No. 886,993. PATENTED MAY 5, 1908.

A. KUZEL.

ELECTRIC SIGNAL FOR RAILWAYS.

APPLICATION FILED DEC. 30, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

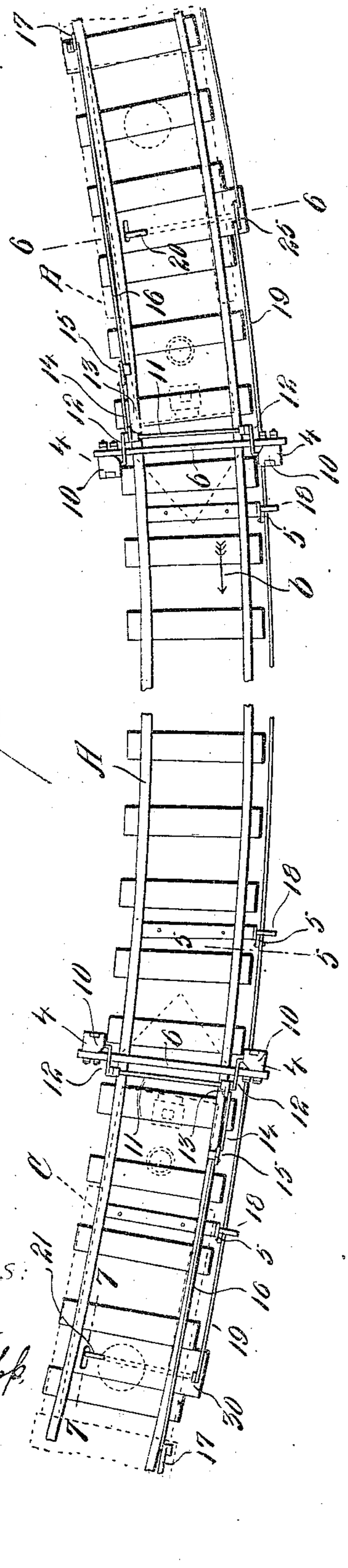


Fig. 2.

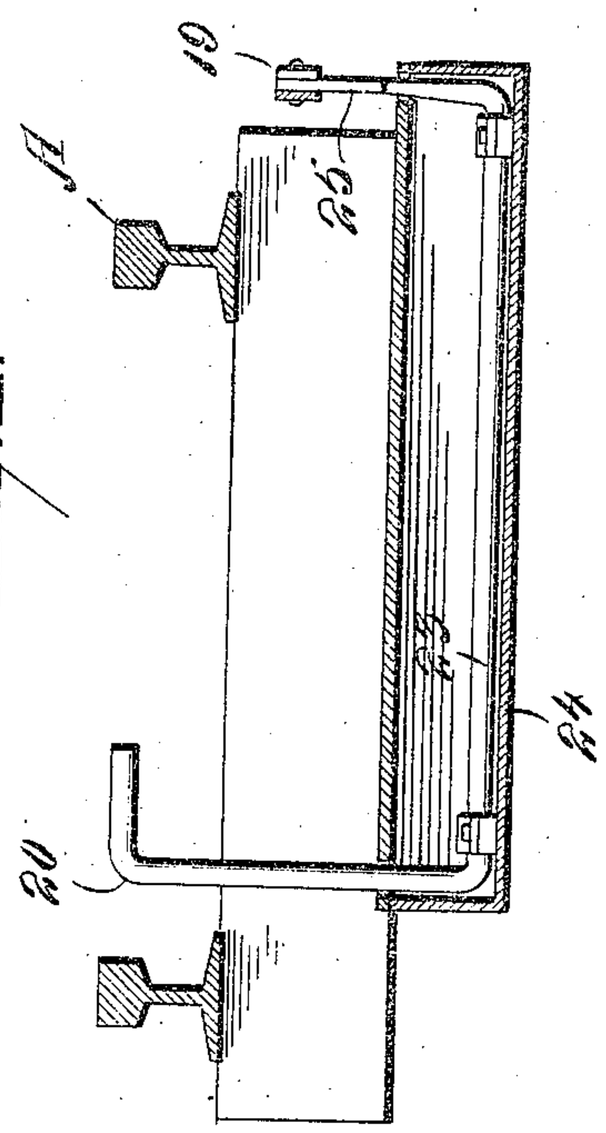


Fig. 3.

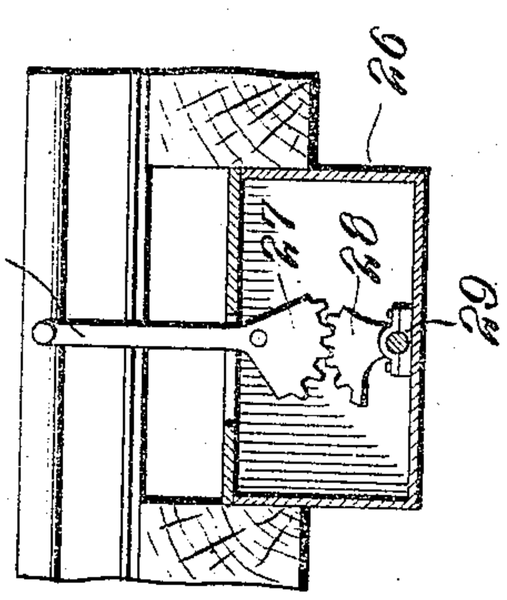
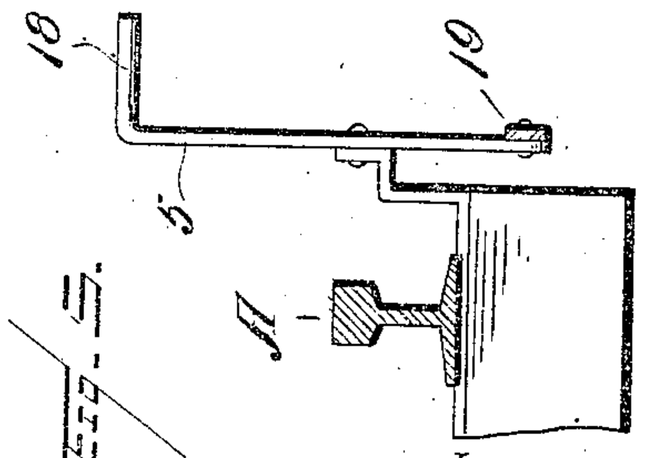


Fig. 4.



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ELECTRIC SIGNAL FOR RAILWAYS.

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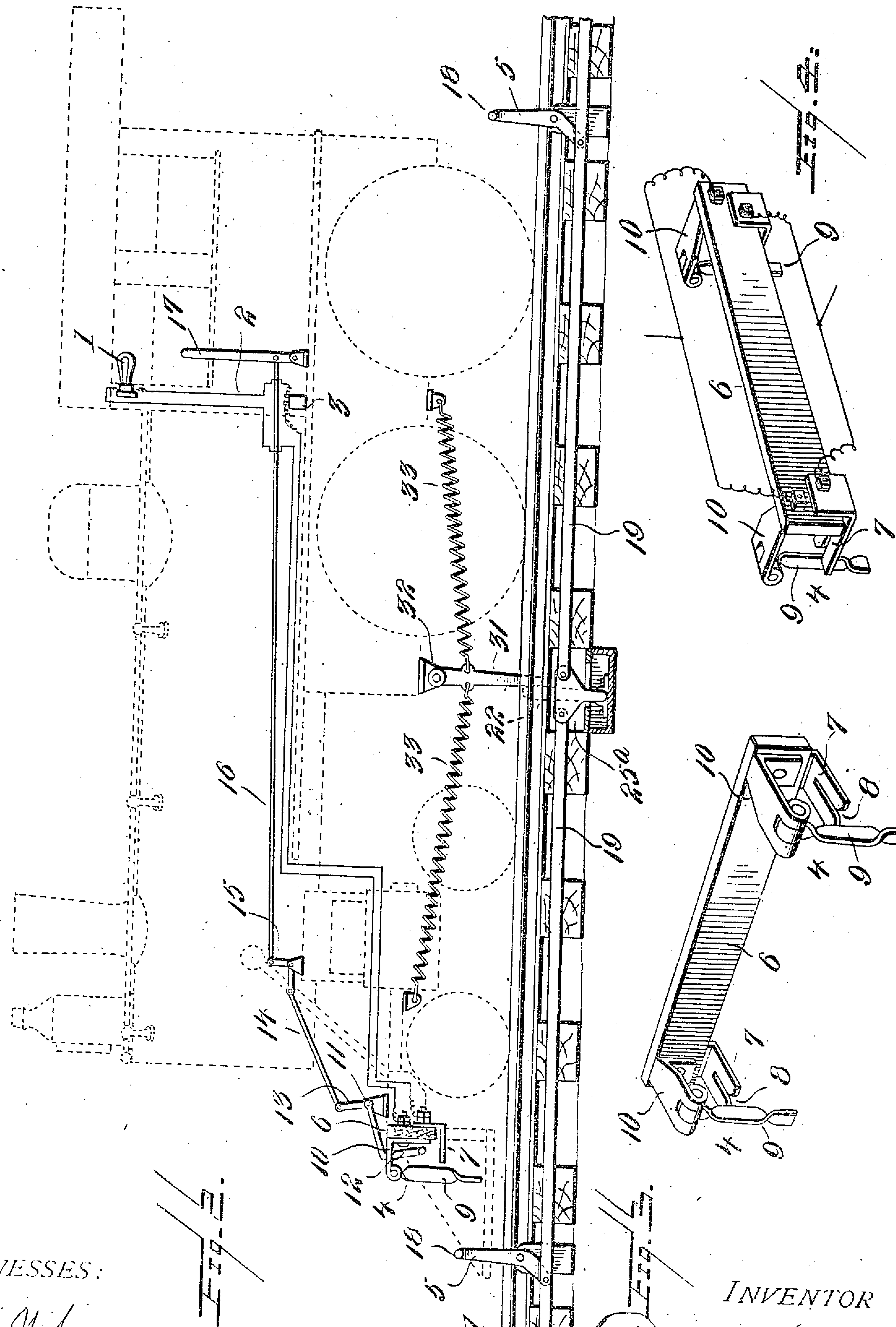
2 SHEETS—SHEET 2.



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ELECTRIC SIGNAL FOR RAILWAYS.

No. 886,993. Specification of Letters Patent. Patented May 5, 1908.

Application filed December 30, 1907. Serial No. 408,612.

To all whom it may concern:

Be it known that I, ANTON KUZEL, citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Electric Signals for Railways, of which the following is a specification.

My invention relates to improvements in electric safety signals for railways, and more particularly one for preventing head on collisions upon curves or other dangerous portions of a railway track.

The object of the invention is to provide a signal apparatus of this character which will be simple, practical, efficient and reliable.

With the above and other objects in view, the invention consists of the novel features of construction and the combinations and arrangement of devices hereinafter fully described and claimed, and illustrated in the accompanying drawings in which:

Figure 1 is a plan view of a portion of a curve in a railway track showing my invention applied thereto, two approaching locomotives being indicated in dotted lines; Fig. 2 is a side elevation of the track and portions of the invention, a locomotive being shown in dotted lines to indicate the arrangement of the apparatus thereon; Figs. 3 and 4 are respectively front and rear perspective views of the circuit closing device upon the locomotive; Figs. 5, 6, and 7 are detail sectional views taken respectively upon the planes indicated by the lines 5—5, 6—6, and 7—7 in Fig. 1.

My improved signal apparatus is designed to protect dangerous points in railway tracks, such for instance as curves where the engineer upon a train cannot see an approaching train; and it consists of an electric signal apparatus located upon each locomotive and adapted to be actuated by trip devices located along the dangerous portion of the track and controlled by one of the locomotives.

In the preferred embodiment of the invention I provide in the cab of the locomotive a signal 1 such as an electric lamp and include it in the circuit 2 of a battery 3 or other electric generator. In this electric circuit 2 is also included one or more circuit closers 4 adapted to be actuated by trip devices 5 arranged along the track A. I preferably provide two of the circuit closers and locate them upon opposite sides of the locomotive at its front, so that the devices 5 which are upon one side only of the track, will actuate one when the locomotive moves in one direction and the other when it moves in the opposite direction.

Each of the circuit closers 4 is mounted upon one end of a transverse beam 6 of wood or other non-conducting material, and consists of a stationary contact member 7 formed with a tapered notch or opening 8 to receive a swinging contact member or lever 9 pivotally suspended at its upper end from a bracket 10. The member 9 hangs vertically and is normally out of engagement with the member 7, and it also hangs so that its lower end will be struck and moved rearwardly into the notch or fork 8 by the trip devices 5 when the latter are elevated to an operative position as presently explained.

In order to enable the engineer to break the circuit 2 after it has been closed, I preferably provide upon the locomotive a transverse rock shaft 11 having at its ends angular crank arms 12 to actuate the members or levers 9 in a forward direction. Said shaft is also provided with an intermediate crank arm 13 connected by a link 14 to a bell-crank 15 which latter is in turn connected by a link 16 to a hand lever 17 located within the locomotive cab.

The trip devices 5 are arranged at suitable distances apart along the dangerous part of the track and the portions adjacent thereto, and each is in the form of a bell-crank or lever suitably pivoted intermediate its ends and having its upper end bent at right angles or horizontally to provide an arm 18 to engage the contact members 9. The lower ends of the trip levers are connected to each other by links 19 so that they will move in unison and be simultaneously raised or lowered into or out of the path of the contact members 9, by means of throw levers 20, 21, 22. The levers 20, 21 are arranged at the ends of the protected part of the track and one or more of the levers 22 may be arranged between the levers 20, 21. Said levers 20 is in the form of a crank on one end of a transverse rock shaft 23 journaled in bearings in casing 24 located beneath the track. Upon the outer end of the shaft 23 is a crank arm 25 to which may be connected one or more of the links 19, as shown in Figs. 1 and 6. The lever 21 is pivoted intermediate its ends in a casing 26 and has upon its lower end a gear segment 27 which meshes with a similar gear segment 28 carried by one end of a rock shaft 29 suitably

journaled, in the casing 26 and having at its outer end a crank arm 30 to which latter is connected one of the links 19. It will be seen that this construction will cause the trip devices 5 to be raised when a locomotive B (moving in the direction of the arrow *b* in Fig. 1) actuates the lever 20 and to be lowered when said locomotive actuates the lever 21. The lever 22 is similar in construction and operation to the lever 20 and upon the outer end of its rock shaft is a crank arm 25ª which is similar to the arm 25 and connected to two of the links 19. The throw lever or levers 22 are provided to insure the elevation of the trip devices or levers 5 should, for any reason, the lever 20 fail in its operation.

For the purpose of causing the levers 20, 21, 22 to be automatically actuated by a passing locomotive, 1 provide upon the latter a trip lever 31 which has its upper end suitably pivoted at 32 and its free end depending and adapted to engage and actuate the said throw levers 20, 21, 22. The lever 31 is yieldably retained in its vertical position, as shown in Fig. 2, by stiff coil springs 33 connected to opposite sides of the lever at their inner ends and to suitable parts of the locomotive at their outer ends. These springs pull in opposite directions and are of equal strength to maintain the lever vertical. Each of said springs is, however, of sufficient strength to actuate one of the throw levers as it engages and passes the same.

In operation, assuming the locomotive B to be moving in the direction of the arrow *b* in Fig. 1, when its trip lever 31 actuates the throw lever 20, the trip devices or levers 5 will be simultaneously raised to an operative position or into the path of contact members 9 on both the locomotive B and the locomotive C (see Fig. 1) which is moving toward the locomotive B. When one of the members 9 on each of the locomotives strikes one of the devices 5, it will be forced into the notch 8 of the coacting contact member 7 and the electric circuit 2 on each locomotive will be thus completed to warn the engineer of danger. When these circuits are completed the lamps 1 become lighted, but it will be understood that other signal or alarm devices may be used. When the locomotive B passes the lever 21, the trip devices or levers 5 will be moved in the opposite direction that is, lowered to an inoperative position.

I have shown the apparatus applied to a steam locomotive but it will be understood that it may be used upon an electric car or engine or any similar vehicle.

From the foregoing it will be seen that my improved safety signal apparatus will effectively prevent head-on collisions and that it is exceeding simple, in construction, comparatively inexpensive to install, and reliable in operation.

While I have shown and described the preferred embodiment of my invention it will be understood that I do not limit myself to the precise construction disclosed, and that various changes in the form, proportion and minor details may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention what I claim is:

1. In a safety electric signal for railways, the combination of a trip device upon a track, a signal circuit upon a locomotive, a circuit closer in said circuit and having a horizontally disposed stationary member provided with a forked portion, and a vertically disposed swinging contact member pivotally suspended from its upper end to hang in advance of and out of contact with the forked portion of the stationary member, the lower free end of said swinging member being adapted to be engaged and actuated by the trip device, substantially as set forth.

2. In a safety electric signal for railways, the combination of a trip device upon a track, a signal circuit upon a locomotive, a circuit closer in said circuit and having a horizontally disposed stationary member provided with a forked portion, a vertically disposed swinging contact member pivotally suspended from its upper end to hang in advance of and out of contact with the forked portion of the stationary member, and means within reach of the engineer for retracting the swinging contact member, substantially as set forth.

3. In a safety electric signal for railways, the combination of a trip device upon a track, a signal circuit upon a locomotive, a circuit closer in said circuit and having a horizontally disposed stationary member provided with a forked portion, a vertically disposed swinging contact member pivotally suspended from its upper end to hang in advance of and out of contact with the forked portion of the stationary member, a double crank shaft having one crank arm arranged to engage the swinging contact member and release it from engagement with the stationary contact member, an operating device in the cab of the locomotive, and operative connections between said operating device and the other crank arm of the double crank shaft, substantially as set forth.

4. In a safety electric signal for railways, the combination of a trip device upon the track, a cross beam upon a locomotive, stationary contact plates upon the ends of the beam and having forwardly projecting horizontal portions formed with notches, forwardly projecting brackets upon the ends of the beam, swinging contact members pivoted at their upper ends to said brackets and adapted to hang in advance of the notched portions of the stationary contact plates, the lower ends of the swinging members being

adapted to be engaged and actuated by said trip device, a transverse shaft upon the locomotive, crank arms upon said shaft adapted to engage and operate said swinging members, another crank arm upon said shaft, a hand lever in the locomotive cab, operative connections between the hand lever and the last mentioned crank arm, an electric generator, an electric signal and an open electric circuit including said generator and said signal and having one branch connected to the two, stationary contact plates and its other branch connected to the two brackets, substantially as set forth.

5. In a railway safety signal, the combination with a signal apparatus carried by a locomotive and including a swinging member, of a plurality of trip levers pivoted along a track for vertical swinging movement and adapted to project into the path of said member when elevated, means connecting said levers for simultaneous operation, throw levers arranged upon the track for operating said trip lever, a trip lever pivoted at its upper end upon the locomotive and having its depending free end arranged to engage and operate said throw levers, and coil springs fixed at their outer ends to the locomotive and having their inner ends connected to opposite sides of the last mentioned trip lever, substantially as set forth.

6. In a railway safety signal, the combination with a signal apparatus carried by a locomotive and including a swinging member, of a plurality of trip levers pivoted along a track for vertical swinging movement and adapted to project into the path of said member when elevated, links connecting said levers for simultaneous swinging movement, throw levers arranged upon the track for actuating said trip levers, and a yieldably mounted trip lever upon the locomotive for actuating said throw levers, substantially as set forth.

7. In a railway safety signal, the combination with a signal apparatus carried by a locomotive and including a swinging member, of a plurality of trip levers pivoted along a track for vertical swinging movement and adapted to project into the path of said member when elevated, links connecting said levers for simultaneous swinging movement, a shaft upon the track, a crank arm upon said shaft and connected to one of said links, a throw lever upon said shaft, a second shaft upon the track, a crank upon said second shaft and connected to one of said links, a gear segment upon said second shaft, a pivotally mounted throw lever and a second gear segment upon the latter and in mesh with the first mentioned gear segment, substantially as set forth.

8. In a railway safety signal, the combination with signal apparatus carried by a locomotive and including a swinging member, of a plurality of trip levers arranged along the track and pivoted intermediate their ends, links connecting said levers, rock shafts upon the track and having crank arms, links connecting the latter to said trip levers, throw levers upon said shafts, and means upon the locomotive for actuating said throw levers.

9. In a railway safety signal, the combination with a signal apparatus carried by a locomotive and including a swinging member, of a plurality of trip levers pivoted along a track for vertical swinging movement and adapted to project into the path of said member when elevated, means connecting said levers for simultaneous swinging movement, a throw lever connected to said connecting means for moving the trip levers in one direction, a second throw lever connected to said connecting means for actuating said trip levers in the opposite direction, and means upon the locomotive for actuating said throw levers, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ANTON KUZEL.

Witnesses:
J. D. YOAKLEY,
JOHN PERNAT.