G. H. LUTZ.

SYSTEM OF OPERATING STEAM RAILWAY TRAINS.

APPLICATION FILED APR. 21, 1910.

1,030,669. **Patented June 25, 1912.**

2 SHEETS—SHEET 1.

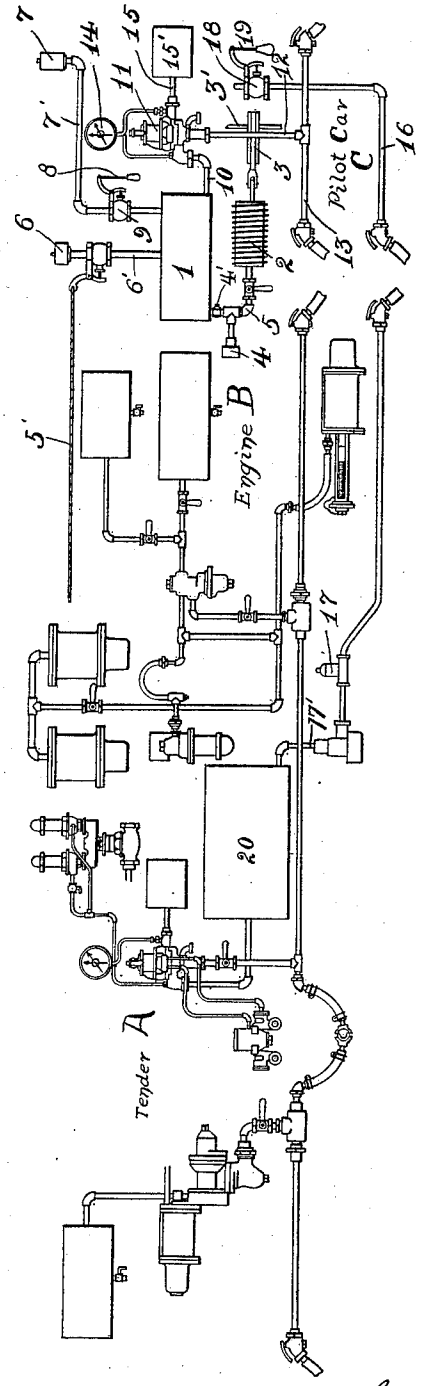

FIG. 1.

Witnesses.

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2 SHEETS—SHEET 2.

FIG. 2.

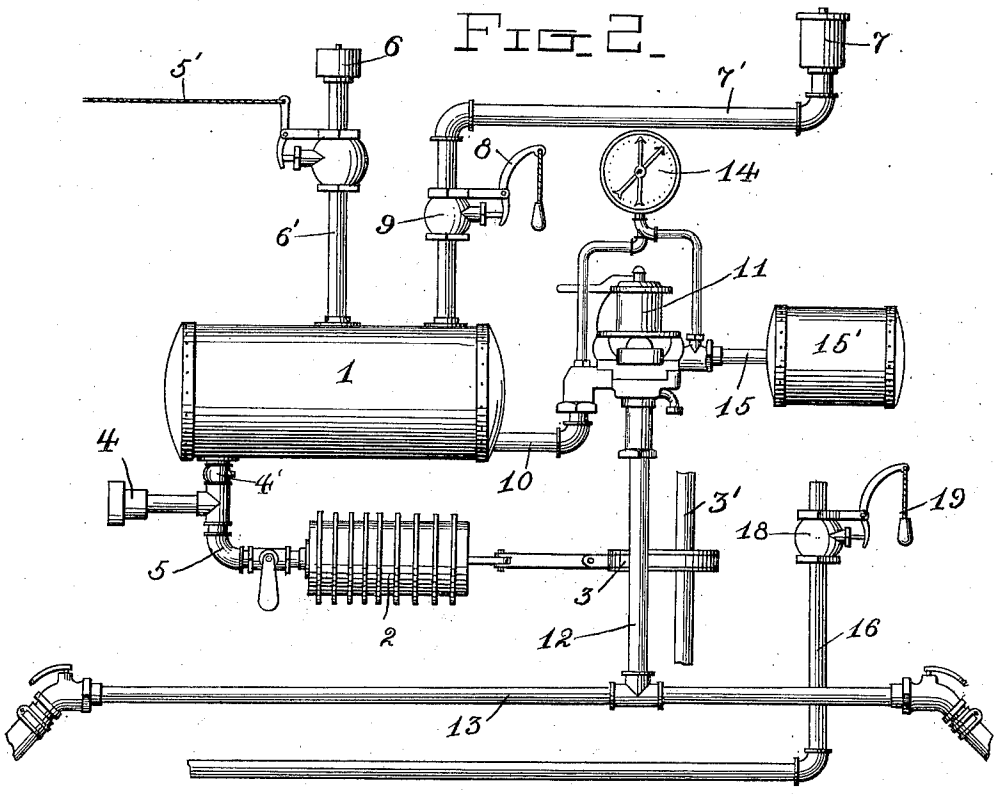


FIG. 3.

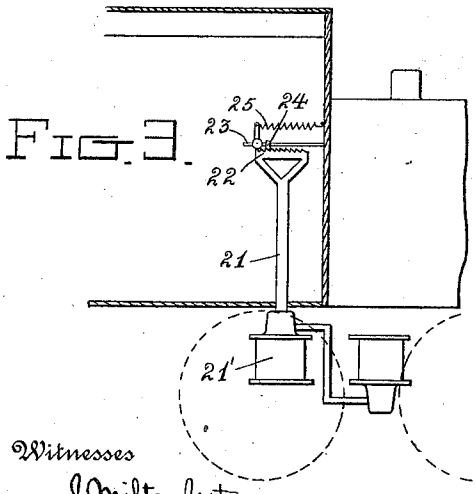
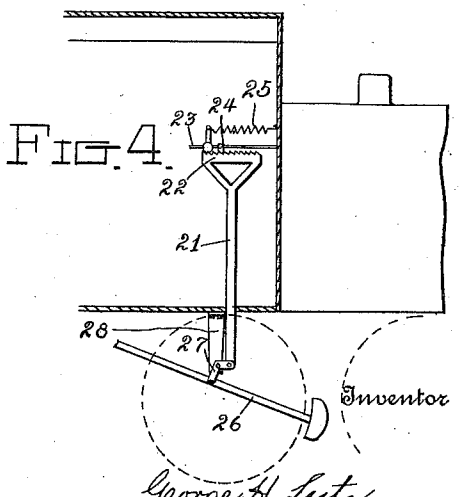


FIG. 4.



Witnesses

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SYSTEM OF OPERATING STEAM-RAILWAY TRAINS.

1,030,669. Specification of Letters Patent. Patented June 25, 1912.

Application filed April 21, 1910. Serial No. 556,895.

To all whom it may concern:

Be it known that I, GEORGE H. LUTZ, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Systems of Operating Steam-Railway Trains, of which the following is a specification.

This invention relates to an improved system of train propulsion, the primary object thereof being to transfer the locomotive from the front to the rear of the train in order to avoid the objectionable effects now experienced from having the locomotive in front.

In carrying out the invention, the means for developing the fluid pressure for the brakes, is located upon the locomotive which develops and applies the steam power for propelling the train and which is located at the rear end of the train, while the entire train is provided with braking apparatus that is supplied with braking pressure from said locomotive. But means for both applying the brakes throughout the train and thereafter releasing the brakes at will, either for slowing or stopping and starting the train, is located on a pilot car at the front end of the train under control of the pilot or master hand, whose position is necessarily at the front of the train and in which position he will have an unobstructed view of the track, and will not be subjected to the annoyances and disadvantages which, under certain conditions, frequently render it impossible for the present engineer to properly perform his duties. There will also be located on the engine a means for arresting the supply of steam to the locomotive engine, which arresting means will be so connected with the braking system as to be actuated simultaneously with the application of the brakes, either by having a mechanical connection with the brakes on the locomotive or having an actuating means under control of the train pipe pressure.

In the present invention, attention has been directed mainly toward the employment of what is generally known as standard equipment, so as to avoid as far as possible, difficulties or inconveniences that would naturally arise by any radical changes in the present system of operation. For these reasons the means of control will be largely pneumatic and incident to the air brake system. This controlling means will be employed with or without the use of additional pipe lines, so that the pilot or master hand can by applying the air brakes to the train incidentally shut off the steam supply to the engine in case the engineer fails to properly execute the signals given by the pilot or master hand. The pilot car will be especially equipped with the necessary controlling mechanism to permit the pilot or master hand to control the movements of the trains from a single position.

Further objects and advantages will appear from the following description with reference to the accompanying drawings wherein:—

Figure 1 is a diagrammatic view of a portion of the air brake and controlling system of a train embodying the present invention. Fig. 2 is a detail view of the controlling mechanism and connections with which the pilot car is equipped. Fig. 3 is a fragmentary view of an engine cab illustrating one method of connecting the throttle lever with the brake structure. Fig. 4 shows a modified form of the throttle control disclosed in Fig. 3.

In Fig. 1 it will be seen that only the equipment for the tender, engine and pilot car are disclosed, it being understood that any desired number of passenger or other cars may be interposed between the engine and pilot cars. The reference characters A, B and C indicate the tender, engine and pilot car respectively. The pilot car C which will be first described, is provided with a storage tank 1, which is of such dimensions that it will hold a sufficient quantity of compressed fluid, to allow performance of the various functions under control of the pilot or master hand. This tank 1 is supplied with fluid under pressure by means of the compressor pump 2 which is operated by an eccentric 3 or other suitable means connected to one of the axles 3′ of the pilot car, the said pumps being continuously in operation whenever the car is in motion, and made to apply pressure through the pipe 5 and check valve 4′. In order to prevent an excessive pressure within the tank 1, the pipe 5, which conveys the fluid or air from the pump 2 to the said tank, is provided with a safety relief valve 4. As soon as the pressure within the tank 1 reaches a predetermined point, the valve 4 is actuated so as to permit the air from the pump to exhaust to the atmosphere, but

as soon as the pressure is reduced below the predetermined point, the valve 4 is again automatically actuated so as to permit the air to pass into the tank 1, thus keeping a certain amount of compressed air constantly in the tank 1. In order to permit communication between the various cars and the pilot car, a signal cord 5′ extends, throughout the length of the train, being connected at its front end with the signal 6, located within the pilot car. The location of this cord within the intermediate cars is immaterial, as long as it is within reach of the passengers or train operators. The signal 6 in the present instances comprises a whistle, which is supplied with fluid from the tank 1, through the pipe 6′. To take the place of the ordinary locomotive whistle, the pilot car has a compressed air whistle 7 which extends out of said car, and is operated by means of the lever arrangement 8 connected with the valve 9, which in turn, controls the flow of air from the tank 1, through the pipe 7′ to the whistle.

The brake controlling system of the present invention, see Figs. 1 and 2 consists, primarily of the regular train line air pipe 13, which is supplied with air from the tank 1. A pipe 12 which is connected at one end to the train line pipe 13, passes into the "engineer's" valve 11. The term engineer's valve has a distinct meaning to those skilled in this art and it is therefore deemed unnecessary to enter into any detailed description thereof. The tank 1 is connected to the valve 11 by means of the pipe 10, the supply of air passing from the tank 1 through this pipe being under complete control of the operator or pilot by means of the engineer's valve 11. A double handed pressure gage 14 is located adjacent to the engineer's valve 11, this gage being connected to the pipes 10 and 15 respectively, whereby the pressure within the tank 1 and the train line air pipe 13 may be determined instantly at a single glance by the pilot. At one side of, and connected to the "engineer's valve", by means of the pipe 14, is a small equalizer tank 15′ which tends to equalize the flow of air through the valve 11 when it is opened by the pilot or master hand. The train line air pipe 13 extends beneath the cars throughout the length of the train having suitable couplings between the adjacent cars. It will be understood that the pilot car has the regular air brake equipment in order to check its own movement, this equipment being connected to the train line air pipe 13 at any suitable point. As shown in Fig. 1 this pipe may be connected up with the engineer's valve located in the engine or locomotive in substantially the same manner as it is connected with the engineer's valve in the pilot car. By connecting the train pipe 13 to the "engineer's valve" in the engine, the initial charging of the storage tank 1 of the pilot car may be readily obtained. For instance, when a pilot car is brought in for making up a train, the reservoir or tank 1 thereof will not be charged, but as soon as the car is coupled with the yard engine, or with the train engine, the said tank may be readily charged from the train pipe 13, by throwing the engineer's valve 11 to the "release and train line charging position" so that air will flow from the pipe 13, through pipe 12, valve 11, and pipe 10, to the tank 1.

It should be understood that the present invention does not contemplate the elimination of the engineer's services, but these services are to be subject entirely to the signals given by the pilot or master hand, which will be communicated back to the engine cab by means of a pipe 16, which carries a whistle 17, located adjacent to or within the engine cab. The operating valve 18 for this whistle is positioned within the pilot car and is provided with a pull cord 19 so that it may be easily operated by the pilot.

In order to avoid a complication of pipe connections with the tank 1 and to overcome the possibility of reducing the air pressure therein to such a degree that it would be unable to furnish sufficient pressure to operate the various parts heretofore described, the pipe 16 is connected to and supplied with fluid from the storage tank 20 carried by the engine. Intermediate the whistle 17 and the tank 20 a suitable reducing valve is located in the pipe 17′, whereby the pressure in the pipe 16 may be regulated.

From the above description it will be seen that the pilot from his position in the pilot car at the front of the train can communicate with the engineer at the rear of the train, through the signal 17, and by means of a prearranged set of signals, gives the necessary orders, however in some instances it is advisable to so connect the throttle valve, which regulates the steam supply of the engine, with the brake system, that it will automatically close and shut off the steam supply simultaneously with the applying of the brakes of the train.

Referring to Fig. 3, there is shown a fragmentary view of the engine showing the driver brake cylinders, of the ordinary construction, one of which is inverted in the present instance. This inverted brake cylinder 21′ has an upwardly projecting rod 21 connected to its piston. Secured to the top of this rod is a rack 22 which at times lies adjacent to the path of the throttle lever 23, and is adapted to be engaged by a depending pawl 24 secured thereto, whereby the throttle lever will be locked in its adjusted position. However, when the brakes are "set"

the rod 21 will be drawn downwardly thereby disengaging the pawl 24 from the rack 22, thus permitting the spring 25, which is secured to the engine cab and to the throttle lever respectively to draw the lever into position to close the throttle valve thus shutting off the steam supply to the engine simultaneously with the setting of the brake.

As shown in Fig. 4 the rod 21 may be connected to the brake rod and actuated positively instead of pneumatically as in Fig. 3. The elements used in this construction are substantially the same as those described in Fig. 4, with the exception of the connection between the rod 21 and its controlling mechanism. The connection between the brake rod 26 and the rod 21, Fig. 4, comprises a simple bell crank lever 27 secured to the lower end of the rod 21 and to the brake rod 26. It will be appreciated that this lever 27 is pivotally mounted on some stationary portion of the engine such as a bracket 28 which extends down from the cab floor.

In Fig. 3 it will be seen that when the brakes are applied the piston within the driver brake cylinder will be actuated in such a direction as to cause a disengagement between the pawl 24 and racks 22, while in Fig. 4, the action of the brake rod will positively control the movement of the rack 22 either throwing it out of engagement with pawl 24, or into a position to be engaged by said pawl.

I claim:—

1. In a system of steam locomotive railway propulsion, the combination with a standard train equipment including a fluid pressure braking system, throughout the train and a steam locomotive at the rear end of the train, said locomotive having steam power-controlling and brake pressure developing and supplying mechanism; of a pilot car at the front end of the train having means through which to both apply and release brakes throughout the train.

2. In a system of steam locomotive railway propulsion, the combination with a standard train equipment including a fluid pressure braking system, throughout the train and a steam locomotive at the rear end of the train, said locomotive having steam power-controlling and brake pressure developing and supplying mechanism; of a pilot car at the front end of the train having means through which to both apply and release brakes throughout the train and also means for arresting the supply of steam to the propelling locomotive.

3. In a system of steam locomotive railway propulsion, the combination with a standard train equipment including a fluid pressure braking system, throughout the train and a steam locomotive at the rear end of the train, said locomotive having steam power-controlling and brake pressure developing and supplying mechanism; of a pilot car at the front end of the train having means through which to both apply and release brakes throughout the train, said pilot car also having a brake pressure developing apparatus located thereon.

The foregoing specification signed at Canton, Georgia this second day of April, 1910.

GEORGE H. LUTZ.

In presence of two witnesses:

F. M. LUTZ,

OLIVE FINCHER.