No. 881,751. PATENTED MAR. 10, 1908.

W. A. WEANT.

FLUID PRESSURE RAILWAY BRAKE.

APPLICATION FILED SEPT. 30, 1907.

2 SHEETS—SHEET 1.

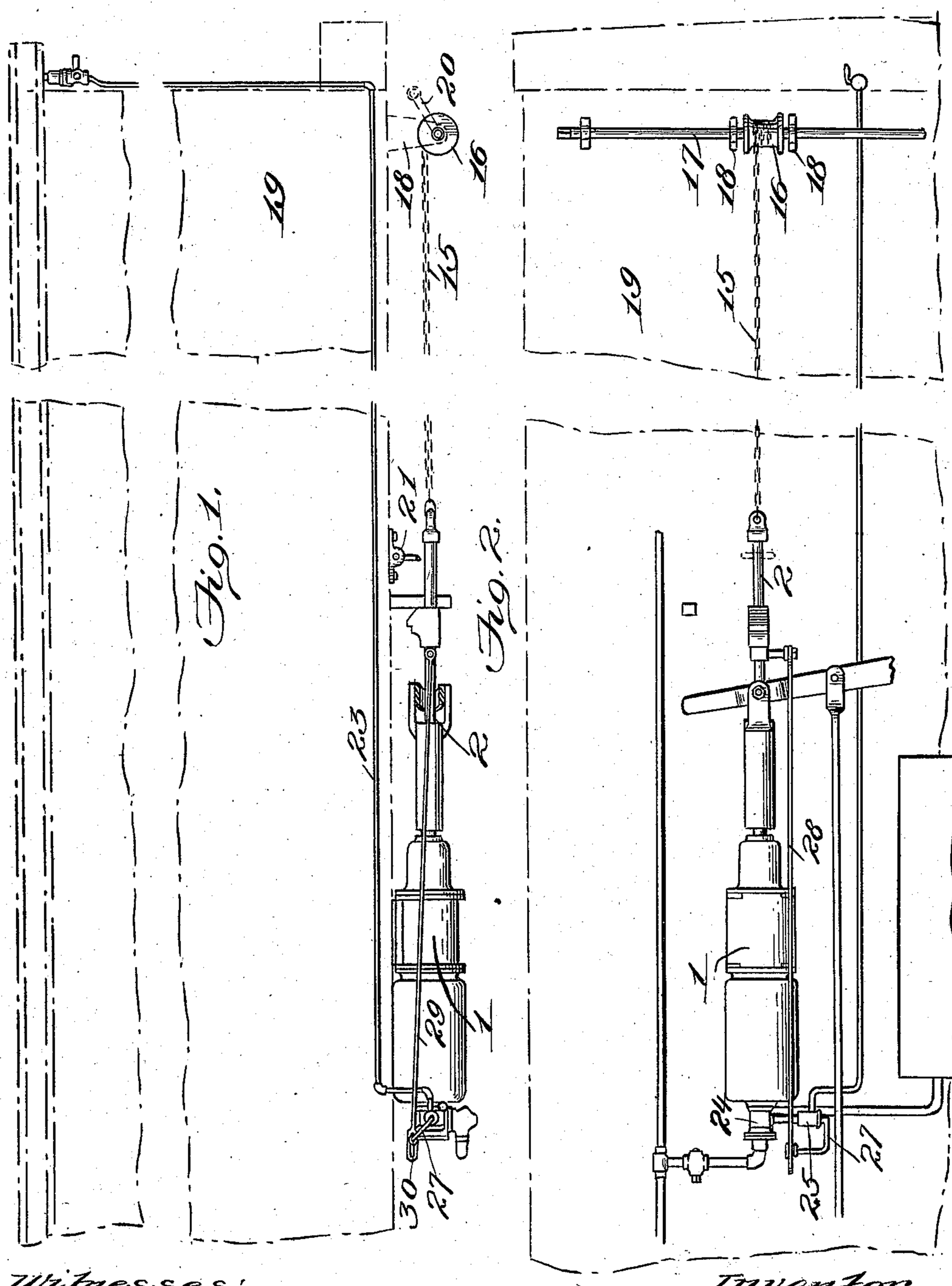

Fig. 1.

Fig. 2.

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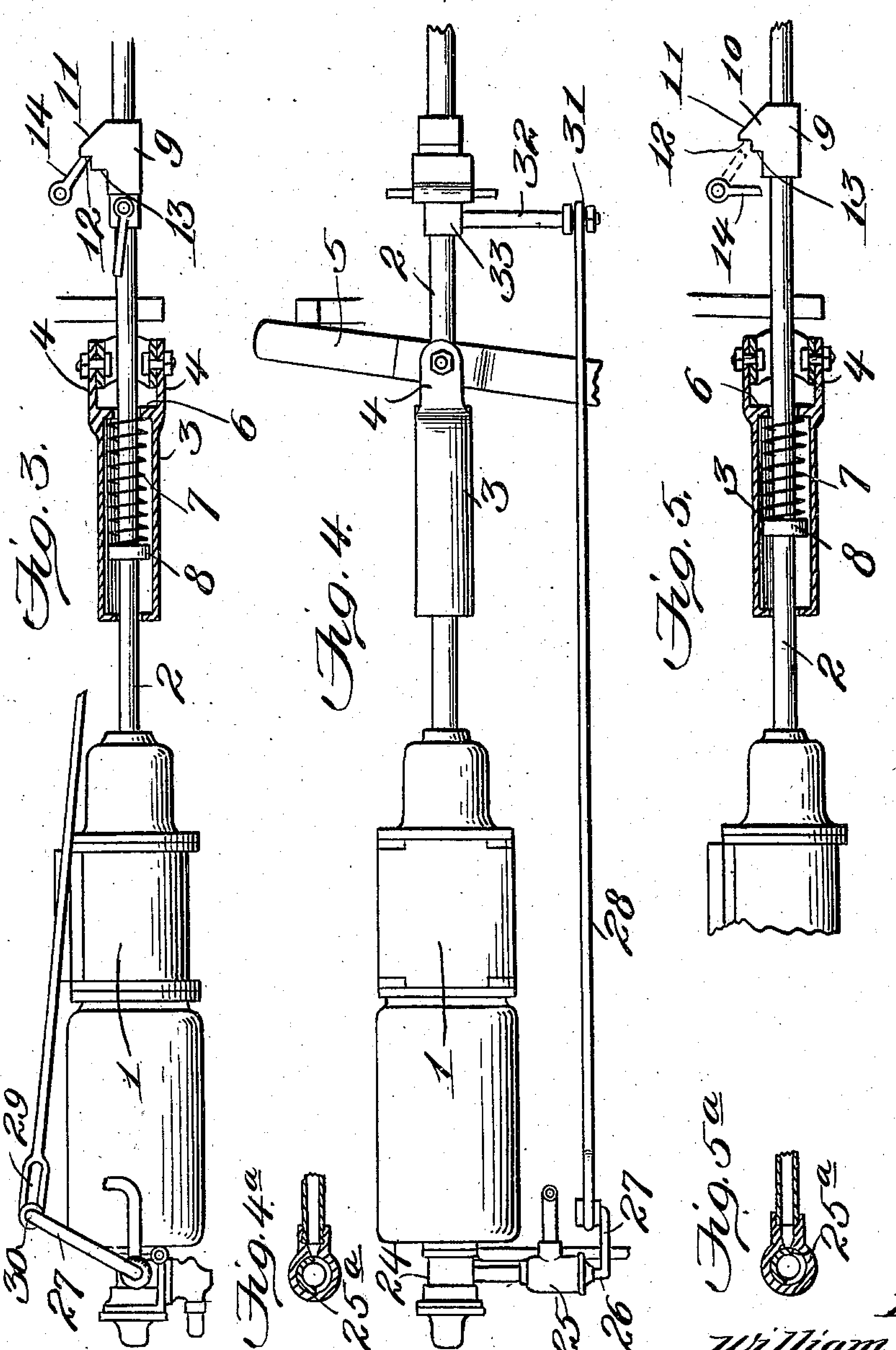

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FLUID-PRESSURE RAILWAY-BRAKE.

No. 881,751. Specification of Letters Patent. Patented March 10, 1908

Application filed September 30, 1907. Serial No. 395,185.

To all whom it may concern:

Be it known that I, WILLIAM A. WEANT, a citizen of the United States, residing at Mocksville, in the county of Davie and State of North Carolina, have invented new and useful Improvements in Fluid-Pressure Railway-Brakes, of which the following is a specification.

This invention relates to fluid pressure railway brakes, and one of the objects thereof is to provide means in a manner as hereinafter set forth for automatically closing a pressure retaining valve to overcome leakage when the maximum brake pressure has been applied and the brakes held.

A further object of the invention is to provide means in a manner as hereinafter set forth whereby the brakes can be locked and retained in such position after the air has been exhausted from the brake cylinder.

A further object of the invention is to provide means in the manner as hereinafter set forth for automatically releasing the brakes from locked position.

A further object of the invention is to provide means in the manner as hereinafter set forth whereby the brakes can be manually locked.

A further object of the invention is to provide attachments for air brakes for automatically closing a pressure retaining valve and for holding the brakes locked when applied after the pressure has been exhausted from the brake cylinder, and which shall be simple in construction, strong, durable, efficient in its use, readily set up, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view, the invention consists of the novel construction, combination and arrangement of parts hereinafter more specifically described and illustrated in the accompanying drawings wherein is shown the preferred embodiment of the invention, but it is understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In describing the invention in detail, reference is had to the accompanying drawings wherein like reference characters denote corresponding parts throughout the several views, and in which:—

Figure 1 is a side elevation of a car, broken away, showing the adaptation of the attachments for fluid pressure railway brakes in accordance with this invention. Fig. 2 is an inverted plan of the car showing the arrangement of the air brake attachments in accordance with this invention. Fig. 3 is a side elevation of the brake cylinder, showing the adaptation therewith of the attachments in accordance with this invention, certain of the parts being shown in sections. Fig. 4 is a plan of the elements shown in Fig. 3. Fig. 4^a is a detail showing the position of the pressure retaining valve when the parts are arranged in the manner as shown in Figs. 3 and 4. Fig. 5 is a sectional detail, and Fig. 5^a is a view similar to Fig. 4^a, showing the position of the valve when the parts are set in the position shown in Fig. 5.

Referring to the drawings by reference characters, 1 denotes a brake cylinder and 2 the piston rod projecting therefrom, which are of known construction. Mounted upon the rod 2 is a sleeve 3 provided at one end with a pair of ears 4 to which are pivotally connected a brake beam 5. The sleeve 3 is formed with an inwardly extending annular shoulder 6, against which abuts one end of a coil spring 7 surrounding the piston rod 2. The other end of the said spring 7 is connected to a collar 8 affixed to the piston rod 2. The latter carries forwardly of the brake beam 5 a short sleeve 9, provided with an extension 10 having the forward end thereof beveled as at 11 and formed with shoulders 12 and 13, against which is adapted to engage a locking dog 14 for maintaining the piston rod 2 in an out position when the brakes are applied and after the pressure has been exhausted from the brake cylinder.

From the foregoing construction and arrangement of parts it is evident that the engineer can hold the brakes applied while at the same time reducing the pressure in the brake cylinder, and in such connection it will be stated that it will be assumed, by way of example, that the maximum pressure is 60 lbs. and that the brakes can be applied at 40 lbs.; when such amount of pressure is had upon the piston within the brake cylinder 1, the piston rod 2 is forced outwardly and the brakes applied. To maintain the brakes in this instance, it is necessary to hold the pressure, but to overcome this holding of the pressure, at the same time maintaining the brakes in the applied position, an additional pressure, say of ten pounds, is applied to the piston and which causes the piston rod to move outwardly so that the collar 9 will ride under the dog 14 and the latter will have its

free end engage against one of the shoulders of the collar 9. The pressure being released, the rod 2 will tend to move inwardly owing to the action of the spring 7 and the spring within the brake cylinder, but this inward movement of the rod 2 will be arrested by the dog 14 and collar 9, consequently the piston rod 2 will be maintained in its out position and the brakes will be held applied. When the piston rod 2 is moved outwardly after the initial application of pressure, the sleeve 3 moves therewith and actuates the beam 5, as will be evident, but upon the second application of pressure, the sleeve 3 remains stationary while the piston rod 2 moves outwardly and compresses the spring 7. Normally, unless it is desired to maintain the brakes in the locked position for a predetermined time, the second application of pressure is not made. The second application of pressure is made when it is desired to lock the entire train and at the same time reduce the pressure in the brake cylinder. If the train should be locked through the medium of the dog 14 and the collar 9, and it be desired to release the brakes, a third application of pressure, say of 10 lbs., is had upon the piston in the brake cylinder 1 so as to shift the collar 9 entirely clear of the dog 14, the latter assuming the position as shown in Fig. 5. Now, if the pressure is reduced, the action of the spring 7 and the spring within the brake cylinder will cause the rod 2 to move inwardly, the action being such that the collar 9 will quickly pass the dog 14 when the brakes are released. Preferably the lock for the brakes is used to lock a train on a siding for an indefinite time without holding the pressure within the brake cylinder, or in other words it allows for the exhaust of the fluid pressure after the necessary applications have been made to set the lock, the latter maintaining the brakes applied.

In Fig. 2 means is shown connected to the piston rod 2 whereby the lock can be applied manually, irrespective of the application of fluid pressure, and in this connection it will be stated that to the end of the piston rod 2 is attached a chain or cable 15, which winds upon a drum 16, carried by a spindle 17 suspended in the hangers 18 depending from the bottom of the car 19, or the cable may be attached to a vertical hand brake staff similar to that now used and so as to provide an emergency stop. A crank handle 20 is provided upon each end of the spindle 17 to allow of the revolving of the spindle 17 for the purpose of applying and releasing the lock. If the vertical staff is used, the ordinary hand wheel is employed for revolving the staff. The lock is set by winding the chain or cable 15 upon the drum 16 which draws the rod 2 out until the dog 14 which is suspended from the bottom of the car, by the keepers 21, engages one of the shoulders of the collar 9 which will prevent the rod 2 from moving inwardly. The drawing out of the rod 2 in the manner as stated will cause the application of the brakes and a further movement of the rod 2 will cause the dog 14 to engage one of the shoulders of the collar 9 and lock the rod from moving inwardly, thereby maintaining the brakes applied. If it be desired to release the brakes, the chain or cable 15 is wound further upon the drum 16 which draws the collar clear of the dog 14. The spindle is then released, the rod 2 is moved inwardly and the collar 9 passes the dog 14. When the rod 2 is pulled outwardly through the action of winding the chain or cable 15 upon the drum 16, the spring 7 and the spring within the brake cylinder will be compressed, as is evident, and when the collar 9 is clear of the dog 14 and the spindle 17 is released, the action of the springs will draw the rod 2 inwardly.

The attachment further comprises a means operated from the piston rod 2 for automatically closing a pressure retaining valve when the maximum brake pressure is applied, so as to prevent leakage during the holding of the brakes. The pressure retaining valve is so mounted and constructed that it will not be brought to a full close unless the maximum brake pressure is applied; by way of example, it will be stated that if the maximum brake pressure is fifty pounds, and but thirty-five or forty pounds is applied to the piston in the brake cylinder, although the pressure retaining valve will be actuated, the movement, however, will not be to such extent as to completely close. The said pressure retaining valve is mounted in a casing 25 which is interposed in an exhaust pipe 23 and positioned exteriorly of the triple valve mechanism 24. The pipe 23 communicates with the exhaust of the triple valve casing.

The pressure retaining valve which is indicated by the reference character 25[a] has a stem 26 projecting from the casing 25 and connected by an arm 27 to a link 28. One end of the link 28 is enlarged and slotted as at 29, and in the slot 29 plays a pin 30 carried by the upper end of the arm 37 and by such an arrangement a pin and slot connection is had between the arm 27 and the link 28. The length of the slot 29 may be as desired in accordance with the duration of the lost motion. The other end of the link 28 is pivotally connected as at 31 to a rod 32 coupled by the collar 33 to the piston rod 2, the collar 33 being fixed to the said piston rod 2. By such an arrangement it is evident that when the brakes are applied the link 28 will be carried therewith thereby shifting the arm 27 and actuating the retaining valve within the casing 25. If the maximum brake pressure is applied, the retaining valve 25 will be completely closed; if the pressure

applied is below the maximum, the valve 25ª will only be partly closed. Owing to the pin and slot connection between the arm 27 and the link 28, the said arm is not immediately shifted when the link 28 is carried forward by the piston, as the slot 29 provides for lost motion. By the foregoing arrangement, the mechanism of the triple valve not only prevents exhaust, but also the retaining valve. If for any reason there should be a leak through the triple valve mechanism, the retaining valve will prevent exhaust if it is completely closed and therefore a means is set up which will prevent leakage when the maximum pressure has been employed to apply the brakes. When the application of brake pressure is discontinued upon the piston in the brake cylinder to allow of the release of the brakes, the piston rod 2 moves slightly rearwardly such action carrying the link therewith, the movement of the link being sufficient to slightly shift the arm 27 and the slight movement of the arm 27 partly opens the valve 25ª. This allows of an exhaust from the brake cylinder through the triple valve mechanism and valve 25ª. The exhaust from the brake cylinder allows of the piston to further move inwardly which action carries the link therewith and imparts a further shifting movement to the arm 27, consequently increasing the exhaust opening as the valve 25ª is further shifted to open position. This action is continued until the valve 25ª is completely opened so that the brake cylinder will be entirely exhausted, that is to say if the manually operated retaining valve is set so that a free exhaust is had to the atmosphere. Of course, if the manually operated retaining valve is set so that the exhaust will be had against the action of the weight which forms a part of the manually operated pressure retaining valve, it is evident that a certain amount of pressure will be held in the brake cylinder to furnish a sufficient retarding power to prevent a too rapid acceleration of the train speed. After the extreme application is made the piston rod will move back a distance due partly to the looseness of the brake rigging and to the leaking of air past the brake piston, so that when the movement of the triple valve occurs for brake release the lost motion, owing to the pin and slot connection, will have been taken up. In this case, however, dependence upon the looseness of the valve 25 would have to be relied upon for initial movement of the arm 27. Preferably reliance for initial movement is had for release by setting up the valve 25 in such a manner (grooved by way of example) that the air will not be completely or entirely cut off by the valve, but the valve will allow sufficient escape of air so as to let the piston rod come gradually back. This will give sufficient time to change the auxiliary reservoir before the brakes are entirely released. The manually operated retaining valve is of known construction, so consequently it is unnecessary to describe it. The pin and slot connection between the arm 27 and the link 28 provides means whereby the pressure retaining valve 25ª is not shifted to open position until after the exhaust of the triple valve is opened, that is to say, although the triple valve exhaust may be open, yet the brake pressure is retained in the brake cylinder until the pressure retaining valve 25ª starts to open. The pin and slot connection between the arm 27 and the link 28 furthermore provides means to prevent a too sudden actuation of the pressure retaining valve in either direction.

What I claim is:—

1. A fluid pressure railway brake provided with means operated by the piston rod of the brake cylinder for actuating a pressure retaining valve when the brakes are applied and released.

2. A fluid pressure railway brake comprising the combination with a triple valve mechanism and its exhaust, of a brake cylinder having a piston rod projecting therefrom, a pressure retaining valve interposed in the exhaust of the triple valve mechanism, an arm connected to the stem of said retaining valve, and connections between said arm and said rod for actuating said arm to shift the valve during the application and release of the brakes.

3. A fluid pressure railway brake comprising a pressure retaining valve, an arm connected to the stem of said valve, a brake cylinder embodying a piston and piston rod, a link connected with the piston rod and shifted during the application and release of the brakes, and a pin and slot connection between said arm and said link, said link causing the actuation of said arm and shifting of said pressure retaining valve when actuated by the piston rod.

4. A fluid pressure railway brake comprising a brake cylinder embodying a piston and an elongated piston rod, a sleeve mounted upon said piston rod, a brake beam pivotally connected to said sleeve, a collar mounted upon the rod, a coil spring arranged within said sleeve, having one end abutting against the sleeve and its other end affixed to said collar, a dog suspended from the bottom of the car, and a shouldered collar carried by the rod and adapted to be engaged by the dog when the piston rod is moved outwardly, thereby arresting the inward movement of the rod and maintaining the brakes applied.

5. A fluid pressure railway brake comprising a brake cylinder embodying a piston and an elongated piston rod, a sleeve mounted upon said piston rod, a brake beam pivotally connected to said sleeve, a collar mounted

upon the rod, a coil spring arranged within said sleeve, having one end abutting against the sleeve and its other end affixed to said collar, a dog suspended from the bottom of the car, a shouldered collar carried by the rod and adapted to be engaged by the dog when the piston rod is moved outwardly, thereby arresting the inward movement of the rod and maintaining the brakes applied, and means whereby the dog and shouldered collar are moved out of engagement to allow of the return of the piston rod.

6. A fluid pressure railway brake embodying an automatically operable pressure retaining valve exteriorly of the triple valve mechanism and means connected with said valve and with the piston rod of the brake cylinder for actuating said valve when the brakes are applied and released.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM A. WEANT.

Witnesses:
JOHN L. FLETCHER,
N. LOUIS BOGAN.