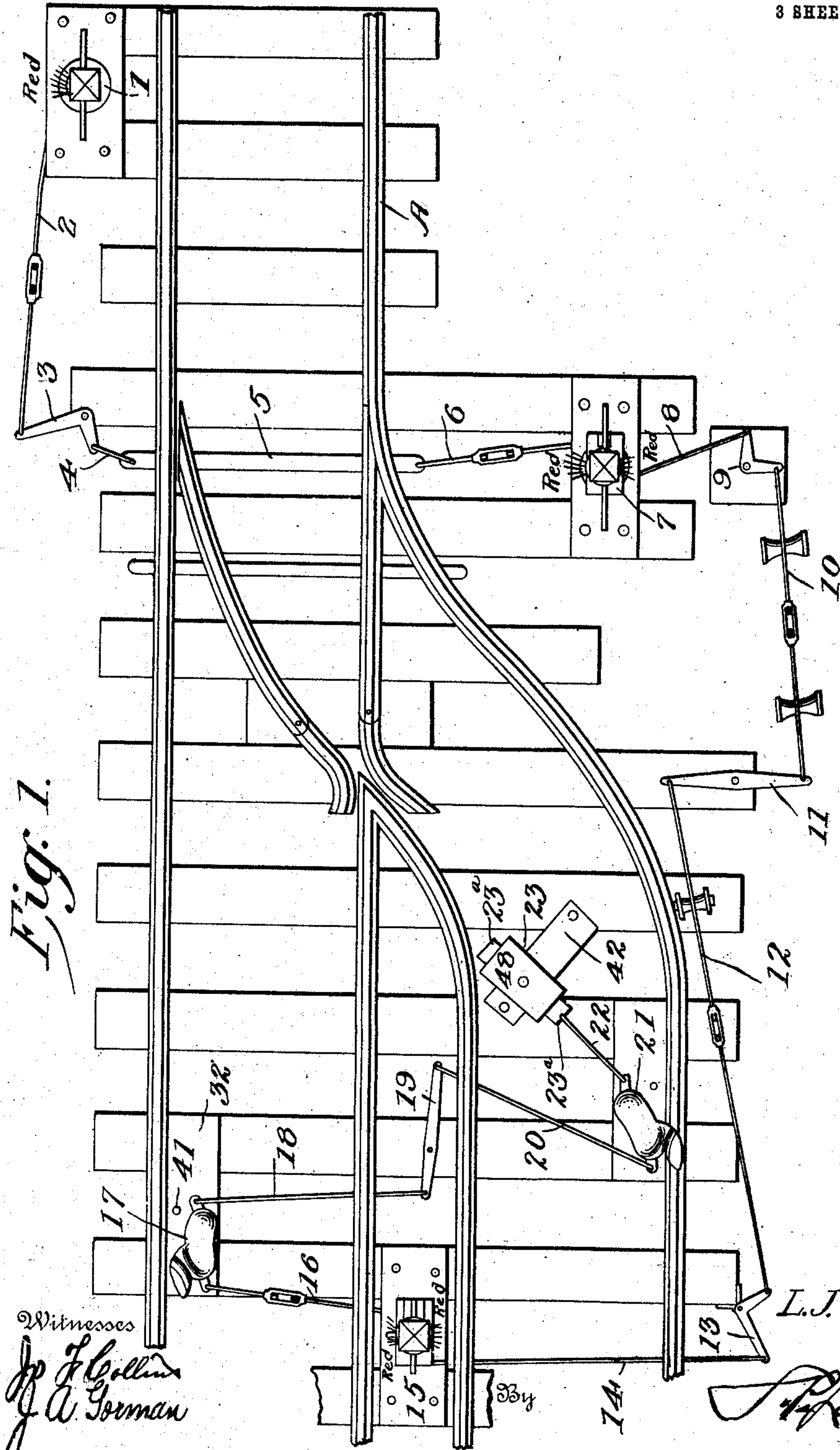


L. J. KIEFFER.
SAFETY SWITCH FOR RAILWAYS.
APPLICATION FILED FEB. 8, 1910.

990,273.

Patented Apr. 25, 1911.

3 SHEETS—SHEET 1.



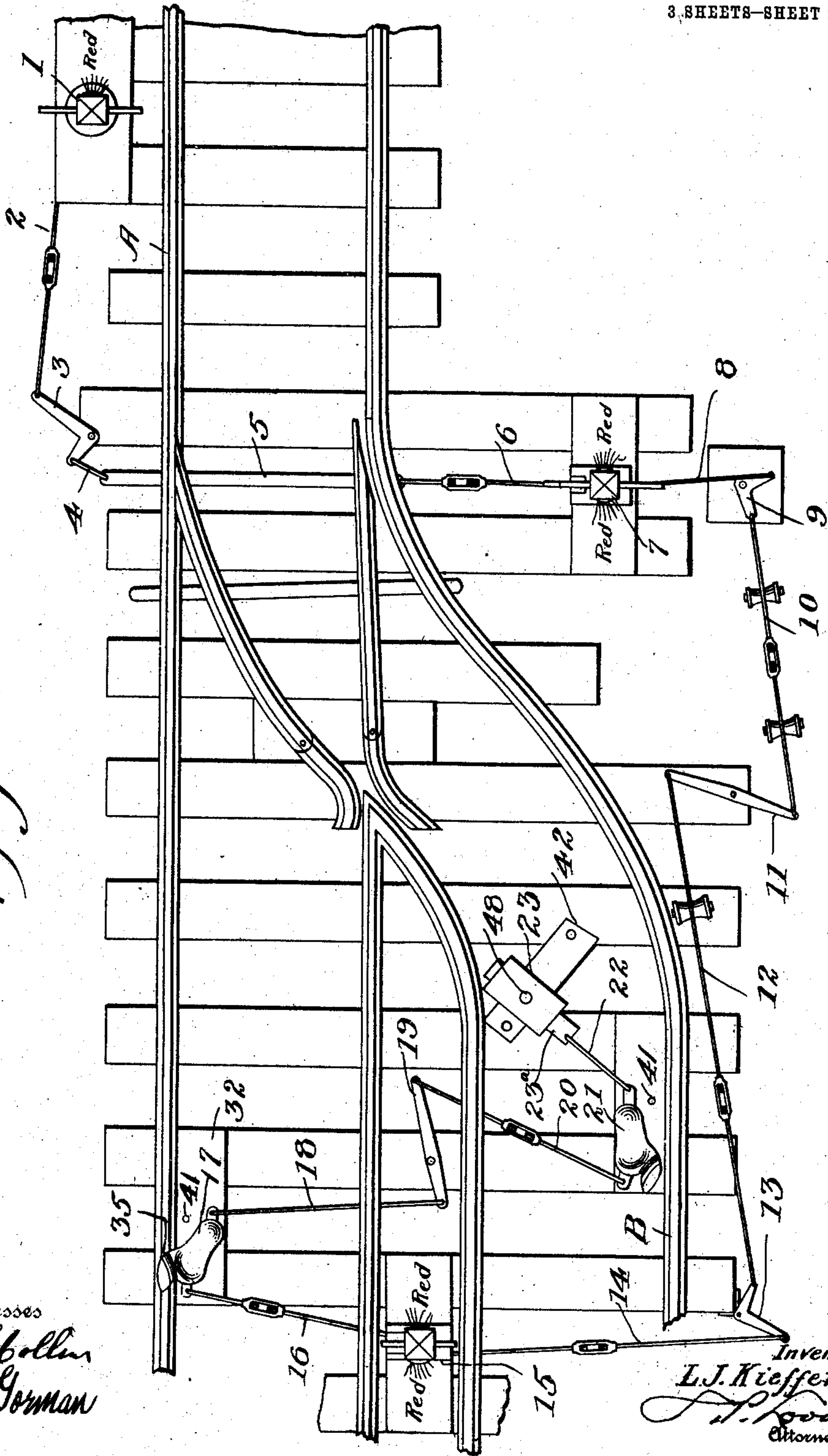
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 4.

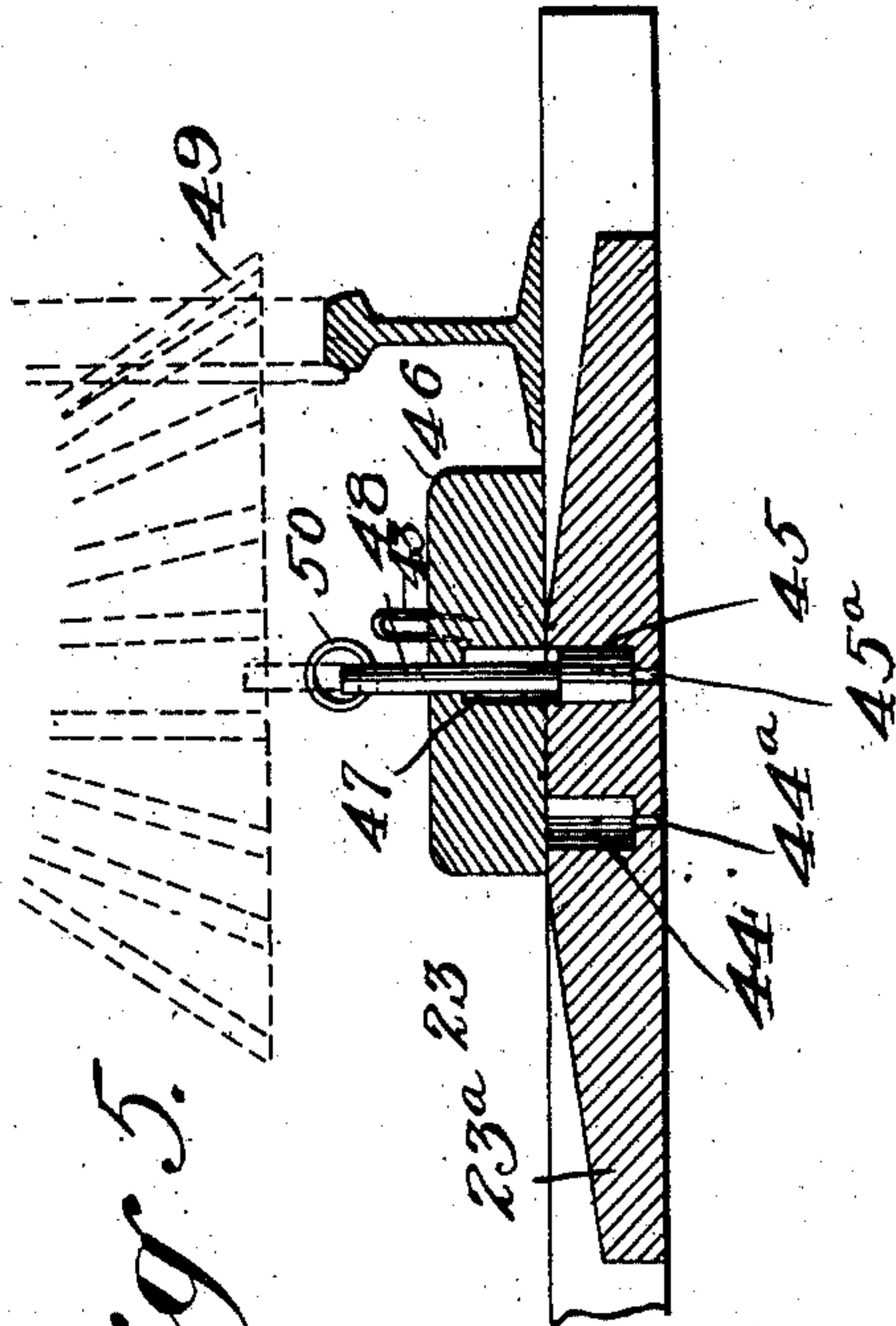
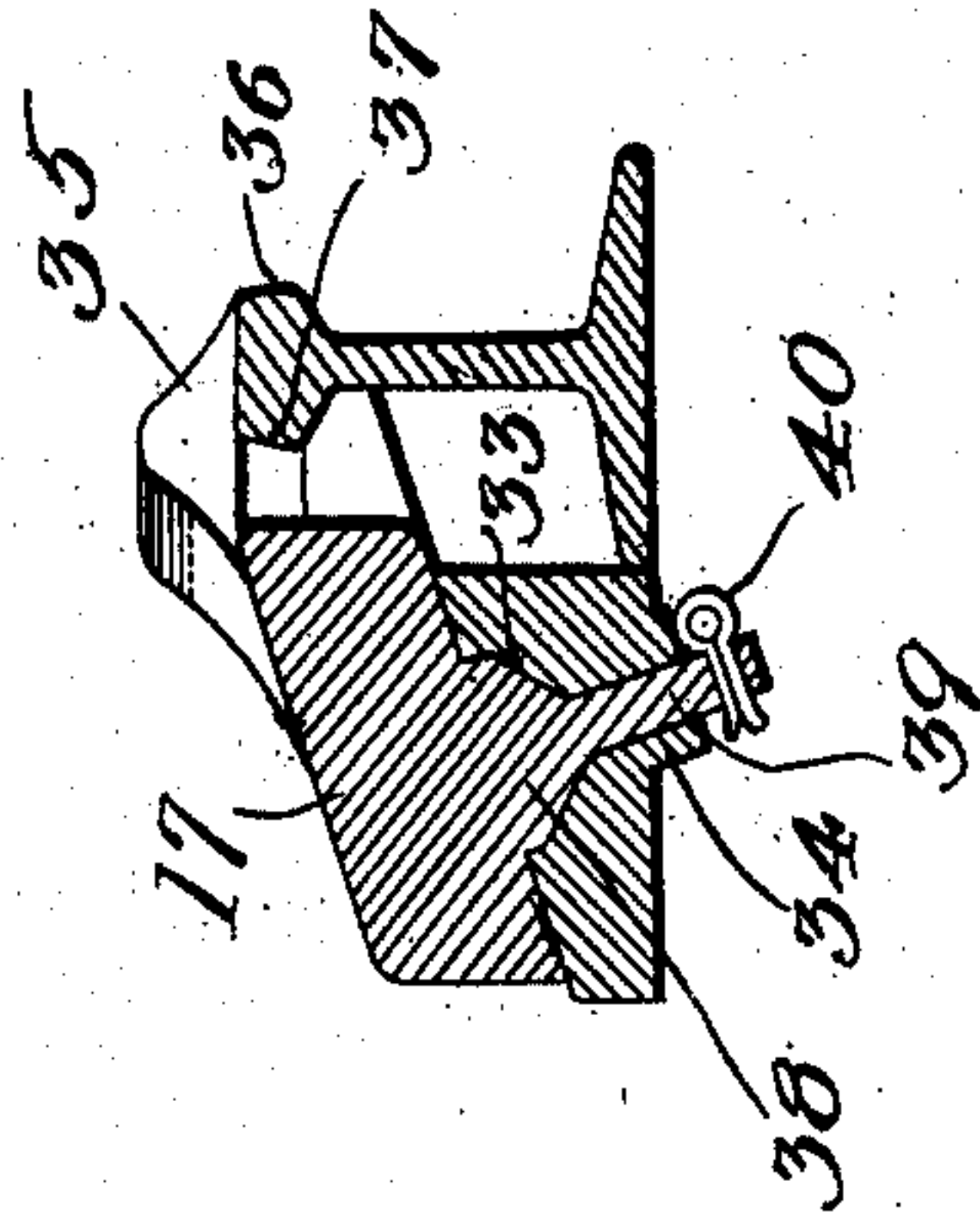


Fig. 5.

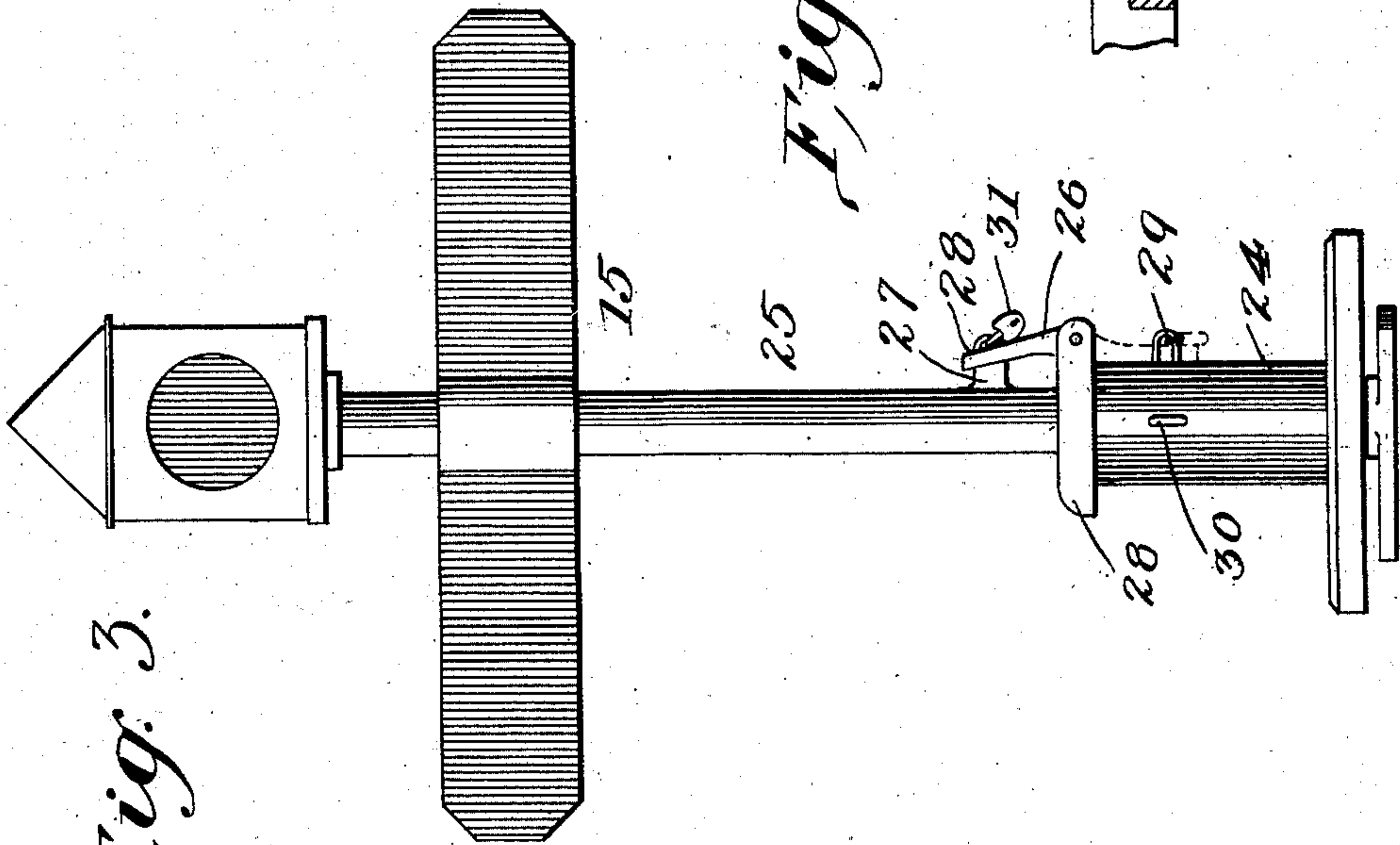


Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE

LOUIS JACOB KIEFFER, OF BOWLING GREEN, KENTUCKY.

SAFETY-SWITCH FOR RAILWAYS.

990,273.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed February 8, 1910. Serial No. 542,779.

To all whom it may concern:

Be it known that I, LOUIS JACOB KIEFFER, a citizen of the United States, residing at Bowling Green, in the county of Warren and State of Kentucky, have invented certain new and useful Improvements in Safety-Switches for Railways, of which the following is a specification.

My invention relates to safety switches for railways.

Broadly speaking, my object is to provide means for effectually safeguarding trains against accidents which are liable to occur in connection with or on account of railway switches on main tracks, such for instance as head end collisions and rear end collisions in sidings, rolling stock on either the main track or siding running through a closed switch and splitting the same, a train on the main track running into a train moving into or out of the siding, a train on the main track side swiping rolling stock fully in the siding but standing too near the end thereof, the throwing of a switch while rolling stock is either entering or leaving the siding.

My invention consists in certain novel parts and combinations hereinafter described and claimed, and illustrated in the accompanying drawings.

One of these features is the combination with a main railway track and its cooperating siding, of a derailer for each track, said derailers being connected with the switch operating mechanism and so related to their respective tracks that when either track is opened and the other thereby closed, their respective derailers will also be opened and closed simultaneously therewith to permit the unobstructed passage of a train on the open track and to forbid the passage of an approaching train into the closed switch on the other track.

Another feature is a safety lock which compels the cooperation of two parties separated from each other a material distance in order to throw the switch or derailers, or to operate any of the switch mechanism and which also prevents a switch from being inadvertently thrown by any one while cars are passing over the switch points on either track, and which after a train has passed far enough into the siding for the locomotive to reach the safety lock prevents the throwing of the switch points or of the derailers till the rear cars have passed far enough

into the switch not to be sideswiped by a train passing on the main track.

Still another feature is an emergency lock entirely under the control of the local agent or other designated party. This lock is normally unlocked, but is adapted in cases of emergency to lock the entire switch mechanism in a given position so that it cannot be changed by any of those who ordinarily operate it.

Other minor features will appear in the subjoined description.

In the drawings I have shown a section of a main line of railway and one end of a cooperating siding provided with my improvements. It is of course understood that each end of the siding is provided with similar mechanism.

Referring to the drawings: Figure 1 is a top plan view illustrating my invention as it appears in connection with a railway switch when closed. Fig. 2 is a similar view showing the switch open. Fig. 3 is a side elevation of the emergency lock and derail signal. Fig. 4 is a transverse sectional view of one of the derailers, showing it in operative relation to its support and to the railway track. Fig. 5 is a vertical longitudinal section of the safety lock, with the position of the cow catcher and wheel of a locomotive indicated in dotted lines.

The letter A indicates the main line of a railway track and B a cooperating siding.

The numeral 1 indicates a signal giving warning to an approaching train of the proximity of a switch. This signal shows but one light which is red, and which faces up the track in the direction away from the switch when the switch is open, as indicated in Fig. 2, and faces away from the track at right angles thereto (as shown in Fig. 1) when the switch is closed, so that in that case it will not be seen from a train approaching it in either direction. This signal through the mediation of the connecting rod 2, the crank arm 3, the link 4, the switch bar 5 and the connecting rod 6, is connected with the switch stand 7, from which it is operated. The signal carried on this stand is of ordinary construction showing red lights in both directions when the switch is open and showing white lights in both directions when the switch is closed.

The rod 8, the crank arm 9, the connecting rod 10, the lever 11, the connecting rod 12,

the crank arm 13, and the rod 14 form an operative connection between the switch stand 7 and the combined emergency lock and signal stand 15. The rod 16 connects
 5 this combined lock and stand with the main track derailler 17, which in turn is connected through the rod 18, the lever 19, and the rod 20, with the switch derailler 21, which is further connected by the short rod 22 with
 10 the slide 23^a of the safety lock 23.

The combined emergency lock and signal stand 15 consists of the stationary base 24 and the rotatable post 25 which through the connections described is rotated back and
 15 forth ninety degrees as the switch is opened and closed. The pivoted locking hasp or arm 26 is normally locked in its inoperative position in engagement with the rigid staple or lug 27 on the signal post 25, as illustrated
 20 in full lines in Fig. 3. It will be apparent that when the hasp 26 is in this position the lock will not in any way interfere with the operation of any of the switch operating mechanism, with all of which it is more or
 25 less directly connected, since the flange 28 is rigidly connected with the post 25 and rotated therewith on the stand 24. But it will be further seen from Fig. 3 that the stand 24 has two, staples 29 and 30 spaced 90 degrees
 30 from each other, and these staples are so located that when the switch is closed one of them will be in position to be engaged by the hasp 26 (as illustrated in dotted lines) and when it is open the other one will be in
 35 position to be engaged thereby; and when the hasp 26 is in engagement with either one of these staples, the entire switch operating mechanism will be rendered inoperative thereby. The key controlling the padlock 31
 40 of this device is always left in the custody of the station agent or other designated party, but is never given to any of the train crew. The object of this emergency locking device is to be able in cases of emergency to
 45 lock the switch and all the mechanism connected therewith, in any position desired beyond any possible interference therewith upon the part of any of the train crew.

My derailleurs are rights and lefts, but are
 50 otherwise similar to each other in construction. One of these is illustrated in Fig. 4 of the drawings and is mounted on an inclined support 32. This support is provided with a bore having a conical bottom 33 with an
 55 opening 34 leading from the apex of the cone down through the support 32, for purposes of drainage.

The derailler has a projecting portion 35 adapted when in operative position to over-
 60 lie the top of the rail 36, and is provided on its side adjacent the rail with a groove 37, adapted to receive the inner side of the rail. It has an integral projection 38 on its under side, which fits the bore 33 in the support 32,
 65 and terminates in a pin 39 carrying a cotter

40 in its lower end to securely hold the derailler in the support 32 upon which it rotates. The object of having the support 32 inclined is to cause the derailler to naturally
 70 tend to move out of engagement with the rail 36 into inoperative position in case any of the mechanism operating it should get broken; and the support 32 carries a stop pin 41 (Figs. 1 and 2) which prevents the
 75 heavy front end of the derailler from moving down the incline far enough to bring the rear end into engagement with the rail.

The automatic safety lock 23 of my device is mounted on the track in any suitable manner, as for instance on the plate 42 (Figs. 1
 80 and 2), and is provided with the slide 23^a, having the openings 44 and 45, which have small outlets 44^a and 45^a respectively, at their lower ends, for purposes of drainage. Above the slide 23^a is located the block 46
 85 having the shouldered opening 47 into which is received the shouldered locking bolt 48. The openings 44 and 45 are so located that when the switch is open one of them will be in registration with the opening 47 of the
 90 block 46, and when the switch is closed the other one will be in registration therewith so that whichever position the switch may be caused to assume it will be automatically locked in that position by the gravity lock-
 95 ing bolt 48.

In order to prevent any one from propping the locking bolt 48 up in its uppermost position so that it would be rendered inoper-
 100 ative, I make its upper end to extend up far enough to come into the path of the cow catcher 49 (indicated in dotted lines in Fig. 5) of a passing locomotive, thus placing upon all parties operating this lock the ne-
 105 cessity of seeing that the bolt 48 is always in its downward position before leaving it. This locking bolt 48 is prevented from being entirely withdrawn from the opening 47 in the block 46 by reason of the fact that both
 110 the bolt and opening are shouldered as shown. The bolt 48 may be provided in its upper end if desired with a ring 50 to facilitate lifting the bolt. The projecting ends of the slide 23^a are inclined on their top sides for purposes of drainage, and if desired a
 115 cover may be provided for the block 47 to protect it from the weather.

The emergency lock is combined with the signal stand at 15 for purposes of convenience and economy of construction, and this
 120 signal is located in proximity to the derailleurs in order to give notice of their nearness to an approaching train. The independent safety lock 23 is also placed reasonably near the derailleurs so that the one signal 15 will
 125 serve to give notice of the nearness of both; but the lock 23 must always be out of reach of the main switch stand so that one party can never operate both at the same time. This lock 23 is located preferably between
 130

the two rails of the siding so that a train entering the siding will cover it up and render it inaccessible till the rear car has passed over it, thus rendering it impossible for any one to throw the switch by accident or inadvertence while a train is passing into it. Moreover this automatic lock 23 must be so far down in the switch from the end thereof that when the hindmost car of a train has passed over it, and again rendered it accessible, that car will be in the "clear," so that it would not be sideswiped by a train passing on the main track.

The block 46 of the independent safety lock 23 may be provided, if desired, with a staple 43 (in Fig. 5) and the padlock 31 of the emergency lock may be passed through this staple and the ring 50 of the locking bolt 48 to lock the same in its downward position, thereby utilizing the safety lock 23 also as an emergency lock to be used instead of or in addition to the emergency lock 15, if desired, or at any rate when the lock 15 might be disabled or undergoing repairs, etc. This arrangement also provides, in cases of emergency, an absolute lock at each end of the line of mechanism connecting the derailleurs.

In describing the operation of my device let us suppose the switch is open to receive a train as illustrated in Fig. 2, in which case the red light of the signal 1 is facing up the track to notify the approaching train that the switch is near. The operation of the mechanism which threw the switch open has simultaneously therewith thrown the switch derailer 21 into inoperative position and the main track derailer 17 into operative position. It should be noted, however, that it took two men to perform this operation—one had to go down the track to raise the locking bolt 48 of the lock 23 which enabled the other one to throw the switch and to simultaneously operate the rest of the mechanism from the main switch stand 7—and that as soon as the bolt 48 was released it again fell into one of the openings in the slide 23^a and thus locked the switch and all the mechanism connected therewith in the position shown. Now when a train has sufficiently entered the siding the locomotive and cars will cover the safety lock 23 and thereby render it inaccessible till the last car of the train has passed over it; so that no one even though moved by malicious intent, could cooperate with an accomplice to throw the switch while the train is passing over it. And the lock 23 is so far down from the end of the siding that when the last car has passed over it the whole train will be in the clear so that it could not be sideswiped by a train passing on the main track. Let us suppose further that a train is coming up the main track from the left as this train just referred to enters the switch. In the first place the engineer will be warned by the red

light of the signal stand 15 that the switch is open and that the derailer 17 in the main line just ahead is set against him, and then if the signal is disregarded or the engineer loses control of his train and it comes on, its locomotive will be ditched by the derailer 17 and the other train will neither be run into nor sideswiped, neither will the switch be split. Let us again suppose that two passenger trains are to pass each other and that the one coming from the left has entered the siding and that the main track is now open for the passage of the other train approaching from the right. In this case all the signals are "clear" and should any one through mistake or otherwise attempt to throw the switch from the main switch stand 7 and head the train, coming from the right, into the switch and thereby cause a head end collision he cannot do it, on account of the independent safety lock 23. Moreover the engineer in the siding will now be near both the signal stand 15 and the lock 23 so that he can easily inspect them both for himself and be assured of his safety without depending on some less careful and less capable employee. He would be in the same position and would be still more cautious if he had backed into the siding at the right end thereof because he would know in that case that the switch was open till he or some one else had operated the independent safety lock 23 in cooperation with some one at the main switch stand. Again let us suppose that this train is on the siding for a faster passenger train coming in the same direction (from the left) to pass it; in this case the safety lock is covered by the train and therefore no one can by mistake or otherwise get at it to cooperate with a man at the switch stand to throw the switch while the faster train is passing and thereby split the switch or ditch the train by catching the wheels on the left side between the left switch and the left rail of the main track. Again let us suppose that while the fast train just described is passing (from the left) on the main track, the engineer in the siding should inadvertently attempt to follow too soon and be in danger of running into the point of the switch and getting his engine sideswiped by the passing train. In that case the engineer in the siding would be ditched by the switch derailer. These derailleurs also afford a most convenient and ever ready means for ditching runaway trains.

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

1. In safety switches for railways the combination with a main track and a cooperating siding, of switch operating mechanism having an operating lever, and an independent non-electrical safety lock located out of reach of said operating lever.

2. In safety switches for railways the combination with a main track and a cooperating siding, of switch operating mechanism having an operating lever, and an independent non-electrical safety lock located a material distance from said operating lever and from the end of the siding.

3. In safety switches for railways the combination with a main track and a cooperating siding, of a switch stand and switch operating mechanism connected therewith, and an independent safety lock located between the rails of the siding a material distance down the siding from the switch points and the switch stand.

4. In safety switches for railways the combination with a track and a cooperating switch, of switch operating mechanism, an automatic locking device connected with said operating mechanism to lock the same, and means for rendering said device inoperative in its locked position.

5. In safety sidings for railways the combination with a track and a cooperating switch, of switch operating mechanism; an automatic lock; means for rendering said lock inoperative in its locked position; and a derailer connected with said switch operating mechanism.

6. In safety switches for railways the combination with a track and a cooperating switch, of switch operating mechanism; a derailer for the main track; and an independent lock in the switch practically beyond the curved end thereof and out of reach of the switch stand.

7. In safety switches for railways the combination with a track and a cooperating switch, of switch operating mechanism; an independent automatic lock; derailleurs for the tracks; and an emergency lock, whereby to doubly lock the switch in special cases.

8. In safety switches for railways the combination with a track and a cooperating switch, of switch operating mechanism, an independent lock for automatically locking the switch when thrown; and an emergency lock, said locks being connected with said operating mechanism.

9. In safety switches for railways the combination with a track and a cooperating switch, of switch operating mechanism; a derailer for the switch; and an automatic lock in the switch both connected with said operating mechanism, and both being located beyond the switch points well down into the siding.

10. In safety switches for railways the combination with a track and a cooperating switch, of switch operating mechanism; derailleurs for each track and an automatic lock operated by said mechanism and means for rendering the lock inoperative when in locked position.

11. In safety switches for railways the

combination with a switch stand and switch operating mechanism of a safety lock located out of reach of the switch stand and provided with means requiring the presence of an operator immediately at the lock and necessitating the restoration of the lock to its locked position when the switch is thrown.

12. In safety switches for railways the combination with switch operating mechanism of a safety lock located in the portion of the siding which parallels the main track and having a part projecting into the path of rolling stock when in unlocked position.

13. In safety switches for railways the combination with switch operating mechanism of a safety lock comprising a slide adapted to be engaged by the switch operating mechanism to be moved back and forth thereby when the switch is thrown and provided with openings; a rigid block mounted above said slide; an approximately vertical bolt loosely mounted in said block and adapted to drop by gravity into said openings in the slide, to lock the switch in its different positions, and the top of said bar being arranged to project up into the path of rolling stock when sufficiently withdrawn to be disengaged from the openings in the slide; and means for preventing the locking bolt from falling down through its bearings or from being entirely withdrawn therefrom, said openings in the slide being extended entirely through the same for drainage purposes, and the ends of the slide projecting beyond the locking block, being inclined also for purposes of drainage.

14. In safety switches for railways the combination with a track and a cooperating switch, and switch operating mechanism, of a safety lock located in the siding approximately at the point where it parallels the main track and adapted to contact with rolling stock when in unlocked position.

15. In safety switches for railways the combination with a track and a cooperating switch, of operating mechanism; a safety lock; derailleurs for the tracks; and an emergency lock, all connected together and cooperating with each other.

16. In safety switches for railways the combination with a main track and a cooperating switch, of operating mechanism for throwing the switch; an independent safety lock connected therewith and located in the switch at approximately the point where the switch parallels the main track, whereby to bring the lock ordinarily under a train safely within the switch; and a main track derailer operated by said mechanism and adapted to move into operative relation to the track when the switch is open and into inoperative relation thereto when the switch is closed.

17. In safety switches for railways, the

combination with a main track and its co-
operating siding, of a switch stand and
switch operating mechanism; and a locking
device located out of reach of the switch
5 stand and adapted to automatically lock the
switch-operating mechanism at either end of
its throw, said device being adapted to be
unlocked manually and also adapted, after
being thus unlocked, to automatically relock
10 itself at the same end of the throw whenever
released by the hand of the operator.

18. In safety switches for railways, the
combination with a switch stand and switch
operating mechanism, of a safety lock lo-
15 cated out of reach of the switch stand
and adapted to lock automatically and to be
unlocked manually whereby to require the
coöperation of two operators separated a
material distance from each other in order
20 to operate the switch; and means necessitat-
ing the locking of the device manually in
case it fails to lock automatically.

19. In safety switches for railways, the
combination with switch operating mecha-

nism, of a safety lock having a movable part 25
adapted to automatically lock the switch in
position; and means for rendering said mov-
able part inoperative in its locked position.

20. In safety switches for railways, the
combination with switch operating mecha- 30
nism of a safety lock having a relatively sta-
tionary part, and a gravity bolt adapted to
automatically lock the switch in position; a
ring in the upper end of said bolt for lifting
the same into unlocked position; and a staple 35
in said stationary part of the lock adjacent
the ring in the locking bolt when said bolt
is in locked position, whereby to adapt the
locking bolt to be secured to said staple by a
padlock, to render said bolt inoperative 40
when in locked position.

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

LOUIS JACOB KIEFFER.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
