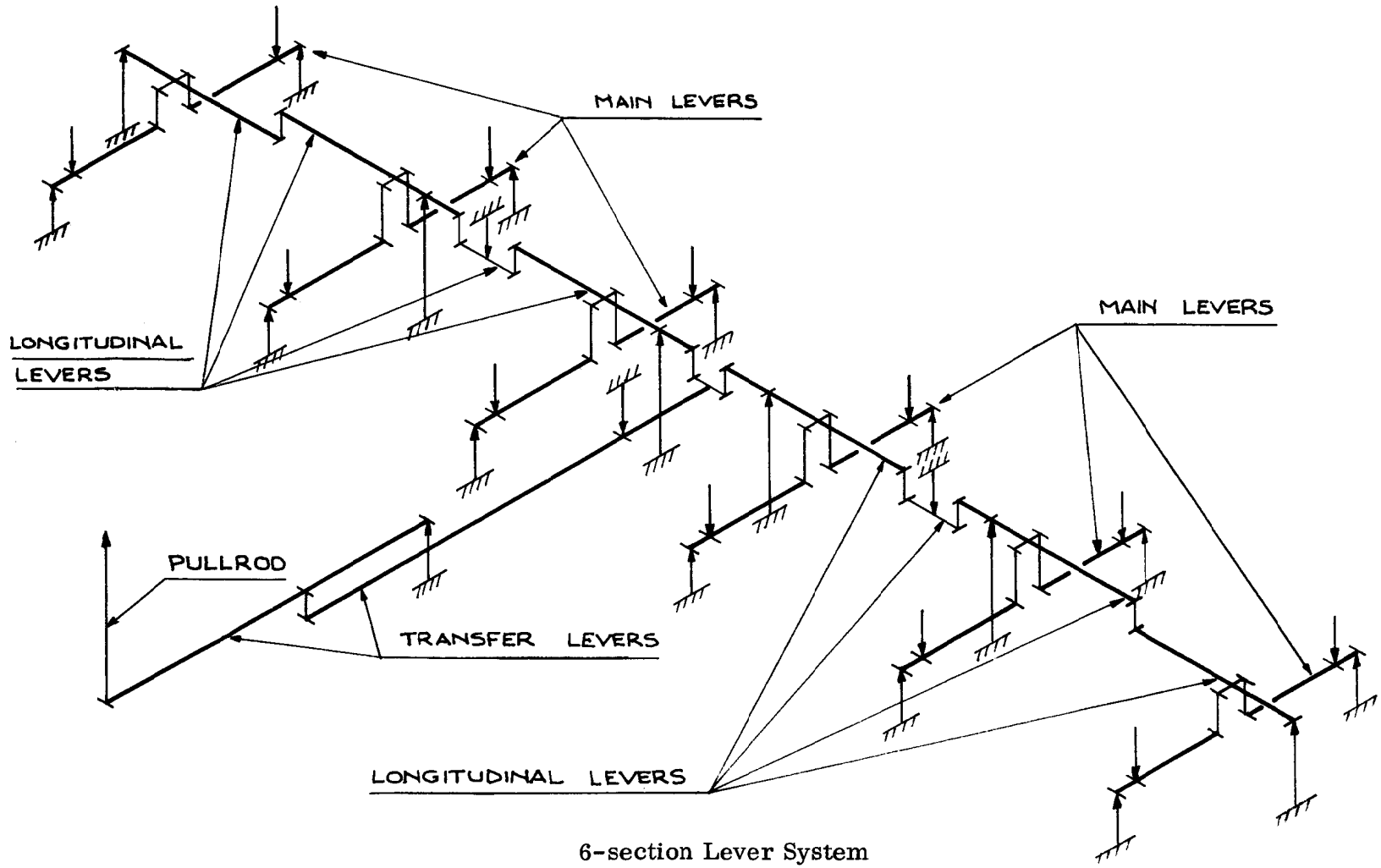
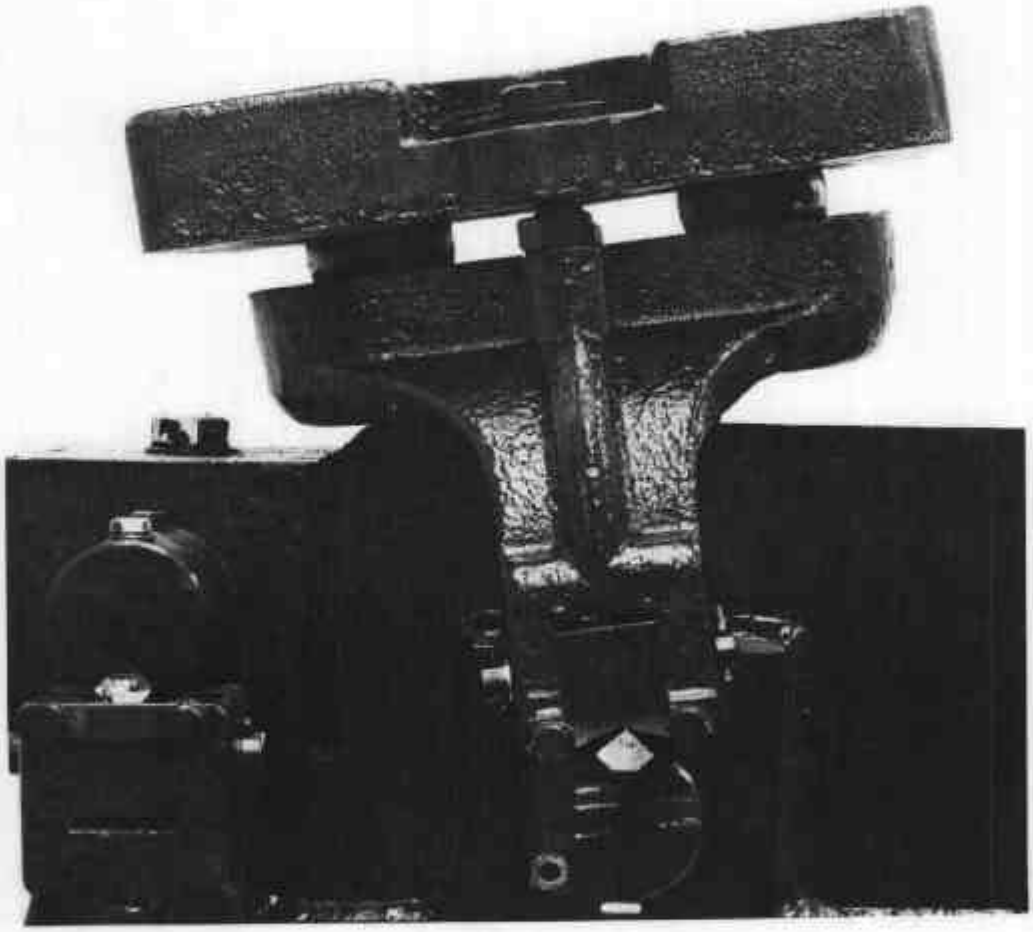


6-section Lever System

FIGURE 6/10B/1 - 14



Platform Support

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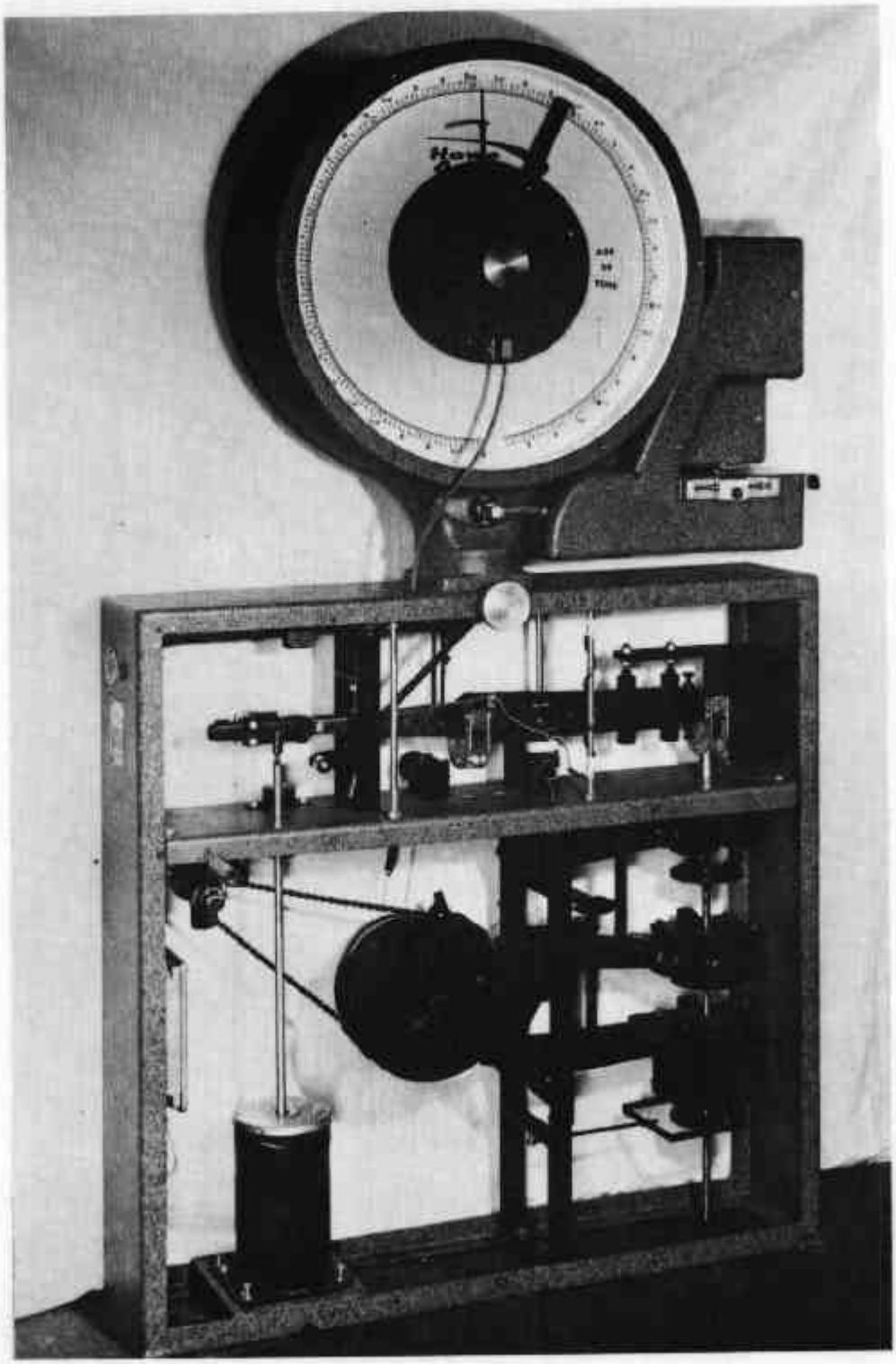
FIGURE 6/10B/1 - 15



A-type Cabinet

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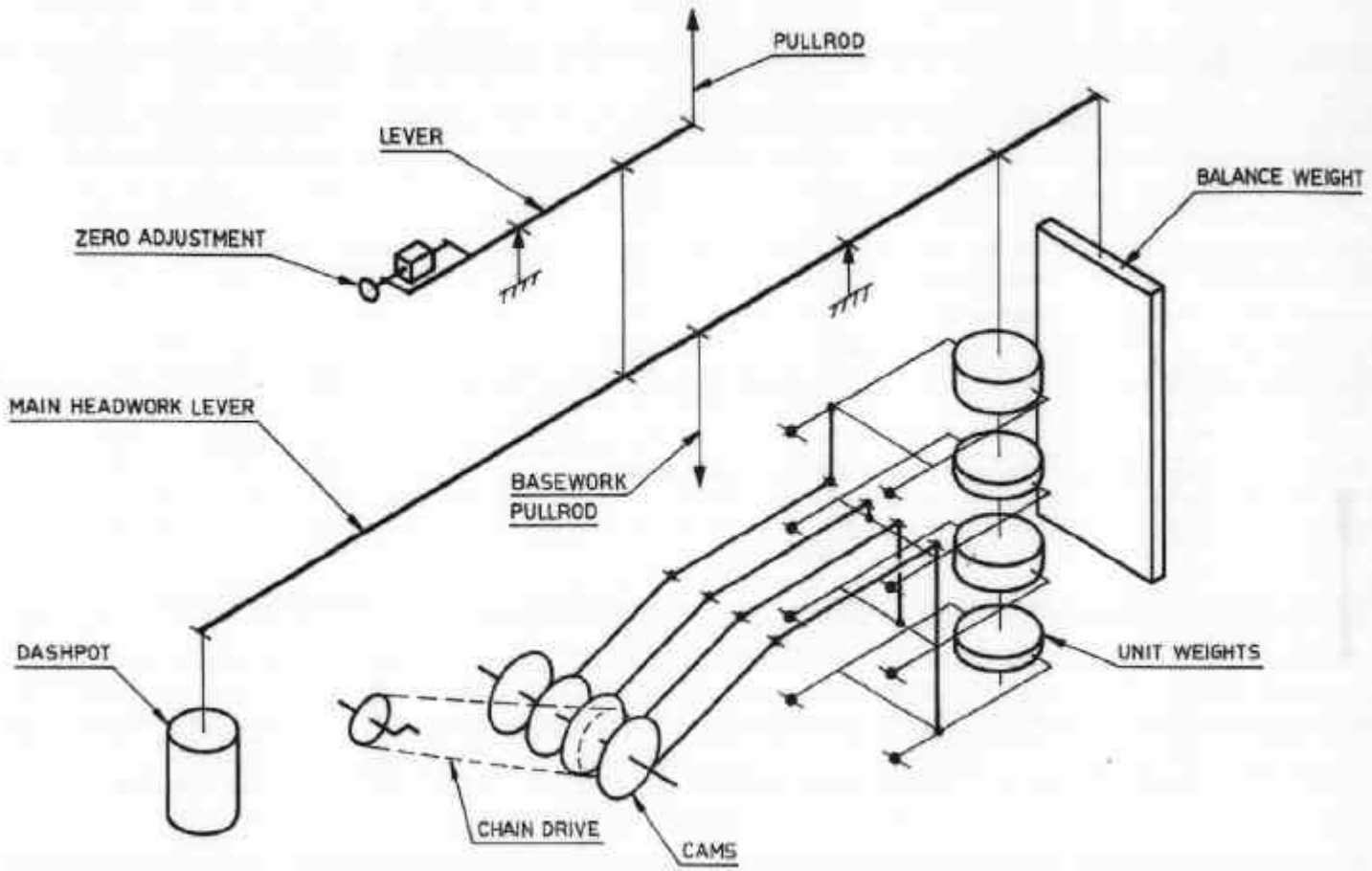
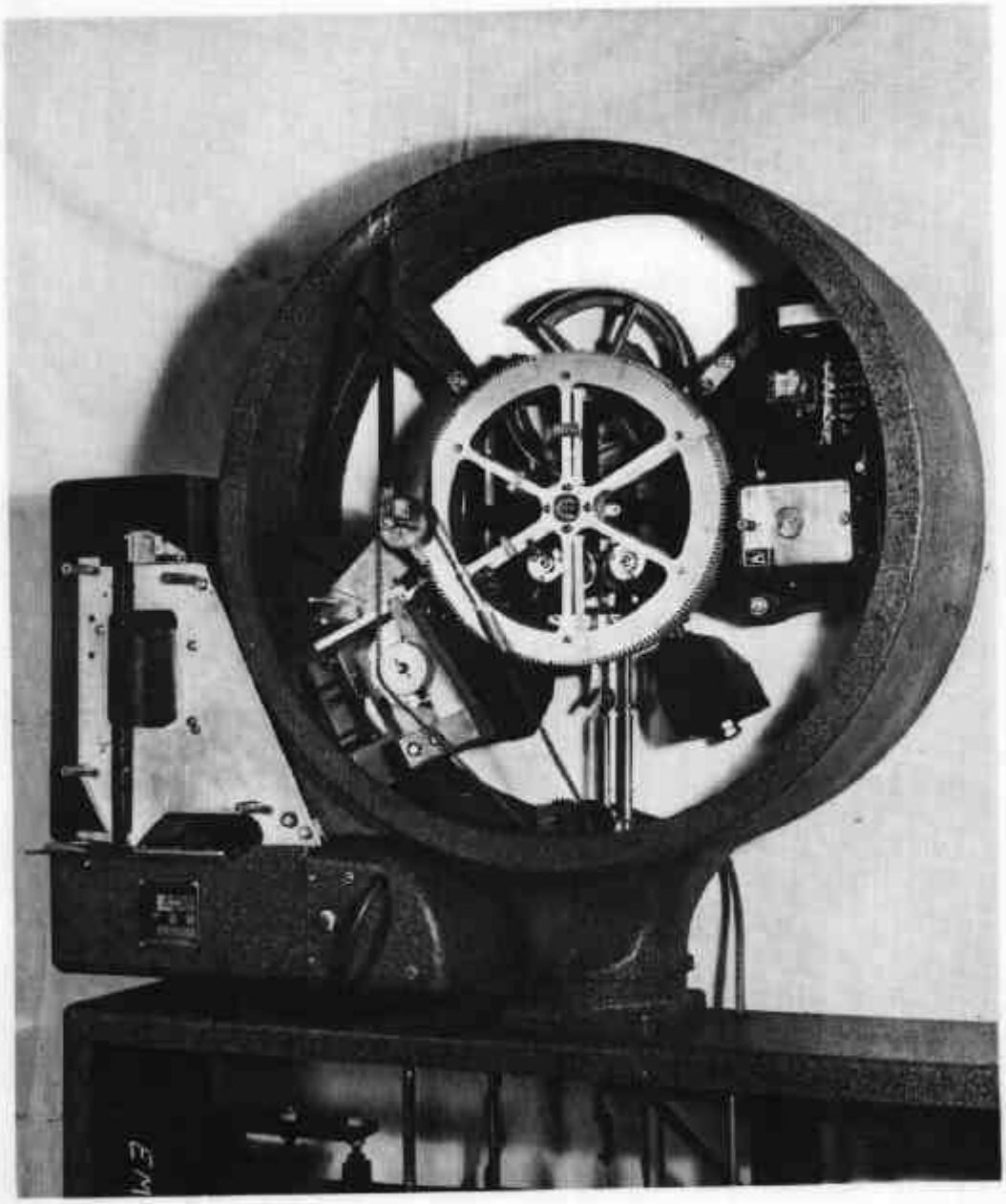
FIGURE 6/10B/1 - 16



Schematic Diagram of Unit-weight Mechanism

FIGURE 6/10B/1 - 17



Ticket Printer Fitted to A-type Cabinet

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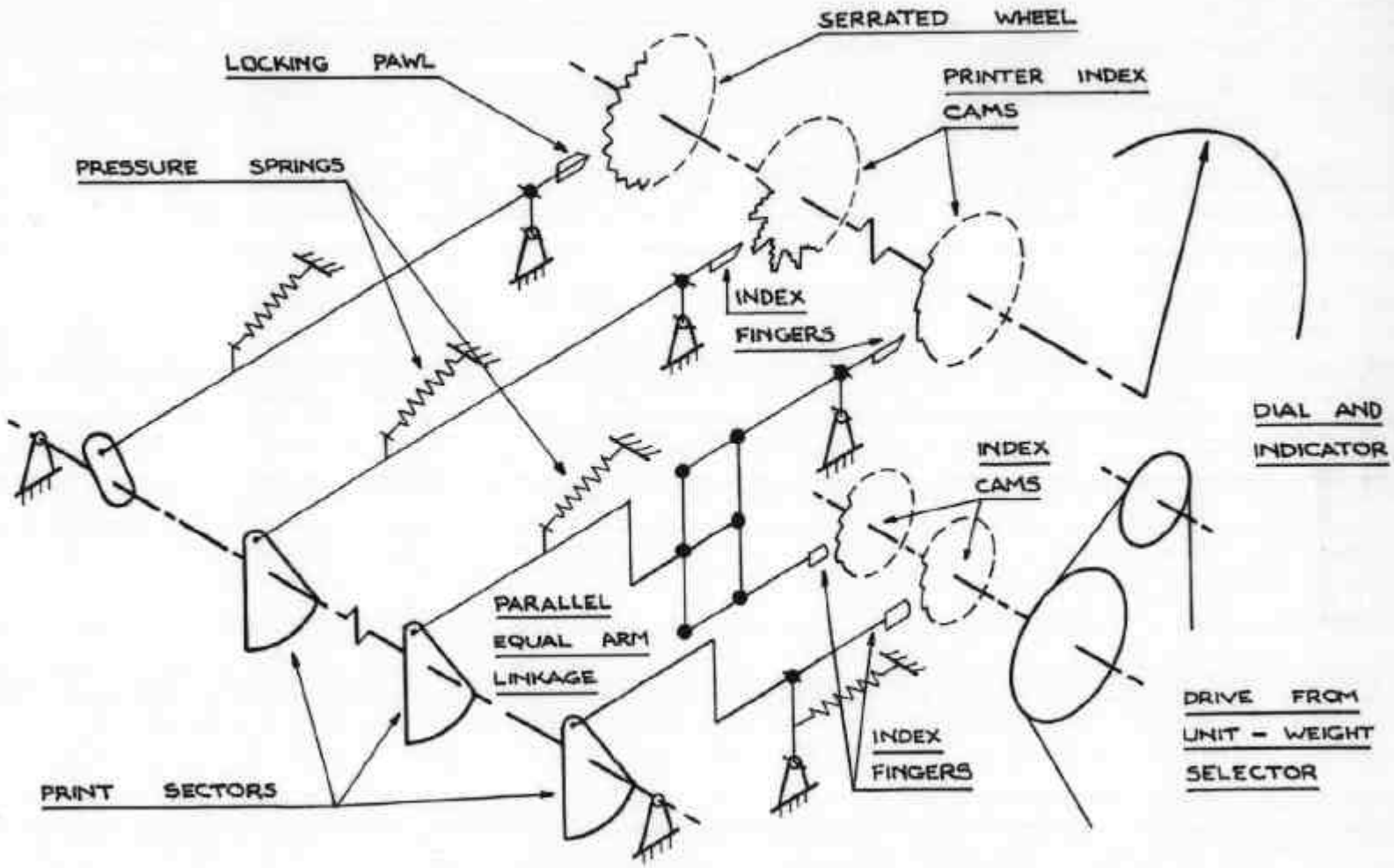
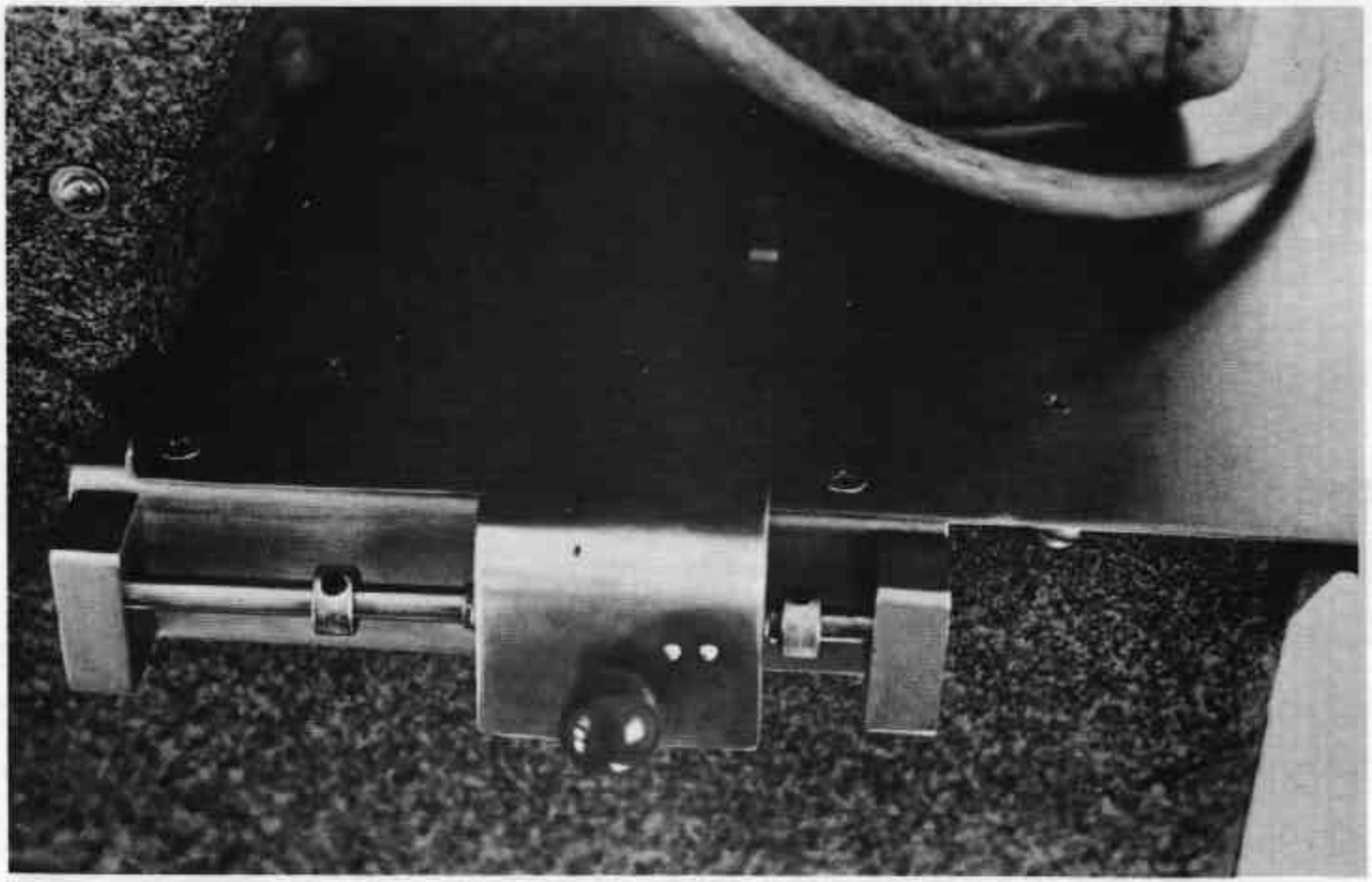
FIGURE 6/10B/1 - 18

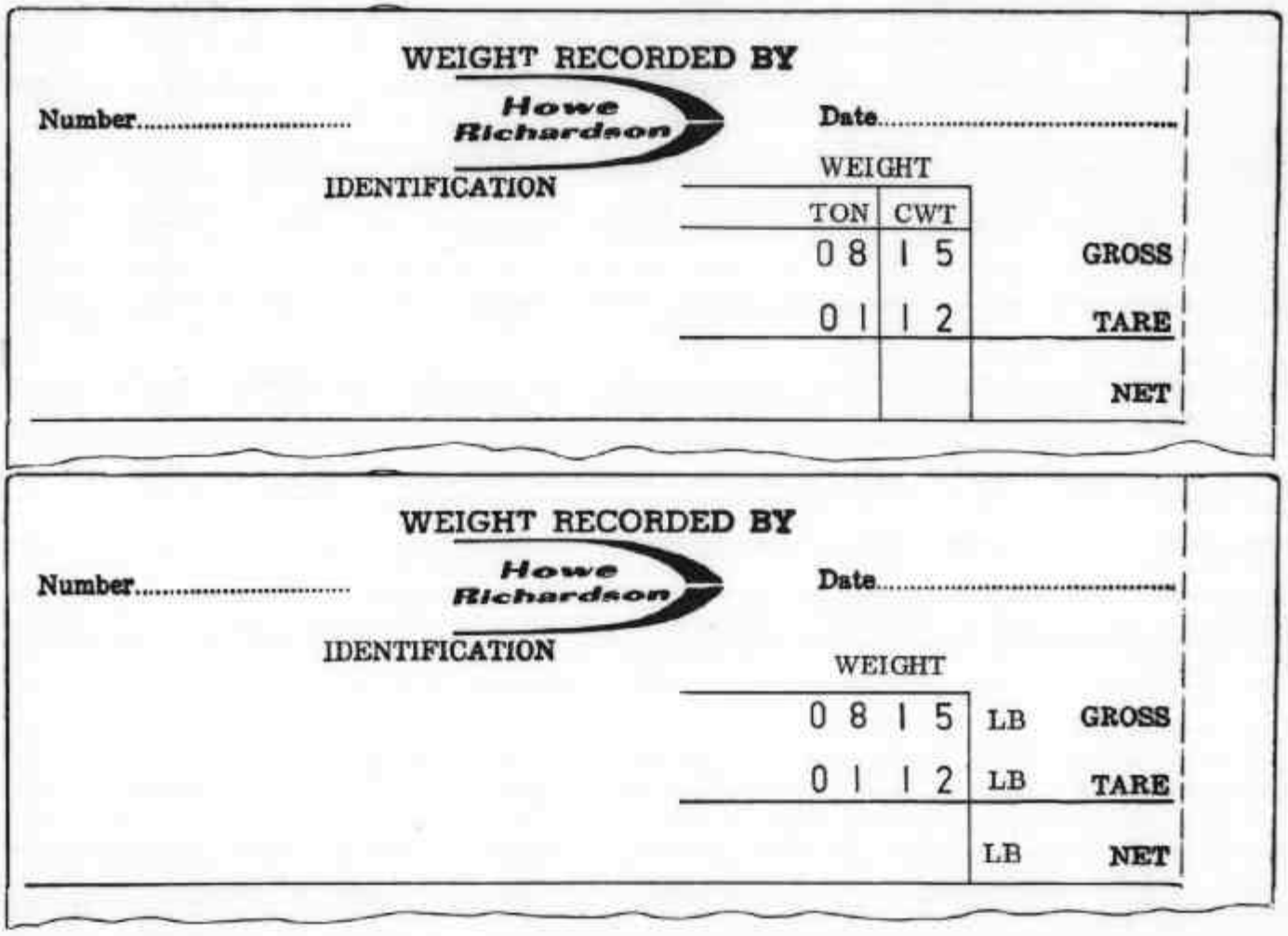


Ticket-printer Mechanism — Schematic Diagram



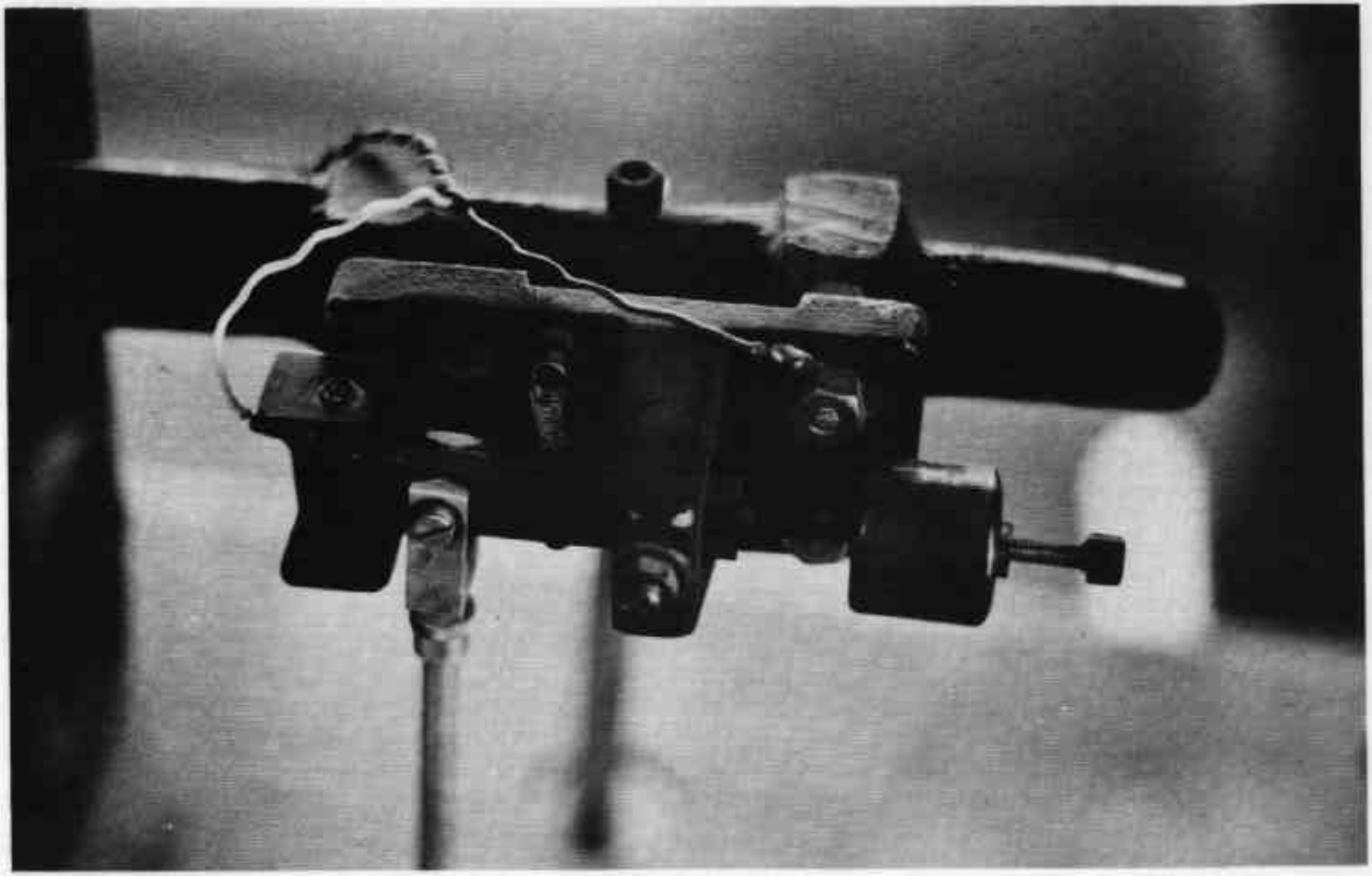
Ticket Guide

FIGURE 6/10B/1 - 20



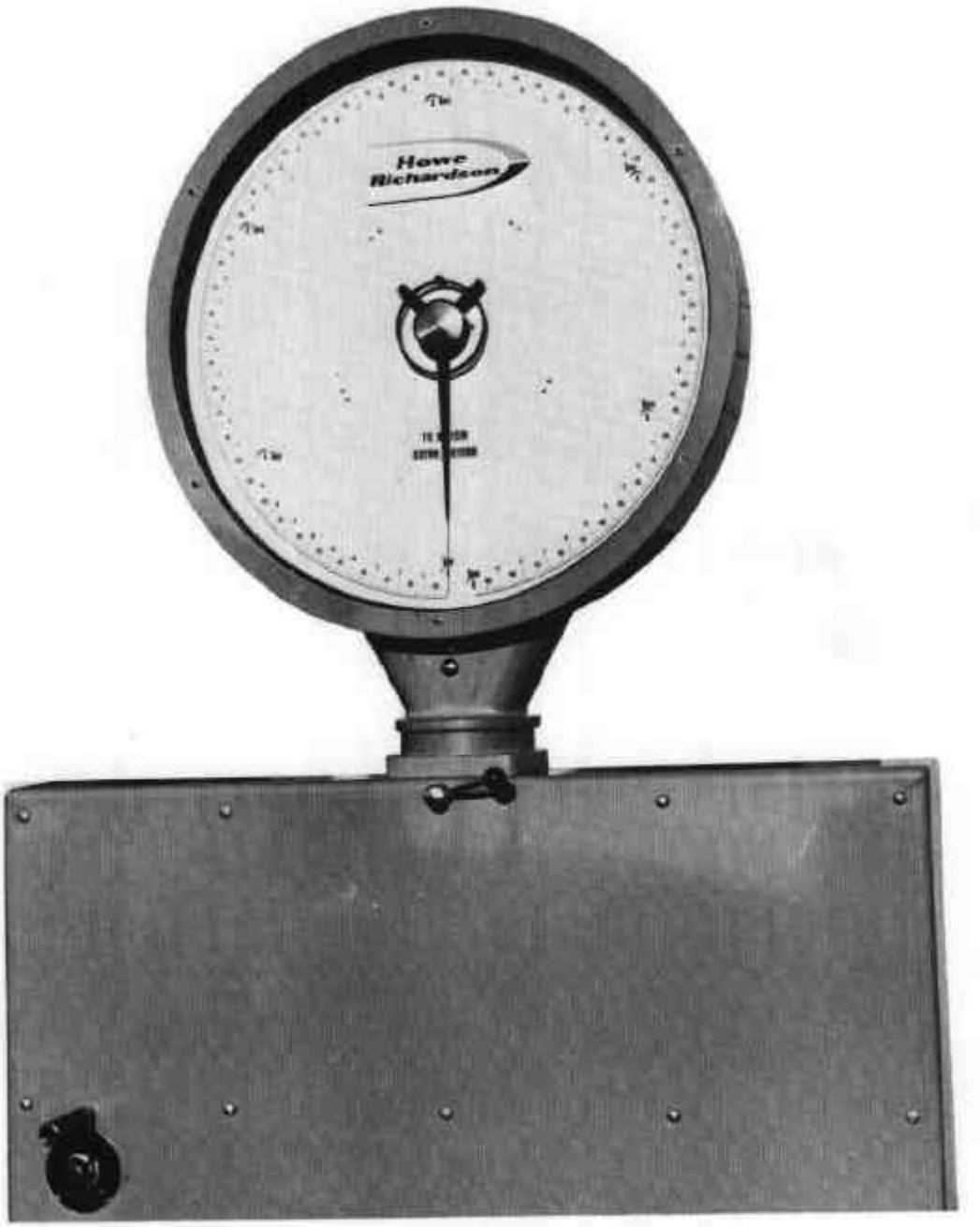
Tickets (actual size)

FIGURE 6/10B/1 - 21



Motion Detector

FIGURE 6/10B/1 - 22



Model A Self-indicating Headwork with Circular Dial and Flash Dial

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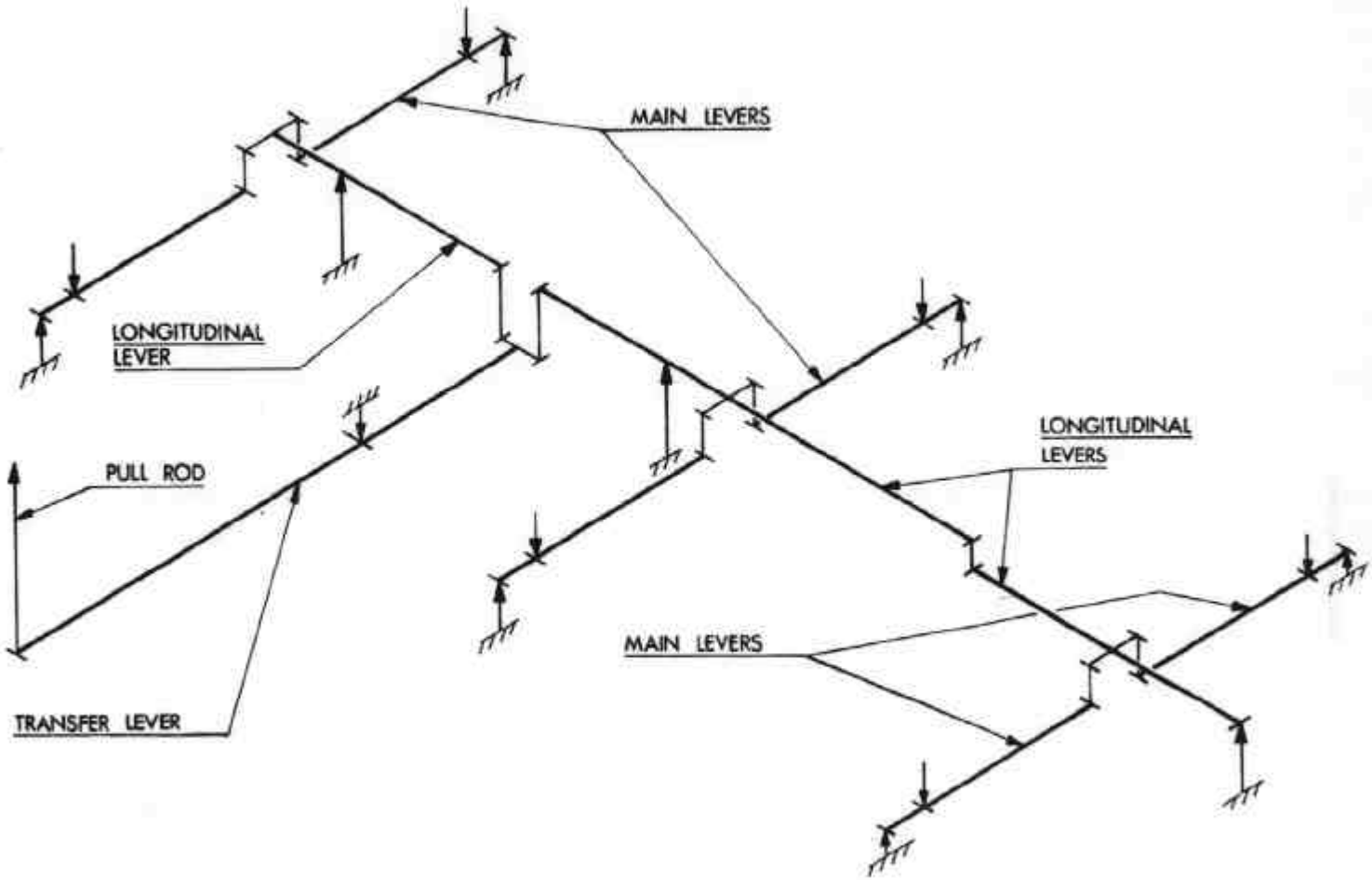
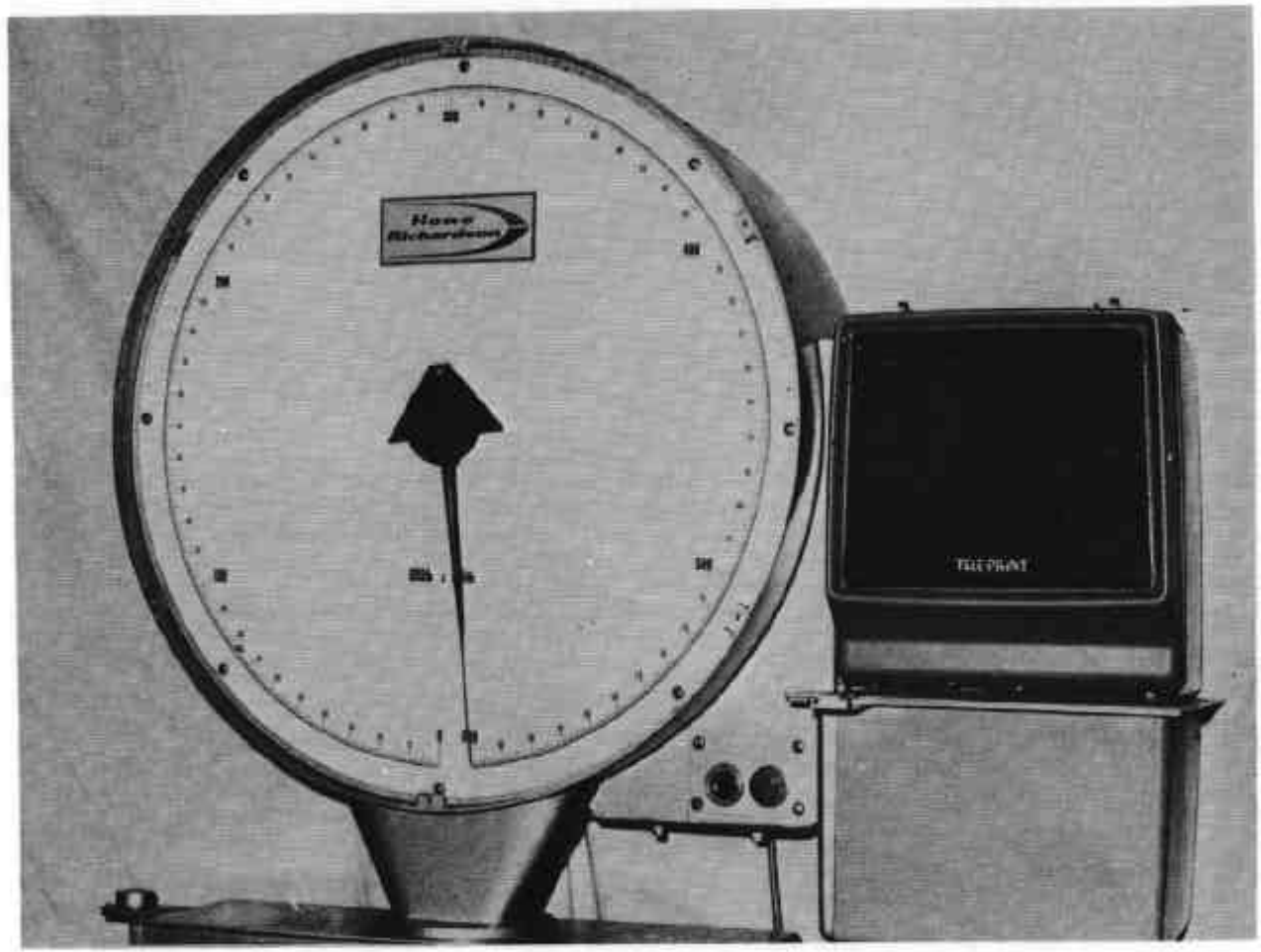
FIGURE 6/10B/1 - 23



3-section Lever System

FIGURE 6/10B/1 - 24



Howe Richardson Headwork with CP Teleprint Ticket Printer