

No. 622,750.

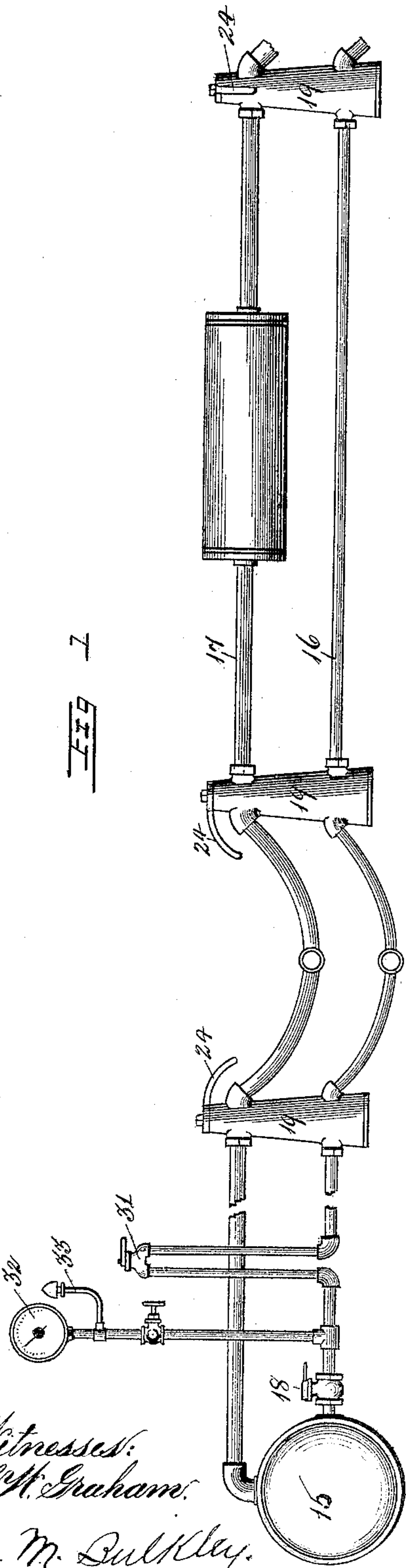
Patented Apr. 11, 1899.

C. F. BANE.  
AIR BRAKE.

(Application filed Apr. 13, 1896.)

(No Model.)

2 Sheets—Sheet 1.



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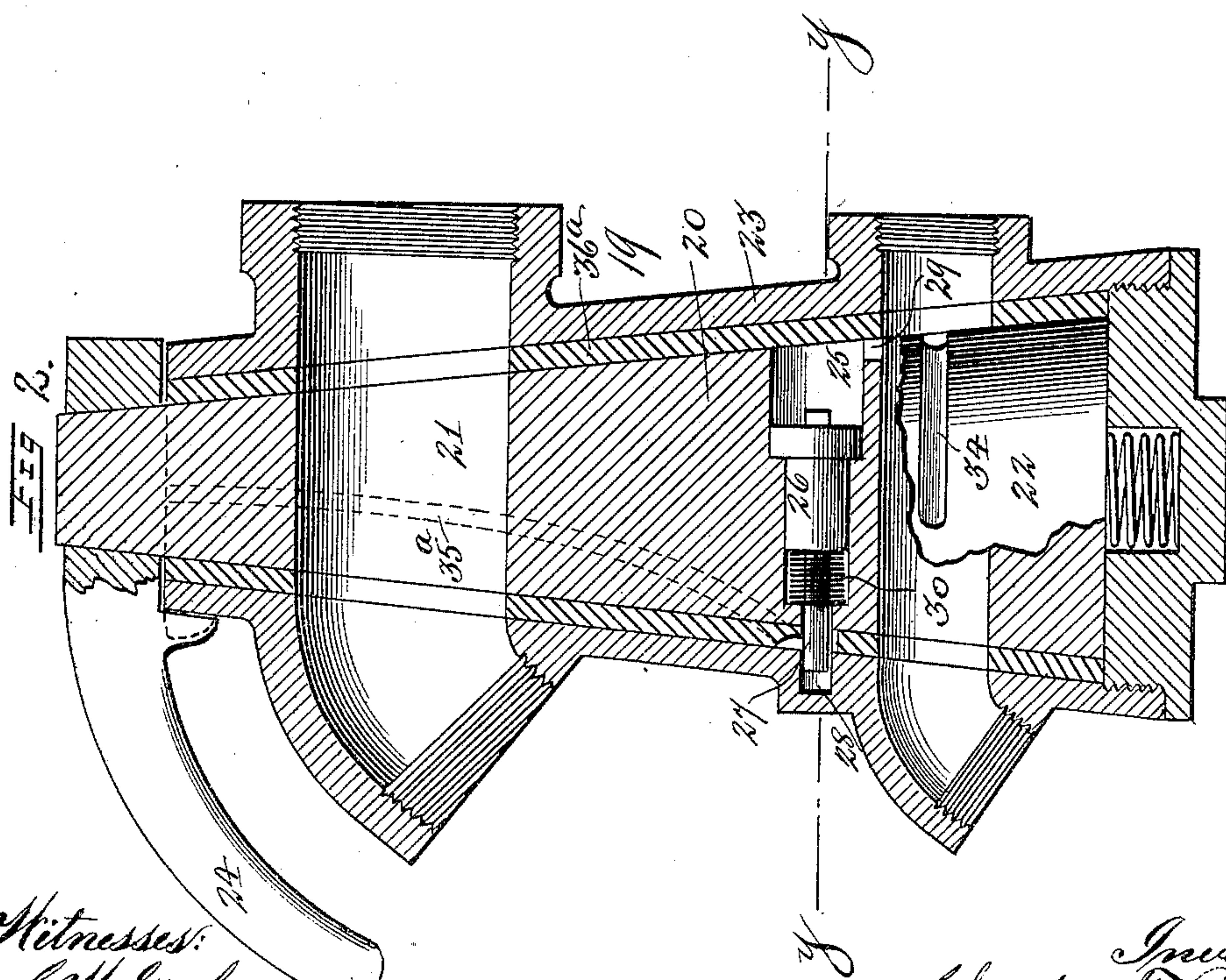
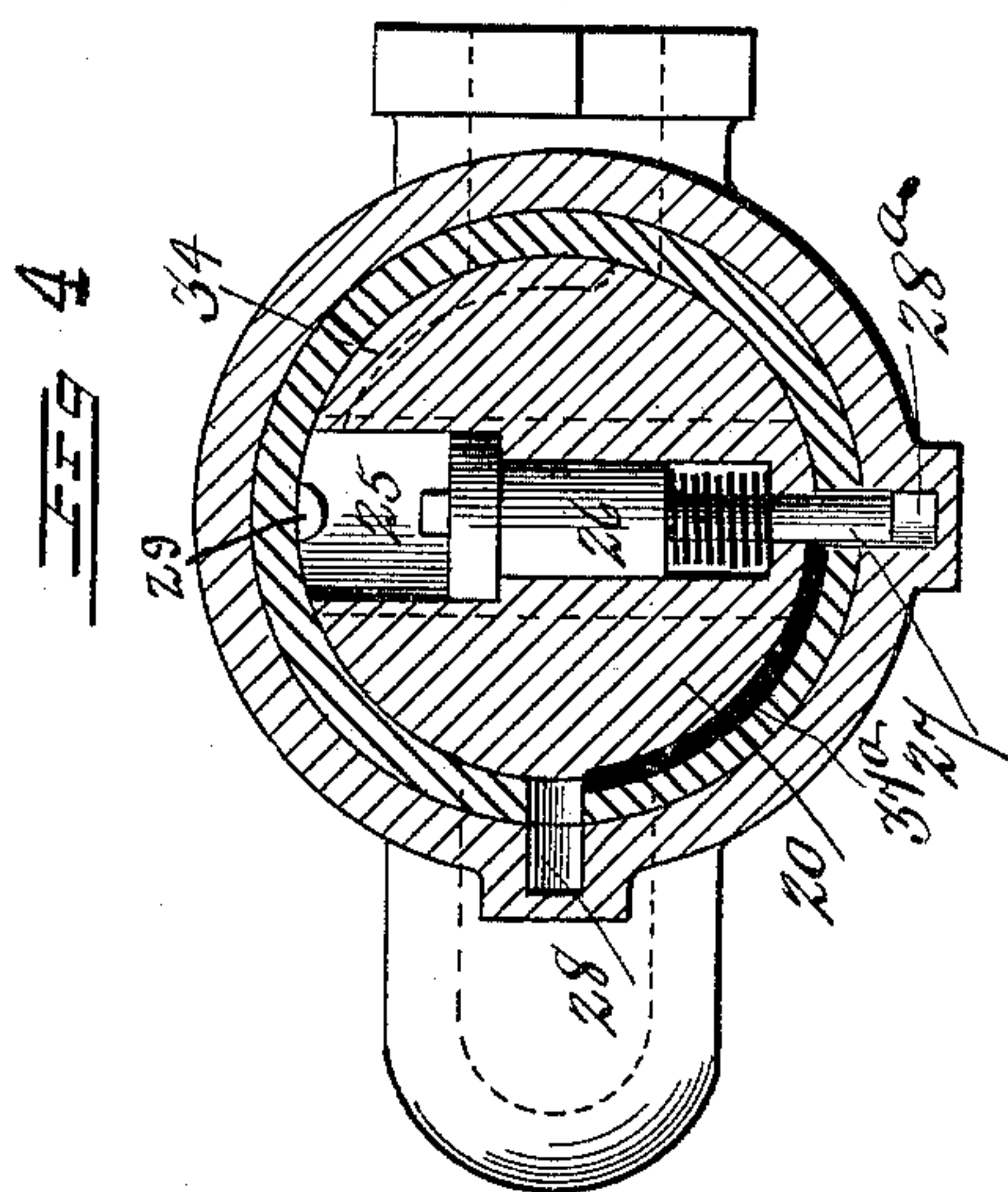
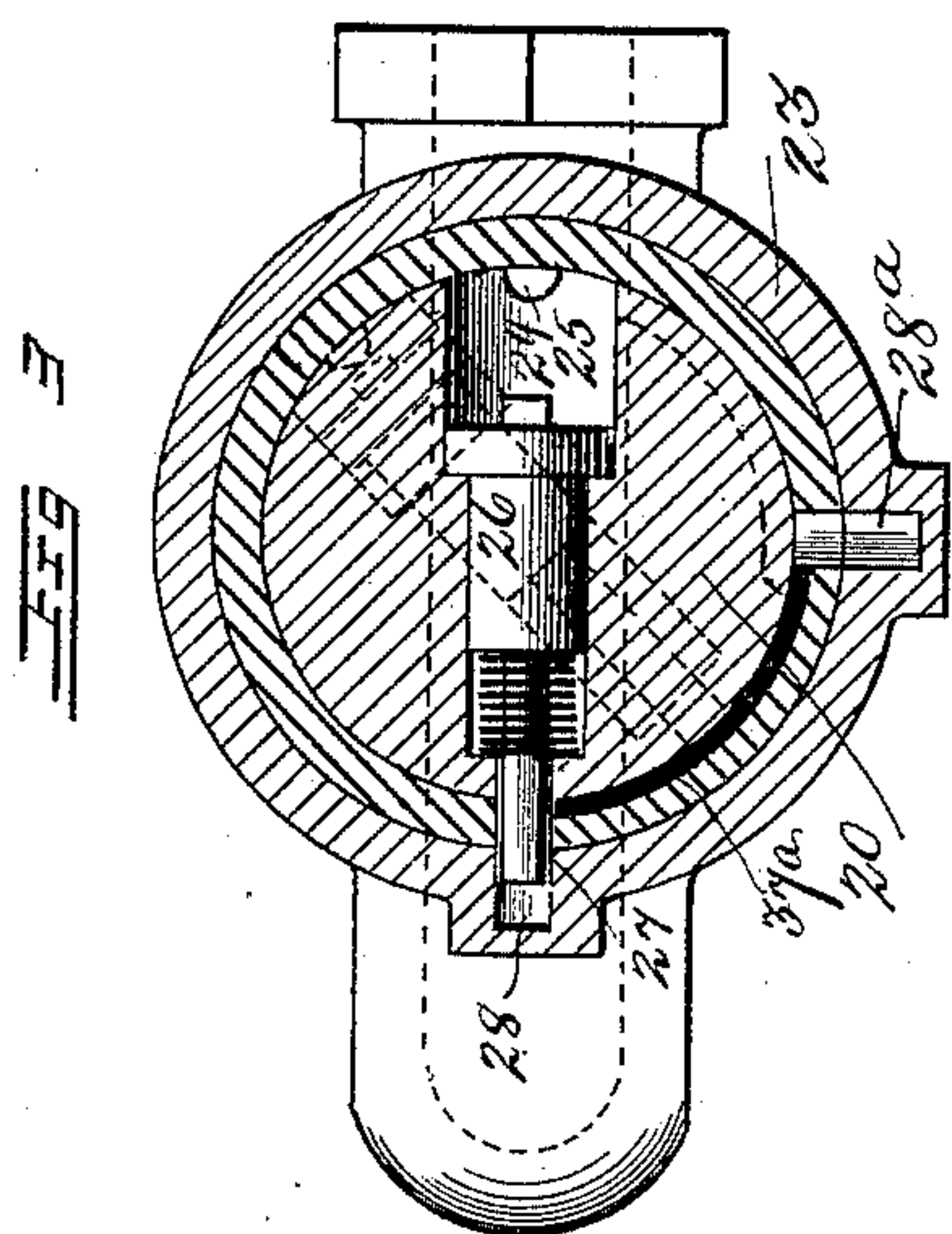
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# UNITED STATES PATENT OFFICE.

CHARLES F. BANE, OF LAFAYETTE, INDIANA.

## AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 622,750, dated April 11, 1899.

Application filed April 13, 1896. Serial No. 587,387. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES F. BANE, a citizen of the United States, residing at Lafayette, Tippecanoe county, and State of Indiana, have invented certain new and useful Improvements in Air-Brakes, of which the following is a specification.

My invention relates to certain improvements in that type of air-brake systems which employ a train-pipe extending beneath the train, in which air is maintained at a predetermined pressure to automatically apply the brakes by a reduction of train-pipe pressure and in which also a supplemental pipe or whistle or signal pipe extends continuously through the train, the pressure in which is controlled by angle-cocks at each end of each car and engine.

My invention has for its object the provision of means whereby the angle-cocks at each end of each car or coach or engine of the train are locked in an open position by the engineer in the cab, except the angle-cock on the tail end of the train, which is locked closed. In carrying out this feature of invention it is my purpose to locate the locking devices for the angle-cocks in the signal or whistle pipe and to connect the angle-cocks of the train brake-pipe with the angle-cocks of the whistle-pipe, whereby the two sets are adapted for operation in unison and in pairs by one manual movement, and to control the locking devices for each angle-cock throughout the train by an engineer's cock located in the cab and interposed in the line of the whistle-pipe.

My invention has for a further object the provision of apparatus and arrangement thereof whereby the brakes are automatically set whenever the angle-cocks are closed, which arrangement may be used in conjunction with the signal-pipe of the passenger system or with a supplemental line of pipe for freight service.

My invention has certain other objects in view; and it consists in certain features about to be described and pointed out in my claims, reference being now had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view showing the continuous train brake-pipe and whistle-pipe connected up with the air reservoir or

drum on the locomotive. Fig. 2 is an enlarged vertical longitudinal section of one of the combined angle-cocks. Fig. 3 is a cross-section on the line *y y* of Fig. 4, showing the locking mechanism locking the turning plug of the angle-cock in an open position. Fig. 4 is a like view showing the turning plug of the angle-cock locked in a closed position.

I will describe first that form of construction by which the angle-cocks at each end of each car may be locked by the engineer from a position within the cab of the locomotive.

Provision has heretofore been made for closing the valves of the angle-cock of the automatic train brake-pipe in unison with the valves of the angle-cocks of the signal or whistle pipe by providing a common turning plug controlled manually by one lever, and so, also, the valves of the angle-cocks of the automatic train brake-pipe have been automatically locked by the opening of the said angle-cock to admit the pressure of the train brake-pipe, the locking mechanism being located within or adjacent to the casing of the angle-cock controlling the automatic brake-pipe pressure and operated by said pressure. It is my object to control the locking mechanism whereby the angle-cocks are held open and closed by means of the pressure within or admitted to the signal or whistle pipe, and thus avoid those disadvantages which I shall hereinafter set forth.

Referring now to Fig. 1, the drum or receiving-reservoir beneath the locomotive is designated at 15, with which the signal or whistle pipe 16 and the train-pipe 17 of the automatic brake has communication in the usual manner, a reducing-valve 18, of ordinary construction, located in the whistle or signal pipe 16, serving to reduce the pressure in the said pipe below that normally maintained in the train-pipe 17. The train and whistle pipes are extended along beneath the train in the usual manner, and the ordinary arrangement of auxiliary reservoir, brake-cylinder, and controlling-valves are employed.

In order to provide a lock for each of the angle-cocks at either end of each car, I provide the combined whistle-pipe angle-cock and train-pipe angle-cock, which I shall designate as the "combined angle-cock" 19, consisting, as shown in Figs. 2 and 3, of the com-



mon turning plug or valve 20, having therein the valve ways or ports 21 and 22, respectively, for the train-pipe and the whistle-pipe. This common turning plug or valve 20 is mounted within a single casing 23, to which the whistle and train pipes are connected, and is manually operated by one handle 24 to open and close both the valve of the train-pipe and that of the whistle by one and the same movement.

I will now describe the locking mechanism by which the angle-cocks of both the train-pipe and whistle-pipe are locked either in a closed or open position.

The turning plug 20 is chambered at 25 to permit the reciprocative movement therein of a locking-piston 26, having a locking pin or bolt 27, adapted to engage a recess in the casing 21, said chamber 25 having communication with the valveway 22 of the whistle-pipe by means of the by-port or passage 29. A spring 30 tends to maintain the piston 26 in the advanced position indicated by the dotted lines in Fig. 3, the locking mechanism being disengaged, but in a position to be engaged. I also provide another recess 28<sup>a</sup> in the casing 23, in which the locking-pin 27 is adapted to engage to lock the angle-cock in a closed position.

Referring to Fig. 1, it will be observed that I provide a whistle-pipe-pressure-controlling cock 31 of ordinary construction capable of venting the pressure in the whistle-pipe and also of admitting the pressure thereto by opening communication with the drum 15, which cock is operated by the engineer in his cab. I also provide an indicating-gage 32 for the whistle-pipe and a whistle 33. As the car-inspector or trainman couples the hose between each car he then opens the angle-cocks of the train-pipe and whistle simultaneously. When he has coupled all the hose and opened all the angle-cocks, he signals the engineer to try the air and then signals from the tail end of the train by the whistle-pipe pressure that all the couplings have been made and all the angle-cocks opened, the engineer in trying the air having admitted the pressure to the whistle-pipe 16 by opening the valve or cock 31 to the drum 15. If the car-inspector has failed to open all of the angle-cocks of the train-pipe, it will be impossible to give a signal, for if any of the train-pipe cocks or valves are closed the whistle-pipe cocks or valves are likewise closed, as when the engineer admits pressure through the whistle-pipe 16 the air passes through the by-port or passage 29 into the chamber 25 and, acting upon the locking-piston 26, forces the locking-pin 27 into the recess 28, this recess being coincident with the pin when the angle-cocks are open and maintains the angle cocks or valves of the whistle-pipe and train-pipe locked in an open position during all the time that the pressure is maintained. When the angle-cock at the tail end of the train is closed, the locking-pin 27 is

coincident with the recess 28<sup>a</sup> and the air is permitted ingress to the chamber 25 by a passage 34, circumferentially arranged in the turning plug 20, one end of which opens into the whistle-pipe on that side of the turning plug 20 in which the pressure is maintained and the other end opening into the valveway 22, the air passing through this passage 34 into the valveway 22, from thence through the port 29 into the chamber 25, and forcing the locking-pin 27 into the recess 28<sup>a</sup> to lock the angle-cock in its closed position. When the engineer arrives at the end of the trip, he vents the whistle-pipe by the engineer's cock or valve 31, which, reducing the pressure in the whistle-pipe, also withdraws the pressure from the chamber 25 and permits the spring 30 to restore the piston 26.

It is evident that the locking mechanism should be adjacent to and operated by the whistle-pipe pressure, which pressure is under the control of the engineer within the cab, and the arrangement, construction, and combination of elements by which this result is accomplished constitute the feature of this part of my invention.

The purpose of the angle-cocks at each end of each car and at each end of the locomotive is to provide a means whereby the application of the brakes is prevented when the couplings are split and also to maintain the train-pipe pressure, whereby the brakes may be applied when a car is separated from the locomotive. It will therefore be observed that in my arrangement and combination of parts the angle-cocks are locked by the engineer in the cab by the pressure within the whistle-pipe, and thus the result is accomplished without any interference whatever with the train-pipe pressure.

Were locking mechanism employed operated by reducing or exhausting and charging train-pipe pressure, it is evident that the act of reducing the train-pipe pressure to disengage or release the locking mechanism would apply the brakes and also withdraw the train-pipe pressure, thus preventing an automatic application of the brakes on each car when it is detached from the locomotive.

Although throughout the foregoing description I have referred to the "whistle" or "signal" pipe or "whistle-pipe pressure," it is evident that the same results are capable of accomplishment independent of those functions incident to the apparatus for signaling. Thus a supplemental pipe may be used and having no signaling apparatus on the locomotive, but extending beneath the locomotive and cars in the same manner as described. A mere supplemental pipe may be found preferable in freight service, and when used should a freight-car be included in the line of a passenger-train it would be equipped with the whistle-pipe for signaling.

Referring now again to the apparatus described in connection with the drawings, I will proceed to describe the means by which



the prevention of a back cushion of air in the rear of the piston 26 is accomplished, consisting in the provision of a venting channel or passage 35<sup>a</sup>, which extends through the bushing 36 about the turning plug 20, communicating at one end with the chamber in the rear of said piston 26 and at the other end opening to the outer air just below the handle 24, as shown in Fig. 2.

It may possibly occur, either accidentally or intentionally, that the handle 24 may be but partially turned and the valves neither opened nor closed. In order to apprise the engineer of such a state of things, I provide means by which the air in the signal-pipe is exhausted into the open air, thus either sounding the whistle 33 or indicating upon the gage 32. In accomplishing this result I provide a supplemental passage 37<sup>a</sup>, Figs. 3 and 4, establishing communication between the recesses 28 and 28<sup>a</sup>. As indicated by the dotted lines in said figures, the passage 34 establishes communication between the recess 28<sup>a</sup> and the piston-chamber 25 through the by-port 29. A venting-passage 35 also extends from the recess 28<sup>a</sup> to the open air. Should the valve be but partially turned, as shown by the dotted lines in Fig. 3, it is evident that the air would pass through the signal-pipe into the signal-pipe valve port or passage, through the by-port 29 into the piston-chamber 25, and from thence by the piston 26 into the chamber in the rear thereof, and from thence to the passage 37 to the passage 35 and venting into the open air to reduce the signal-pipe pressure.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In an air-brake system, the combination with the air-receiving reservoir, braking apparatus, train-pipe and supplemental or whistle pipe, of angle-cocks located at either end of each car or locomotive common to both the supplemental and train pipe, a common turning plug for each angle-cock and a locking-piston operated by the pressure within the supplemental or whistle pipe together with a venting-passage communicating with the chamber in the rear of said locking-piston which also opens into the outer air.

2. In an air-brake system, the combination with the air-receiving reservoir, braking apparatus, train-pipe and supplemental or whistle pipe, of angle-cocks located at either end

of each car or locomotive, a common turning plug constructed and operated to close or open both the supplemental or whistle pipe and the train-pipe simultaneously, locking mechanism operated by the pressure within the supplemental or whistle pipe adapted to hold the turning plug in locked position and an air-passage communicating with the signal-pipe when the angle-cock is closed whereby the air is diverted about the turning-plug of the angle-cock to act upon the locking-piston and lock the valve in a closed position.

3. In an air-brake system, the combination with the air-receiving reservoir, braking apparatus, train and supplemental or whistle pipes, of angle-cocks which are located at either end of each car or locomotive and provided with train and supplemental valves connected with one another so as to simultaneously open and close the train and supplemental pipes, and which are adapted to vent the supplemental pipe when the valves are only partially opened or closed; and locking devices respectively associated with the angle-cocks and adapted to lock the same in either an open or a closed position.

4. The combination with the locking-piston located in the turning plug of the angle-cock of a venting-passage communicating with the chamber in the rear of said locking-piston and also opening into the outer air.

5. The combination with the locking-piston located in the turning plug of an air-passage communicating with the signal-pipe when the angle-cock is closed whereby the air is diverted about the turning plug of the angle-cock to act upon the locking-piston and lock the valve in a closed position.

6. Means for automatically indicating that the angle-cock is only partially opened or closed, comprising a valve having a locking piston-chamber which communicates with the air-supply pipe; and a valve-casing having a passage which communicates with the locking piston-chamber of the valve when the valve is only partially opened or closed, and also having a supplemental passage or passages establishing communication between said last-mentioned passage and the open air.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES F. BANE.

Witnesses:

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L. M. BULKLEY.