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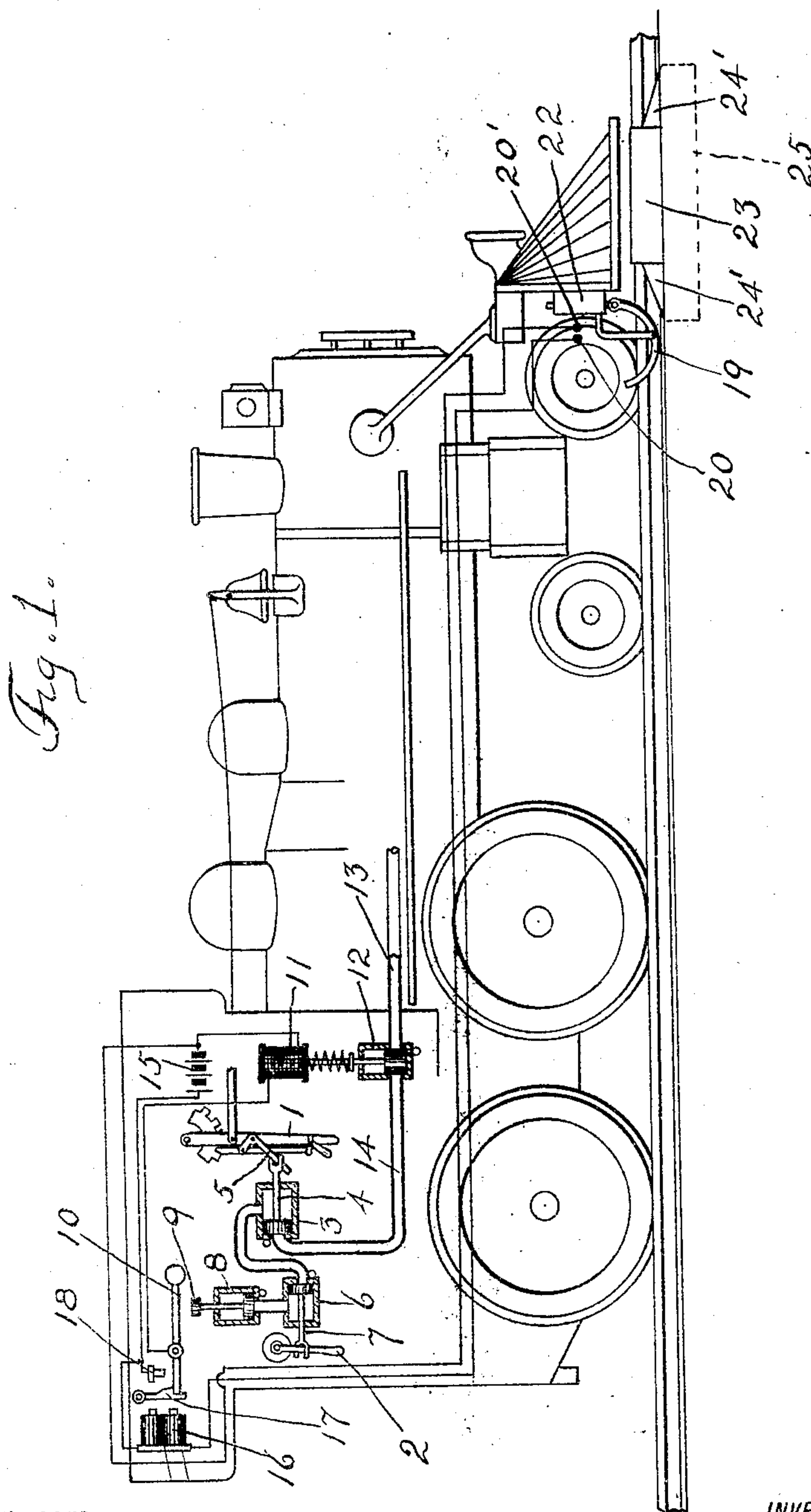
PATENTED JUNE 16, 1908.

J. H. LYNCH.

CIRCUIT CLOSER FOR AUTOMATIC TRAIN STOPS.

APPLICATION FILED MAY 2, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

C. W. Wischnie Jr.
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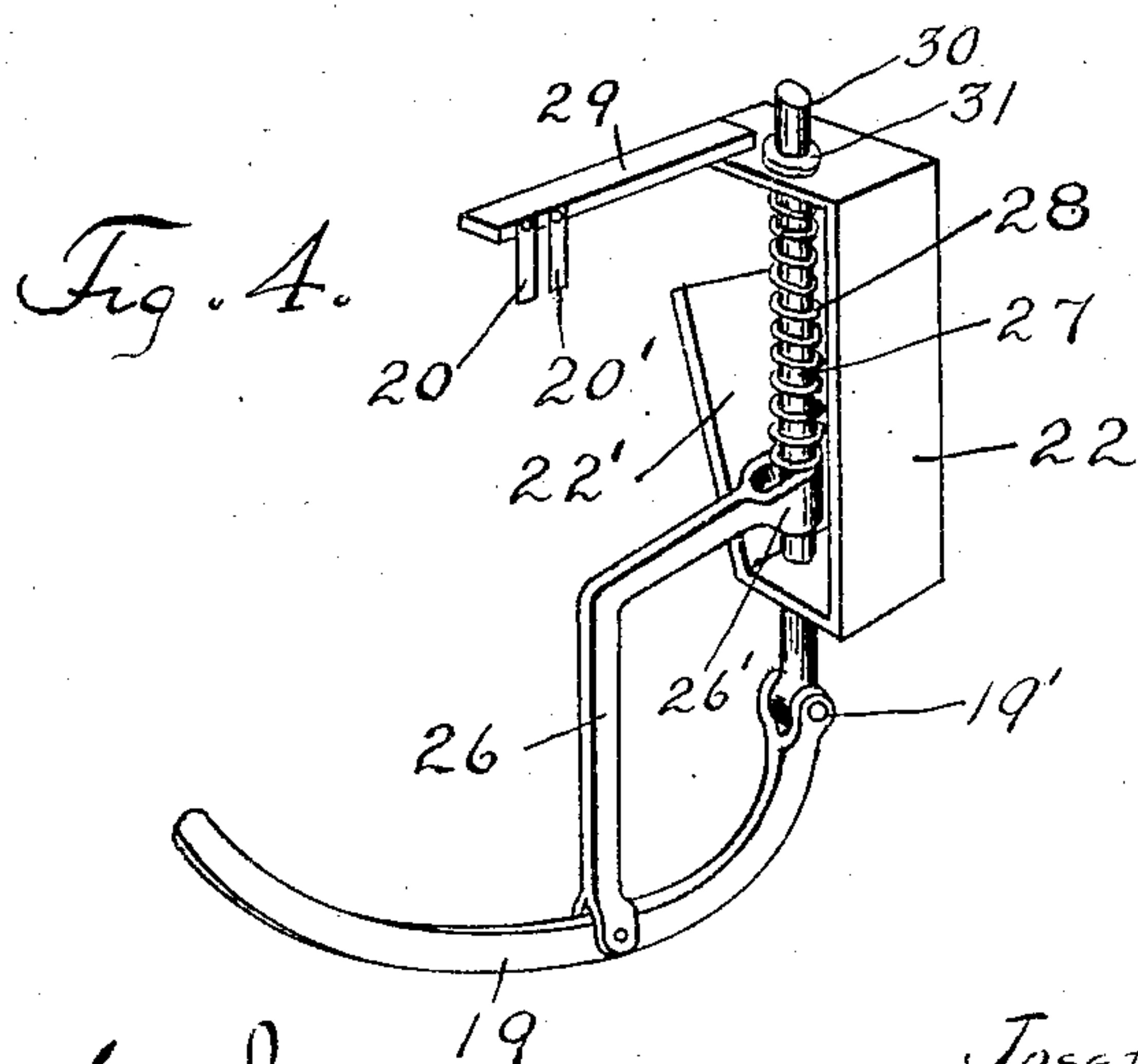
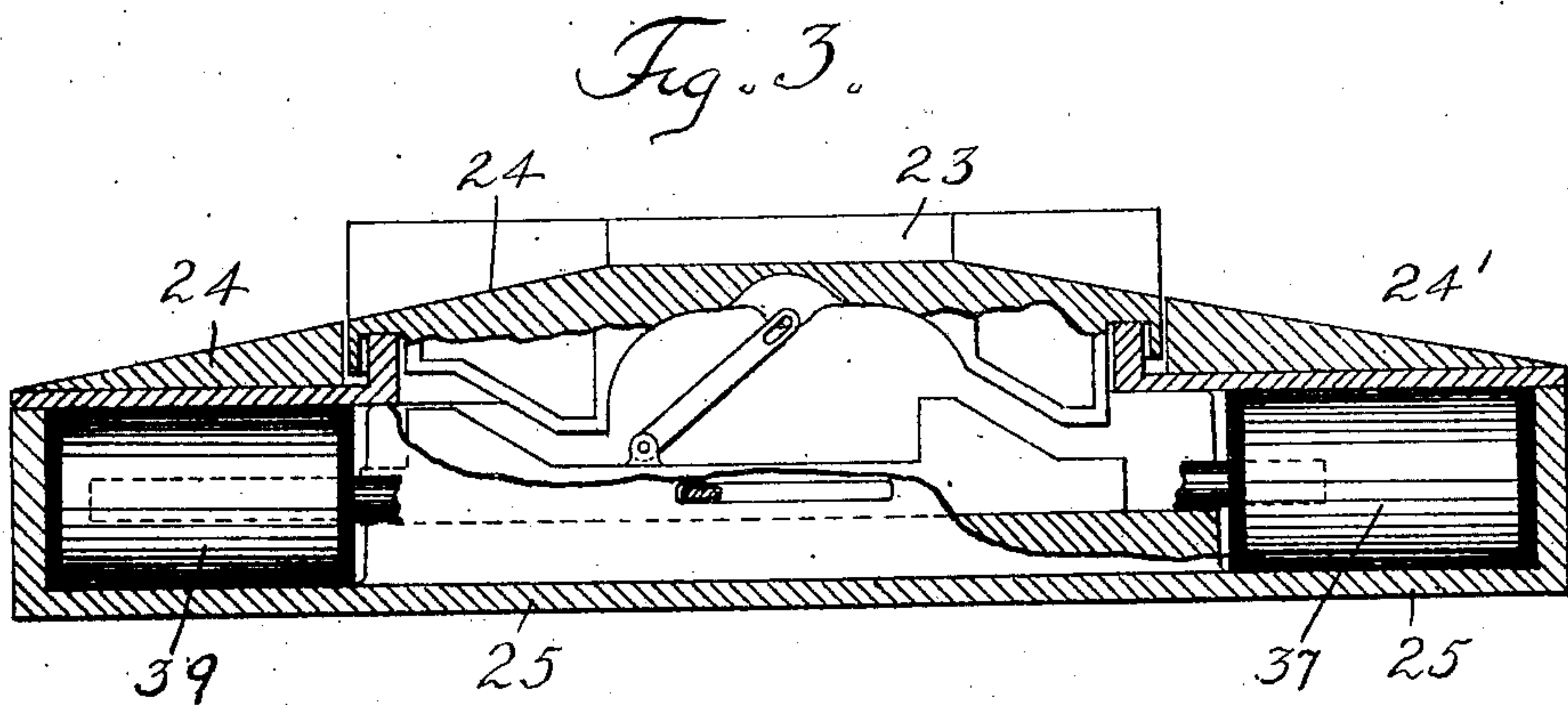
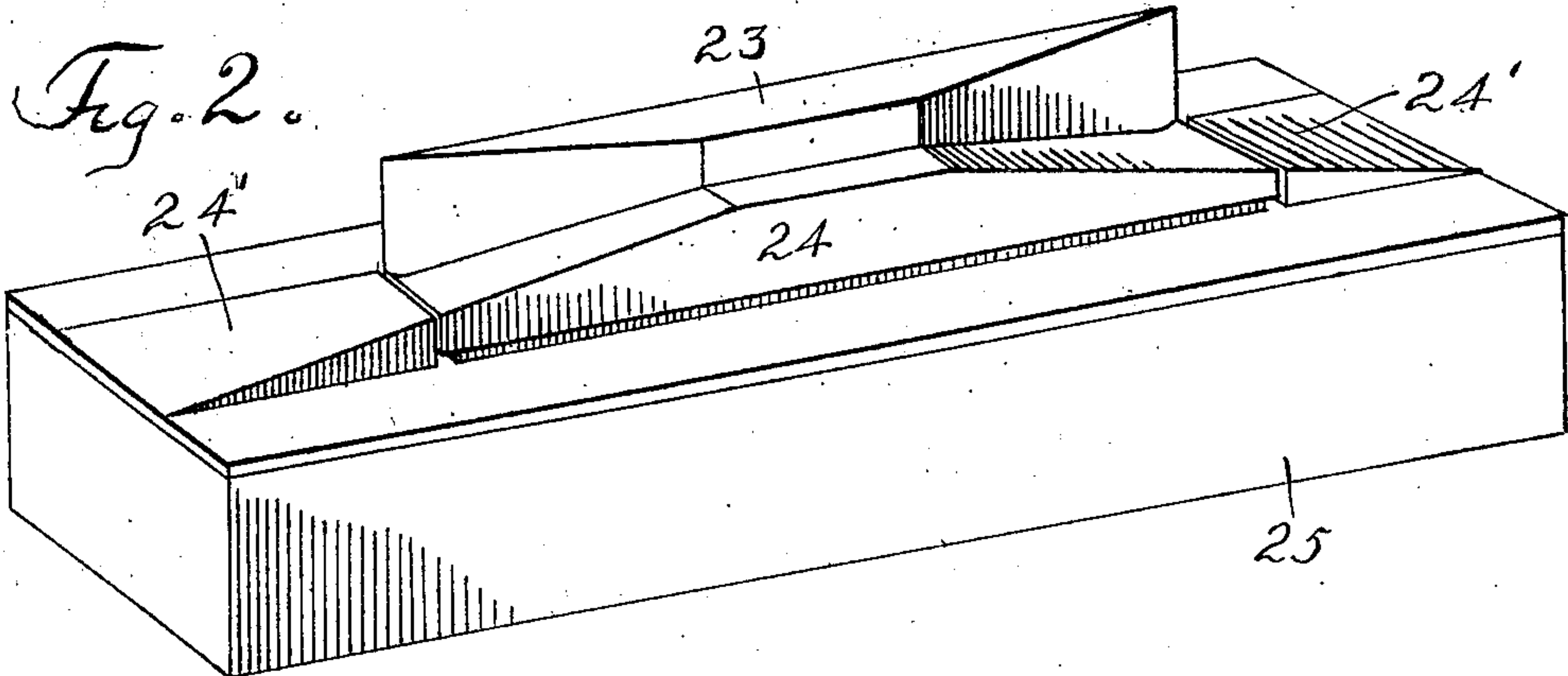
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UNITED STATES PATENT OFFICE.

JOSEPH H. LYNCH, OF RED BANK, NEW JERSEY.

CIRCUIT-CLOSER FOR AUTOMATIC TRAIN-STOP.

No. 890,670.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed May 2, 1907. Serial No. 371,514.

To all whom it may concern:

Be it known that I, JOSEPH H. LYNCH, a citizen of the United States, and a resident of Red Bank, in the county of Monmouth and State of New Jersey, have invented certain new and useful Improvements in Circuit-Closers for Automatic Train-Stops, of which the following is a specification.

My invention relates to apparatus for controlling the movement of railway vehicles by the use of an obstruction upon the permanent way adapted to operate a shoe upon a passing vehicle whereby the desired electrical or mechanical operations may be produced on said vehicle necessary for giving a visual or audible signal to the motorman or engineer or for automatically cutting off the driving power and applying the brakes or for bringing about other desired operations on such vehicles.

My invention is particularly useful in those cases where the shoe on the vehicle constitutes a part of a circuit closer, although my invention may be employed in other cases where the shoe operates in a purely mechanical fashion upon the devices carried by the vehicle.

In my previous patent No. 817,497, dated Apr. 10th, 1906, I describe and show an obstruction on the permanent way movable into and out of position or into different positions for engagement by the shoe on a passing vehicle.

My present invention relates mainly to the form or construction of the obstruction and the manner of mounting or constructing the shoe which coöperates therewith, the object being to secure a movement of the shoe and its connected parts in two directions, one vertical by engagement of the shoe with a horizontal incline on the obstruction, and the other a horizontal movement by engagement of the shoe with a vertical incline. Otherwise stated, this part of my invention embodies as its leading characteristic an obstruction having two inclined or operating surfaces one adapted to move the shoe vertically and the other to move it transversely in order to bring the shoe and its attached parts to the desired position for operating upon the devices carried by the vehicle.

My invention consists also in the improved

special manner of mounting the shoe and in the details of construction and combinations of shoe and obstruction as hereinafter more particularly described and then specified in the claims.

My invention consists further in an improved combination of apparatus for automatically bringing the vehicle to rest in case the engineer or motorman should fail to bring it to a stop before passing the guard point on the permanent way at which the obstruction is located.

In the accompanying drawings; Figure 1 is a side elevation of a steam locomotive having my improved devices applied thereto. Fig. 2 is a perspective view of the obstruction and casing therefor upon the permanent way. Fig. 3 is a horizontal vertical section through the casing and obstruction some of the parts being shown in side elevation. Fig. 4 is a perspective view of the shoe and its attachments when employed to close an electric circuit. In Fig. 1 automatic train stop apparatus substantially the same as that described in my application for patent filed May 1st, 1907, S. N. 371,288, is shown located in any suitable manner in the locomotive cab.

The operation of this automatic train stop apparatus is controlled, preferably, by the action of a shoe 19 mounted on the pilot or on a truck of the vehicle and adapted to close a circuit open normally at two contact points 20, 20' as will be hereafter more particularly described. In the circuit thus closed and as clearly shown in the diagram, Fig. 1, is a trip electromagnet 16 which trips a weighted circuit closer 10 by withdrawing a catch 17 forming or attached to the armature of said electromagnet. When tripped the circuit closer or controller closes a circuit upon a point 18 and energizes a valve controlling magnet 11 whose movable core or armature is connected to the valve rod of a piston valve in casing 12 so that, by the action of the magnet, a connection between pipes 13 and 14 will be open. When the magnet is deenergized a suitable spring as indicated closes the valve.

15 is a battery or other source supplying energy for working magnets 16 and 11.

Pipe 13 leads from the tank of compressed

air on the locomotive and pipe 14 runs to a cylinder 3 containing a plunger which, through plunger rod 4, is adapted to operate upon the vehicle motive power controller 1. The latter in the case of a steam locomotive would be the ordinary throttle lever and may be provided with a locking quadrant and lock rod provided with attachments for unlocking it from the handle end of the lever 1. An elbow lever 5 mounted on the rod is connected by its short arm with the lock rod while its long arm is in the path of a yoke or head on the other end of plunger rod 4 so that, as the plunger moves forward, the rod will first operate on elbow lever 5 to unlock the controller and will thereafter engage and operate the controller and throw the same over so as to shut off the motive power for the locomotive. From cylinder 3 at the side thereof a pipe leads to the end of a cylinder 6 containing a plunger for operating upon the air brake controller 2. 7 is the plunger rod, the end of which, when the plunger moves forward, will engage the brake controller 2 and move it from "off" position to "on" position. Air passes to cylinder 6 and operates the plunger therein, as soon as the plunger in 3 has moved forward sufficiently to cut off the motive power, by which time it will have cleared the opening in the side of the cylinder, thereby allowing the operating air to pass from behind the piston through the pipe in the side of the cylinder 3 to the cylinder 6 where it acts to drive the plunger in the latter forward and put on the brakes. As the plunger in 6 moves forward it clears an opening in its side and allows air to pass from behind it into a pipe leading to a cylinder 8. This it does only after it has moved sufficiently far to fully apply the brakes. When the air passes to cylinder 8 it operates a plunger therein and the plunger rod engages by its head 9 the underside of the circuit closing arm 10 and by resetting the same to engagement with the latch 17, opens the circuit of magnet 11. The latter then loses its power and the valve operated by it closes thus shutting off the supply of air by which the various plungers are operated. The air retained in the plunger cylinders escapes or is bled from them in the usual way by suitable vents or exhausts of small capacity, as usual in the art, so that now the various plungers may be restored to the normal position by the engineer or motorman and the controllers may be operated to again put on the power and take off the brakes.

The construction and manner of mounting the circuit closer shoe is as follows: Referring more particularly to Fig. 4, 19 is the shoe, preferably pivotally mounted at 19' on a suitable support adapted for rotation in a

horizontal plane. Said support consists preferably of a vertical rod or rock shaft 30 adapted to turn in suitable bearings in a case or frame 22 secured to the pilot or other part of the vehicle as well understood in the art. A collar 31 on the rod prevents the same from dropping, but allows rotation thereof.

Loosely connected with the shoe is an arm 26, which at its free end has an elongated yoke or eye embracing the shaft 30 or other suitable guide and engaging a cushion or restoring spring 28 from beneath. Said spring 28 may be a coil spring on rod 30 and may have a bearing at its top against the underside of the cross-piece of the frame in which the rod 30 turns. Attachment 26 may act itself directly as a circuit closer by engaging simultaneously the two contact springs 20, 20' when it is raised to a level with said springs and is also swung around to engagement therewith by the turning of the shoe and the rock shaft or support to which it is attached.

Contact springs 20, 20' may be secured to an arm 29 or other attachment upon the frame or other part. When the shoe rises, it is also forced sidewise carrying with it the loose arm 26 which rides against or upon the inclined guide 22', or in close proximity thereto, said guide serving to turn the shoe and attachment back to their normal position when the parts descend by the action of a spring 28, which they are free to do as soon as the shoe passes the obstruction. The obstruction may itself be mounted and operated in any desired manner as, for instance, in the manner described in my prior patent already referred to.

25 is the casing containing the operating parts for raising the obstruction to the desired operating position or positions and 37 and 39 are the actuating electromagnets whose movable cores operate through suitable intervening mechanism on the obstruction-carrying frame as described in my prior patent. The obstruction itself is composite and embraces two parts, 23, 24. The part 24 is provided with suitable inclined surfaces arranged horizontally and adapted to raise the shoe vertically, while the part 23 has two vertically disposed inclined surfaces adapted to move the shoe horizontally.

Obviously, the form of each obstruction may be varied without departing from my invention, the only requirement being that the part 24 shall be adapted to raise the shoe and the part 23 to swing the shoe horizontally.

Suitable preparatory operating inclines 24' may be used for starting the shoe in the movement before it reaches the obstruction proper by which it is moved to operating position. When the obstruction is depressed,

the shoe, if raised at all, will not rise sufficiently to reach the level necessary for closing the circuit on the vehicle or performing any other required operation. But when the obstruction is raised, the shoe will rise to the higher required level and being at the same time swung by the horizontally operating portion 23 of the obstruction will close the circuit or do any other work required of it. Obviously, the obstruction may be raised by any desired mechanism or devices, when it is necessary to bring the automatic train stop apparatus into operation. Also, whenever electromagnets are used they may be connected into proper guard or controlling circuits in any of the various ways known to the art. When the obstruction is raised, and the vehicle carrying the shoe passes the same, the said shoe being operated in the manner described, will close the circuit of trip magnet 16, thereby energizing valve magnet 11 and cutting off the motive power and applying the brakes in the manner already described. After the brakes have been put on, the resetting plunger in cylinder 8 resets the circuit controller 10, thus deenergizing the magnet 11 and said circuit closer is automatically latched in open circuit position since the shoe 19 will have passed the obstruction so as to open the circuit of the magnet 16. By forming the obstruction and mounting the shoe so that a double or compound movement is required to bring about the proper action of the devices connected to the shoe, the danger of accidental operation from accumulation of ice or snow on the obstruction is very much lessened since, as will be obvious, such accidental operation would not be brought about or completed unless there were an accumulation on both the vertical and horizontal surfaces of the obstruction. Obviously shoes may be applied at both sides of the vehicle and a connecting rod may be employed between them as described in my prior patent before referred to, so that when either shoe is operated, the circuit will be closed.

What I claim as my invention is:

1. The combination of a vertically movable shoe mounted for vertical movement on a horizontally movable support carried by a moving vehicle, and an obstruction on the permanent way having surfaces disposed in vertical and horizontal positions and adapted to raise the shoe and at the same time move it laterally.

2. The combination of a horizontally and vertically movable shoe on a vehicle and a composite obstruction on the road-bed adapted to move the shoe sidewise while at the same time raising it.

3. The combination of a pivoted shoe on a vehicle, a vertical rock shaft on which the

shoe is pivoted and an operating arm connected to the shoe and engaging a buffer spring by which the shoe and arm may be returned to normal position after being raised, or displaced, and means upon the permanent way for raising said arm during movement of the vehicle.

4. The combination of a pivoted shoe, a rock shaft on which the shoe is pivoted and adapted to turn in a plane transverse to the plane of the movement of the shoe on its pivot, an arm loosely connected with said shoe, a spring operating on said arm, and a guide engaged by the arm for turning the rock shaft and shoe to position, and means upon the permanent way for raising said shoe and arm during movement of the vehicle.

5. The combination of the pivoted shoe, the rock shaft upon which the shoe is pivoted, the arm loosely connected to the shoe and having a forked end loosely embracing the rock shaft, and a spring engaging said arm and resisting the movement of the shoe, as and for the purpose described.

6. The combination of a shoe, a rock shaft upon which the shoe is pivoted to turn in a plane transverse to the rocking plane of the shaft, and a composite obstruction with which the shoe engages on two surfaces disposed so as to turn the shoe on its pivot and to move the shoe sidewise to rock the shaft.

7. The combination, substantially as described, of a horizontally and vertically movable shoe on a vehicle, means for closing a circuit through the movement of said shoe to the proper vertical and horizontal position, an obstruction on the permanent way adapted to be engaged by the shoe and to produce said movements, a trip magnet on the vehicle in the circuit closed by the operation of the shoe, a circuit controller tripped by said magnet, a valve operating magnet controlled thereby, a motive power controller and brake controller having operating plungers and connecting pipes whereby, on operation of the valve, the said plungers will be actuated by fluid under pressure.

8. The combination of a shoe mounted on the vehicle, an obstruction on the road-bed adapted to be engaged thereby, means for raising the obstruction to position for engagement by the shoe, means for closing a circuit on the vehicle when the shoe is operated by engagement with said obstruction, a trip magnet in said circuit, an automatic train stop controlled by said trip magnet and embodying means for shutting off the power and applying the brakes, a resetting device, and means for automatically operating the resetting device through the action of the device which actuates the brake controller and after the operation of said brake controller to apply the brakes.

9. The combination of a vertically and horizontally movable circuit closer on a moving vehicle, an obstruction on the permanent way formed, as described, to produce a compound movement of the circuit controller to circuit closing position, an automatic train stop apparatus on the vehicle a trip magnet on the vehicle in the circuit of said circuit closer, and means controlled by the latter for

shutting off the motive power and applying the brakes. 10

Signed at New York in the county of New York and State of New York this 1st day of May A. D. 1907.

JOSEPH H. LYNCH.

Witnesses:

C. F. TISCHNER, Jr.,
LILLIAN BLOND.