No. 795,693. PATENTED JULY 25, 1905.

F. S. CRAVENS.

AIR BRAKE APPARATUS.

APPLICATION FILED APR. 3, 1905.

Fig. 1.

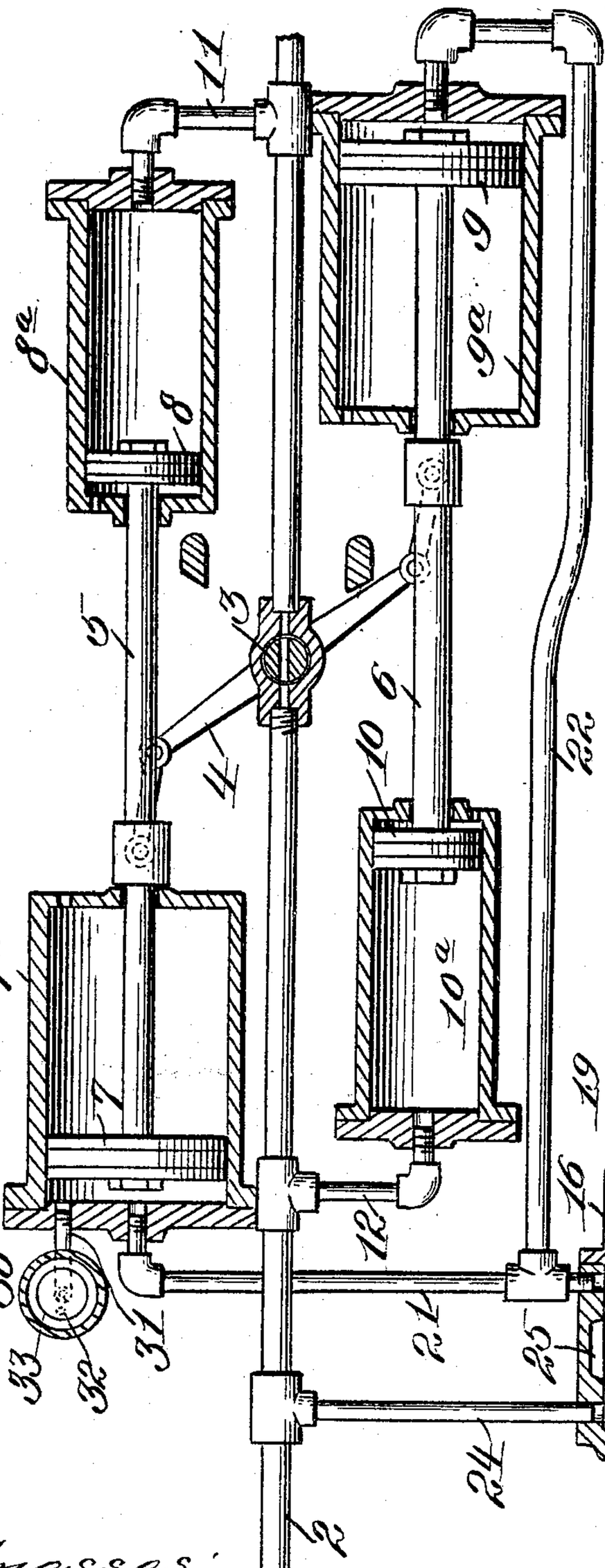
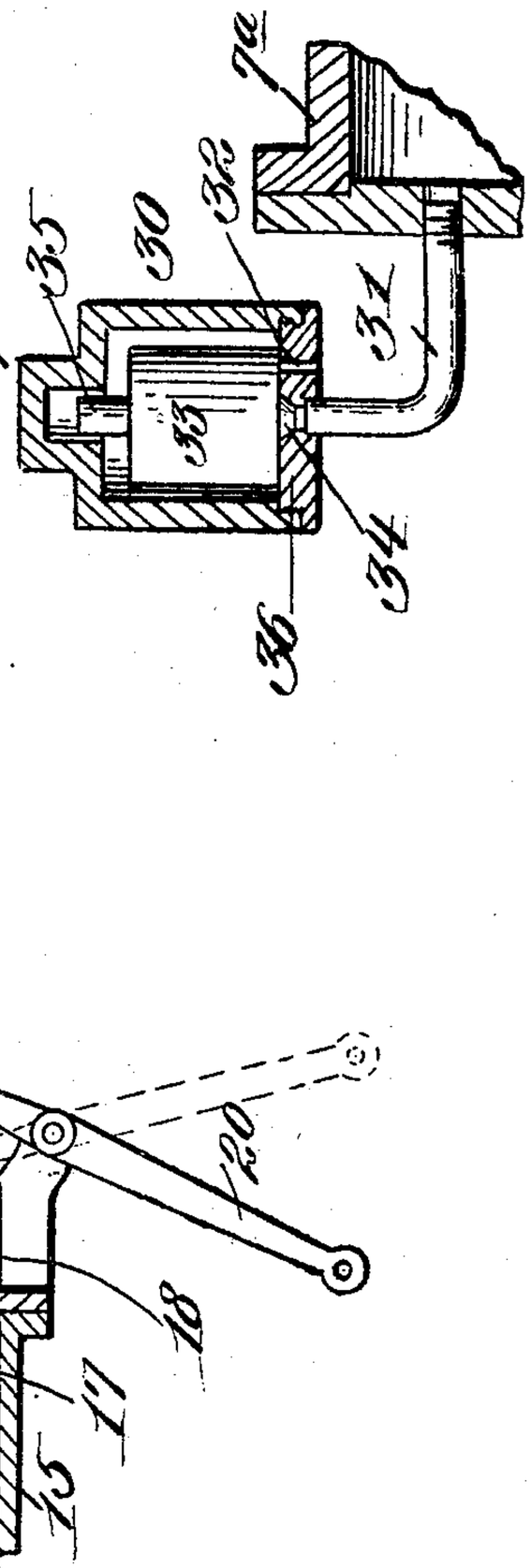


Fig. 2.



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UNITED STATES PATENT OFFICE.

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AIR-BRAKE APPARATUS.

No. 795,693. Specification of Letters Patent. Patented July 25, 1905.

Application filed April 3, 1905. Serial No. 253,478.

To all whom it may concern:

Be it known that I, FRANK S. CRAVENS, a citizen of the United States, residing at Lexington, in the county of Fayette and State of Kentucky, have invented new and useful Improvements in Air-Brake Apparatus, of which the following is a specification.

This invention relates to an air-brake apparatus; and it is an improvement upon the apparatus set forth in Letters Patent No. 789,081, granted to me May 2, 1905. While the apparatus disclosed in the said Letters Patent is highly effective, the present one is an advance thereover in that it possesses advantages, as will hereinafter more particularly appear, not accompanying the prior apparatus.

In the drawings accompanying and forming a part of this specification, Figure 1 is a diagrammatic sectional view of an apparatus involving my invention. Fig. 2 is an enlarged sectional view of valve mechanism hereinafter particularly described.

Like characters refer to like parts throughout the drawings.

In Fig. 1 I have shown certain features illustrated, described, and claimed in the Letters Patent hereinbefore mentioned, and the same need be but briefly described in the present case—that is, I will describe the features already covered in my prior patent in such manner as to indicate clearly the way in which the improvements coact therewith.

The numeral 2 designates a train-pipe, and it is represented as intersected by a valve, as 3, to the stem of which is connected centrally a rocker 4. The opposite ends of the rocker are linked to rods 5 and 6, each rod being common to two pistons. The pistons for the rod 5 are denoted by 7 and 8, while the other two pistons are denoted by 9 and 10, respectively. The pistons 7 and 9 are of equal superficial area, while the pistons 8 and 10 are also of superficial area, but of less superficial area than the pistons 7 and 9. I will designate the cylinders by 7^a, 8^a, 9^a, and 10^a, respectively. The cylinders 8^a and 10^a are connected to the train-pipe 2 at their outer ends and at opposite sides of the valve 3 by pipes denoted, respectively, by 11 and 12, so that air from the train-pipe 2 can enter the clyinder 8^a or 10^a in order to advance the piston 8 or 10. To effect the opening of the valve 3, the pistons 8 and 10 are shown in Fig. 1 as occupying their advanced positions, they having on their advancing movement opened the valve, as indicated in said Fig. 1.

It will be assumed that a car is provided with apparatus constructed as hereinbefore described, the dummies at both ends of the train-pipe 2 being hung up. It will be further assumed that the dummy on the right (neither dummy, however, being shown) is dismounted and coupled to a train-pipe section on the car in advance of the one mentioned. When the dummies are hung up, the valve 3 will be closed, its port at such time being at right angles to the position shown in Fig. 1. When the dummy on the right is coupled to the train-pipe section on the car in advance of it, air is caused to enter the train-pipe section from the right, and as it travels toward the left it will enter the pipe 11 and then the cylinder 8^a, so as to drive the piston 8 (then in its backward position) forward to cause the operation of the rocker 4 and the opening of the valve 3 in order to provide a passage through the train-pipe 2 for the air.

In Fig. 1 the piston 8 is in its advanced position. When the air comes from the left toward the right, the piston 10 will be operated. When it is desired to cut a car out from a train, it becomes necessary to close the valve 3 or to move its port to a position at right angles to the position it is represented as occupying in Fig. 1, and I will now describe the means for securing this result.

A cylinder is shown at 15 and as having a reduced extension 16. The cylinder contains a piston, as 17, while the reduced extension thereof is provided with a piston, as 18. The stem of the two pistons is denoted by 19, and its outer end is adapted for engagement by a hand-lever 20. Leading from the cylinder 15 are pipes, as 21 and 22, the opposite ends of the pipes opening into the outer ends of the cylinders 7^a and 9^a. Said pipes 21 and 22 open into what might be considered the pressure sides of the said two cylinders 7^a and 9^a. The stem 19 extends entirely through the two pistons 17 and 18, the lever 20 engaging the outwardly-extending portion, while the other portion is surrounded by the coiled spring 23, bearing against the piston 17 and also against one head of the cylinder 15. Opening into the cylinder 15 at the side opposite that from which the pipes 21 and 22 extend is a pipe 24, which extends from the train-pipe 2. In the wall of the cylinder 15 is formed the by-pass passage 25.

The piston 17 is shown as being in its forward relation in Fig. 1, and when in such relation it serves as a valve to prevent the flow

of air from the cylinder 15, which is in constant communication with the train-pipe 2, to and through the pipes 21 and 22. When, however, it becomes necessary to uncouple a car from one in advance of it or to cut it out from a train, the valve 3 should be closed, and this result can be brought about as follows: The lever 20 will be moved by hand from the full-line position in Fig. 1 to the dotted-line position in said figure, so as to cause the piston 17 to be moved to the left or assume the dotted-line position in said figure in order that air in the cylinder 15, which comes from the train-pipe, can flow through the by-pass passage 25 and then into the pipes 21 and 22. The air leaving said pipes 21 and 22 will enter the pressure sides of the cylinders 7^a and 9^a to move the pistons 7 and 9 from their advanced position (shown in Fig. 1) to their retracted positions. During this motion of the pistons 7 and 9 they serve, through the intervention of the rods 5 and 6 and rocker 4, to close the valve 3, so that the car equipped with the brake apparatus can be uncoupled from another car or cars. The instant that the hand-lever 20 is released the spring 23, then under compression, will by relaxing return the piston 17 to its original position.

A casing, which may be of cylindrical form, it being thus shown, is provided in connection with the apparatus hereinbefore described, said casing being denoted by 30 and being connected by a tube, as 31, with the pressure side of the cylinder 7^a. The opposite ends of the tube are threaded into one head of the casing 30 and into what is shown as the outer head of the cylinder 7^a. It will therefore be obvious that the casing 30 has communication with the pressure side of said cylinder 7^a. In one head of the casing, or what is shown as the inner one, is a port 32, controlled by an automatic valve 33. The automatic action of the valve is secured by weighting the same. The valve when closed covers the port or outlet 32, which, as will be understood, opens into the atmosphere. The stem of the valve 33 is oppositely extended therefrom, as at 34 and 35, the portion 34 of the stem when the valve is closed or covering the port or outlet 32 having its tapered portion fit a correspondingly-tapered seat in that head of the casing in which the port 32 is located. The other extension 35 of the valve-stem is guided in an opening in the outer head of the casing 30, which opening is closed by the plug 36.

It will be understood from what I have hereinbefore stated that when it becomes necessary to cut out a car the valve 3 is closed by the admission of air through the pipes 21 and 22 into the cylinders 7^a and 9^a. When the air rushes into the cylinder 7^a, it will of course pass into the pipe 31; but initially it will not raise the valve 33, the valve being made sufficiently heavy in the present case to assure this result, so that I can secure a prompt action of the pistons 7 and 9 in order to give a trainman sufficient time to uncouple and hang up the dummies at the end of the train-pipe 2. When the pressure of air entering into the cylinders 7^a and 9^a reaches a certain point, however, the air will lift the valve 33. This, however, will not occur until the pistons 7 and 9 have made considerable movement. When the valve 3 is closed, it will be understood that before it can be opened it is necessary for air to act against the pistons 8 and 10, and to permit the movement of said pistons 8 and 10 it is necessary to exhaust air from the pressure sides of the two cylinders 7^a and 9^a, which air is in the space between the pistons 7 and 9 or outer heads of the said two last-mentioned cylinders. The exhaust can, as will be understood, readily take place through the tube 31, and as the air enters said tube 31 it lifts the valve 33 and passes to the atmosphere by way of the port 32, which is uncovered by the valve 33 as it rises. The valve 33 therefore, in connection with the parts associated therewith, serves as a simple and effective means for securing an initial high pressure against the pistons 7 and 9, while at the same time it provides for the exhaust from the cylinders which contain said pistons when it becomes necessary to open the valve 3.

I have described Fig. 1 as a diagrammatic view. The several cylinders 7^a, 8^a, 9^a, 10^a, and 15 are generally horizontally alined, or approximately so, while the casing 30 is vertically disposed, so as to secure the automatic action of the weighted valve 33.

Having thus described my invention, what I claim is—

1. In an air-brake apparatus, the combination of a train-pipe, a valve in the train-pipe, a cylinder having a piston, the cylinder being in communication with and adapted to receive air from the train-pipe to advance the piston, the latter, when advanced, serving to open the valve, a second cylinder in communication with the train-pipe, having a piston arranged to be advanced by air from the train-pipe, and when advanced, to close the valve, and automatic means for controlling the exhaust of air to the atmosphere from the pressure side of the said second cylinder.

2. In an air-brake apparatus, the combination of a train-pipe, a valve in the train-pipe, a cylinder having a piston, the cylinder being in communication with and adapted to receive air from the train-pipe to advance the piston, the latter, when advanced, serving to open the valve, a second cylinder in communication with the train-pipe, having a piston arranged to be advanced by air from the train-pipe, and when advanced, to close the valve, a casing in communication with the pressure side of said second cylinder, having a port opening into the atmosphere, and an automatically-operat-

ing valve in said casing, normally closing said port.

3. In an air-brake apparatus, the combination of a train-pipe, a valve in the train-pipe, a cylinder having a piston, the cylinder being in communication with and adapted to receive air from the train-pipe to advance the piston, the latter, when advanced, serving to open the valve, a second cylinder in communication with the train-pipe, having a piston arranged to be advanced by air from the train-pipe, and when advanced, to close the valve, a casing in communication with the pressure side of said second cylinder and having a port opening into the atmosphere, and a weighted valve in the casing, normally held by its weight over the port.

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

FRANK S. CRAVENS.

Witnesses:
GARRETT P. WELSH,
HARRY STOUGH.