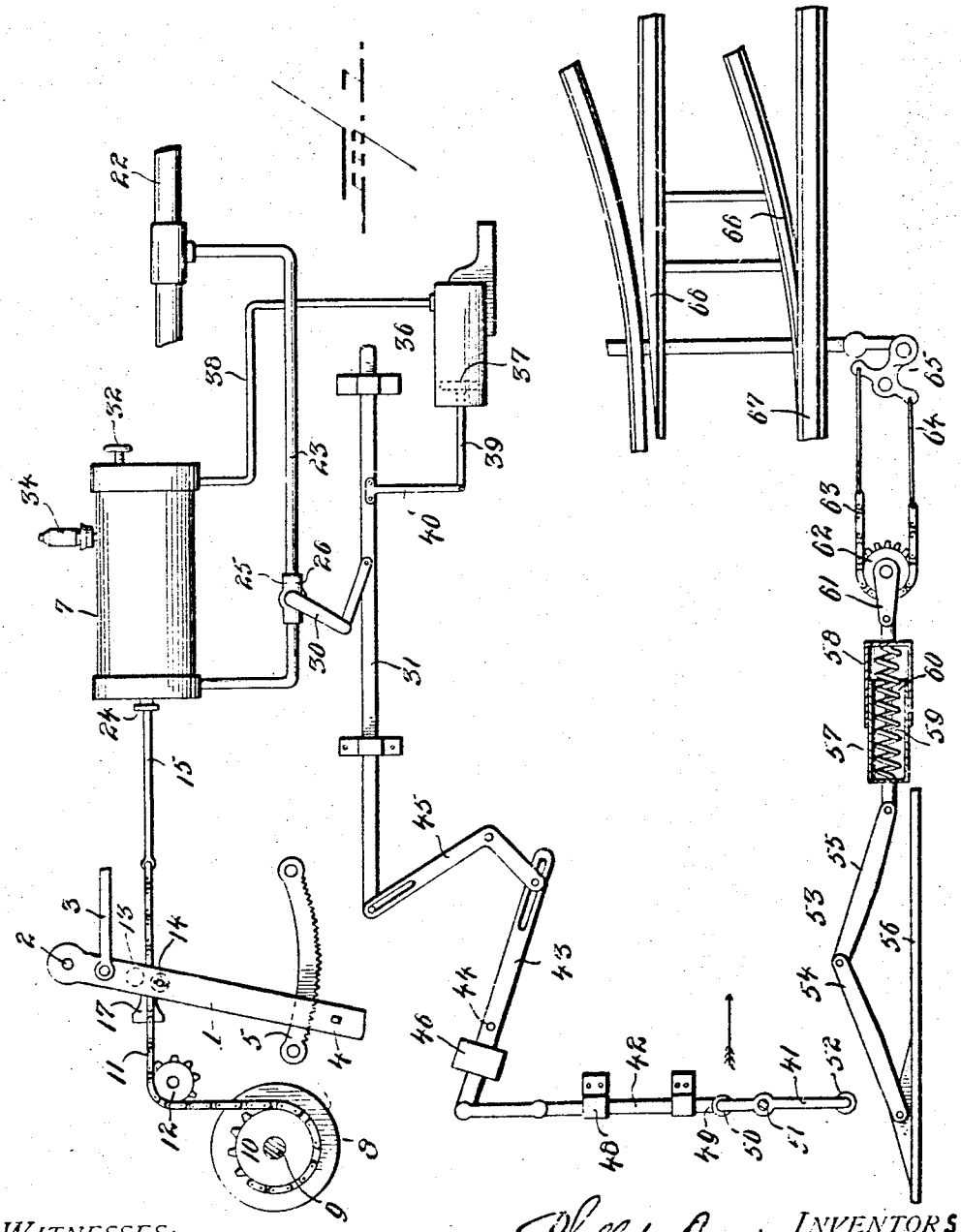
No. 845,727. PATENTED FEB. 26, 1907

P. DEWITT & E. J. CLARKE.

SAFETY DEVICE FOR RAILROADS.

APPLICATION FILED MAR. 10, 1906.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 2.

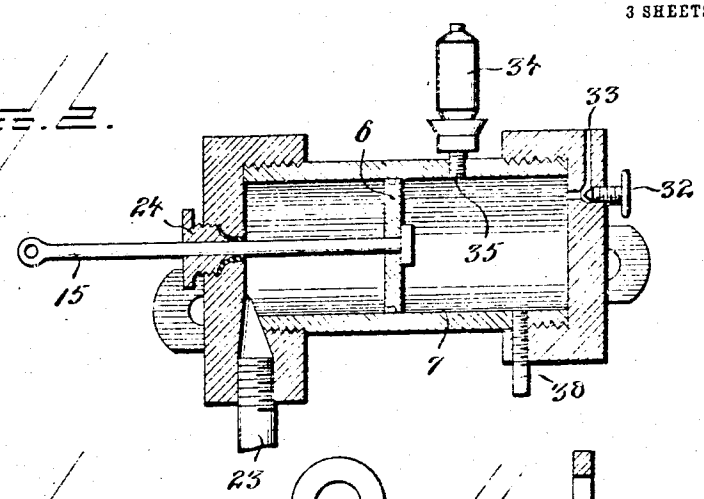


Fig. 3.

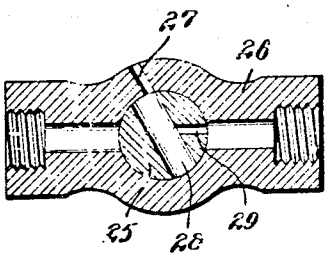


Fig. 4.

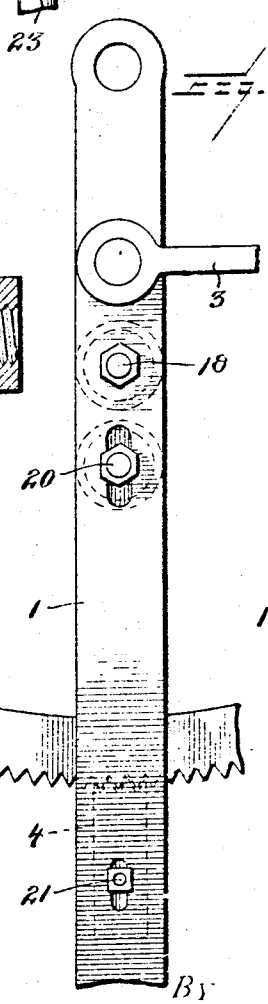
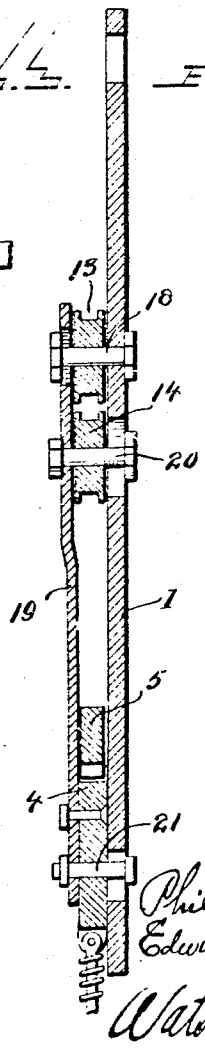


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 7.

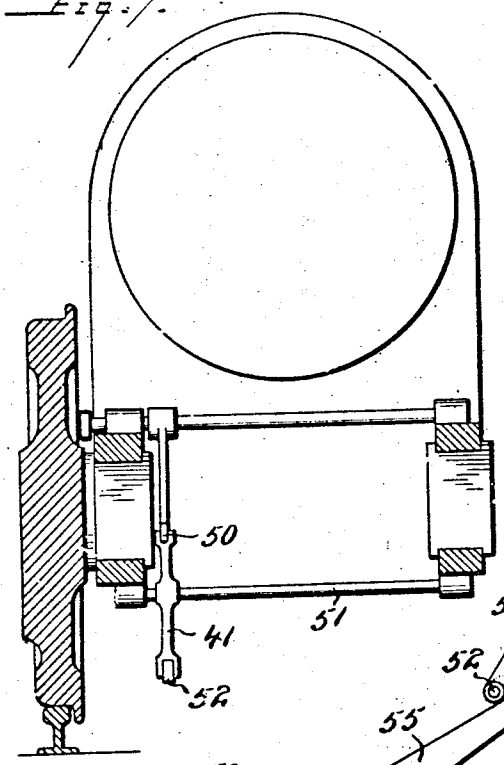


Fig. 8.

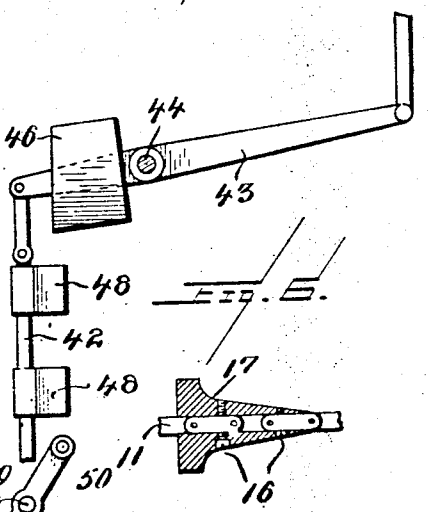


Fig. 6.

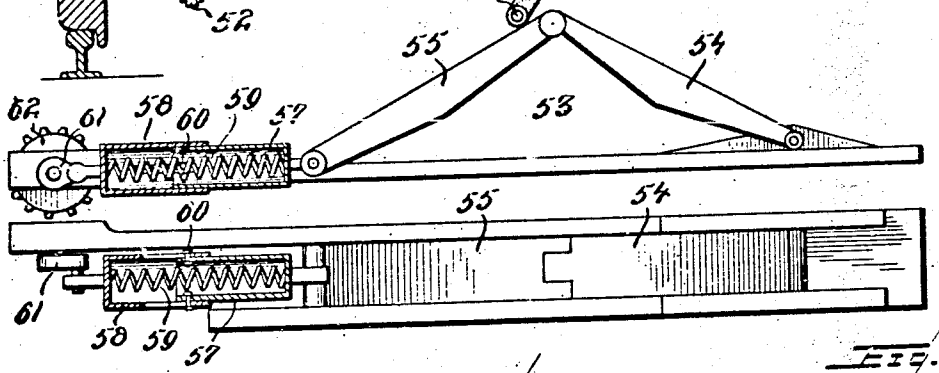


Fig. 9.

Fig. 10.

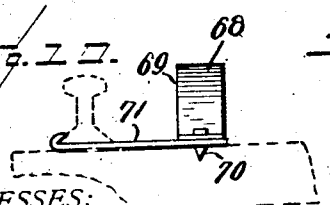
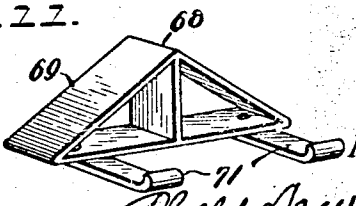


Fig. 11.



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PHILIP DEWITT AND EDWARD J. CLARKE, OF SCRANTON, PENNSYLVANIA.

SAFETY DEVICE FOR RAILROADS.

No. 845,727. Specification of Letters Patent. Patented Feb. 26, 1907.

Application filed March 10, 1906. Serial No. 305,314.

To all whom it may concern:

Be it known that we, PHILIP DEWITT and EDWARD J. CLARKE, citizens of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Safety Devices for Railroads, of which the following is a specification, reference being had therein to the accompanying drawing.

Our invention relates to improvements in safety devices for railroads, and more particularly to one by means of which a train may be automatically stopped whenever a switch is improperly set or the target of a semaphore or other signal is set to indicate "danger," or whenever it is desired to stop a train at a certain point either regularly or in a case of emergency.

One object of the invention is to provide a simple and practical device or apparatus of this character which when operated will simultaneously actuate the locomotive throttle-lever to close the throttle-valve, actuate the engineer's brake-valve to apply the air-brakes on the train and sound a whistle or other signal to warn the engineer, trainmen, or other persons.

Another object of the invention is to provide a device or apparatus of this character with means for automatically resetting its parts after each operation.

With the above and other objects, which will appear as the nature of our invention is better understood, are accomplished by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a diagrammatic view of our improved safety device or apparatus. Fig. 2 is a sectional view through the operating or main cylinder. Fig. 3 is a side elevation of the throttle-valve lever. Fig. 4 is a longitudinal sectional view through the same. Fig. 5 is a sectional view through the controlling air-valve. Fig. 6 is a detail sectional view through the dog or block upon the chain for operating the throttle-valve lever. Fig. 7 is a detail vertical transverse sectional view through a portion of a locomotive-frame, showing the swinging latch device. Fig. 8 is a longitudinal sectional view of the stationary trip device and the parts of the latch shown in Fig. 7. Fig. 9 is a top plan view of the stationary trip device. Fig. 10 is an end view of a portable trip device, showing it in an operative position; and Fig. 11 is a perspective view of the portable trip device.

The present embodiment of our invention is adapted for use upon a steam-locomotive, and in the drawings the numeral 1 denotes the usual throttle-lever, pivoted at 2 and having the valve rod or stem 3 connected to it. Said lever is locked in an adjusted position by the usual sliding dog or pawl 4, which is forced into engagement with the segmental rack 5 by a spring and is disengaged by a pivoted handpiece (not shown) mounted upon the handle end of the lever in the usual manner. The lever is actuated by the movement of the piston 6 in a fluid-pressure cylinder 7, and the movement of said piston is also adapted to actuate the usual engineer's valve 8 of the air-brake system upon the train to move said valve from its "running position" to its "service-stop" position, so that the motive power is cut off and the brakes applied at practically the same time.

The stem 9 of the engineer's valve carries a sprocket-wheel 10, to which is attached one end of a sprocket-chain 11, which passes around a guide-wheel 12, through grooved rollers 13 and 14 upon the throttle-lever 1, and has its other end attached to the rod 15 of the piston 6. The chain 11 has adjustably secured upon it, by means of set-screws 16, a spreading-dog or wedge-shaped block 17, which is adapted to enter between the rollers 13 and 14 to first force them apart to disengage the dog or pawl 4 from the rack 5 and to then cause the lever to move with the chain as the piston moves in the cylinder 7.

As shown in Figs. 3 and 4, the journal 18 of the roller 13 is fixed to the lever 1 and projects through a slot in a rod 19, which has fixed to it the dog or pawl 4 and the journal 20 of the other roller 14. The journal 20 has one of its ends projecting through a slot in the lever 1, and the dog or pawl 4 also carries a pin or stud 21, which projects through a slot in the lever 1, so the said parts will be retained upon the lever and guided in their sliding movement. It will be seen that when the wedge-block or dog 17 is forced between the rollers 13 and 14 the rod 19 will be shifted to move the dog or pawl 4 against the tension of its actuating-spring and out of engagement with the rack 5 for the pur-

pose of releasing the lever and permiting it to be shifted to close the throttle-valve.

The piston 6 may be actuated by fluid-pressure from any source; but we preferably employ compressed air and take it from the usual train-pipe 22 of the air-brake system. A pipe or conductor 23 leads from the train-pipe to end of the cylinder 7, through which the piston-rod 15 extends, a stuffing-box 24 being provided for said rod to prevent the escape of air, and in said pipe 23 is provided a controlling-valve 25. The latter, as shown in Fig. 5, is in the form of a rotary plug adapted to turn in a casing 26, in which is formed a relief-port or vent 27. This plug-valve 25 is formed with a large transverse port 28 and a small angular relief-port 29, which parts are so arranged that when the valve is in one of its two positions the compressed air can pass through the pipe 23 from the train-pipe 22 to the cylinder 7, and when in the other of its two positions said pipe 23 will be closed and the relief-port 29 will be brought into alinement with that branch of the pipe 23 which leads to the cylinder, so that the air in the latter may escape slowly through said valve and the port 27 in its casing. The latter is the normal position of the valve, and this relief is thus provided to enable the piston to be returned to its normal position after each operation and to enable the throttle-lever and the engineer's valve to be operated without interference from the attachments upon them. It will be observed that this feature and the provision of the chain or flexible connection 11 will permit the throttle-lever to be operated in the usual manner both before and after the device is operated and that the engineer's valve may be shifted to its "emergency position" after having been moved to its service-stop position by the operation of the invention. The valve 25 has upon its stem a crank-arm 30, which is loosely connected to a movable operating rod or element 31, suitably mounted upon the locomotive. Said rod 31 is operated by mechanism hereinafter described, mounted upon the locomotive, and in turn operated by trip or cam devices suitably located along the track traveled by the locomotive or other motor-vehicle upon which the controlling apparatus is mounted. Suitable means hereinafter set forth is also provided for automatically returning the valve to its normal position, which position is shown in Fig. 5. The movement of the piston 6 under the action of the compressed air admitted into one end of the cylinder 7 is cushioned by a screw or needle valve 32, provided in a relief-port or vent 33, located in the opposite end of the cylinder.

In order to notify the engineer or other attendant of the train that there is danger and that the apparatus has been operated, we provide a suitable alarm or signal for this purpose. This alarm or signal device may be of any description; but we preferably employ a whistle 34 of well-known form and located at a suitable point upon the cylinder 7, so that it will be sounded by the compressed air in said cylinder when the piston passes the inlet 35 of said whistle. When located as shown in Fig. 2, it will be sounded shortly before the piston reaches the limit of its stroke and after the throttle-lever and engineer's valve have been operated.

In order to reset the valve or return it to its normal position, we preferably employ a cylinder 36, in which its sliding piston 37 is actuated by compressed air or other fluid under pressure. As shown, it is operated by compressed air admitted into one end of its cylinder through a pipe 38, leading from the cylinder 7. Said pipe 38 opens into the cylinder 7 adjacent to its outer end, so that the compressed air is not admitted through said pipe until the piston 6 reaches the limit of its outward movement. The rod 39 of the piston 37 extends parallel with the rod or element 31 and is connected thereto for operation therewith by a bracket or arm 40 or by any other suitable means.

The means or mechanism for operating the rod 31, and hence the controlling air-valve 25, comprises a swinging latch 41, a gravity-bolt 42, and a lever 43. The latter is pivoted at 44 and is, as shown, connected to the rod or element 31 by a bell-crank 45, which has slot-and-pin connections between its arms and the adjacent ends of the lever 43 and the rod 31. The other arm of the lever 43 is weighted, as at 46, and suitably connected to the upper end of the bolt 42. Said bolt slides vertically in suitable guides 48 and has at its lower end a notch or seat 49. The bolt 42 is adapted to be forced downwardly by the weighted lever 43, and it is suspended in its elevated or normal position (shown in Fig. 1) by the latch 41, which has on its short upper end or arm a roller 50 to engage the seat 49. Said latch is secured to a transverse shaft 51, journaled in suitable bearings upon the under side of the locomotive-frame, so that its long arm, which carries a roller 52, hangs downwardly in the path of suitable operating devices located along the track. When the latch engages one of said operating devices, it is swung to the position shown in Fig. 7, so that its roller 50 leaves the seat 49 in the bolt 42 and permits the latter to drop under the action of the weighted lever 43, as shown in said figure. The movement of the lever 43 will, through the bell-crank 45, be imparted to the rod or bar 31.

The track device 53 (shown in Figs. 1, 8, and 9 of the drawings) for operating the latch 41 comprises a pair of longitudinally-disposed toggle-levers or arms 54 and 55,

mounted upon a base 56, secured upon cross-ties adjacent to the track-rails. The lever 54 has a fixed pivot in the base, and the lever 55 is pivotally connected to a cross-head which slides in guides in the base and has pivoted to it one of two telescoping casing sections or members 57 and 58, which inclose and are connected by a coil-spring 59. These casing members have a slot-and-pin guide connection 60 with each other, and the member 58 is connected to a crank 61 upon one end of a shaft mounted in said base and having on its opposite end a sprocket-wheel 62. The latter is engaged by a sprocket-chain 63, having its ends connected to wires 64, which lead to two arms of a bell-crank 65, the third arm of which latter is connected to a switch-point 66 in the track 67, over which the locomotive travels. It will be seen upon reference to Fig. 1 that when the switch-point is thrown so that the siding is open, or so that an oncoming train would pass upon the wrong track, the toggle-levers 54 and 55 will assume their angular position, (shown in said figure,) so that they will project into the path of the latch 41 and actuate the latter, and that when the switch is in its closed or proper position said levers 54 and 55 will assume a position parall l to the base 56 and will not project into the path of said latch. The latter position is the normal one, as will be understood. The spring 59 is sufficiently stiff to hold the levers in their angular positions, so that they actuate the latch without regard to the direction in which the train is passing, but at the same time relieves the parts of the shock and strain caused by the impact of the latch upon the rapidly-moving train. The device 53, or any other device for the same purpose, may be actuated by connections with the automatic signal apparatus of railroads, by manually-operated devices, or by any other means, so that the locomotive or train may be stopped automatically under any circumstances or condition.

In Figs. 10 and 11 of the drawings we have shown a portable operating device or trip 68, designed to serve the same office as the device 53. It is made portable to enable it to be carried by flagmen, trainmen, or others, and quickly placed in position along a track so as to automatically stop an approaching train which is in danger. It comprises a triangular-shaped cam 69, having upon its bottom spurs 70 to enter the cross-tie on which it is placed, and pivoted foldable hook-arms 71 to engage a track-rail, as shown in Fig. 9.

The operation of the invention is as follows: Assuming the parts of the apparatus upon the locomotive to be in their normal position (shown in Fig. 1) and the locomotive to be moving in the direction indicated by the arrow in said figure, when it is desired to automatically stop the train one of the trips or operating devices 53 68 is operated or set so that it is in the path of the latch 41. When the latter is tripped, the bolt 42 and weighted lever 43 will drop and actuate the rod 43 in one direction to open the air-valve 25 and move the piston 37 to the opposite end of its cylinder. When the compressed air enters the cylinder 7, the piston will be moved outwardly to close the throttle-valve and swing the engineer's valve to the "service-stop" position, as previously explained. The continued movement of the piston 6 will admit air to the whistle 34 and sound the same and finally admit air through pipe 38 into the cylinder 36 to return its piston to its normal position to close the air-valve 25 and also reset the lever 43, bolt 42, and latch 41, as will be readily understood.

While we have shown and described the preferred embodiment of the invention, it will be understood that we do not wish to be limited to the precise showing herein set forth, since various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described our said invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an automatic train-controlling apparatus, the combination of means for controlling the motive power, means for controlling the brake system, an alarm-whistle, a fluid-pressure cylinder and a piston therein for operating said motive-power-controlling means, and brake-system-controlling means for controlling the operation of said whistle.

2. In an automatic train-controlling apparatus, the combination of means for controlling the motive power, means for controlling the brake system, means for operating the said motive-power and brake-system controlling means, and fluid-pressure-operating means for automatically resetting the first-mentioned operating means.

3. In an automatic train-controlling apparatus, the combination of means for controlling the motive power, means for controlling the brake system, a fluid-pressure cylinder, a piston in the latter for operating said motive-power and brake-system controlling means, a valve for controlling the operation of said piston, means for actuating said valve, and means for automatically returning said valve and its actuating means to their normal positions.

4. In an automatic train-controlling apparatus, the combination of means for controlling the motive power, means for controlling the brake system, a fluid-pressure cylinder, a piston in the latter for operating said motive-power and brake-system controlling means, a valve for controlling the operation of said piston, a self-actuated operating

means for said valve, a latch for holding said valve-operating means against movement, and means for returning said valve and its operating means to their normal positions.

5. In an automatic train-controlling apparatus, the combination of means for controlling the motive power, means for controlling the brake system, a fluid-pressure cylinder, a piston in the latter for operating said motive-power and brake-system controlling means, a valve for controlling the operation of said piston, a self-actuated operating means for said valve, a latch for holding said valve-operating means against movement, a second fluid-pressure cylinder, and a piston in the latter for resetting said valve and its operating means.

6. In an automatic train-controlling apparatus, the combination of means for controlling the motive power, means for controlling the brake system, a fluid-pressure cylinder, a piston in the latter for operating said motive-power and brake-system controlling means, a valve for controlling the inlet and outlet of a fluid under pressure to and from one end of said cylinder, and means for operating said valve.

7. In an automatic train-controlling apparatus, the combination of means for controlling the motive power, means for controlling the brake system, a fluid-pressure cylinder, a piston in the latter for operating said motive-power and brake-system controlling means, a valve for controlling the inlet and outlet of a fluid under pressure to and from one end of said cylinder, means for actuating said valve in one direction, and means for automatically returning said valve to its original position.

8. In an apparatus of the character described, the combination of means for controlling the motive power of the vehicle, means for controlling the brake system of the vehicle, a fluid-pressure cylinder, a piston therein, and a flexible connection between said piston and the motive-power and brake-system controlling means.

9. In an apparatus of the character described, the combination of a throttle-lever, an engineer's brake-valve, means for locking said throttle-lever, an operating element, a flexible connection between said element and said valve, an unlocking means for said lever and carried thereby, and a wedge or cam device upon said connection for successively actuating said lever-unlocking means and said lever.

10. In an apparatus of the character described, the combination of a throttle-lever, an engineer's brake-valve, a rack, a dog upon said lever to engage said rack, means for operating said rod to disengage it from said rack, a fluid-pressure cylinder, a piston therein, a flexible connection between said piston and said valve, and a wedge-block upon said connection for successively actuating said dog-operating means and said lever.

11. In an apparatus of the character described, the combination, with means for controlling the motive power and the brake system of a motor-vehicle, of an actuating element for said means, a weighted lever connected to said element, a sliding bolt actuated by said lever, and a swinging latch for holding said bolt retracted.

12. In an apparatus of the character described, the combination, with means for controlling the motive power and the brake system of a motor-vehicle, of an actuating element for said means, a weighted lever connected to said element, a sliding bolt actuated by said lever, a swinging latch having one end engaged with said bolt, means for tripping said latch, and means for resetting the same.

13. In an apparatus of the character described, the combination of means for controlling the motive power and the brake system of a motor-vehicle, a fluid-pressure cylinder, a piston therein for actuating said means, a second fluid-pressure cylinder, a piston in the latter, a pipe between one end of the first-mentioned cylinder and one end of said second cylinder, a valve for controlling the admission and exhaustion of a fluid under pressure to and from the other end of the first cylinder, an operating element, a connection between said element and said valve, and a connection between said element and the piston in said second cylinder.

14. In an apparatus of the character described, the combination of means for controlling the motive power and the brake system of a motor-vehicle, a fluid-pressure cylinder, a piston therein for actuating said means, a second fluid-pressure cylinder, a piston in the latter, a pipe between one end of the first-mentioned cylinder and one end of said second cylinder, a valve for controlling the admission and exhaustion of a fluid under pressure to and from the other end of the first cylinder, an operating element connected to said valve and the piston of said second cylinder, a self-actuated operating means for said element, and a latch for holding said self-actuated operating means against movement.

15. In an apparatus of the character described, the combination of means for controlling the motive power and the brake system of a motor-vehicle, a fluid-pressure cylinder, a piston therein for actuating said means, a second fluid-pressure cylinder, a piston in the latter, a pipe between one end of the first-mentioned cylinder and one end of said second cylinder, a valve for controlling the admission and exhaustion of a fluid under pressure to and from the other end of the first cylinder, an operating element, slidably-mounted connections be-

tween said element and said valve and piston in the second cylinder, a weighted lever connected to said element, a sliding bolt having a seat in its bottom and its upper end connected to said lever, and a swinging latch having antifriction devices in its ends, said device in its upper end being adapted to engage the seat in said bolt.

16. A trip device of the character described comprising toggle-levers, an operating element, and an elastic connection between said element and one of said levers.

17. A trip device of the character described comprising goggle-levers, a rotary element actuated by a switch or the like, and a connection between said element and one of said toggle-levers comprising telescoping members and a spring between said members.

18. A trip device of the character described comprising a base, a pair of toggle-levers, one of the latter being pivoted upon said base and the other having a sliding connection therewith, a shaft having a crank-arm, and a connection between said crank-arm and said sliding end of the toggle-lever, said connection comprising telescoping members, and a coil-spring between said members.

19. A portable trip device of the character described comprising a cam-body, a spur upon the same to enter a cross-tie, and an arm upon said body to engage a track-rail.

20. A portable trip device of the character described comprising a cam-body, a spur upon the same to enter a cross-tie, and a folding arm pivoted upon said body for engagement with a track-rail.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

PHILIP DEWITT.
EDWD. J. CLARKE.

Witnesses:
GEO. W. BUCKNAM,
HORTON E. KIMBLE.