

No. 883,358.

PATENTED MAR. 31, 1908.

J. W. SPARKS & C. J. ALLEN.  
AUTOMATIC RAILWAY SWITCH.

APPLICATION FILED OCT. 16, 1907.

5 SHEETS—SHEET 1.

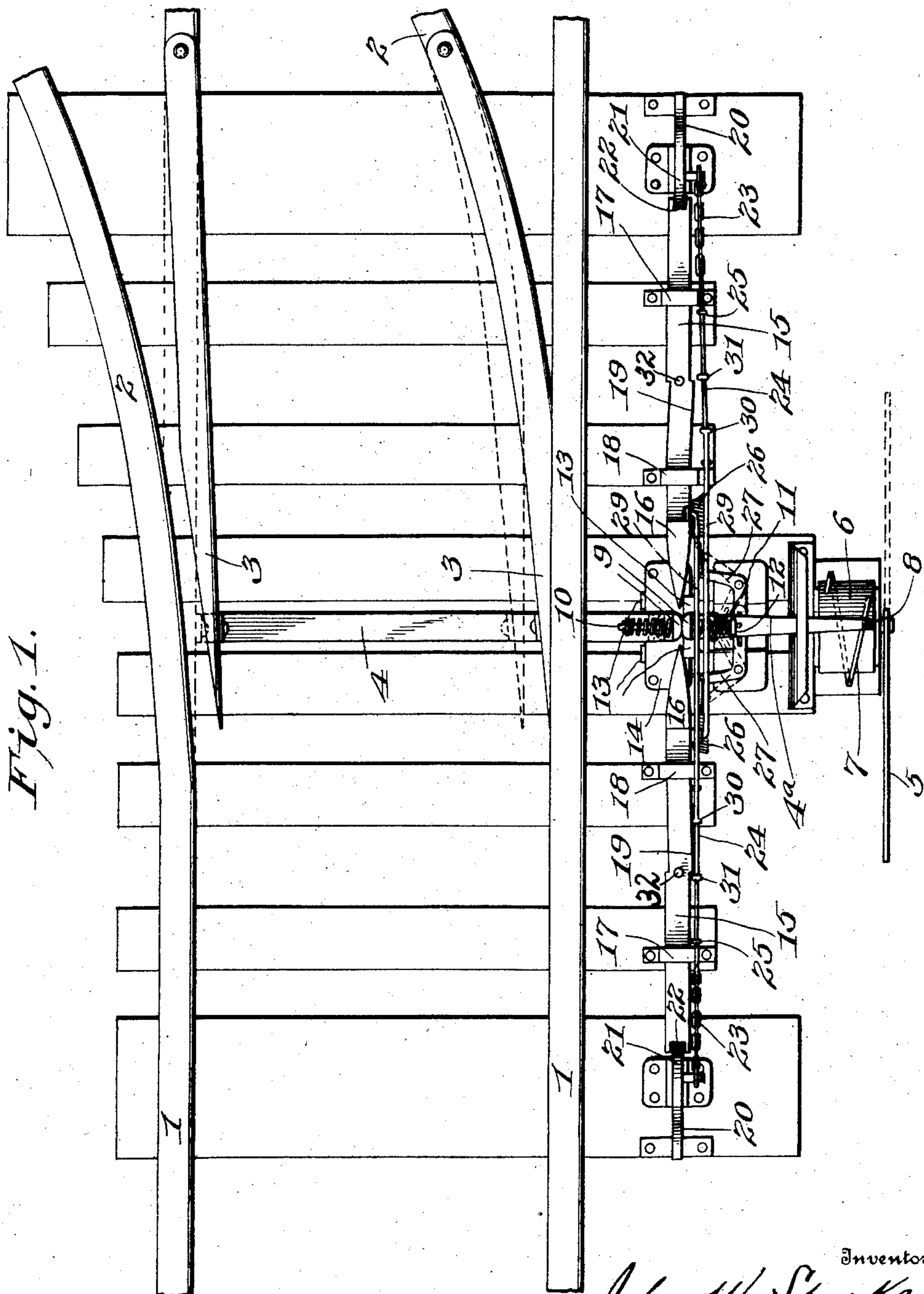


Fig. 1.

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5 SHEETS—SHEET 2.

Fig. 2.

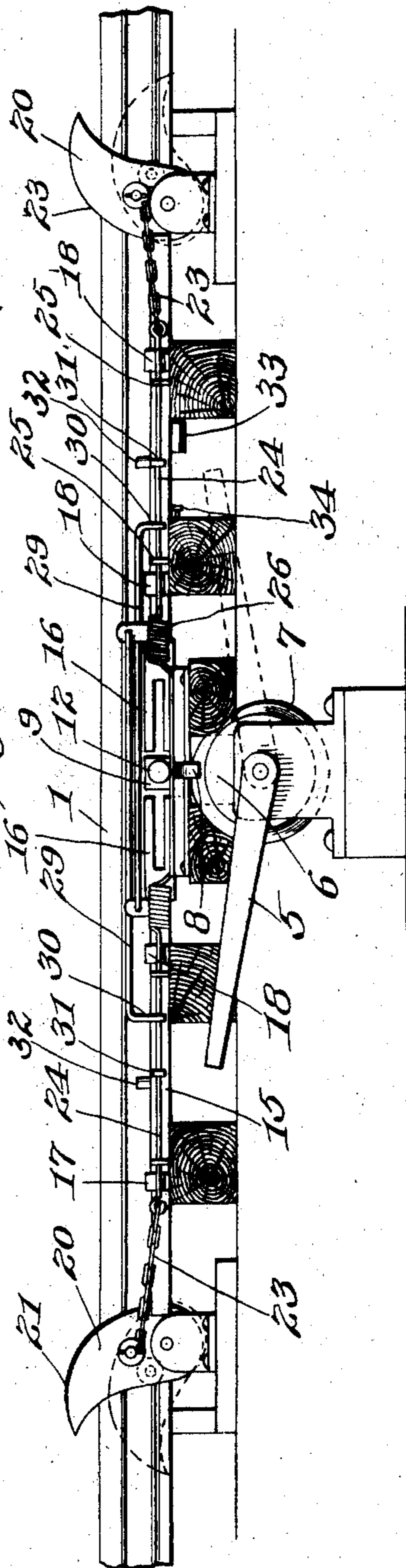
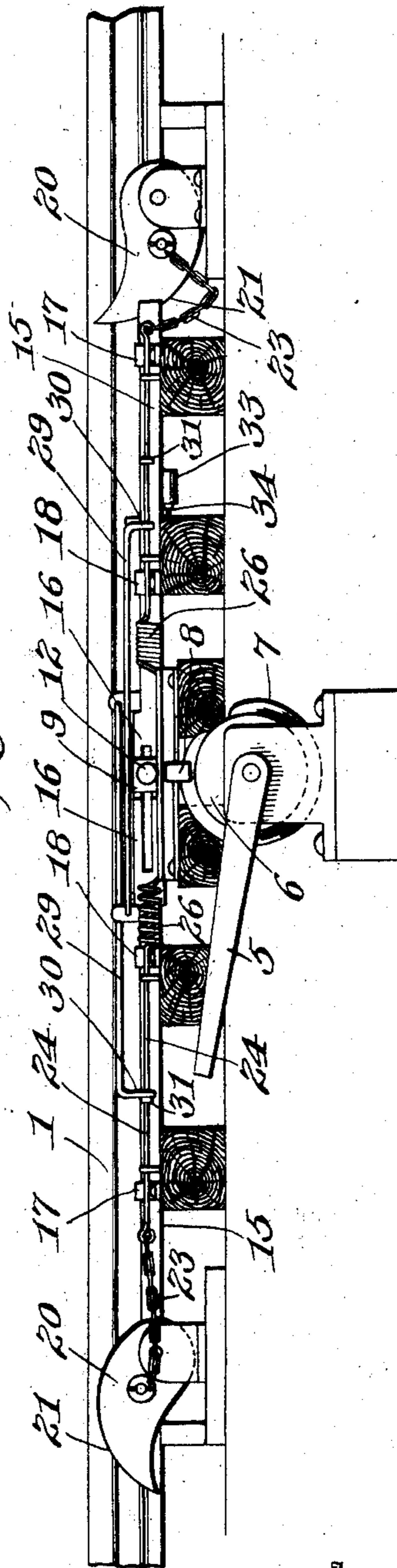


Fig. 3.



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5 SHEETS—SHEET 3.

Fig. 4.

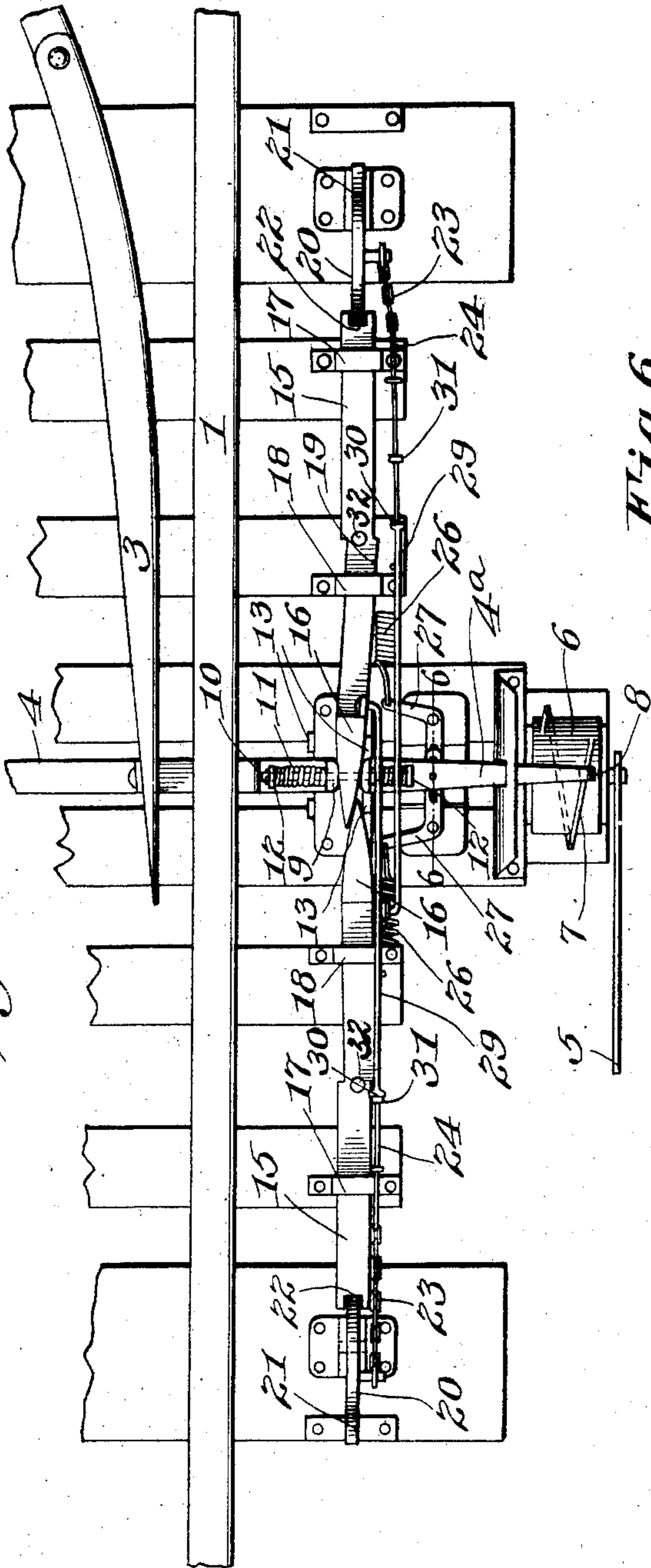


Fig. 6.

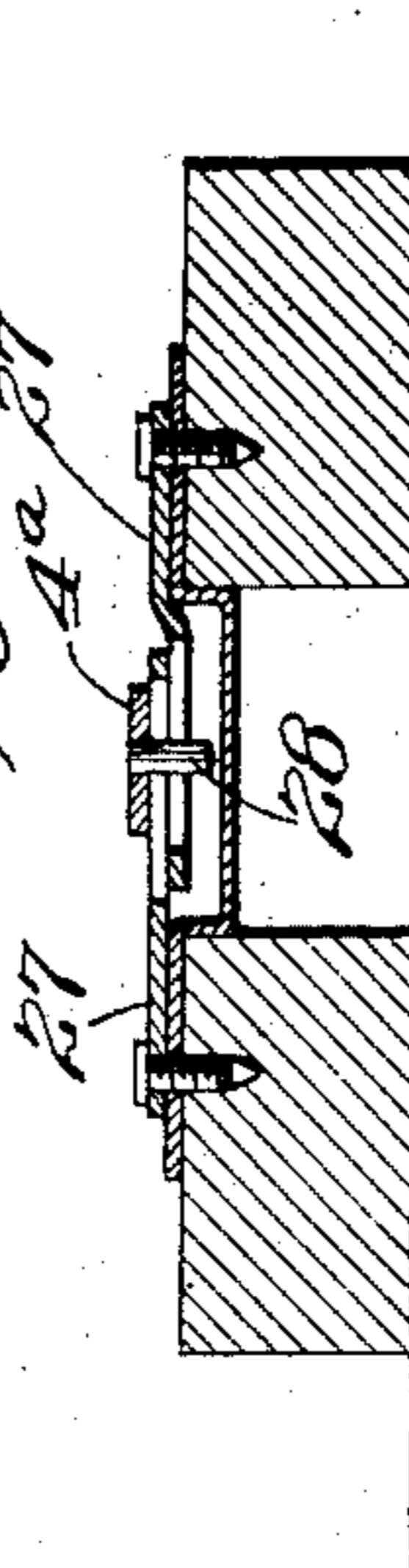


Fig. 5.

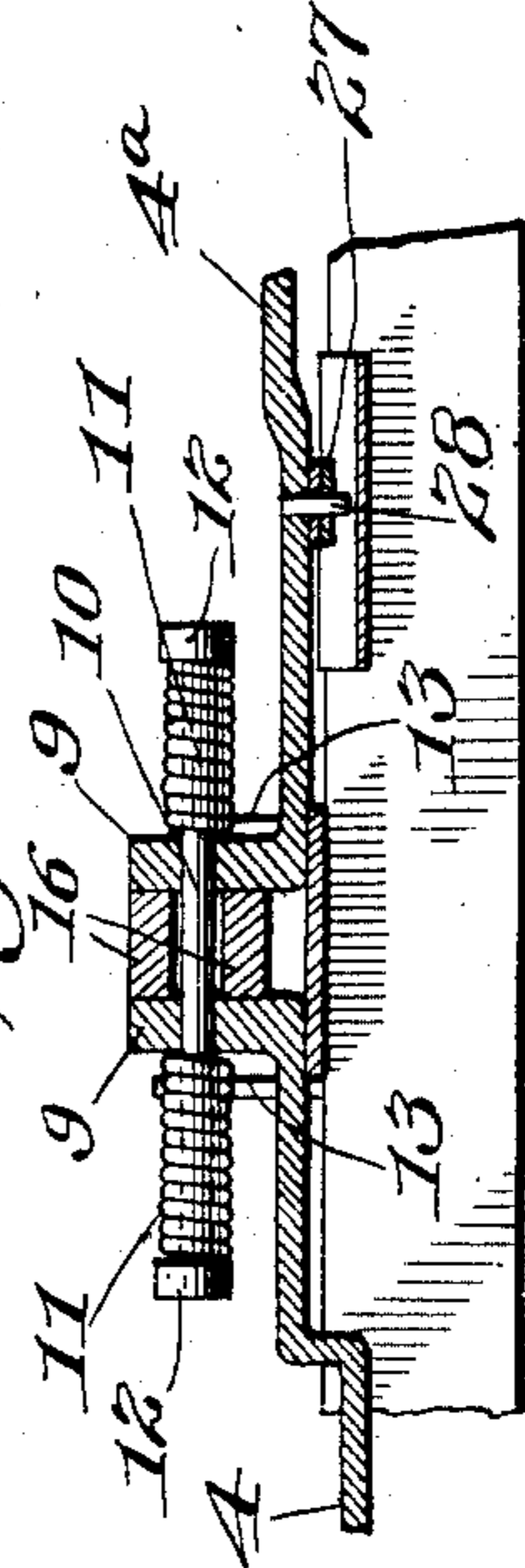
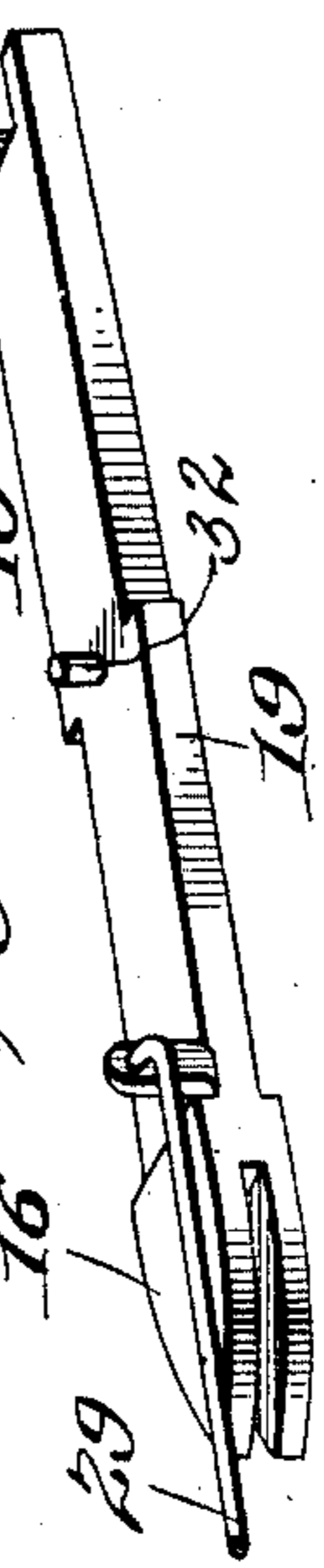


Fig. 7.



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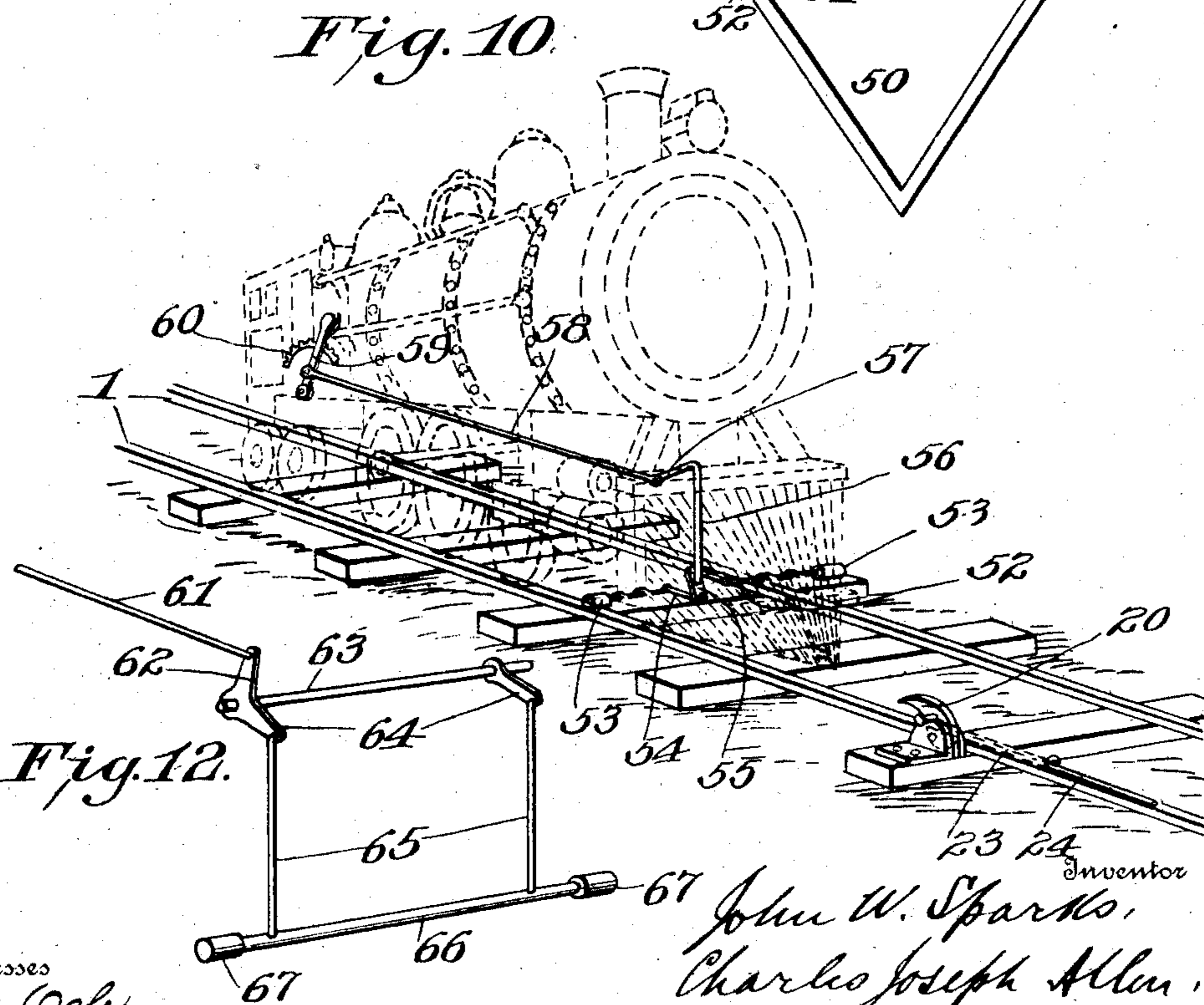
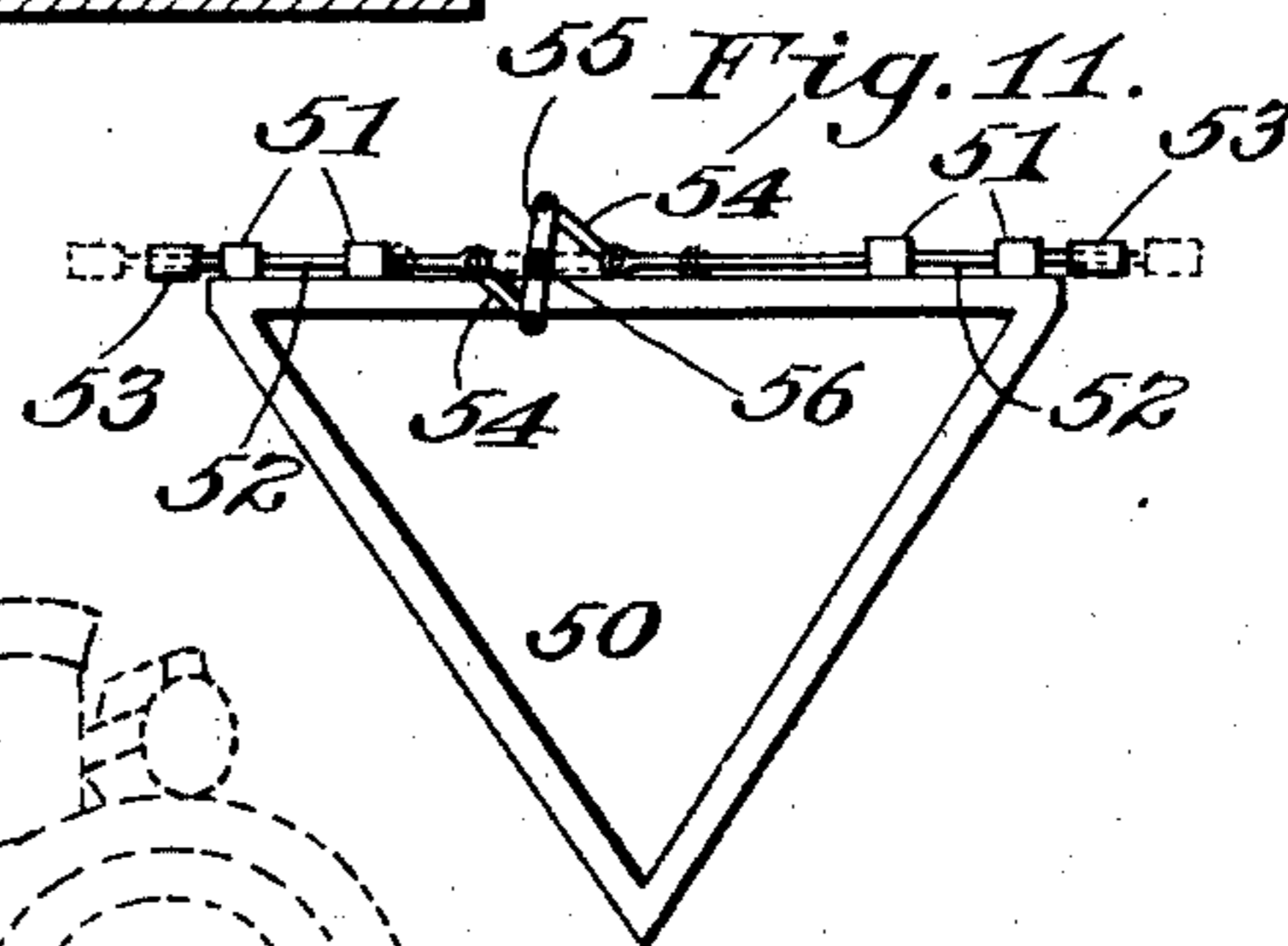
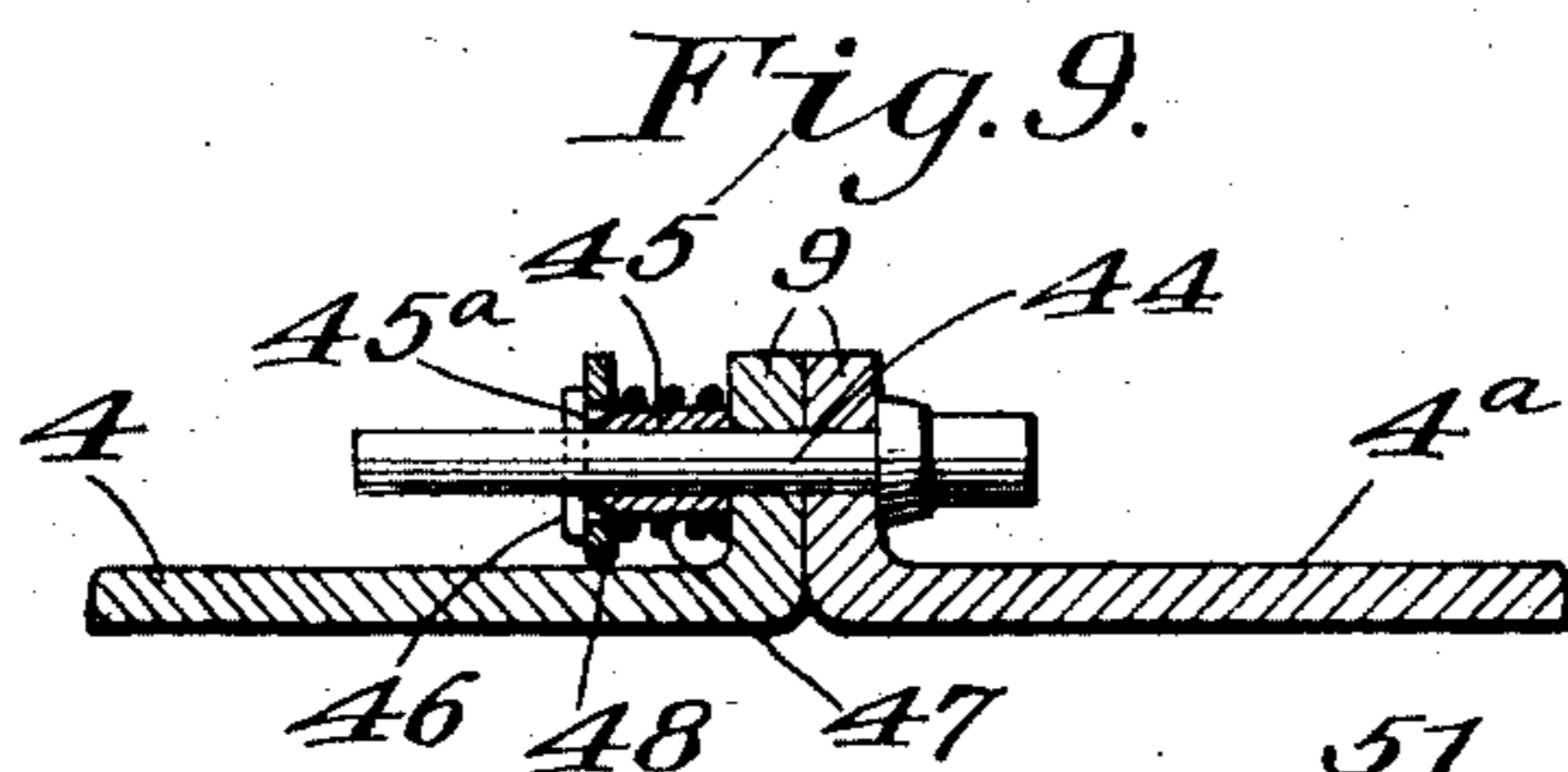
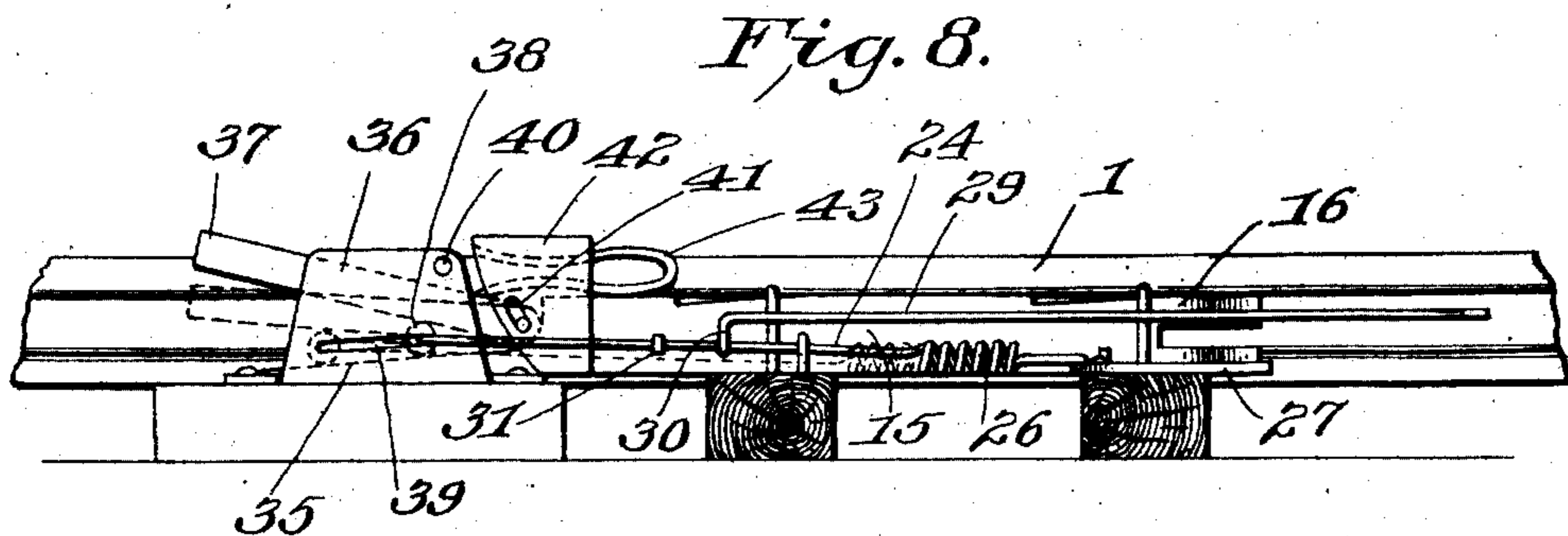
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5 SHEETS—SHEET 4.



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5 SHEETS—SHEET 5.

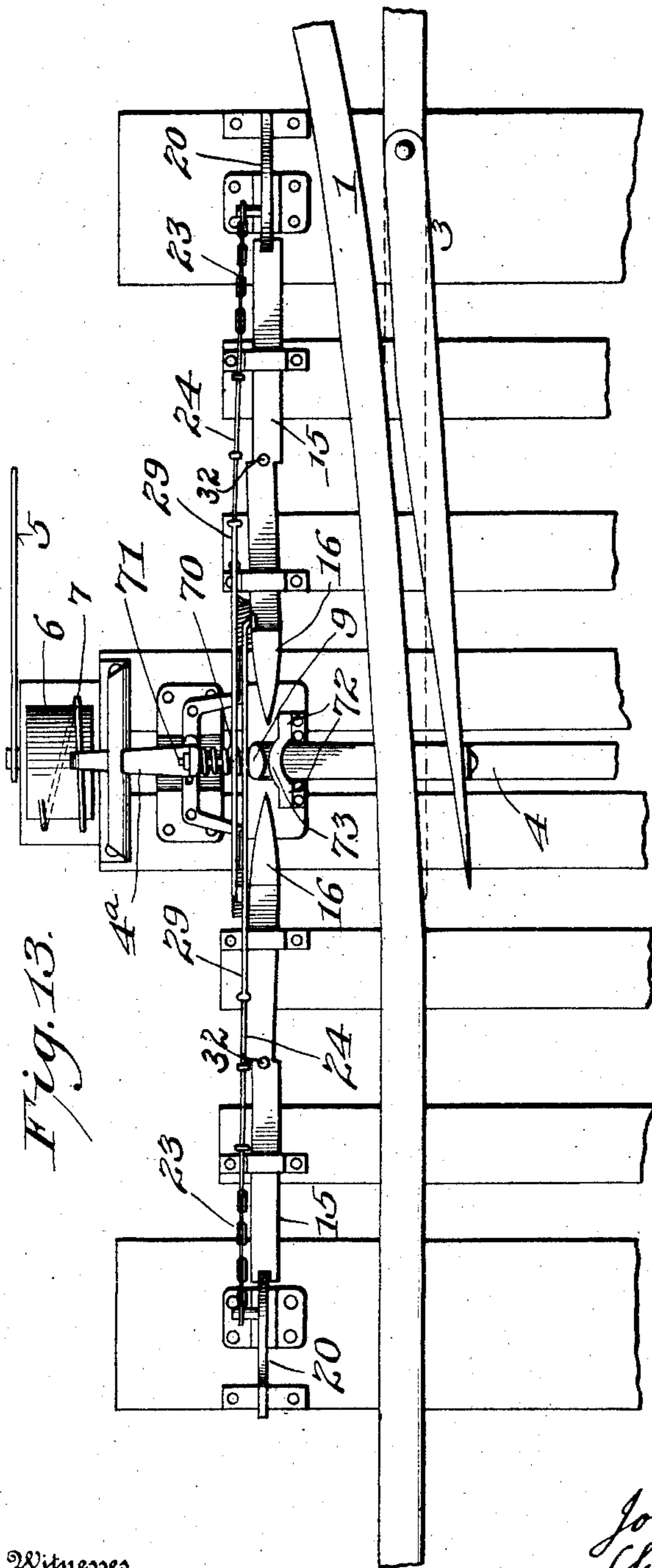


Fig. 13.

Fig. 15.

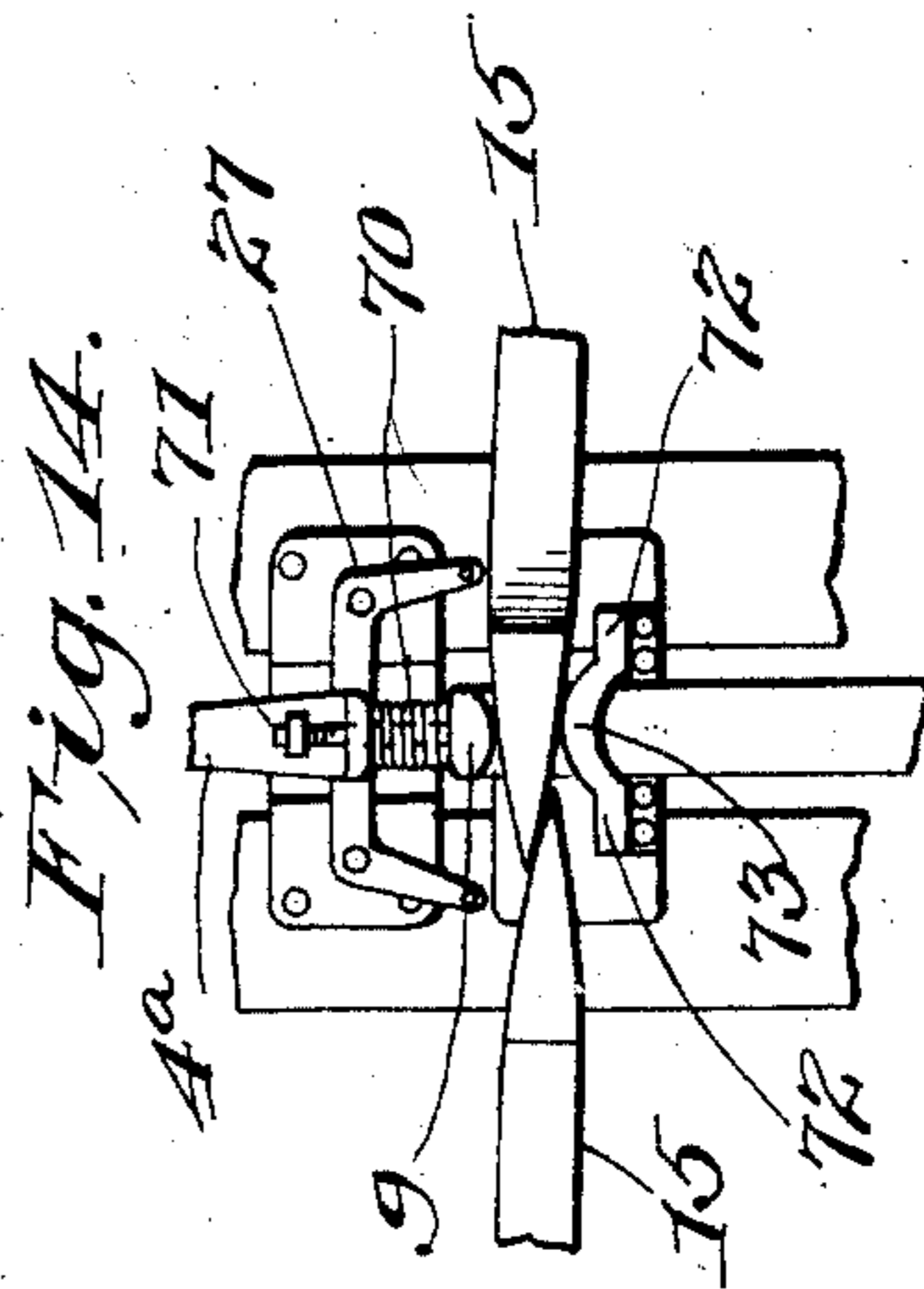
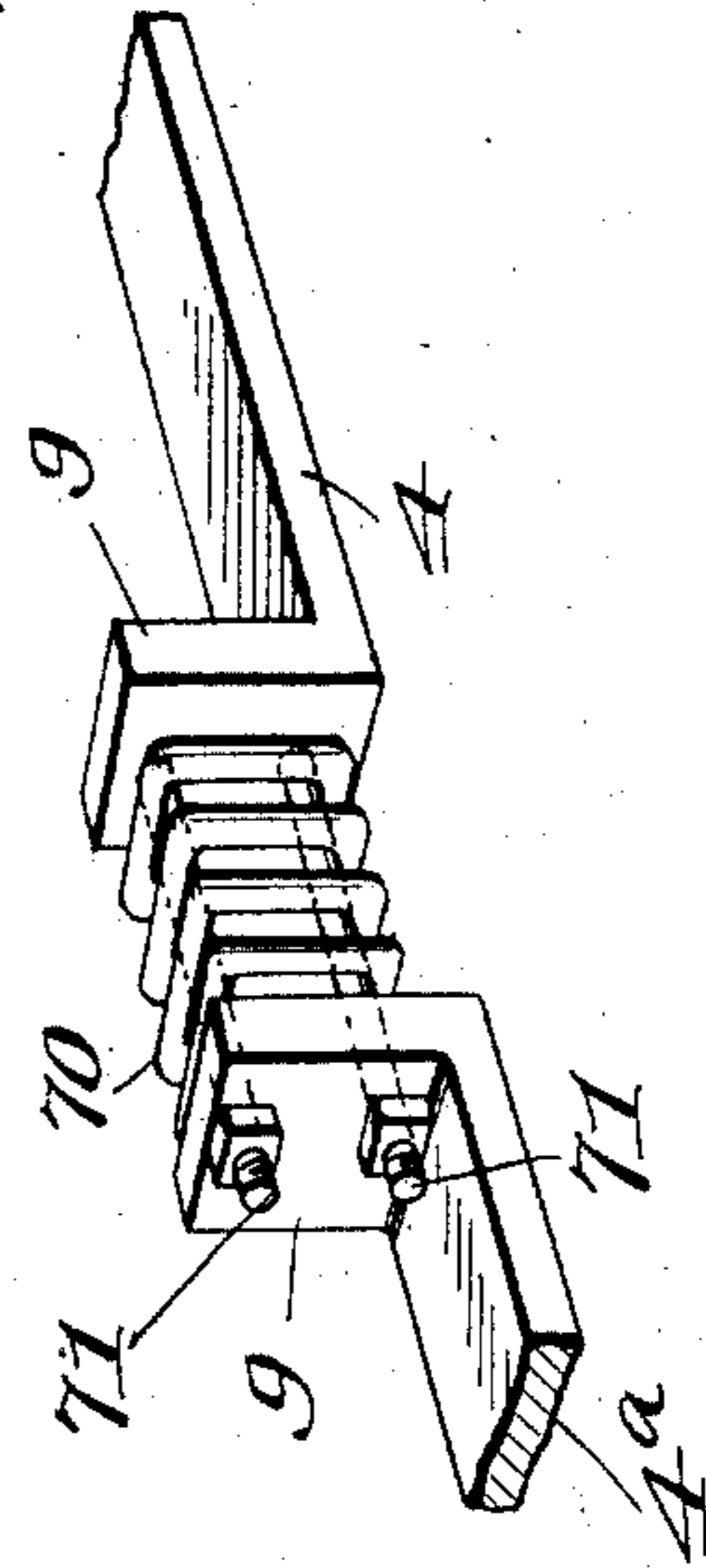


Fig. 14.

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# UNITED STATES PATENT OFFICE.

JOHN W. SPARKS AND CHARLES JOSEPH ALLEN, OF SABINA, OHIO.

## AUTOMATIC RAILWAY-SWITCH.

No. 883,358.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed October 16, 1907. Serial No. 397,657.

*To all whom it may concern:*

Be it known that we, JOHN W. SPARKS and CHARLES JOSEPH ALLEN, citizens of the United States, residing at Sabina, in the county of Clinton and State of Ohio, have invented certain new and useful Improvements in Automatic Railway-Switches; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates more particularly to that class of railway switches that are operated by the approaching train at the will of the engineer, whereby the main line may be kept clear and the danger of accidents by running into open switches may be avoided.

The main object of the invention is to provide an improved switch of the above noted character, positive, instantaneous and reliable in action.

As a further object, the invention provides a switch that may be operated either automatically by the moving train or manually by an ordinary switch-lever, the two instrumentalities operating independently.

As a further object, the invention comprises an automatic train-operable switch-throwing mechanism, which may be applied to any of the ordinary switch-stands, or used in conjunction with any of the well known manual switch-throwing levers or devices already in use, as well as with the device provided by this invention.

As a further object, the invention comprises an improved manual switch-throwing device which is particularly adapted for use in connection with the automatic switch-throwing mechanism.

A practical embodiment of the invention is illustrated in the accompanying drawings which form a part of this specification, and with reference to which the invention will be fully described and then more particularly pointed out and defined in the claims following this description.

Figure 1 of said drawings is a plan view of a switch embodying our invention, the switch being represented in open position, to which position it has been thrown by the switch-lever, and the dotted lines indicating the closed position of the switch when the switch-lever is reversed. Fig. 2 is a side view of the switch as shown in Fig. 1, with dotted lines indicating the position of the switch lever and other parts when the switch is closed. Fig.

3 is a side elevation of the switch when thrown to closed position by the automatic-throwing mechanism which has been struck by a projection carried by the locomotive. Fig. 4 is a plan view of the switch according to Fig. 3, showing the mode of closing the switch by the train-operated mechanism. Fig. 5 is a detail sectional view taken longitudinally through a divided portion of the switch bar between the track and the switch-lever. Fig. 6 is a detail section on line 6—6 of Fig. 4. Fig. 7 is a perspective view of one of the plunger-bars, constituting a part of the train-operated switch-throwing mechanism. Fig. 8 is a side view of a modified form of train-operated switch-throwing mechanism, the full lines indicating the operative position, which position is automatically assumed when the switch-lever is thrown to open the switch. Fig. 9 is a detail sectional view of a modified form of division in the switch-bar. Fig. 10 is a perspective view of a portion of the track just ahead of the switch with an approaching locomotive represented by dotted lines and showing diagrammatically a suitable instrumentality mounted on the locomotive, and controlled by the engineer from the cab, for projecting suitable devices for engaging and actuating the train-operated switch-throwing mechanism. Fig. 11 is a plan view of the base of the pilot of the locomotive, showing devices carried thereby for engaging and actuating the train-operated switch-throwing mechanism, the full lines indicating the retracted and inoperative positions of such devices, and the dotted lines indicating the projected and operative positions thereof. Fig. 12 is a perspective view of another form of instrumentality for actuating the train-operated switch-throwing mechanism. Fig. 13 is a plan view of another form of train-operable mechanism embodying our invention, showing the switch open. Fig. 14 is a detail plan view showing the switch closed. Fig. 15 is a perspective view of a modified detail.

In one form where the switch-lever is on the opposite side of the track from the switch side the invention comprises the usual switch-bar joining the movable switch-points and adapted to be shifted by a lever or other manually operable means connected therewith for opening and closing the switch in the regular way. The switch-bar is divided, one member thereof being connected to the two movable switch-points, and the other

member connected to the switch-lever. The said members of the switch-bar are normally held together in such manner as to work practically as a rigid unitary switch-bar when the switch is opened or closed by the switch-lever, while said members are adapted to be parted or separated by either of two opposite wedge-headed plunger-bars which are arranged longitudinally of and beside the track, and are adapted to be shoved end-wise to separate said divided switch-bar; the said plunger-bars being shoved by means of suitable trips, preferably cam-levers engaging the ends of said bars, which trips or cam-levers are adapted to be struck by means carried by the pilot of the locomotive. It is this parting of the switch-bar that effects the automatic closing of the switch by the locomotive, the one member of the switch-bar to which the switch-points are connected being shoved endwise to carry the switch-points to closed position, while the other member remains in the same relation to the switch-lever to which it is connected, so that the position of the latter is not changed by the automatic closing of the switch. The trips or levers which are to be struck by the projection on the engine-pilot for shoving the plunger-bars are, by suitable connection with the switch-bar or with the switch-lever, raised or moved to operative position when the switch is opened, in which position said trips or cam-levers are adapted to be struck by the projection on the engine-pilot, the latter being also projected or retracted into or out of engaging position at the will of the engineer. In another form, when the switch-lever is on the switch side of the track, the invention is substantially similar, except that the divided or separable switch-bar has its members held apart, though connected to operate as a unitary switch-bar, and said members are adapted to be brought together by the action of the wedges to automatically close the switch.

With the foregoing explanation of the general plan and principle of our invention, more specific reference will now be had to the accompanying drawings, in which the numeral 1 denotes the main track-rails, 2 the side track rails and 3 the movable switch-points, the latter being joined to and directly operated by the shiftable switch-bar 4 for opening and closing the switch.

The switch-bar 4 may be connected to and operated by any appropriate switch-lever or hand-operated mechanism, but as a part of this invention we have provided an improved switch-throwing device comprising a lever 5 attached to and adapted to turn axially a substantially cylindrical drum 6, which is rotatably mounted beside the track with its axis at right angles to the rail. Said drum 6 has a spiral 7 thereon in operative engagement with the end of the switch-bar, so as to shift the latter inward or outward ac-

ording to the direction of rotation of the drum. In the case illustrated, the spiral 7 is in the form of a flange engaging between a pair of lugs or projections 8 on the end of the switch-bar; but it is obvious that the switch-bar might carry a plunger or projection engaging in the spiral groove in the drum. When the switch-lever 5 is thrown to the position shown in full lines in Figs. 1 and 2, the switch-bar is pulled outward, thereby opening the switch. When the switch-lever is thrown to its reversed position, indicated by dotted lines in Figs. 1 and 2, the switch-bar is shoved in the opposite direction, thereby closing the switch.

As aforesaid, the switch-bar is divided, in order to permit independent displacement of that member to which the switch-points 3 are connected, under action of the train-operated switch-throwing mechanism. This division of the switch-bar occurs between the track and the switch-lever. For the sake of clearness, the reference symbol 4 is applied in the drawings to the main portion of the switch-bar to which the switch-points 3 are connected, and the symbol 4<sup>a</sup> is applied to the separate shorter length of the switch-bar which is in engagement with the spiral flange on the drum 6. The two members of the switch-bar are, as above noted, held together in such manner as to operate normally as a rigid unitary switch-bar. This may be effected in various ways, but preferably the adjacent ends of the two members of the switch-bar are formed with upstanding abutting lugs or heads 9, and a rod 10 is inserted loosely through suitable apertures in said lugs, and stout coiled springs 11 are arranged on said rod between the respective lugs 9 and collars 12 or other suitable abutments on the ends of said rod, as shown in Figs. 1 and 4, and more clearly shown in Fig. 5. The force or pressure exerted by the opposing springs 11 is sufficient to hold the two members of the switch-bar together, practically as a rigid unitary bar, while yet permitting the forcing apart of said members by the wedge-shaped devices actuated by the train, as hereinafter explained. The lugs 9 are made comparatively stout or heavy, and their contacting faces are rounded or beveled to facilitate the entrance of the said wedges. The divided portion of the switch-bar may be guided between two pairs of lugs 13 rising from a base-plate 14 which is attached on the ties between which the switch-bar 4 reciprocates.

Referring to the train-operated switch-throwing mechanism, as will be seen, two oppositely arranged plunger-bars 15, running longitudinally of the main track, are located at opposite sides of the abutting lugs 9, 9 of the divided switch-bar 4, 4<sup>a</sup>. According to the direction of travel of the train, one of said plunger-bars or the other is adapted to

be shoved inward toward the switch-bar, by means of a projection on the engine-pilot engaging with a suitable trip, cam-lever or other device operating on the far or outer end of the plunger-bar, as will be hereinafter described. The inner or adjacent ends of said plunger-bars 15 are formed or provided with the aforementioned wedges 16, either of which, according to which plunger-bar is operated, will enter between the lugs 9 of the switch-bar and forcibly part or separate the members of the switch-bar against resistance of the springs 11. The lugs 9 are brought into position to admit entry of the wedges 16 when the switch is thrown to open position, as shown in Figs. 1 and 4. When one of the wedges enters between the lugs, the main portion of the switch-bar is displaced, being shoved in a direction away from the switch-lever 5, thereby closing the switch, as shown in Fig. 4; while the shorter length 4<sup>a</sup> of the switch-bar remains fixed in its engagement with the drum 6. As shown in Figs. 2, 3 and 7, the wedges 16 are bifurcated to allow them, when forcing apart the members of the divided switch-bar, to straddle the rod 10 which enters through the lugs 9 and connects them by means of the springs 11. By thus straddling the rod 10, as shown in Figs. 3 and 5, the operating wedge can act equally against the greater parts of the confronting faces of the lugs 9, without obstruction from the said rod.

As will be seen by reference to Fig. 4, when the divided switch-bar is parted by the entrance of one of the wedges 16 between the lugs 9, the point of the acting wedge will pass beyond the point of the opposite wedge. Inasmuch as the wedges are arranged opposite to each other, it is necessary to deflect the acting wedge so that it will pass the point of the other wedge without danger of obstruction. For this purpose the following means is provided. The plunger-bars 15 work back and forth in suitable guides 17 and 18 secured on the rail-ties, leaving sufficient clearance to allow a slight lateral play of the plunger-bars; and the inner portions of said plunger-bars working in the guides 18 nearest the switch-bar are slightly offset or staggered with relation to the outer straight portion of said bars, thereby providing a slight inclined offset 19 at one side, and a corresponding inclined depression at the opposite side. Hence when one of said bars is shoved inward to throw the switch, the inclined offset 19, bearing against the side of its guide 18, will cause the entering wedge 16 to be slightly deflected so as to safely pass the point of the opposite wedge, as shown in Fig. 4.

The plunger-bars 15 extend from opposite sides of the wedge-bar for suitable distances along the track to their operating trips or devices which are adapted to be struck by

the projection carried by the engine-pilot. The preferred devices for actuating the plunger-bars comprise cam-levers 20, fulcrumed behind and below the rear or outer ends of the plunger-bars and having convex-curved cam faces 21 adapted to bear against the outer ends of said bars, the latter being preferably notched or bifurcated as at 22 to provide a guide-bearing for the cam-lever. When the switch is thrown to open position, the cam-levers 20 are adapted to be raised into the path of the projection or engaging device carried by the locomotive, and for this purpose said cam-levers are shown connected by short chains 23 to links or rods 24 which are guided through suitable eyes or guides 25 on the rail-ties, the inner ends of said rods or links 24 being connected through coiled springs 26 to the outer arms of bell-crank levers 27, the inner arms of both of which levers have a pivotal connection with the switch-bar, by means of a stud 28 depending from the switch-bar and engaging slots in the said arm of said bell-crank levers, as shown more clearly in Fig. 6. Hence when the switch-lever 5 is thrown either to open or closed position, the movement of the switch-bar will be imparted through the bell-crank levers 27 and rods 24 to the cam-levers 20, thereby raising the latter to operative position so as to be struck by the projection carried by the engine, or allowing them to fall back to inoperative position according to whether the switch is opened or closed. Each plunger-bar 15 also has attached thereto a rod 29 which extends across the switch-bar and is provided with an eye or loop 30 loosely inclosing the rod 24 at the opposite side; that is, the rod 29 from the plunger-bar at one side of the switch-bar has its loop 30 riding on the rod 24 at the opposite side of the switch-bar. When either of the plunger-bars is shoved inward to separate the divided switch-bar and close the switch, the rod 29 carried by said plunger-bar moves in the same direction and its eye or loop engages a stop or collar 31 on the rod 24 at the opposite side of the switch-bar, the said rod 24 being thereby moved a sufficient distance against resistance of its spring 26 to cause the cam-lever at the opposite side of the switch to drop out of the way of the engine, as represented in Fig. 3. Thus, when the projection carried by the engine-pilot engages the upstanding cam-lever 20 at one side of the switch-bar, the other cam-lever at the opposite side is allowed to drop out of the way of the engine, the switch having also been automatically closed.

To summarize the operation, let us suppose that, by means of the switch-lever 5, the switch is thrown from closed position indicated by dotted lines in Fig. 1 to open position shown by full lines in the same figure. By this movement, the cam-levers 20 are

raised from the inoperative dotted line position in Fig. 2 to the full line position shown in Fig. 2. Assume that a train is passing from right to left looking at Fig. 2, the projection carried by the engine-pilot being in position to engage the cam-lever 20 nearest the engine. Hence, when the engine reaches the first cam-lever, at the right hand end of Fig. 2, it will strike it and throw it forward, as shown in Fig. 3. As the cam-lever is thus thrown forward, the right-hand plunger-bar 15 is forcibly shoved inward toward the switch-bar, and the wedge 16 carried thereby enters between the lugs 9 of the divided switch-bar, as shown more clearly in Fig. 4, thereby parting the divided or separable members of the switch-bar and displacing the main portion thereof to which the switch-points 3 are connected, thus closing the switch. At the same time, this movement of the plunger-bar 15 carries forward the rod 29 attached thereto, so that the eye 30 of said rod 29 engages the stop 31 on the rod 24 at the opposite side of the switch-bar, as shown in Figs. 3 and 4, thus moving the said rod 24 against resistance of its spring 26 so as to let the second cam-lever 20 drop back to an inoperative position, as shown in Fig. 3. The switch is thus automatically closed and locked in closed position, the wedge 16 remaining between the lugs 9 of the divided switch-bar. To withdraw the wedge, both plunger-bars 15 are shown provided with knobs 32, by means of which the switchman can unlock the switch when it is desired to open it by the switch-lever 5.

In connection with the train-operated switch-closing mechanism, provision may be made for exploding a torpedo to warn the engineer that his train has passed and closed a previously opened switch, so that he may, if desired, stop his train to reset the switch, or notify the agent at the next station. For example, there may be secured at the lower side of each of the plunger-rods 15 a box or casing 33 hanging below the level of the upper surface of the cross-ties, and adapted to receive a torpedo which can be exploded by a spike 34 driven in the adjacent cross-tie so as to enter said box and strike the torpedo when the plunger-bar 15 is forced toward the switch-bar. Instead of this arrangement, a torpedo-exploding device may be arranged on the pilot of the engine to be exploded when the projection carried thereby strikes the cam-lever 20.

It is evident that the entire switch-stand and mechanism may be inclosed in a suitable housing or casing of any appropriate construction, leaving exposed only the switch-lever 5 and the cam-levers or trips 20, which latter may project through suitable slots in the upper surface of the said housing or casing. This housing or casing is not shown in the drawings. Where such a housing or cas-

ing is used, the divided connection of the switch-bar and the plunger-bars 15 may be accessible through suitable lids hinged to the top of the box, so that the wedges can be withdrawn and the mechanism reset after the switch has been automatically closed by the train.

While the mechanism hereinbefore described is at present regarded as the best and preferred embodiment of our invention, it is obvious that various modifications may be made in the details of construction thereof and the arrangement of parts, without departing from the principle and scope of our invention, so that we do not desire to limit ourselves to any specific structural embodiment, nor do we desire to limit ourselves essentially to any particular means or devices for manually controlling the switch, or for actuating the train-operated switch-closing mechanism, or for holding together the separable members of the divided switch-bar. For example, Fig. 8 shows a modification of the train-operated switch-closing mechanism. In this figure, only the mechanism at one side of the switch-bar is shown, and the switch-bar itself is omitted since it may be substantially the same as in the preceding figures. In this Fig. 8, the plunger-bar 15, working in suitable guides on the ties, is provided with the wedge-shaped head 16 as in the preceding case. Associated with said plunger-bar 15 is the same rod or link 24, connected by a spring 26 to the bell-crank lever 27 actuated by the shifting of the switch-bar, as in the case already described, and there is also shown the previously described rod 29 extending from the other plunger-bar (not shown) and having its loop adapted to engage a stop or collar 31 on the said rod 34, the functions of these parts being already understood. The outer end of said plunger-bar 15 is cut away to form a downwardly rearwardly inclined portion 35, which may reciprocate in a housing 36 mounted on the ties. In said housing 36 is a trip-lever 37, the forward end of which is pivotally attached to the plunger-bar 15 and bears against the cut away portion of said bar. Between the lever 37 and the incline 35 is a roller 38 carried by the rear end of the rod 24, the axis of said roller projecting through inclined slots 39 in the sides of said casing 36. The upward movement of said lever 37 is limited by a stop 40, which may be a transverse pin connecting the sides of the casing 36. When the switch is normally closed, the roller 38 occupies a position at the rear end of the slots 39, so that the lever 37 is in dotted line position shown in Fig. 8, where it is out of the way of the projection carried by the engine pilot. But when the switch is opened by the switch-lever, the rod 24 being pulled inward, the roller 38 is caused to ride up the incline 35 and lift up the trip-

lever 37 to the position shown in full lines, where it is adapted to be struck by the projection carried by the pilot of the engine. Hence, when the train approaches, the said projection on the engine-pilot will engage the trip-lever 37 and thereby push the plunger-bar 15 inward and throw the switch to closed position in the manner previously explained. As the plunger-bar is moved inward, the lever 37 and incline 35 are pushed to a point where the stop 40 forces the lever 37 beyond the reach of the projection carried by the engine pilot. The pivotal connection between the lever 37 and plunger-bar 15 is shown by means of a pivot-pin on the lever engaging in slots 41 in a casing 42 attached on the plunger-bar. A spring 43 bearing on the forward end of the lever 37 holds its pivot at the lower ends of the slots 41, but allows the lever to be rocked on the roller 38 so as to permit the rear end of the lever to be depressed by the projection carried by the engine coming from the direction of the switch, said switch having been closed by the mechanism on the opposite side.

Fig. 9 shows a modified means for keeping the ends of the divided switch-bar together. A headed pin or bolt 44 projects through the openings in the lugs 9 and carries on its projecting end a sleeve 45. One end of said sleeve 45 bears against the adjacent lug 9 and the opposite end of said sleeve is ground to a knife-edge 45<sup>a</sup> which abuts against a small pin 46 inserted through the rod or bolt 44. When the lugs or heads 9 are parted by the entrance of one of the wedges of the train-operated switch-closing mechanism, the knife-edge 45<sup>a</sup> will cut off the pin 46, and thus allow the necessary displacement of the main length of the divided switch-bar. A spring 47 is shown surrounding the sleeve 45 and forcing a washer 48 against the pin 46, to prevent the knife-edge 45<sup>a</sup> from wearing on the pin 46 under ordinary conditions, that is when the switch is operated by the switch-lever 5.

Inasmuch as the divided switch-bar is separable, the apparatus herein described may be so arranged that the trip on the side of the switch nearest the siding may be brought relatively close to the switch proper, so that the plunger-bar 15 at that side may be relatively shortened, since it is evident that with only the pressure of the springs 11 (Fig. 5) holding the connection together, the flanges of the engine-wheels may exert sufficient pressure against the switch-points to throw the switch to closed position, the action of the automatic switch-throwing device being only necessary to lock the switch by interposing the wedge-shaped head between the lugs 9 and to drop the trip at the opposite side of the switch.

It is understood that in connection with

the train-operated switch-closing mechanism described, any suitable instrumentality may be carried by the engine-pilot, the same being preferably adapted to be thrown into operative or inoperative position at the will of the engineer. As a diagrammatic representation of such instrumentality, in Figs. 10 and 11 the numeral 50 represents the base of the engine-pilot, at the rear of which, in suitable guides 51, are mounted reciprocatory-rods 52, the outer ends of said rods having heads 53 adapted to be moved from the full line position shown in Fig. 11 to the dotted line position shown in the same figure. In the dotted line position, the said heads 53 are adapted to engage the cam-levers 20 or other trips for actuating the plunger-bars 15 (Figs. 1 to 4), when the said cam-levers or plunger-bars are raised to position to be struck. The inner ends of said rods 52 are connected by links 54 to a lever 55 which is rigidly attached at its center to a shaft 56 having a crank 57 connected by a link or rod 58 to a lever 59 in or at the side of the locomotive-cab, said lever carrying a suitable lock-bolt for engaging a segmental-lock 60. As will be seen in Figs. 10 and 11 when the engineer pulls back on the lever 59, the shaft 60 is thereby turned in a position to throw out the rods 52 and project the heads 53 into position for engaging the trips at the ends of the automatic switch-closing mechanism. Another arrangement is shown in Fig. 12, where 61 represents a rod connected with a lever in the engine-cab. Said rod 61 is connected by a lever 62 with a rock-shaft 63 on the engine-pilot, said shaft 63 having arms or levers 64 from which are suspended by means of rods 65 a rod 66 carrying heads 67. By means of the rods 61, the shaft 63 can be turned to elevate or lower the rod 66 and its heads 67, the latter working in suitable guides therefor (not shown). The idea is that when the heads 67 are raised they will pass over the trippets at the side of the track, but when lowered will engage said trippets and thereby automatically close the switch. It is intended that the lugs or projections carried by the engine pilot shall always be in operative position except when it is desired to allow switching.

In Figs. 13 and 14, we have illustrated an embodiment of our invention wherein the switch-stand is on the switch side of the track. The mechanism is substantially the same as in the preceding figures, except that the divided switch-bar 4, 4<sup>a</sup>, instead of having its members held together, has its two members normally separated by a spring 70, shown arranged on a rod or bolt 71 extended through the lugs or heads 9 of the members 4, 4<sup>a</sup> of the divided switch-bar. The spring 70 normally holds or connects the members of the divided switch-bar in such manner as

to operate them as a unitary rigid switch-bar, when the switch is operated by the switch-lever 5. The displaceable member 4 of the switch-bar is guided between two stationary lugs 72, having preferably a bridge 73 connecting them. The said bridge 73 and the confronting surface of the adjacent lug 9 are desirably rounded or beveled. When the train-actuated mechanism is operated, one of the wedges 16 will pass between the part 73 and the adjacent lug 9 and thereby force the main member of the switch-bar toward the switch-lever, compressing the spring 70. This displacement of the switch-bar will of course close the switch.

Fig. 15 shows a modification of the division of the switch-bar and spring; in this case the spring being of a square form and surrounding two rods or bolts inserted through the lugs 9.

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

1. In a railway-switch, the combination with the movable switch-points, of a switch-bar joining said switch-points, and a switch-throwing device operatively-connected thereto, said switch-bar being divided or separable between the track and switch-throwing device but normally connected to operate as a unitary bar, a wedge adapted to enter between bearing surfaces, one of which is on the displaceable member of said switch-bar, and train-operable means for actuating said wedge.

2. In a railway switch, the combination with the movable switch-points, of a switch-bar joining said switch-points, and a switch-throwing device operatively connected thereto, said switch-bar being divided between the track and switch-throwing device and having that member which is connected to the switch-points displaceable, said displaceable member having a bearing surface, an adjacent bearing surface, a plunger-bar beside the track carrying a wedge adapted to enter between said bearing surfaces to displace said displaceable member, a trip at the outer end of said plunger-bar adapted when engaged by means carried by the locomotive to actuate said plunger-bar and shove in the wedge, and connections between said trip and switch-bar whereby the trip is raised to operative position when the switch is opened.

3. In a railway-switch, the combination with the movable switch-points, of a switch-bar joining them, and a switch-throwing device operatively - connected thereto, said switch-bar being divided between the track and switch-throwing device, means for displacing that member of said switch-bar to which the switch-points are joined, a trippet for actuating the same adapted to be engaged by an instrumentality on the approach-

ing train, and means for moving said trippet into operative or inoperative position by the opening or closing of the switch.

4. In a railway-switch, the combination with the movable switch-points, of a switch-bar joining them, and a switch-throwing device operatively - connected thereto, said switch-bar being divided between the track and switch-throwing device, that member of the switch-bar to which the switch-points are joined being movably connected to the other member, a bearing surface, an adjacent bearing surface on the movable member of the switch-bar, oppositely-arranged devices respectively adapted to part said bearing surfaces, trippets for actuating said devices respectively located at removed points at opposite sides of said switch-bar and adapted to be engaged by means on the approaching train, and connections between said trippets and devices whereby when one trippet is engaged and displaced by the train the other trippet is moved to inoperative position.

5. In a railway-switch, the combination with the movable switch-points, of a switch-bar joining them, and a switch-throwing device operatively - connected thereto, said switch-bar being divided between the track and switch-throwing device, oppositely arranged wedges respectively adapted to enter and part two bearing surfaces, one of which is on the displaceable member of said divided bar, and train-operable means for shoving in said wedges.

6. In a railway-switch, the combination with the movable switch-points, of a switch-bar joining them, and a switch-throwing device operatively - connected thereto, said switch-bar being divided between the track and switch-throwing device, spring-means yieldingly holding the members of said bar together, and train-operable means for displacing one member of said bar against the resistance of said spring.

7. In a railway-switch, the combination with the movable switch-points, of a switch-bar joining the same, a switch-lever beside the track, a rotary drum operable thereby, said drum having a spiral engagement with said switch-bar, the switch-bar being divided between the track and drum, and train-operable means for parting said switch-bar.

8. In a railway-switch, the combination with the shiftable switch-bar, the same being divided or separable, of the oppositely-placed wedges for parting two bearing surfaces, one of which is on the displaceable member of said switch-bar, train-operable means for shoving said wedges, and guide-means for deflecting the acting wedge past the point of the opposite inactive wedge.

9. The combination with the divided switch-shifting bar and plunger-bar carrying a wedge for parting said switch-bar, of a trip-

pet for shoving said plunger-bar adapted to  
be engaged by means on the approaching  
train, said trippet consisting of a lever hav-  
ing a convex-curved cam-face bearing against  
5 the rear end of said plunger-bar.

10 10. The combination with the movable  
switch-points, of the switch-bar connected  
therewith, and a switch-throwing device  
comprising a rotary drum and lever for turn-  
ing the same, said drum having thereon a  
spiral guide operatively-engaging said switch  
bar.

11. In a railway-switch, the combination  
with the movable switch-points, of a shift-

able switch-bar joining them, a switch-throw- 15  
ing device operatively-connected therewith,  
the switch-bar being independently displace-  
able relative to its connection with said  
switch-throwing device, and train-operable  
means for displacing said switch-bar. 20

In testimony whereof we affix our signa-  
tures, in presence of two witnesses.

JOHN W. SPARKS.

CHARLES JOSEPH ALLEN.

Witnesses:

P. H. SPARKS,

HOWARD BARNS.