

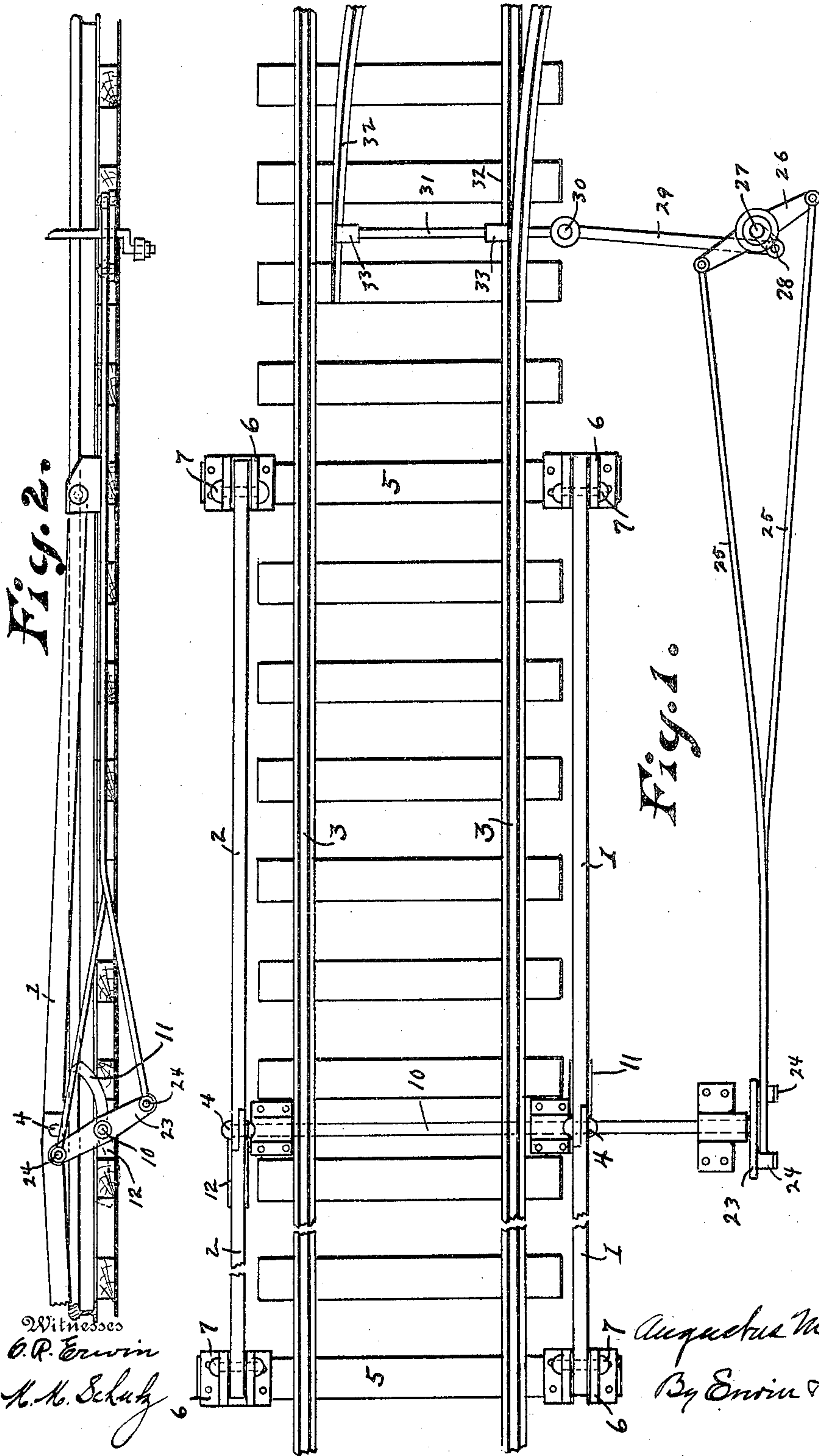
No. 822,358.

PATENTED JUNE 5, 1906.

A. M. FRISH.  
AUTOMATIC RAILWAY SWITCH.

APPLICATION FILED OCT. 23, 1905.

3 SHEETS—SHEET 1.



Witnesses  
C. R. Erwin  
H. M. Schatz

Inventor

Augustus M. Frish  
By Erwin & Wheeler  
Attorneys

No. 822,358.

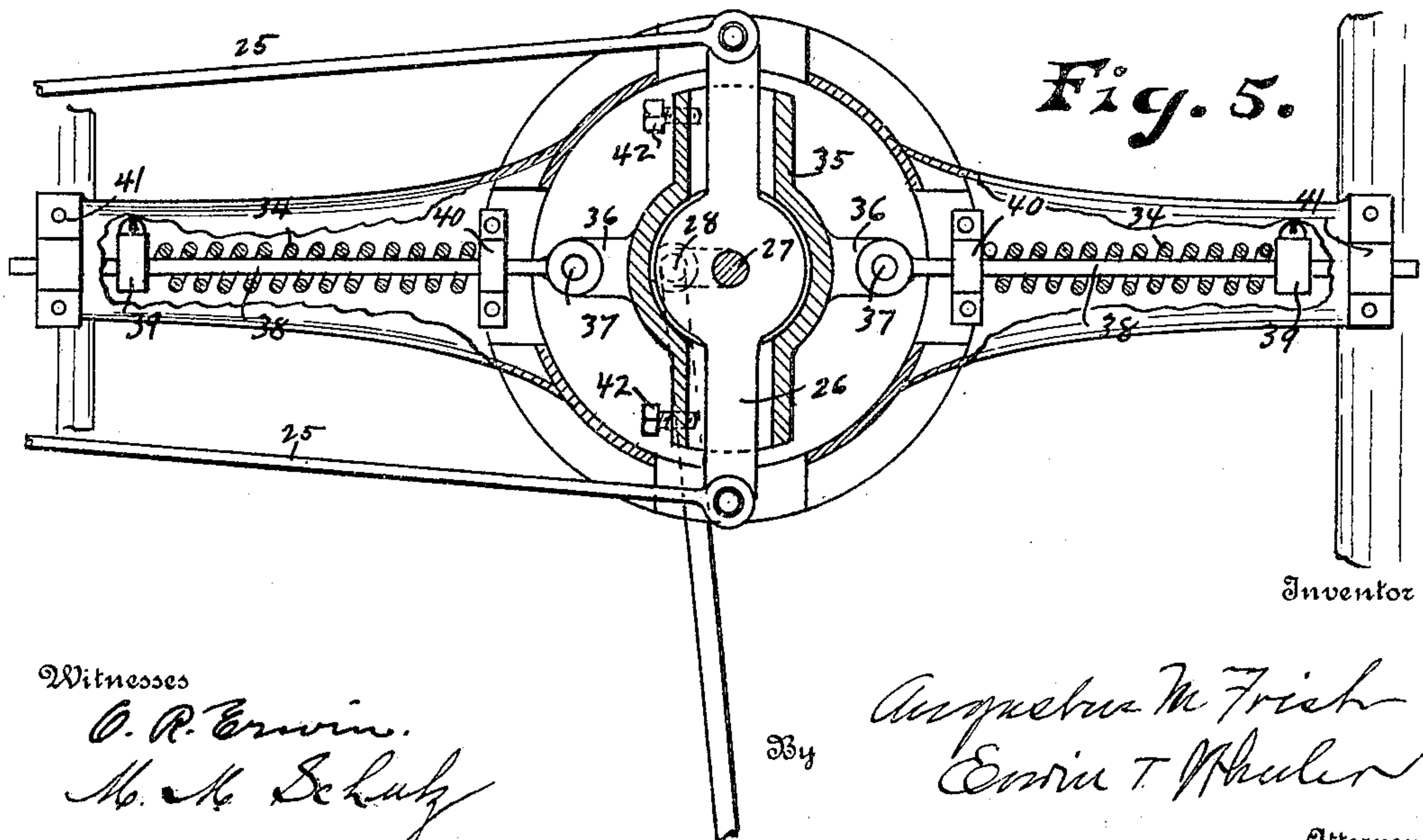
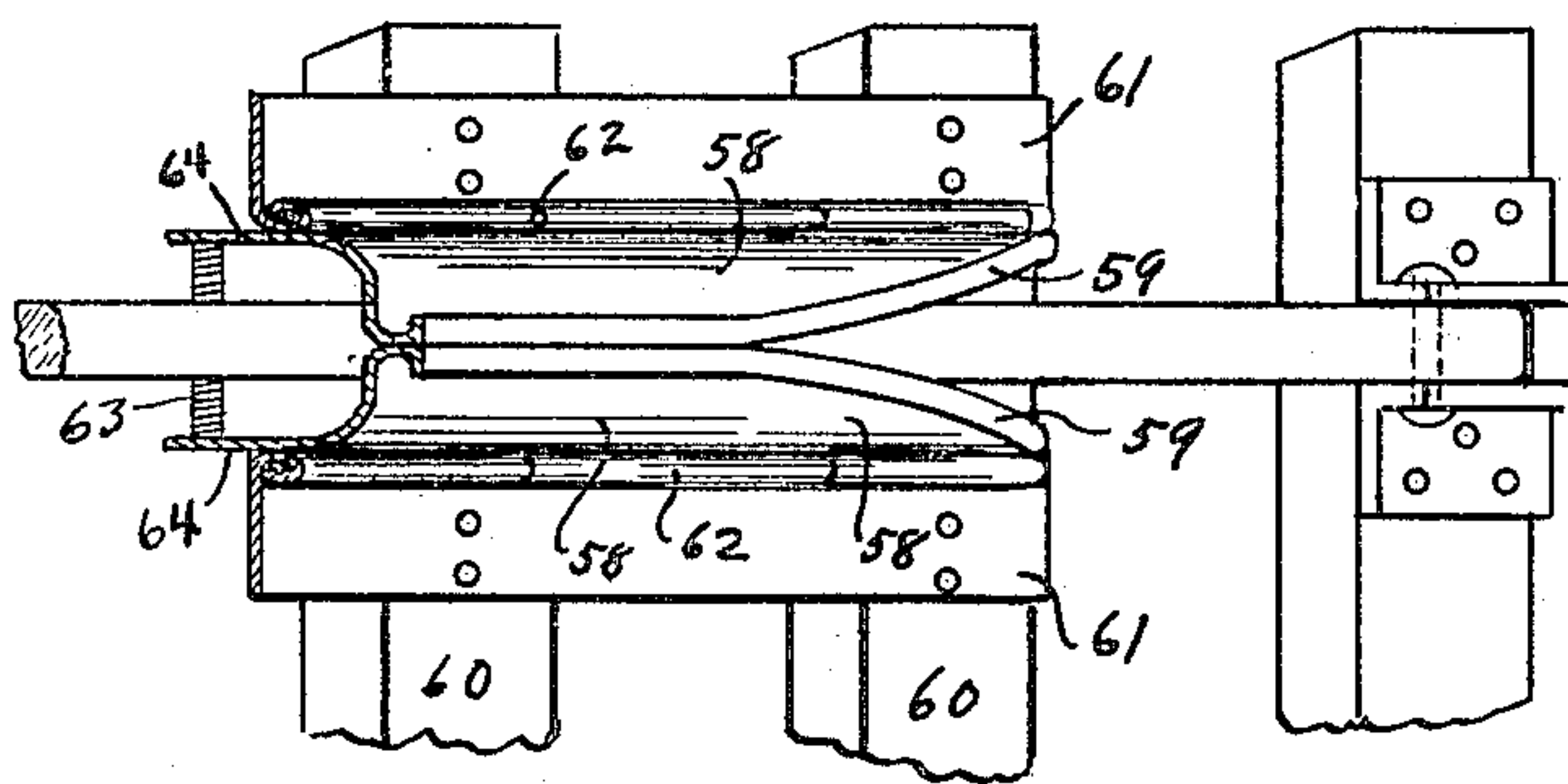
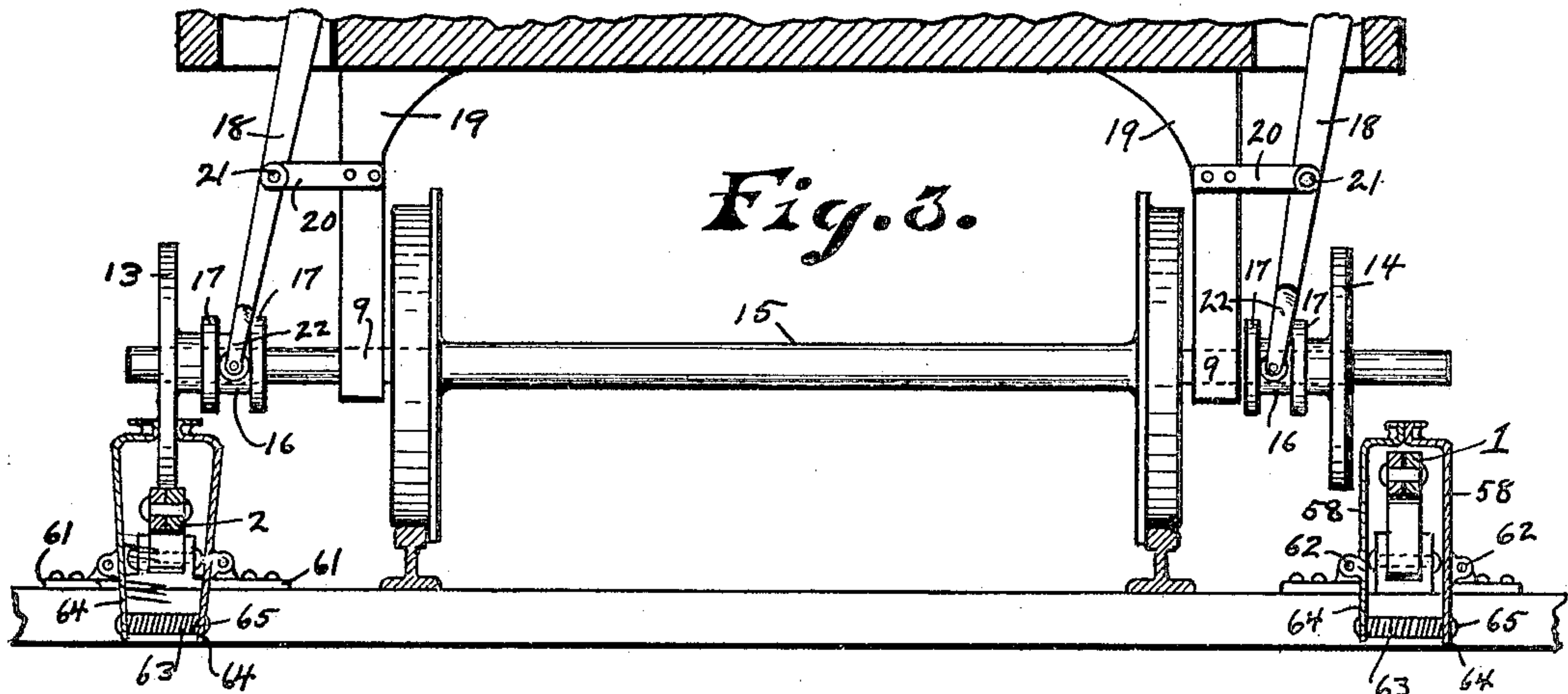
PATENTED JUNE 5, 1906.

A. M. FRISH.

AUTOMATIC RAILWAY SWITCH.

APPLICATION FILED OCT. 23, 1905.

3 SHEETS—SHEET 2.



Witnesses

O. R. Erwin.

M. H. Schulz

By

Augustus M. Frish  
Erwin T. Wheeler

Attorneys

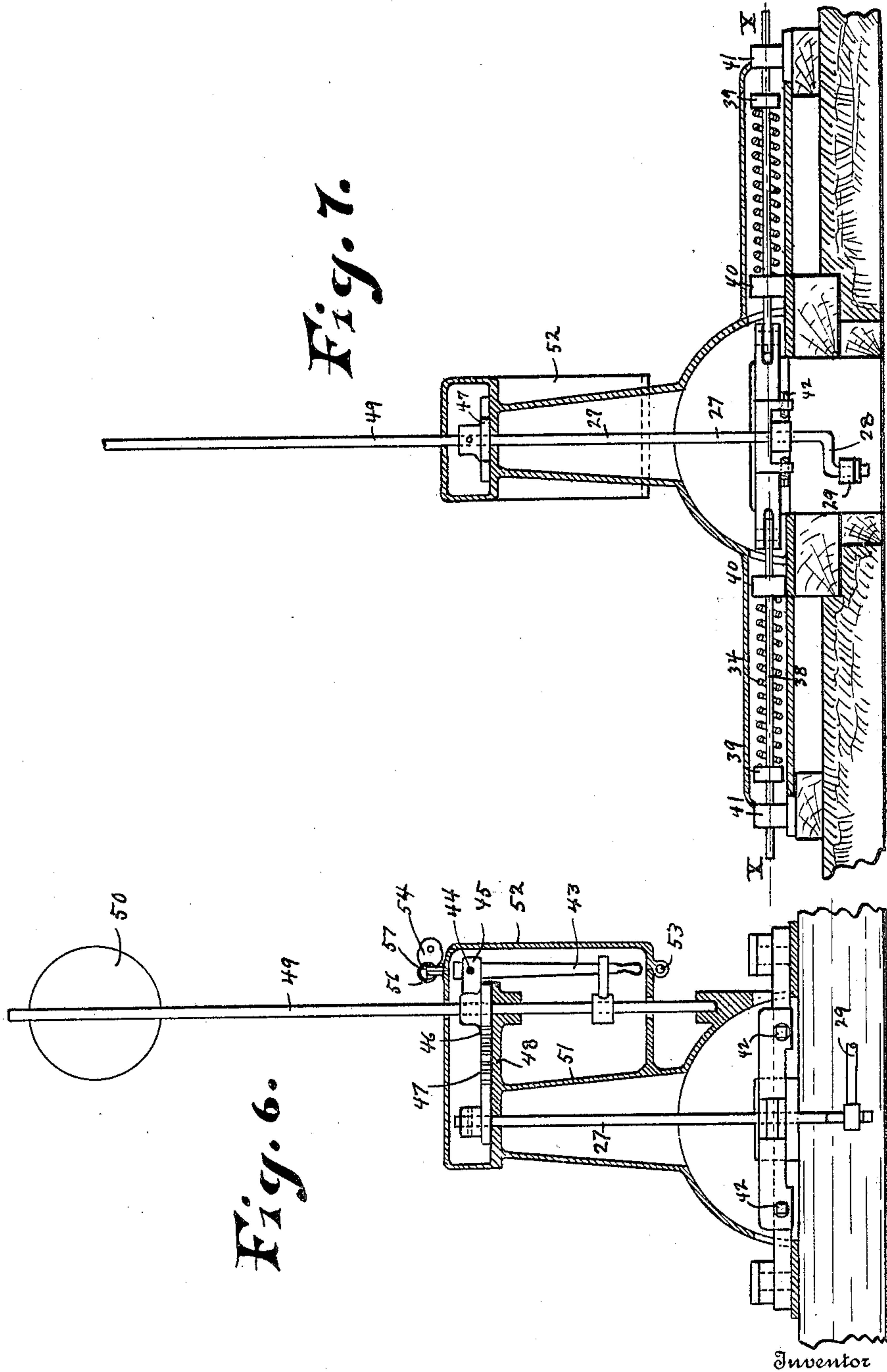
No. 822,358.

PATENTED JUNE 5, 1906.

A. M. FRISH.  
AUTOMATIC RAILWAY SWITCH.

APPLICATION FILED OCT. 23, 1905.

3 SHEETS—SHEET 3.



Witnesses  
O. R. Erwin  
H. H. Schulz

By

Augustus M. Frish  
Erwin & Rhulen

Attorneys.



# UNITED STATES PATENT OFFICE.

AUGUSTUS M. FRISH, OF MADISON, WISCONSIN.

## AUTOMATIC RAILWAY-SWITCH.

No. 822,358.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed October 23, 1905. Serial No. 284,120.

*To all whom it may concern:*

Be it known that I, AUGUSTUS M. FRISH, a citizen of the United States, residing at the city of Madison, county of Dane, and State of Wisconsin, have invented new and useful Improvements in Automatic Railway-Switches, of which the following is a specification.

My invention relates to improvements in automatic railway-switches.

The object of my invention is to provide a device by which a railway-switch may be operated by the engineer from the locomotive or any of the cars connected therewith and thrown toward the right and left while the train is in motion, whereby in case a train or other obstruction is standing upon the main track alongside of said switch and the switch has not been set so as to lead the moving train from the main to the side track the engineer can as he approaches the switch set a contact-bearing connected with the train in such a position that it will cause the switch to be automatically set so that the moving train will run upon the side track past the stationary train or obstruction, whereby a collision with such obstruction is avoided, also whereby in case the stationary train or other obstruction is found to be standing on the side track and the switch is accidentally left so that the moving train would be caused to run upon the side track the engineer upon the moving train may readily set a contact-bearing connected therewith so that the switch will be thrown and set in the opposite direction, whereby the moving train will pass the obstruction and a collision with such obstruction will be avoided.

The construction of my invention is explained by reference to the accompanying drawings, in which—

Figure 1 represents a plan view of my device for automatically operating a switch. Fig. 2 represents a side view of the device shown in Fig. 1. Fig. 3 represents a transverse section of the railway-track, a railway-car, part in section, and a transverse section of the switch-operating mechanism in connection with the track and car. Fig. 4 is a perspective view, part in section, of one end of the device for operating the switch from the train. Fig. 5 represents a horizontal section of a part of the switch mechanism, showing the rods which communicate therefrom to the switch-rails, the same being drawn on line X X of Fig. 7. Fig. 6 represents a verti-

cal section of the hand operating mechanism for setting the switch, and Fig. 7 represents a transverse section of the device shown in Fig. 6 drawn at right angles thereto.

Like parts are identified by the same reference-figures throughout the several views.

My invention comprises, among other things, two sets of toggle-joint levers 1 and 2, which are respectively located upon the respective sides of the railway-track 3. The contiguous ends of the levers 1 and 2 are connected together by the bolts 4, said levers being provided with slots or elongated bearings for the reception of said connecting-bolts, which permit of the required lateral movement of said bolts therein as the contiguous ends of said levers are raised and lowered, while the respective ends of the said toggle-joint levers are connected with the railway-ties 5 5 of the track by brackets 6 6 and bolts 7 7. The respective sets of toggle-joint levers are connected, near their contiguous ends, with a transverse shaft 10 by the respective arms 11 and 12. The relative position of said arms 11 and 12 to each other is such that when one is thrown upwardly by turning said shaft 10 on its longitudinal axis the other will be thrown downwardly. For example, when the arm 11 is thrown up in contact with the toggle-joint levers 1 upon the right, as shown in Fig. 2, the arm 12 will be thrown down beneath the other set of toggle-joint levers 2, as indicated on the left-hand side of shaft 10 in Fig. 2. The arm 11 is connected with the toggle-joint levers 1 upon one side of the track, and the arm 12 is connected with the toggle-joint levers 2 upon the opposite side of the track, whereby it will be obvious that when one set of toggle-joint levers is forced down to a horizontal position by contact with a bearing from a moving train the other set of toggle-joint levers will be thrown up by the opposite arm, so that one or the other set of levers will always be retained in the raised position, while the other set will always be retained in the lower or horizontal position. Motion is communicated to the respective sets of toggle-joint levers from the moving train through the contact-wheels 13 and 14, which wheels are supported from the shaft or axle 15. The shaft 15 may be an integral part of the ordinary car-axle, as shown in Fig. 3, or, if desired, a special shaft may be provided for said contact-wheels. The wheel-supporting shaft may be connected with the car through the



ordinary journal-bearings 9 9. Wheels 13 and 14 are provided with loosely-fitting sleeves 16, which permit them to move longitudinally upon said shaft 15. Said sleeves 16 are each  
 5 provided with two annular flanges 17 17, which sleeves and flanges are formed integrally with said bearing-wheels. When desirous to throw either of said contact-bearing wheels  
 10 13 and 14 into or out of contact with the toggle-joint levers, said bearing-wheels are shifted to the right or left on their supporting-shaft by the operator from the moving train through the levers 18 18. Levers 18 are respectively connected with the body of the  
 15 car above through the car-supporting bearings 19 19, brackets 20 20, and pivotal bolts 21 21. The lower ends of the levers 18 are provided with bifurcated bearing ends 22, which operate respectively upon the respective  
 20 sides of the sleeves 16 between the flanges 17, whereby it is obvious that when the upper end of either of the levers 18 is thrown toward the left motion will be communicated through said levers to the bearing-  
 25 wheels 13 and 14 and said bearing-wheels will be shifted toward the right, while by a reverse movement of said levers 18 said bearing-wheels will be shifted toward the left, whereby the engineer may at pleasure shift  
 30 said bearing-wheels so that they will operate the toggle-joint levers upon either side of the track as occasion may require and whereby motion may be communicated through said toggle-joint levers, as hereinafter described, to the switch by the switch operator  
 35 at a distance from the approaching train. Motion is communicated from the toggle-joint levers 1 and 2 to the switch through the said arms 11 and 12, arm-supporting shaft  
 40 10, two-armed lever 23, transverse pivotal bolts 24 24, connecting-links 25 25, two-armed lever 26, vertical shaft 27, horizontal arm 28, link 29, pivotal connection 30, and switch-bar 31, which switch-bar 31 is connected with  
 45 the moving ends of the switch-rails 32 by the ordinary clamping-brackets 33.

Thus it will be understood that when one set of toggle-joint levers is thrown down by the contact-bearing the switch-rails 32 will  
 50 be thrown in one direction and when the other set of toggle-joint levers is thus thrown down switch-rails 32 will be thrown in the opposite direction, and the engineer can determine which set of toggle-joint levers shall be operated by the approaching train by shifting  
 55 either one or the other of said operating-levers 18 as circumstances may require.

It will be understood that when the switch is moved in either direction, as described, it  
 60 is necessary that the same be rigidly held in place in contact with the rails of the track until the train has passed. To accomplish this object, the two-armed lever 26, through which motion is communicated from the  
 65 links 25 to the switch, is provided with a re-

taining mechanism by which when the lever 26 is carried by the links 25 slightly past the center of its movement in either direction it will be thrown to and retained at the extreme  
 70 limit of its movement. This end is accomplished by the resilient action of the springs 34, whereby said switch will be retained in place until reversed in the opposite direction. Motion is communicated from the two-  
 75 armed lever 26 to the springs 34 through the arm-retaining sleeve 35, radial arms 36, pivotal bolts 37, links 38 38, and spring-actuating bearings 39 39. The links 38 are retained in place by the brackets 40 40 and 41 41. The inner ends of the springs 34 bear against the  
 80 brackets 40, while their outer ends are in contact with the bearings 39.

Thus it will be obvious that as the two-armed lever 36 is turned in either direction said  
 85 links 38 will be drawn inwardly by the circular movement of the arms 36, whereby the bearings 39 39 will be drawn inwardly against the spiral springs 34, and whereby said springs 34 will be compressed. When, how-  
 90 ever, said two-armed lever has been carried in either direction slightly past the center of its movement, it will be thrown to the limit of such movement by the recoil of said spiral springs 34, whereby the switch, which is con-  
 95 nected, as hereinbefore described, with said two-armed lever 26, will be held in place until by the reverse action of said two-armed lever 26 the several parts will be thrown in the opposite direction. 42 42 are adjusting-  
 100 screws having threaded bearings in the bracket 35 and adapted to bear at their inner ends against the respective arms of the lever 26, whereby the movement of said arms in said bracket may be limited as circumstances may  
 105 require.

I have thus far described the switch mechanism as adapted to be operated from a moving train. The same, however, is also adapted to be manually operated as follows:

When desirous to operate the switch manually, I connect the operating-handle 43 with  
 110 the upper end of said vertical shaft 27 through the pivot 44, bracket 45, gear-segment 46, and gear-segment 47, whereby it is obvious that when turning said lever 43 said  
 115 shaft 27 will be turned in its bearings and motion will be communicated therefrom to the switch, as previously described. The gear-segment 46 is connected with the supporting-frame 48 through the vertical shaft  
 120 49. The upper end of said shaft 49 is provided with an ordinary signal 50, by which the position of the switch is indicated. 51 is an inclosing case which is provided with a  
 125 handle inclosing cover 52, by which cover access to the operating-handle 43 is prevented, except by those who have authority to open the same. The cover 52 is secured at its lower side to the case 51 by hinges 53 and is  
 130 secured in its closed position by an ordinary



padlock 54, which engages the fastening-lugs 56 and 57 to the case and cover.

It will be understood that when the switch is operated automatically the handle or gear-segment with which it is connected are also free to move with movement of the other co-operating parts the same as if they were moved manually. The hand operating mechanism is in no way locked, but is simply inclosed, so that access to the operating lever or mechanism cannot be reached from the exterior of the inclosing case.

To prevent the toggle-joint levers from being accidentally operated or from being meddled with or operated otherwise than by the moving train, I preferably inclose them with the covers 58 58. The covers 58 are respectively pivotally connected with the ties 60 along the track by the horizontal plates 61 61 and the hinge connections 62 62. The covers 58 are so shaped as to meet centrally above the toggle-joint levers 1 and 2, as shown in Figs. 3 and 4, and they are retained in their closed position above the toggle-joint levers by the recoil of the spiral springs 63, which springs are connected with the respective covers 58 through the downwardly-extending arms 64 64 and the spring-supporting bolt 65.

Thus it will be obvious that when the contiguous edges of the cover 58 58 are thrown apart by contact with the bearing-wheels 13 and 14 as said bearing-wheels pass between them in the act of operating the toggle-joint levers said springs 63 will be compressed between the arms 64 64; that as soon as the bearing-wheels 13 and 14 have passed from between the upper edges of the inclosing covers said covers will be thrown together above the toggle-joint levers by the recoil of the spiral springs 63. It will be understood that the covers not only serve to prevent the toggle-joint levers from being tampered with, but that they also prevent them from being obstructed by snow or otherwise. To facilitate the bearing-wheels 13 and 14 entering between the contiguous edges of the covers 58 58 from either direction, respective ends of said covers 58 58 are curved outwardly, forming the angular contact-bearings 59 59, as indicated in Fig. 4. To facilitate showing the toggle-joint mechanism, the covers 58 have been omitted from Figs. 1, 2, and 7.

It is understood that by the construction shown the switch-rails will begin to move as soon as the bearing-wheels of the train are brought in contact with the extreme ends of the toggle-joint levers and that said switch-rails will not be brought to the end of their movement until the contact-bearings of the train reach the center of said levers, owing to which fact the switch and switch mechanism are gradually closed and the liability of breaking the same, which would otherwise occur were such parts moved quickly by direct

contact of the wheels of the moving train, is avoided.

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

1. An automatic railway-switch system consisting of the combination of two sets of toggle-joint levers respectively located upon the respective sides of the railway-track, means for communicating a vertical movement from one of said sets of toggle-joint levers to the other whereby as the contiguous ends of one set of said levers are forced downwardly the other set will be raised; means connected with a railway-train for forcing down either one of said sets of toggle-joint levers and simultaneously raising the other at the will of the person on the train as the train approaches the switch whereby one of said sets of levers is always in position to actuate the switch; and means connected with said toggle-joint levers for communicating motion therefrom to the switch at a distance.

2. An automatic railway-switch system consisting in the combination of two sets of toggle-joint levers respectively located upon the respective sides of a railway-track; a straight transverse shaft communicating between the said toggle-joint levers across the track provided at its respective ends with radial arms extending outwardly and at opposite directions from such shaft beneath the respective sets of toggle-joint levers whereby as one of said sets of levers is thrown downwardly against one of said arms the other arm will be thrown upwardly beneath and caused to raise the other set of levers; means connected with a railway-train for forcing down either one of said sets of toggle-joint levers and simultaneously raising the other at the will of a person on the train as the train approaches a switch; and means connected with said toggle-joint levers for communicating motion therefrom to a switch at a distance.

3. In an automatic railway-switch of the class described the combination with two sets of toggle-joint levers through which motion is communicated from the moving train to the switch, of a pair of covers pivotally connected with the ties of the railway-track by hinge connections and provided upon their lower sides with downwardly-projecting arms extending past and beneath said toggle-joint levers, a resilient spring interposed between said arms, said spring being adapted by its recoil to throw said arms apart, whereby said covers are brought together above said toggle-joint levers, all substantially as and for the purpose specified.

4. An automatic railway-switch system consisting of the combination of two sets of toggle-joint levers respectively located upon the respective sides of the railway-track; means for communicating a vertical movement from one of said sets of toggle-joint le-



vers to the other whereby as the contiguous  
ends of one set of said levers are forced down-  
wardly the other set will be raised; means con-  
nected with a railway-train for forcing down  
5 either one of said sets of toggle-joint levers at  
the will of a person on the train as the train  
approaches the switch; means connected with  
said toggle-joint levers for communicating  
motion therefrom to the switch at a distance;  
10 additional means connected with said switch  
for operating the same manually; and means  
connected with the switch-operating mechan-  
ism for throwing the switch-rails after being  
first moved a slight distance by the toggle-  
15 joint levers with a quick positive action to the  
limit of their movement in either direction in-  
dependently of the action of said toggle-joint  
levers.

5. An automatic railway-switch system  
20 consisting in the combination of two sets of  
toggle-joint levers respectively located upon  
the respective sides of the railway-track; a  
covering for said toggle-joint levers; means  
for automatically closing said covers above  
25 the toggle-joint levers when at rest; means  
carried by the moving train for separating  
said covers above said toggle-joint levers as

they are actuated from the moving train;  
means for communicating a vertical move- 30  
ment from one of said sets of toggle-joint le-  
vers to the other whereby as the contiguous  
ends of one set of said levers are forced down-  
wardly the other set will be raised; means con-  
nected with a railway-train for forcing down  
either one of said sets of toggle-joint levers 35  
at the will of a person on the train as the train  
approaches the switch; means connected with  
said toggle-joint levers for communicating  
motion therefrom to the switch at a distance;  
40 additional means connected with said switch  
for operating the same manually; and means  
connected with the switch-operating mechan-  
ism for throwing the switch-rails after being  
first moved a slight distance by the toggle-  
45 joint levers with a quick positive action to  
the limit of their movement in either direc-  
tion independently of the action of said tog-  
gle-joint levers.

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

AUGUSTUS M. FRISH.

Witnesses:

T. A. COLEMAN,  
S. G. SMITH.