No. 672,445. Patented Apr. 23, 1901.

S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

(No Model.) 9 Sheets—Sheet 1.

Fig. 1.

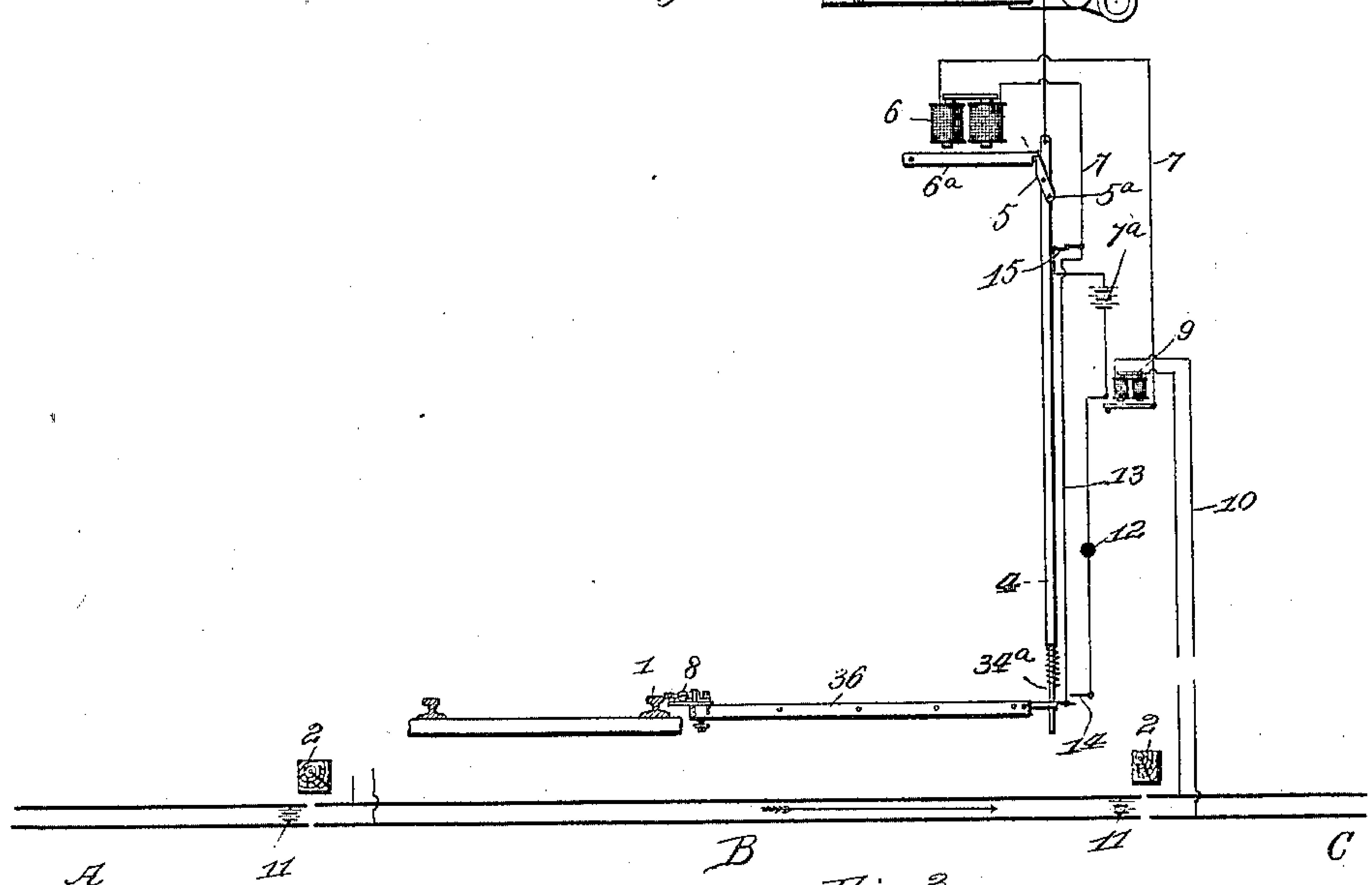


Fig. 2.

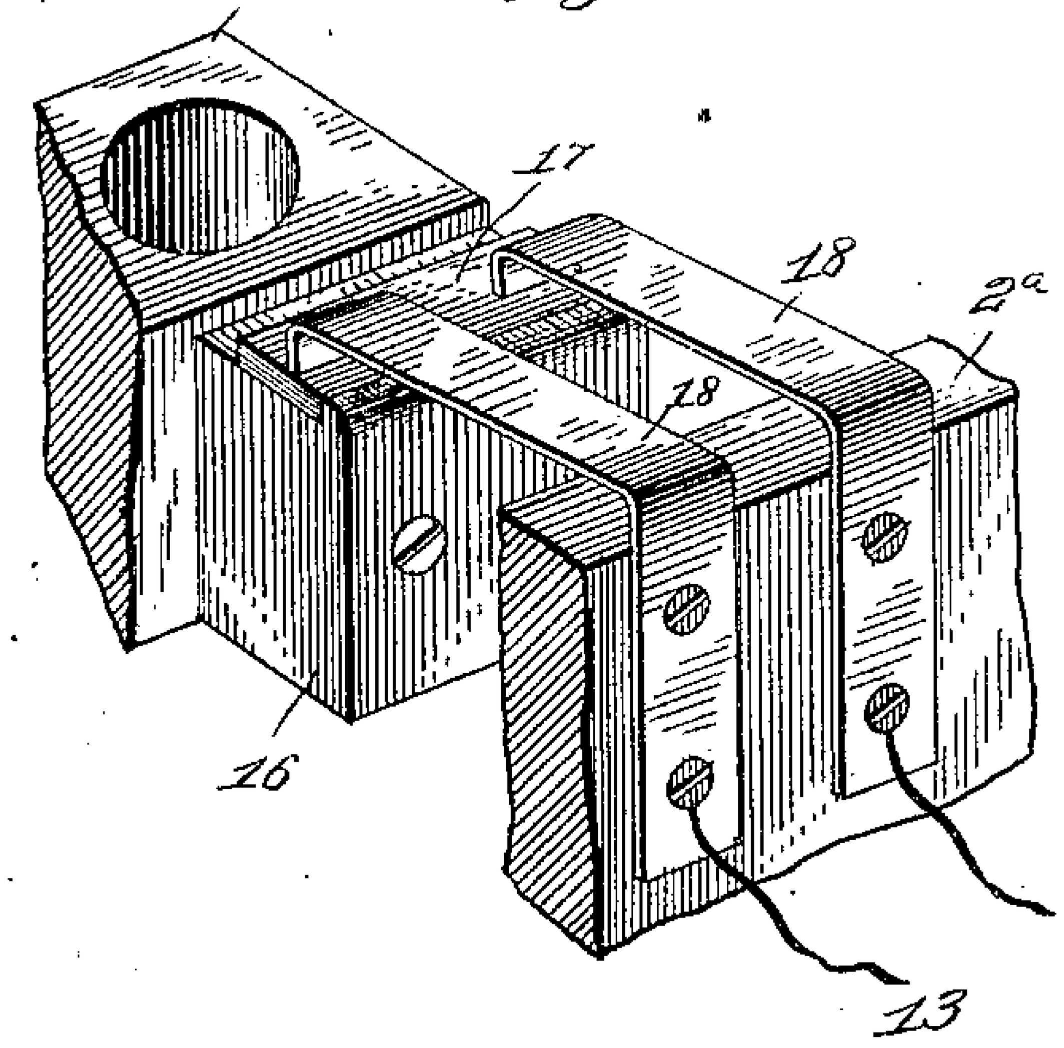


Fig. 3.

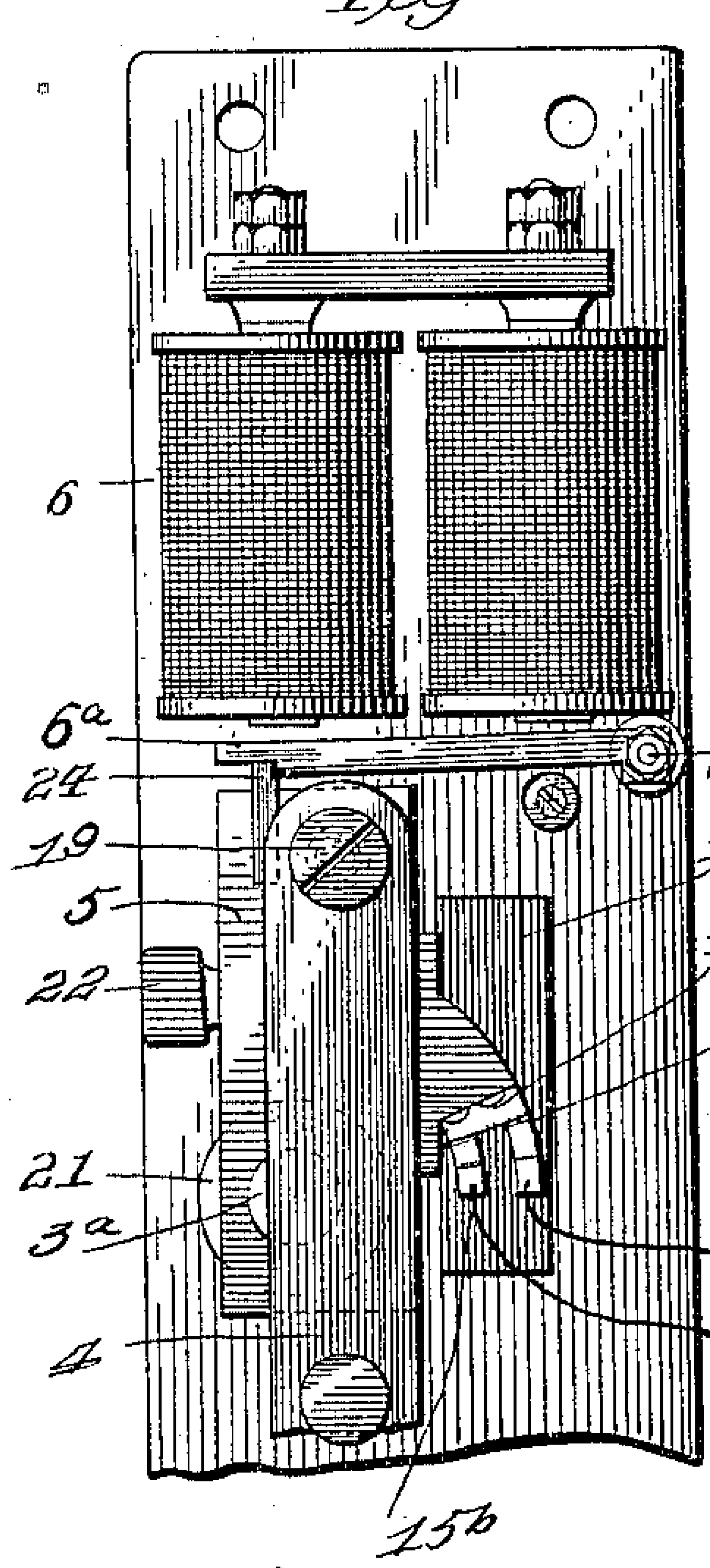
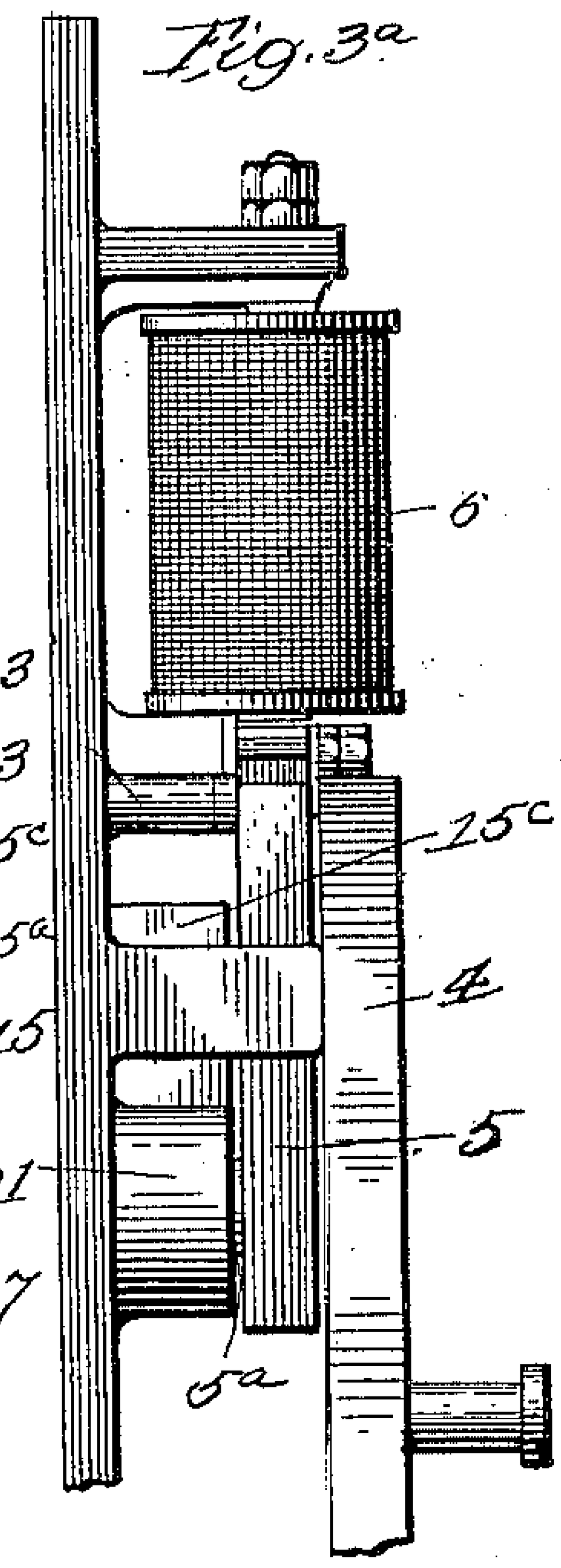


Fig. 3a.



Witnesses

Herbert Bradley

Katharine E. Manning

Inventor

Slaughter W. Huff.

By Howson & Howson(?) Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

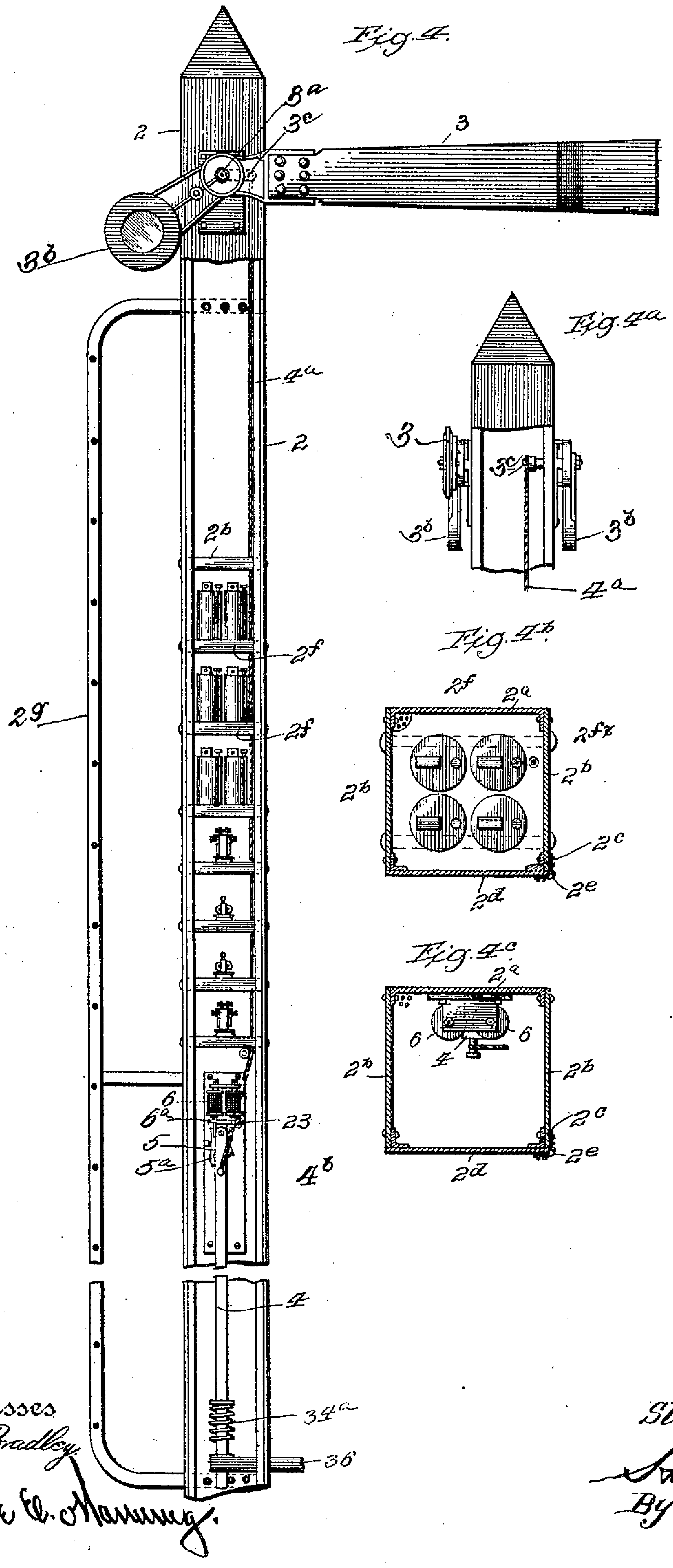
No. 672,445. Patented Apr. 23, 1901.

S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

(No Model.) 9 Sheets—Sheet 2.



Witnesses
Herbert Bradley
Katherine E. Manning

Inventor
Slaughter W. Huff
By Henry E. Knight
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

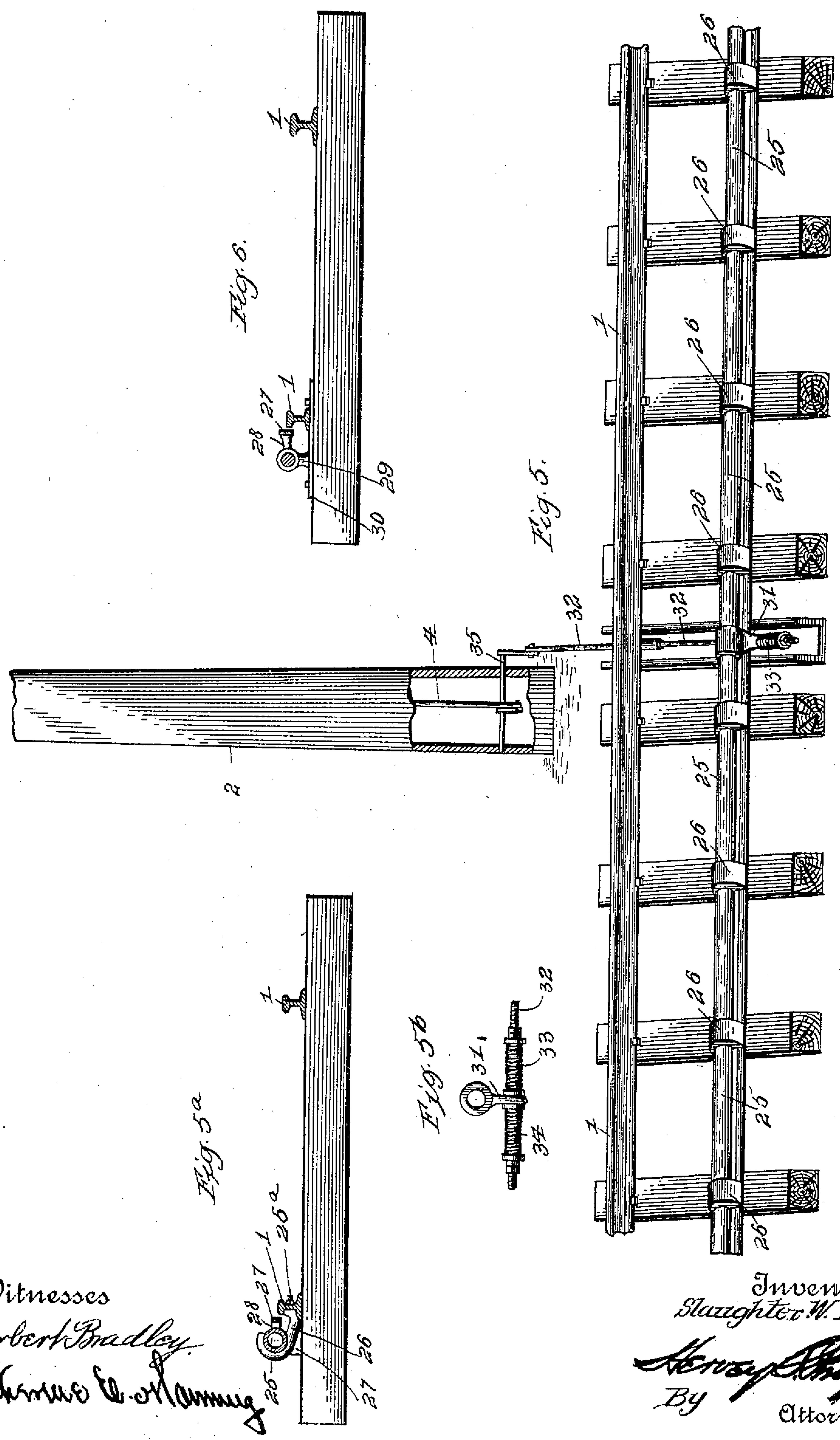
No. 672,445. Patented Apr. 23, 1901.

S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(No Model.) (Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

9 Sheets—Sheet 3.



Witnesses
Herbert Bradley
Walkman E. Hanning

Inventor
Slaughter W. Huff.
By Henry E. Knight
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

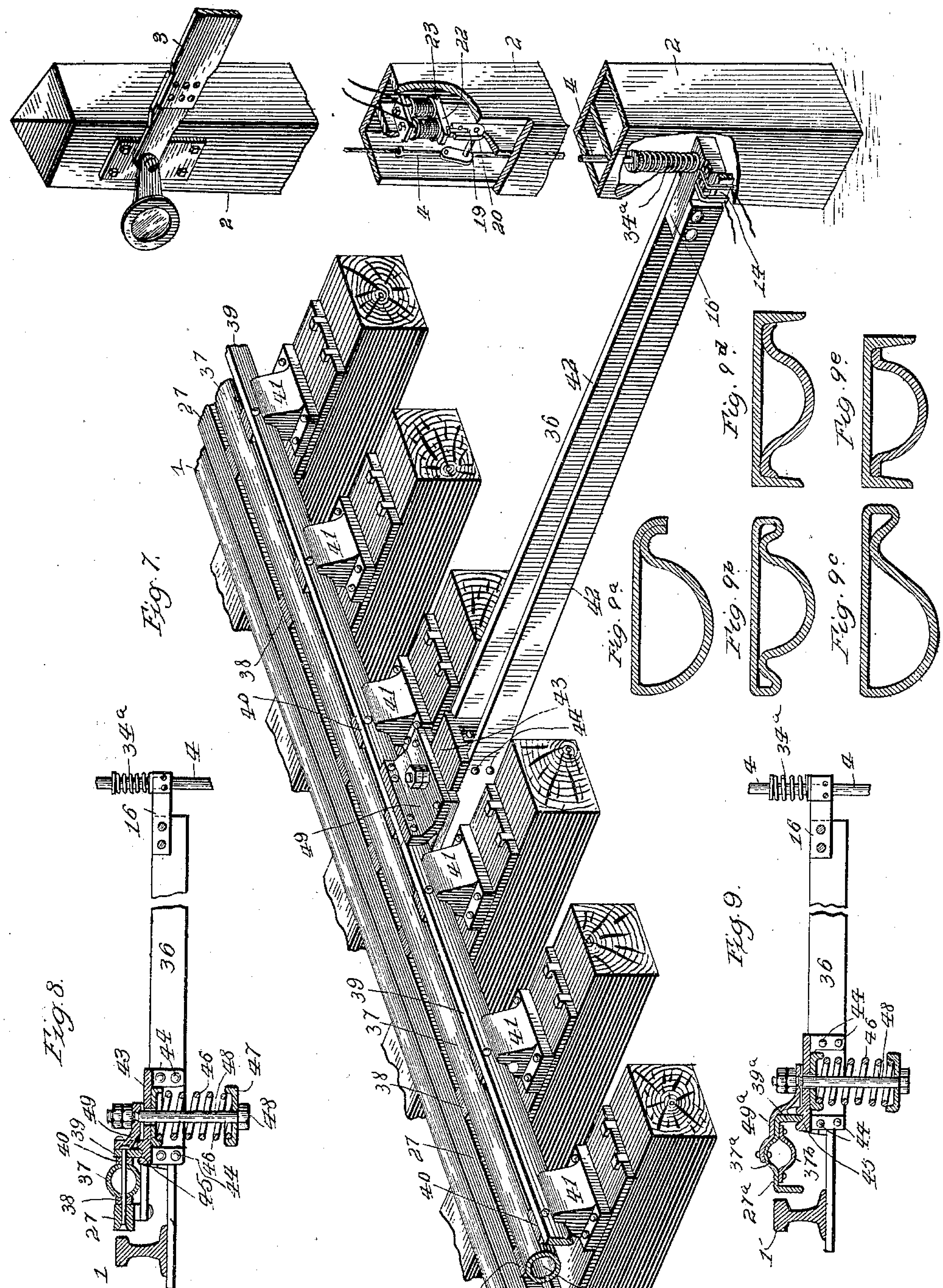
No. 672,445. Patented Apr. 23, 1901.

S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

(No Model.) 9 Sheets—Sheet 4.



Witnesses
Herbert Bradley.
Katharine E. Manning

Inventor
Slaughter W. Huff.
By Henry ... Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

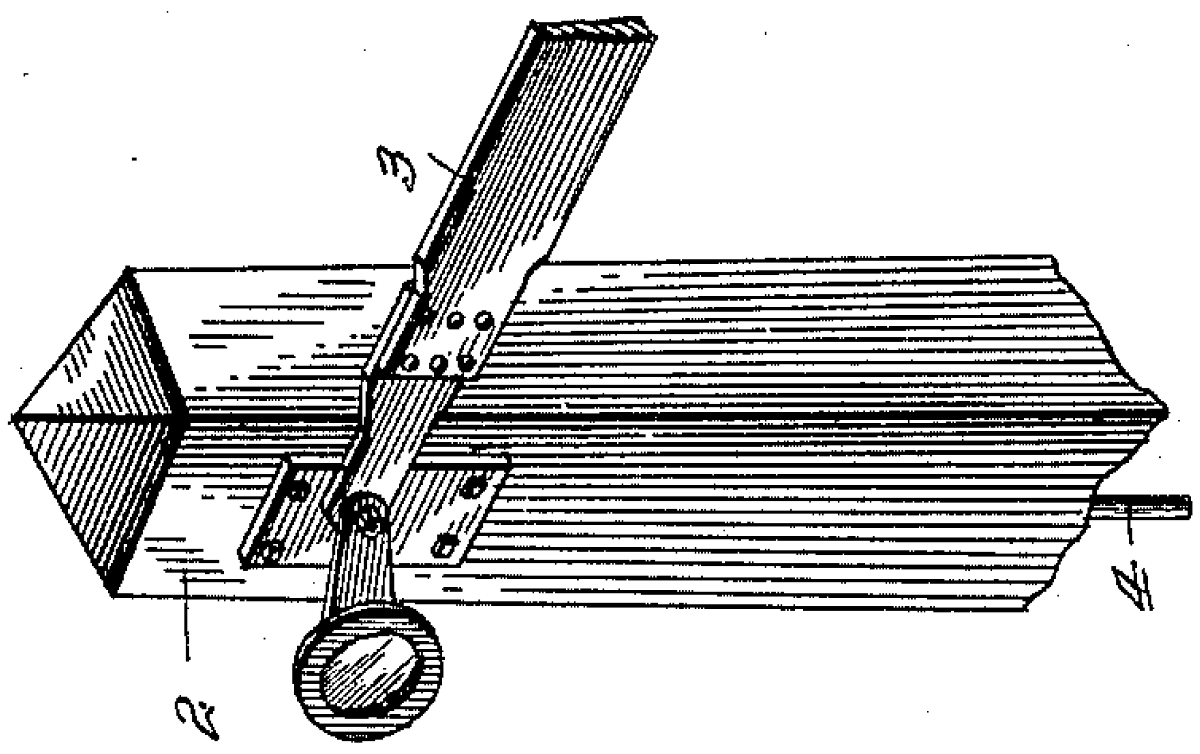
No. 672,445. **Patented Apr. 23, 1901.**

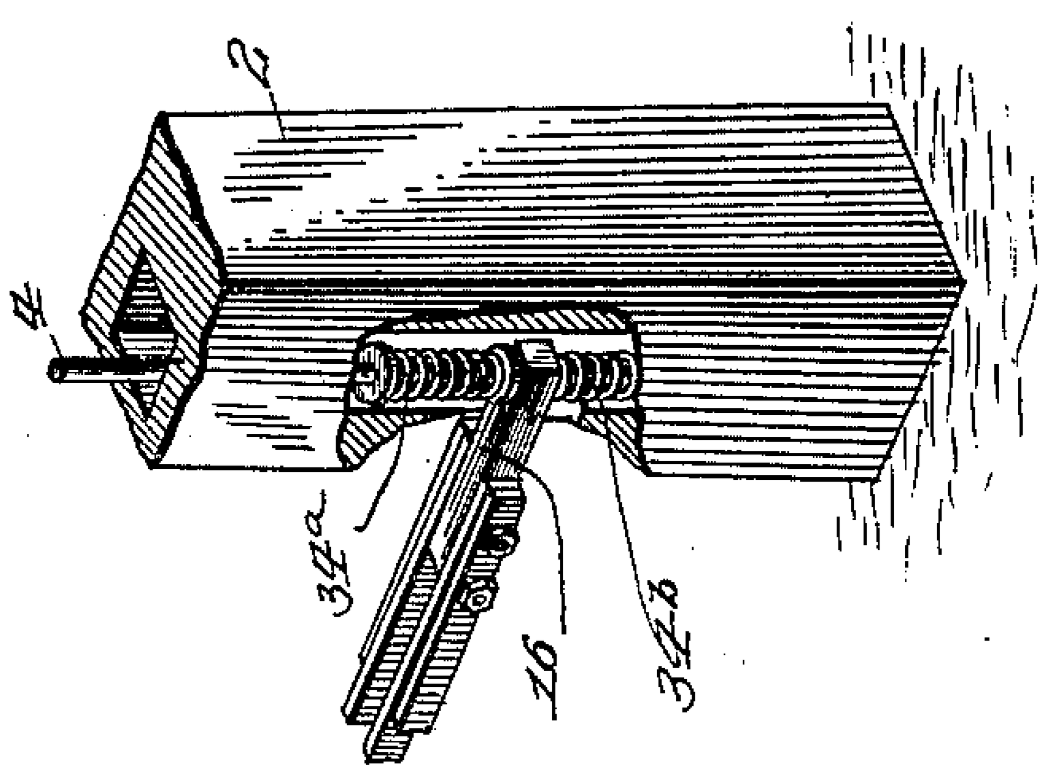
S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

(No Model.) 9 Sheets—Sheet 5.





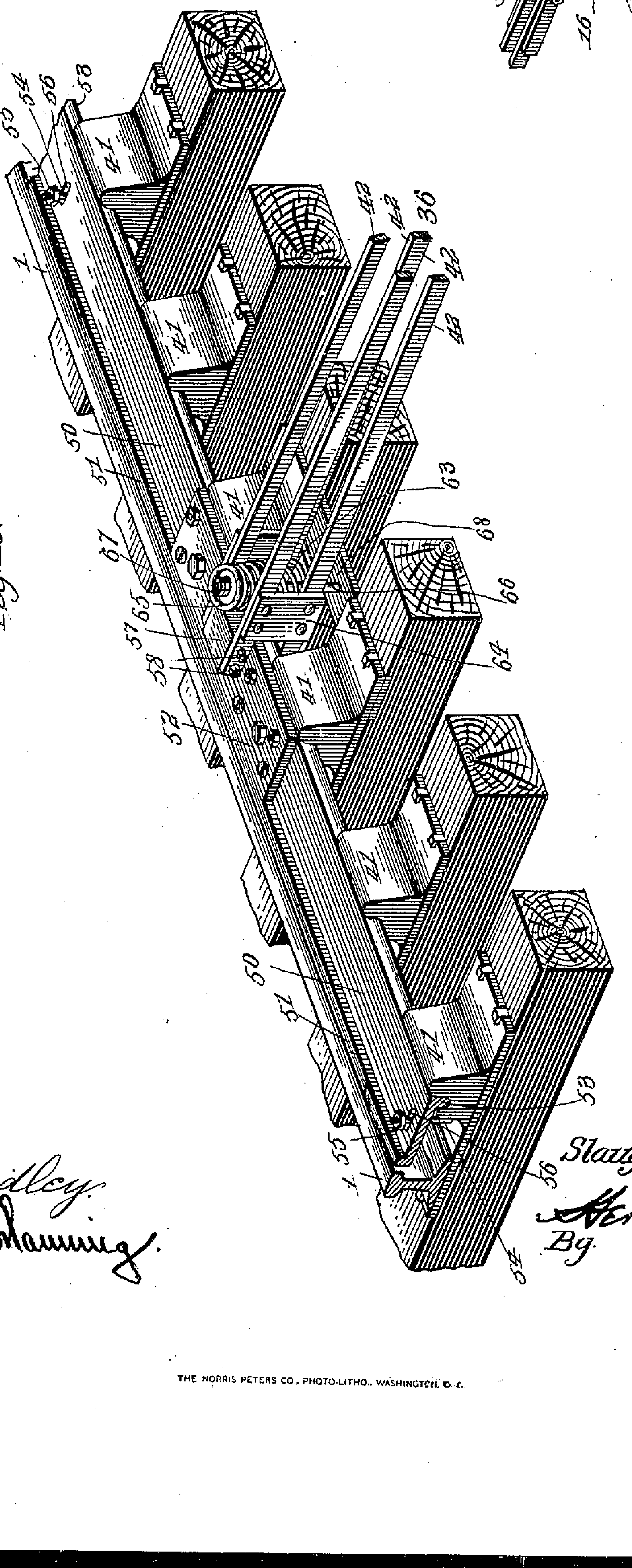


Fig. 10.

Witnesses
Herbert Bradley.
Katherine W. Manning.

Inventor
Slaughter W. Huff.
By Henry B. Knight
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

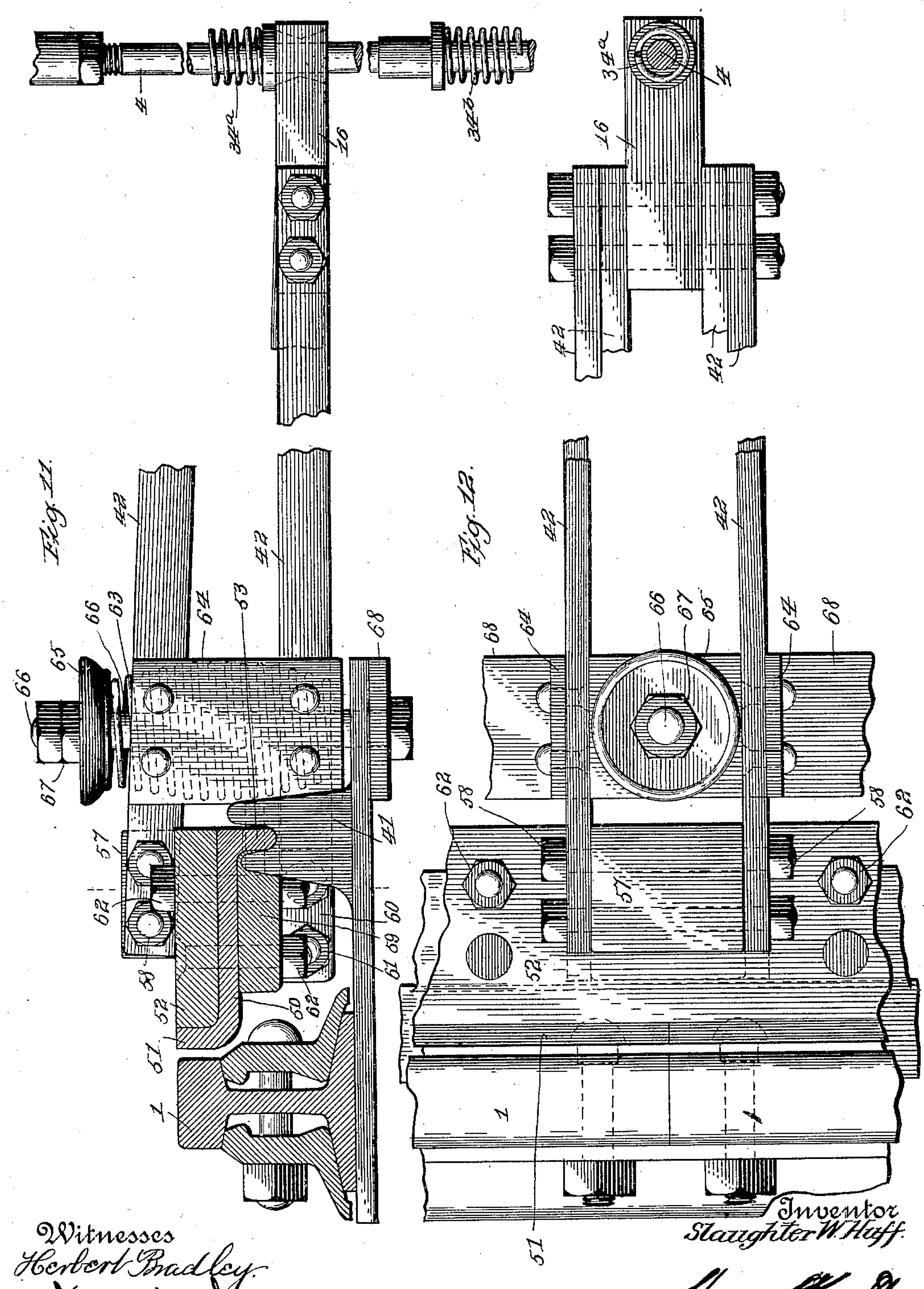
No. 672,445. Patented Apr. 23, 1901.

S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

(No Model.) 9 Sheets—Sheet 6.



Witnesses
Herbert Bradley
[illegible]

Inventor
Slaughter W. Huff
By [illegible]
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 672,445. Patented Apr. 23, 1901.

S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(No Model.) (Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

9 Sheets—Sheet 7.

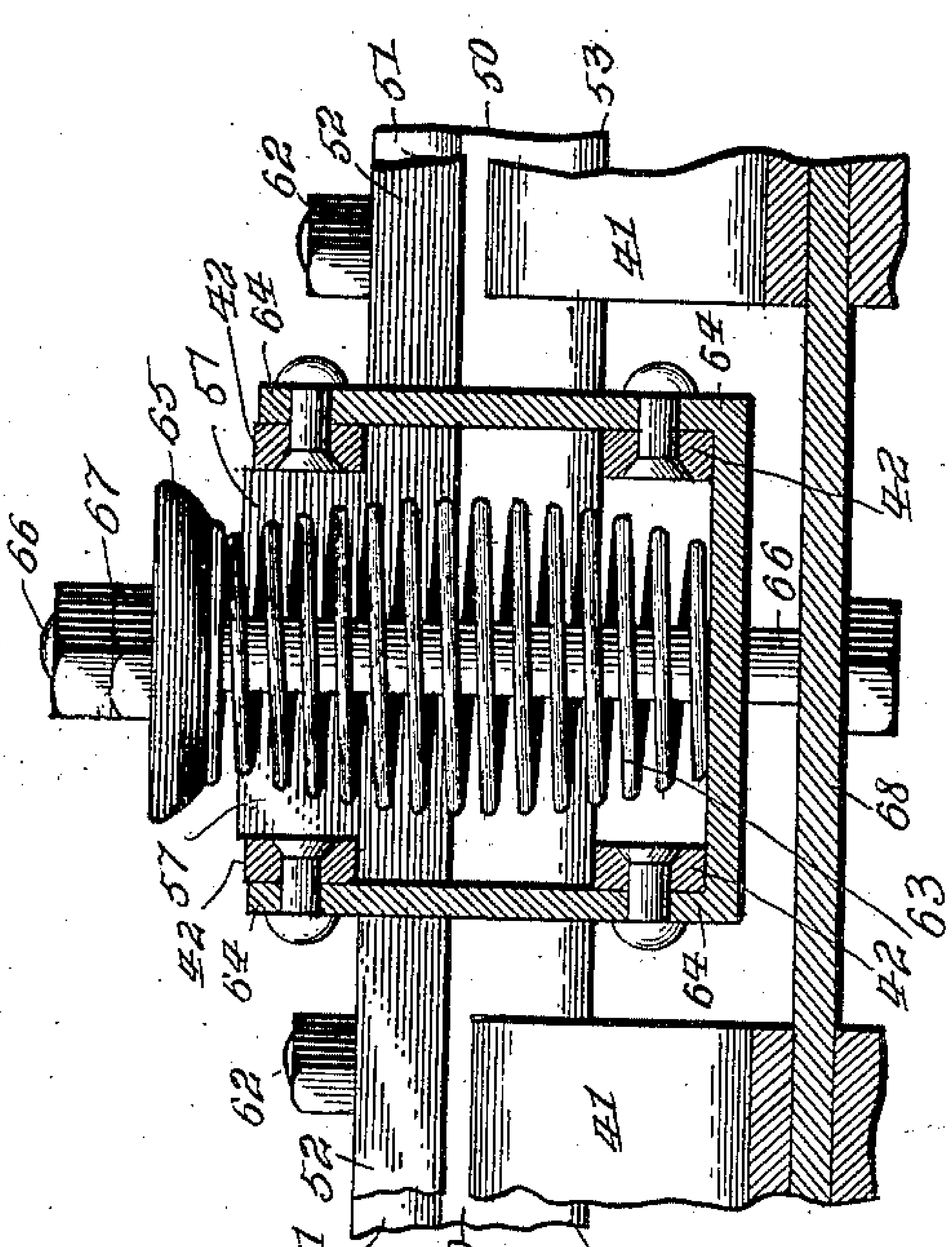
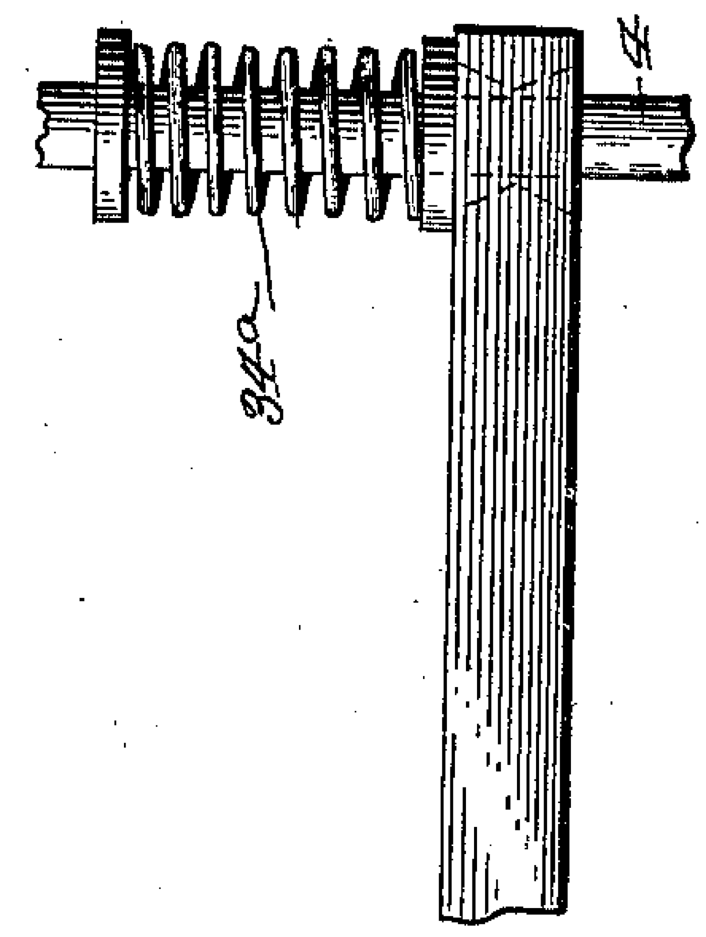


Fig. 14.



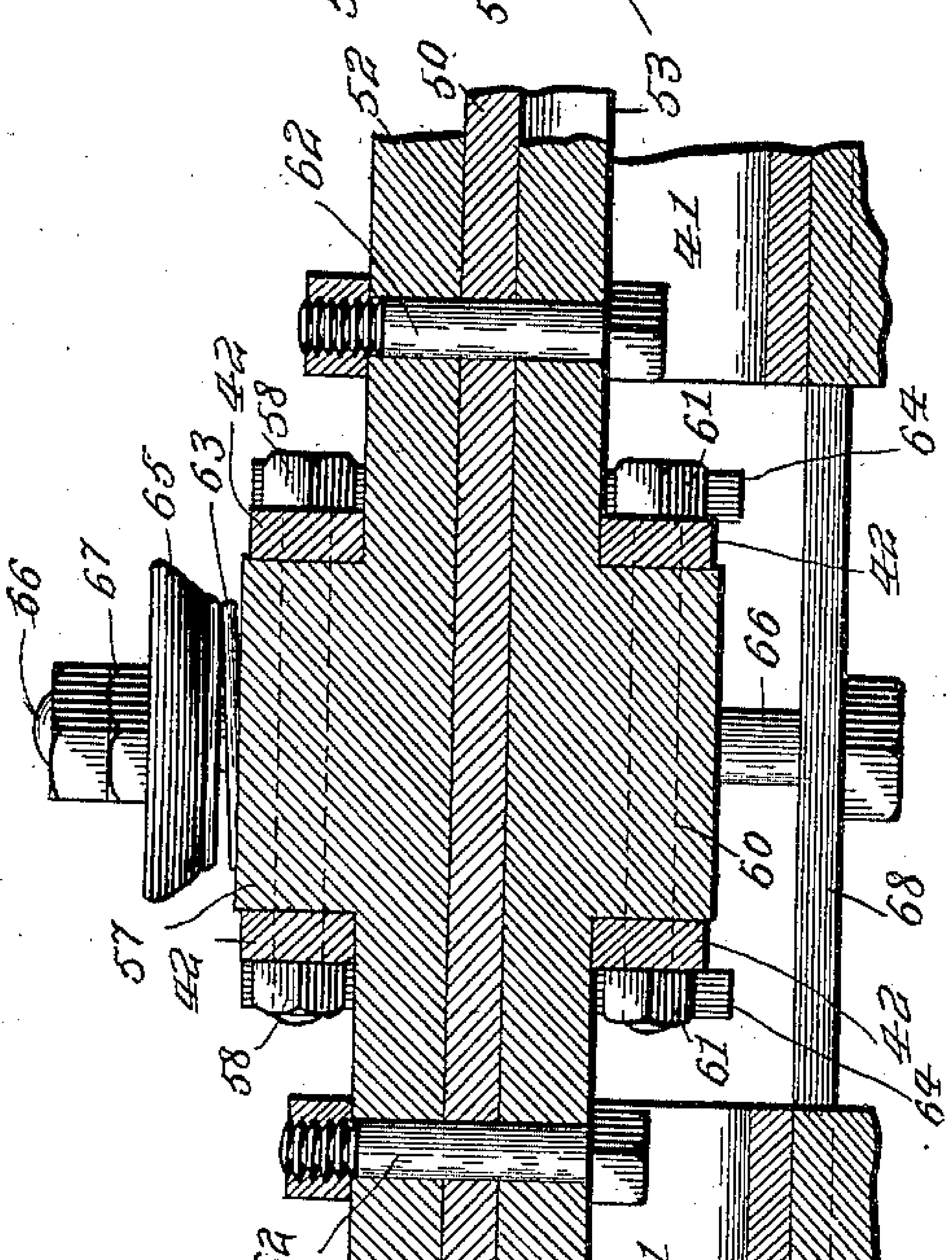


Fig. 13.

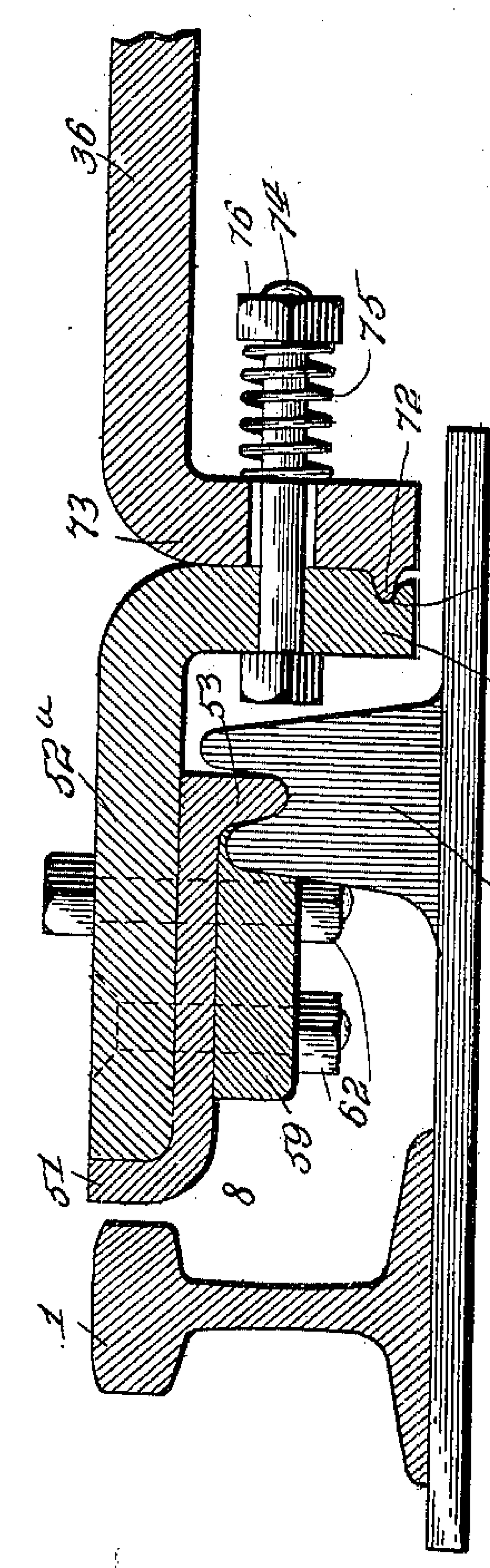


Fig. 15.

Witnesses
Herbert Bradley
Katherine E. Manning

Inventor
Slaughter W. Huff.
By [signature]
Attorney

No. 672,445. **Patented Apr. 23, 1901.**

S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(No Model.) (Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

9 Sheets—Sheet 8.

Fig. 16.

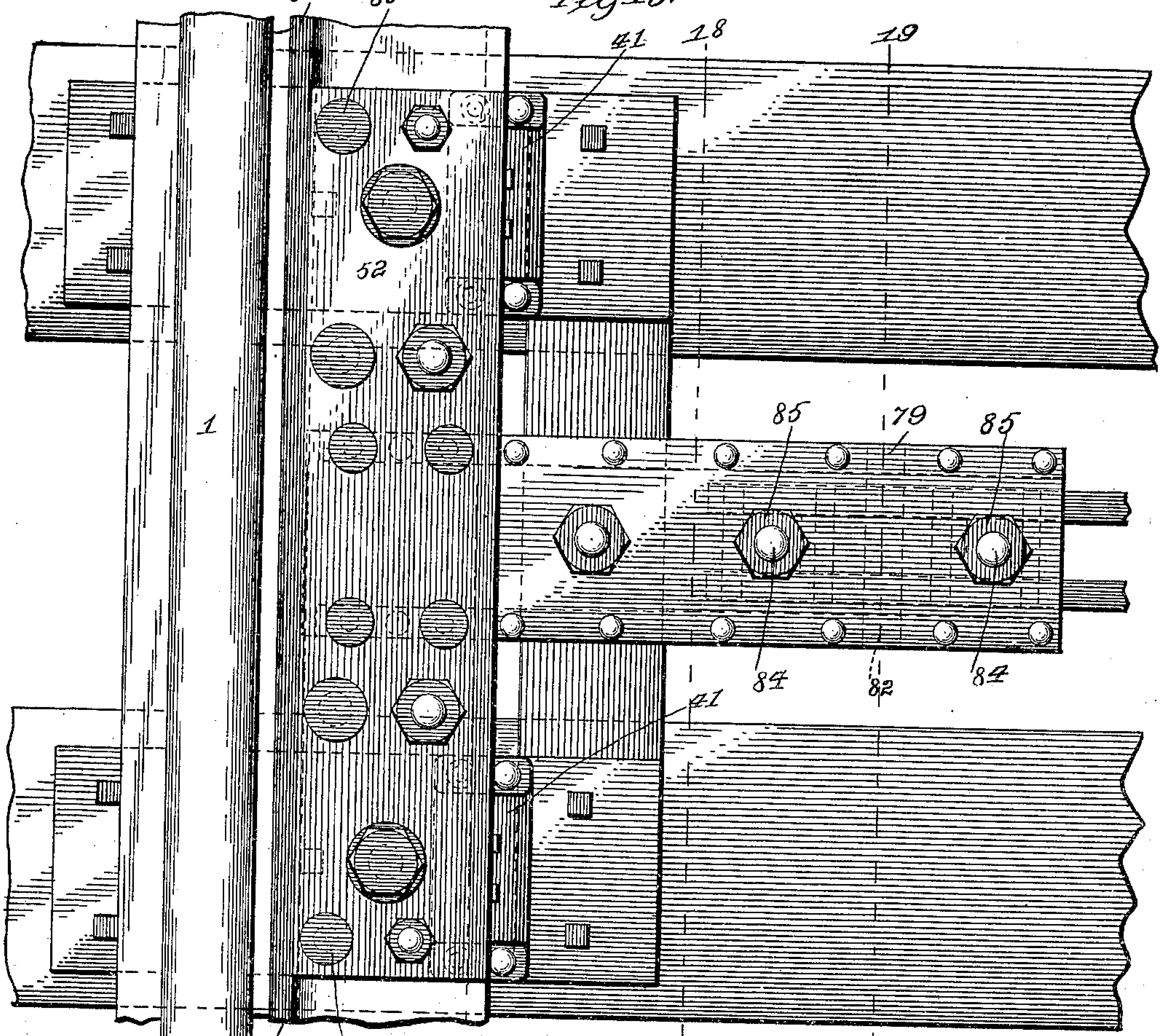
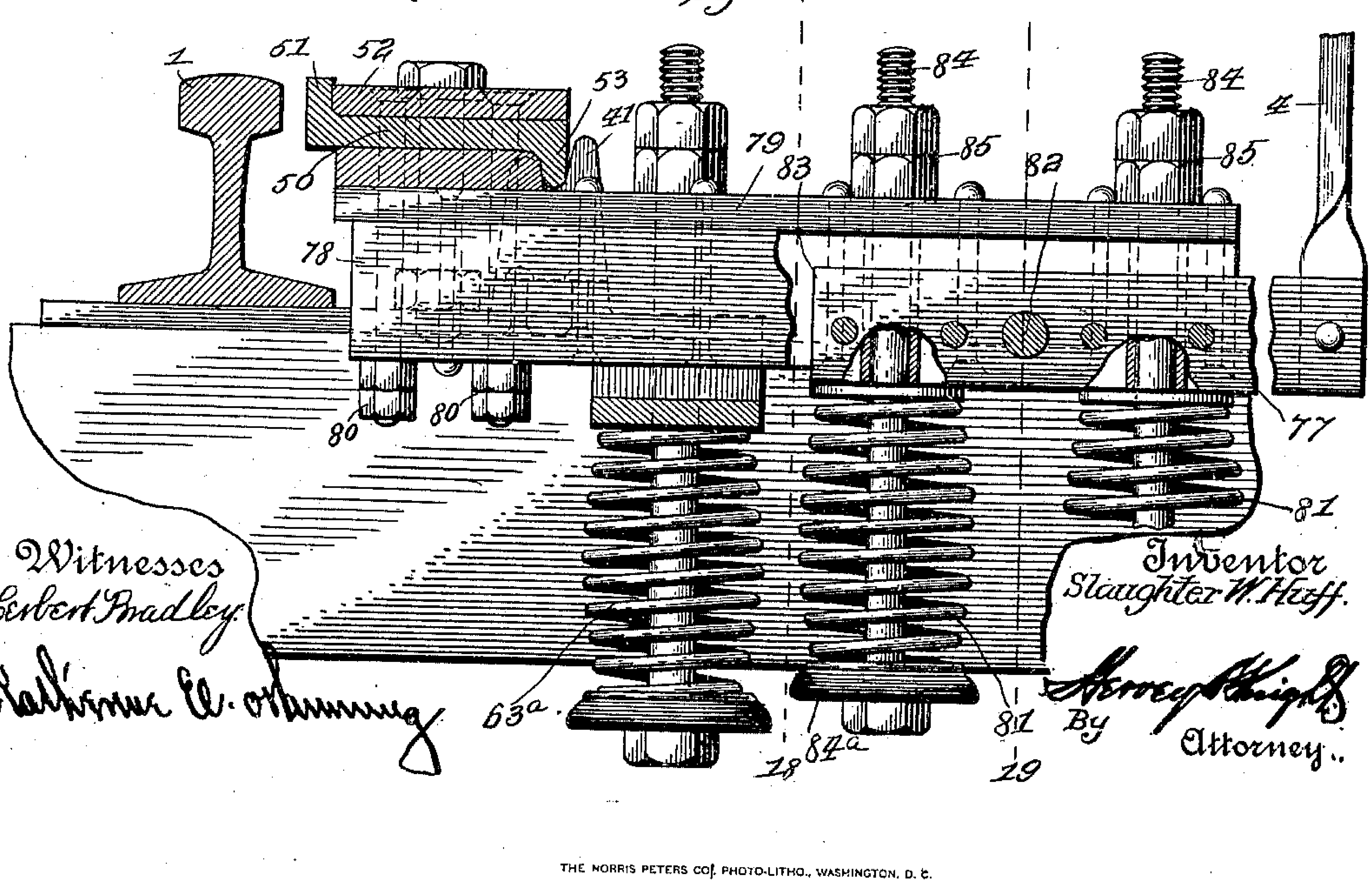


Fig. 17.



Witnesses
Herbert Bradley
Katherine E. Manning

Inventor
Slaughter W. Huff.
By [signature] Attorney.

No. 672,445. Patented Apr. 23, 1901.

S. W. HUFF.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

(No Model.) (Application filed Jan. 17, 1898. Renewed Sept. 12, 1900.)

9 Sheets—Sheet 9.

Fig. 18.

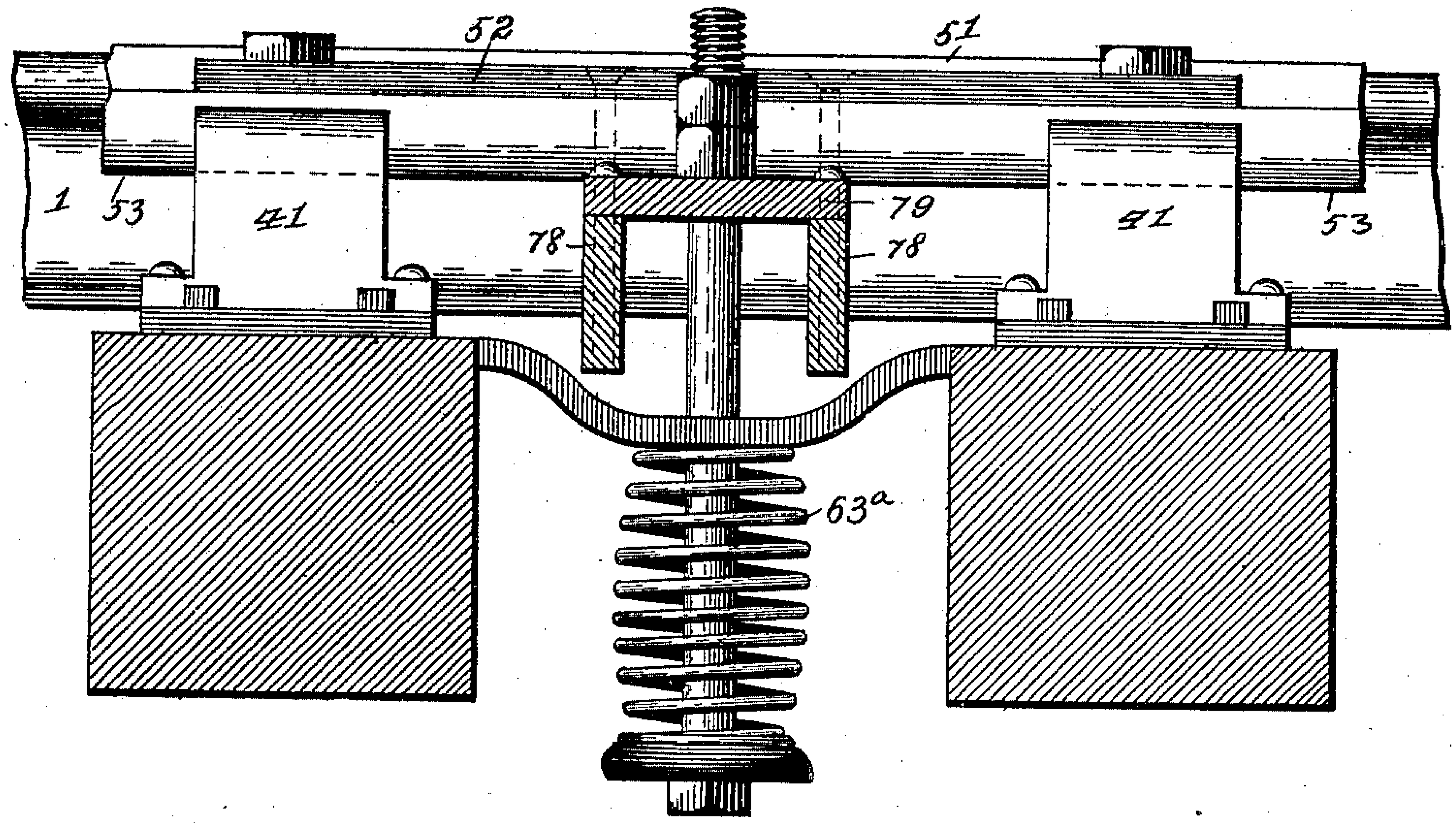
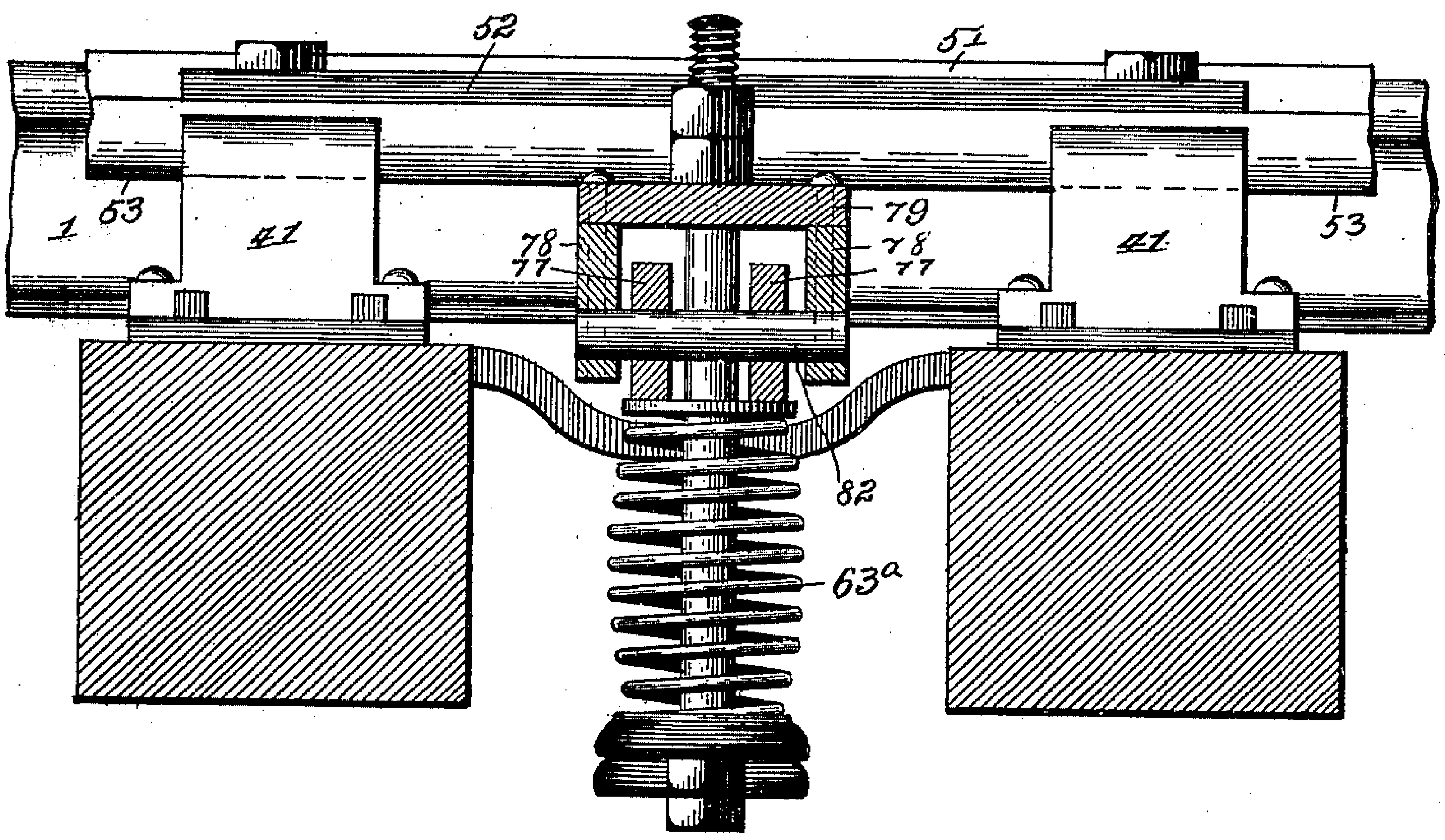


Fig. 19.



Witnesses
Herbert Bradley
Katherine E. Manning

Inventor
Slaughter W. Huff.
By Percy B. Knight
Attorney

UNITED STATES PATENT OFFICE.

SLAUGHTER W. HUFF, OF BALTIMORE, MARYLAND.

ACTUATING MECHANISM FOR AUTOMATIC RAILWAY APPLIANCES.

SPECIFICATION forming part of Letters Patent No. 672,445, dated April 23, 1901.

Application filed January 17, 1898. Renewed September 12, 1900. Serial No. 29,850. (No model.)

To all whom it may concern:

Be it known that I, SLAUGHTER W. HUFF, a citizen of the United States, and a resident of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Actuating Mechanism for Automatic Railway Appliances, of which the following is a specification.

My present invention relates to means by which power may be received from passing trains or rolling-stock on a railway and transmitted for the purpose of performing work.

The objects of my present invention are to provide efficient, practical, and durable track devices which will receive the impact of the wheels of rapidly-passing rolling-stock and be moved a limited distance thereby without destructive shock, and to provide means which will take off such movement and transmit it in a gradual or deliberate manner to a desired point for the performance of work while absorbing all appreciable shocks.

While appliances constructed in accordance with my present invention may be employed for performing various kinds of work, such as operating gates and the like, they are designed more particularly to perform the mechanical work of the electromechanical signal system which forms the subject of my copending application, Serial No. 666,991, and for purposes of illustration I shall describe the invention in connection with a mechanically-set and electrically-released signal system; but I do not limit myself to its use in this connection alone.

One feature of my present invention consists in so constructing the track device and applying the load thereto that it will while remaining a vibratory member have such an amount of elasticity or yield under the actuating and opposing forces applied at different points that movement caused by a load at the point of first impact will not be instantly transmitted to the point at which the work is taken off, but the track device at the point at which the load is imposed will first yield by reason of the elasticity of the structure and the great load imposed and the motion will be transmitted to the remaining parts of the device only as the elasticity of the track device overcomes its inertia and the resistance offered by the work to be performed.

Another feature of my present invention consists in providing for such a resilient or yielding track device a mounting which will cause it to receive an oscillatory or approximately rotating movement under the passing train, so that the aforesaid quality of elasticity in the structure may be availed of torsionally. The resistance to movement is principally at the point of taking off the work or at the point of attachment of the transmitting-beam. In practice I load the track device by the relative lengths of the levers and by the return-spring, so that the initial resistance to movement of the track device is about one thousand pounds on the tread of the track device. Hence I have ample opportunity to introduce the element of resiliency, and yet maintain the durability of the structure under the excessive shocks of heavy trains striking at high rates of speed. For this reason the transmitting connections are located at such a distance from the point of first impact or at which the first full depression takes place as to insure a yielding in the structure, so that while the tread is of substantially uniform height throughout its length the end of approach receives its full depression before any appreciable movement takes place at the point of transmitting or taking off the work, and the depression of the point of transmission takes place gradually as the heavy pressure of the advancing wheels transmitted through the elastic track device overcomes the resistance to the movement. All movement of the effective point is therefore imparted through the resiliency of the structure, and the work is initiated so gradually that shocks are entirely avoided. As the track device is frequently desired for use in both directions the transmitting connection is generally placed at or about the middle of the track device, and the latter is of such length as to bring the transmitting-point an ample distance from either end to insure the necessary resilient effect, so that if a train strikes at either end of the track device the movement will not be transmitted abruptly to the transmitting-beam, but only as the torsional elasticity overcomes the resistance of the load. If, therefore, the parts be properly made and proportioned, so that the yield between the ends and the middle is considerable, but the resistance at the middle is not sufficient to cause permanent set in the track device, the cushioning effect may be regulated to a nicety and the heavy shock of rapidly-moving trains entirely absorbed.

A further feature of my present invention consists in introducing a resilient or yielding connection between the track device and transmitting-beam or in the beam itself, so that vibrations which are difficult to avoid in the track device during the passage of the train over the transmitting-point will not be transmitted to the delicate mechanism of the signal. Many different plans may be followed to accomplish these results, some of which will be fully described hereinafter.

Further features of my present invention relate to details of construction and arrangement of the several parts employed for carrying out the principles hereinbefore mentioned.

I will now proceed to describe in detail in connection with the accompanying drawings the construction of different forms of appliances embodying the features of my said invention and the manner in which the same operate to accomplish the desired ends.

In said drawings, Figure 1 is a diagrammatic view of two adjacent track-sections and one set of mechanical and electrical equipment used in connection with each track-section. The track is shown in section to disclose the relation of the mechanical parts to the track and also in plan to show the electrical connections. Fig. 2 is a detail view of the torpedo-switch. Figs. 3 and 3^a are detail views, on an enlarged scale, showing in front and side elevation the preferred form of trip. Figs. 4, 4^a, 4^b, and 4^c show by vertical and horizontal sections the construction of the signal-post and the manner of mounting batteries and instruments therein. Figs. 5, 5^a, and 5^b show by perspective and detail views a simple arrangement of torsional track device and its connections for actuating the signal. Fig. 6 is a transverse section of a track having applied thereto a modification of the track device shown in Figs. 5, 5^a, and 5^b. Fig. 7 is a perspective view of a portion of track having applied thereto a track device with the lever principle of transmission, the same being my preferred form of appliance. Fig. 8 is a transverse section of parts shown in Fig. 7, the section being taken along the central line of the beam. Fig. 9 is a view corresponding to Fig. 8, showing a different construction of parts embodying similar principles. Figs. 9^a, 9^b, 9^c, 9^d, and 9^e represent five different sections of track devices. Fig. 10 is a perspective view showing another construction of track device with a rigidly-attached transmitting-beam and showing a resilient connection between said beam and the setting-rod. Figs. 11 and 12 are respectively a vertical section and a plan of the same appliance shown in Fig. 10. Figs. 13 and 14 are vertical sections taken, respectively, on the lines 13 13 and 14 14, Figs. 11 and 12. Fig. 15 is a vertical section showing a simple construction of spring-jointed transmitting-beam. Figs. 16 and 17 are respectively a vertical section and a plan of a further modification in the connection between the transmitting-beam and track device. Figs. 18 and 19 are sections taken, respectively, on the lines 18 18 and 19 19, Figs. 16 and 17.

Referring to Figs. 1, 2, and 3 of the drawings, A, B, and C represent insulated sections of a railway-track to be protected by an automatic signal system. 1 represents the track-rails, and 2 the signal-posts, of any suitable construction, (though I prefer to employ the novel construction hereinafter described,) upon each of which posts is to be mounted a swinging arm controlled by a setting-rod 4, through cable or other flexible connection and normally balanced in danger position by the customary counterpoise. The arms are loaded by means of the rod 4 or the parts connected with said rod, so that their counterpoise will be overcome and they will be drawn down to safety position when released. To permit the arm to assume elevated position, the rod is held by a detent 5, controlled by an armature 6^a of an electromagnet 6, which is included in the local circuit 7 with a battery 7^a. The local circuit is arranged to be closed by a relay 9 in a circuit 10, formed partly by the rails 1 of the track of the insulated section beyond the post, and which circuit 10 is energized by a battery 11, located at the farther end of said section C. The relative position of this battery 11 in section C is the same as shown in the sections A and B. When a train sets the signal and passes onto the section beyond the post, it short-circuits the battery 11 and the relay 9 opens the circuit 7, so that the signal remains in danger position. When the train passes off the farther end of the section, battery 11 energizes relay 9 and the latter closes the circuit 7, so that the signal drops to safety position, which position it normally assumes when no train is present on the section following the post. An engineer on a train approaching the post under those conditions is thus apprised of the fact that the section ahead is clear and passes the post. As the train passes the wheels engage a track device 8, from which vertical movement is imparted to the setting-rod 4, which is caught up by detent 5 and the signal is again set to "danger" as the train enters the next section. The forward end of the train enters the section and short-circuits the battery 11 before the rear end leaves, so that it is impossible for a train to trip the signal behind itself until it reaches the far end of the section.

Should the signal stand at "danger" as the train approaches the post, as it would do if another train remained in the section ahead and if the engineer did not heed the danger signal, but attempted to pass the post, the track device would again be depressed and a torpedo would be exploded through the following connections:

12 represents a torpedo in a circuit 13, which includes the battery 7^a and which is controlled by two breaks 14 and 15. The break is always closed when the signal is set and the break 14 is closed momentarily in the act of raising the setting device. If, therefore, the setting device is raised a second time after the signal is already set, the torpedo 12 will be exploded and an audible signal thus given to the engineer in the event that he fails to heed the visual signal. The fact that the track device, to be herein described, is of sufficient length and of such construction as to insure but a single depression by the passage of but one train renders it impracticable for the front end of a train to set the signal and the rear end to explode the torpedo. It is also to be noted that the construction of the switch 14 on the setting mechanism is such that it closes the break at that point momentarily on the upward movement, so that when the signal is set and the said device returns the torpedo will not explode, as will be understood upon reference to Fig. 2, wherein 16 represents a block carried by the setting mechanism 36 and carrying on its upper face a plate 17, which scrapes past brushes 18 18 on a fixed part 2^a of the post. As the part 16 moves up and before the closing of the breaker 15 the space between the branches 18 is momentarily bridged and a circuit closed between them. Therefore unless the signal has already been set and the breaker 15 closed the torpedo is not exploded. As the part 16 moves down the breaker 15 remains closed; but the brushes 18 snap past the part 16 without coming in contact with the plate 17 and no circuit is made.

The circuit-breaker 15, which is closed so long as the signal is set, comprises a bifurcated bridge-piece 15^a, carried by the crank-arm 5, and a pair of segmental strips 15^b, supported upon the fixed block 15^c and connected to the respective ends of the circuit to be closed.

In addition to the function of closing the torpedo-circuit at the point while the signal is set, as described, the circuit-breaker 15 serves the additional important function of breaking the local signal-circuit when the signal drops, from which two advantages arise, to wit: In the first place, when working with a normally-energized relay 9, which closes the local signal-circuit and drops the signal, were the circuit-breaker 15 not used the local battery would be normally active and much waste would follow. The same waste would result in the absence of the circuit-breaker when working with a circuit which was closed by the presence of a train within the block, if such train should stop within the block for any length of time. In the second place, when the circuits are such that the opening of the local signal-circuit takes place at the circuit-break 15 all sparking at the relay is avoided.

The principle of the detent which I prefer to employ is illustrated best by Figs. 3 and 3^a, wherein 5 represents a crank-arm swinging upon a fixed pivot 5^a in the bearing 21 and connected by a screw 19 to the upper end of setting-rod 4. As the rod 4 is moved upward the crank-arm 5 assumes an approximately vertical position, at which time nearly all of the load imposed by the rod 4 and any parts which may be connected with it will be supported by the bearing 21 and very little pressure will be exerted in a lateral direction. The armature 6^a, fulcrumed at 23, receives lengthwise and toward its fulcrum the slight tendency of the crank-arm to move laterally, so that the resistance to attraction of the armature by the magnet 6 is comparatively small. The crank-arm 5 may be provided with a wearing-tip 24 of harder metal inserted at the point of contact with the armature 6^a. 20 is a wrist-pin which receives a flexible connection 4^a, Fig. 4, between the rod 4 and the signal-arm. 22 is a stop for arresting the crank-arm's upward movement.

The construction of the signal-post will be understood upon reference to Figs. 4, 4^a, 4^b, and 4^c, wherein the post is shown of hollow construction made up of a back channel-iron 2^a, sides 2^b, riveted to the flanges of the back channel-plate, angle-irons 2^c, secured along the front edges of the sides, and a front 2^d, secured to one of the sides by hinges 2^e, and thereby affording access to the interior of the post. The post is further provided with horizontally-arranged projections or shelves 2^f at suitable points to afford convenient support for the batteries and instruments which are located in the post and control the electric circuits employed for tripping the signal. Beneath the shelving I prefer to locate the trip-magnet 6, which controls the setting-rod 4 in the manner hereinbefore described. 4^a represents the cord or cable passing from the wrist-pin 4^b on the rod 4 upward through suitable openings formed through the shelves and connecting at top with the crank-arm 3^c on the shaft 3^a of the signal-arm 3. 3^b represents the counterpoise of said signal-arm, which tends to hold it normally elevated. The post also forms a convenient covering or protection for the wiring between the instruments, which pass up through openings in the shelves along one corner of the post. The post may also be provided with the usual ladder 2^g, which is riveted onto the side plates in any suitable manner. The shelving 2^f is preferably secured in place by means of rivets $2^{f\times}$, which pass through and through the shelving and the sides of the post and are riveted for the double purpose of supporting the shelves vertically and uniting the shelving and wall of the post in a solid braced structure.

All the forms of track devices which I shall describe are mounted to move as a whole under a load imposed at any one point. I have also illustrated them, as they are preferably constructed, long enough to bridge the greatest distance between car-wheels, so that they will receive but one depression from a passing train, whatever the length of the train may be.

The forms of track devices in this case are constructed to have a rotary, oscillatory, or turning movement with relation to their bearings, so that movement transmitted from one part to another is torsional. This enables me to avail myself of the elasticity of the structure to avoid shocks to the track device and to store up work and transmit it gradually to the parts to be actuated.

Referring to Figs. 5 and 5[a], the track device consists of a twist-shaft 25, mounted to turn in bearings 26, suitably secured outside the rails and carrying a tread 27, which lies in proximity to the rail and in position to be engaged by the wheels of the rolling-stock 28, said tread being connected with and spaced from the shaft 25 by means of spacing-blocks at suitable intervals. The shaft 25 bears the torsional strain in the structure, and this shaft may be either solid, as shown in Fig. 6, or tubular, as shown in Fig. 5. According to Figs. 5 and 5[a], the bearings for the shaft 25 are in the form of chairs 26, resting upon the ties at 27 and bolted to the rails at 26[a] and open on their inner sides to permit oscillation of the shaft. According to Fig. 6, the bearings are in the form of vertical standards 29, which surround the shafts and are spiked or otherwise secured to the ties by means of attaching-plates 30. The transmitting connections for the form of track device shown in Figs. 5 to 6 may be conveniently made by applying at a point distant from where the first full depression of the bar takes place, or preferably at or near the middle, a downwardly-projecting lever 31, through which a connecting-rod 32 is passed and which transmits motion in opposite directions to said rod through the medium of springs 33 34. When the track device is depressed and the shaft 25 rotated, the lever 31 pulls the rod 32 through the medium of the resilient connection 34, and said movement is imparted to the bell-crank lever 35 and by it transmitted as a vertical movement to the setting-rod 4. The springs 33 and 34, interposed between the rod 32 and lever 31, absorb all objectionable vibrations of the track device resulting from unevenness in the tracks, hammering of the wheels, and any other causes, and, moreover, movement of the lever 31, which is necessarily quite abrupt when the train first strikes the track device, is transmitted gradually to the setting-rod and parts controlled by it.

According to the form shown in Figs. 7 to 9, which embodies the preferred details of construction, the transmitting connection between the track device and the setting-rod is in the form of a beam 36, which projects from the track device beyond the bearings in such a manner as to operate upon the principle of a lever, which amplifies the slight movement imparted to the track device sufficient to accomplish the setting of the signal by its outer end. In this construction the track device comprises a tube or shaft 37, extending the full length of the track device and having on one side a bar 27 in the form of a rectangular bar separated from the shaft 37 by means of spacing-blocks 38. On the outer side the shaft carries a bearing-piece 39, spaced therefrom by lugs 40 and which rests in suitably-formed chairs 41, placed along the ties. The transmitting-beam 36 is formed of two bars 42, making connection with the setting-rod at their outer ends through the medium of the block 16, hereinbefore referred to, which carries a circuit-closer 14 and has the rod 4 working through it, with an interposed spring 34[a] to take up shocks. The bars 42 are connected at their inner ends by means of a casting 43, to which they are bolted at 44 and which has a bearing 45, which engages beneath the bearing-strip of the track device. The beam is further connected with the track device through the medium of a spring 46, resting in a cap-plate 47 and at its upper end beneath the casting 43, and the bolt which passes through the cap-plate 47, through the casting 43, and has its upper end secured in a plate 49, which projects rigidly from the track device. When the track device oscillates in its bearings, it lifts up from the transmitting-beam 36 through the medium of the spring 46 and the rigidly-projecting plate 49. Inasmuch as the transmitting-beam is free to spring upon its bearing 45 relatively to the track device so far as the spring 46 will permit, it follows that the movement of the track device cannot be abruptly transmitted to the beam 36, but will only move said beam when the spring 46 overcomes the inertia of the beam and the resistance offered by the setting-rod 4. Again, any movement which is imparted to the beam 36 must be transmitted to the rod 4 through the medium of the spring 34[a], and here again vibrations are absorbed and abrupt impulses prevented from being transmitted. It therefore follows that any sudden movement imparted to the track device will be transformed into a slow gentle movement to the parts to be operated without sacrificing any of the work received by the passage of the train over the track device; but said work will be stored up not only by the elasticity of the structure, as heretofore described, but also by the springs and connections and delivered to the parts to be operated in a manner which insures easy working of all the mechanism and avoids destructive shocks on the track device itself and other parts.

The shaft 37 is preferably tubular in structure, as this enables me to obtain ample rigidity without undue weight and permits a selection of material which will afford all the torsional resiliency which it is desired to obtain in the track device with sufficient strength to avoid the parts taking a permanent set by constant use. Substantially the same tubular form and equivalent connections of the parts may be obtained, as illustrated in Fig. 9, by forming the shaft of an upper member 37^a, which is rolled integrally with the tread 27^a and the bearing-plate 39^a, and a lower member 37^b, which is bolted to the upper member 37^a between the tread and bearing-strip. The parts 37^a and 37^b are provided with semicylindrical channels, which when the parts are brought together practically make a tube, from which the parts 27^a and 29^a project as integral members. The rigidly-projecting plate for attachment of the spring-bolt is then provided by bolting on a plate 49^a of proper form to adapt it to the shaft and projecting in proper relation for engagement with the spring-bolt 48, as hereinbefore described. Track devices embodying all the principles of the forms shown in Figs. 7 to 9, but of variously-differing sections, are shown in Figs. 9^a, 9^b, 9^c, 9^d, and 9^e.

Another convenient form in which the track device 8 may be constructed is illustrated in Figs. 10 to 19. In each of the arrangements shown in these figures the track device is constructed on the basis of a Z-bar 50, of which one flange 51 projects up adjacent to the track-rail to form the tread of the track device and at the same time forms a seat for the reception of the plate 52 or equivalent part employed for attachment of the transmitting-beam, while the other flange 53 of said Z-bar projects downwardly and is fitted to the bearings 41, heretofore described with reference to other figures, in order to permit the track device to rock in carrying out the objects of my invention. The track device thus formed is conveniently anchored to the road-bed by bolts 54, projecting upward from some fixed part and provided with nuts 55 on their ends, which project through slots 56 in the Z-bar.

A track device of Z-bar construction embraces many if not all of the advantages of the continuous-depression torsional track device, which it is the object of my present invention to secure. Moreover, the construction of the bar makes it convenient to add to it along some or all of its length reinforcing-pieces in order to stiffen it or divide up the strain and to cause the torsional yield to take place at or near the ends and to gradually lessen toward the center, where the work is finally performed.

In the construction shown in Figs. 10 to 14 the transmitting-beam 36 is constructed of parts 42, somewhat similar to Fig. 7, except that four parts are used which converge toward their outer ends and are formed into a lap-joint connection with the block 16 at the central post. These parts have rigid connection at their inner ends with the track device through the medium of the upper plate 52, provided with integral block 57, on opposite sides of which the upper parts are secured by bolts 58, while the lower parts are secured to the under side of the track device by a similarly-constructed lower plate 59, havan integral block 60, on opposite sides of which said lower parts are secured by bolts 61. 62 represents bolts which pass through the web of the Z-bar and through the respective plates 52 59 to secure said parts firmly in position. In a construction employing a rigidly-projecting transmitting-beam I prefer to interpose springs 34^a and 34^b on opposite sides of the block 16 and surrounding the setting-rod in order to absorb shocks and prevent a transmission of undesirable vibrations, which necessarily result from the rapid movement of the car-wheels over the track device. I also employ in this construction a spring 63, which rests in a yoke 64, bolted to the bar 43, and which has a cap 65, which receives a bolt 66, having nuts 67, which bolt is anchored in a bed-plate 68. By putting the proper amount of tension on the spring 63 through the medium of the adjustable nut 67 said spring will hold the transmitting-beam and the track device in normal position, but yield to the passage of a train and permit the beam to raise the setting-rod 4. The spring 63 also serves, through the medium of the transmitting-beam and the spring 34^b, to load the setting-rod 4 so that the signal will be drawn down to "safety" when released.

Instead of employing a yielding connection between the track device and the transmitting-beam I may construct the transmitting-beam with a spring-joint, which will hold the beam with sufficient rigidity to perform the work required of it. In other words, the spring which contains the joint is of sufficient strength to close the joint against the load imposed by the setting-rod of the outer end of the beam; but it is not of sufficient strength to prevent opening of the joint under a sudden shock, such as the striking of the car-wheels on the track device. The result is that the joint will yield to the sudden depression of the track device by the passing of a train, so that the shock will not be imparted through the transmitting-beam; but as the inertia of the transmitting-beam and the load imposed upon it by the setting-rod is gradually overcome the movement which the track device has received from the train will be gradually transmitted to the work to be performed.

The simplest embodiment of a spring-jointed transmitting-beam is illustrated in Fig. 15, according to which plate 52^a is bolted to the track device and is provided with a downwardly-projecting end 70, formed with a groove 71, which receives a tongue 72 on the downturned end 73 of the transmitting-beam 36, which is shown for the purpose of illustration as consisting of a straight bar receiving the setting-rod 4 at its outer end and moving the same through a spring 34^a, as heretofore described with reference to other figures. The projections 70 and 73 are held together yieldingly by bolt 74 through the medium of a spring 75, interposed between the projection 73 and the nut 76 on the bolt, by which latter any desired tension can be put upon the spring. The tongue and groove 71 72 constitute a joint at the lower ends of the projection 70 73, which permits them to separate without being displaced relatively. When a shock is imparted to the track device 8, the spring 75 is not strong enough to sustain the alinement of the transmitting-beam with the plate 52a, owing to the inertia of the beam and the load placed upon it by the setting-rod, and the joint yields. The shock is therefore absorbed and cannot be imparted to the signal. Any vibrations that are transmitted by the spring 75, which is necessarily somewhat strong, will be by the spring 34a in a manner heretofore described. Another construction of such a spring-joint is shown in Figs. 16 to 19, wherein 77 represents a hinge-joint in the beam, the inner end of which is of hollow construction, made up of side plates 78 and top plate 79 and secured to the under side of the track device 8 by bolts 80. 63a represents the spring for returning the parts to normal position after passage of the train. Springs 81 are applied to the under side of the beam on opposite sides of its pivot 82 in such a manner that one or other of said springs is compressed by the rocking movement of the beam, so that it will be held normally in line with the inner rigidly-attached end 83. These springs 81 may be conveniently mounted by means of bolts 84 passing through their caps 84a and having their upper ends fixed by nuts 85 in the top of the hollow beam end. The beam being thus provided with a spring-joint having its outer end connected with the rod 4, it will readily be seen that any suddenness of movement cannot be transmitted from the track device through the beam, but will be taken up by the springs 81, and the beam will follow the movements of the track device slowly as its inertia and the resistance of connected parts are overcome.

In any or all of the forms of track devices which I have described I may employ suitable means for preventing displacement of the track device from its bearing—such, for instance, as bolts 54, engaging loosely in slots 56 in the track device anchored in the bed-plate—or any suitable means may be employed for confining the track device without restricting its limited vibratory movement.

A track device constructed in accordance with the foregoing description will be found to accomplish all the objects hereinbefore recited as essential to a complete signal-setting device.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In combination with a railroad and an appliance to be operated, an elongated structurally-resilient track device arranged to be moved by rolling-stock upon the railroad, and a connection between the appliance to be operated and a point in the track device distant from the end of first impact; said appliance and connection opposing the movement of the track device from the point of first impact, with a force which brings into play the resiliency of the track device, whereby the shock of first impact is not transmitted through the track device, substantially as explained.

2. A track device for performing work by the movement imparted to it from a passing train, the same comprising a structurally-resilient member, conforming to the track-rail and having means for transmitting work therefrom; the dimensions being selected to give structural resiliency proportional to the actuating and opposing forces transmitted through it and cause it to yield under the impact received from the passing train and absorb shocks; substantially as herein explained.

3. A track device for performing work by movement imparted to it from a passing train, the same comprising an elongated member upon which the rolling-stock progressively bears, provided with means for transmitting movement at a point distant from the end of first impact and made structurally resilient between said end of first impact and the point of transmitting the movement, the resiliency of the track device being proportional to the actuating and opposing forces applied at such points, substantially as herein explained.

4. A track device of substantially the character described comprising an elongated member upon which the wheels of rolling-stock progressively bear, provided with means for transmitting the movement and having inherent structural resiliency in a torsional direction; said resiliency being proportioned to the opposing forces whereby it is called into play by the actuating force of the passing wheels and the opposing force of the work which is performed through the medium of the track device, substantially as and for the purposes set forth.

5. As a means for receiving the actuating force from passing rolling-stock and transmitting it for the performance of work; an elongated member with inherent structural resiliency proportional to the actuating and opposing forces whereby its resiliency is called into play in the performance of the work; formed for mounting adjacent to the track-rail in position to receive the wheels running thereon; having a tread substantially parallel with the tread of the rail, whereby it receives continual pressure from the wheels; and having bearings located to cause a substantially-rotating movement under pressure of the wheels; substantially as and for the purposes set forth.

6. An actuating device for railway appli-

ances comprising an elongated track device having inherent resiliency proportional to the actuating and opposing forces and formed with a substantially even tread constructed for arrangement adjacent to the track-rail of sufficient length to bridge the greatest distance between wheels whereby it receives but a single impulse, in position to receive movement from the wheels of passing rolling-stock, bearings for said member which cause it to receive an approximately rotating movement, and suitable means for transmitting the movement to the work to be performed; located at a point distant from the end of the first impact, substantially as explained.

7. A track device adapted to be mounted adjacent to the rail of a railway-track, having suitable supports located to cause it to receive an approximately rotary motion under the wheels of a train, constructed to be torsionally resilient in proportion to the actuating and opposing forces, and provided with a tread substantially parallel with the tread of the rail for a distance sufficient to bridge the greatest distance between car-wheels, and means for transmitting movement from said track device; substantially as and for the purposes set forth.

8. In combination with a railway-track; a track device having inherent torsional resiliency which is called into play by the work transmitted through the track device, and with a tread long enough to bridge the greatest distance between car-wheels and parallel with the rail-tread, bearings for causing the track device to receive a torsional movement under the wheels of a train, and transmitting connections located on the track device at a point distant from the point of initial depression sufficient to permit complete depression at the end of approach before movement of the transmitting connection, whereby movement is imparted to the latter through resilience of the structure and shocks are avoided; substantially as herein explained.

9. A device of substantially the character described, through which work is transmitted by a progressive movement of an actuating force upon it, the same comprising an elongated member having means for transmitting the work at a point located distant from the point of first application of the actuating force, and constructed with uniform inherent resiliency which is proportional to the force transmitted through the device and distributes the performance of the work uniformly over the device; substantially as herein explained.

10. In an actuating device for railway appliances, the combination of a torsionally-resilient oscillating track device having a tread substantially parallel with the rail-tread for a distance equal to the greatest distance between car-wheels and a transmitting-beam located at a point distant from the point of initial depression sufficient to permit complete depression of said initial point before movement of the beam, and having yielding connection with the track device and oscillated therewith for transmission of movement in the work to be performed; substantially in the manner explained.

11. In an actuating device for railway appliances, the combination of a track device having a downwardly-projecting bearing edge, bearings in which said track device oscillates on its edge, a transmitting-beam having a bearing beneath the bearing edge of the track device, a plate projecting from the track device, and a yielding connection between said plate and the transmitting-beam; substantially as and for the purpose set forth.

12. A track device for railway appliances, comprising an elongated tubular member, a tread projecting from one side thereof to receive the wheels of the rolling-stock, a bearing-plate projecting from the other side of said tubular member, bearings in which the bearing-plate is mounted, and means for transmitting movement from the track device to work to be performed; substantially as herein explained.

13. In a railway electric signal, the combination of a main signal, a setting device actuated by the passing of rolling-stock, an electric circuit having two breaks and including a supplemental signal, and two circuit-closers operated respectively by the standing of the main signal at danger and by the movement of the setting device by the passing of a subsequent train; substantially as and for the purposes set forth.

14. In combination with a signal, a track device for setting the signal, a detent for said signal, a tripping-circuit containing a suitable source, a supplemental signal-circuit including the battery of the tripping-circuit, and two breaks in the supplemental signal-circuit controlled respectively by the signal first named and by the track device; as explained.

15. In a signal system, the combination of a main signal, a supplemental signal included in a circuit having two breaks one of which is closed by the main signal when standing at danger, and a setting-arm for said main signal having a bridge-plate which is moved into contact with the terminals of the other break by the act of setting; substantially as set forth.

16. In combination with a signal, a setting-rod for said signal, a crank-arm swinging on a fixed pivot, and a detent for the setting-rod, a controlling-circuit for the detent, and a circuit-break for said circuit comprising a bridge-piece carried by the crank-arm and a pair of contacts upon which the bridge-piece bears when the signal is set, substantially as and for the purpose set forth.

17. An elongated structurally-resilient track device for transmitting movement from a passing train to work to be performed, the same being constructed with a tread adapted to lie adjacent to the railroad-rail, and with

a longitudinal fulcrum out of the vertical plane of said tread whereby depression of the tread causes torsional movement of the device, and a connection located distant from one end of said device whereby the structural resiliency is called into play to absorb the shock of first impact.

18. The combination of a signal normally gravitating to one position, a detent for said signal opposing its gravitation, an electric circuit controlled by a train for actuating said detent and a herein-described elongated structurally-resilient track device for moving signal into engagement with its detent.

19. As a new article of manufacture an elongated track device, constructed to receive movement from a passing train, structurally resilient to enable it to absorb the shock of impact of said train and having means for transmitting movement for the performance of work.

20. As a new article of manufacture an elongated track device constructed to receive movement from a passing train and to transmit said movement for the performance of work and torsionally resilient for the purpose set forth.

SLAUGHTER W. HUFF.

Witnesses:
M. M. CORBIN,
FRED. L. WITTIG.