

FREIGHTLINER TRAINS

Description and Maintenance Instructions

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PREFACE

This manual now covers the description and maintenance of freightliner vehicles only.

The Temporary Working Instructions (Appendix 1) in the original manual has been re-issued as a separate booklet to all concerned by :-

M.B. Marsden, Esq.,
Operational Assistant,
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LONDON,

Freightliner Containers, Description, Loading, Securing Etc. (Appendix 11) in the original manual is being issued as a separate booklet to all concerned by :-

Chief Engineer's (T.&R.S.) Dept.,
Mechanical Engineer (Design),
Nelson Street,
DERBY.

The Spares List (Appendix 111) in the original manual has been re-issued as a separate booklet to all concerned by :-

Chief Engineer's (T.&R.S.) Dept.,
Mechanical Engineer (Design),
Nelson Street,
DERBY.

PREFACE contd.

FREIGHTLINER VEHICLES.			
1st Batch	End Vehicles	B.601003 - B.601020	- 18 off
	Intermediate Vehicles	B.602003 - B.602084	- 82 off
2nd Batch	End Vehicles	B.601021 - B.601061	- 41 off
	Intermediate Vehicles	B.602085 - B.602141	- 59 off

The 1st Batch of freightliner vehicles have the solebars and headstocks painted Black.

The 2nd Batch of freightliner vehicles have the solebars and headstocks painted Blue.

The following modifications are to be carried out ON THE 1ST BATCH OF VEHICLES at the earliest opportunities :-

- (a) The clamp warning light unit on the headstocks to be replaced by a new type of press button unit (see Page No.32) on all vehicles.
- (b) Spring loaded ball catches to be fitted into the clamp mechanism (see Fig. No.1) on all vehicles to ensure that the clamps remain in the closed positions in the absence of air pressure.
- (c) Locating and securing equipment for the conveyance of I.S.O. containers to be fitted on 12 Intermediate vehicles (See Page No. 34.) vehicle Nos.
- (d) Six sets of Emergency securing equipment for containers (See Fig.No.3) to be carried in the spares locker on all end vehicles
- (e) The bogies on all end vehicles to be fitted with rubber mounted side friction blocks and side-frame radius rods (see Fig. No.2)

- 3 -

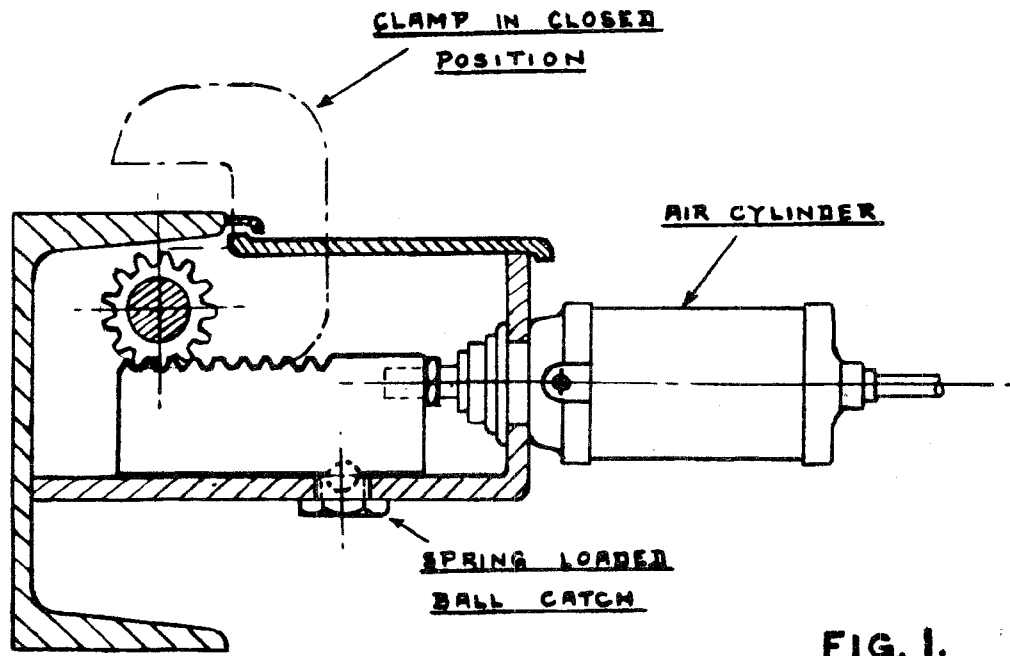


FIG. 1.

RUBBER MOUNTED
SIDE FRICTION BLOCKS

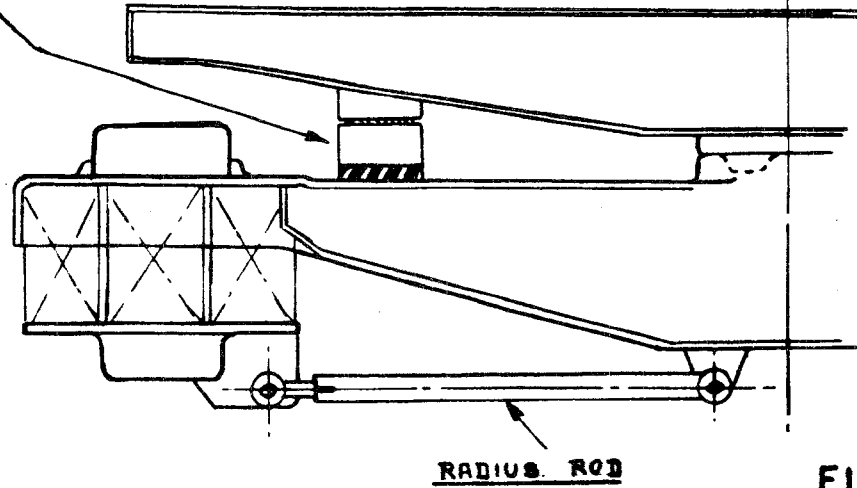


FIG. 2.

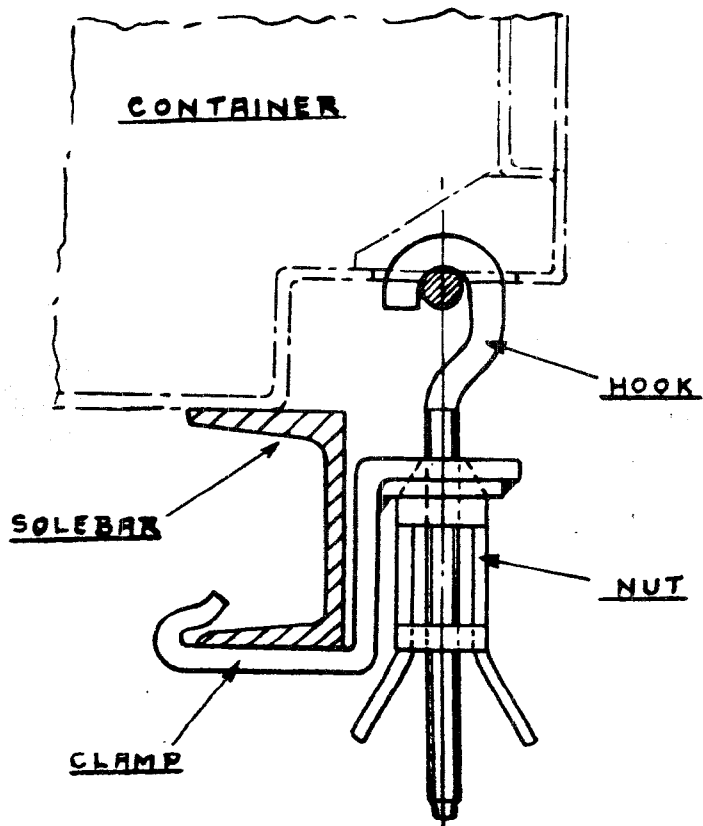
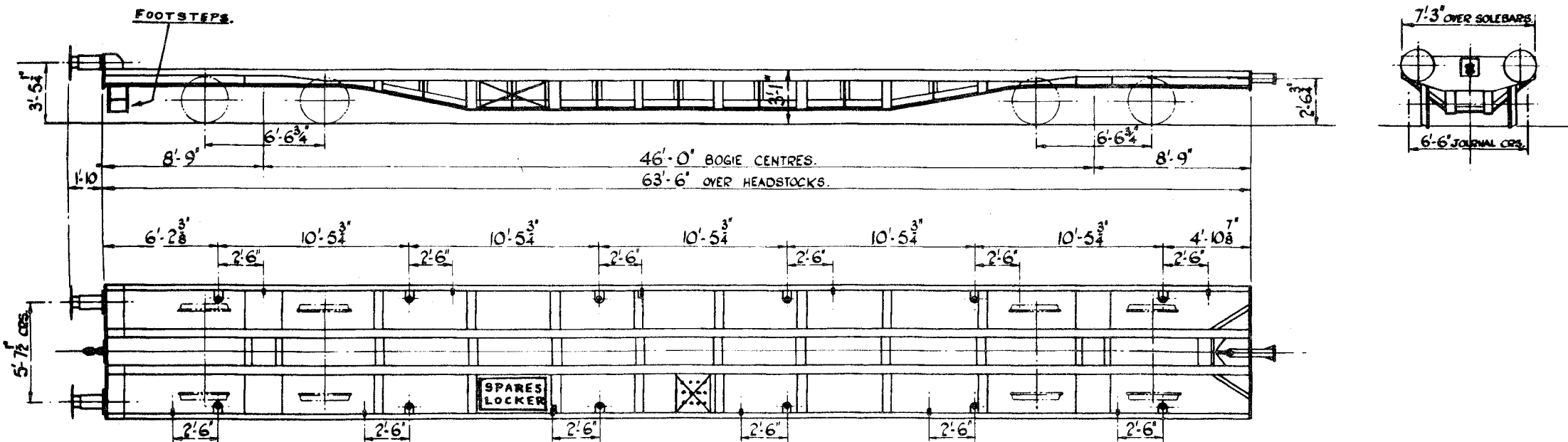


FIG. 3.

**62'-6" PLATFORM LEADING & TRAILING
FREIGHTLINER VEHICLE.
1ST BATCH**



TARE:- 19 TONS **CARRYING CAPACITY :- 51 TONS.**
BRAKE:- AUTO. AIR DISC BRAKE & HAND WHEEL.
MIN. CURVE:- 3 1/2 CHAINS.

WHEELS:- 2'-8" DIA.
JOURNALS:- 9" X 4 7/8" ROLLER BEARING AXLEBOXES.
COUPLINGS:- OUTER END- SCREW COUPLING. INNER END- BAR COUPLER.
BUFFERS:- SELF CONTAINED HYDRAULIC. 18" DIA. HEAD

SECURING DEVICE:- AIR OPERATED
CLAMPS.
CONTAINER LOCATION:- LOCATION FMS

FIG.4.

62'-6" PLATFORM INTERMEDIATE
FREIGHTLINER VEHICLE.
1ST BATCH

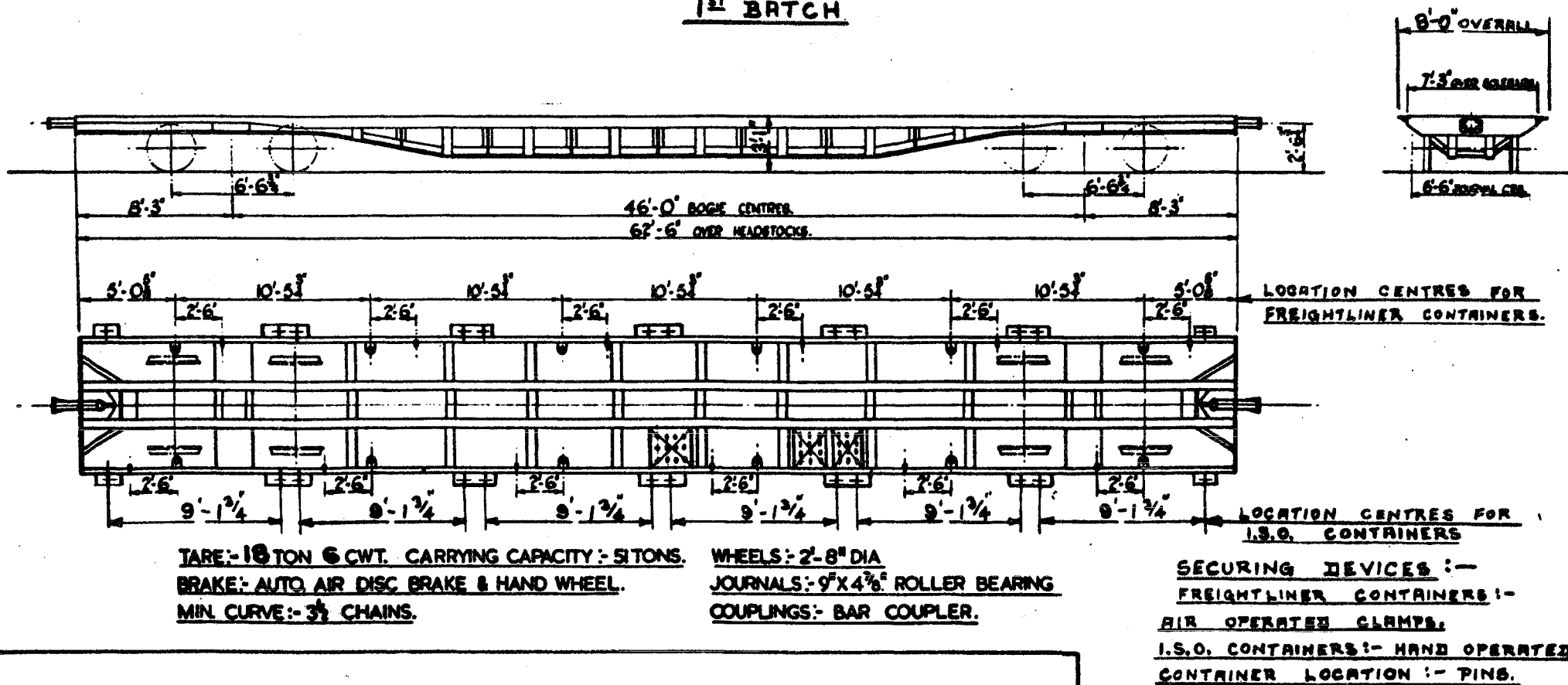


FIG. 5.

DESCRIPTION OF TRAIN

Freightliner wagons are designed to work in fixed sets which will only be split up in an emergency or as necessary for repair, replacement, etc.

There are two types of wagon, End wagons and Intermediate wagons. The usual fixed set will consist of 15 wagons i.e. two End and 13 Intermediate in the first instance but this formation may be altered as dictated by experience.

End wagons are constructed with one conventional end complete with buffers, two air brake hose connections and coupling hook but no coupling. Thus, when attaching a locomotive to a freightliner train, the engine coupling must be used. An emergency screw coupling is carried in a spares locker on each End vehicle for coupling End vehicles together or coupling the End vehicle to the Locomotive should its coupling fail. The inner end of End wagons and both ends of Intermediate wagons are fitted with special cast steel bar couplers which are held together with four bolts and nuts per pair of couplers. The bar couplers incorporate the air brake pipe connections between vehicles.

Freightliner wagons are provided with 12 loose container location pins (or spigots) in a tray at the centre of the underframe. These fit into sockets on the underframe so as to locate the containers which have recesses in their bases for the purpose. Each wagon is equipped with a container securing device in the form of air operated throw-over clamps controlled by a carriage key operated valve at diagonal ends of the Intermediate wagon and at each side of the inner ends of End wagons.

A spares locker is fitted on each End vehicle complete with :-

- One Emergency Screw Coupling
- One Drawhook
- One Flexible Air Brake Hosepipe (1" coupling head)
- One Flexible Main Reservoir Hosepipe (¾" coupling head)
- 6 sets of Emergency Securing Equipment**

Self Sealing Couplings are fitted at the outer end of End Vehicles for connection when attaching the flexible Air Brake Hoses of the Guards Caboose (See Page 21)

Footsteps are provided at the outer end of End Vehicles for easy access to the Guards Caboose.

All wheels are to the Heumann Tread Profile.

12 intermediate vehicles have been fitted with brackets for the conveyance of I.S.O. Containers and two storage trays are provided at the centre of the underframe for 24 loose container location spigots and 24 container securing pins.

GENERAL VEHICLE PARTICULARS ARE AS FOLLOWS :-

Length over headstocks 63'-6"	End vehicle
62'-6"	Intermediate vehicle

Total length of 15 wagon train 982'-3"

Width over platform 7'-3"

Platform height above rail 3'1"

Buffer height 3'-5 $\frac{1}{4}$ " projection 1'-10"

Bogies Ridemaster with 2'-8" dia.
Roller bearing wheel sets.
Wheelbase 6'-6 $\frac{1}{4}$ "

Tare	End vehicle	19-tons.
	Intermediate vehicle	18-tons. 6-cwts.

Maximum Load 51-tons

Maximum Running Speed 75 m.p.h.

Brake : Air operated disc brakes
at each wheel

Train classification Code 1.

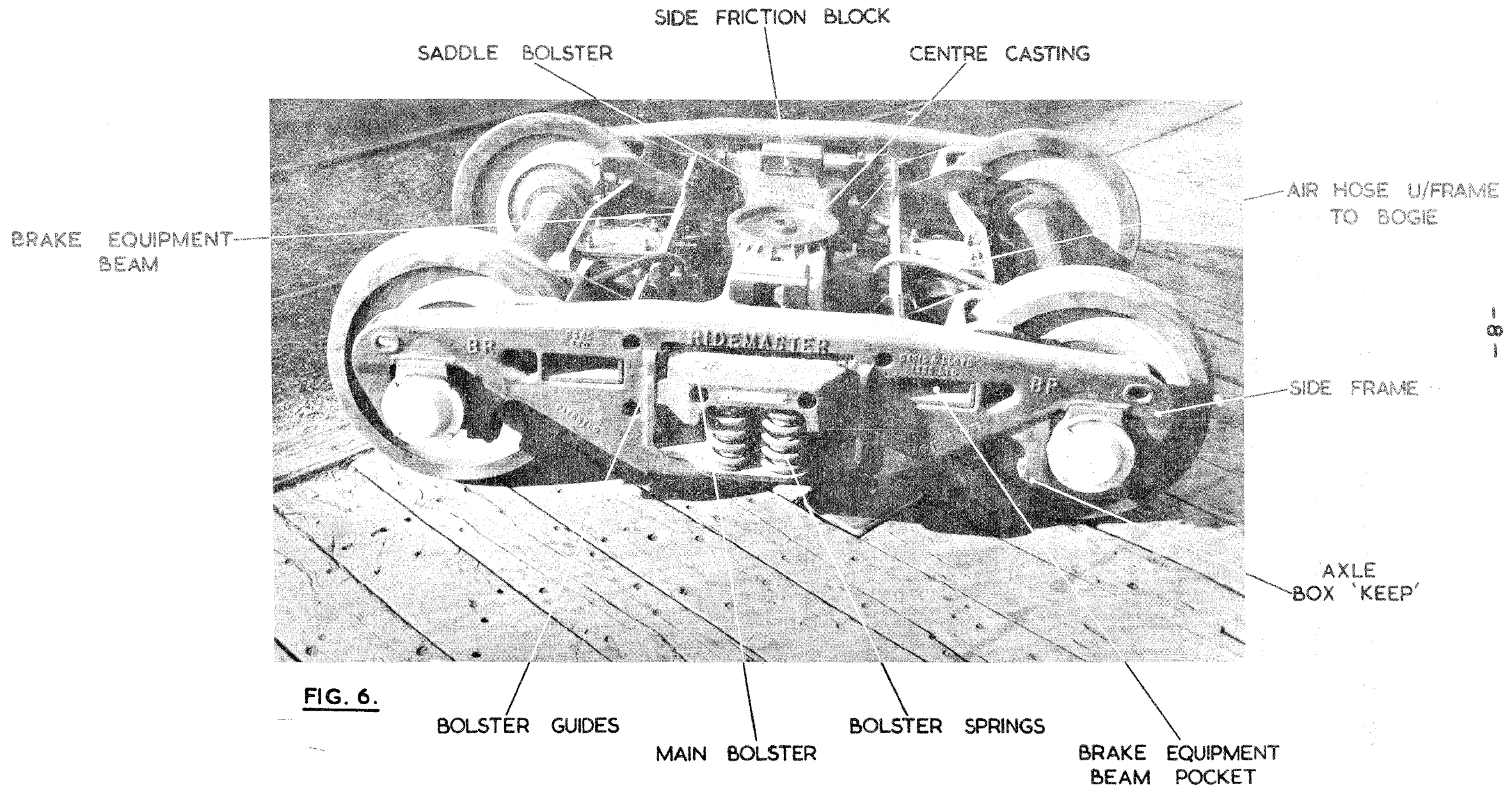


FIG. 6.

FREIGHT LINER TRAINS-RIDEMASTER BOGIE

RIDEMASTER BOGIE.

The Ridemaster bogie fitted to Freightliner trains has a cast steel frame, fitted with 2'-8" dia. wheels with 4.7/8" journals and roller bearing axleboxes, at 6'-6.3/4" (2 metre) centres.

The bogie frame is made up of four main castings - two side frames, a main bolster, and a saddle bolster.

The ends of the main bolster are fitted through apertures in the side frames and rest on nests of five steel coil springs, three of these springs have inner springs also. Fitted into the ends of the bolster are spring loaded cast steel wedges which bear ~~on~~ ^{on} spring steel plates tack-welded to the sides of the aperture. These provide a measure of damping to the main springs and it is essential that these surfaces remain dry and unlubricated.

The saddle bolster, which also incorporates the bottom centre casting is fitted over the main bolster, where it is located by, and rests on, two rubber pads. There is provision for 1" of laterall movement in each direction. The two rubber pads provide the force to return the saddle bolster to the central position, as any lateral movement tends to distort the rubber.

The top face of the main bolster (and the rubber pads) is inclined at an angle of about 15° viewed from the bolster end, so that as the load on the centre casting increases, the saddle bolster tends to slide down the incline. This causes friction plates on the sides of the saddle bolster to bear with increasing force on the sides of the main bolster. In this way a measure of damping, proportional to the load, is applied to the lateral movement of the saddle bolster and also of course to the vehicle frame.

There is in addition a spring tensioned bolt which provides a fixed (minimum) bearing pressure between the two friction faces. This tension is adjusted in Main Works and should not require re-adjustment during service.

The side friction blocks, also carried on the saddle bolster, are spring loaded so that they always remain in contact with those on the underframe. The faces are composed of anti-friction material and need no lubrication.

With the two side frames located, but not fixed, by the main bolster the side frames are free to move relative to one another in any direction, the amount of movement being governed only by the clearances provided between the various components. This is an essential part of the design of this type of bogie and it is vital that this movement is not restricted in any way. It is, therefore, most important that the clearances between the components are maintained.

The axleboxes are retained in the axlebox guides by means of small 'keeps' bolted to the bottom of one leg of each guide, and the top of the box is domed slightly to allow the sideframe to rock in a vertical plane. The clearance between axlebox and guide is adjusted to allow this.

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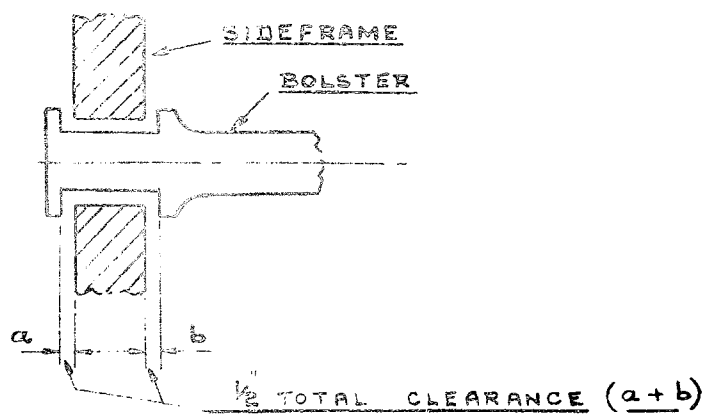
All the bogie brakework is carried on two beams, the ends of which fit into sockets cast into the side frames. In order to locate the brake callipers as accurately as possible, but still preserve the freedom of movement between the bogie components, the plug ends of these brake beams have to be fitted individually to their sockets, owing to the slight variations in the castings. It is most important, therefore, that each beam should always be re-assembled at its correct position on the correct bogie.

Maintenance of the bogies consists of regular inspection of clearances, checking for broken bolster springs and lubrication of axleboxes as necessary.

The recommended clearances are as follows.

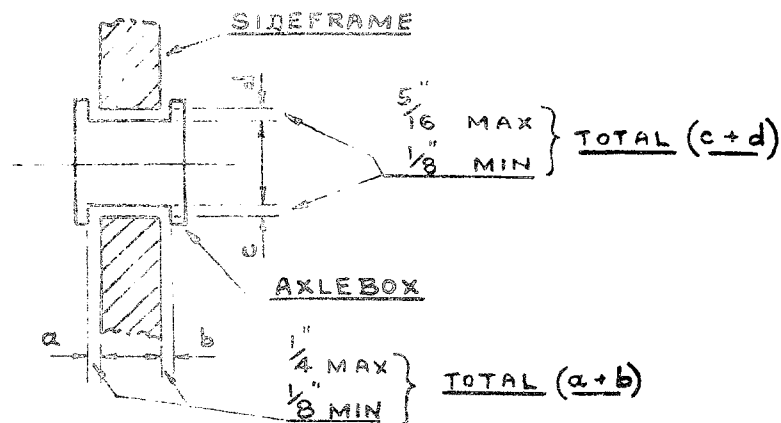
MAIN BOLSTER TO SIDE FRAME.

FIG 7



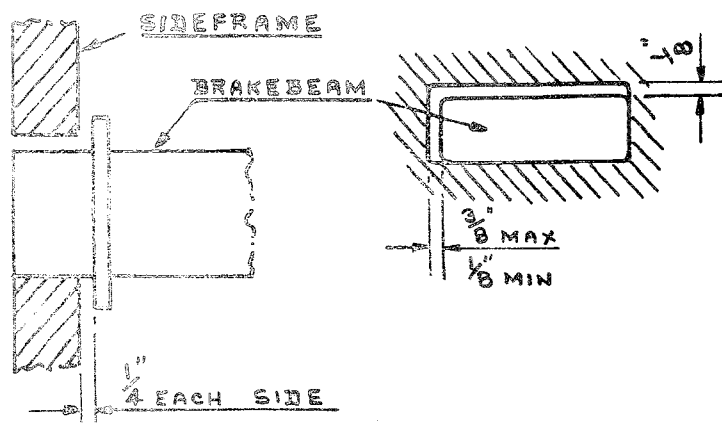
AXLEBOX TO SIDE FRAME.

FIG 8



BRAKE BEAM TO SIDE FRAME

FIG 9



COUPLING AND UNCOUPLING OF INTERMEDIATE WAGONS.

Wherever possible wagons should be coupled and uncoupled on **reasonably** straight track. Where this is not possible it will be necessary to align the couplers by suitable means before bringing the vehicles together.

When couplings have been disconnected, the mating faces and the sealing plate should be protected with polythene sheet or bags of suitable strength properly secured to the coupling head to ensure complete protection.

(a) To Uncouple.

1. Release air pressure from both the brake pipe and the main reservoir pipe.

The air pressure in the brake pipe can be released by the locomotive driver making an emergency brake application or, if no locomotive is attached to the train, by opening the brake pipe coupling cock at one end of the train.

If there is air pressure in the main reservoir pipe, open the main reservoir pipe end coupling cock on the wagon next to the locomotive (or static air supply) and the air pressure will then exhaust through the vent hole in the locomotive (or static air supply) end cock when this is in the closed position. Alternatively a spare main reservoir end coupling hosepipe can be coupled to the hose on the end wagon and the end coupling cock opened.

2. Ensure that the air brakes on the vehicles to be moved have been released by pulling release cords on each wagon as necessary. Ensure that sufficient hand brakes have been applied to prevent movement of vehicles as appropriate
3. Remove split pins from the four 1.1/8" dia. bolts securing the coupling. Remove nuts, washers and bolts, and then part vehicles either manually or with the aid of a locomotive. As the parting of the vehicles is carried out, care should be taken to ensure that the loose sealing plate is not dropped. This plate which is dowelled into the coupling faces, carries the four 'O' rings which provide the seals round the pipe connections in the two faces.

(b) To Couple :-

1. Ensure that the four 'O' rings carried in the grooves of the sealing plate are in good condition, and that the faces of the sealing plate and the two couplers are clean and free from rust and particles of foreign matter, etc.
2. Attach sealing plate, by means of the dowel, to one of the coupler faces, taking care to ensure that the 'O' rings are not dislodged.
3. Bring the two vehicles together by manual means or with a locomotive, ensuring that the dowels in the faces of the coupler engage with the holes in the sealing plate attached to the second coupler, and that the 'O' rings remain in position. In carrying out this operation, it is necessary to support the two couplers level in the horizontal plane with packings in the headstock opening.

Continued.

(b) To Couple (Cont'd.)

4. Insert four bolts, fit plain washers, and nuts and tighten the nuts with a torque spanner set at 960 lbs. ins.
5. If necessary the nuts should then be further tightened with a socket spanner to bring a slot in the castellated nut in line with the split pin hole. Insert split pins as shown in Fig.10. and open to secure.
6. Charge system with air and test coupling joint/s.

NOTE :- In an emergency, and in the absence of a torque spanner, the nuts, on recoupling should be tightened sufficiently by the socket spanner so as to ensure that there is no leakage at the coupling. The vehicle should then be green carded for the coupling nuts to be tightened by torque spanner at the end of journey.

Recommended tools for coupling and uncoupling are as follows :-

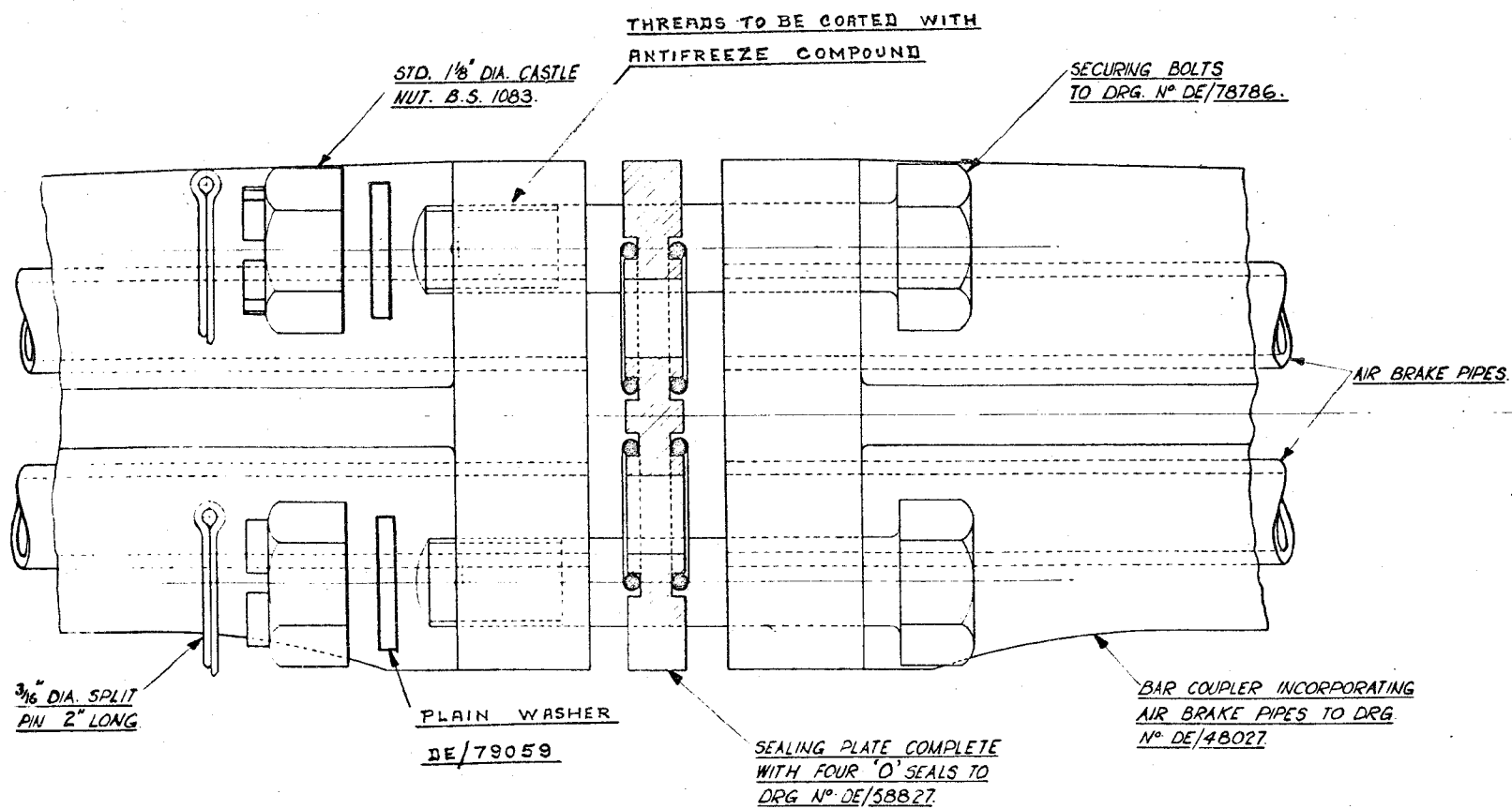
- (a) Adjustable torque wrench
Britool part No. EVT.1700/R
½" square drive O/A length 22½"
Range 300 - 1700 lbs. ins.
- (b) Convertor.
Britool part ESHP
½" square socket x ¾" square plug.
- (c) Socket 1.1/8" British STD Bihexagonal
Britool part No. HB1670
1.670" A/F 2.324 OD.
- (d) Swivel handle
Britool part No. H79.
¾" square drive O/A length 17"
- (e) Std. 1.1/8" open-end spanner.

NB. (i) Britool part numbers are shown; other manufacturers of equivalent performance and size are acceptable.

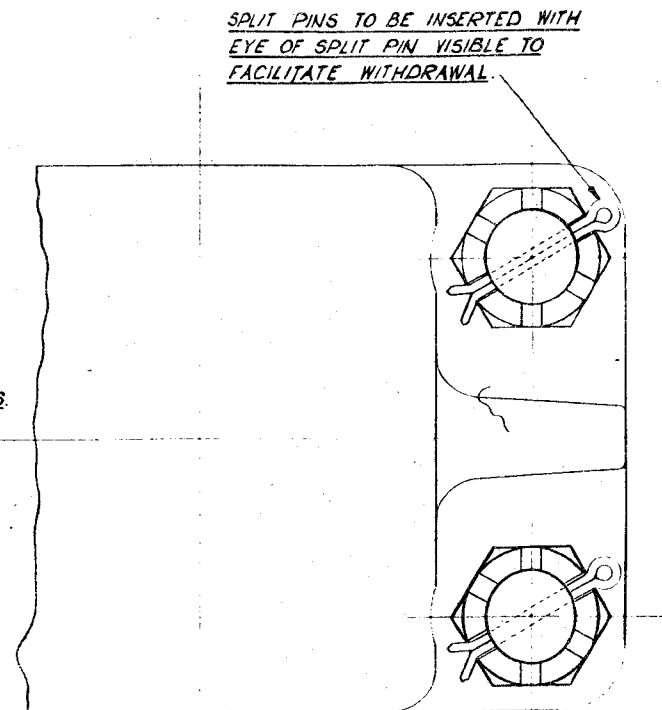
(ii) Under no circumstances must a nut be undone with a torque spanner.

The nuts and bolts fastening adjacent bar couplers are manufactured from special steel and when changing these for any reason, care should be taken to ensure that the correct replacement is fitted.

Continued



EXPLODED VIEW OF COUPLING SHOWING COMPONENTS.



VIEW SHOWING METHOD OF INSERTING SPLIT PINS.

FIG. 10.

FREIGHT LINER TRAIN.

AIR BRAKE EQUIPMENT

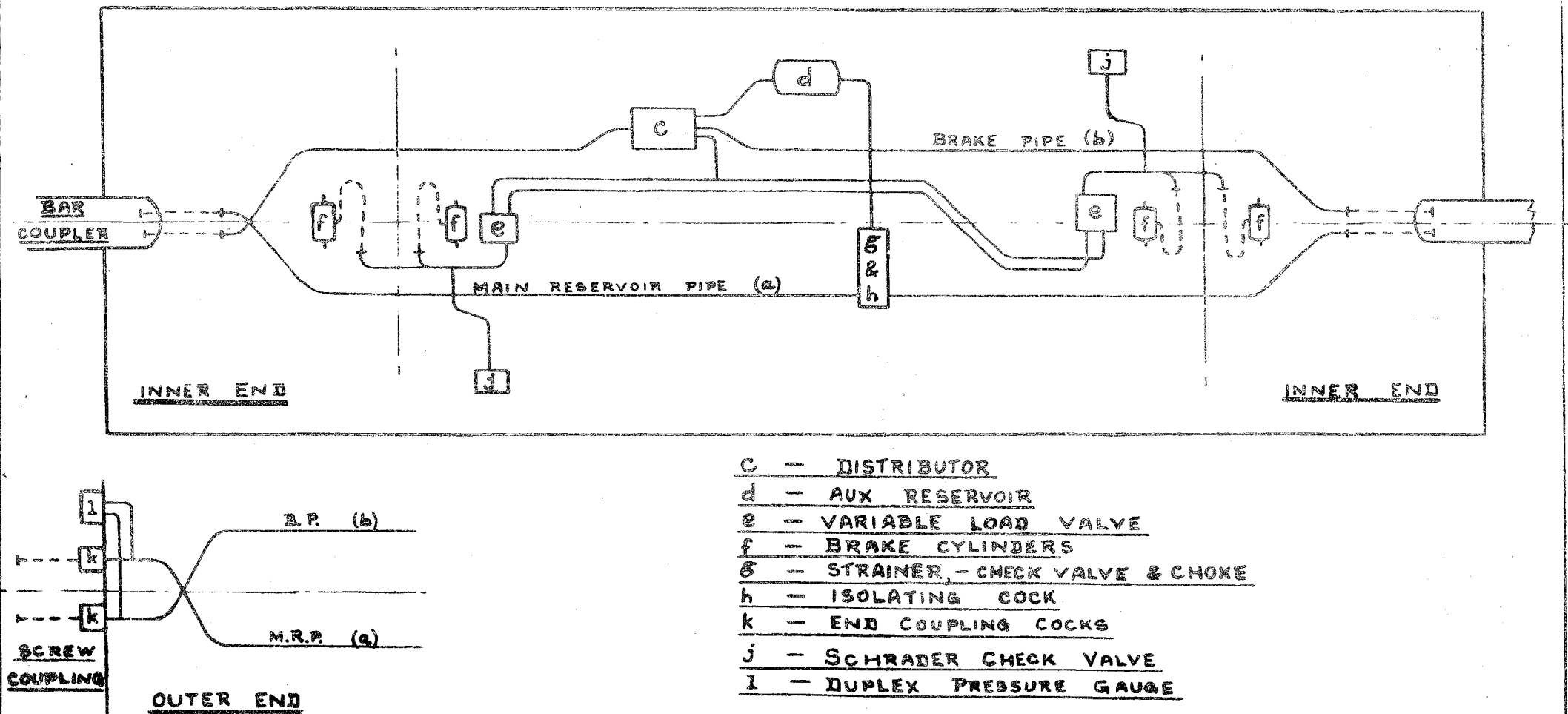


FIG. II.

FREIGHTLINER TRAINS - BRAKE DESCRIPTION.

Air Brake Description. (See figure 10).

Freightliner train vehicles are fitted with what is known as a "Two Pipe Automatic Air Brake" system. There are two makes thus :-

- (1) Westinghouse
and (2) Davies, & Metcalfe

Both work on similar principles; the following is a list of the main component parts on each vehicle:-

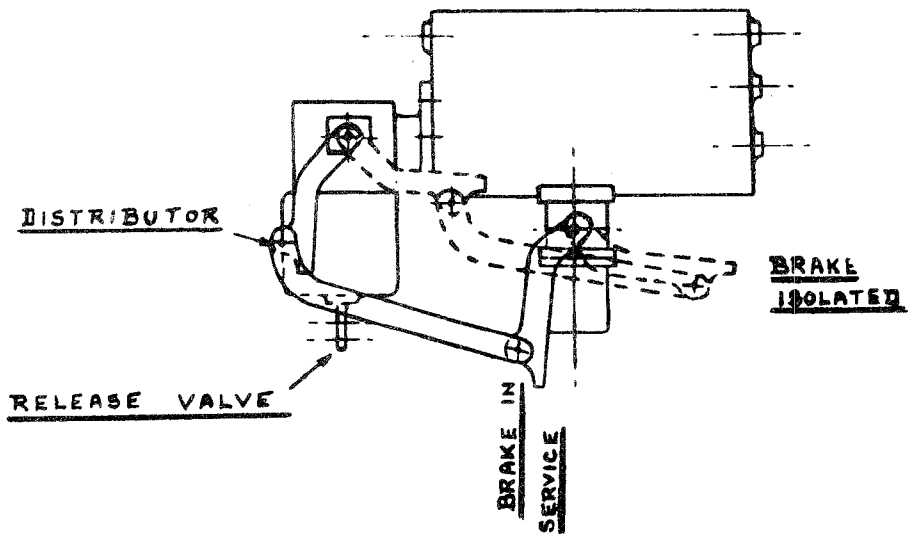
- (a) Main Reservoir Pipe.
- (b) Brake Pipe.
- (c) Distributor.
- (d) Auxiliary Reservoir.
- (e) Variable Load Valves (two per vehicle)
- (f) Brake Cylinders (two per bogie)
- (g) Strainer, Check Valve and Choke Unit.
- (h) Main Reservoir pipe isolating cock.
- (j) Schrader Check Valve (two per vehicle)
- (k) End Coupling Cocks (End vehicles only)
- (l) Duplex Pressure Gauge (End vehicles only)
- (m) Flexible Hosepipes.

Description & Function of Component Parts. (See figure 11).

- (a) Main Reservoir Pipe supplies air from the locomotive down the train at 100 p.s.i. to the auxiliary reservoirs and container clamping cylinders.
- (b) Brake Pipe supplies air from the locomotive to control the brakes on the train. A fall in brake pipe pressure will apply the brake. The brake pipe is charged to 70 p.s.i. to fully release the brake. A reduction to 50 p.s.i. will fully apply the brake. Reductions below this have no effect on the brake pad pressure at the wheels, but serve to apply the brake more rapidly as in an emergency application or division of the train.

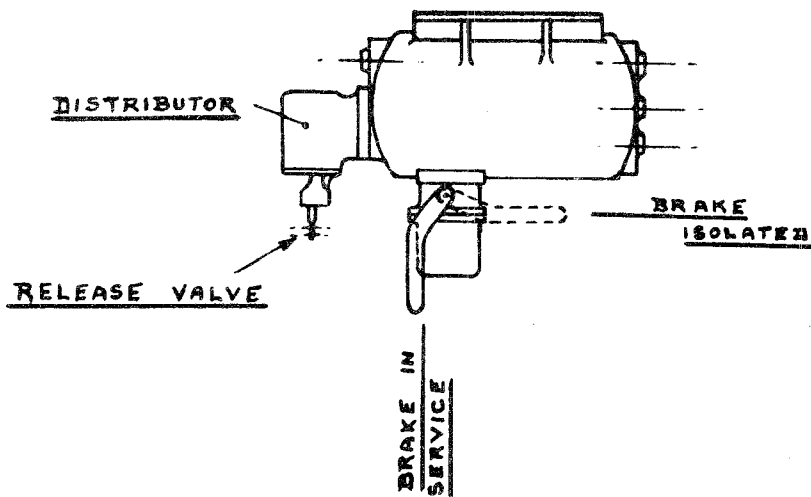
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FIG.12.



WESTINGHOUSE P.4.P. DISTRIBUTOR
MOUNTED ON PIPE BRACKET

FIG.13.



DAVIES & METCALFE:- OERLIKON. DISTRIBUTOR Est 3e
MOUNTED ON PIPE BRACKET

(c) Distributor (See figures 12 & 13)

The distributor controls the application and release of the brake and operates in response to air pressure changes in the brake pipe which are normally controlled by the driver's brake valve.

The distributor is fitted with an isolating cock controlled by a handle for use in isolating the brake. The handle is vertical for normal operation and horizontal for brake isolated.

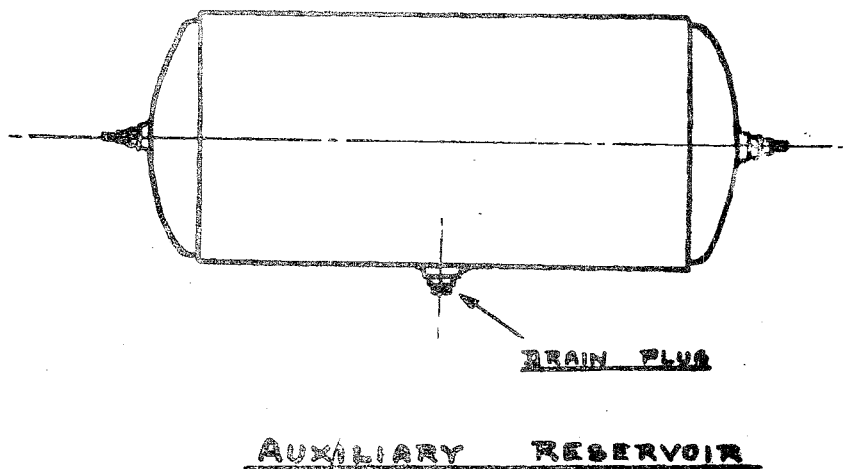
The distributor is also fitted with a release valve for use in releasing the brake manually on individual wagons. It is operated on the normal cord method from either side of the vehicle.

The distributor is fixed to the vehicle by three bolts to a support bracket which enables the distributor to be changed without breaking any pipe joints.

(d) Auxiliary Reservoir (See figure 14). Air is stored in the auxiliary reservoir. It is supplied direct from the main reservoir pipe which maintains the auxiliary reservoir at 100 p.s.i. The auxiliary reservoir supplies air to the brake cylinders via the variable load valve and distributor in accordance with the brake pipe pressure.

When it is necessary, for any reason, the Westinghouse auxiliary reservoir can be vented to atmosphere by placing the distributor isolating valve in the horizontal or "isolated" position (See figure 12). With the Davies & Metcalfe equipment it is necessary to vent the reservoir by unscrewing the drain plug by three turns only. Under no circumstances must this plug be unscrewed by more than three turns when the reservoir is charged with air.

FIG. 14.



Continued

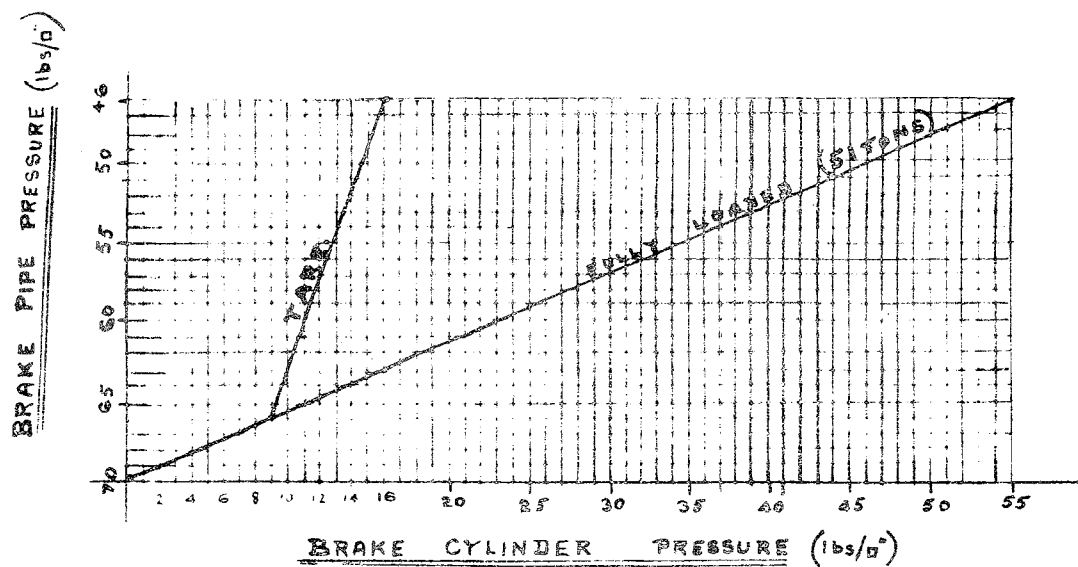
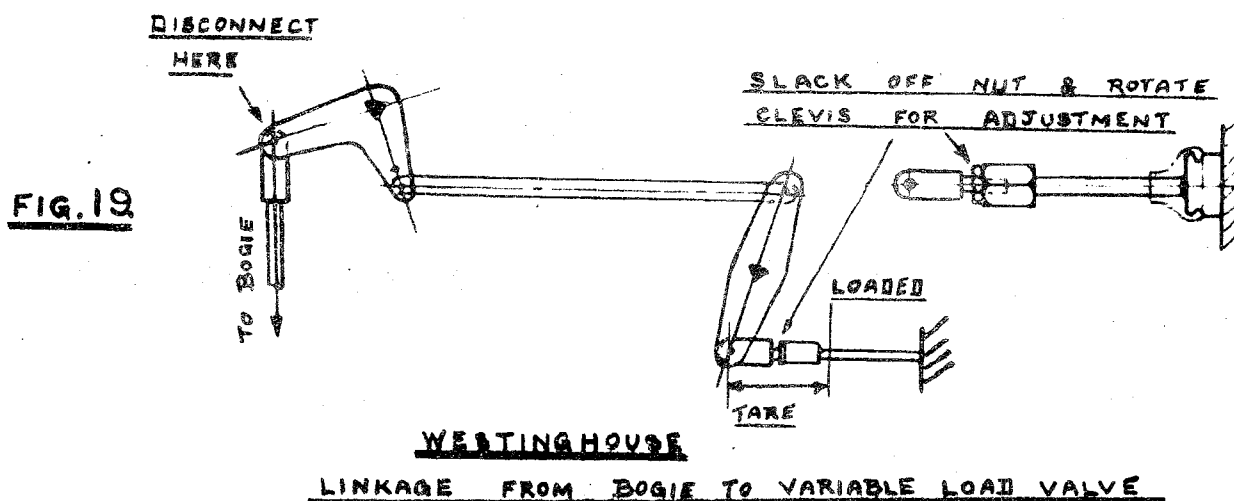
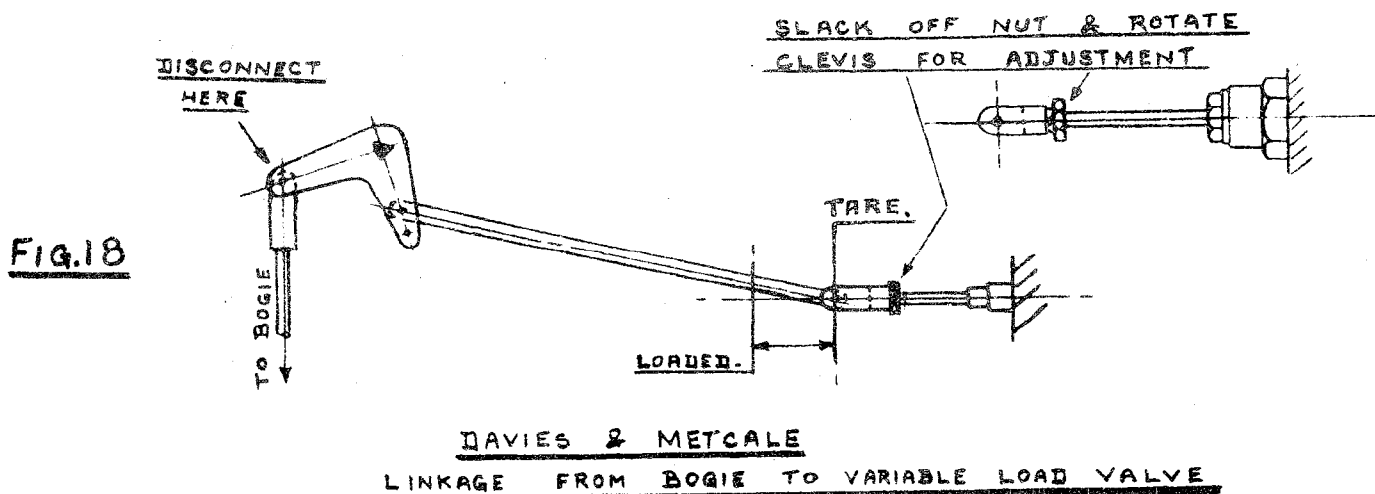
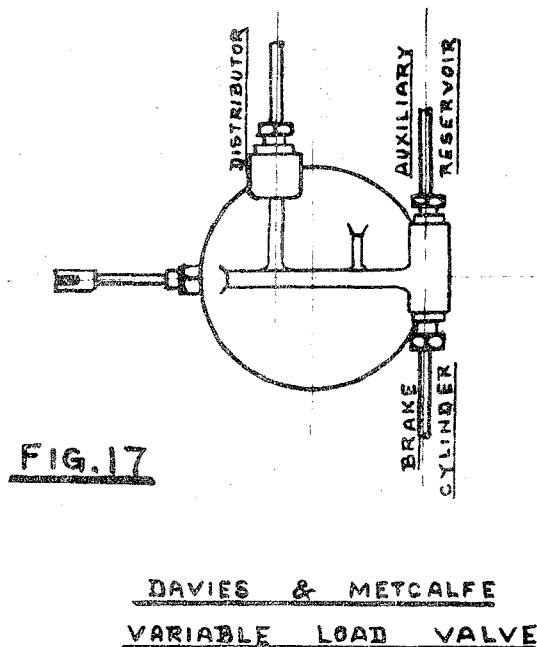
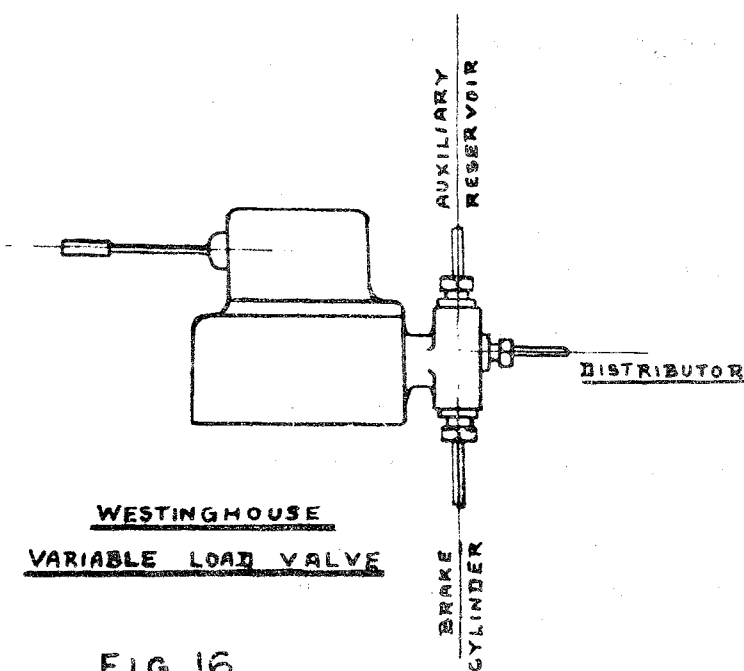


FIG. 15.

- (e) Variable Load Valves (See figure 16 & 17). These are fitted, one to control each pair of brake cylinders on each bogie. They relay air from the auxiliary reservoir in proportion to the load on the bogie. Thus, with a fully loaded vehicle the variable load valve adjusts the pressure of the air supply to the brake cylinders to 55 p.s.i. for a full brake application on the train. Likewise, with an empty wagon the supply to the brake cylinders is adjusted to 16 p.s.i. (See figure 15). Any pressure between these two is proportional to the load on each bogie.

There is a difference in the mechanical linkage to the variable load valves of the two makes (See figures 18, & 19)



- (f) Brake Cylinders. One brake cylinder is arranged to operate the brake pads on each pair of wheels on the vehicle. They are mounted on the bogie.

They are of the duplex type in that two piston rods are fitted, one at each end of the cylinder, and connected one to each pair of calipers to the wheel discs.

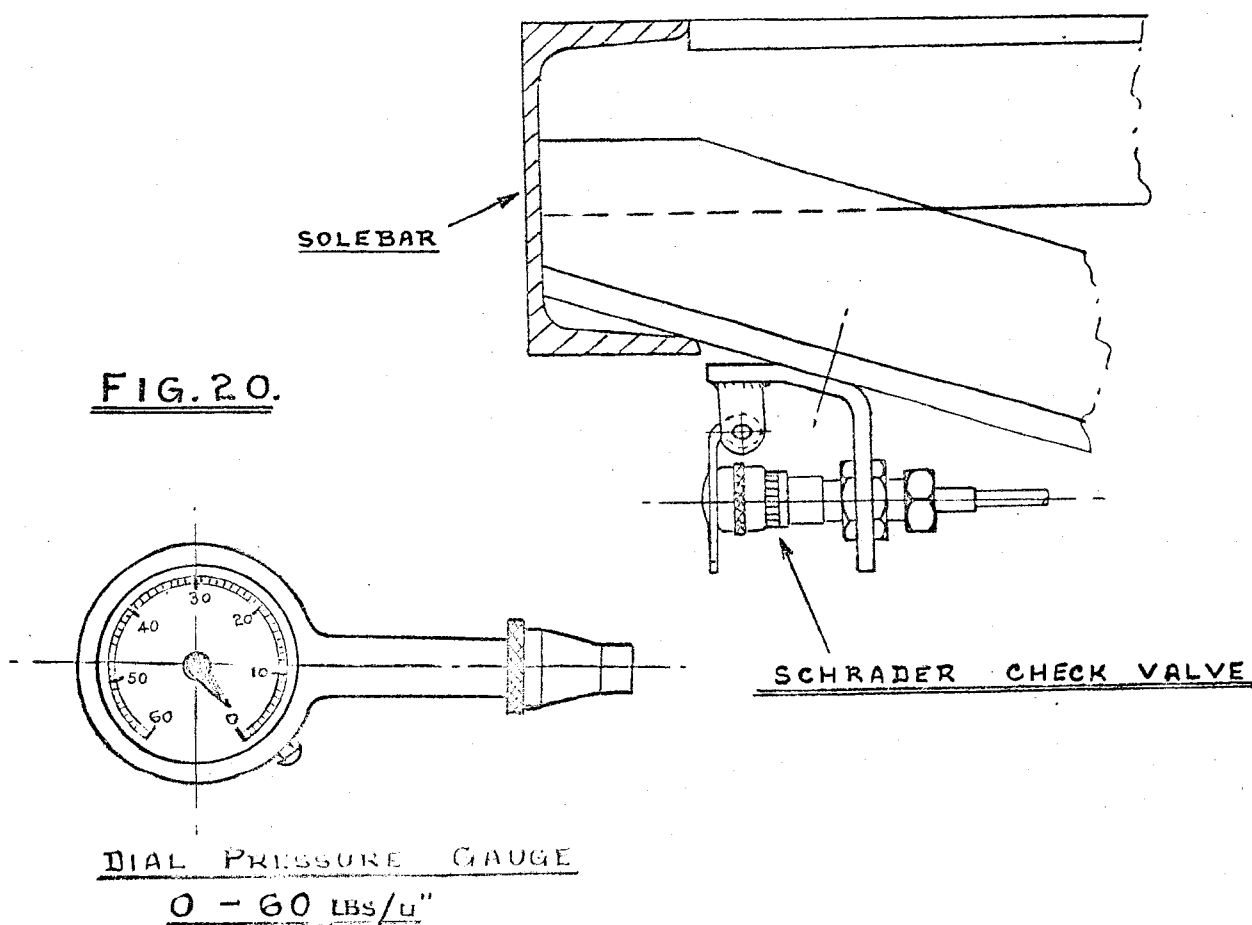
The brake cylinder incorporates a slack adjuster which is single acting.

- (g) Strainer. Check Valve and Choke Unit. This is fitted in the pipeline from the main reservoir pipe to the auxiliary reservoir. The strainer is fitted to filter out any foreign matter which may be present in the air supply.

The check valve is fitted to ensure there is no back flow of air from the auxiliary reservoir to the main reservoir pipe if the latter is at a lower pressure.

The choke unit is fitted to control the rate of compressed air supply from the main reservoir pipe to the auxiliary reservoir.

- (h) Main Reservoir Pipe Isolating Cock. Is fitted in the pipe from the main reservoir pipe to the auxiliary reservoir. In conjunction with the distributor isolating valve it enables the braking system on a vehicle to be isolated. The operating handle is at right angles to the pipe when the cock is closed and in line with the pipe when open.
- (j) Schrader Check Valve (See figure 20) This valve is fitted in the pipeline from the variable load valve to the brake cylinders. Thus, the brake cylinder pressures can be obtained with the aid of a portable pressure gauge. Both the valve and pressure gauge must be kept perfectly clean and free from dirt and foreign matter.



- (k) End Coupling Cocks. End cocks are fitted to the headstock end of the brakepipe and main reservoir pipe on End vehicles only.

The outlet side of these cocks is vented to atmosphere when the cock is in the closed position thus releasing any air in the hosepipes.

The operating handle is upright when the cock is closed and horizontal when open.

- (l) Duplex Pressure Gauge. This is fitted to the headstock of outer vehicles only and enables the brakepipe and main reservoir pipe air pressures to be observed at both the front and rear of the train.

- (m) Flexible Hosepipes. There are Four types of hosepipes thus:-

- (1) End Coupling Hosepipes. These are fitted to the outer ends of End vehicles and enable the brakepipe and main reservoir pipe to be coupled. The hosepipe connected to the brakepipe is fitted with a 1" coupling head and has no identification band. That connected to the main reservoir pipe is fitted with a ¾" coupling head and has a white identification band. A spare hosepipe of each type is carried on each End vehicle.

- (2) Bar Coupler to Brakepipe and Main Reservoir Pipe Hosepipes.

These are flexible hosepipes with unions at both ends. They are of the same type and size. Since the Intermediate vehicle coupling for both the brakepipe and main reservoir pipe is via the bar coupling they allow of free movement of the latter.

- (3) Brake Cylinder Hosepipes. These are fitted in the pipeline to the brake cylinders to cater for the relative movement between the bogie and underframe of the vehicle. They are flexible hosepipes with unions at both ends and are interchangeable.

- (4) Guards Caboose Hosepipes. These are flexible Hosepipes and are attached to the Guards Caboose by means of a union fitting. The connection to the Liner Train Vehicle is by means of a Self Sealing Coupling.

The Brake Pipe is fitted with a ¾" self sealing Coupling. The Main Reservoir Pipe is fitted with a 3/8" self sealing coupling.

To Release Self Sealing Coupling:-

Push the knurled portion on the fixed end of the coupling attached to the outer vehicle in a downward direction, this automatically releases the flexible hose assembly.

A spring loaded dust cap is positioned over each self sealing coupling, for use when the flexible hose pipe is disconnected.

- (n) Cast Iron Check Plates are fitted on All Wheels for Braking surfaces with the Disc Brake Pads.

The Disc Brake Pad Specification for this condition is :-
Ferodo 659F.

- (o) The Bolt Heads of the Brake Pad Keeper Plates must be securely fastened by locking wire.
- (p) All Nuts fitted on these vehicles must be of the Round Top Castle Type with Split Pins.

NOTE: All pressures quoted above are nominal

FREIGHTLINER TRAINS.

FAULT FINDING CHART - BRAKES.

FAULT	CHECK	ACTION
1. No air pressure in either or both brake pipe or Main Reservoir pipe (Cannot charge brakes).	<p>All coupling cocks are open (except end of train)</p> <p>All hoses properly connected.</p> <p>Pressure gauge on locomotive.</p> <p>For obvious air leaks.</p>	<p>Open cocks (handles horizontal).</p> <p>Connect hoses.</p> <p>If no pressure - locomotive defective.</p> <p>Seal as necessary.</p>
2. Brake fails to <u>apply</u> on one <u>vehicle</u> .	<p>Distributor isolating cock is open. (The handle to be in a vertical position).</p>	<p>Note: If this cock has to be opened, recharge brake pipe, allow time for auxiliary reservoir to fill, re-apply brake. If this fails to rectify fault; change distributor.</p>
3. Brake fails to apply on one <u>bogie</u> .	<p>Brake cylinder and hoses for leakage.</p> <p>Variable load valve.</p> <p align="center">Continued. . .</p>	<p>Replace as necessary.</p> <p>Release bogie control rod from bell crank. Depress free end of bell crank as far as it will go. Fully apply brake. Check air pressure at Schrader check valve is 13 p.s.i. Lift free end of bell crank as far as it will go. Fully apply brake. Check air pressure at Schrader check valve is 55 p.s.i.</p>

FAULT	CHECK	ACTION
3. Brake Fails to apply on one <u>bogie</u> (Cont'd).	Brake cylinder & levers jammed.	If these pressures are not obtained change variable load valve. Lubricate or replace components as necessary.
4. Brake does not release on <u>one vehicle or bogie</u> .	Handbrake is released Operation of distributor Brake cylinder or levers jammed.	Release handbrake. Pull release cord. If brake is not released change distributor. Pull release cord to release brake cylinder pressure. Prise levers apart to free pads Lubricate or replace components as necessary.
5. Brakes not fully released at end of train. (Brake pipe pressure gauge shows less than 70 p.s.i.)	Drivers brake valve handle is in RUNNING position and check all pipework on train for leaks.	Seal leaks as necessary. It is likely that this Fault is caused by a number of small leaks rather than one large one.

IMPORTANT. If time does not permit repairs or replacements to be carried out it may be necessary to isolate brake on vehicle.

Proceed as follows:-

(a) Close ½" isolating cock between main reservoir pipe and the strainer, check valve, choke unit (handle to be at right angles to the pipe).

(b) Close the isolating cock on the distributor (handle to be in the horizontal "BRAKE ISOLATED" position).

(c) Pull the release cord to vent the air from the control reservoir.

(d) Check that the brake pads are clear of the brake discs.

If fault is large leak anywhere on main reservoir pipe, this pipe may be isolated by closing main reservoir coupling cocks on locomotive and on leading vehicle. (Note: This will isolate container clamping equipment. Loaded trains must not, therefore, be allowed to go forward in this condition.

The brake system will now be fully operative, but brake release times may be slightly increased.

Continued . . .

FAULT	CHECK	ACTION
IMPORTANT (Cont'd).		
<p>Before the train is allowed to go forward with a vehicle with its brake isolated, reference should be made to the Operating instructions to ensure that train has the requisite number of braked vehicles. The destination terminal of the train must also be advised of this action, and also if it has been necessary to isolate main reservoir pipe. Generally, except for air leaks on the train, either low or high pressures on the brake pipe or main reservoir pipes is indicative of a fault on the locomotive.</p>		
<p>6. Locomotive Drivers Safety Device Low main reservoir pressure device operates during charging (Brake pipe vented)</p>		<p>Move Drivers Brake valve handle to EMERGENCY position and hold there until main reservoir pressure is restored. Return handle to RUNNING POSITION.</p>

7. The main reservoir pipe isolating cock, when closed, does not effect the working of the brake, but this cock must be placed in the open position. (Handle in line with pipe) when in service, otherwise the brake release times will be slightly increased, as the auxiliary reservoir cannot be charged from the main reservoir pipe.

NOTE: All pressures quoted above are nominal.

BRAKE TESTS.

NOTE: All references to "air supply" refer to locomotive or static plant.

Leakage rates quoted are for a 15 wagon train. Rates for other lengths of train are pro rata.

1. LEAKAGE TEST. (Incorporating leakage test on container clamping system)

- (a) Ensure that all distributor isolating cocks and main reservoir pipe isolating cocks are fully open on the train. Also check that both end coupling cocks at the far end are fully closed, and that intermediate end coupling cocks are fully open.
- (b) Attach air supply to train. Open brake pipe end coupling cocks on end wagon and on air supply. Main reservoir pipe end coupling cocks on end wagon and on air supply should remain closed.
- (c) Apply and release the train brakes twice. If there is air pressure in the main reservoir pipe, open the main reservoir pipe end coupling cock on wagon next to air supply and allow air pressure to exhaust to zero via the vent hole in the air supply end coupling cock. Close end coupling cock on this wagon.
- (d) Ensure that the brake pipe is charged to approx. 70 p.s.i. Check this value at both ends of train.
- (e) Isolate the brake pipe from the air supply by closing the end coupling cocks on the end wagon and on the air supply. Note subsequent fall in brake pipe pressure. This must not exceed a rate of fall of 2 p.s.i. per minute taken over a period of 5 minutes. Leakage above this rate must be traced and corrected. Note that it is possible for defective check valves between the main reservoir pipe and auxiliary reservoir to by-pass air back to the main reservoir pipe, in which case there will be a rise in main reservoir pipe pressure. Check that this has not occurred. By closing all main reservoir pipe isolating cocks in turn and observing the main reservoir pipe pressure defective check valves can be traced.
- (f) Recharge brake pipe to approx. 70 p.s.i. and open both main reservoir pipe end coupling cocks on end wagon and on air supply. Wait at least 2 minutes after main reservoir pipe pressure has reached 85 - 100 p.s.i. and check this value at both ends of train.
- (g) Isolate main reservoir pipe from air supply by closing end coupling cocks on end wagon and on air supply. Note subsequent fall in main reservoir pipe pressure. This must not exceed a rate of fall of 3 p.s.i. per minute over a period of 5 minutes. Leakages above this rate must be traced and corrected. Note that the container clamping system is supplied with air from the main reservoir pipe and is permanently connected. This leak test must be carried out in container 'clamp' conditions.

Continued. . . .

- (h) Recharge main reservoir pipe to 85 - 100 p.s.i. by opening the end coupling cock and fully apply the brake by reducing the brake pipe pressure to approx. 46 p.s.i. Check each brake cylinder and associated pipework for audible leaks. Excessive leaks must be traced and corrected.

2. BRAKE CYLINDER AIR PRESSURE CHECK.

- (a) Ensure that distributor isolating cocks and main reservoir pipe isolating cocks are fully open on the train. Also check that both end coupling cocks at far end of train are fully closed.
- (b) Attach air supply to end wagon.
- (c) Fully release and apply the train brakes. Brake pipe pressure must be 68 -70 p.s.i. and main reservoir pipe 85 - 100 p.s.i. before brake is applied.
- (d) Check individual brake cylinder pressures with the portable pressure gauge applied to each Schrader check valve. With an empty vehicle the brake cylinder pressure should be 16 p.s.i. and with a fully loaded vehicle 55 p.s.i. Values between these two figures will be obtained according to the load on the bogie.
- (e) Should the values obtained in (d) be suspect carry out check Item(3) " Fault finding chart - Brakes" . Also check that there is no mechanical damage to variable load valve linkage. If necessary replace the Variable **load** valve and defective parts. Again carry out brake cylinder air pressure check.

3. BRAKE CYLINDER PISTON STROKE & BRAKE PAD CLEARANCES

- (a) Satisfy conditions in test 2 (a), (b), and (c) and that all handbrakes are in the off position.
- (b) The clearance between each Brake Pad & Brake Disc to be $1/8''$ this gives a piston stroke of $13/32''$

At present the Westinghouse Brake cylinder has a working stroke of $1\frac{1}{2}'' \pm 1/8''$ giving a Pad Clearance of $15/32''$, before the Slack Adjuster comes into operation.

The Davies & Metcalfe Brake Cylinder has a working stroke of $5/8'' - 3/4''$ giving a Pad Clearance of $7/32''$ before the Slack Adjuster comes into operation.

Modifications are being carried out as soon as possible for these cylinders to maintain a Brake Pad clearance of $1/8''$.

- (c) If piston stroke is less than that stated, check:-
 - (i) that the pads are applied hard to both sides of the brake disc.
 - (ii) that nothing is trapped between pads and disc.
 - (iii) that the various brake levers and pins are not binding or rubbing.
 - (iv) for oversize brake pads.
 - (v) that brake is fully applied by checking brake cylinder pressure.
 - (vi) for faulty brake cylinder.

- (d) If piston stroke or Pad Clearance is greater than that stated, check:-
- (i) that pads are not worn below minimum thickness ($\frac{1}{4}$ ")
 - (ii) that one or more pads are not missing or displaced.
 - (iii) for worn or defective brake levers and pins.
 - (iv) for faulty brake cylinder.

(e) RESETTING THE BRAKE CYLINDER SLACK ADJUSTER:-

- (i) Westinghouse (See Fig. 21.)

Pull the re-setting ring at the bottom of the Brake cylinder to disengage the Slack Adjuster Ratchet.

Maintain Pull on the ring and rotate the Handwheel anticlockwise until the push rod is drawn right in.

Release the ring and check that Handwheel cannot be rotated further.

- (ii) Davies & Metcalfe (See Fig. 22.)

Pull the resetting ring situated at end of Piston Rod to Disengage locking pin from Handwheel.

Maintain Pull on the ring and rotate the Handwheel clockwise until the Piston Rod is drawn right in.

Release the ring and check that the locking pin is engaged in one of the Holes in the Handwheel to stop rotation.

4. TEST TO ENSURE BRAKES ARE WORKING.

- (a) Satisfy conditions in test 2 (a) and (b). Ensure that all handbrakes are in the off position and wheels chocked if necessary.
- (b) Place brake valve on air supply in running position. Wait until main reservoir pipe and brake pipe pressures have attained 85-100 p s.i. and 68-70 p.s.i. respectively
- (c) Reduce brake pipe pressure to approximately 48 p.s.i. by means of the brake valve.
- (d) Examine all wagons and check that all brake pads are applied hard to the wheel discs particularly at the rear of the train
- (e) Recharge brake pipe to 68-70 p.s.i.
- (f) Wait 2 minutes and then check that all brake pads are fully released from the **braking discs**.
- (g) Reduce brake pipe pressure to approximately 48 p.s.i. by means of the brake valve. Release the brakes on each vehicle by pulling the cord to operate the release valve on the distributor.

N.B. IN NO CIRCUMSTANCES IS IT PERMISSIBLE TO LEAVE A BRAKE IN ACTION WHICH CANNOT BE RELEASED BY THE AIR SUPPLY BRAKE VALVE.

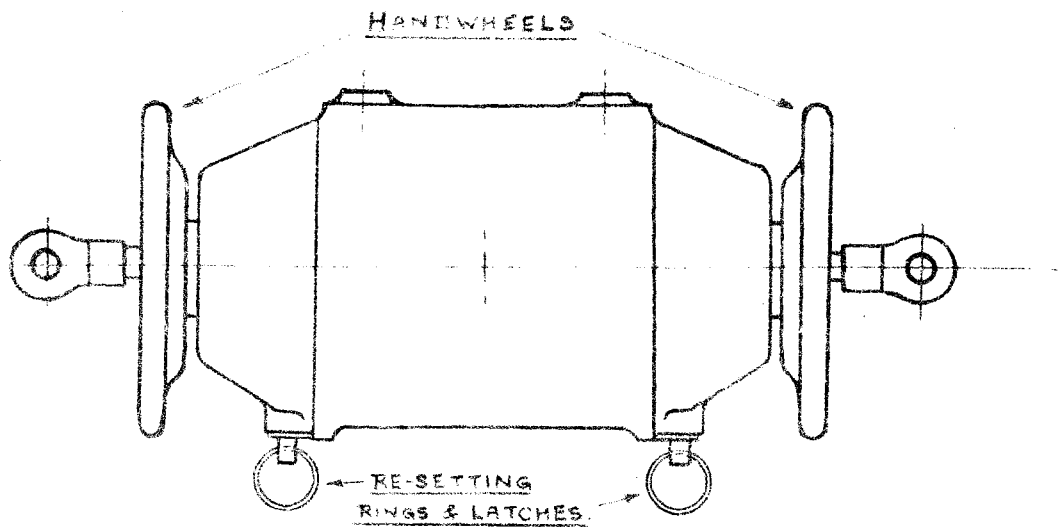


FIG 21.

WESTINGHOUSE AIR BRAKE CYLINDER

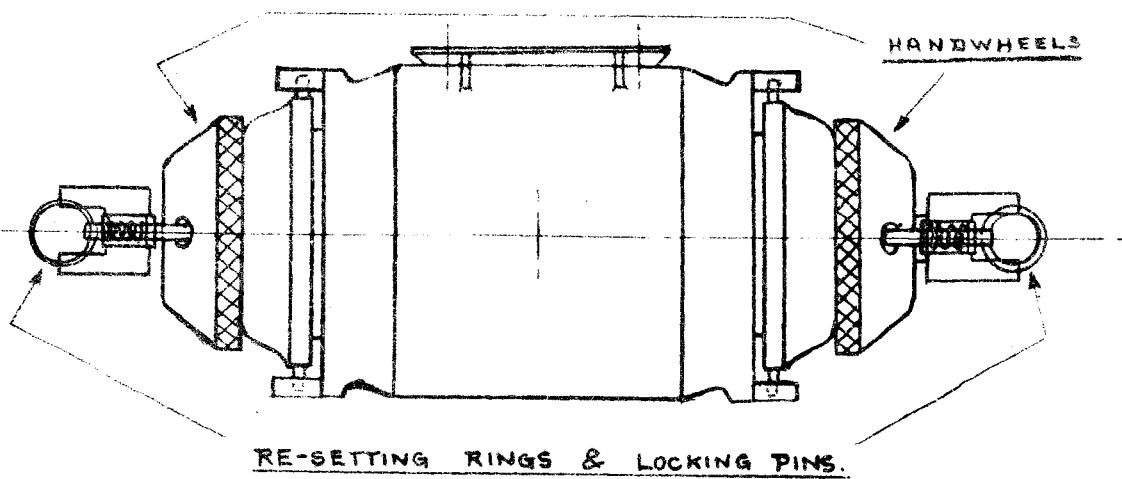


FIG 22.

DAVIES & METCALFE AIR BRAKE CYLINDER

DIAGRAMMATIC LAYOUT OF EQUIPMENT

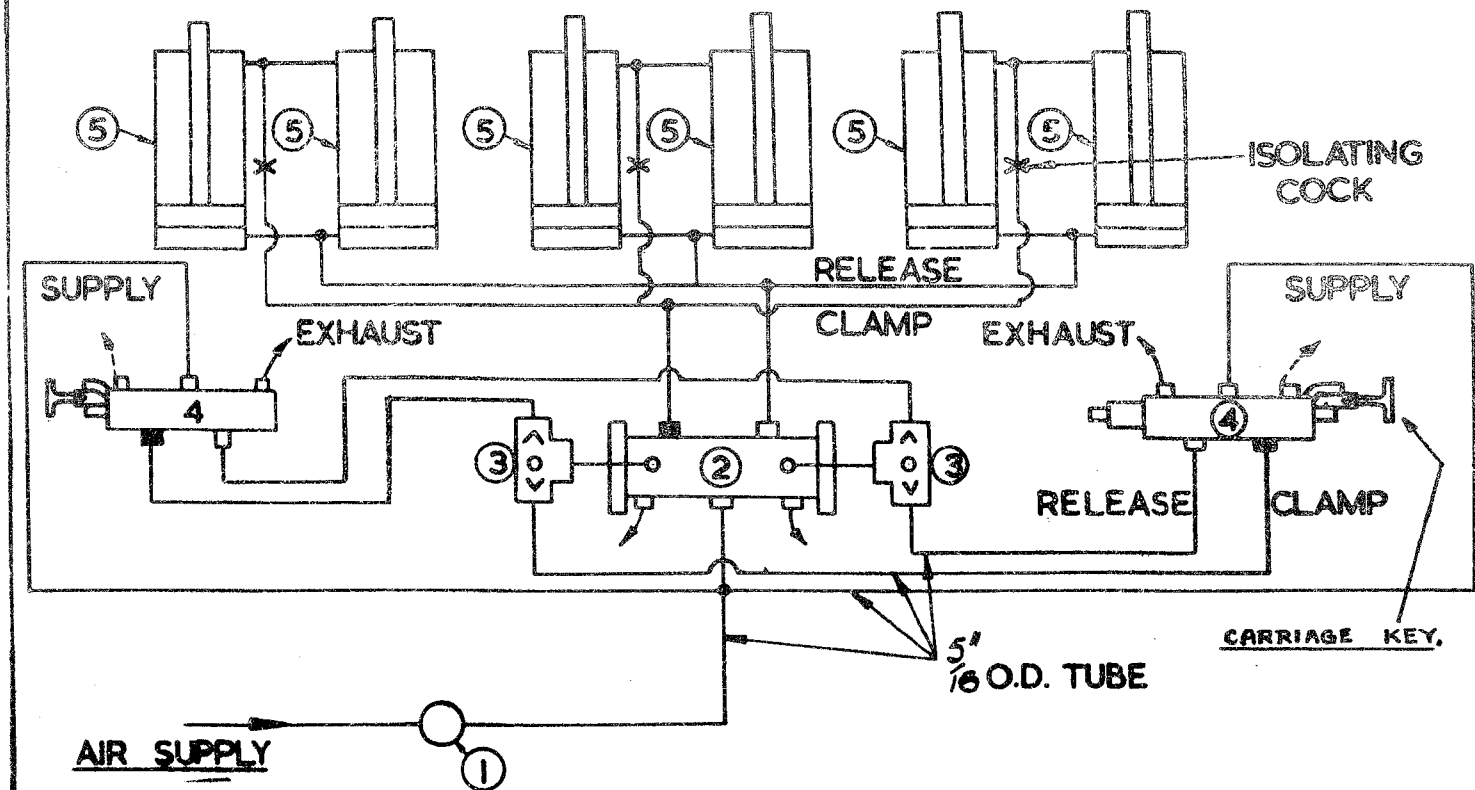


FIG. 23.

SECURING FREIGHTLINER CONTAINERS.

NOTE :-

Where I.S.O. Containers are fitted with the standard freightliner location and securing devices, the normal procedure of loading for freightliner containers will be applied.

When Freightliner containers are loaded onto the wagon they are positioned accurately by means of spigots which fit into sockets in the vehicle underframe and engage with sockets in the container underframe. The purpose of these spigots besides positioning the containers relative to one another is to prevent lateral and longitudinal movement.

The container is secured against excessive vertical movement by means of a system of rotary catches or clamps. The clamps are fixed onto shafts mounted on the inner face of the wagon solebar; each shaft carries two clamps.

The shaft is rotated to drive the clamps into the clamp or release position by a pneumatic cylinder operating through a rack and pinion. The rack is also profiled to operate micro switches, whose rollers bear on it, to provide an indication of the position of the clamps for the warning light system.

The supply of compressed air for actuating the cylinder is taken from the main reservoir pipe, through a strainer and lubricator which provides a small amount of oil entrained with the air to provide lubrication for the various items of equipment

To clamp the container. The sequence of operations is as follows.

The figures in brackets refer to the item in the diagram Fig. 23

A carriage key must be inserted in the four-way piston valve (4) mounted on the headstock and moved in the direction of the arrow as far as it will go and then released. The valve will then return to the Neutral position. The movement of this valve causes a short burst of air to be supplied to the 'clamp' side of the shuttle valve (3) causing an air impulse to be supplied to the pilot operated four way piston valve (2). This releases any compressed air from the 'release' air lines, and supplies compressed air to the 'clamp' air lines, and thence to one side of the pneumatic cylinders (5). The racks and pinions rotate the shafts to bring the clamps to the raised ('clamp') position.

During this sequence of operations, the warning light mounted on the headstock adjacent to the control valve will be seen to light up and then go out. The warning system is so arranged that should any of the cylinders fail to take up the required position, the lamp will remain lit.

An air pressure switch in the 'clamp' air line is switched 'on' by the air pressure and a circuit is made through the micro switch which will remain closed until the racks have nearly completed the movement to the 'clamp' position. As all these micro switches are wired in parallel, the circuit will remain completed until all the racks have moved over, then, all the micro switches will be opened and the light will go out.

The battery for the warning system is carried in a box mounted on one headstock. It is a 'dry' battery and, therefore, does not require charging, also as the drain on it is light it will need replacing only at long intervals of time.

NOTE :-

The existing clamp warning light unit is to be removed and replaced by a new type of press button lamp unit (see fig. No. 42) at the earliest opportunity on all vehicles.

Continued.....

Existing Version of Clamping Equipment
(Not equipped with press-button lamp unit)

To secure containers on the wagons.

- (a) Ensure that an air pressure of at least 30 p.s.i. is available in the main reservoir pipe.
- (b) Check the working of the lamp by pressing the blue cap.
- (c) The carriage key when inserted in the valve must be moved to and held in the "clamp" position.
- (d) During the movements of the clamping mechanism the lamp will light and after completion of the operation will go out.
- (e) The carriage key can then be removed and the valve will return to the neutral position.
- (f) Re-check that lamp is working as in (b).

NOTE :

If the lamp remains lit after carrying out the securing or releasing operations described above the mechanism has not functioned correctly.

Modified version of Clamping Equipment
(Equipped with press-button lamp unit) (SEE FIG N° 42)

To secure containers on the wagons.

- (a) Ensure that an air pressure of at least 30 p.s.i. is available in the main reservoir pipe.
- (b) Check the working of the lamp by pressing the "test" button on the side of the lamp unit.
- (c) Press and hold the indicator button on the front of the lamp unit insert the carriage key in the valve and move it to and hold it in the "clamp" position.
- (d) During the movements of the clamping mechanism the lamp will light and after completion of the operation will go out.
- (e) The carriage key can then be removed, the valve will return to the neutral position and the indicator button can be released.
- (f) Re-check that lamp is working as in (b)

NOTE :

If the lamp remains lit after operation (d) has been carried out the mechanism has not functioned correctly.

To release the container on the wagon.

By a similar procedure (as for securing) but moving the carriage key to the "release" position it can be established when the containers have been released for unloading.

Each pair of clamps is fitted with a white painted indicator bar the end of which projects below solebar level. When the ends of the indicators are horizontal the clamps are fully dis-engaged. When the clamps are engaged the ends of the indicator bars are retracted out of sight (See Fig.24). Any position between these two indicates that the pair of clamps concerned have not worked correctly (Care should be taken to keep clear of clamps and indicator bars which have not functioned properly as further movements of these may trap fingers etc.)

The air operated clamps will not function if there is inadequate air pressure in the main reservoir pipe. However, in the absence of air pressure the three indicator bars on each side of the wagon may be moved by hand to operate the clamps.

NOTE :- Ensure that all isolating cocks for the air operated throw-over clamps are fully open when loading Freightliner Containers.

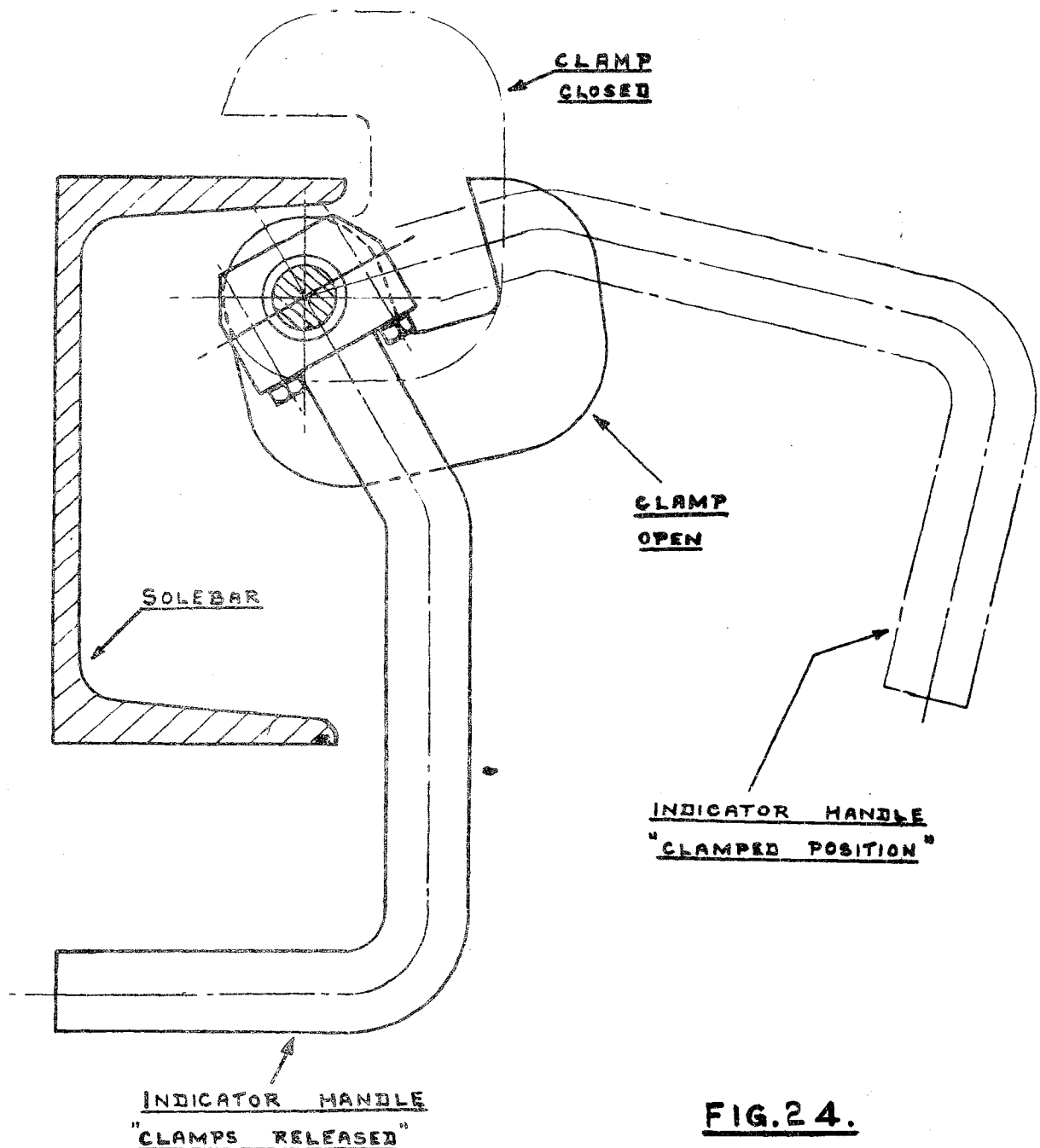


FIG.24.

SECURING OF I.S.O. CONTAINERS

NOTE :-

Where I.S.O. Containers are fitted with the standard freightliner location and securing devices, the normal procedure of loading for freightliner containers will be applied.

Twelve intermediate vehicles have been modified for the conveyance of I.S.O. Containers.

The Container is positioned accurately by means of spigots which fit into the additional sockets welded on the vehicle underframe, and engage into the recesses in the bottom of the corner casting of the containers.

For position of location points (see Fig. No. 5)

To secure the Container on the Wagon.

- (a) Special locating spigots must be fitted into the I.S.O. Container Sockets provided on the wagon underframe and secured in position by means of the locating spigot securing pin (See Fig. No. 25).
- (b) When the I.S.O. Container is located on the wagon the corner casting of the container sits over the spigot, the securing pin must then be inserted through the casting and the spigot, care being taken to see that the flange of the securing pin is located inside the corner casting before lowering the handle. The pin is then in the locked position (See Fig. No. 25).
- (c) When I.S.O. Containers are loaded on a vehicle and secured in this manner the air operated throw-over clamps for securing freightliner containers occupying this space must be made inoperative by isolating the air supply to the clamps concerned.

An isolating cock is provided for each set of throw clamps (See Fig. No. 26).

- (d) If any set of clamps have been isolated, the electrical clamp warning light system on this vehicle is no longer operative.
- (e) Freightliner containers must not be loaded on these vehicles when I.S.O. containers are being conveyed.

To release the Container

- (a) Remove the container securing pin (See Fig. No. 25)
- (b) Unless another I.S.O. Container is being loaded the location spigot securing pin must be withdrawn, and the location spigot removed.

These two items must then be replaced in the receptacle provided on the freightliner underframe, and the clamping system isolating cocks opened.

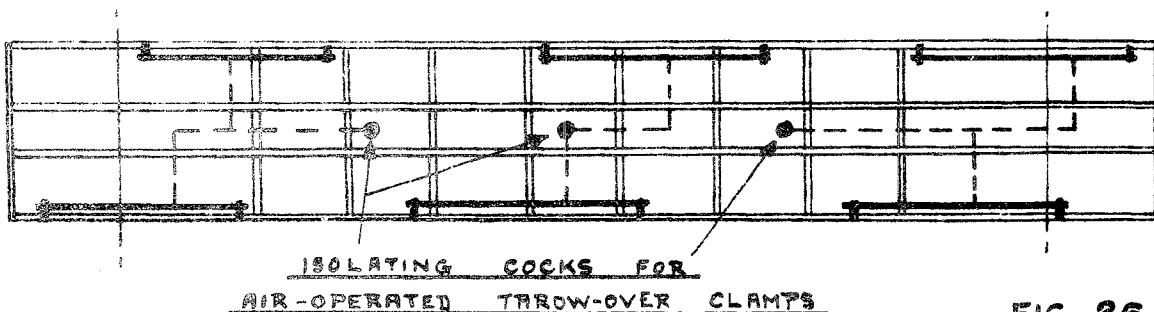
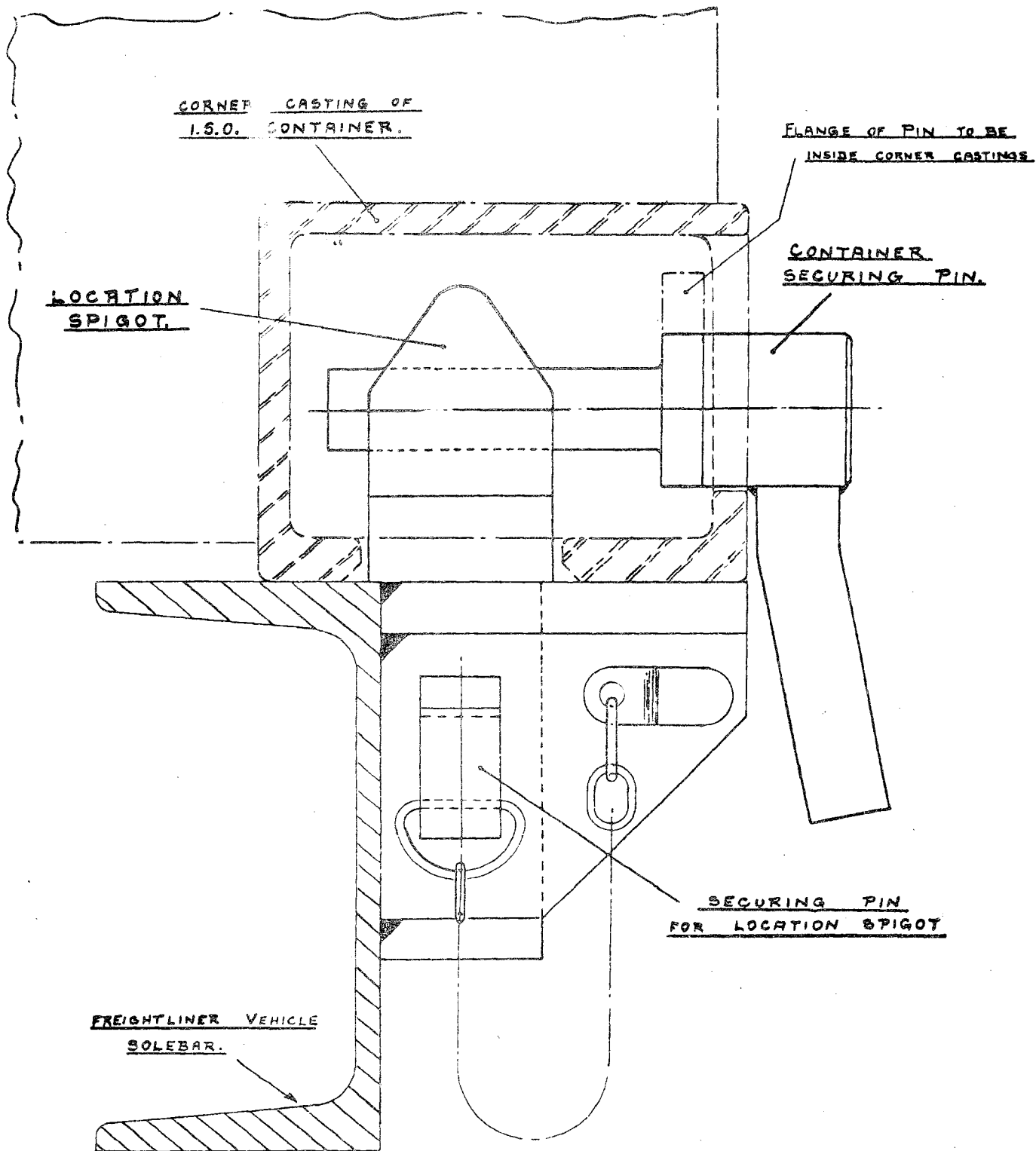


FIG. 26.



LOCATING & SECURING
OF I.S.O. CONTAINERS
FREIGHTLINER VEHICLES 1ST BATCH

FIG. 25.

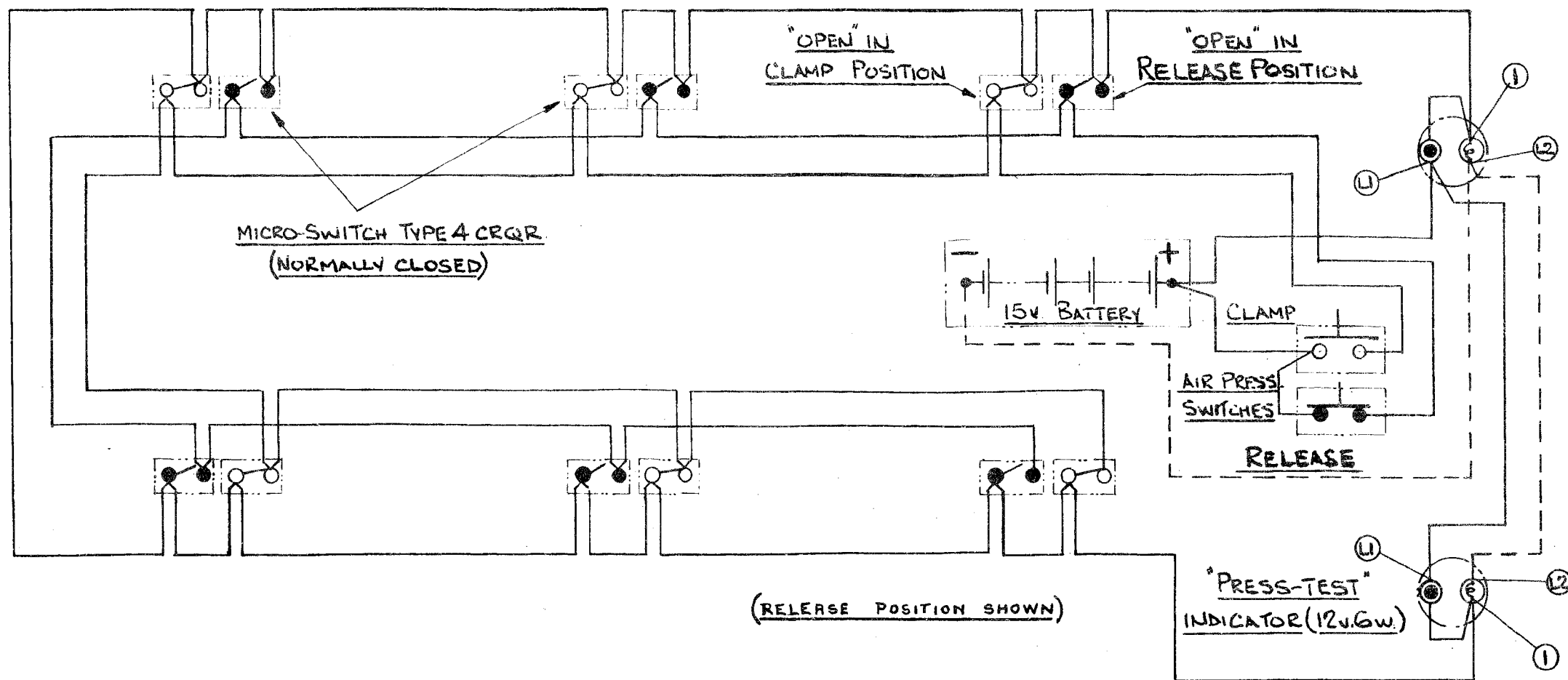
FREIGHTLINER TRAIN.

FAULT FINDING CHART - CONTAINER SECURING EQUIPMENT.

FAULT.	CHECK.	ACTION.
Indicator lamp does not light when clamp/release lever is operated.	<p>Lamp by pressing dome.</p> <p>Adequate air pressure available in Main Reservoir pipe.</p> <p>Operation of air pressure switches.</p> <p>Battery Voltage.</p> <p>Adjustment of micro-switches.</p> <p>Wiring and connections. Wiring diagram EL.299 - outer vehicle. Fig 21 Wiring diagram EL.300 - inner vehicle. Fig 22</p>	<p>Replace lamp and re-test. Lamp is 12v. 6w. Cat: No: 9/54/30360.</p> <p>Charge pipe to 50 p.s.i. minimum.</p> <p>20 p.s.i. min. required to operate. Change defective switches. (Smiths oil/air press switch. P.S.4201/20).</p> <p>Replace if discharged. Battery is Exide Type L30. 7.1/2 v. 2 per vehicle.</p> <p>Re-adjust as necessary. Replace defective switches - (Burgess Type 4 CRQR metal clad).</p> <p>Tighten connections. Renew defective wiring. (Cable is 14/.012" single core P.V.C. insulated light duty cable to B.S.1862 Table 7. armoured to Clause 17).</p>
Indicator lamp lights and remains lit when clamp/release lever is operated.	Position of clamps by visual examination of handles.	<p>Correct stiffness in bearings on shaft carrying clamps. (Examine for corrosion, paint over bearing, bent shaft etc.)</p> <p>Examine air cylinders for stiffness. Check level of oil in lubricator in main airline by dipstick provided. Recommended oil: Shell Tellus 15.</p>

Continued . . .

FAULT	CHECK.	ACTION.
Indicator lamp lights and remains lit when clamp/release lever is operated. /Continued...	Air pressure available in Main Reservoir pipe. Operation of air pressure switches.	Charge pipe to 50 p.s.i. Change defective switches.



LINER TRAIN.
SCHEMATIC WIRING DIAGRAM FOR
CLAMP DEVICE WARNING SYSTEM.
— OUTER VEHICLE. —

DIAGRAM No. EL299
FIG. 27.

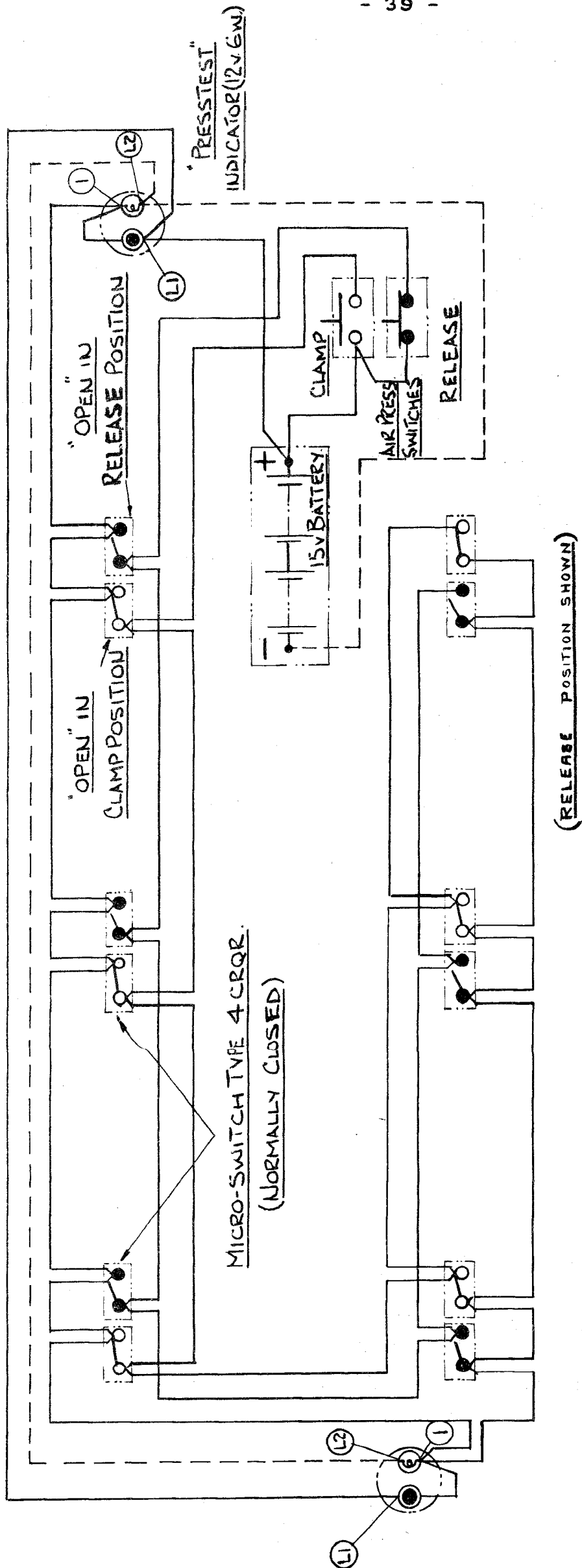


DIAGRAM No. EL300
FIG. 28.

LINER TRAIN
SCHEMATIC WIRING DIAGRAM FOR
CLAMP DEVICE WARNING SYSTEM.
— INTERMEDIATE VEHICLE. —

- (6) Slide Micro-Switch and base plate out of casting.
- (7) Fit new Micro-Switch (with tails) to base plate, and reverse procedure outlined in items 3 to 6.
- (8) Adjust to Drawing No. DE/37923 (FIG. 29)
(Fixing holes in base plate are elongated).
- (9) Test and replace covers ensuring that cover is resealed with jointing compound.

MICRO-SWITCH BURGESS TYPE 4CRQR
(METAL CLAD).

When a micro-switch is proved to be faulty, the following procedure must be followed to replace it.

- (1) Remove Micro-Switch housing cover (1/2" x 2 BA, CH, HD Set Screws) situated on each side of rack and pinion housing.
- (2) Remove rack and pinion housing cover.
- (3) Disconnect Micro-Switch 'tails' from two-way junction block.
- (4) Remove lock-nuts, (where fitted) from stem of micro-switch.
(Note:- do not replace lock nuts).
- (5) Unscrew, and remove completely 5/8" x 2 BA, CH HD Screw from Base plate.
- (6) Slide Micro-Switch and base plate out of casting.
- (7) Fit new Micro-Switch (with tails) to base plate, and reverse procedure outlined in items 3 to 6.
- (8) Adjust to Drawing No. DE/37923 (FIG. 29)
(Fixing holes in base plate are elongated).
- (9) Test and replace covers ensuring that cover is resealed with jointing compound.

Appendix I

FREIGHTLINER TRAINS

2ND BATCH

FREIGHTLINER VEHICLES

The 2nd batch of Freightliner Vehicles have been modified thus :-

Redesign of Bogie.

Redesign of Underframes.

Redesign of Brakework.

Redesign of Air-operated Clamping System.

Redesign of Electrical Warning System.

The following instructions and diagrams included in the manual for the 1st batch of vehicles are not applicable to the 2nd batch of vehicles :-

Page 6, 7, 9, 31, 32, 33, 34, 36, 37 & 41

Page 20 Paragraph (f)

Page 22 Paragraph (n)

Page 27 Paragraph 3 (b) (c)

Page 28 Paragraph 3 (d) (e)

Fig. Nos. 1, 4, 5, 6, 11, 18, 19, 21, 22, 23, 25, 26, 27, 28 & 29

GENERAL VEHICLE PARTICULARS ARE AS FOLLOWS : -

Length over headstocks 63'-6" End vehicle
62'-6" Intermediate vehicle

Total length of 15 wagon train 982'-3"

Width over platform 6'-11"

Platform height above rail 3'-3"

Buffer height 3'-5½" projection 1'-10"

Bogies **B.R.2 M.** with 2'-8" dia.
Roller bearing wheel sets.
Wheelbase 6'-6¼"

Tare	End vehicle	19-tons 18 cwts.
	Intermediate vehicle	19-tons 8-cwts.

Maximum Load 51-tons

Maximum Running Speed 75 m.p.h.

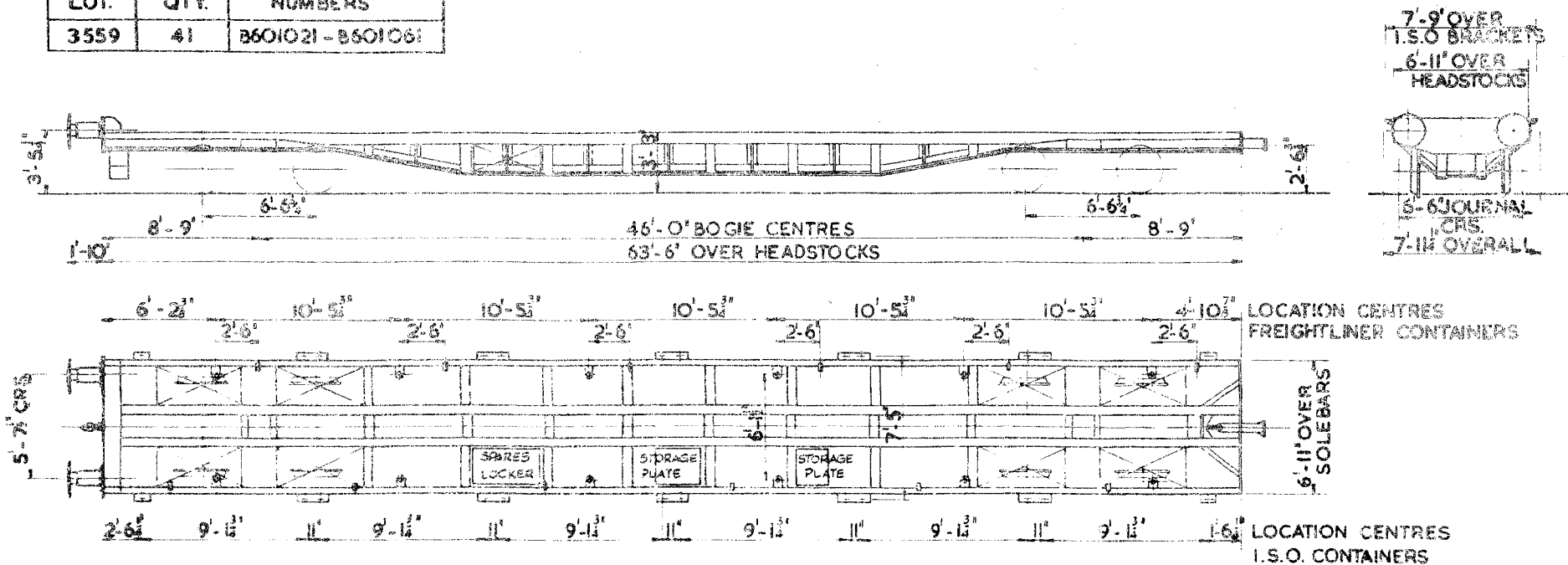
Brake : Air operated disc brakes ON AXLES.

Solebars and Headstocks Painted Blue.

Train classification Code 1.

62'-6" PLATFORM OUTER FREIGHTLINER VEHICLE (2ND BATCH)

LOT.	QTY.	NUMBERS
3559	41	B601021-B601061



TARE - 19 TONS 18 CWT.

CARRYING CAPACITY - 51 TONS

BRAKE - AUTO AIR DISC BRAKE
(VARIABLE LOAD DEVICE) & HANDWHEEL

MIN. CURVE - 3 1/2 CHAINS

WHEELS - 2'-8" DIA.

JOURNALS - 9" X 4 1/2" ROLLER BEARING.

COUPLINGS - OUTER END - SCREW COUPLING
INNER END - BAR COUPLER

BUFFERS - SELF CONTAINED HYDRAULIC

SECURING DEVICES

FREIGHTLINER CONTAINERS -

AIR OPERATED CLAMPS

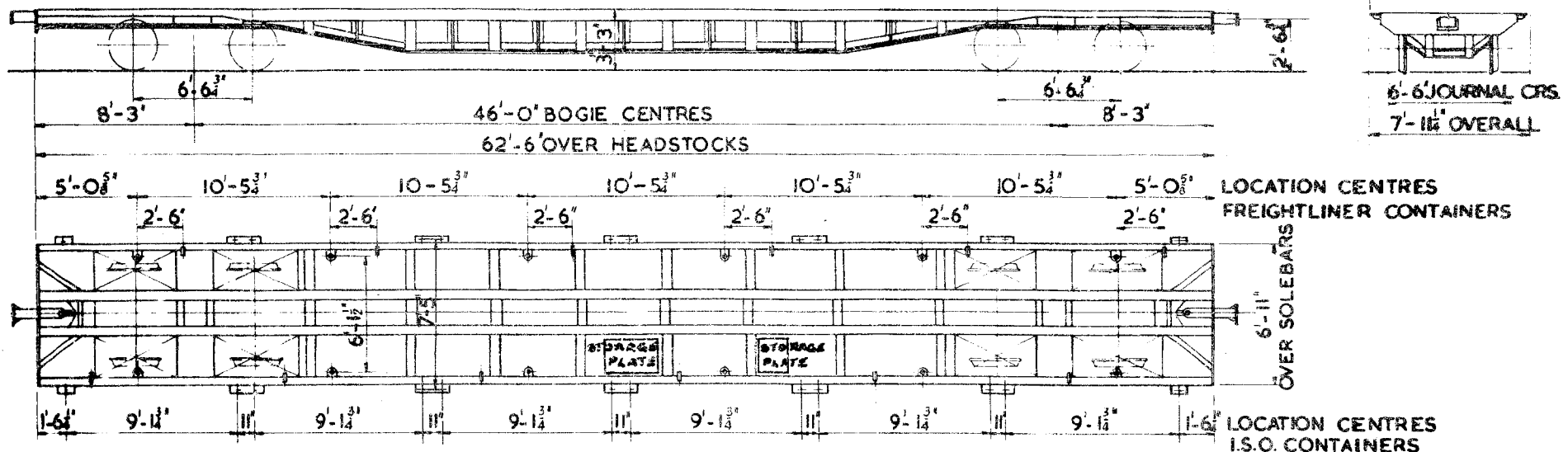
I.S.O. CONTAINERS - HAND OPERATED PINS.

CONTAINER LOCATION - PINS

Fig. 30.

62'-6" PLATFORM - INNER FREIGHTLINER VEHICLE. (2ND BATCH)

LOT	QTY	NUMBERS
3560	59	B602085-B602143



TARE-19 TONS. 0 CWT.

CARRYING CAPACITY :- 51 TONS

BRAKE-AUTO AIR DISC (VARIABLE LOAD DEVICE) & HANDWHEEL

MIN. CURVE 3 1/2 CHAINS

WHEELS:- 2'-8" DIA.

JOURNALS:- 9"x4 7/8" ROLLER BEARING.

COUPLINGS :- BAR COUPLER

SECURING DEVICES

FREIGHTLINER CONTAINERS -

AIR OPERATED CLAMPS

I.S.O. CONTAINERS - HAND OPERATED PINS.

CONTAINER LOCATION - PINS

B.R. 2.M - BOGIES (2ND BATCH)

(SEE FIG. NO. 32)

The bogie fitted to the 2nd batch of Freightliner trains has a cast steel frame fitted with 2' 8" dia. wheels with 4.7/8" dia. journals and roller bearing axleboxes at 6' 6.3/4" (2 metre) centres.

The bogie frame is made up of three main castings, two side frames and a bolster.

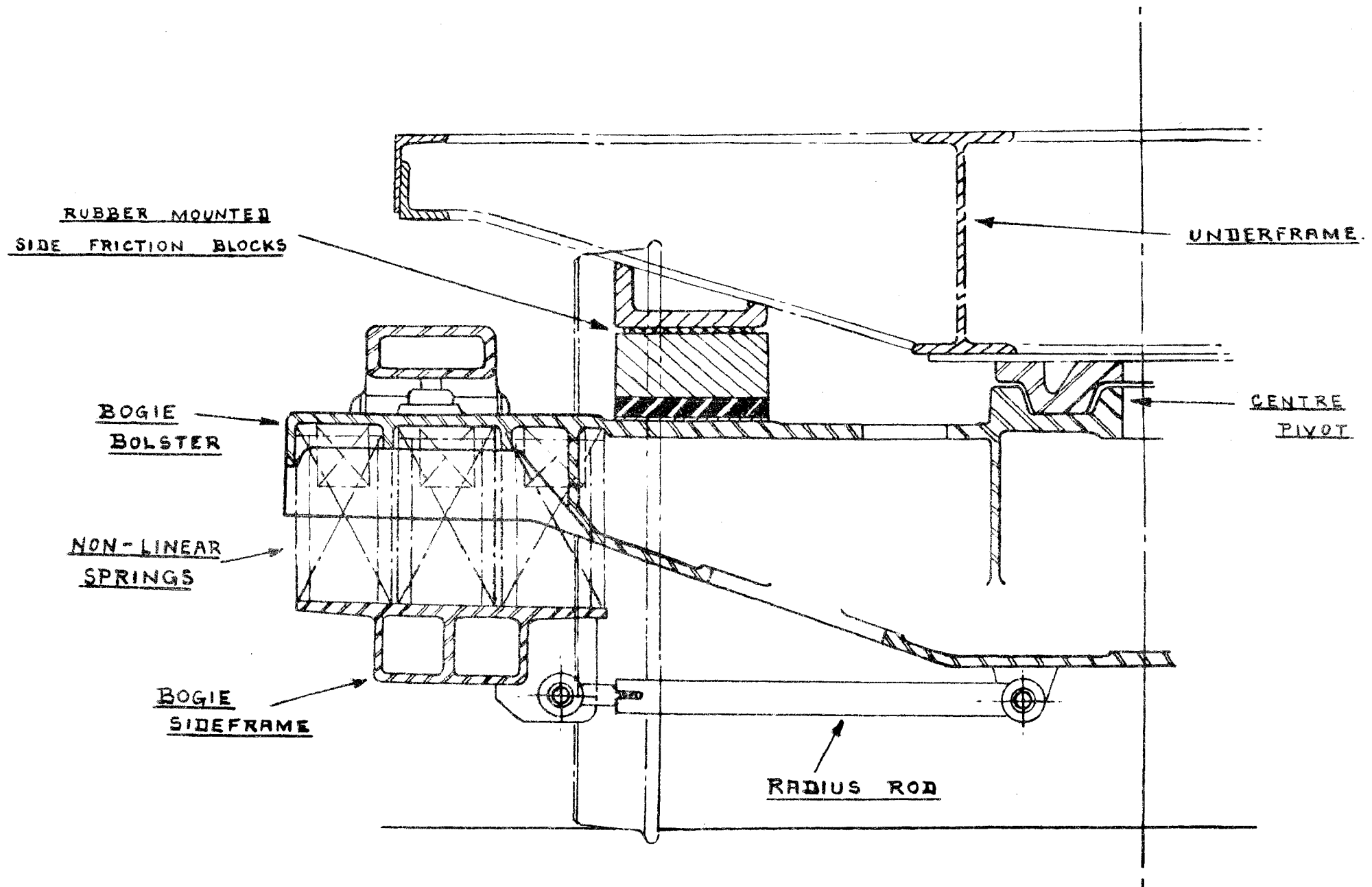
The ends of the bolster are fitted through apertures in the side frames and rests on a nest of non-linear springs. Fitted into the ends of the bolster are spring loaded cast steel wedges which bear on spring steel plates tack-welded to the sides of the aperture. These provide a measure of damping to the main springs and it is essential that these surfaces remain dry and unlubricated.

There are rubber mounted side friction blocks on the bolster which are in contact with those on the underframe. The faces are composed of anti-friction material and need no lubrication.

The two side-frames are located to the bolster by means of radius rods to control the movement between the components.

NOTE - The radius rods are fitted individually to each side frame, owing to the slight variations in the castings it is most important therefore that the rods must not be interchanged.

The axleboxes are retained in the axlebox guides by means of small 'keeps' bolted to the bottom of one leg of each guide, and the top of the box is domed slightly to allow the side frame to rock in a vertical plane. The clearance between axlebox and guide is adjusted to allow this.

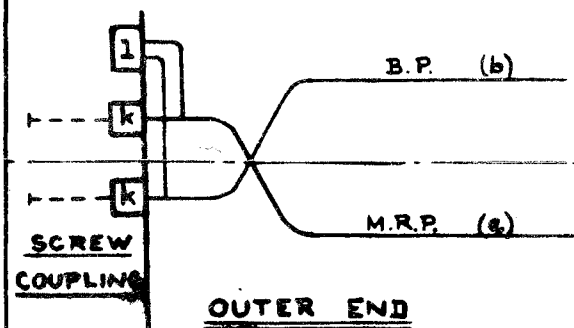
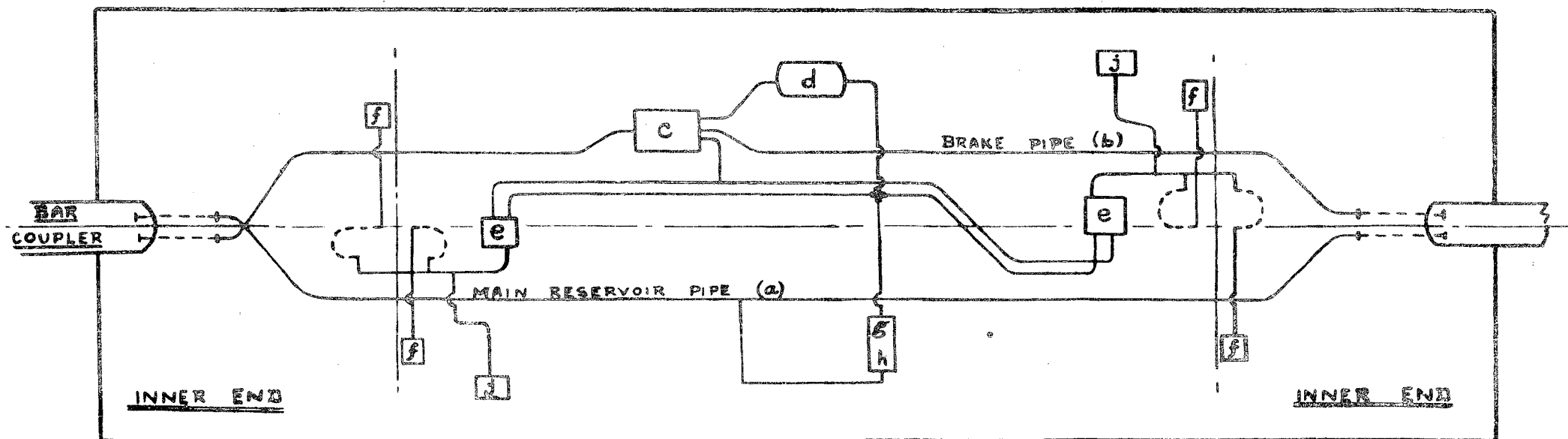


BR 2M FREIGHT BOGIE

FIG. 32.

FREIGHT LINER TRAIN

AIR BRAKE EQUIPMENT



- C - DISTRIBUTOR
- d - AUX RESERVOIR
- e - VARIABLE LOAD VALVE
- f - BRAKE CYLINDERS
- g - STRAINER, - CHECK VALVE & CHOKE
- h - ISOLATING COCK
- k - END COUPLING COCKS
- j - SCHRADER CHECK VALVE
- l - DUPLEX PRESSURE GAUGE

FIG. 33.

Brake Description :- 'Two Pipe Automatic Air Brake System'

All brakework equipment is of the Westinghouse type (See Fig. No. 33)

Brake Cylinder and Pad Clearances.

- (a) Brake cylinder : one 8" dia. (Westinghouse) brake cylinder is mounted on each brake Beam, which operates the brake pads on each axle.
- (b) Each axle is provided with two braking discs. (See Fig. 34)
- (c) The brake cylinder piston rod is connected with two sets of calipers to each axle (See Fig. 34).
- (d) An adjusting rod is fitted between these calipers to maintain the correct clearance between brake pad and brake disc (See Fig. 34)
- (e) The clearance between each brake pad and brake disc to be 1/16" MIN. and 3/16" MAX.
- (f) The brake pads must not be worn below a minimum thickness of 1/4".
- (g) The brake pad specification for this condition is Ferodo 659F

NOTE - 15 vehicles are to be fitted with Westinghouse Type 36 Brake Cylinders (Any faulty cylinders must be returned to the manufacturers for replacements.)

Variable Load Valve.

For adjustment of mechanical linkage between variable load valve and bogie (See Fig. 35).

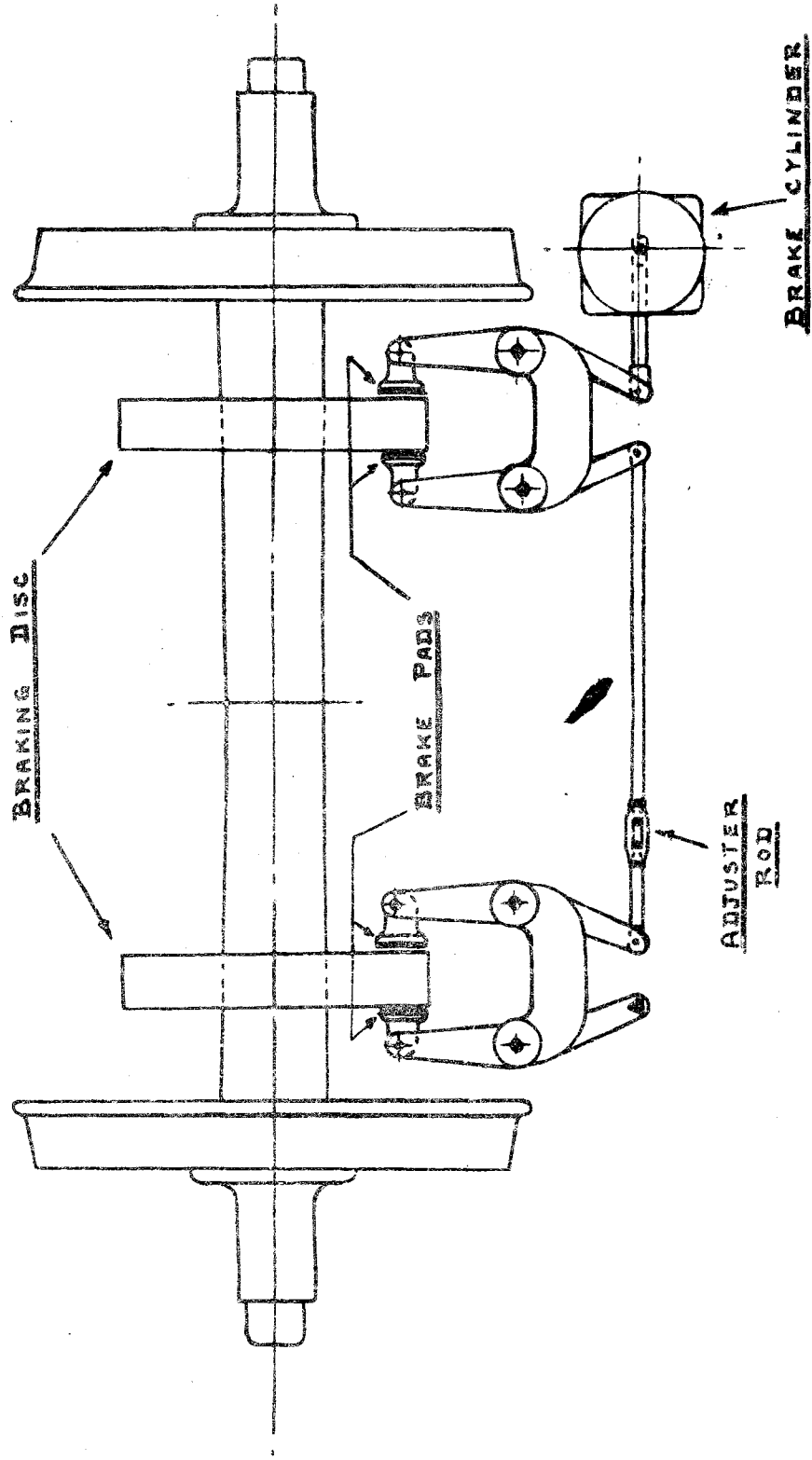
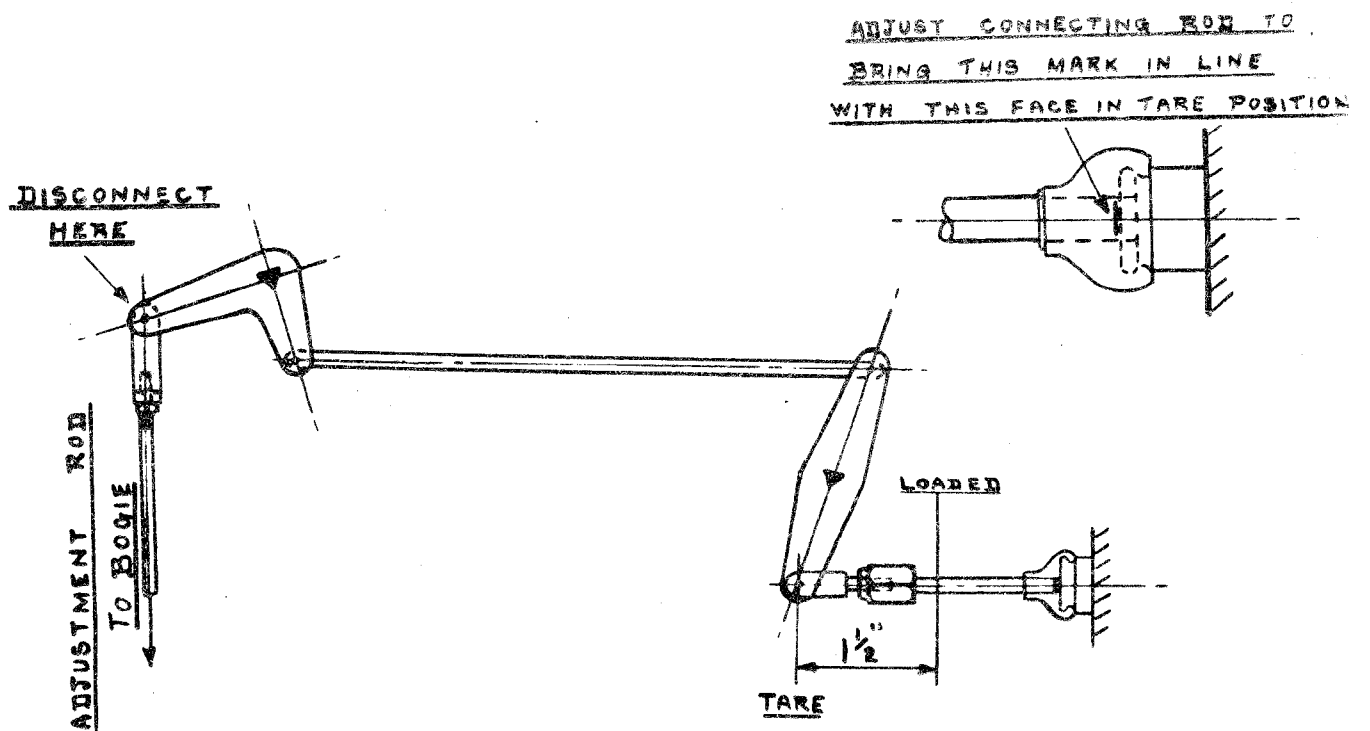


FIG. 34.



LINKAGE FROM BOGIE TO
VARIABLE LOAD VALVE
(WESTINGHOUSE)

FIG 35.

SECURING FREIGHTLINER CONTAINER

NOTE :-

Where I.S.O. Containers are fitted with the Standard Freightliner location and securing devices, the normal procedure of loading for freightliner containers will be applied.

When freightliner containers are loaded onto the wagon they are positioned accurately by means of spigots which fit into sockets in the vehicle underframe and engage with sockets in the container underframe. The purpose of these spigots besides positioning the containers relative to one another, is to prevent lateral and longitudinal movement.

The container is secured against excessive vertical movement by means of a system of rotary catches or clamps. The clamps are fixed onto shafts mounted on the inner face of the wagon solebar, each shaft carries one clamp. Each shaft is rotated to drive the clamp into the clamp or release position by a pneumatic cylinder operating through a rack and pinion. A spring loaded ball catch is positioned to engage with the rack and retain the clamps in the closed position in the event of a failure in the air supply (See Fig. No. 40).

The rack is also profiled to operate micro-switches, whose rollers bear on it, to provide an indication of the position of the clamps for the warning light system.

The supply of compressed air for actuating the cylinder is taken from the main reservoir pipe, through a strainer and lubricator, which provides a small amount of oil entrained with the air to provide lubrication for the various items of equipment.

An Air Isolating Cook incorporating an isolating electrical switch is provided for each pair of clamps.

For a Diagrammatic Layout of Clamping Equipment, (See Fig. No. 39).

1. Strainer and Lubricator.
2. Pilot Operated Four-Way Piston Valve.
3. Shuttle Valve.
4. Four-Way Piston Valve.
5. Pneumatic Air Cylinders.

When the carriage key is inserted in the four-way piston valve on the headstock and moved in the direction for clamping an electrical air pressure switch in the "clamp" air line is actuated, by the air pressure. This completes an electrical circuit through the micro-switches to the Indicator Lamp. When the racks have completed the movement to the clamp position, all the micro-switches on the clamp side should be open and no light will show when the operator presses the Clamp Indicator Button.

If the lamp lights after pressing the Clamp Indicator Button, the mechanism has not functioned correctly.

To Secure Freightliner Containers on the Wagon

- (a) Ensure that an air pressure of at least 30 p.s.i. is available in the main reservoir pipe.
- (b) Check the working of the lamp by pressing the "Test" button on the side of the control box.
- (c) Press and hold the indicator button on the front of the control box insert the carriage key in the valve and move it to and hold it in the clamp position.
- (d) During the movements of the clamping mechanism the lamp will light and after completion of the operation will go out.
- (e) The carriage key can then be removed, the valve will return to the neutral position, and the indicator button can be released.
- (f) Recheck that the lamp is working as in (b).

To Release Freightliner Containers on the Wagons.

- (a) Ensure that an air pressure of at least 30 p.s.i. is available in the main reservoir pipe.
- (b) Check the working of the lamp by pressing the "Test" button on the side of the control box.
- (c) Press and hold the indicator button on the front of the control box insert the carriage key in the valve and move it to and hold it in the release position.
- (d) During the movement of the releasing mechanism the lamp will light and after completion of the operation will go out.
- (e) The Carriage Key can then be removed, the valve will return to the neutral position, and the indicator button can be released.
- (f) Recheck that the lamp is working as in (b).

NOTE:-

If the lamp remains lit after operation (d) has been carried out the mechanism has not functioned correctly.

Each clamp is fitted with a white painted indicator bar the end of which projects below solebar level. When the ends of the indicators are horizontal the clamps are fully dis-engaged. When the clamps are engaged the ends of the indicator bars are retracted out of sight. Any position between these two indicates that the pair of clamps concerned have not worked correctly (care should be taken to keep clear of clamps and indicator bars which have not functioned properly as further movements of these may trap fingers etc.).

If the lamp is not working during the above sequence of operations, it must not be assumed that the lamp has failed, but that the clamping or releasing mechanism has not functioned correctly; maintenance staff must be sent for to rectify the fault and deal with the clamping or releasing of the containers.

The air-operated clamps will not function if there is inadequate air pressure in the main reservoir pipe. However, in the absence of air pressure the three indicator bars on each side of the wagon may be moved by hand to operate the clamp.

Ensure that all isolating cocks for the air-operated throw-over clamps are fully open when loading Freightliner Containers.

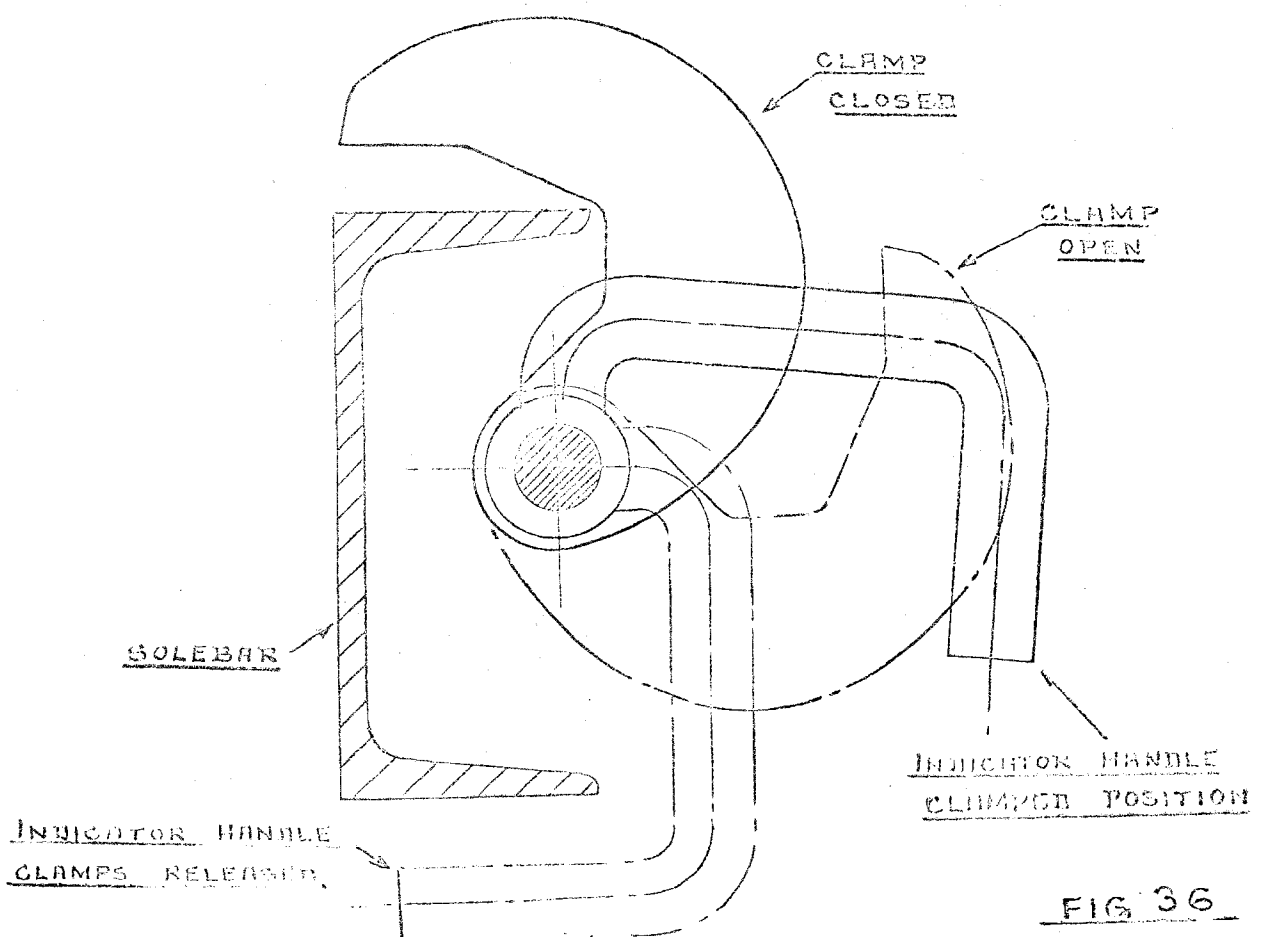


FIG 36

SECURING OF I.S.O. CONTAINERS

NOTE :-

When I.S.O. Containers are fitted with the standard freightliner location and securing devices, the normal procedure of loading for freightliner containers will be applied.

The container is positioned accurately by means of spigots which fit into the I.S.O. sockets provided on the vehicle underframe and engage into the recesses in the bottom of the corner casting of the container.

For position of location points (See Fig. No.30-31).

To Secure the Container on the Wagon

(a) Special location spigots must be fitted into the I.S.O. sockets provided on the wagon underframe (See Fig. No.30-31) and placed in the release position for loading of the containers.

(b) When the container is located on the wagon the operating lever of the spigot (See Fig. No. 38) is raised in a Horizontal position rotated 90° in a LEFT-HAND direction, then replaced in its vertical position. This is then in the clamped position and secures the spigot in the corner casting of the I.S.O. Container.

(c) When I.S.O. Containers are loaded on a vehicle, and secured in this manner, the air operated throw-over clamps for securing freightliner containers occupying this space must be made inoperative by isolating the air supply to the clamps concerned. An isolating cock is provided for each pair of clamps (See Fig. No. 37).

(d) The air operated throw-over clamps can be isolated in pairs without affecting the electrical warning light system for freightliner containers.

To Release the Containers

(a) The operating lever of the spigot (See Fig. No. 38), must be raised in a horizontal position rotated 90° in a RIGHT-HAND direction and then replaced in its vertical position.

The location spigot is now in the release position inside the container corner casting and the container can be lifted off the vehicle.

(b) Unless another I.S.O. Container is being loaded the location spigot securing pin must be withdrawn, and the location spigot removed. These two items must then be replaced in the receptacle provided on the freightliner underframe and the clamping system isolating cocks opened.

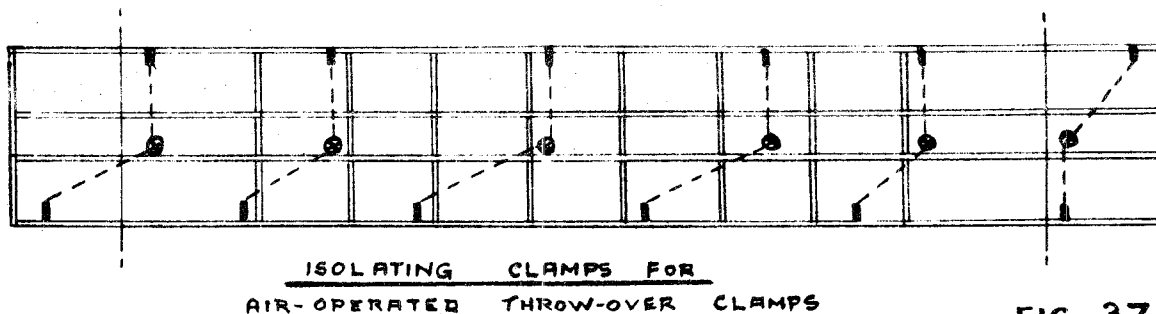
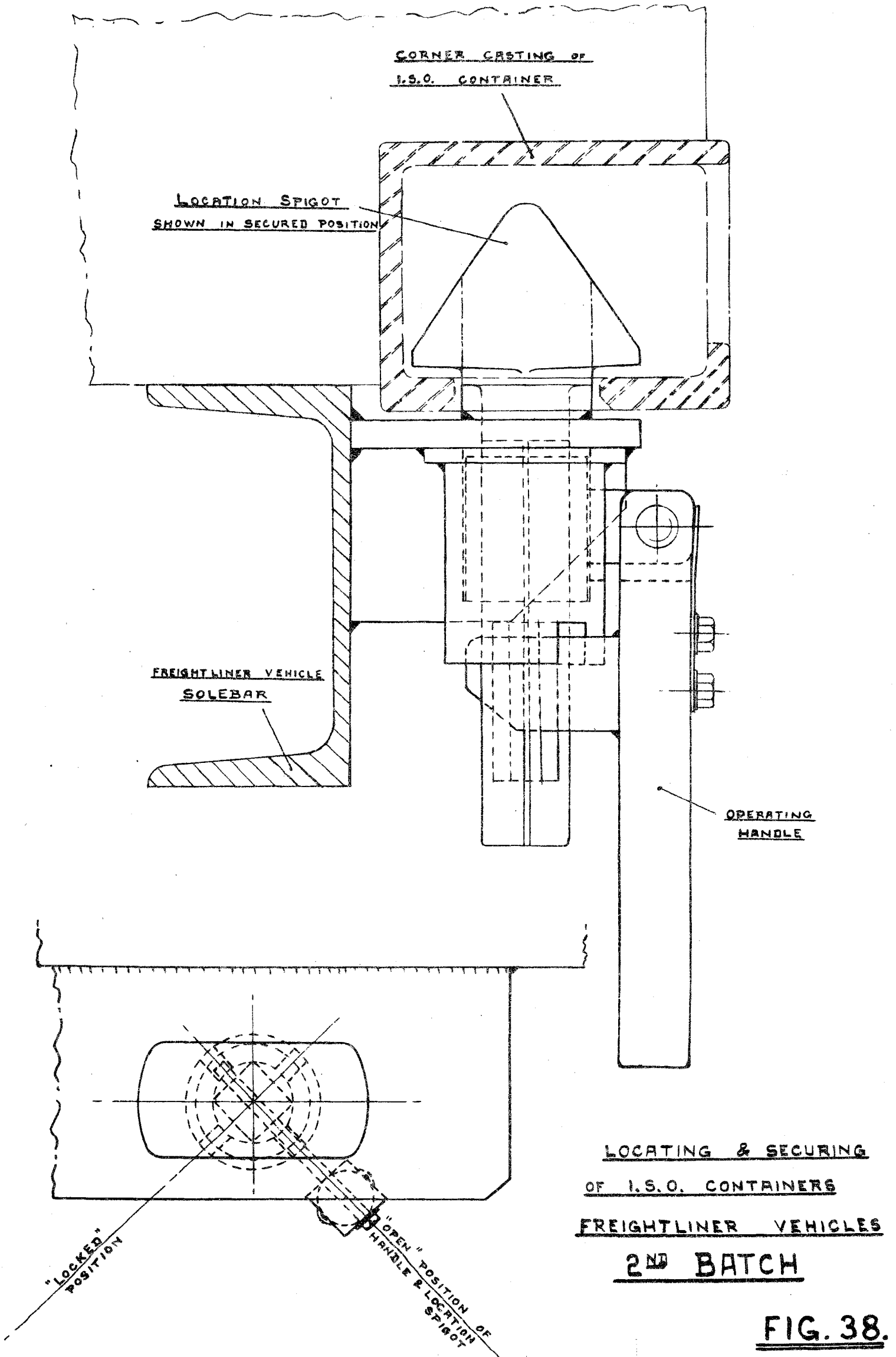
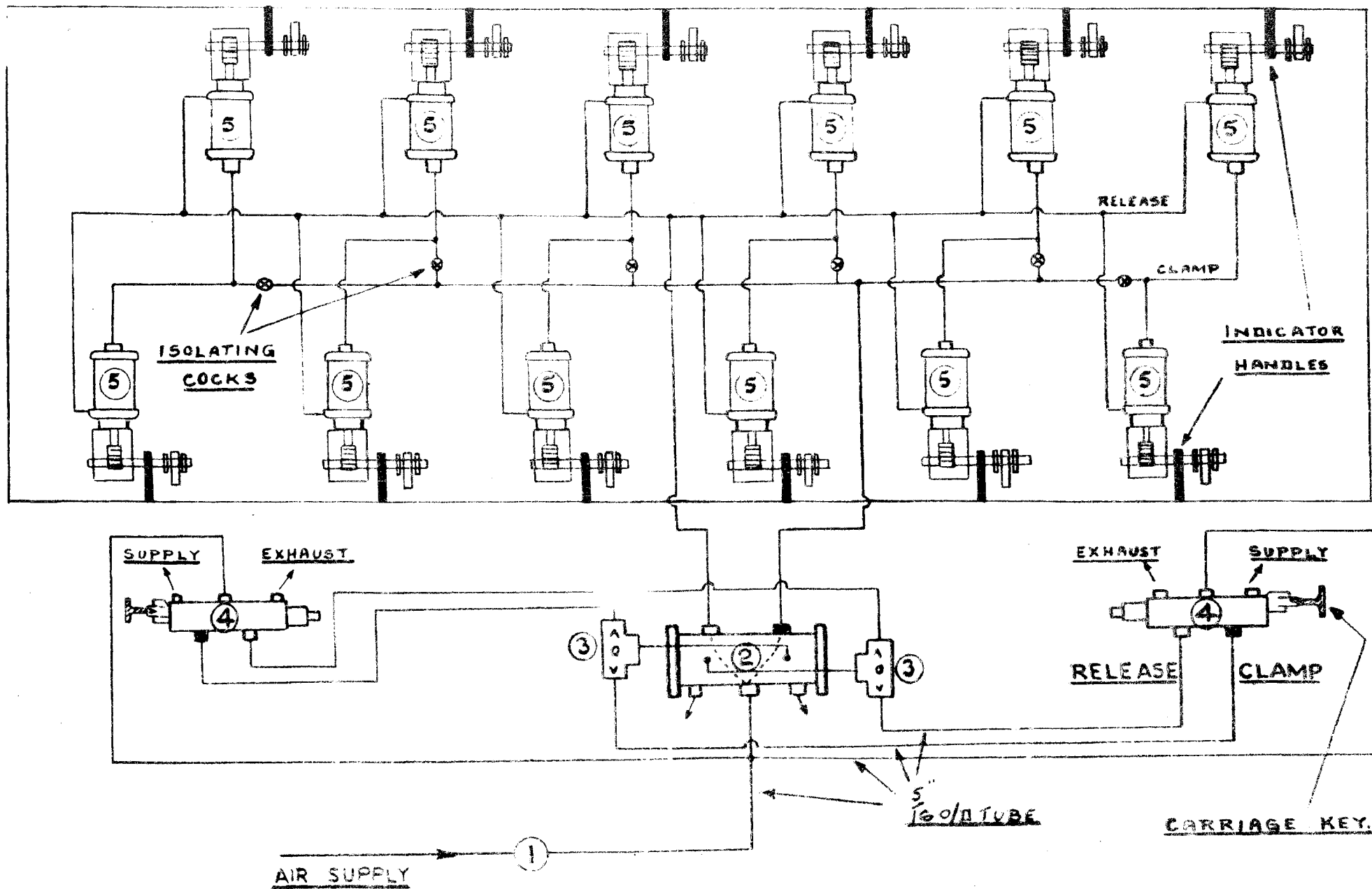


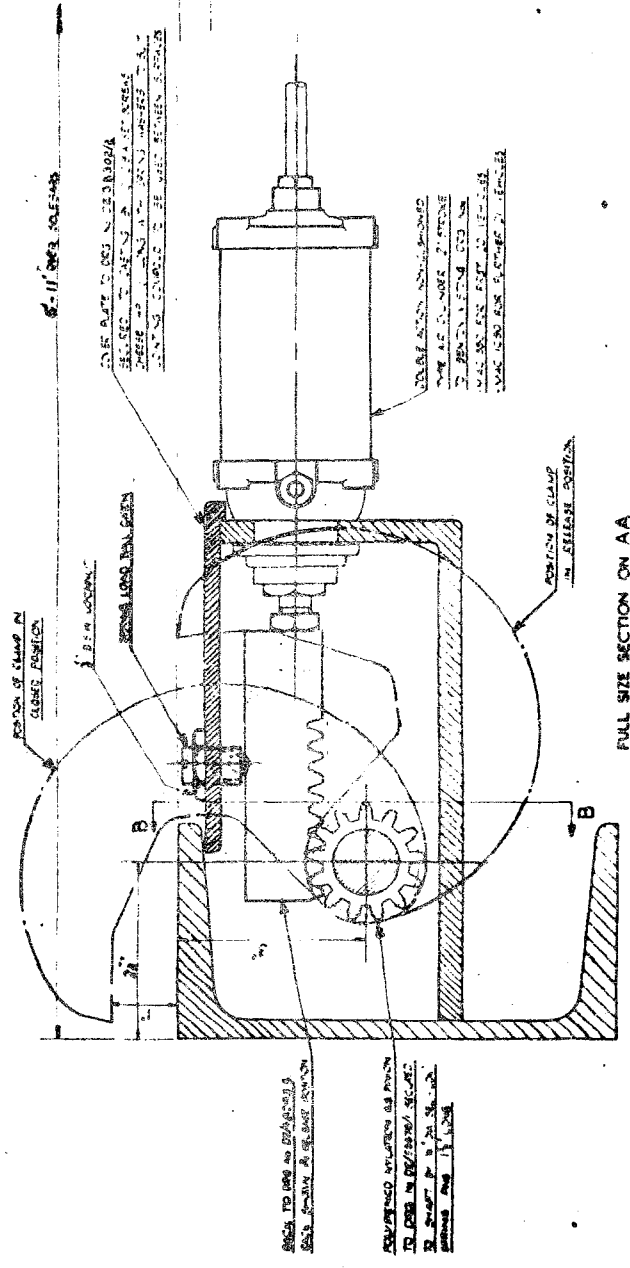
FIG. 37.



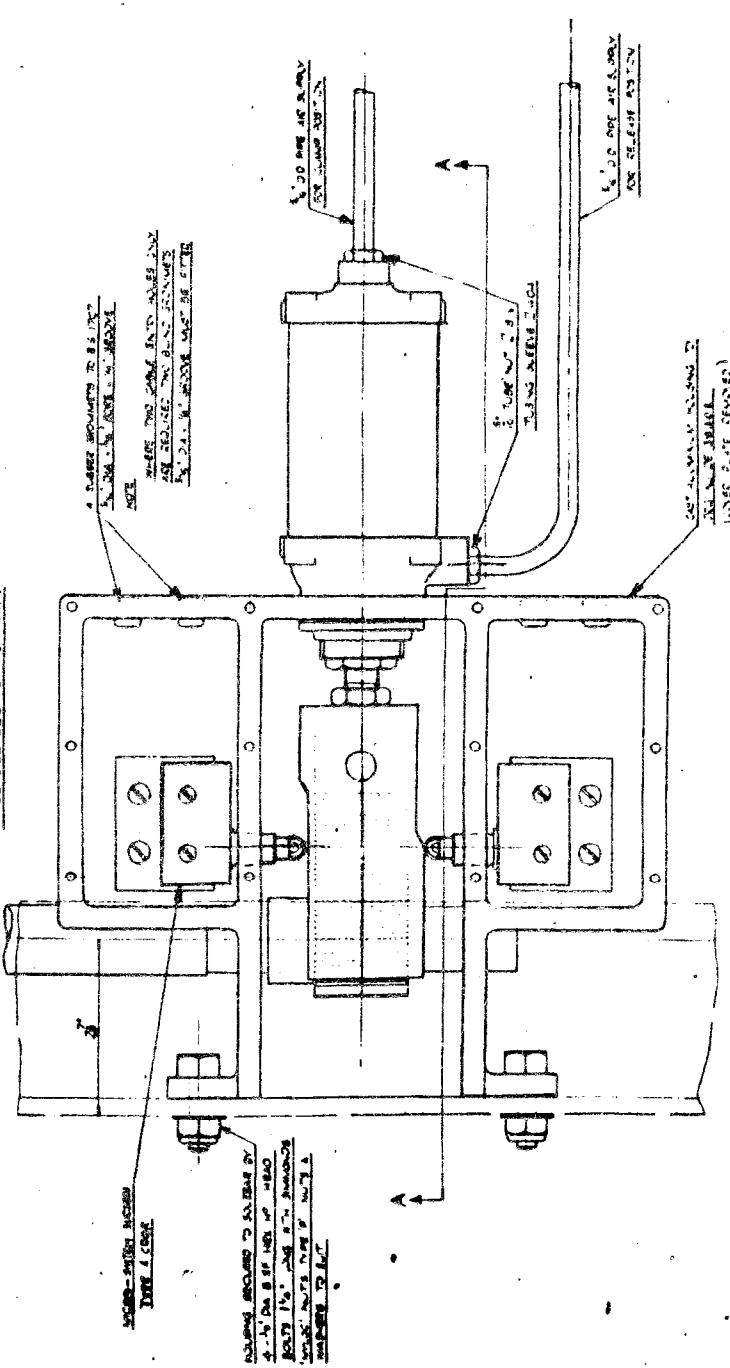


DIAGRAMMATIC LAYOUT OF EQUIPMENT

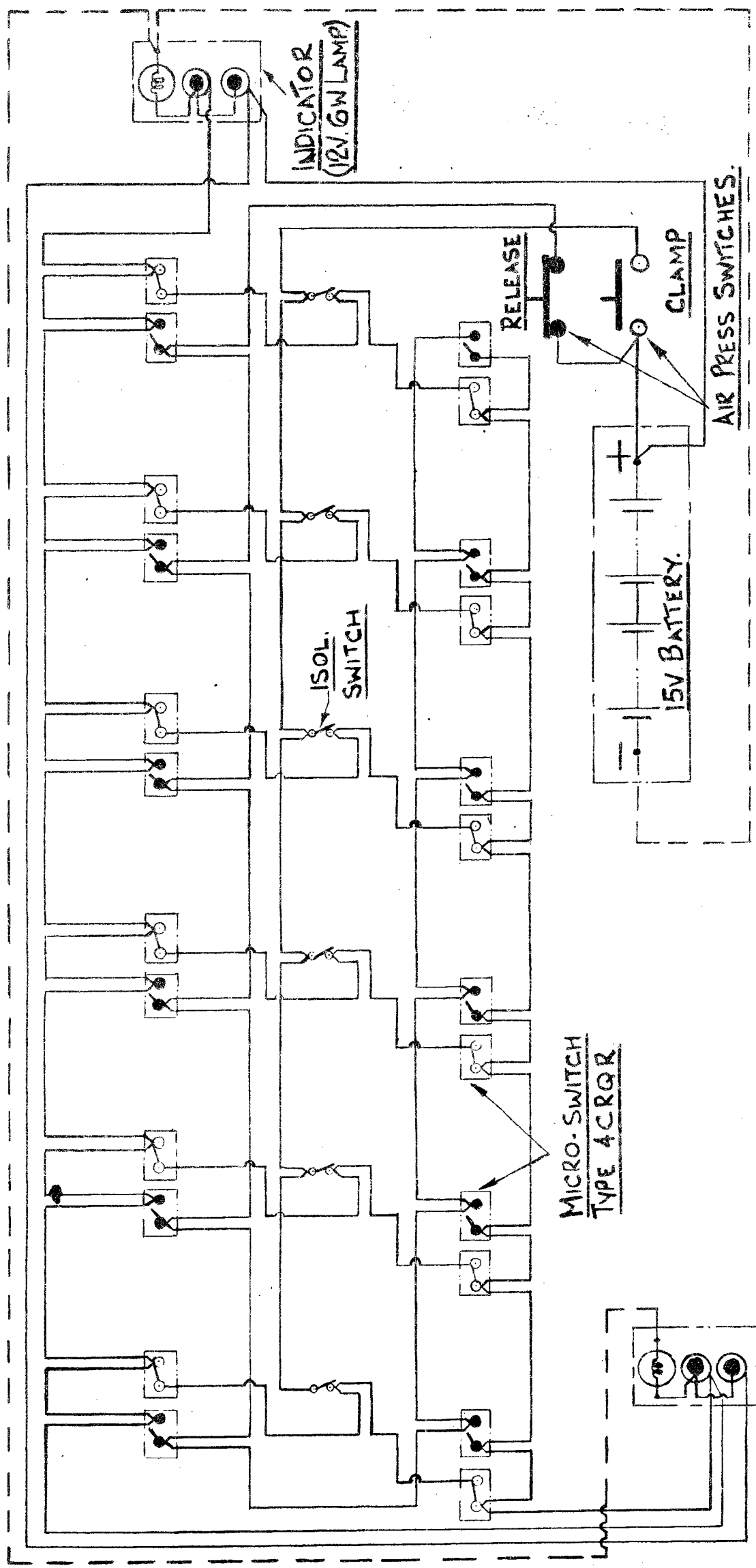
FIG. 39.



FULL SIZE SECTION ON A A



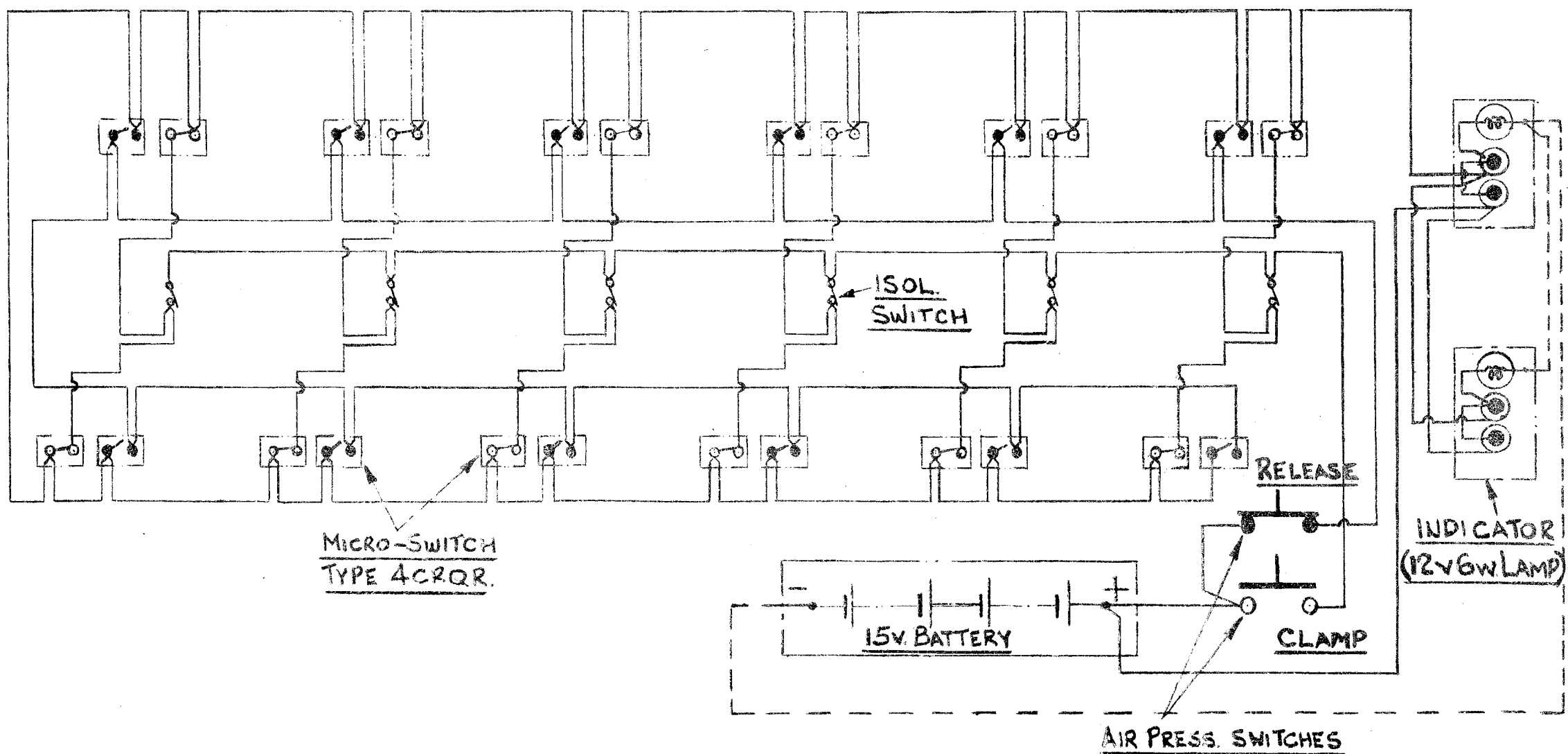
FULL SIZE DETAIL AT 'A'



(RELEASE POSITION SHOWN)

LINER TRAIN - 2ND BATCH.
SCHEMATIC WIRING DIAGRAM FOR
CLAMP DEVICE WARNING SYSTEM.
— INTERMEDIATE VEHICLE —

FIG. 41.



LINER TRAIN - 2ND BATCH.
SCHEMATIC WIRING DIAGRAM FOR
CLAMP DEVICE WARNING SYSTEM.
— OUTER VEHICLE —

(RELEASE POSITION SHOWN)

FIG. 42.

FREIGHTLINER TRAIN.

FAULT FINDING CHART - CONTAINER SECURING EQUIPMENT

<u>FAULT</u>	<u>CHECK</u>	<u>ACTION</u>
Indicator lamp does not light when press-to-test button is pressed.	Battery Voltage.	Replace lamp and re-test. Lamp is 12v. 6w. Cat: No. 9/54/30360 Replace if discharged. Battery is Exide Type L30. 7.1/2 v. 2 per vehicle
Indicator lamp lights when clamp indicator button is pressed.	Operation of air pressure switches. Adequate air pressure available in Main Reservoir pipe. Adjustment of clamp micro-switches Wiring and connections. Wiring diagram outer vehicle. Fig. 42 Wiring diagram inner vehicle. Fig. 41 Operation of isolating valve micro-switches.	20 p.s.i. min. required to operate. Change defective switches. (Smith oil/air press switch P.S.4201/20). Charge pipe to 50 p.s.i. minimum. Re-adjust as necessary. Replace defective switches - (Burgess Type 4 CRQR metal clad). Tighten connections. Renew defective wiring (Cable is 14/.012" single core P.V.C. insulated light duty cable to B.S.1862 Table 7. armoured to Clause 17). Replace defective switches.

MICRO-SWITCH BURGESS TYPE 4CRQR
(METAL CLAD)

When a micro-switch is proved to be faulty, the following procedure must be followed to replace it:-

- (1) Remove Micro-Switch housing cover (1/2" x 2 BA, CH, HD Set Screws) situated on each side of rack and pinion housing.
- (2) Remove rack and pinion housing cover.
- (3) Disconnect Micro-Switch 'tails' from two-way junction block.
- (4) Unscrew, and remove completely 5/8" x 2 BA, CH, HD Screw from Base Plate.
- (5) Slide Micro-Switch and base plate out of casting.
- (6) Fit new Micro-Switch (with tails) to base plate, and reverse procedure outlined in items 3 to 5.
- (7) Adjust to Drawing Nos. DE/12500 and DE/12499 Fig. No. 40. (Fixing holes in base plate are elongated).
- (8) Test and replace covers ensuring that cover is resealed with jointing compound.

