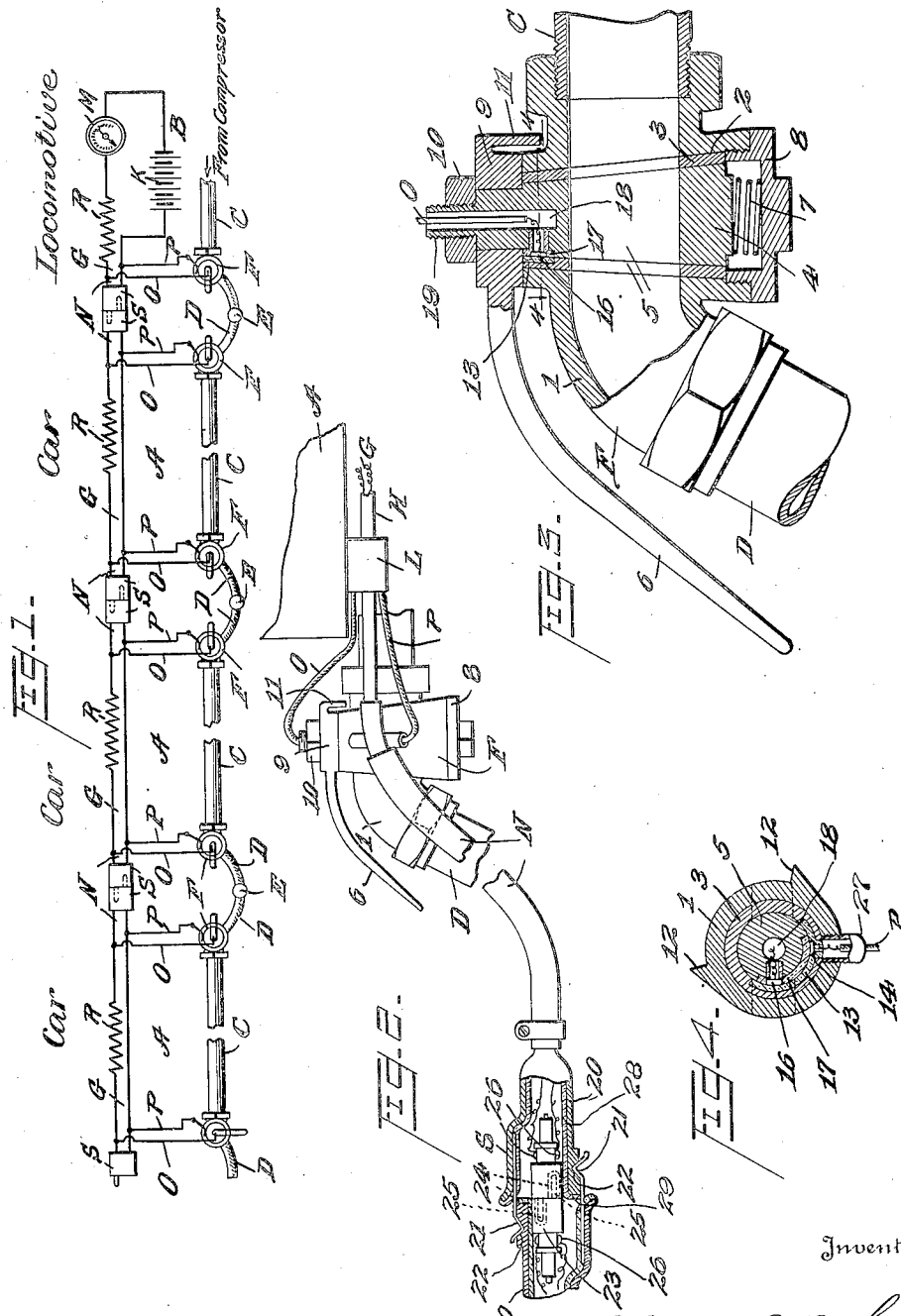


Jan. 5, 1926.

1,568,041

C. J. BESHEARS
AUTOMATIC MEANS FOR INDICATING THE CONDITION
OF AIR BRAKE MECHANISM ON TRAINS
Filed August 21, 1923



Inventor

Clarence J. Beshears,

By Watson, Coit, Morse & Grindle,
Attorney

UNITED STATES PATENT OFFICE.

CLARENCE J. BESHEARS, OF MEMPHIS, TENNESSEE, ASSIGNOR OF ONE-HALF TO
HARRY C. AGNEW, OF WASHINGTON, DISTRICT OF COLUMBIA.

**AUTOMATIC MEANS FOR INDICATING THE CONDITION OF AIR-BRAKE MECHANISM
ON TRAINS.**

Application filed August 21, 1923. Serial No. 658,642.

To all whom it may concern:

Be it known that I, CLARENCE J. BESHEARS, a citizen of the United States, and a resident of Memphis, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Automatic Means for Indicating the Condition of Air-Brake Mechanism on Trains, of which the following is a specification.

The subject of the present invention is the provision of automatic means for visually notifying the engineer of a train of the number of cars on which the air-brakes are operatively connected.

In the present air-brake systems each car of a train is provided with air-brakes all supplied by a compressor and controlled by a valve on the locomotive. The pipe line running the length of the train, known as the "train line" is formed by a rigid pipe on each car, to each end of which is fastened a short section of hose. Each hose is provided with a coupling member whereby the pipe on one car can be coupled to that on the next. Between each hose and its corresponding pipe is provided a valve, known in the trade as a "cut-out cock" in order that the train line may be closed at the end of the last car.

The hose coupling members in the train line must be manually coupled although the cars are automatically coupled. Consequently it often happens that a large train is made up with but a few or maybe no cars having the air-brakes coupled for operation. It may also happen that the train line is properly coupled but the cut-out cocks are not all opened, leaving the cars to the rear of the first closed cock with inoperative brakes. Either of the above conditions may be the cause of a serious accident since the engineer, relying on all of the air-brakes, will not be able to stop the train in the anticipated space or on certain steep down-grades.

It is therefore an object of this invention to provide an automatic visual signal in the engine cab to indicate how many cars have their brakes coupled to the train line.

It is a further object of this invention to provide an automatic visual signal in the engine cab to indicate the number of cars immediately back of the locomotive that have their cut-out cocks open.

Another object of this invention is the provision of an air-brake cut-out cock provided with electric circuit closing means operative simultaneously therewith.

Further objects will appear as the description proceeds.

Stated briefly, this invention contemplates the provision of an electric circuit adapted to be connected through all the cars and the locomotive. Each car is provided with a resistance of fixed value and the locomotive is provided with a source of electric energy and an indicator. The cut-out cocks are each provided with a switch in shunt to the circuit so that in case any one is closed the circuit will also be closed at that point and the indicator will show the number of resistances in circuit, which number will correspond to the number of cars having operative air-brakes.

The invention may be best understood by reference to the following description taken in connection with the drawings in which:

Fig. 1 is a schematic view of several cars and a locomotive equipped with the invention.

Fig. 2 is an elevation of a cut-out cock in position on the end of a car, showing also the electric connector partially in section.

Fig. 3 is a longitudinal vertical section of a cut-out cock showing the circuit closing mechanism.

Fig. 4 is a horizontal section on line 4—4 of Fig. 3.

Referring to Fig. 1, there are shown three cars A, and a locomotive B, equipped with the invention. Each car has as standard equipment a train pipe section C, with a short length of hose D at either end thereof. These hose sections are adapted to be connected together between cars by couplings E. Between each train pipe section C and hose section D, there is provided a cut-out cock F for closing off the train pipe at any car that forms the end of a train, or when it is desired to render the air-brakes on certain cars inoperative. Each car and the locomotive is provided with an electric circuit G carried in a conduit H. These conduits terminate in junction boxes L, from which lead the flexible cables N, O and P. N is a twin conductor of heavy reinforced construction and carries at its end one por-

tion of a quick detachable connector S, which will be described later.

In the electric circuit of each car and locomotive is a series resistance R. The locomotive carries a suitable source of current, here shown as a battery K, and an indicator M connected in series with the battery K, resistance R, and circuit G. The connectors S are adapted to extend this circuit to all cars of the train. In order that this circuit may be closed at the last car having the air-brakes properly coupled, there is incorporated in each cut-out cock F a circuit closer, connected by leads O and P in parallel to the train circuit.

The cut-out cock F comprises a cast iron housing 1, internally threaded at one end for attachment to the train pipe C, and at the other end having a 45° bend and a hose coupling mechanism. This housing has a tapered bore 2 into which is pressed a brass sleeve 3 similarly tapered, both internally and externally. Fitting rotatably within the sleeve is a brass core 4. Both sleeve and core are properly drilled, as at 5, to permit the flow of air when the core is in the position shown, but to cut off any flow when the core 4 is rotated 90° by means of the handle 6. The core is held in position and maintained air-tight by means of a spring 7 pressed against its end by a cast iron plug 8 which is screwed into the body of the cock. The handle 6, with the enlarged head 9, is slipped over a squared shank on the core and held in position by a nut 10. A depending lug 11 on the enlarged head is adapted to cooperate with stops 12—12 on the body of the cock to limit the movement of the plug to 90°.

In the upper part of the cut-out cock is arranged an electric circuit closer adapted to be operated simultaneously with the cock. Within the upper part of the sleeve 3 is pressed an arcuate piece of fibre or other suitable insulating material 13. Set in this insulating material is a copper contact 14. The brass sleeve 3 and cast iron body 1 of the cock are drilled and tapped opposite this contact to fit a threaded nipple 27 which is bent downward 45° and accommodates the conductor cable P which is connected to the contact 14. After the contact and wire are in place the bushing is filled with a water-proof and sunproof wax. The second contact 16 of the circuit closer is located in the plug 4 from which it is insulated by the bushing 17 of suitable insulating material. The top of the plug has a longitudinal bore 18 through which the flexible cable O is adapted to pass and be connected to the contact 16. This hole is also suitably insulated with wax. The upper end of the plug is externally threaded as at 19, to receive a coupling member of a flexible conduit (not shown) which surrounds the cable O. The

cable P is also surrounded by a flexible conduit. These flexible conduits and their enclosed cables run to the junction boxes L.

The flexible cables N enclosed in flexible conduits are connected to the junction boxes L and each terminates in one member of a separable connector S. The two parts of this connector are duplicates so but one part will be described. The outside shell 20 of the connector is made of cast iron, is generally of tubular shape, and is provided with suitable means of attachment for the flexible conduit. The shell is provided with a spring clip 21 adapted to snap into a depression 22 on the opposite shell member and thus hold the parts together.

Suitably secured in the shell is a block of insulating material 23 in which are embedded the contacts 24 and 25. Contact 24 is a socket and 25 is a plug so that any member S is adapted to be connected to any other similar member. At the rear of the block 23 are arranged binding screws 26 electrically connected to the contacts 24 and 25 and adapted to hold the cables contained in the flexible conduit N. Between the shell and the block 23 is arranged a rubber gasket 28 to insulate the contacts. In order that the connector shall be watertight when closed, this gasket has a flange 29 overlapping the end of the shell.

The resistance R is carried in a suitable junction-box (not shown) connected in the conduit H. It is to be understood that the resistances R are of the same value on every car.

The source of electric energy K may be a suitable battery such as that used for lighting the train and is preferably of 32 volts. The indicator M is of the ammeter type but is graduated to read in "number of cars with operative air-brakes".

Operation: When a train is made up the crew connects the air-brake couplings and turns on the cut-out cocks F. At the same time the connectors S are coupled. With all of the air-brakes operative only the last cut-out cock will be closed and the electric circuit will include the resistances R of all cars, allowing but a small current to pass which will be indicated at the meter M. However, if the crew fails to open a cut-out cock, for instance, at the end of the first car, then the circuit will be closed there and but two resistances R, one on the car and one on the locomotive, will be in circuit and a correspondingly higher current will flow, indicating to the engineer that but one car has its air-brakes operative. He can then take the necessary steps to correct this condition. In case of failure to make connections between cars by means of connectors S, when all cut-out cocks are open, the circuit will be open and such information will be communicated to the engineer by failure of the

indicator hand to move from its zero position.

The above description will make the construction and operation of my invention clear to those skilled in the art to which it appertains, but it is to be understood that the embodiment shown is merely illustrative of one form of the apparatus, which is not to be construed as limiting the invention within the scope of the appended claims.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In combination with an air brake system for trains having a train pipe and cut-out cocks on individual cars, a circuit closed at one end of said train and extending the full length thereof, a source of current and a current strength indicator in series in said circuit, a resistance of similar value on each car in said circuit and means operable by the closure of a cut-out cock to close said circuit to include the resistances between it and the normally closed end of said circuit to indicate the number of cars having their air brakes connected.

2. In combination with an air brake system for multicar trains having a train pipe extending the length of the train and adapted to be closed by cut-out cocks on the cars, a pair of wires extending the length of the train, a source of current at one end thereof, an indicator in series with said wires responsive to variations in current flow, a resistance of similar value on each car in series with one of said wires and means operable by the closure of a cut-out cock to close the circuit thereat.

3. In combination with an air brake system for trains having a train pipe composed of a plurality of car pipe sections with a cut-out cock at each end of each section; a train circuit composed of a plurality of car circuit sections coupled together, each car circuit section including a resistance of similar value, and a shunt circuit-closer operable with each cut-out cock, an indicator in said train circuit at one end thereof responsive to variations in the resistance thereof, a source of current in said circuit, the clos-

ing of any cut-out cock serving to thereby operate its circuit closer to close the train circuit at that point and include in the circuit all of the resistances on cars between said cut-out cock and indicator.

4. In a signal system for air brakes, in combination, cars each having equipment consisting of a train pipe section having a detachable connector, a cut-out cock thereon, a circuit section, a detachable connector at each end thereof, a resistance of equal value in each circuit section, a circuit closer operated by movement of said cut-out cock connected in shunt to said circuit section; a locomotive having a train pipe section provided with a cut-out cock and circuit closer operable therewith, a circuit section closed at one end, a connector at the opposite end, a resistance therein, a source of current and an indicator in said locomotive circuit section responsive to variations in the resistance of the circuit, said cars and locomotive adapted to have their circuit sections and train pipe sections connected together by said detachable connectors whereby the closing of a cut-out cock to cut off the train pipe beyond it from the locomotive will close the circuit thereat including the resistances between it and the locomotive and indicate on said indicator the number of cars having operatively connected air brakes.

5. In combination with an air brake system having a train pipe and cut-out cocks on each car, an open circuit extending through the train comprising a plurality of car circuit sections coupled together each circuit section including a similar resistance in series in said circuit and a circuit closer connected in shunt to the circuit and operable simultaneously with the cut-out cock, a source of current and current measuring device in said circuit, whereby the closure of a cut-out cock will complete the circuit thereat including the resistance of the cars ahead of said cut-out and thereby indicate on said device the number of cars having operatively connected air brakes.

In testimony whereof I hereunto affix my signature.

CLARENCE J. BESHEARS.