No. 839,186. PATENTED DEC. 25, 1906.

J. NOBLE.

AIR BRAKE SYSTEM.

APPLICATION FILED JULY 10, 1905.

2 SHEETS—SHEET 1.

Fig. I.

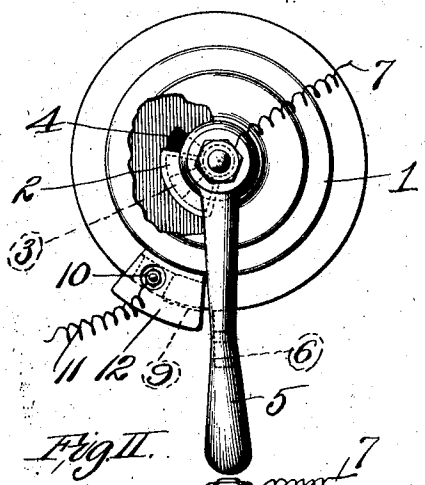


Fig. IV.

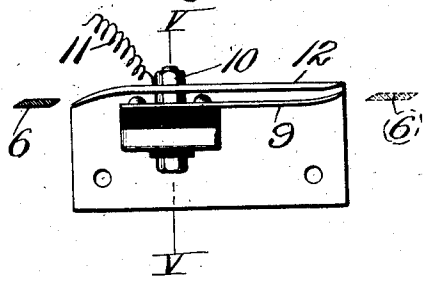


Fig. II.

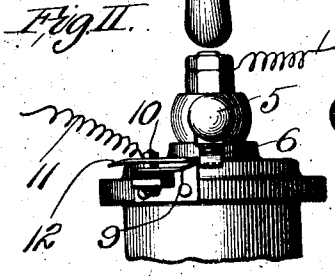


Fig. III.

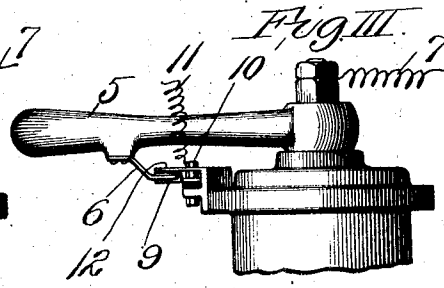


Fig. V.

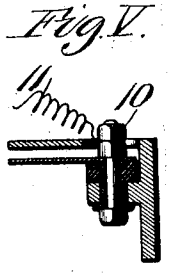
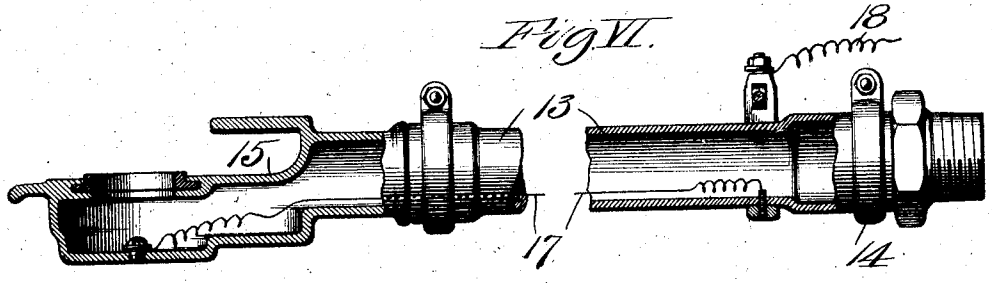


Fig. VI.



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2 SHEETS—SHEET 2.

Fig. VII.

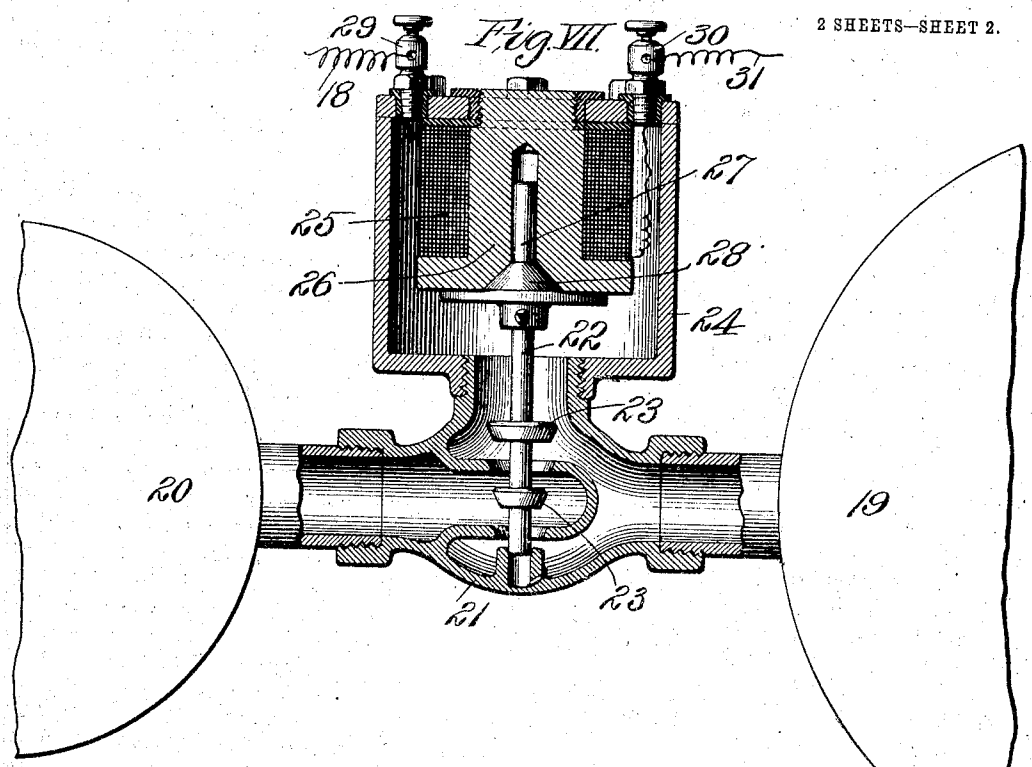
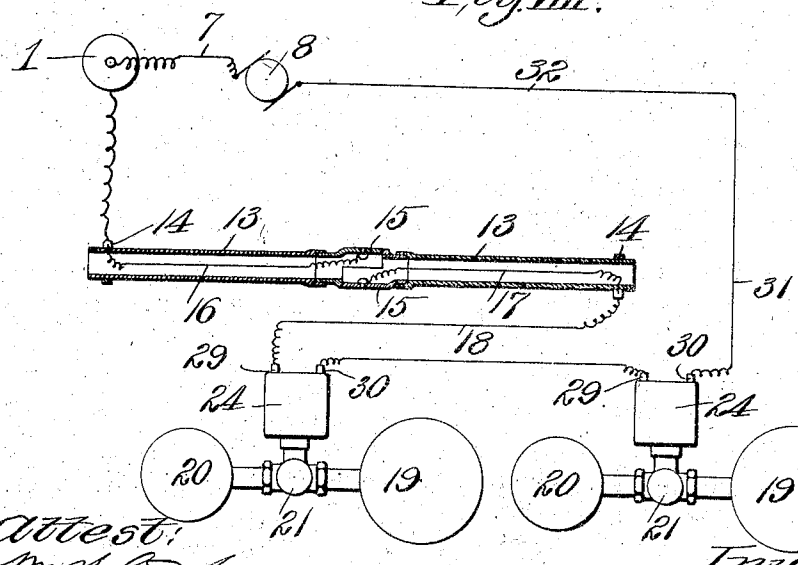


Fig. VIII.



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UNITED STATES PATENT OFFICE.

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AIR-BRAKE SYSTEM.

No. 839,186. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed July 10, 1905. Serial No. 268,997.

To all whom it may concern:

Be it known that I, JAY NOBLE, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Air-Brake Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to air-brake systems for railway-cars; and it has for its object to provide means whereby the brakes throughout an entire train of cars may be simultaneously applied, thereby accomplishing braking action in all parts of the train without an interim between the time of application of the brakes in one part of the train and the brakes in another part of the train, thus rendering the system much more effectual in stopping the train equipped therewith and lessening the shock in any particular portion of the train.

Figure I is a top or plan view, partly broken out, of the engineer's valve of my system. Fig. II is a front elevation of the engineer's valve. Fig. III is a side elevation of the engineer's valve. Fig. IV is a view illustrating the contact-arm carried by the engineer's valve and the bridge above said valve. Fig. V is an enlarged vertical section taken on line V V, Fig. IV. Fig. VI is a view, partly in elevation and partly in longitudinal section, of one of the train-pipe-connecting hose-pipes and the hose-coupling carried thereby. Fig. VII is an enlarged section of the controlling-valve governing communication between one of the auxiliary reservoirs and brake-cylinders of the system and the solenoid by which the valve-rod is actuated. Fig. VIII is a diagrammatical view illustrating my system.

1 designates the engineer's valve of an air-brake system, which consists of a cylinder and the usual valve 2, that controls communication between the air-fed port 3 and exhaust-port 4.

5 is the lever of the valve 3, by which it is actuated to provide communication between the air-fed port and exhaust-port. This lever carries a contact-arm 6.

7 is an electrical conductor leading from a source of electrical energy, such as the dynamo 8, (see Fig. VIII,) to the valve 3 to conduct an electrical current to said valve and therefrom through its lever to the contact-arm 6.

9 designates a contact-arm supported by the cylinder of the engineer's valve and insulated therefrom, the said contact-arm 9 being secured through means of a binding-post 10, that has attached to it an electrical conductor 11, that leads to a point to be hereinafter designated. The contact-arm 9 is adapted to receive the valve-lever-carried contact-arm 6, which is so disposed as to pass thereunder, and by contact therewith transmit the current from the energized conductor 7 to the conductor 11. As it is only desirable to effect contact between the valve-lever-carried contact-arm and the fixed contact-arm 9 while the valve 3 is being moved to provide communication between the air-fed port and the exhaust-port of the engineer's valve and not during the reverse movement of the valve 3, I place above the contact-arm 9 a bridge 12. (See Figs. I to V, inclusive.) This bridge is adapted to receive the valve-lever-carried contact-arm when the valve-lever is moved in a reverse direction after communication has been provided between the air-fed port and exhaust-port of the engineer's valve, as is usual in the manipulation of said valves, thereby conducting the valve-lever-carried contact-arm back into its former position ready to be moved into contact with the arm 9 when the valve 3 is to be moved in the succeeding act of setting the brakes in the system.

13 designates the connecting hose-pipes which unite the train-pipes of the system. These hose-pipes (see Figs. VI and VIII) are secured to the train-pipes by the usual bands 14, and they are equipped with the usual coupling members 15. The electrical conductor 11 leads from the engineer's valve, to which it is connected at the contact-arm 9, as stated, to one of the bands 14, as seen in Fig. VIII, and the electrical current transmitted through said conductor is conveyed through a conducting-wire 16, preferably located in the hose-pipe to which said band 14 is applied, to the coupling member 15, carried by said hose-pipe. The electrical current is thereby conducted to said coupling member, and when the mating coupling member is associated therewith the current is transmitted into said second member. From this second member the electrical current is transmitted, through a conducting-wire 17,

affixed to said member, to a band 14, applied to the hose-pipe by which the second coupling member is carried. Leading from the last-named band is an electrical conductor 18.

19 designates one of the auxiliary reservoirs of the system, and 20 one of the brake-cylinders, with which parts, in addition to the train-pipes and the hose-pipes for uniting them, each car in a train is equipped. The auxiliary reservoir and brake-cylinder are connected together by suitable pipes, and interposed in said pipes is a controlling-valve 21, that governs the flow of air from said reservoir to said cylinder.

22 is the valve-rod of the controlling-valve which carries the valves 23.

24 is a case supported by the controlling-valve 21.

25 designates a solenoid within the case 24, the said solenoid having the fixed core 26. One end of the valve-rod 22 constitutes the moving core 27, which operates in the fixed core of the solenoid and which when moved in said fixed core upon energization of the solenoid serves to reciprocate the valve-rod 22 and unseat its valves 23 to permit flow of fluid past them through the controlling-valve 21. The moving core 27 preferably has applied to it a cone 28, that is adapted to enter a conical enlargement of like contour in the inner end of the fixed core of the solenoid, thereby providing for a greater travel of the moving core to move the valve 23 when said moving core is attracted and drawn into the solenoid. The solenoid 25 is energized through the medium of the electrical current conveyed through the conductor 18 to a binding-post 29, insulated from the solenoid-case and having connection with the solenoid-coil, as seen in Fig. VII.

When an electrical circuit has been established between the source of electrical energy—as, for instance, the dynamo 8—to and from the engineer's valve and along the air-conducting train-pipes and connecting hose-pipes to the solenoid 25, upon the manipulation of the engineer's valve in causing exhaust of air therethrough the said solenoid is energized, and as a consequence the valve-rod 22 is shifted to unseat the valves 23. Upon the unseating of said valves flow of air is permitted from the auxiliary reservoir to the brake-cylinder, with a result of actuating the piston in said cylinder, through the medium of which the brakes are applied in the usual manner.

The description as thus far given relates to my system in so far as it is applied to a single car or the locomotive of a train. The system is continued throughout the remainder of the train by duplication of the described parts with the exception of the engineer's valve and the dynamo, and the duplicated parts upon each car are connected to those described by electrical conductors uniting the solenoids through the medium of which the controlling-valves 21 are governed. For the purpose of connecting the solenoids each solenoid-coil has united to it a binding-post 30, to which is attached an electrical conductor 31, that leads to the binding-post 29 of the next adjacent solenoid. The circuit is completed from the last solenoid to the source of electrical energy, such as the dynamo 8, by a return electrical conductor 32. It will be readily understood that the electrical current conducted to the various solenoids throughout the system is flashed instantly to the solenoids and that as a consequence all of the solenoids are energized at the same moment, with the result that the controlling-valves 21 throughout the system are all opened simultaneously and the brakes throughout the system applied without intermission at any point.

I claim as my invention—

1. In an air-brake system, the combination of a plurality of auxiliary and brake cylinders, controlling-valves interposed between the said auxiliary and brake cylinders for governing the flow of air from the former to the latter and an engineer's valve comprising a fixed contact member, a movable contact member and a means for maintaining an open circuit during the movement in one direction of the said movable contact member.

2. In an air-brake system, the combination of a plurality of auxiliary and brake cylinders, controlling-valves interposed between the said auxiliary and brake cylinders for governing the flow of air from the former to the latter and an engineer's valve comprising a fixed contact member, a movable contact member, and a bridge attachment on one of the contact members whereby an open circuit is maintained during the movement in one direction of the said movable contact member.

3. In an air-brake system, the combination of an auxiliary reservoir, a brake-cylinder, a controlling-valve through which communication is provided from said auxiliary reservoir to said brake-cylinder, a valve-rod forming part of said controlling-valve and having a core, a solenoid arranged to receive said valve-rod core; said valve-rod core having a conical member associated therewith and said solenoid being provided with a conical-shaped recess to receive said conical member, substantially as set forth.

4. In an air-brake system having controlling-valves interposed between the auxiliary and the brake cylinders for governing the flow of air from the former to the latter, the combination of controlling-valves, solenoids and an engineer's valve having a lever, a contact-arm carried by said lever, a fixed contact-arm supported by said engineer's valve and having electrical connection with said

solenoids, and a bridge member surmounting said fixed contact-arm.

5. In an air-brake system, the combination of auxiliary reservoirs, brake-cylinders, controlling-valves to govern the flow of air from the auxiliary reservoirs to the brake-cylinders, and an engineer's valve having a lever, a contact-arm carried by said lever, a fixed contact-arm supported by said engineer's valve and having electrical connection with the controlling-valves, and a bridge member surmounting said fixed contact-arm.

6. In an air-brake system having a series of electrically-operated controlling-valves interposed between the auxiliary reservoirs and braking-cylinders, the combination of a plurality of solenoids, having longitudinally-movable cores for operating the controlling-valves and an engineer's valve with a lever having contact means for operating the controlling-valves, and a bridge member mounted on said valve by means of which the contact means are thrown out of action during the return movement of the lever to its inoperative position.

7. In an air-brake system, the combination of auxiliary reservoirs and brake-cylinders, controlling-valves through which communication is provided from said auxiliary reservoirs to said brake-cylinders, solenoids associated with said controlling-valves and through the medium of which the valves are opened, an engineer's valve having a lever, a contact-arm carried by said lever, a fixed contact-arm supported by said engineer's valve and having electrical connection with said solenoids, and a bridge member surmounting said fixed contact-arm, substantially as set forth.

8. In an air-brake system, the combination of auxiliary and brake cylinders, controlling-valves interposed between the former and the latter and an engineer's valve comprising a fixed contact member, a movable contact member and a bridge attachment to said fixed contact member so arranged that after the movable contact member has made a full forward movement, it may be returned to its initial position without again completing the electric circuit through which the controlling-valves are operated.

JAY NOBLE.

In presence of—
NELLIE V. ALEXANDER,
BLANCHE HOGAN.