Jan. 1, 1924 1,479,062

A. GOTTSCHALK

SAFETY MECHANISM FOR DOORS

Filed Sept. 13, 1919 2 Sheets-Sheet 1

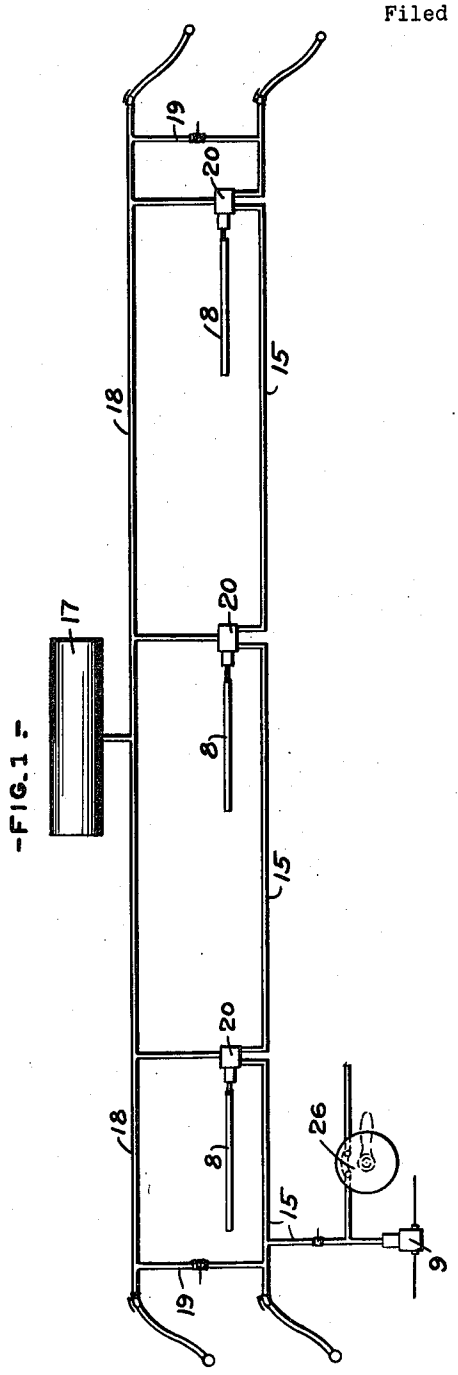


FIG. 1.

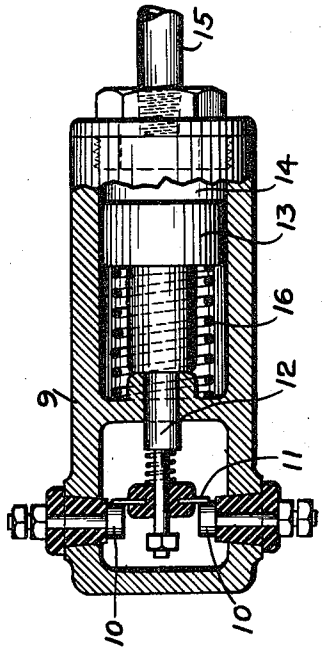


FIG. 3.

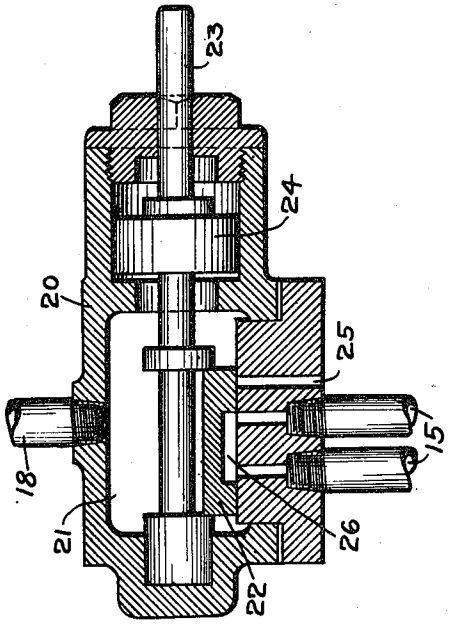


FIG. 2.

INVENTOR
Albert Gottschalk.
BY
Edward A. Wright.
ATTORNEY

Jan. 1, 1924 1,479,062

A. GOTTSCHALK

SAFETY MECHANISM FOR DOORS

Filed Sept. 13, 1919 2 Sheets-Sheet 2

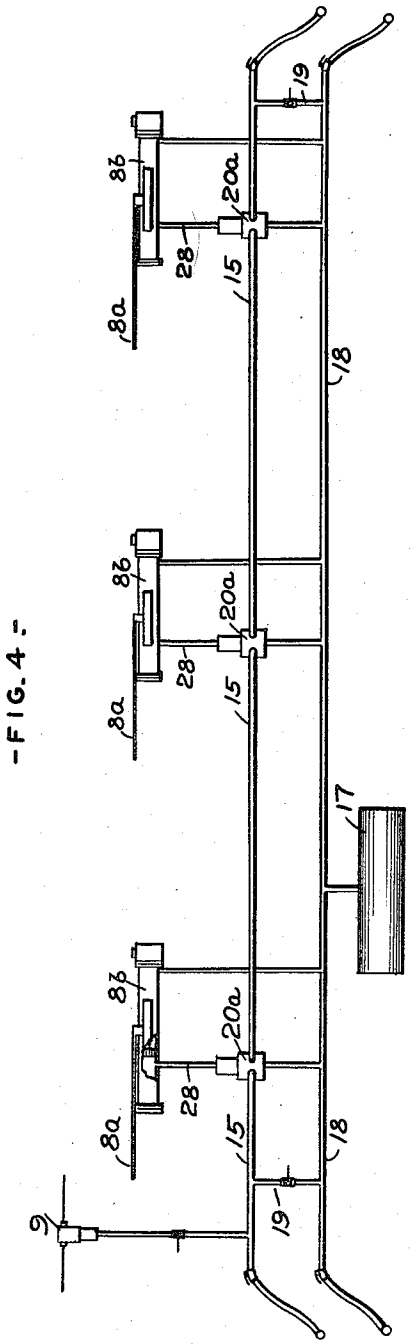


FIG. 4.

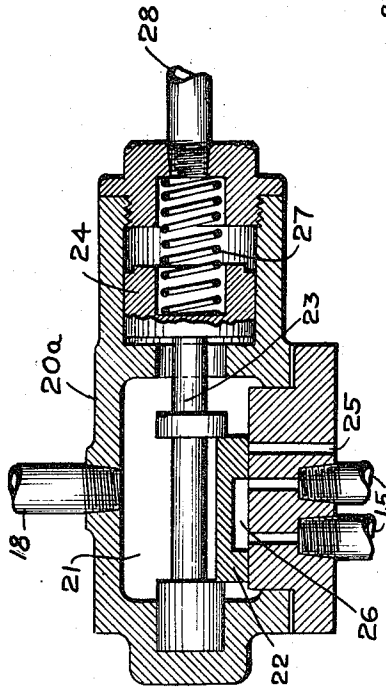


FIG. 5.

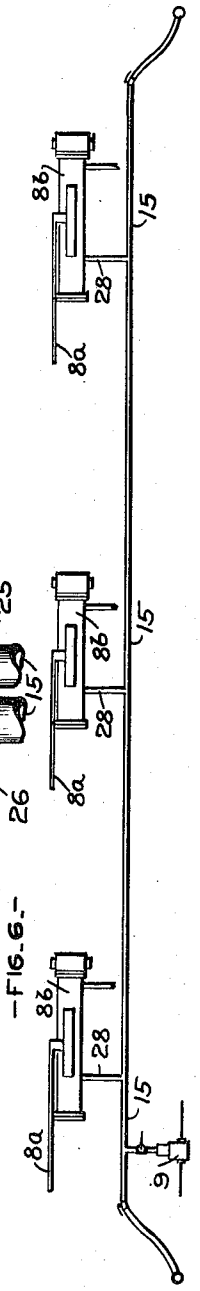


FIG. 6.

INVENTOR
Albert Gottschalk
BY
Edward A. Wright.
ATTORNEY

Patented Jan. 1, 1924. 1,479,062

UNITED STATES PATENT OFFICE.

ALBERT GOTTSCHALK, OF NEW YORK, N. Y., ASSIGNOR TO NATIONAL PNEUMATIC COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

SAFETY MECHANISM FOR DOORS.

Application filed September 13, 1919. Serial No. 323,657.

To all whom it may concern:

Be it known that I, ALBERT GOTTSCHALK, of New York, in the county of Bronx and State of New York, have invented a certain new and useful Improvement in Safety Mechanism for Doors, of which improvement the following is a specification.

This invention relates to safety mechanism to be used in connection with doors, and particularly car doors, where it is desired that the car or train should not start until all of the doors are closed. In apparatus of this type means have been employed for giving an indication or signal to the motorman, or operator, when all of the doors are closed, and such signals may be of various forms, either visual or audible. This indicating device may also be used for controlling, by suitable means, the power as applied for propelling the vehicle, car, or train, whereby it will be impossible for the operator to start until all of the doors are closed. With this control device the motorman may turn his power controller to running position when the car has stopped, and the doors are open; then as soon as the last door is closed, the device will operate automatically to apply the power and start the car promptly and without delay.

Such a device for controlling the application of the power, or for giving the indication to the motorman, may be termed an indicating or control device, and may be embodied in various different forms.

The object of my invention is to provide an improved device of this character which shall be positive, accurate, and reliable in its operation, and adapted to be applied to one or more doors, or to one or more cars of a train, whether the doors are operated manually, or by motors, and either singly or collectively, or separately and independently by the guards or platform men, as desired. Broadly stated, my improvement may be said to comprise an indicating or control device and fluid pressure means governed by the position of the doors for operating the same, whereby the device is automatically operated to the starting position when the door, or all of the doors, is or are moved to the closed position, and is otherwise operated when the door, or any one or more of the doors, is or are opened or moved away from the closed position. Any suitable or preferred form of means governed by the position or movement of the door, either directly or indirectly, may be employed for controlling the fluid pressure for operating the indicating or control device.

In the accompanying drawing: Figure 1 is a diagram illustrating a car equipment embodying my improvement as applied to a plurality (three) of doors; Fig. 2, a sectional view of one form of valve device governed by the position of the door; Fig. 3, a sectional view of one form of fluid pressure operated indicating or control device; Fig. 4, another diagram showing a modification in which the doors are operated by fluid pressure motors; Fig. 5, a sectional view of the governing valve employed in Fig. 4; and Fig. 6, a diagram showing another modification.

In the class of service for which my improvement is particularly designed, such as cars or trains operating on the multiple-unit principle, as in the traffic on subways, elevated, and inter-urban railroads, the cars are usually provided with a number of doors on each side, and in the diagram, Fig. 1, I have illustrated three such doors, 8, but it will be understood that in accordance with my invention, one or any number of doors may be employed, the same being suitably connected up to govern the operation of the indicating or control device, 9. While this device may also assume various forms, I prefer to illustrate the same as an electric switch having fixed contacts, 10, and a movable contact, 11, carried by the stem, 12, of a piston, 13, mounted in cylinder, 14, and actuated by fluid pressure admitted through pipe, 15, and by a spring, 16, (see Fig. 3). The electric switch may serve to control the operation of a signal, or the application of power for propelling the car, or both, as will be readily understood, and these devices are usually located at the end of the car, or in the motorman's cab, it also being understood that ordinarily only one of such devices is cut in for operation upon the car or train. The pipe, 15, is shown as extending the length of the car, and provided with suitable hose and couplings for connecting the same to the corresponding pipe on adjoining cars of the train, as will be readily understood. There is also indicated a source of fluid pressure, such as reservoir, 17, and supply pipe, 18, which may also extend through the train by the usual couplings, and is pro-

vided with any suitable means for supplying fluid to the pipe or conduit, 15, such as branch pipes, 19, having cut out cocks.

One form of valve device, 20, governed by the position or movement of the door for controlling the pressure through pipe, 15, to the indicating or control device is shown in Fig. 2, and comprises a casing having a valve chamber, 21, containing a valve, 22, for controlling communication through the pipe, 15, and operated by a stem, 23, extending outside of the casing. The stem is adapted to be engaged by the door, 8, or any other part moving with the door, in such a manner that when the door moves to its closed position, the valve is moved thereby to its position for opening communication through the pipe, 15, that is, the two sections of the pipe are connected together through the cavity, 26, in the valve, as indicated in Fig. 2. Any suitable means may be provided for closing the valve and cutting off communication through the pipe when the door is opened or moved away from its closed position. For such purpose, I have shown a piston, 24, mounted on the stem, 23, of the valve, and subject on one side to the fluid pressure in the valve chamber, 21, admitted from the supply pipe, 18. The chamber at the other side of the piston is open to the atmosphere through the opening around the loose fitting stem, 23. When the door or other moving part recedes from the stem, 23, the fluid pressure acting on piston, 24, immediately moves the valve to its other position in which communication from one section of pipe, 15, to the other is cut off. The valve device may also have an exhaust port, 25, which, in this position of the valve, is connected by the cavity, 26, in said valve, to the section of the pipe, 15, leading toward the indicating or control device, for the purpose of releasing the fluid pressure therefrom.

With this construction, if there is only one door to be operated, the governing valve is located in the pipe, 15, between the indicating or control device and the source of fluid pressure supply, and, in like manner, if there are a plurality of doors, the supply of fluid to pipe, 15, is located beyond the last one of the governing valves, so that all of the said governing valves, one for each door, shall be located along the pipe, 15, between the source of supply of fluid and the indicating or control device, and each governing valve controls communication through said pipe. It will, therefore, be seen that when all of the doors have reached the closed position, communication will be opened throughout the pipe, 15, by the governing valves at the respective doors, so that fluid will flow to the indicating or control device and act on its piston, 13, to close the electric switch member, 11. If, however, any one of the doors should not be closed, the governing valve at such door would remain closed, and cut off communication through the pipe, 15, so that fluid could not be admitted to the piston of the control switch, and the spring, 16, would hold said switch in its open position.

When the car or train comes to a stop, and any one or more of the doors are opened, fluid is then released from the piston, 13, and pipe, 15, through the exhaust port, or ports, 25, of such valves as are shifted, and the spring, 16, then returns the indicating or control switch to its other position until all of the doors are again closed, when the car may again proceed. If desired, an additional hand release valve, 26, may be connected to the pipe, 15, at or near the indicating or control device for exhausting fluid therefrom manually at such times as the doors are opened after the train has come to a stop, and such valve may or may not be the same valve as is employed for controlling the opening and closing of the doors. While it is not ordinarily necessary to employ such manually controlled exhaust valve where the governing valves, 20, are provided, with the exhaust ports, 25, it may be used if preferred, and in some cases the exhaust ports, 25, may be dispensed with.

It will be evident that the supply pipe, 18, may be connected to the pipe, 15, by merely attaching their couplings together at the end of the car or train, and this will serve the purpose of the cross over pipes, 19. If the latter are employed, however, all except the one at the end of the car or train will ordinarily be cut out.

In the modification shown in Figs. 4 and 5, I have illustrated my improvement as applied in connection with doors operated by a well known standard form of fluid pressure motor, 8^b, having a swinging arm, 8^a, adapted to be attached to the door. With this form of fluid pressure motor, the piston is moved to one position for closing the door, and to its opposite position for opening the door in the usual way, and, according to one feature of my improvement, the governing valve may be actuated by fluid pressure controlled by the movement of the motor piston. For this purpose, a pipe, 28, communicates with a port in the motor cylinder, so located as to be opened when the motor piston reaches its closed door position whereupon fluid from the motor cylinder flows through pipe, 28, to the governing valve device, 20^a. This device, as shown in Fig. 5, is substantially the same as that of Fig. 2 for controlling communication through the pipe, 15, except that instead of the valve, 22, being actuated by a direct engagement of the door or other part, with the stem, 23, fluid from pipe, 28, is admitted to the outer side of piston, 24, and, co-operating with spring,

27, overcomes the fluid pressure on the opposite side of said piston, and moves the same and the valve, 22, to its open position for establishing communication through the pipe, 15.

When the motor piston moves away from its closed position, the fluid pressure from pipe, 28, and the outer side of piston, 24, is exhausted to the atmosphere, and the pressure in the valve chamber, 21, acting on piston, 24, overcomes the spring, 27, and moves the valve to its closed position to cut off communication through pipe, 15, and to open the exhaust port, 25, from the section of pipe, 15, in advance of the valve, to the atmosphere. In other respects, the operation of this modification is the same as that before described with reference to Figs. 1, 2 and 3.

In the modification shown in Fig. 6, I have illustrated a simple form of my improvement, in which the separate governing valve for each door is eliminated, and the pipe, 28, from the opening in the motor cylinder, is connected directly to the pipe, 15, leading to the piston of the indicating or control device, 9. In this construction, when one door motor moves to closed position, fluid pressure is supplied to the pipe, 15, but as long as one or more of the other door motors have not reached the closed position, the fluid from said pipe, 15, escapes through the pipes, 28, of such motors, so that pressure acting on the piston, 13, of the indicating or control device, 9, does not accumulate sufficiently to actuate said device. When, however, all of the door motors have moved to closed position, the escape of fluid is stopped, and the pressure immediately accumulates on piston, 13, and operates the device to its starting position.

From the foregoing, it will now be apparent that my improvement has the advantage of providing a positive and reliable indication or control, regardless of the system under which the doors may be operated, that is, whether the doors are all operated collectively from a single point, as for instance, by the motorman, or operated selectively, as where the doors of each car may be operated by a guard or conductor, or operated single and independently, as by a guard or platform man stationed at each door. In all cases, the clear indication or control for starting will not be given until all of the doors are closed. It will also be obvious that the indication for one, or any given number of doors upon one or more cars of the train may be given upon each car or for any number of cars, as desired.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a safety mechanism adapted to effect control of an associated power motor, the combination with a door, and a motor for actuating said door, of a fluid pressure operated indicating or control device, and means governed by the movement of the door actuating motor for varying the fluid pressure acting on said device.

2. In a safety mechanism adapted to effect control of an associated power motor, the combination with a door, and a motor for actuating said door, of a fluid pressure operated indicating or control device, and means governed by the movement of the door actuating motor to close the door for admitting fluid under pressure to said device to thereby automatically place said power motor into operation.

3. In a safety mechanism, the combination with a door, and a motor for actuating said door, of a fluid pressure operated indicating or control device, and means governed by the movement of the motor to close the door for admitting fluid to said device, and by the movement of the motor to open the door for releasing fluid from said device.

4. In a safety mechanism, the combination with a door, and a fluid pressure motor for actuating said door, of a fluid pressure operated indicating or control device, a valve for controlling a supply of fluid to said device, a piston normally subject to fluid pressure for holding the valve in one position, and means governed by the movement of the motor for varying the fluid pressure on one side of said piston, to move said valve to another position.

5. In a safety mechanism, the combination with a door, of a fluid pressure operated indicating or control device, a valve for controlling a supply of fluid to said device, a piston connected to said valve and normally subject to fluid pressure on one side for holding the valve in one position, and means governed by the movement of the door to closed position for actuating said valve to another position.

6. In a safety mechanism, the combination with a door, and a fluid pressure motor for actuating said door, of a fluid pressure operated indicating or control device, and means governed by the movement of the motor piston to its closed position for admitting fluid to said control device.

7. In a safety mechanism, the combination with a plurality of doors, of a fluid pressure operated indicating or control device, a fluid pressure conduit leading from a source of supply to said device, a valve for said conduit at each door, and means governed by the movement of the doors to closed position for opening said valves.

8. In a safety mechanism, the combination with a plurality of doors, of a fluid pressure operated indicating or control device, a fluid pressure conduit leading from a source of supply to said device, a valve for said con-

duit at each door, and means governed by the movement of the doors to closed position to open said valves, and by movement of the doors away from closed position to close said valves.

9. In a safety mechanism, the combination with a plurality of doors, of a fluid pressure operated indicating or control device, a fluid pressure conduit leading from a source of supply to said device, a valve at each door, and having one position for opening communication through said conduit and another position for closing said communication and opening an exhaust from one section of said conduit, and means governed by the movement of the door to and from its closed position for operating said valves, said valves being located in the conduit between said device and the source of supply.

10. In a safety mechanism, the combination with a plurality of car doors, of a fluid pressure operated indicating or control device, a fluid pressure train pipe connected to said device, a valve for each car door controlling communication through said train pipe, and means for supplying fluid to said pipe, said valves being located between said device and the source of supply.

In testimony whereof I have hereunto set my hand.

ALBERT GOTTSCHALK.