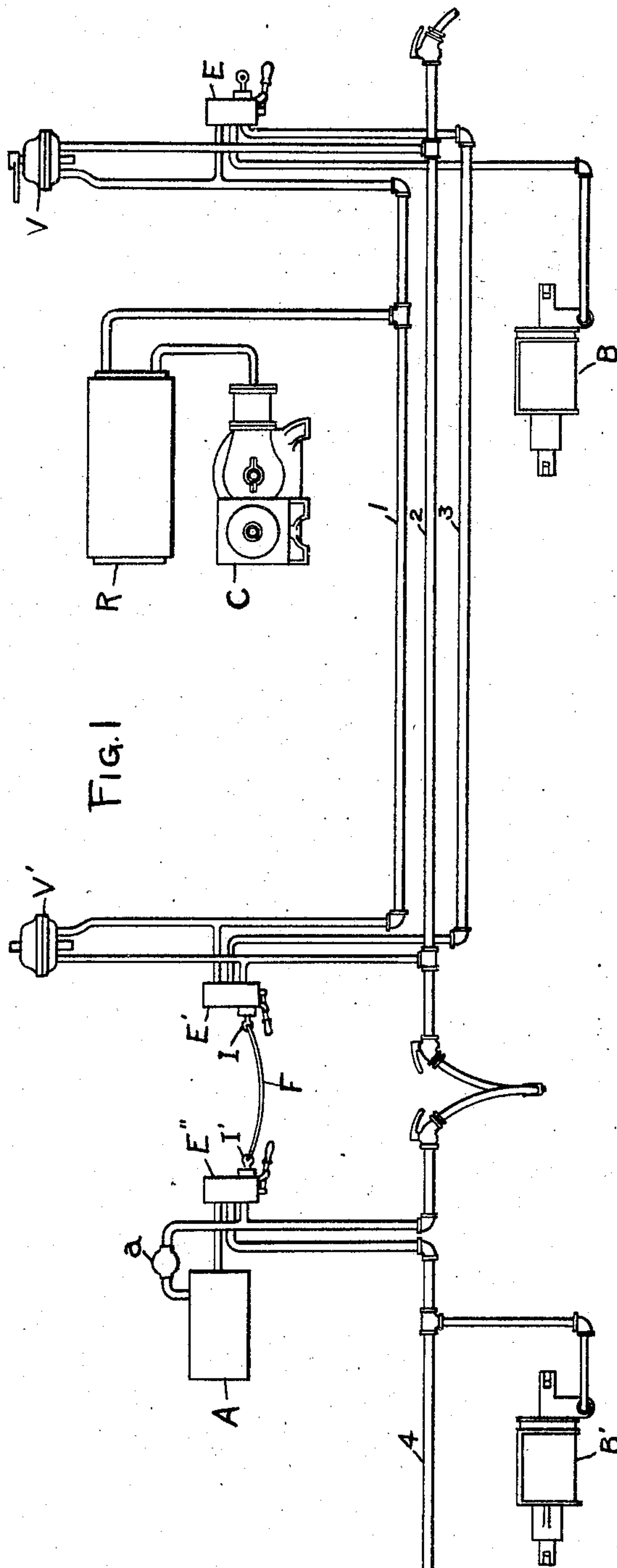
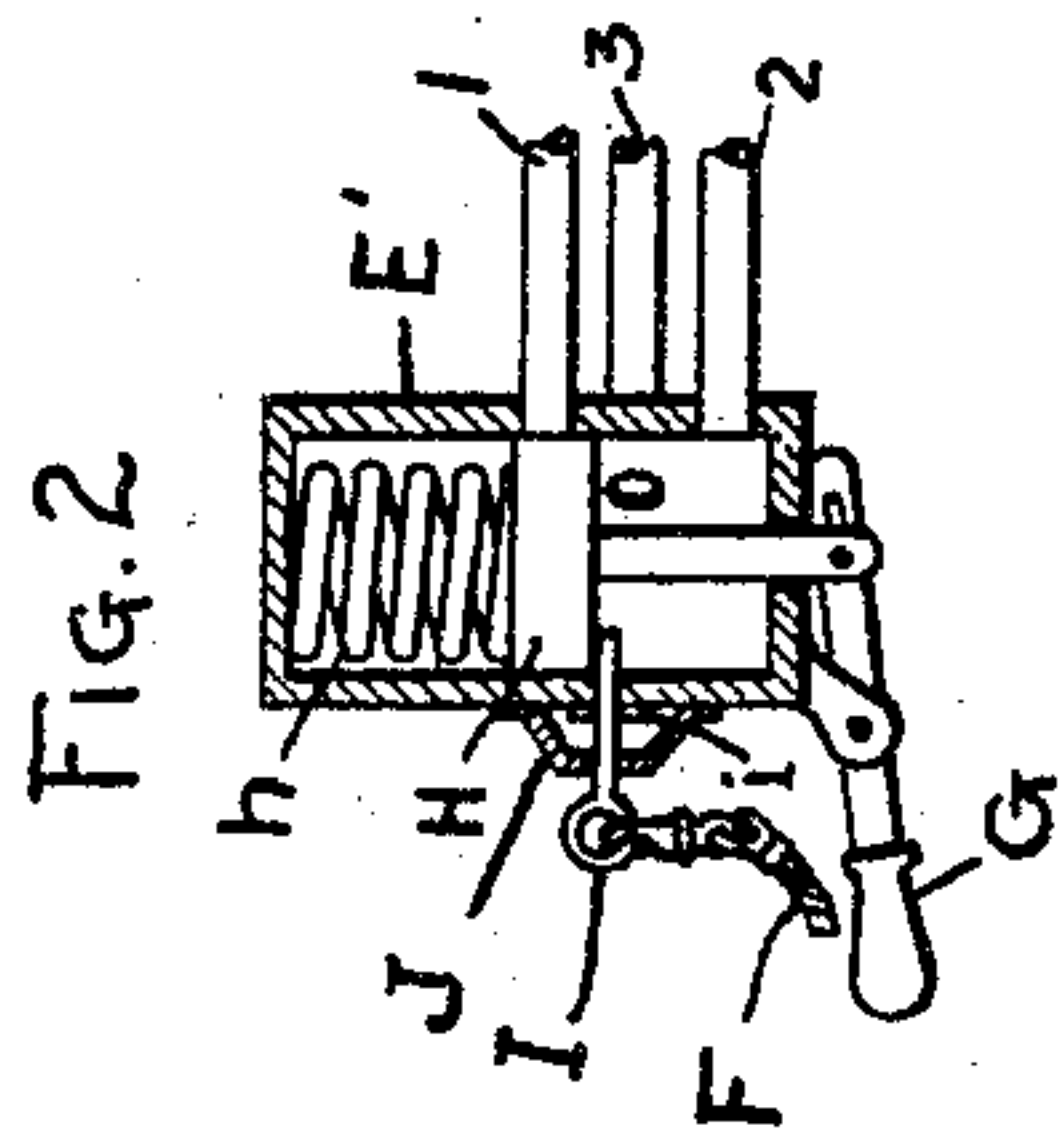


No. 785,549.

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L. A. HAWKINS.
AIR BRAKE SYSTEM AND EMERGENCY VALVE.
APPLICATION FILED JULY 30, 1904.



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AIR-BRAKE SYSTEM AND EMERGENCY-VALVE.

SPECIFICATION forming part of Letters Patent No. 785,549, dated March 21, 1905.

Application filed July 30, 1904. Serial No. 218,882.

To all whom it may concern:

Be it known that I, LAURENCE A. HAWKINS, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Air-Brake Systems and Emergency-Valves, of which the following is a specification.

My invention relates to air-brake systems of the type known as "straight" air-brake systems. In this type the train-pipe is connected to reservoir to apply the brakes and to atmosphere for releasing the brakes in counter-distinction to the automatic system in which the train-pipe is connected to atmosphere to apply the brakes and to reservoir to release the brakes. For single cars the straight air-brake system is invariably used on account of its greater simplicity and smaller liability to derangement. These advantages are possessed by the straight air-brake system not only for single cars, but also for short trains—as, for instance, where a number of motor-cars are coupled together in a train or a motor-car is drawing one or more trailers. When used for controlling the brakes of a train, however, the straight air-brake system has a serious defect as compared with the automatic system, since while the automatic system instantly applies the brakes upon all the train in case the train breaks apart at any point the straight air-brake system as ordinarily arranged does not do this.

The object of my invention is to provide a simple and efficient arrangement for a straight air-brake system by means of which the brakes will be applied on all the cars of a train in case of its breaking apart at any point in the same manner as is accomplished by the automatic air-brake system.

One feature of my invention consists in the employment of valves mechanically actuated upon the breaking apart of the train to cut off the brake-cylinder on each car from the train-pipe and connect it to a source of compressed air. These valves are furthermore arranged to cut off the motorman's valve on the front car from the brake-cylinders, so that the brakes will be applied on all the cars,

even if the motorman has his valve at release position, connecting the train-pipe to atmosphere when the breaking apart of the train occurs.

Another feature of my invention consists in so arranging the actuating means for the emergency-valves that the actuating means for each valve must be properly set to operate in case of an emergency in order that the brakes may be released on the train.

My invention will best be understood by reference to the accompanying drawings, in which—

Figure 1 shows diagrammatically a straight air-brake system arranged in accordance with my invention and adapted for use on a motor-car with one or more trailers, and Fig. 2 shows a cross-sectional view of an emergency-valve adapted for use in such a system.

In the drawings, C represents the usual compressor, and R represents the reservoir connected to the reservoir-pipe 1, which is connected in the usual manner to the motorman's valves V and V' at opposite ends of the car. The motorman's valves are also connected to a second pipe 2, which corresponds to the usual train-line and which is connected by the usual coupling to a pipe 4 on the trailer.

B represents the brake-cylinder on the motor-car, which is not connected directly to the train-line, as in the ordinary arrangement, but is connected to the train-line through emergency-valve E, pipe 3, and emergency-valve E'. Thus both of the emergency-valves E and E' are inserted in series in the connection between the brake-cylinder B and the motorman's valves. Furthermore, the connection to the trailer is between the emergency-valves and the motorman's valves. Consequently it will be seen that by the movement of either emergency-valve E or E' the brake-cylinder B may be disconnected both from the emergency-valves E and E' and from the train-pipe 2 and the trailer. The trailer is provided with a similar emergency-valve E'', inserted in the connection between pipe 4 and pipe 2 and with an auxiliary reservoir A, which is connected to the pipe 2 through a check-valve

a, which acts to allow air to flow from pipe 2 to the reservoir A, but prevents the flow in the opposite direction. Thus by means of the check-valve the reservoir A is maintained charged, being connected to the train-line only when the train-line is connected to the main reservoir. The brake-cylinder B' on the trailer is connected to the pipe 4, which is also connected to the other trailers if there are more than one.

The construction of the emergency-valve is clearly shown in Fig. 2. The valve itself consists of a piston H, normally pressed downward by a compression-spring h.

G is a handle, by means of which the piston may be pressed upward into the position shown, compressing spring h. I is a pin passing through the side of the valve-casing, by means of which the piston may be locked in this position. When in this position, it will be seen that a connection exists between the pipes 2 and 3, while pipe 1 is closed. Referring to Fig. 1, it will be seen that if both valves E and E' are in this position the brake-cylinder will be connected directly to the motorman's valves in the usual manner and that if the emergency-valve E'' on the trailer is in this position the brake-cylinder B' and pipe 4 will be connected directly to pipe 2 in the usual manner. Consequently with the emergency-valves all in this position the system acts exactly as the usual straight air-brake system.

The emergency-valve E' on the motor-car and the valve E'' on the trailer have their retaining-pins I and I' connected by a cord F. Consequently if the train should break apart pins I and I' would be pulled outwardly, releasing the emergency-valves E' and E''. The pin I is provided, as shown in Fig. 2, with a collar i, adapted to engage the cap J on the casing and to prevent the complete withdrawal of the pin. The object of this is not only to prevent the loss of the pin, but to insure that both pins I and I' shall be drawn out when the train separates. The cord F is made strong enough to draw out both of these pins before breaking, but to break before tearing the cap J.

When the valve E' is released by the withdrawal of the retaining-pin, piston H moves downward under the pressure of spring h, and thereby closes pipe 2 and connects pipes 1 and 3, as is clearly shown in Fig. 2. The closing of pipe 2 disconnects both of the motorman's valves V and V', pipe 2, and the trailer from pipe 3 and the brake-cylinder B, while the connection between pipes 1 and 3 connects the main reservoir R to brake-cylinder B.

The pressure in the brake-cylinder is consequently raised and the brakes are applied, since neither the breaking apart of the train-pipe nor the possible position of valve V at full release can have any effect upon the application of the brakes. On the trailer the

operation of the emergency-valve acts to disconnect pipe 4 and brake-cylinder B' from pipe 2 on the motor-car and instead connects brake-cylinder B' to auxiliary reservoir A. The brakes are thus applied on the trailer.

If more than one trailer is employed, the auxiliary reservoir A should be large enough to supply the brake-pressure for all the trailers, and each trailer would be a reduplication of the arrangement shown. The invention is equally applicable to a plurality of motor-cars connected in a train, in which case each car would have an equipment the same as is shown for the motor-car in Fig. 1. It will be seen from Fig. 1 that it makes no difference on the motor-car whether it is the emergency-valve E or the emergency-valve E' which is operated. The effect is the same in either case. It will also be seen that the brakes will remain applied as long as any one emergency-valve is released. In order to make it possible for the motorman to release the brakes on the train, each emergency-valve must be raised to the position shown in Fig. 2 and the retaining-pin inserted. Consequently a failure to set the emergency-valves properly can never result from forgetfulness, for the cars cannot otherwise be operated.

Many changes may be made in the construction and arrangement of parts, and I aim in the appended claims to cover all such modifications which are within the scope of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a train of cars equipped with a "straight" air-brake system, an emergency-valve adapted and arranged to disconnect brake-cylinder from train-pipe and to connect brake-cylinder to main reservoir, and means operative upon a breaking apart of the train for actuating said valve.

2. In a train of cars equipped with a "straight" air-brake system, an emergency-valve adapted and arranged to disconnect brake-cylinder from train-pipe and to connect brake-cylinder to reservoir, a spring tending to move said valve to emergency position, means for normally restraining said valve, and means for releasing said valve upon a breaking apart of the train.

3. In a train of cars equipped with a "straight" air-brake system, an emergency-valve adapted and arranged to disconnect brake-cylinder from train-pipe and to connect brake-cylinder to a source of pressure, means tending to move said valve to emergency position, means for normally restraining said valve, and means for releasing said valve upon a breaking apart of the train.

4. In a train of cars equipped with a "straight" air-brake system, an emergency-valve adapted and arranged to disconnect brake-cylinder from train-pipe and to connect brake-cylinder to reservoir, a spring tending

to move said valve to emergency position, a lock for said valve, and means connected to another car of the train for tripping said lock.

5. In a train of cars equipped with a "straight" air-brake system, emergency-valves on adjacent ends of adjacent cars, each valve being adapted and arranged to disconnect the brake-cylinder on its car from train-pipe and to connect it to a source of pressure, springs tending to move said valves to emergency position, a pin for each valve adapted to restrain it against the pressure of its spring, and a cord connecting the two pins.

6. In a train of cars equipped with a "straight" air-brake system, emergency-valves on adjacent ends of adjacent cars, each valve being adapted and arranged to disconnect the brake-cylinder on its car from train-pipe and to connect it to a source of pressure, springs tending to move said valves to emergency position, a pin for each valve adapted to restrain it against the pressure of its spring, a cord connecting the two pins, and means for preventing the total withdrawal of said pins.

7. In a vehicle equipped with a "straight" air-brake system, two emergency-valves at opposite ends of said car inserted in series in the connection between brake-cylinder and motorman's valves.

8. In a vehicle equipped with a "straight" air-brake system, two emergency-valves at opposite ends of said car inserted in series in the connection between brake-cylinder and

motorman's valves, and a connection to another car from between said emergency-valves and said motorman's valves. 35

9. In a train of cars equipped with a "straight" air-brake system, two emergency-valves at opposite ends of a vehicle inserted in series between brake-cylinder and train-pipe. 40

10. In a train of cars equipped with a "straight" air-brake system, two emergency-valves at opposite ends of a vehicle inserted in series in the connection between brake-cylinder and train-pipe and each adapted by its movement to break said connection and to connect brake-cylinder to a source of pressure. 45

11. In a vehicle equipped with a "straight" air-brake system, two emergency-valves at opposite ends of said car inserted in series in the connection between brake-cylinder and motorman's valves and each adapted by its movement to break said connection and to connect brake-cylinder to reservoir. 50

12. In a train of cars equipped with a "straight" air-brake system, an emergency-valve adapted and arranged to disconnect brake-cylinder from train-pipe and to connect it to a source of pressure, and an operating-cord connecting said valve to another car. 55 60

In witness whereof I have hereunto set my hand this 29th day of July, 1904.

LAURENCE A. HAWKINS.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.