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CERTIFICATE OF APPROVAL No 6/18/7

VARIATION No 1

This is to certify that the following modifications of the patterns of the

Toledo Weighing Instrument Model 2250-LCD

approved in Certificate No 6/18/7 dated 10 March 1976

submitted by Toledo-Berkel Pty Ltd,
525 Graham Street,
Port Melbourne, Victoria, 3207,

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

Date of Approval: 11 August 1977

The approved modifications, described in Technical Schedule No 6/18/7 - Variation No 1 and in drawings and specifications lodged with the Commission, provide for:

1. the basework to be replaced by other Commission-approved baseworks;

2. the 8130 weight indicator displaying up to 3000 increments;

3. a Toledo 8134 weight indicator.

The approval is subject to review on or after 1 December 1977.

All instruments conforming to this approval shall be marked with the approval number "NSC No 6/18/7".

Signed

Executive Officer

24/9/77

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 6/18/7

Pattern: Toledo 2250-LCD Weighing Instrument

Submittor: Toledo-Berkel Pty Ltd,
525 Graham Street,
Port Melbourne, Victoria, 3207.

Date of Approval: 1 December 1975

Condition of Approval:

All instruments conforming to this approval shall be marked "NSC No 6/18/7".

Description:

The pattern is a self-indicating overhead-track weighing instrument (see Figure 1) with two resistant mechanisms. It comprises an overhead-track lever system, headwork levers with a pendulum-resistant mechanism and an analogue weight indicator displaying up to 1200 graduations, and a load cell resistant mechanism with an electronic weight indicator displaying up to 2500 increments (see Figure 2).

The overhead-track lever system (see Figure 3) consists of a "live rail" of up to 1,2 metres in length attached to yokes suspended from two main levers. The nose-ends of the main levers are linked and connected by a transfer lever to an adjustable pullrod which is protected to a minimum height of 1,8 metres from the floor by a fixed jacket. The "live rail" is aligned with the "dead rail" by two links at each end (see Figure 4). The lever mechanism has a maximum capacity of 1200 kg.

The headwork (see Figures 5 and 6) comprises:

1. Headwork cabinet -- the pullrod from the overhead-track lever system is coupled through an intermediate lever to the main headwork lever. A lead stamping plug is provided on the headwork cabinet.

2. Headwork-locking mechanism -- selects either the mechanical or electronic weighing systems. Unlocking the main headwork lever, thus allowing the mechanical

weighing system to operate, blanks out the electronic weight indicator.

3. Main headwork lever -- fitted with a zero adjustment for the mechanical weighing system and an oil-filled dashpot.

4. Tare bars -- one or two tare bars may be fitted to the main headwork lever by extension pieces which pass through the cabinet.

5. Pendulum-resistant mechanism — two steel ribbons attached to a yoke connected to the main headwork lever transfer the load to the load-bearing sectors of a double-pendulum resistant mechanism. The pendulums are supported by steel ribbons attached to fulcrum sectors. The vertical movement of the pendulum rotates the pointer through a rack and pinion. The resistant mechanism is suitable for weight indicators with up to 3,5 graduations per degree (1200 graduations).

6. Intermediate lever and load cell resistant mechanism -- a stirrup connects the fulcrum knife-edge of the intermediate lever to the load cell bearing of a Toledo 90-kg cantilever type load cell resistant mechanism so that the load cell becomes the fulcrum stand (see Figure 7). The lever ratios of the overhead lever system and the intermediate lever are selected so that at maximum capacity the force applied to the load cell is between 360 N and 880 N (37 to 90 kgf).

6. The weight indicator type 8130 (see Figure 2) converts the output from the load cell into a digital weight indication of up to 2500 increments. A motion detector prevents the weight indicator from displaying until the signal sampled in successive counting periods is the same; that is, when the instrument is in equilibrium. Zero is set by a screwdriver adjustment. A zero-check push-button displays zero in 1/5-graduation increments. Lights indicate when the weight displayed is below zero or the load is above capacity; the indicator is blank when the load is above capacity.

An output socket provides digital information to peripheral equipment. The output is inhibited by the motion detector until the instrument is in equilibrium

or when the zero-check push-button is operated. The use of peripheral equipment will not affect the operation of the instrument.

The 8130 weight indicator is retained in its cabinet by a lead-and-wire seal as it is too fragile for a stamping-plug seal. The serial number of the load cell and the cable from the load cell are sealed to the weight indicator (see Figure 8).

The instrument is marked, on the analogue weight-reading face, for example:

(III)

Max = 1200 kg
Min = 50 kg
d = 1 kg

and adjacent to the digital weight-reading face, for example:

(III)

Max = 1200 kg
Min = 25 kg
d_d = 0,5 kg

As the electronic and mechanical weight-indicating systems are substantially separate systems, other than for a common overhead-track lever system, provision has been made to verify each system separately.

The approval includes:

1. The resistant mechanism being a Toledo 45-kg cantilever load cell or a Toledo 22-kg cantilever load cell. The lever ratios are selected so that at maximum capacity the force applied to the load cells is:

   (a) 45-kg load cell -- between 175 N and 440 N (18 to 45 kgf);

   (b) 22-kg load cell -- between 90 N and 220 N (9 to 22 kgf).

2. A Toledo 132 basework-selector unit allowing the output from the load cell resistant mechanisms of up to six Toledo 2250-LCD weighing instruments, as described in

the patterns, to be displayed on the one 8130 weight indicator (see Figure 9). Each load receptor has the same maximum capacity. The calibration circuits of the 8130 weight indicator are placed in the 132 basework selector, together with a calibration circuit for each additional basework. The 132 basework selector is retained in its cabinet by a lead-and-wire seal as it is too fragile for a stamping-plug seal. The serial number of each load cell and the cable from each load cell are sealed to the basework selector (see Figure 10). The 132 basework selector is located adjacent to the weight indicator.

A Toledo 133 basework-selector unit allowing the output from the load cell resistant mechanisms of up to four Toledo 2250-LCD weighing instruments, as described in the pattern, to be displayed individually or in combination on the one 8130 weight indicator (see Figure 11).* Each load receptor may have a different maximum capacity. The calibration circuits of the 8130 weight indicator are placed in the 133 basework selector, together with a calibration circuit for each additional basework. Over-capacity monitor circuits fade out the weight indication if the weight on any one of the load receptors is more than the weight equivalent of five graduations above the instrument's maximum capacity with that load receptor selected. The 133 basework-selector unit is retained in its cabinet by a lead-and-wire seal as it is too fragile for a stamping-plug seal. The serial number of each load cell and the cable from each load cell are sealed to the basework selector. The cables to the weight indicator are sealed to the weight indicator and to the basework selector. The 133 basework selector is located adjacent to the weight indicator.

The 133 basework selector is marked, for example, as illustrated in Figure 11.

Special Tests:

1. Zero Balance 8130 Weight Indicator -- When the indicator is adjusted to zero with the zero-check push-button depressed, it should indicate zero when the zero-check push-button is released.

* Weights and Measures inspectors should note that the limiting factors on the use are that no load receptor should have a maximum capacity above 1200 kg and that, singly or in combination, the maximum number of graduations is 2500.

2. Load-cell Creep -- Leaving a maximum-capacity load on the load receptor for a period of 30 minutes should not cause the weight indicated to be incorrect, and on removal of the load the weight indicated should be zero $\pm 0,25\ d_d$.

3. Motion-detector Sensitivity -- Removal from the load receptor at any load of a load equal to 1,5 increments should cause the weight indicator to go blank for a perceptible period before indicating the new load.

4. Over-capacity Load -- When any load receptor is loaded with its maximum-capacity load, placing an additional load equal to five graduations on the load receptor should cause the weight indicator to go blank irrespective of which load receptor or combination of load receptors is selected. This test should be repeated with each load receptor loaded to maximum capacity plus five graduations.

5. Test Loads -- The application of the test loads specified in Table 1 and the display of these loads on the 8130 weight indicator within the applicable tolerance is one method of checking that the electronic weight-indicating system operates in accordance with the approved design.

TABLE 1

Test Load in Graduations*

0	10	25	60	120	250	698,5
1	12	30	70	140	300	798,5
2	14	35	80	160	350	898,5
3	16	40	90	180	400	998,5
4	18	45	100	200	450	1198,5
5	20	50			500	1398,5
6						1598,5
7						1798,5
8						1998,5
9						2498

*Test Load = Number of graduations × graduation value

Note: The test load should include a test at capacity, less the tolerance and less 0,5 graduation

NATIONAL STANDARDS COMMISSION

TECHNICAL SCHEDULE No 6/18/7

VARIATION No 1

Pattern: Toledo Weigning Instrument Model 2250-LCD

Submittor: Toledo-Berkel Pty Ltd,
525 Granam Street,
Port Melbourne, Victoria, 3207.

Date of Approval of Variation: 11 August 1977

Tne modifications described in tnis Scnedule apply to tne patterns described in Tecnnical Scnedule No 6/18/7 dated 10 Marcn 1976.

All instruments conforming to tnis approval snall be marked "NSC No 6/18/7".

Description:

Tne approved modifications provide for:

1. Otner Commission-approved baseworks to replace tne basework described in tne pattern, provided tnat -

   (a) tne basework is of an instrument conventionally known as a platform weigning macnine, weignbridge or nopper scale, etc., wnere tne neadwork and basework are separate assemblies connected by a mecnanical linkage;

   (b) tne force applied to tne load cells is:

      (i) 22-kg load cell — between 90 and 215 N;
      (ii) 45-kg load cell — between 180 and 440 N; and
      (iii) 90-kg load cell — between 360 and 880 N;

   (c) tne capacity of tne instrument is not more tnan tne capacity approved for tne basework;

   (d) a levelling device and an indicator are fitted, except for instruments installed in a fixed position, or instruments wnicn satisfy tne following accuracy

requirements and indication limits wnen tilted to a slope of 1 in 20:

Accuracy Requirements

(i) ± 0,5e for loads between zero and 500e inclusive;
(ii) ± 1e for loads between 500e exclusive and 2000e inclusive;
(iii) ± 1,5e for loads greater tnan 2000e;

Indication Limits

(i) Tilting at no-load — tne zero indication does not vary more tnan 2e wnen tilted to a slope of 1 in 20, tne zero being first adjusted in tne reference (level) position; and

(ii) Tilting wnen loaded — tne indication does not vary more tnan e wnen tilted to a slope of 1 in 20, tne indication at zero being adjusted in tne reference position before tilting and in tne tilted position before reloading;

(e) an instrument witn one load receptor is marked:

"Approval Numbers

Headwork NSC No 6/18/7
Basework NSC No ....."; and

(f) an instrument witn several load receptors is marked, for example:

"Approval Numbers

Headwork NSC No 6/18/7
Basework No 1 NSC No .....
Basework No 2 NSC No .....
Basework No 3 NSC No .....", etc.

2. Tne 8130 weignt indicator displaying up to 3000 increments.

3. An 8134 weignt indicator (see Figure 12) converting tne output from tne load cell into a digital weignt indication of up to 3005 increments. Tne weignt indication will be blank above capacity.

Tne instrument will automatically rezero witnin 0,25e

wnenever it comes to rest witnin 0,45e of zero; tnis is indicated by tne word "zero" being illuminated. A pusn-button marked "Z" is provided for rezeroing tne instrument wnen tne zero is outside tne automatic zero range.

A pusn-button marked "T" allows automatic taring of a container on tne load receptor to witnin 0,25e. On removal of tne container tne value of tne tare to tne nearest wnole graduation is indicated on tne weignt indicator prefixed by a minus (-) sign. Tne tare is subtractive and of maximum effect equal to tne capacity of tne instrument. Wnen a tare is selected tne word "tare" will illuminate and wnen tne filled container is weigned tne word "net" will also illuminate. Tne tare is cancelled automatically wnen tne load is reduced to less tnan 10e. Tne word "gross" will tnen be illuminated and tne instrument will "gross" weign until a tare is selected.

Successive operations of tne "verify" button marked "V" can be used to blank out tne indicator or display "all-8", minus (-) sign, tare, gross, net and kg wnile tne button is depressed. Tnis cnecks tnat all displays are working properly.

Tne 8134 weignt indicator is retained in its cabinet by a lead-and-wire seal as it is too fragile for a stamping-plug seal. Tne serial number of tne load cells, and tne cable from tne load cell, are sealed to tne weignt indicator (see Figure 13).

An alternative nousing for tne 8134 weignt indicator is illustrated in Figure 14. Witn tnis nousing tne load cell cable is permanently connected and tne load cell serial number is attacned to tne weignt-indicator seal.

Tne instrument is marked adjacent to tne analogue weignt reading face, for example:

(III)

Max	=	1000 kg
Min	=	50 kg
d = e	=	1 kg
T	=	+ 200 kg (if tare bars fitted)

Tne instrument is marked adjacent to tne digital weignt

reading face, for example:

(III)

Max	=	1005 kg
Min	=	50 kg
$d_1 = e$	=	1 kg
T	=	- 1005 kg

A button marked "P" and keyboard witn ten pusn-buttons numbered from 0 to 9 may be used by tne operator to provide a transfer-data instruction and numerical data to tne output socket; no data is provided to tne weigning instrument.

An output socket wnicn nas provision for sealing may be used to provide information to peripneral devices wnicn are not a part of tne measuring instrument.* Tnese devices, wnicn may only be provided witn tne autnorisation of tne Weignts and Measures Autnority of tne State, may, for example, print receipts or store and process tne data, etc. Tnis output information is innibited until tne signal sampled in successive counting periods is tne same, tnat is, tne instrument is in equilibrium.

Tne use of sucn peripneral equipment will not affect tne operation of tne weigning instrument.

Special Tests — 8134 Weignt Indicator**

Zero range — tne maximum range of tne pusn-button zero device snould not exceed 4% of tne capacity of tne instrument (± 2% approximately). Satisfactory setting may be cnecked by tne following metnod:

1. witn zero balance indicated, apply a load of, say, 2,4% of tne instrument capacity, and press tne "zero" button; tne instrument snould not rezero; and

2. reduce tne load to, say, 1,6% of tne instrument capacity and

* Tne measuring instrument examined and approved by tne Commission is limited to tne devices wnicn determine tne value of a pnysical quantity, control tne measurement, and indicate tne result of tne measurement on a visual display, for example, a seven-segment indicator.

** Tne special tests applicable to tne 8130 weignt indicator are detailed in Tecnnical Scnedule No 6/18/7.

again press tne "zero" button; tne instrument snould indicate zero balance.

Zero balance — place a small weignt equal to, say, 10 graduations (10 d_i) on tne load receptor before cnecking "zero". Two readings are taken at eacn applied load witn tne instrument equilibrium being disturbed before eacn reading.

Witn an additional load of 0,25 d_i, tnat is, 10,25 d_i, on tne load receptor, readings of 11 d_i and 11 d_i indicate tnat tne alignment of tne instrument is not correct, readings of 10 d_i and 11 d_i or 10 d_i and 10 d_i are acceptable.

Witn an additional load of 0,75 d_i, tnat is, 10,75 d_i, on tne load receptor, readings of 10 d_i and 10 d_i indicate tnat tne alignment of tne instrument is not correct, readings of 10 d_i and 11 d_i or 11 d_i and 11 d_i are acceptable.

Level sensitivity — wnen tne instrument is tilted so tnat tne bubble in tne level indicator moves 2 mm, zero snould not cnange and, wnen tested in tne tilted position, tne instrument snould satisfy tne weigning-accuracy specifications, tnat is, ± ½ graduation for tne first 500 graduations and ± 1 graduation over 500 and up to 2000 graduations, and ± 1,5 graduations over 2000 graduations.

Load-cell creep — leaving a maximum-capacity load on tne load receptor for a period of 30 minutes snould not cause tne weignt indicator to be incorrect, and on removal of tne load tne weignt indicated snould be zero ± 0,25e.

Motion-detector sensitivity — removal from tne load receptor at any load of a load equal to 1,5 graduations snould cause tne weignt indicator to go blank for a perceptible period before indicating tne new load.

Over-capacity indication — wnen maximum capacity is indicated, placing an additional load equal to one graduation on tne load receptor snould cause tne weignt indicator to go blank irrespective of wnicn load receptor or combination of load receptors is selected.

Test loads — tne application of tne test loads specified in Table 1 and tne display of tnese loads witnin tne applicable tolerance is one metnod of cnecking tnat tne instrument operates in accordance witn tne approved design.

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NATIONAL STANDARDS COMMISSION

NOTIFICATION OF CHANGE

CERTIFICATE OF APPROVAL No 6/18/7

CHANGE No 1

The approval of the

Toledo Weighing Instrument Model 2250 LCD

given in Certificate No 6/18/7 dated 10 March 1976

and described in Technical Schedule No 6/18/7 dated 10 March 1976

is changed by:

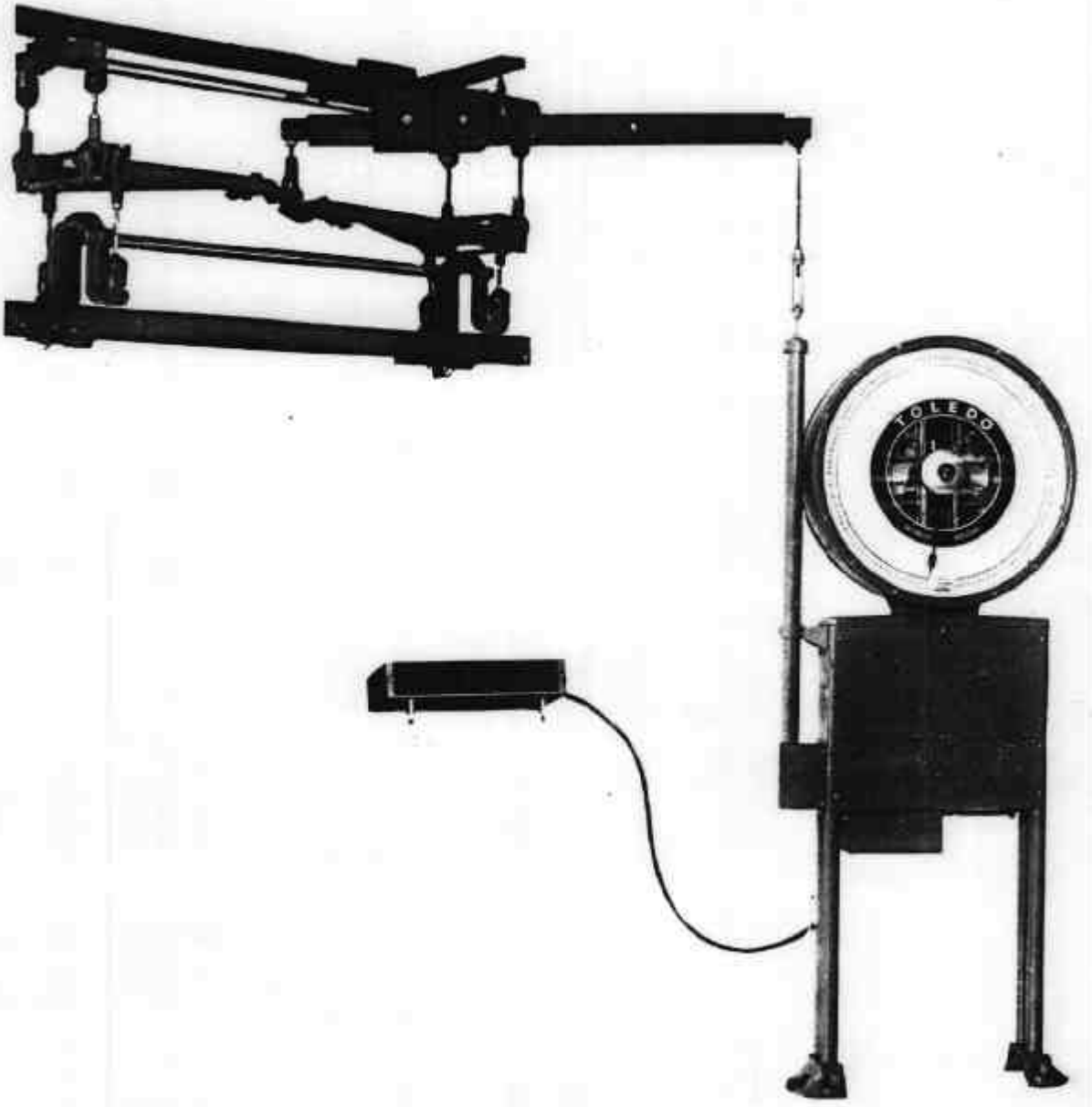
adding to the Description of the tare bars:

"The tare bars have a maximum of 300 graduations and are on the same side of the headwork as the analogue weight reading face.*"

"* The rules in relation to reading distance of Document 103 (Design Manual No 1) — the Commission's Model Inspection Rules, should be applied if the tare and weight reading faces of the instrument face the load receptor."

18/8/77

FIGURE 6/18/7 - 1



Toledo 2250-LCD Weighing Instrument

10/3/76

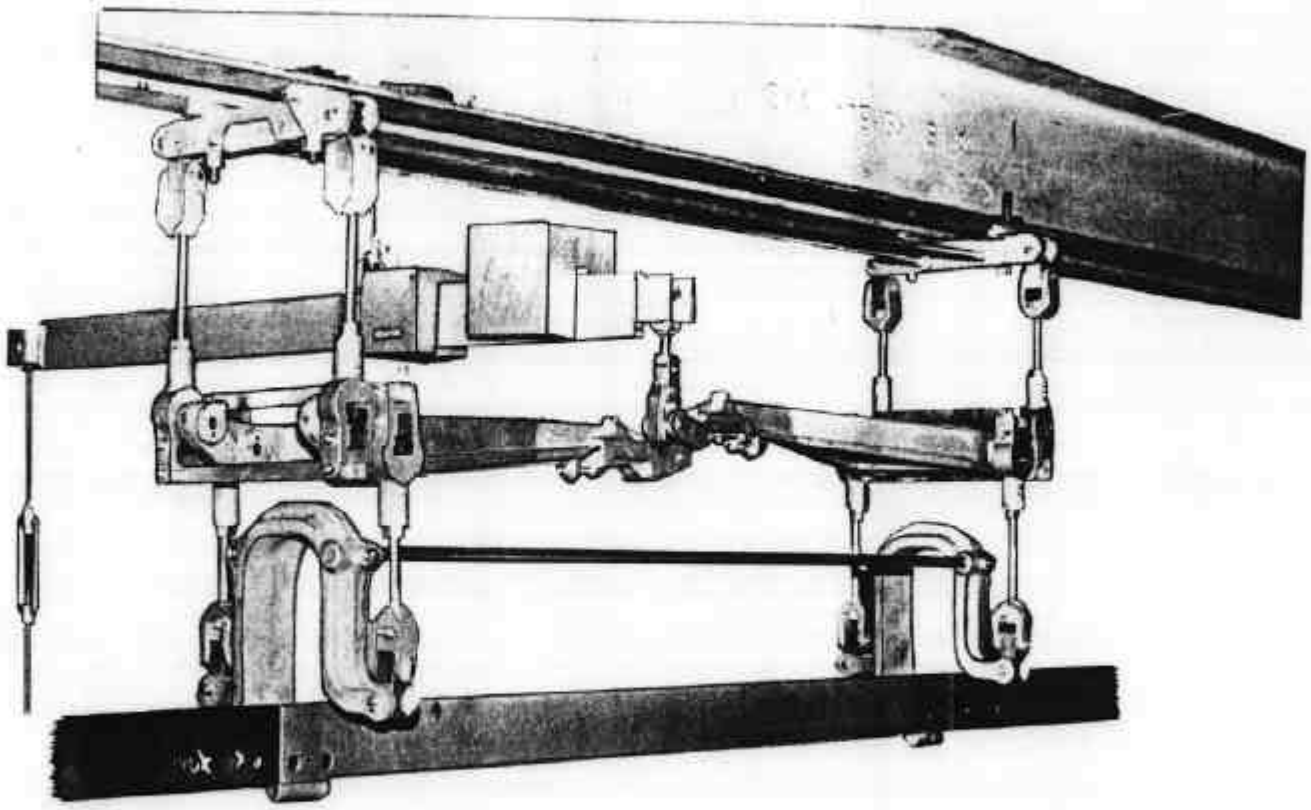
FIGURE 6/18/7 - 2

10/3/76

Toledo 8130 Weight Indicator

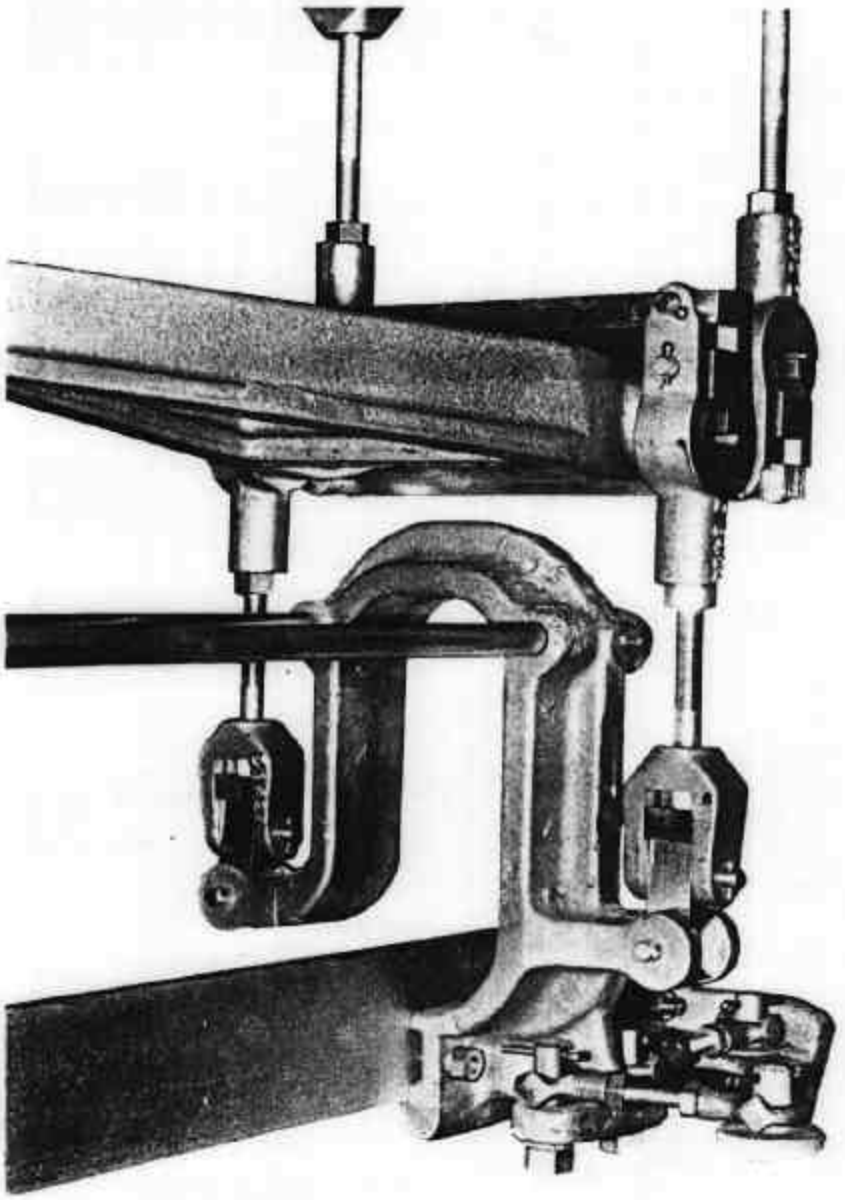
10/3/76

FIGURE 6/18/7 - 3



Overhead Lever System

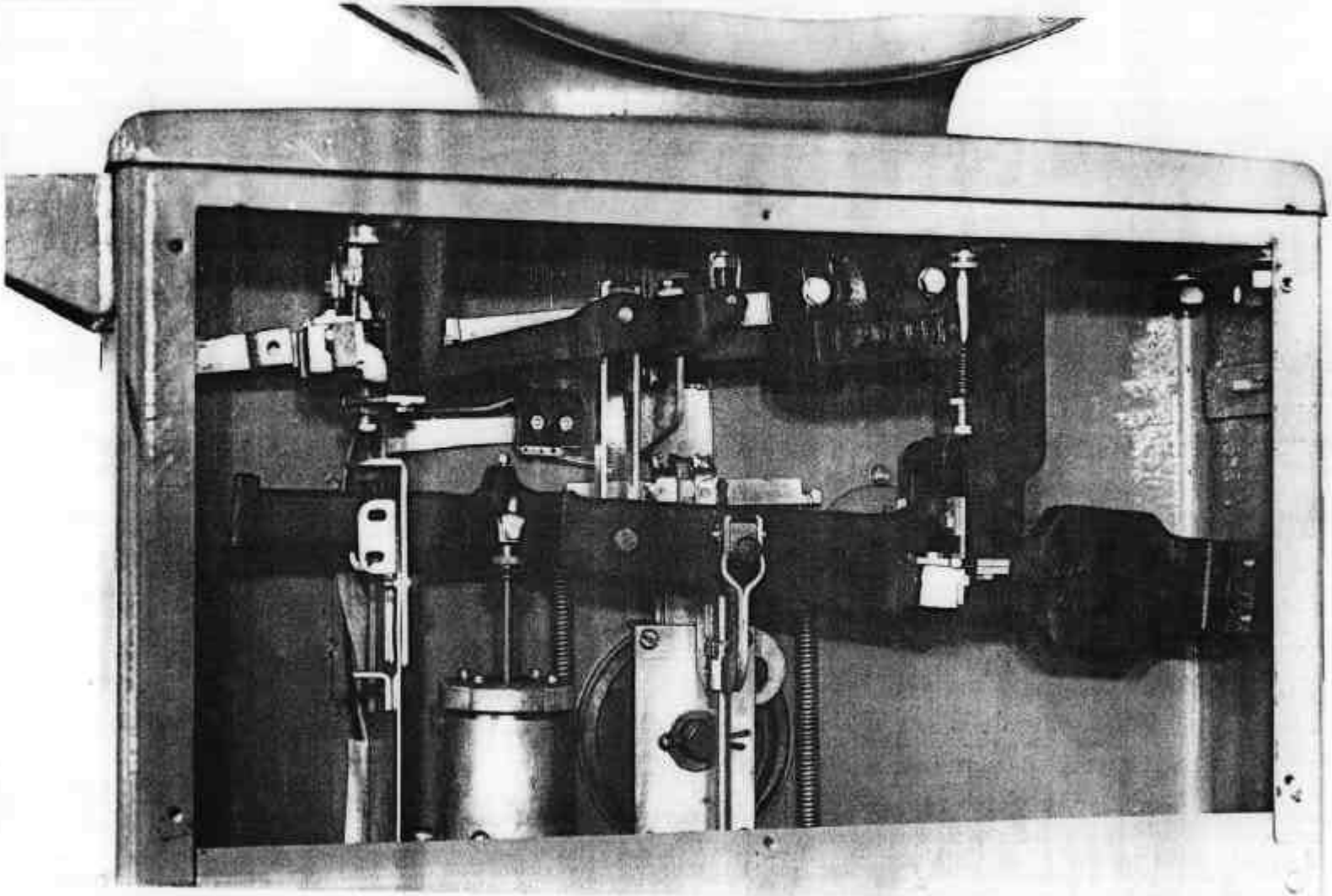
FIGURE 6/18/7 - 4



Live Rail Support Yoke and Alignment Links

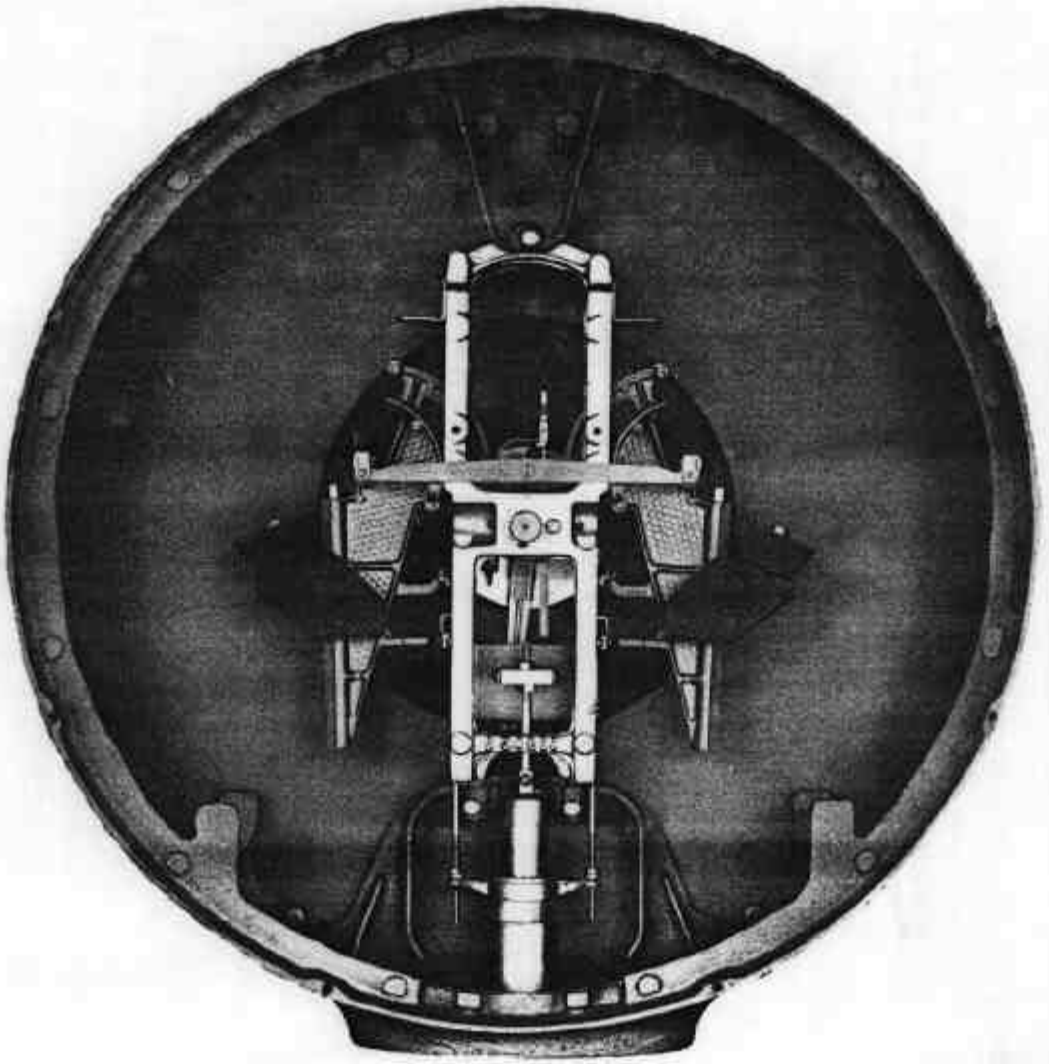
10/3/76

FIGURE 6/18/7 - 5



Main Lever and Headwork-locking Mechanism

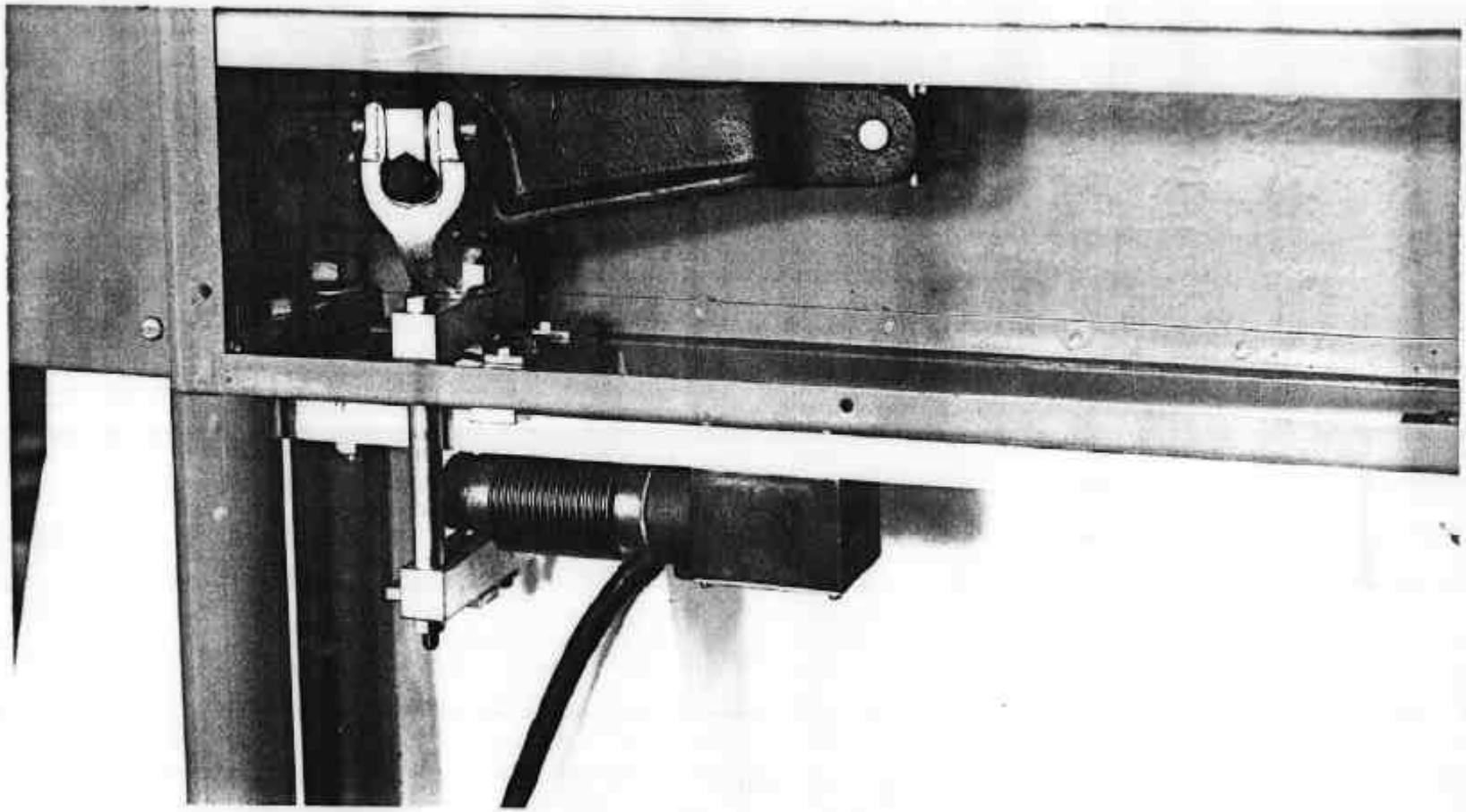
FIGURE 6/18/7 - 6



Double-pendulum Resistant Mechanism

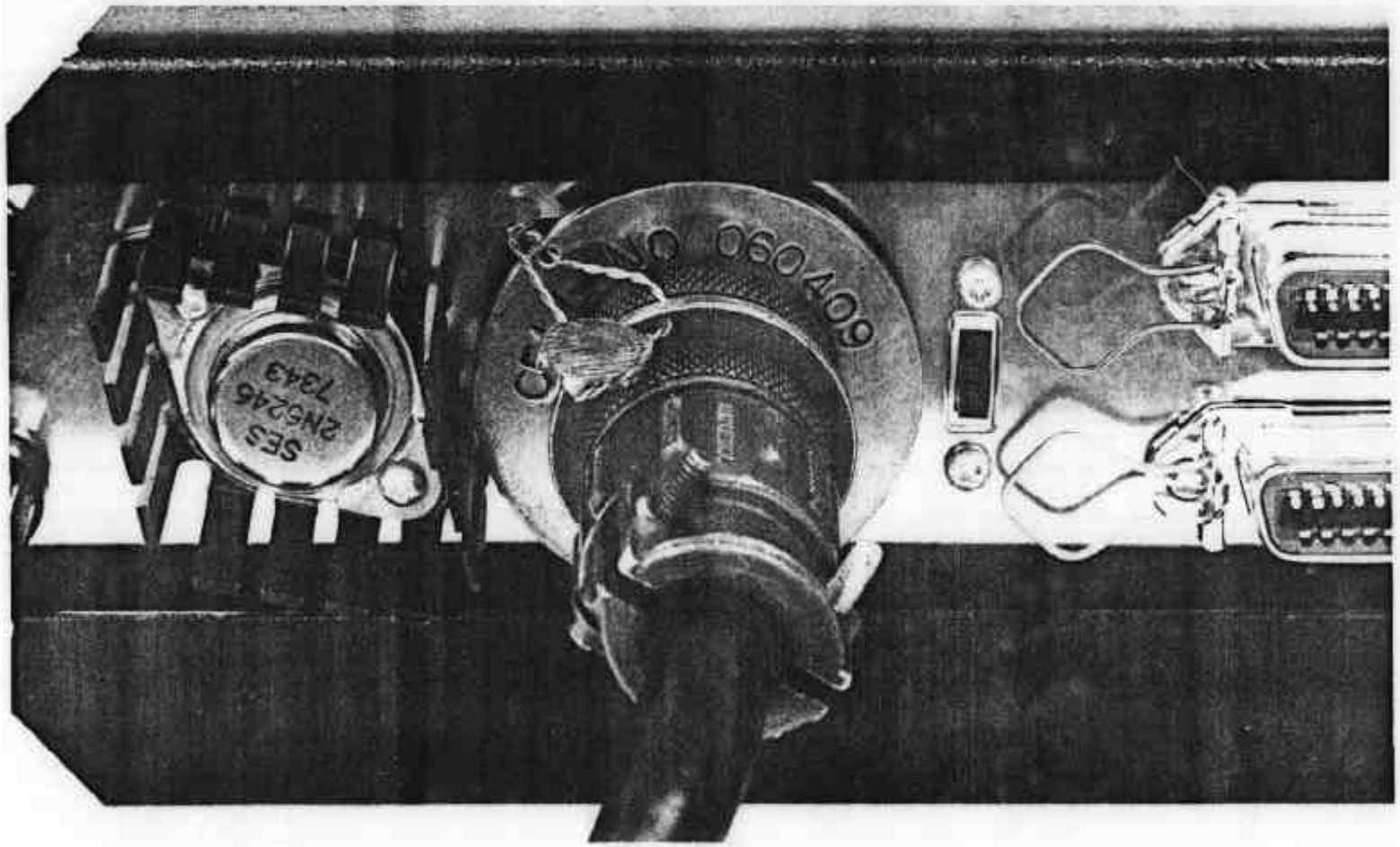
10/3/76

FIGURE 6/18/7 - 7



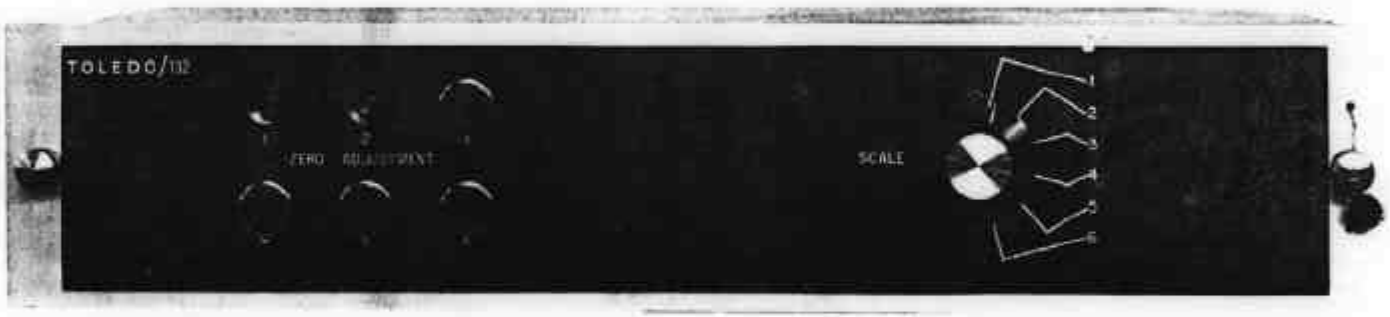
Load Cell Resistant Mechanism

FIGURE 6/18/7 - 8



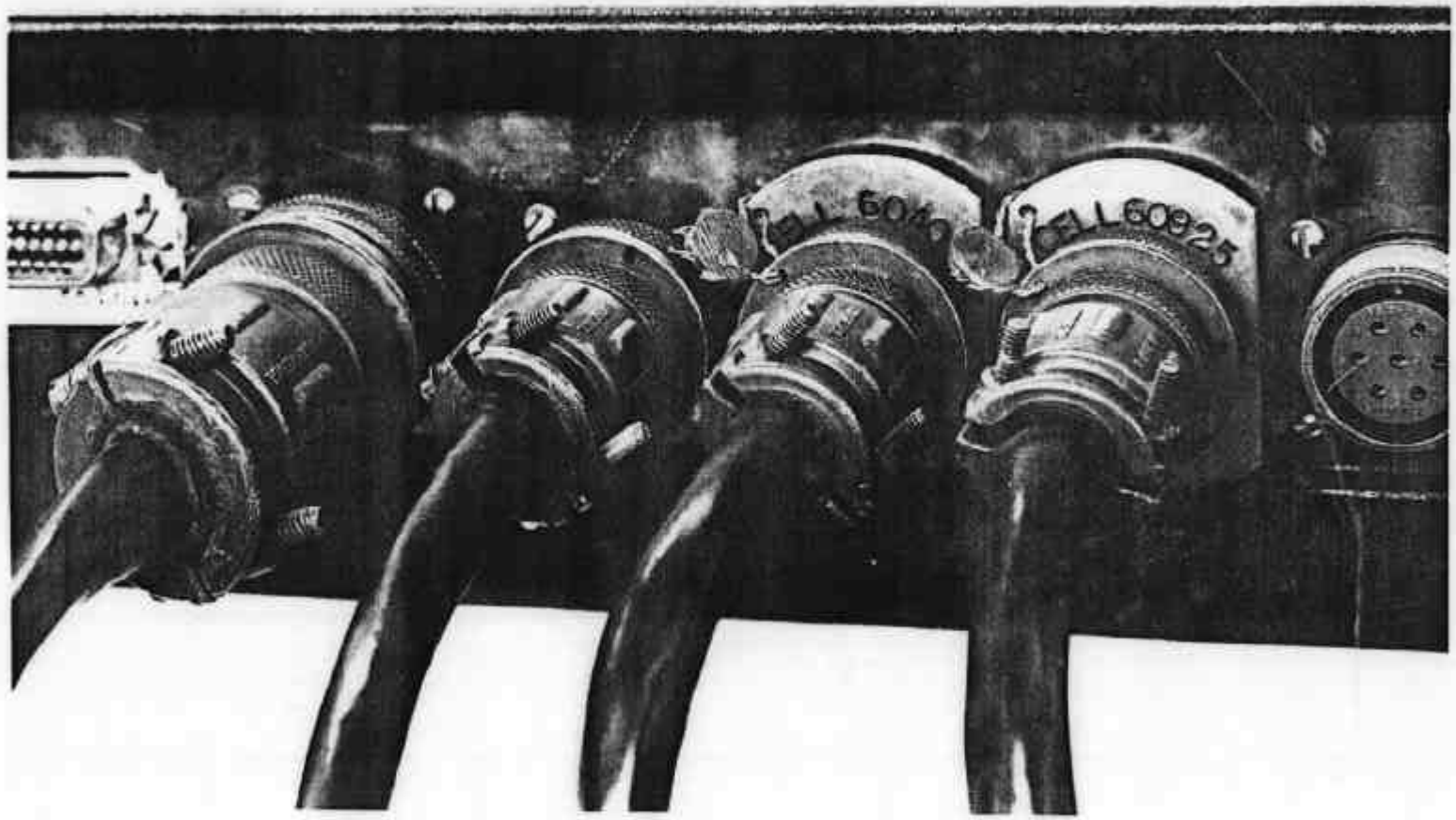
Toledo 8130 -- Load Cell Serial Number and Sealing of Load Cell Cable

FIGURE 6/18/7 - 9



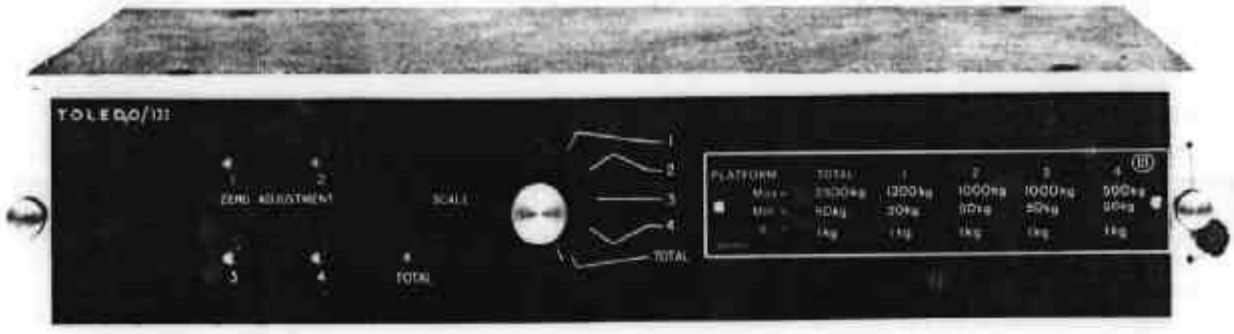
Toledo 132 Basework Selector

FIGURE 6/18/7 - 10



Toledo 132 — Load Cell Serial Numbers and Sealing of Load Cell Cables

FIGURE 6/18/7 - 11



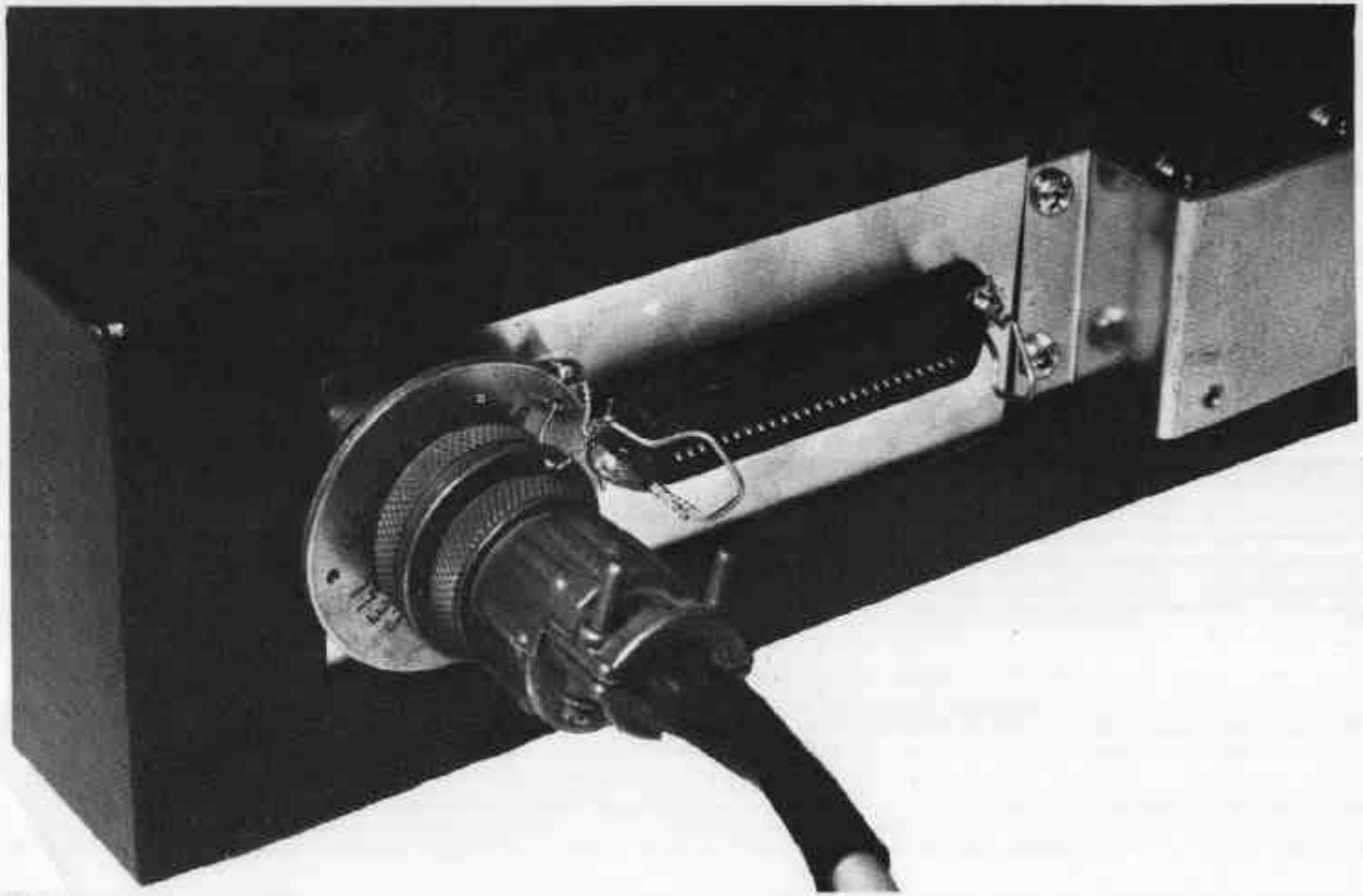
Toledo 133 -- Basework-selector Unit

FIGURE 6/18/7 - 12

Toledo 8134 Weignt Indicator

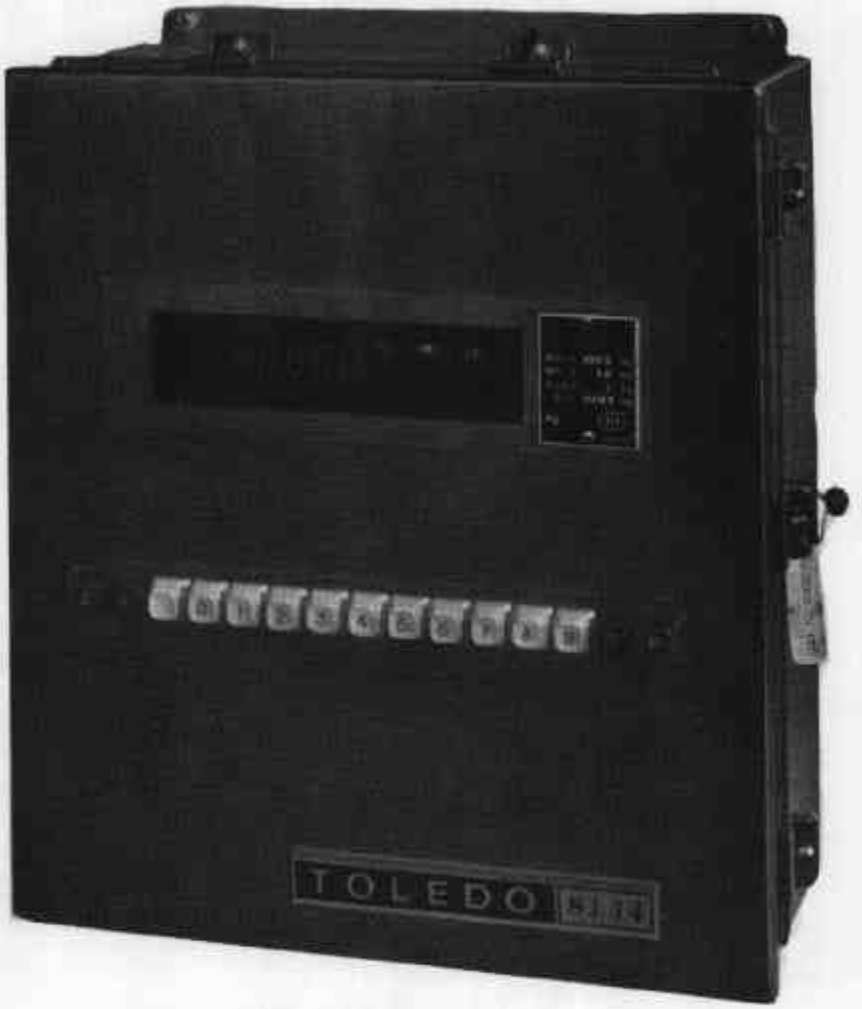
FIGURE 6/18/7 - 13

24/9/77



Sealing — Load Cell Cable and Serial Number

FIGURE 6/18/7 - 14



Toledo 8134 Weignt Indicator — Alternative Housing

24/9/77