No. 767,318. PATENTED AUG. 9, 1904.

V. C. TASKER.

AIR BRAKE TRIPLE VALVE.

APPLICATION FILED OCT. 15, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.

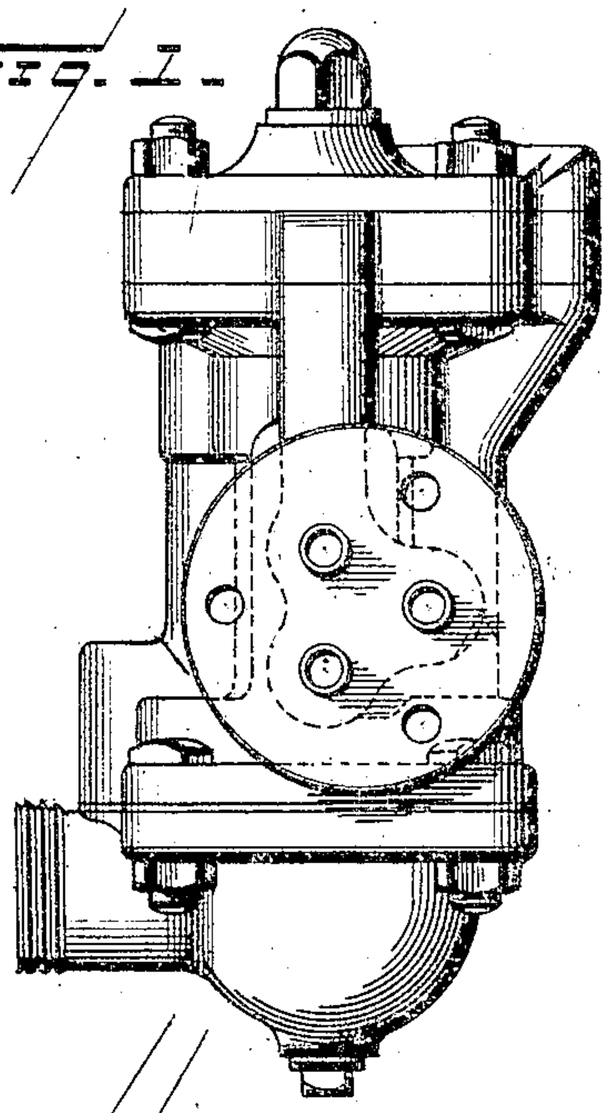


Fig. 2.

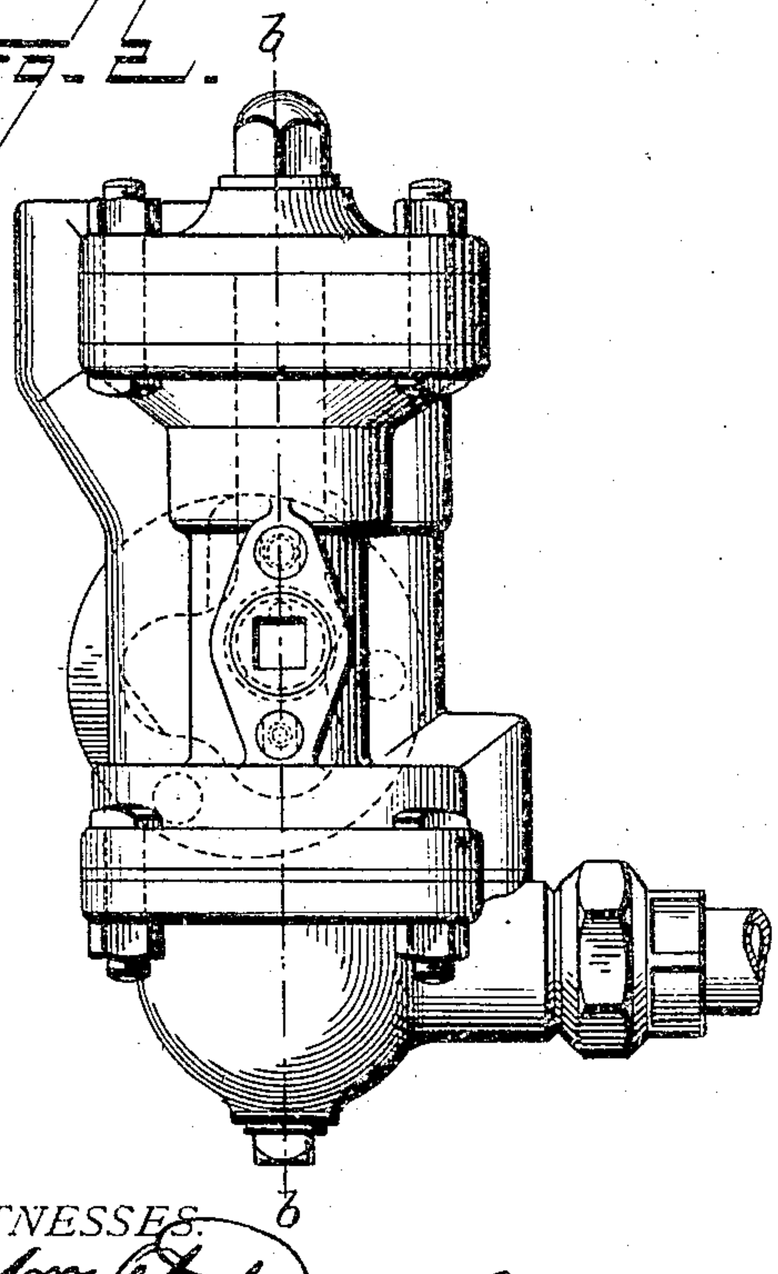


Fig. 3.

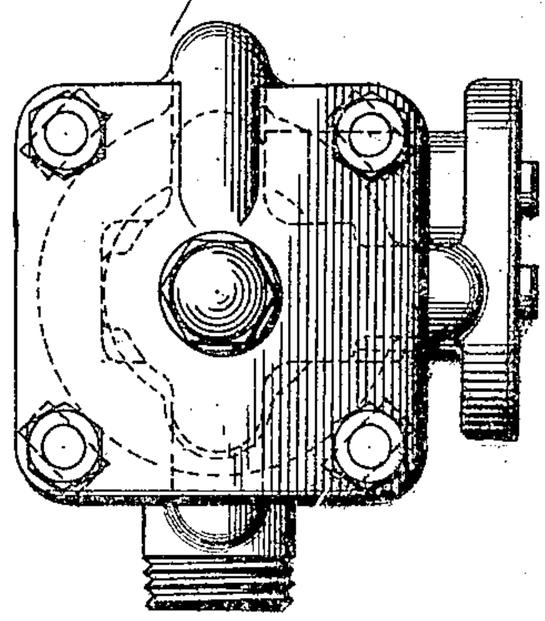
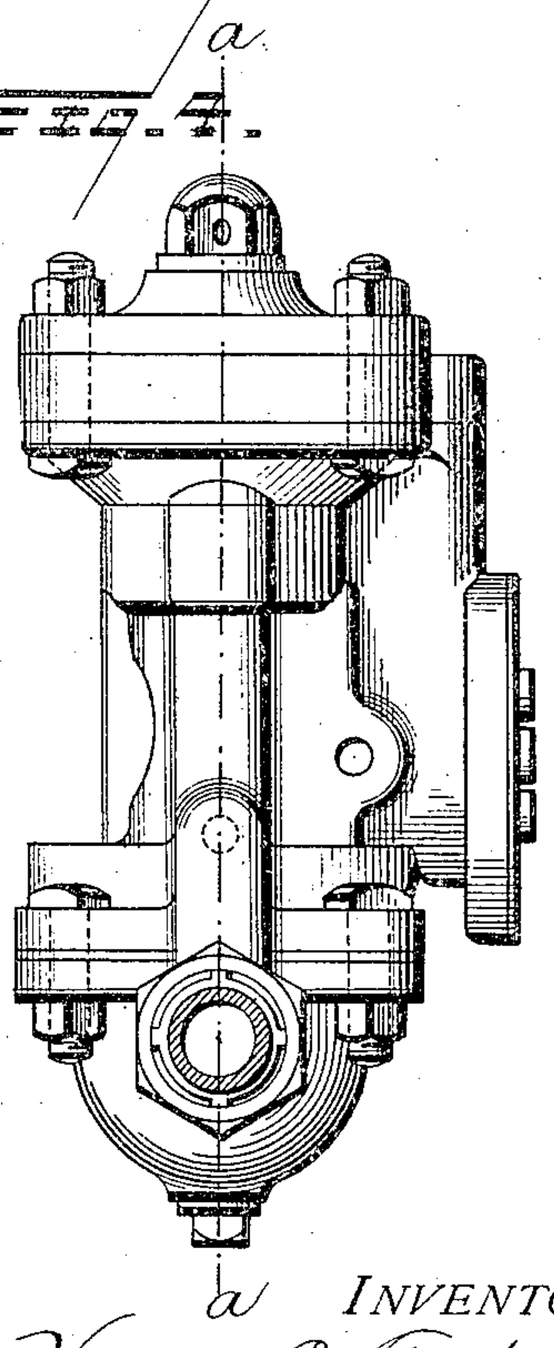


Fig. 4.



WITNESSES.

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NO MODEL. 4 SHEETS—SHEET 2.

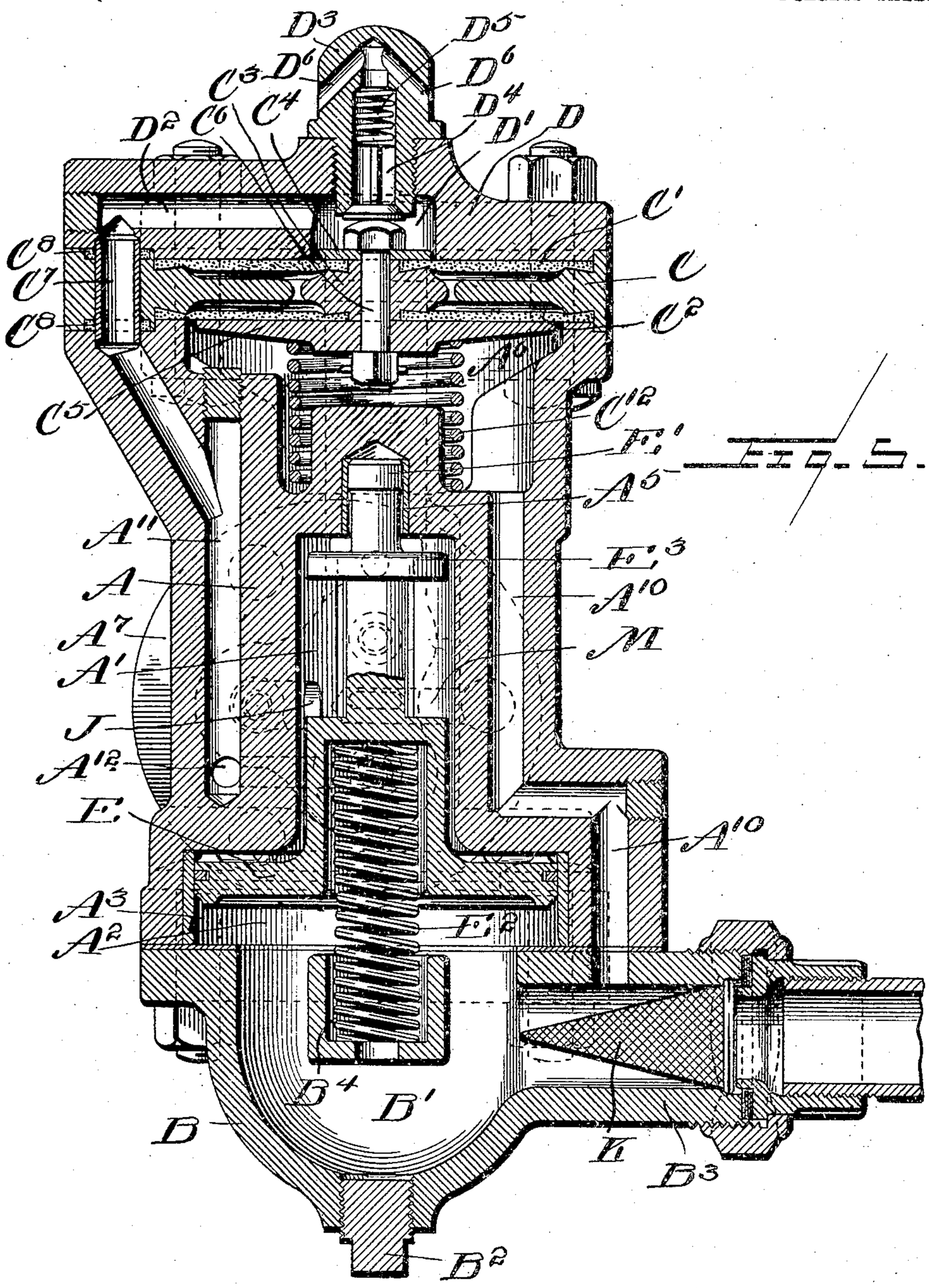

FIG. 5.

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AIR BRAKE TRIPLE VALVE.

APPLICATION FILED OCT. 15, 1903.

NO MODEL. 4 SHEETS—SHEET 3.

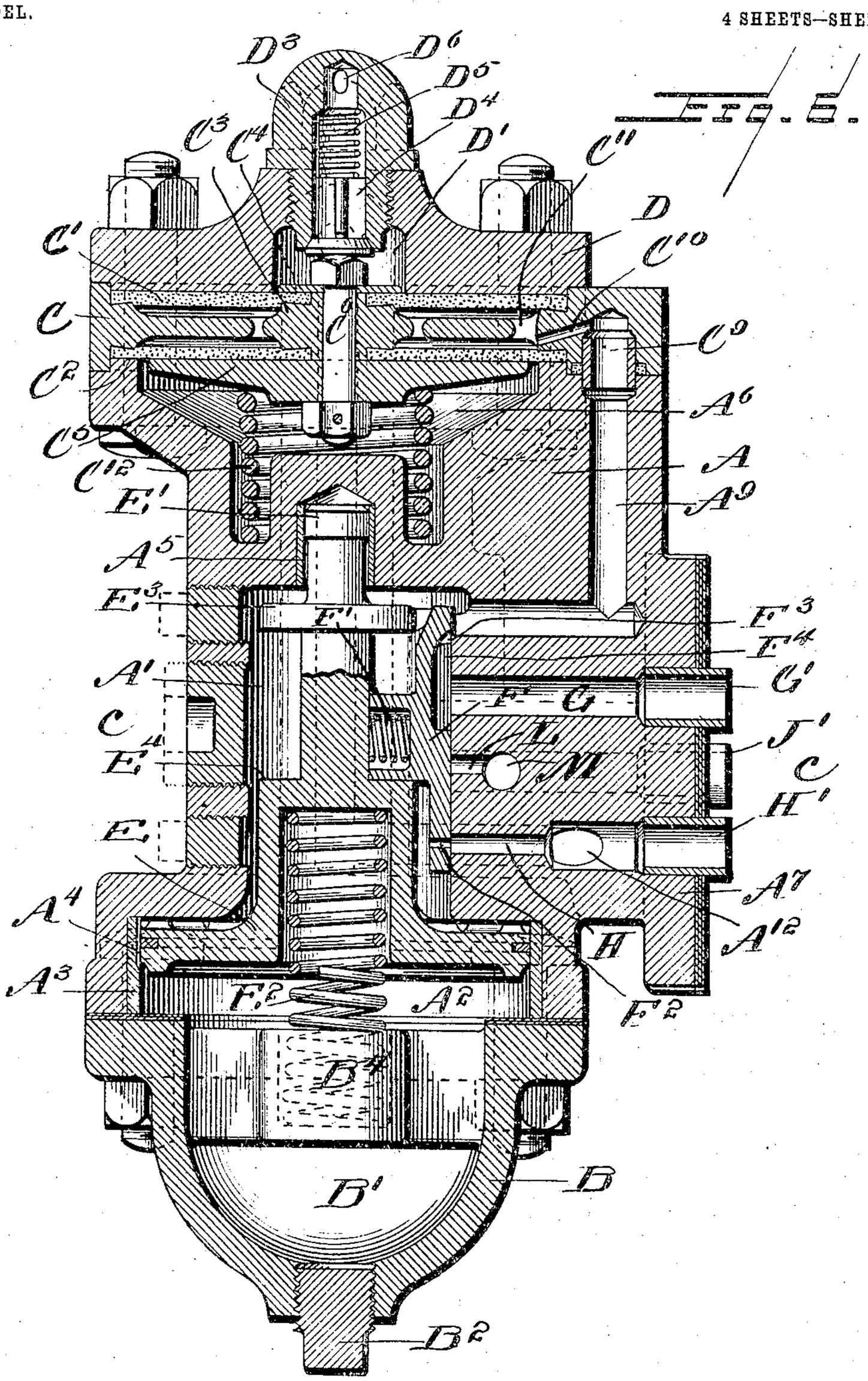

Fig. 2.

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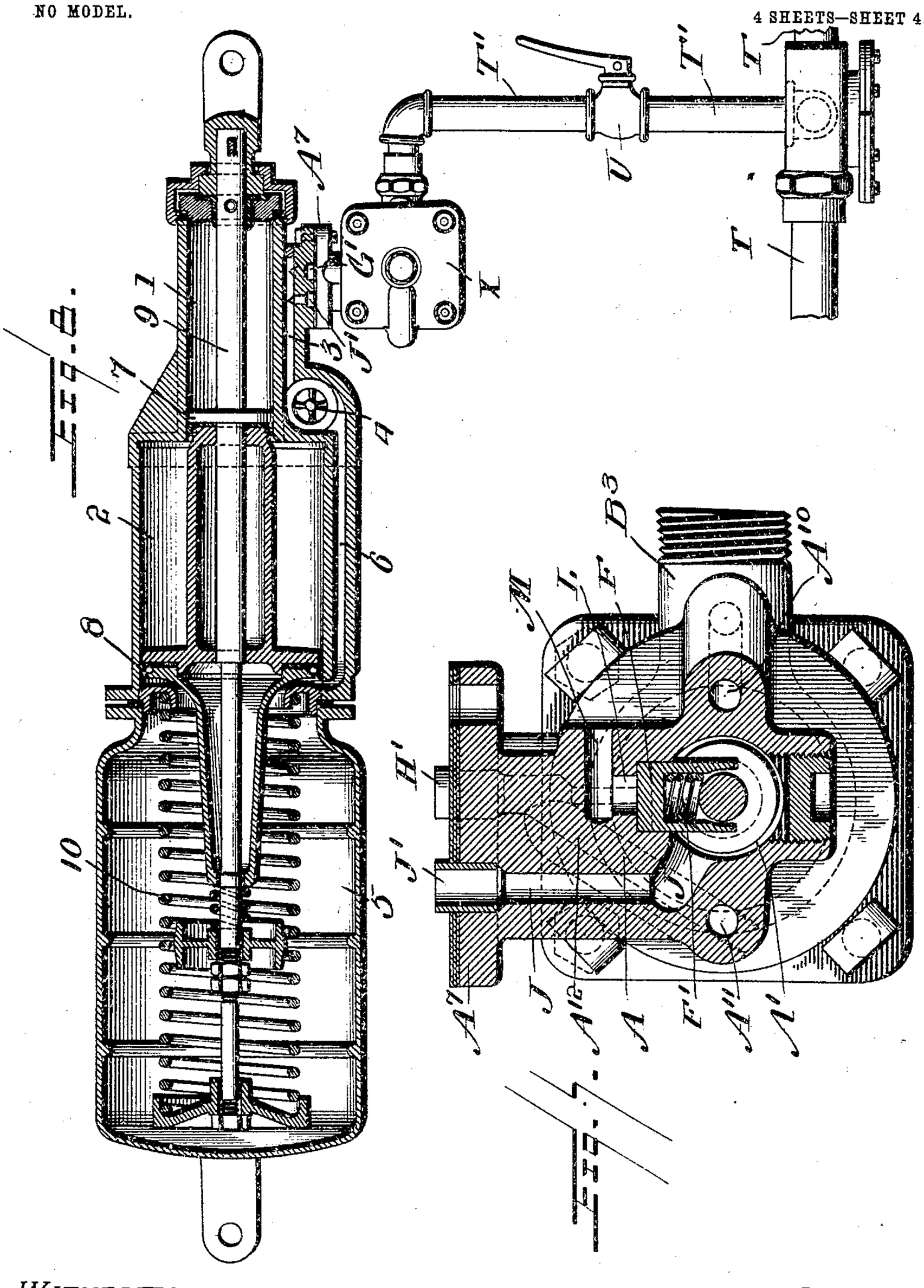
APPLICATION FILED OCT. 15, 1903.

NO MODEL. 4 SHEETS—SHEET 4.



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No. 767,318. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

VERNON C. TASKER, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO SOCIÉTÉ GÉNÉRALE DES FREINS LIPKOWSKI, OF PARIS, FRANCE, A FIRM.

AIR-BRAKE TRIPLE VALVE.

SPECIFICATION forming part of Letters Patent No. 767,318, dated August 9, 1904.

Application filed October 15, 1903. Serial No. 177,158. (No model.)

To all whom it may concern:

Be it known that I, VERNON C. TASKER, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Air-Brake Triple Valves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which like reference characters represent like parts.

My invention relates particularly to triple valves for that class of air-brakes in which the brake-cylinder has two compartments normally charged with air, the exhaust of the smaller of said compartments serving to set the brakes firmly to the wheels with minimum expenditure of air and the progressive exhaust of the larger compartment serving to increase the pressure of the brakes with minimum piston travel.

The object of my invention is to provide such construction and arrangement of parts of the triple valve as will insure efficient action of the brake-cylinder both in applying and releasing the brakes upon suitable variations in pressure of air in the train-pipe and at the same time guard against all liability of the triple valve to become clogged or choked with dirt or water of condensation or disabled by freezing of the latter, to economize in the construction, provide facility for cleaning and draining, and in general to provide an efficient triple valve requiring minimum care and attention.

Referring to the drawings, Figure 1 is a side elevation of the triple valve viewed from the direction of the brake-cylinder. Fig. 2 is an opposite side elevation. Fig. 3 is a plan view. Fig. 4 is a front elevation. Fig. 5 is an enlarged vertical section on the line *a a* of Fig. 4. Fig. 6 is an enlarged vertical section on the line *b b* of Fig. 2. Fig. 7 is an enlarged horizontal section on the line *c c* of Fig. 6; and Fig. 8 is a horizontal section of a brake-cylinder attached to which is my improved triple valve X, having the branch pipe T′, leading to the train-pipe T and provided with the cut-off cock U.

The triple valve (see Figs. 5, 6, and 7) consists mainly of a built-up casing comprising the body A, lower head B, diaphragm-plate C, and upper head D.

The body A has a central valve-chamber A′, expanding downwardly to form a piston-cylinder A^2, lined with the bushing A^3, in which is a small air-groove A^4. In the upper wall of the valve-chamber A′ is inserted a guide-bushing A^5 for the piston-stem E′. A diaphragm-chamber A^6 is formed in the upper portion of the body A.

The lower head B, which is bolted to the body A, contains a chamber B′, serving as a drain-cup for the entire triple valve, having a drain-plug B^2. A lateral extension B^3 is provided for the purpose of effecting a coupling with the branch T′ from the train-pipe. Centrally in the chamber B′ is provided a pocket B^4 for the piston-spring E^2.

The diaphragm-plate C is clamped between the body A and upper head D and separates and rigidly secures the peripheries of the diaphragm-disks C′ and C^2. The central portions of the disks C′ and C^2 are clamped between the floating separator C^3, upper washer C^4, and lower washer C^5 by the diaphragm-bolt C^6. A joint-nipple C^7, encircled by small gaskets C^8, passes through the diaphragm-plate to afford communication between the upper head D and body A. A similar nipple C^9 affords communication from the body A to the port C^{10}, leading to the space C^{11} between the diaphragm-disks.

The upper head D has a chamber D′ and a lateral passage D^2 communicating therewith. An exhaust-plug D^3, screwed into the top of the head D, carries an exhaust-valve D^4, with its spring D^5, and is provided with exhaust-ports D^6.

The piston E fits the cylinder-bushing A^3, the upper end E′ of its stem being guided in the bushing A^5. It is normally held in upward position, as shown by the spring E^2.

The slide-valve F is held to its seat by a spring F′ and is grasped between the collar E^3 and shoulder E^4 of the piston E, being thus obliged to move in unison therewith.

A flange A^7 is provided on the body A for attachment to a similar flange on the brake-cylinder and carries the joint-nipples G′, H′, and J′.

The brake-cylinder (shown in Fig. 8 as connected with a triple valve containing my improvements) comprises the small compartment 1, communicating (by a passage not shown) with the upper port G, Fig. 6, in the triple valve, a larger compartment 2 communicating (by a passage directly below the passage 3) with the lower port H, Fig. 6, of the triple valve and the under side of a downwardly-seating check-valve 4, and a reservoir 5, communicating by the passage 6 with the upper side of the check-valve 4 and thence by the passage 3 with the port J, Fig. 7, in constant communication with the middle chamber A′ of the triple valve. The pistons 7 and 8, fitting the compartments 1 and 2, respectively, are carried by the push-rod 9, and the return-spring 10 normally keeps the parts in the positions shown, as will be clear from the drawings.

The top chamber D′ of the triple valve is in constant communication with a portion of the upper surface of the diaphragm-disk C′, with the exhaust-valve D^4, (which is normally held to its seat by the diaphragm-bolt C^6,) and through the passages D^2, A^{11}, and A^{12} with the lower port H of the triple valve and with the large compartment 2 of the brake-cylinder.

The diaphragm-chamber A^6 is in constant communication with the lower side of diaphragm-disk C^2 and through the passage A^{10} with the train-pipe, said passage also draining the chamber A^6.

The slide-valve chamber A′ has constant communication with the upper side of the piston E and through the passage J in the triple valve and the passages 3 and 6 in the brake-cylinder with the reservoir 5 of the latter. The slide-valve chamber A′ also has communication (when the piston E is in its upper or normal position) with the bottom chamber B′ (and with the train-pipe) through the small groove A^4, with the lower port H of the triple valve through the small perforation F^2 in the slide-valve, and with the upper port G through the groove F^3 and port F^4 in the slide-valve.

The bottom chamber B′ communicates constantly with the under side of the piston E and with train-pipe branch T′. The air entering from the train-pipe passes through a strainer K to prevent particles of scale or other foreign matter from entering the triple valve.

The space between the diaphragm-disks C′ and C^2 communicates by the port C^{10} and passage A^9 with the valve-chamber A′ of the triple valve, and thus with the reservoir 5 of the brake-cylinder. The diaphragm is normally held in upward position by its spring C^{12}.

Between the ports G and H is an exhaust-port L, communicating through the passage M, Fig. 7, with the atmosphere.

The action of the triple valve is as follows: When a train is made up, air under suitable pressure is admitted to the train-pipe T, and thence by the branch T′ to the chambers B′ and A^6 of the triple valve. From chamber B′ the air passes through the port A^4 to the slide-valve chamber A′ and from thence by passage A^9 to the space between the diaphragm-disks, by the groove F^3 and port F^4 of the slide-valve to the port G and small compartment 1 of the brake-cylinder, by perforation F^2 and port H to passages A^{12} and A^{11} and chamber D′ of the triple valve and to the large compartment 2 of the brake-cylinder, and by passages J, 3, and 6 to the reservoir 5 of the brake-cylinder. Thus every compartment of triple valve and brake-cylinder is normally charged with air at full train-pipe pressure, and it is well to notice that at all times the top chamber D′ is in communication with the large compartment 2 of brake-cylinder, the diaphragm-chamber A^6 with the train-pipe, the slide-valve chamber A′ with the reservoir 5, and the bottom chamber B′ with the train-pipe. Upon suitable reduction of train-pipe pressure, the groove A^4 being insufficient to equalize the opposing pressures on the piston E, the latter instantly moves downward. In so doing it passes by the groove A^4, cutting off all communication between the valve-chamber A′ and train-pipe. The downward movement of the piston also shifts the position of the slide-valve F, cutting off communication from chamber A′ to ports G and H and causing the port F^4 of the slide-valve to connect the ports G and L in the triple valve, thus instantly exhausting air from the small compartment 1 of the brake-cylinder. This exhaustion causes the pistons 7 and 8 and push-rod 9 to move forwardly and apply the brakes firmly to the wheels without loss of air from large compartment 2 or reservoir 5, the displaced air in compartment 2 passing by the check-valve 4 to the reservoir 5.

The upper diaphragm-disk C′ is not attached to the upper head D except at its periphery. Upon a further reduction of train-pipe pressure, affecting as it does the lower side of the diaphragm only, (the space between and above the disks C′ C^2 being still subject to their original pressure,) the diaphragms move downwardly, allowing the exhaust-valve D^4 to open, provided, of course, that the reduction of pressure is sufficient to overcome the difference of pressures of the springs C^{12} and D^5. Immediately the cylinder-chamber above the diaphragm suffers a loss of pressure by exhaustion through the ports D^6. The reservoir-pressure, however, between the diaphragms remains unaffected. Consequently the upper disk C′ is for the time being virtually attached to the surface above it and is inoperative to close the valve D^4 except as regards its small exposed central area. The entire area of diaphragm, how-

ever, is operative to retain the spring C^{12} in compression and the valve open.

When the reduction of pressure above the diaphragm, acting upon its small exposed area, is sufficient to overbalance the reduction below the diaphragm, acting upon its entire area, the valve D^4 will close and cease to exhaust the large brake-cylinder. Meanwhile, however, the latter has suffered a reduction greater than original train-pipe reduction about in proportion as the entire area of the diaphragm exceeds the upper exposed area.

To release the brakes, the train-pipe pressure is again increased, whereupon the spring E^2 causes the piston E and slide-valve F to rise to their normal position, and train-pipe air again progressively fills the several compartments of the brake-cylinder, permitting the return-spring 10 to withdraw the push-rod 9 and fully release the brakes.

Having fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a fluid-pressure brake, the combination with a small and a large brake-cylinder operatively connected, and a train-pipe, of a casing having a train-pipe inlet in the bottom thereof terminating in a drain-cup, ports in said casing communicating with said brake-cylinders, and means within said casing operated by reduction of train-pipe pressure, for first exhausting said small cylinder and then partially exhausting said large cylinder, substantially as described.

2. In a fluid-pressure brake, the combination with a small and a large brake-cylinder operatively connected, and a train-pipe, of a casing having a train-pipe inlet in the bottom thereof terminating in a drain-cup, ports in said casing communicating with said brake-cylinders, and means within said casing operated by a reduction of train-pipe pressure, for first exhausting said small cylinder and then partially exhausting said large cylinder and means for draining said casing.

3. In an air-brake, the combination with small and large brake-cylinders in operative connection; of a casing connected with the train-pipe and having ports communicating with said cylinders; and means within said casing for controlling distribution of air in said cylinders, said means being situated above and draining into the train-pipe inlet.

4. In an air-brake, the combination with small and large brake-cylinders in operative connection, of a casing connected with the air-supply and having ports communicating with said cylinders, and means within the casing for controlling the distribution of air in said cylinders, the arrangement of said means being such that water of condensation entering with the air-supply has access to said means only by upward passages, substantially as described.

5. In an air-brake, the combination with small and large brake-cylinders in operative connection; of a casing connected with the air-supply and having ports communicating with said cylinders, and means within the casing for controlling distribution of air in said cylinders, access of air-supply to said means being upward, substantially as and for the purpose set forth.

6. In a fluid-pressure brake, the combination with a small brake-cylinder and a large brake-cylinder operatively connected therewith, of a casing having an upper port communicating with the small cylinder, a lower port communicating with the large cylinder, an intermediate port communicating with the atmosphere, a slide-valve controlling said ports, and a piston actuated downwardly by reduction of train-pipe pressure for actuating said valve.

In testimony whereof I have signed my name to this specification in presence of two witnesses.

VERNON C. TASKER.

Witnesses:
W. F. Roe,
A. Y. Leech, Jr.