

No. 691,781.

Patented Jan. 28, 1902.

C. J. KINTNER.

MECHANISM FOR AUTOMATICALLY OPERATING RAILWAY SWITCHES.

(Application filed Dec. 24, 1900.)

(No Model.)

7 Sheets—Sheet 1.

Fig. 1.

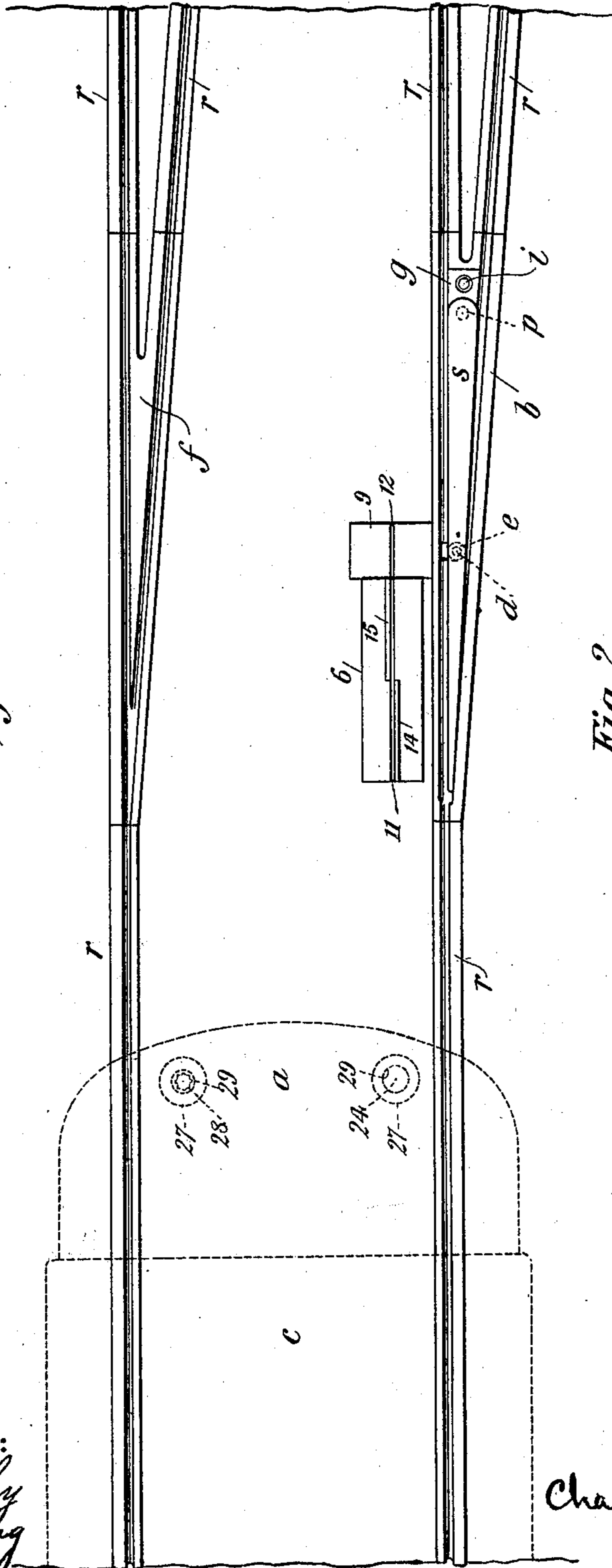
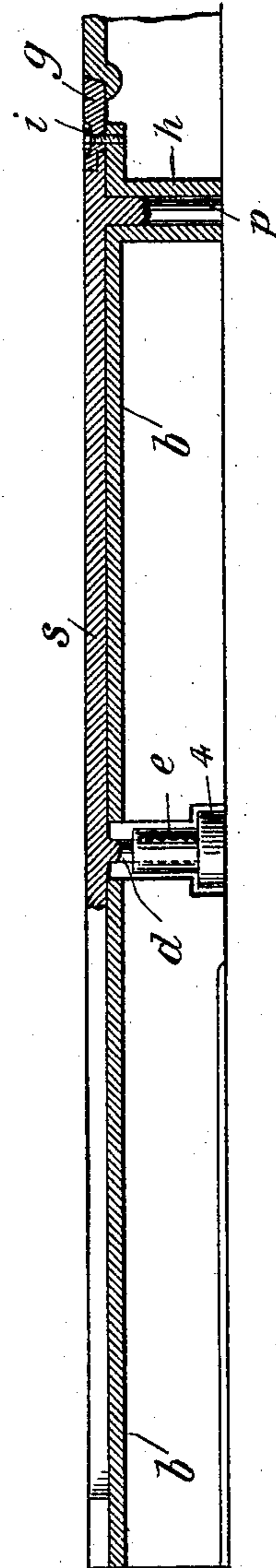


Fig. 2.



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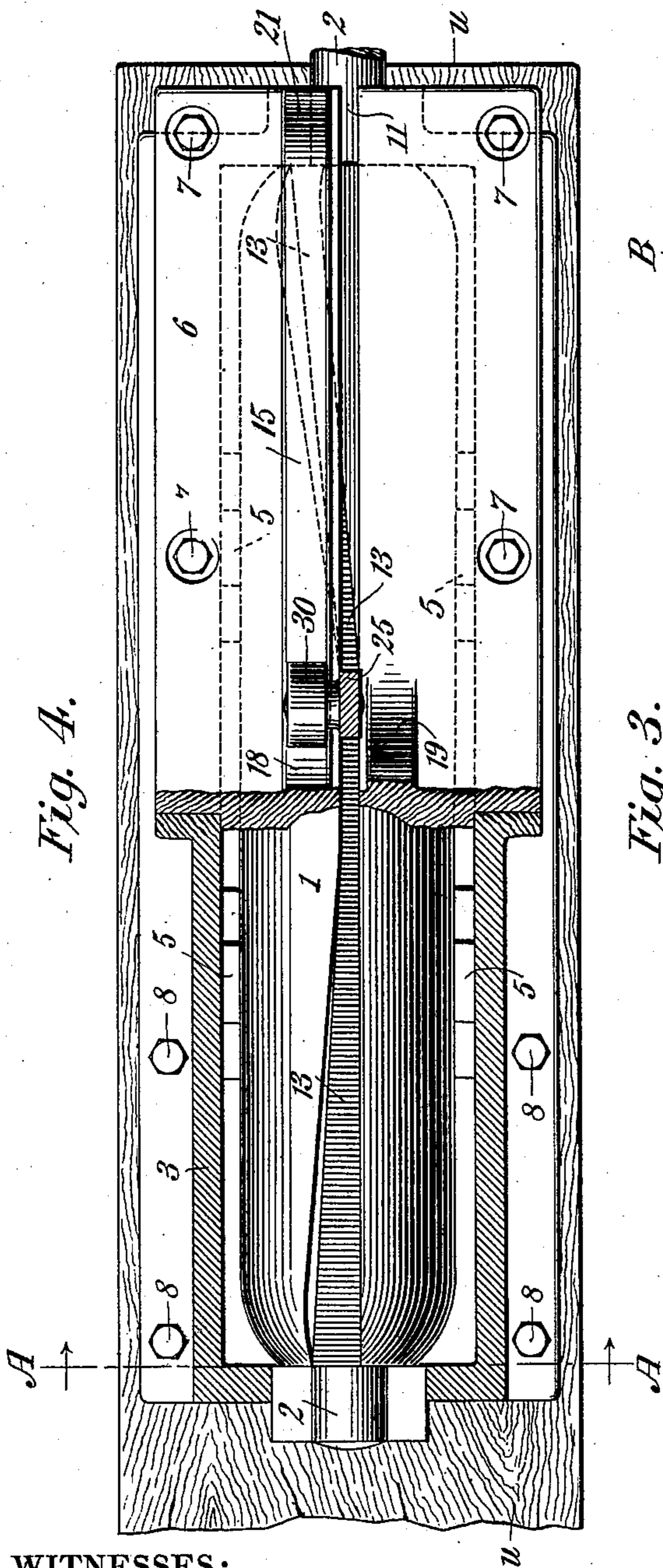
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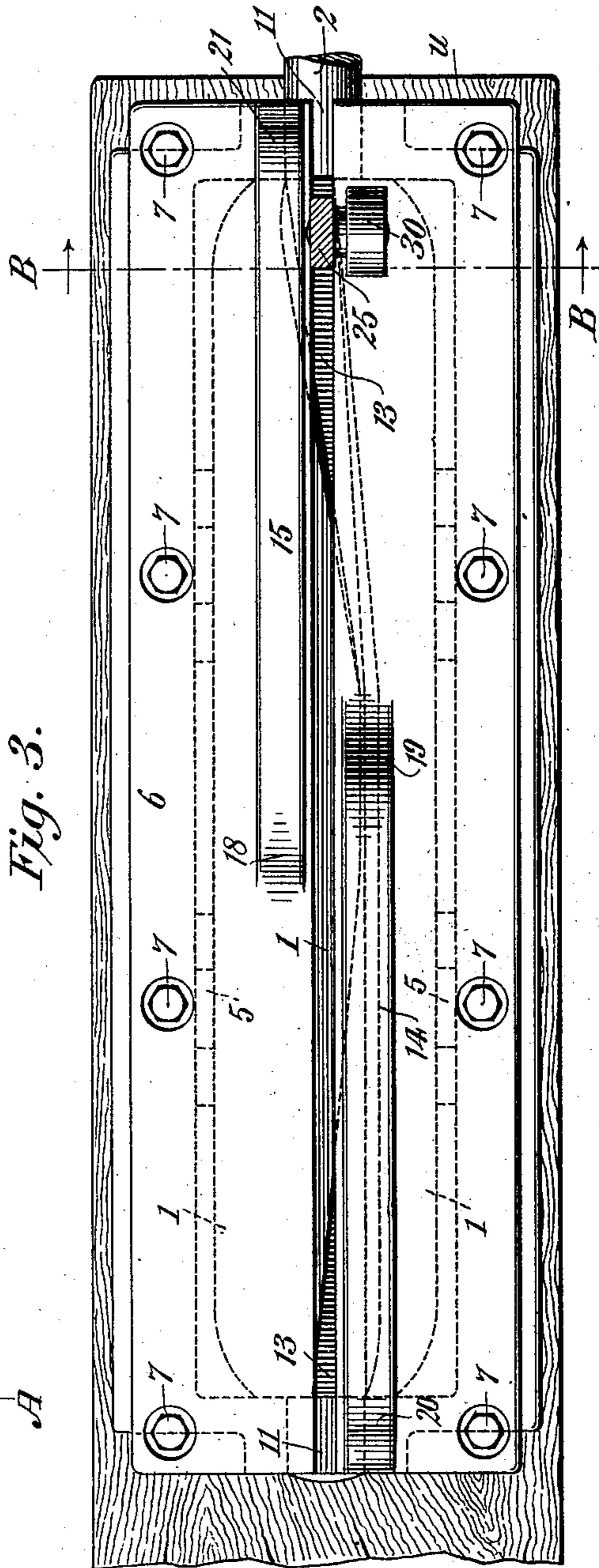
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7 Sheets—Sheet 2.



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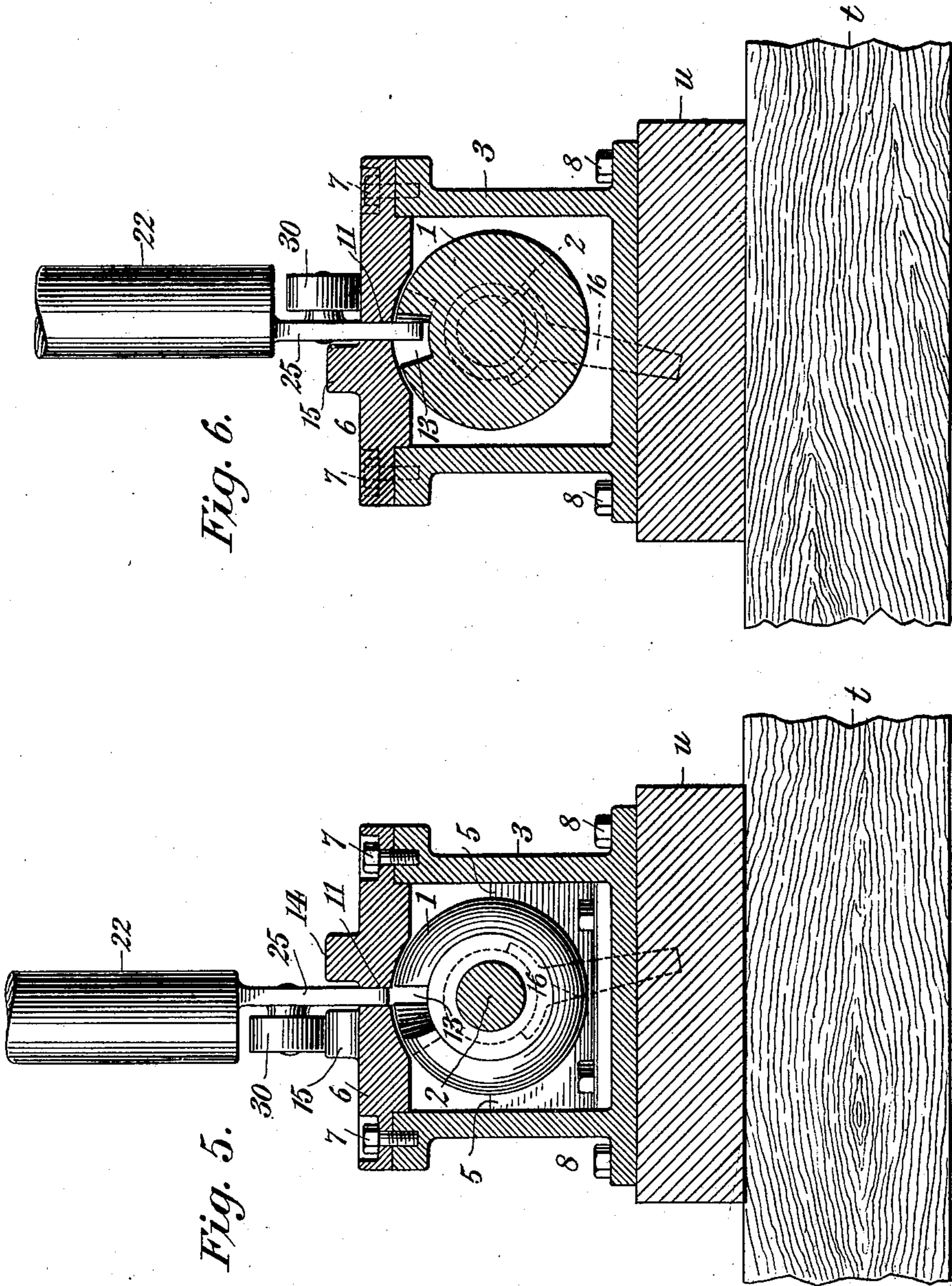
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7 Sheets—Sheet 3.



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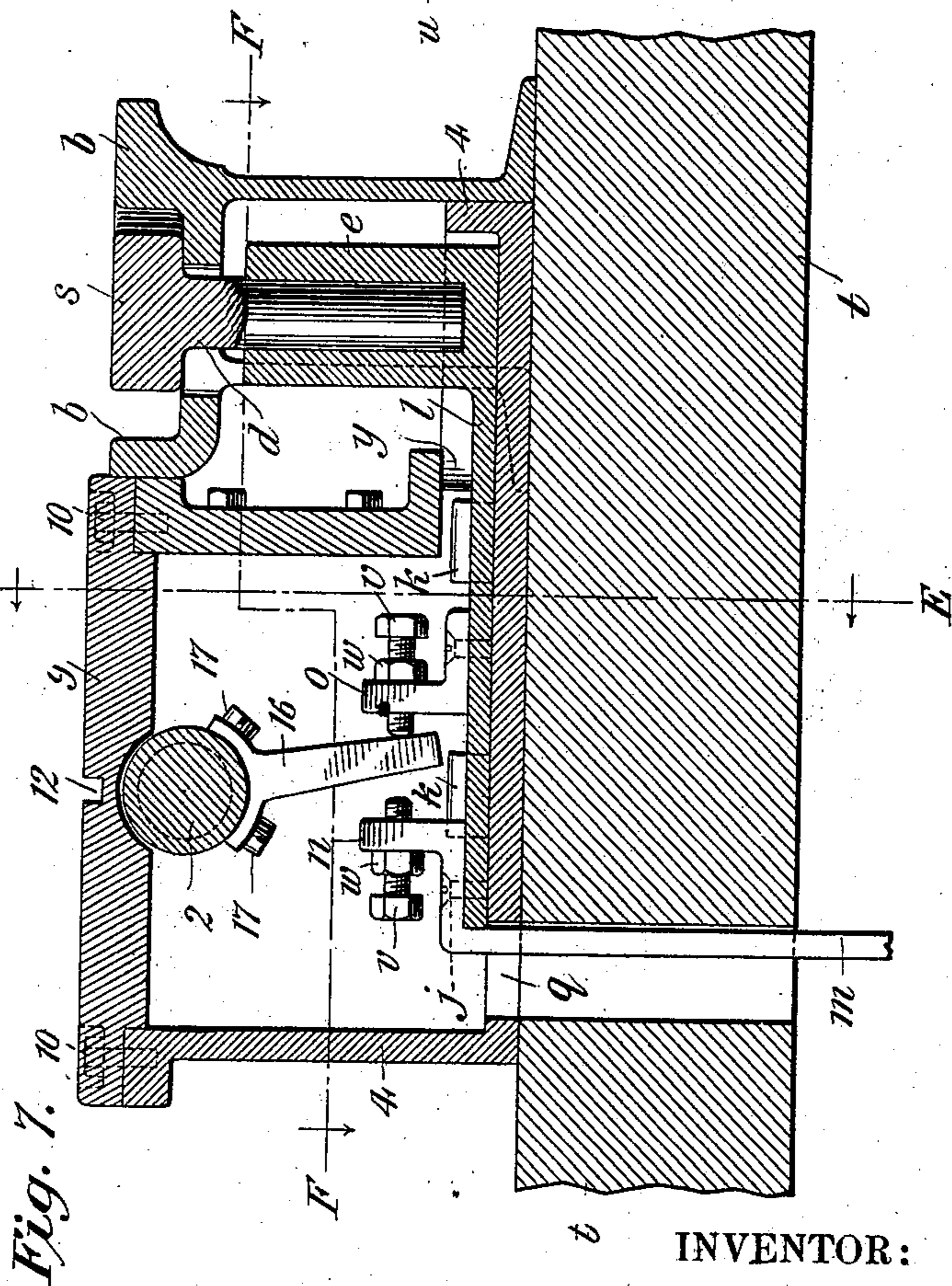
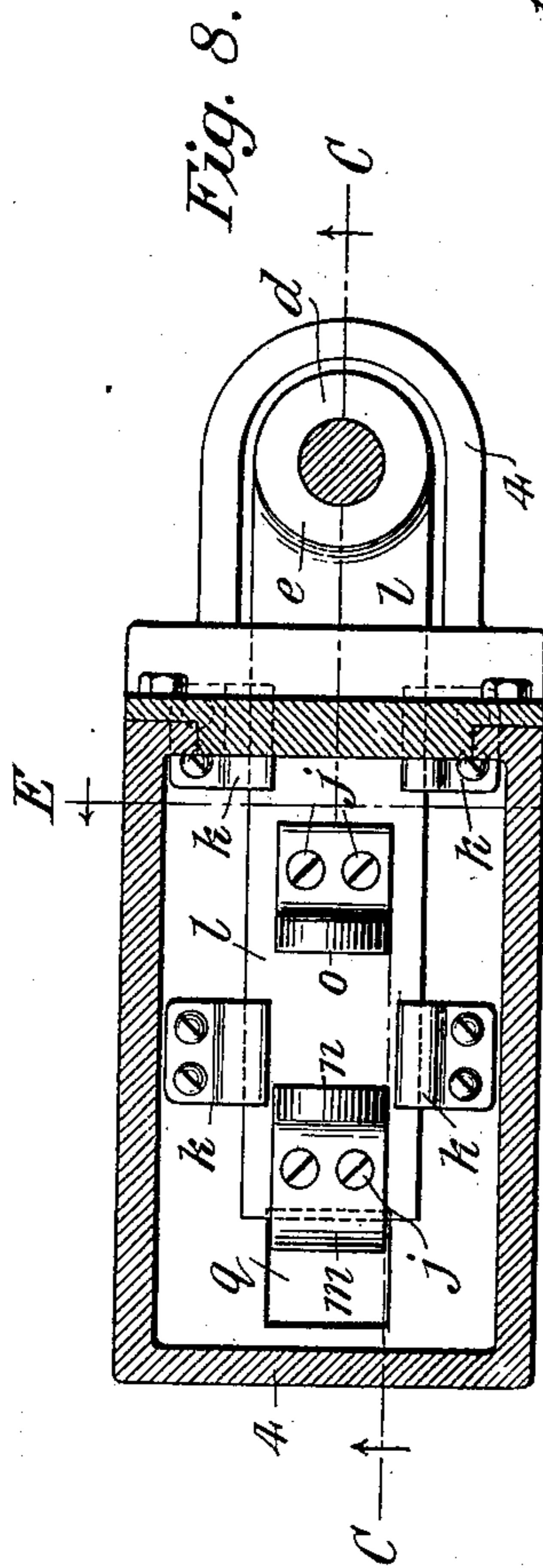
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7 Sheets—Sheet 4.



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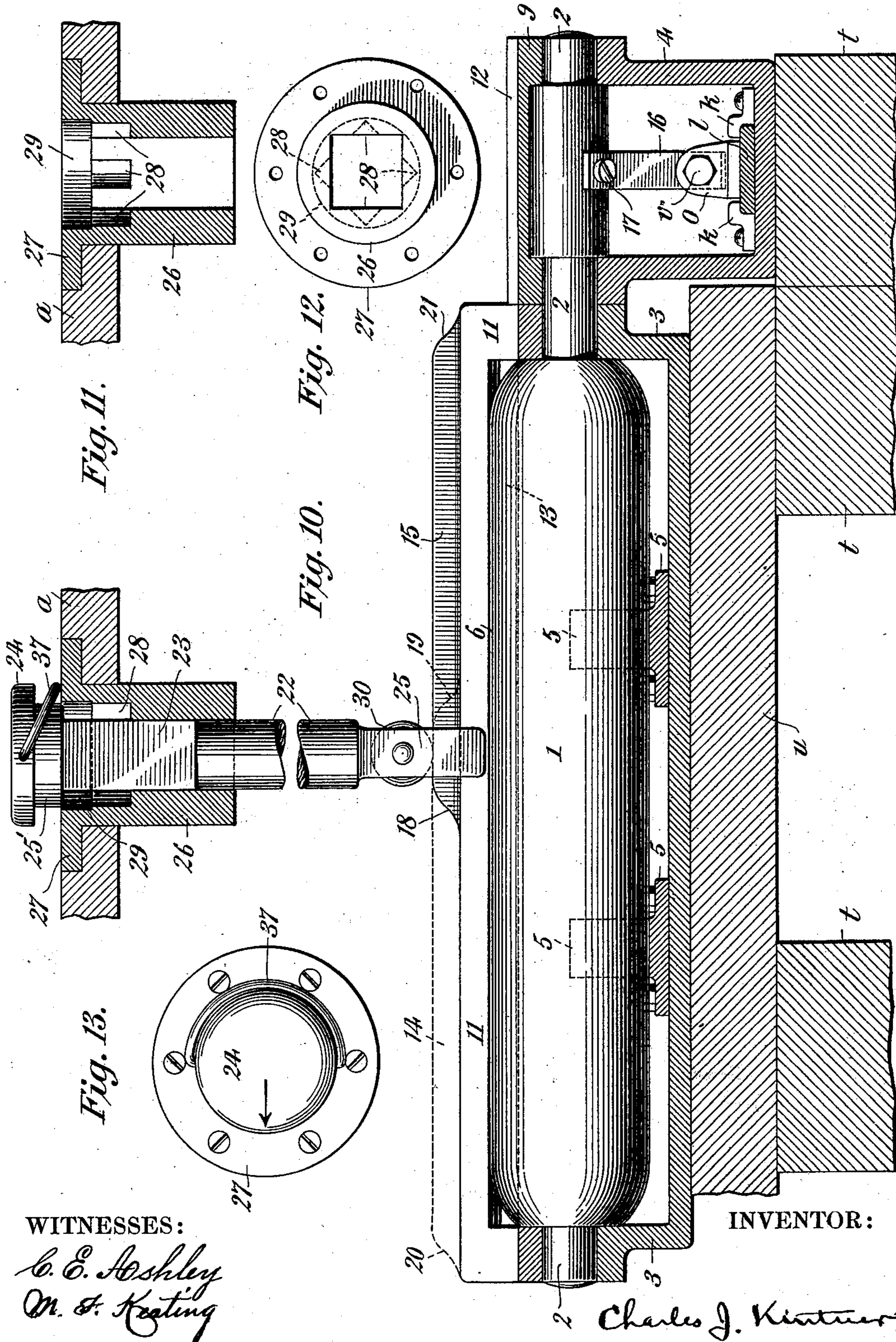
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7 Sheets—Sheet 5.



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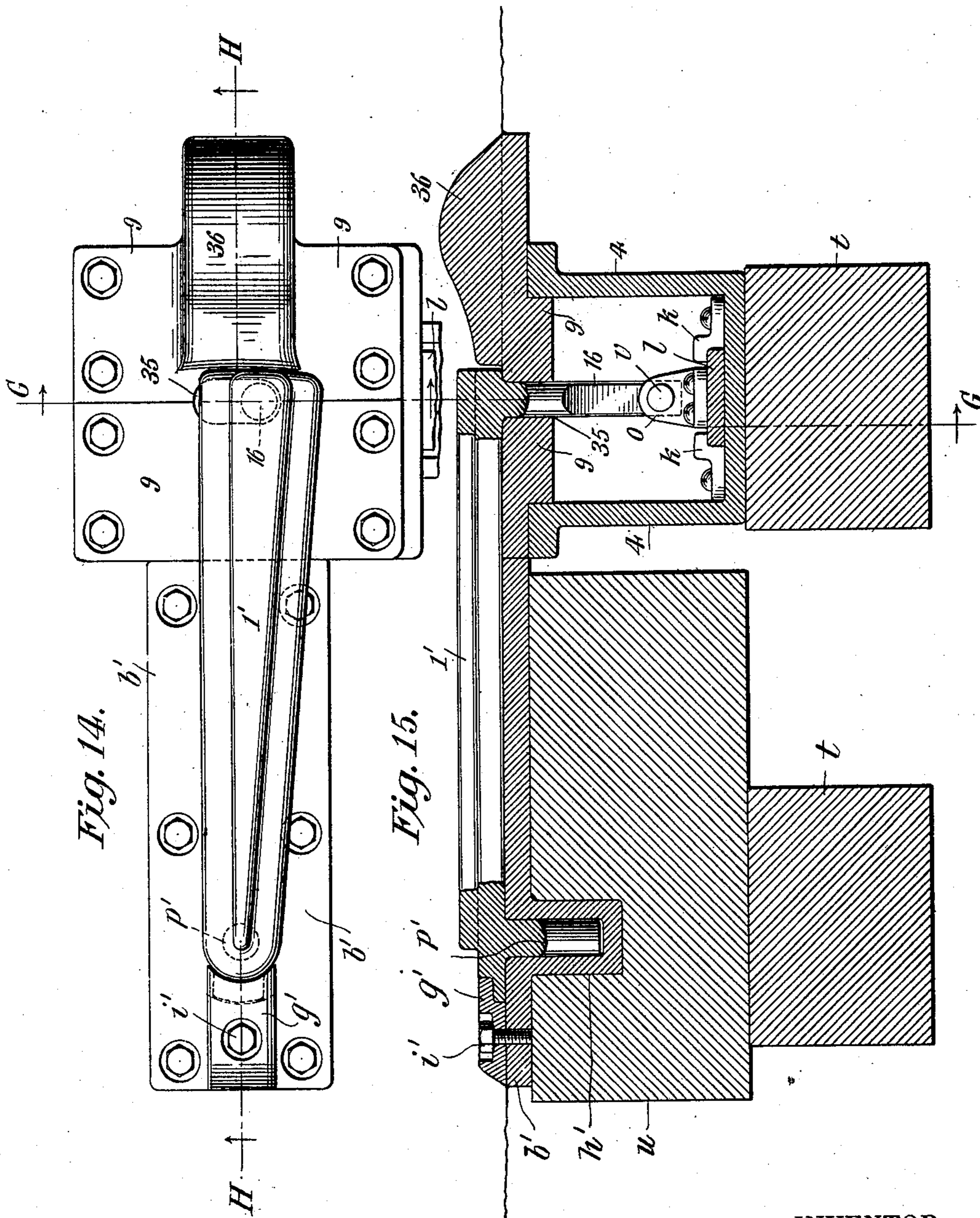
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7 Sheets—Sheet 6.



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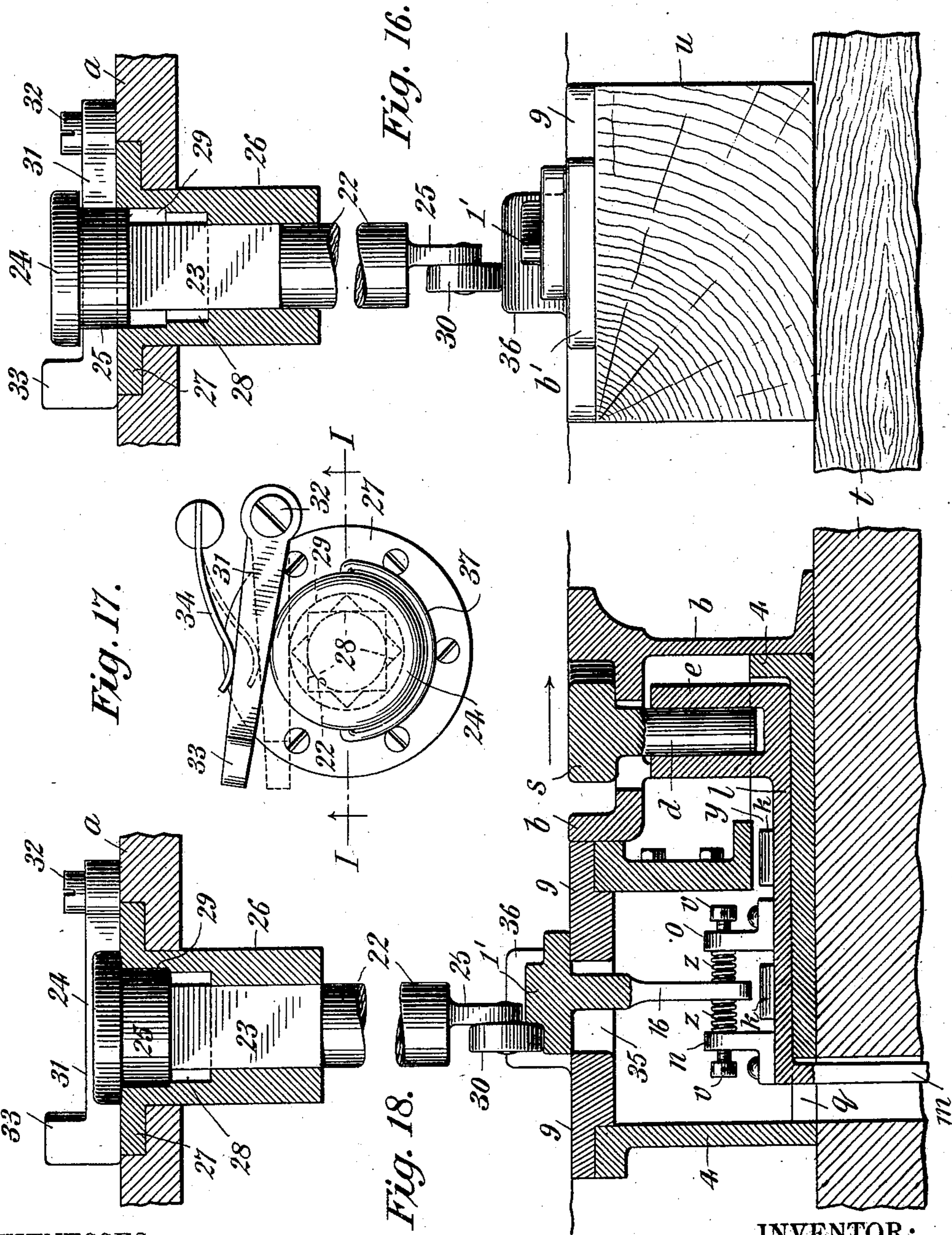
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(No Model.)

7 Sheets—Sheet 7.



UNITED STATES PATENT OFFICE.

CHARLES J. KINTNER, OF NEW YORK, N. Y.

MECHANISM FOR AUTOMATICALLY OPERATING RAILWAY-SWITCHES.

SPECIFICATION forming part of Letters Patent No. 691,781, dated January 28, 1902.

Application filed December 24, 1900. Serial No. 40,937. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. KINTNER, a citizen of the United States, residing at New York, in the borough of Manhattan, county
5 and State of New York, have made a new and useful Invention in Mechanism for Automatically Operating Railway-Switches, of which the following is a specification.

My invention is directed particularly to im-
10 provements in switch-operating mechanism located in the road-bed closely adjacent to a railway-switch and connected to the movable part thereof, together with controlling mechanism carried by a car and so arranged that
15 as it passes the switch the latter is automatically thrown in either direction, dependent upon the wish of the motorman or engineer, and will be fully understood by referring to the accompanying drawings, in which—

20 Figure 1 is a plan view of the railway, together with two branch lines of rails and one form of my normal switch-operating mechanism located in the road-bed and operatively connected with the switch, an approaching
25 car being also shown in dotted lines in plan view, the means for throwing the switch being illustrated on the front platform thereof and in dotted lines. Fig. 2 is an enlarged part sectional and part side elevational view
30 of a railway-switch of well-known form, illustrating also the manner of connecting my novel switch-operating mechanism thereto. Fig. 3 is an enlarged plan view of one form of that portion of my novel switch-operating
35 mechanism which is located in the road-bed and closely adjacent to the switch, and Fig. 4 is a similar view with a portion of the top at the left-hand end broken away for the purpose of illustrating the interior structure.
40 Fig. 5 is a sectional view taken through Fig. 4 on the line A A and as seen looking thereat from left to right in the direction of the arrows. Fig. 6 is a similar sectional view taken
45 through Fig. 3 on the line B B and as seen looking thereat from the left toward the right in the direction of the arrows. Fig. 7 is a sectional view taken on the line C C, Fig. 8, and D D, Fig. 9, and as seen looking
50 thereat in the direction of the arrows upon both figures. Fig. 8 is a sectional view taken on the broken line F F, Fig. 7, and as seen looking thereat from the top toward the bot-

tom of the drawings in the direction of the arrows. Fig. 9 is a partial end elevational view as seen looking at that portion of the
55 apparatus located in the road-bed in Fig. 1 looking from left to right, the switch, however, and its supporting-base and rails not being shown in this view. Fig. 10 is a sectional view taken on the line E E, Figs. 7 and
60 8, and as seen looking thereat from right to left in the direction of the arrows, the body of the apparatus, its attached parts, and the controlling mechanism carried by the car being shown in elevational view. The support-
65 ing-sleeve for the latter and a portion of the platform of the car are also shown in section. Fig. 11 is a sectional view of the supporting-sleeve for the part of the apparatus carried by the car and a portion also of the platform
70 of the same. Fig. 12 is a plan view of the supporting-sleeve of the apparatus carried by the car and as seen looking at Fig. 11 from the top toward the bottom of the drawings. Fig. 13 is a plan view of the supporting-sleeve
75 illustrated in Fig. 12 and also of the operating apparatus itself in position. Fig. 14 is a plan view of a preferred modified form of the switch-operating mechanism located in the road-bed; and Fig. 15 is a sectional view
80 thereof, taken on the line H H, Fig. 14, and as seen looking thereat from the bottom toward the top of the drawings. Fig. 16 is an end elevational view as seen looking at Figs.
85 14 and 15 from the left toward the right hand of the drawings, the controlling mechanism carried by the car being also shown in elevational view in this figure of the drawings and the sleeve for supporting the same, together
90 with a portion of the platform of the car, in sectional view. Fig. 17 is a plan view as seen looking at Fig. 16 from the top toward the bottom of the drawings, the platform of the car not being shown in this view. Fig. 18 is
95 a sectional view taken through Figs. 14 and 15 on the line G G and as seen looking thereat from the left toward the right of the drawings, the controlling mechanism carried by the car being also shown in this view in elevation and the supporting-sleeve therefor, to-
100 gether with a portion of the platform of the car, in section.

My invention is designed particularly for use in connection with complicated systems

of street-railways, such as are found in large cities and where cars moving on different routes are caused to pass over the system in various directions and under many conditions of usage, such as have heretofore rendered it practically impossible to provide an automatic system of switching devices for enabling a motorman to throw or turn any switch in the entire system in such manner as to cause his car to pass in the desired direction; and it is the particular object of my improvement to accomplish this result.

Referring now to the drawings in detail, in all of which like letters and characters of reference represent like parts wherever used, and first to Fig. 1, *r r* represent the tram-rails of a railway and two branch lines of tram-rails, with the usual switch-frog *f* and switch *s*, supported upon a base *b* and provided with a pivot-pin *p*, extending downward in a sleeve *h*, integral with the base, *g* being a locking-plate secured to the base *b* by a screw-bolt *i*, these parts being of well-known construction in connection with railway-switches.

c and *a* represent in dotted lines a car and the platform thereof carrying switch-controlling mechanism readily accessible to the motorman, the switch-operating mechanism being shown in Fig. 1 located permanently in the road-bed and connected directly to the movable part of the switch *s*.

Referring now to the remaining figures of the drawings, *u* represents a timber supported directly upon the cross-ties *t* and parallel with the tram-rails.

3 represents a cast-metal box secured directly to the timber *u* by bolts 8 8 8.

4 represents a second metallic box secured directly to one of the cross-ties *t* and closely adjacent to the first-named box, said boxes being provided with journal-bearings for the journals 2 2 of a cast-metal rotary part 1 of indefinite length.

5 5 are metallic cradles secured by bolts to the bottom of the box 3 and at points intermediate the ends thereof, ball-bearings (not shown) being located in said cradles for supporting in a frictionless manner the rotary part 1.

6 represents the cover of the metallic box 3, said cover being made in two parts secured directly to the top of the box by bolts 7 7 and separated from each other a definite distance, so as to constitute a slot 11.

9 represents the cover of the metallic box 4, secured thereto by bolts 10 10, said cover being cast in a single piece and provided with a groove 12, located when in position directly in alinement with the slot 11 in the cover of the box 3. The rotary part 1 is provided with a spiral groove 13, which has a definite pitch from one end to a point near the center thereof and from that point to the other end a similar pitch in a reverse direction, as will be described more particularly in connection with the description of the mode of operation.

14 is an upwardly-extending rib integral

with one half of the cover 6, and 15 is a similar upwardly-extending rib integral with the other half of the cover of the box 3, said ribs being inclined at their opposite ends, as shown at 19 20 18 21, the function of these ribs being to lift the pin out of the groove of the rotary part.

16 is an arm secured by bolts 17 to that part of the rotary part 1 which is inclosed in the box 4.

l is a connecting link or bar between the switch-operating mechanism located in the road-bed and the movable part of the switch *s*, said link or bar having reciprocating motion through an opening *y* in the side of the box 4 and in four guideways *k k k k*, secured directly to the bottom thereof. Integral with the outer end of the link or bar *l* is an upwardly-extending sleeve *e*, into which a pin *d*, integral with the switch *s*, extends. (See Figs. 1, 2, and 7.) Secured to the inner end of the link or bar *l* by screws *j* is a downwardly-extending arm *m*, passing through an opening *q* in the bottom of the box and cross-tie *t*, its function being to operatively connect the apparatus with the switch of the slot (not shown) in a cable or an electric railway where a grip or trolley plow is used. The upper end of this arm is provided with a lug *n*, *o* being a similar lug secured directly to the link or bar *l* by additional screws *j* and at a definite distance from said lug *n*.

v v are adjustable screw-bolts for limiting the movements of the parts, and *w w* are set-nuts for securing said bolts.

The apparatus thus far described constitutes the switch-operating mechanism located permanently in the road-bed and adjacent to the movable part of the switch *s*.

I will now describe the controlling mechanism carried by the car, referring particularly to Figs. 1, 4, 5, 6, and 10 to 13, inclusive. Secured in each platform of all of the cars of the system and in alinement with the slot 11 and groove 12 of the switch-operating mechanism are two cast-metal guiding-sleeves 26, having horizontal supporting-flanges 27, said sleeves extending downwardly beneath the bottom of the car to points a few inches above the road-bed surface, the arrangement being such that the switch-controlling mechanism may be inserted therein and allowed to fall by its own weight from its upper or locked position to its lower or operative position. These sleeves are cast, as shown in Figs. 10, 11, and 12, with a square opening at the lower end thereof adapted to receive the squared part 23 of the switch-controlling mechanism in the nature of a metal pin having an enlarged head 24, an enlarged cylindrical part 25', a diminished cylindrical part 22 below the squared part 23, and a still further diminished rectangular part 25 at the extreme lower end of such proportions as to adapt it to pass through the slot 11 of the cover 6, the groove 13 of the rotary part 1, and the groove 12 of the cover 9 to box 4. 30 is a roller se-

cured on one side to the rectangular part 25. (See Figs. 5 and 6.)

The metallic guiding-sleeves 26 are each provided with short triangular-shaped grooves 28 28 28 28 near their upper ends, and an enlarged interior cylindrical opening 29 for receiving the enlarged cylindrical part 25' of the metal pin.

37 is a bail or handle for lifting the pin and changing or shifting the operative parts thereof.

In Fig. 13 an arrow is shown upon the head 24 of the pin for indicating to the motorman the relative position thereof.

The operation is as follows: When the car approaches a switch, the motorman lifts the controlling-pin by the bail or handle 37 and turns it so that the arrow on the head 24 points in the direction he wishes his car to be switched. He then allows it to drop until the head 24 rests upon the flange 27. Under these conditions the rectangular-shaped part 25 enters the slot 11 and the spiral groove 13 of the rotary part 1, causing the latter to rotate, say, from left to right (see Figs. 4 and 5) until the switch is thrown by the action of the arm 16 upon the link or bar *l*, thus imparting directly and positively to the switch *s* the desired motion to throw it. When the roller 30 reaches the inclination 18 of the rib 15, the pin is lifted into its upper position, as shown in Figs. 5 and 10, and is carried in this position until it passes down the inclination 21 at the extreme end of the rib 15. Should the motorman of the following car desire to throw the switch in a reverse direction, he simply lowers his switch-controlling pin, with the arrow on the head 24 pointing in the opposite direction from that hereinbefore indicated. Under this condition, therefore, the roller 30 strikes the inclination 20 of the rib 14 and lifts the pin, where it is held in its elevated position until said roller passes down the inclination 19 into the reversely-pitched groove 13, where the rectangular-shaped part, acting upon the right-hand wall of said groove, throws the switch back to its original position. (See Fig. 3.) It will be apparent, therefore, that the location of the arrow upon the head 24 is sufficient to indicate to the motorman whether his switch-controlling pin is correctly located to throw the switch in the proper direction or not. These switch-controlling pins are interchangeable, there being one for each platform, and the motorman will place the pin in the proper guiding-sleeve 26 of the front platform, dependent upon the direction in which his car is traveling. In other words, this arrangement makes it possible for a motorman to shift the switch-controlling pin in accordance with the direction of movement of his car and the location of the permanent switch-operating mechanism in the road-bed. With the arrangement of the triangular-shaped grooves 28 in the sleeves 26 it is possible for a motorman to lift the switch-controlling pin and ro-

tate it ninety degrees, so that the indicating-arrow on the head 24 points either to the front or to the rear, and then lower it with the corners of the rectangular-shaped part 23 in said grooves, thereby maintaining the pin permanently out of operation, the location of the indicating-arrow giving evidence of this fact. This arrangement of switching mechanism makes it possible to throw a switch when a car is traveling at a relatively great speed, the length of the rotary part and the pitch of the groove being the determining features in this particular.

Referring now to Figs. 14 to 18, inclusive, I will describe the preferred modified form of my invention, in which the switch-operating mechanism located in the road-bed consists of a wedge-shaped lever *l'*, having a broadened base resting upon a bed-plate *b'* and having at one end a pin *p'*, adapted to pivotally support it in a sleeve *h'*, *g'* being a locking-plate and *v'* a locking-bolt, said parts being similar in all respects to the parts *p*, *h*, *g*, and *i* illustrated in connection with the switch *s* in Fig. 2 and the movements of the lever *l'* being substantially like that of the movements of the switch. At the base end of the wedge-shaped lever *l'* and integral therewith is an arm 16, extending downwardly through a slot 35 in the two-part cover 9 of the box 4, the lower end of said arm being provided with pins adapted to enter the ends of opposing strong spiral springs *z z*, secured adjustably between the lugs *n* and *o* by set-screws *v v*, said lugs being in turn attached to the link or bar *l*, which is similar in all respects to the corresponding part described in connection with the other figures of the drawings and has an upwardly-extending sleeve *e*, adapted to receive the pin *d* of the switch *s*. At the movable end of the pivoted wedge-shaped lever *l'* and integral with one-half of the cover 9 of the box 4 is an elevation 36, having a double inclined face, the lower end of the face next the free end of the lever *l'* being of substantially the same level as the side flanges of said lever. The controlling mechanism carried by the car is substantially the same as that described and illustrated in Figs. 10, 11, 12, and 13, except that the roller 30 in this instance is attached, preferably, directly to the lower end of the rectangular part 25, an additional feature, however, being provided in the nature of locking mechanism consisting of a lever 31, pivoted directly to the platform *a* by a screw-bolt 32, 34 being a leaf-spring secured at one end to the platform, the free end thereof bearing directly against one face of the lever 31 in such manner as to hold said lever when the switch-controlling pin or mechanism is lifted in its middle position, as clearly illustrated in Figs. 16 and 17. 33 is an extension or lug at the free end of the lever 31 for enabling the motorman to release the lever with his foot. The operation of this form of the invention is as follows: As the car approaches the switch the

motorman strikes the lug 33 of the lever 31 with his foot, thereby releasing the pin and allowing it to fall into operative position, it being assumed, of course, that said pin has been turned to the proper position to throw the switch in the direction desired. As the car approaches the switch, therefore, the interior lateral face of the roller 30 presses against the face of the wedge-shaped lever 1', thus forcing it gradually and continuously in the desired direction, as indicated in Fig. 18, and at the same time imparting motion to the arm 16, and through it and one of the spiral springs z and supporting-lugs to the link or bar l , and hence to the switch s , the function of said spiral springs being to automatically adjust for any lost motion and to prevent any abnormal strain upon the mechanism. Finally, when the switch is thrown to its extreme limit the roller 30 reaches the inclined face of the elevation 36, thus causing the switch-controlling mechanism to be lifted vertically into its middle position, so as to permit the locking-lever 31 to be forced under the head 24 by the spring 34, thereby locking it in this position, so that it will not act upon any switch over which it may pass unless it is again released by the motorman. It is obvious that for the purpose of throwing the switch in a reverse direction it is only necessary for the motorman to reverse the position of the controlling-pin, so that when released and allowed to fall by its own weight the interior lateral face of the roller 30 will strike the other adjacent lateral face of the wedge-shaped lever 1'. This pin or controlling mechanism may of course be interchanged with relation to the different guiding-sleeves 26 upon either of the platforms a of the car, thereby making it possible to operate any switch over which the car may be passing and in any direction. In the event of the wedge-shaped lever 1' being coated with ice to such an extent as to render its movements improbable by the weight of the controlling-pin the motorman might stand with his entire weight upon the head 24, thus assuring the operation. The roller 30 might also, if preferred, have a knife-like edge instead of the flat face, as shown, so as to enable it to more readily act in the event of the presence of ice upon the parts.

I do not limit my invention to the especial details of construction hereinbefore described and illustrated in the accompanying drawings, as I believe it is broadly new with me to combine switch-operating mechanism located permanently in the road-bed with switch-controlling mechanism carried by a car for controlling the movements of said operating mechanism and an attached switch, the arrangement being such that the switch-controlling mechanism on the car may be reversed by a motorman, so as to throw the switch in either direction at will, may be shifted from one point of the platform of the car to another point or to the like points upon

the other platform or to other cars, so as to adapt it for use under all conditions of usage no matter in which direction the car may be traveling, said switch-controlling mechanism being adapted to fall by its own weight when released into operative position and combined with means located in the road-bed adapted to restore it to its normal or inoperative position, and my claims are generic as to these features.

Although I have shown and described a car provided with interchangeable means of support for sustaining the switch-controlling pin or mechanism in four different positions upon the two platforms of a car, a condition which would be required in connection with street-railways of the slotted-conduit type, it is obvious that for street or other railways where there is no intermediate slot or third rails or other obstructions the interchangeable means of support might be in the middle of the platform at each end of the car and the switch-operating mechanism located directly in the center of the road-bed, such matters coming fully within the scope of my claims hereinafter made.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A railway-switch operatively connected to switch-operating mechanism; in combination with switch-controlling mechanism carried by a car, said controlling mechanism being supported in a guiding-sleeve adapted to prevent it from rotating and provided with means at its lower end adapted to assume different relative positions to the switch-operating mechanism; together with locking means for locking it in its upper or inoperative position, the arrangement being such that when the locking means is released the switch-controlling mechanism falls into operative position, substantially as described.

2. Means for automatically throwing a switch, consisting of a controlling-pin having its lower or operative end so constructed that it will, when released, assume different radial positions; in combination with a guiding-sleeve so constructed as to prevent the pin from rotating when located in its lower or operative position; together with locking means adapted to hold said pin normally in its upper or inoperative position, the arrangement being such that when the pin is released it will fall by its own weight to its lower or operative position, substantially as described.

3. Switch-controlling mechanism carried by a car, consisting of a reversible pin sustained in a guiding-sleeve rigidly secured to the car; in combination with locking mechanism adapted to lock the pin in its upper or inoperative position; said pin and its guiding-sleeve being so constructed as to prevent the former from rotating when in its lower or operative position and adapted to fall by its own weight when released, substantially as described.

4. A car provided with two or more guiding-sleeves located at different points; in combination with a switch-controlling pin adapted to be used in either of said guiding-sleeves, said pin and guiding-sleeves being so constructed relatively as to prevent rotation of the former when in its lower or operative position; together with locking mechanism adapted to lock the pin in its upper or inoperative position, substantially as described.

5. A railway-switch operatively connected with operating mechanism adapted to give to the switch gradual and continuous movement as a car approaches it; in combination with controlling mechanism therefor consisting of a pin supported in a guiding-sleeve carried by the car, said pin and sleeve being relatively so constructed that the former is prevented from rotating when in its lower or operative position; together with means for locking the pin out of operative relation with the switch-operating mechanism, the arrangement being such that when the pin is released it will fall by its own weight into working position, substantially as described.

6. Switch-controlling mechanism consisting of a rectangular guiding-sleeve carried by a car and a rectangular-shaped pin adapted to assume different positions therein when rotated and seated, the lower or operative end of the pin being adapted to assume relatively different positions with relation to the switches over or by which it passes, substantially as described.

7. Railway-switch-controlling mechanism consisting of a guiding-sleeve the interior surface of which is cylindrical in cross-section at its upper end and rectangular in cross-section at a lower point; in combination with a pin the lower or operative end of which is so constructed as to assume relatively different operative positions with relation to the switches over or by which it passes, the arrangement being such that when the pin is lifted and rotated a partial revolution it will be held, when released, by the sleeve in its inoperative position, and when lifted and rotated still further in either direction and released

it will fall by its own weight to operative position, substantially as described.

8. A railway-switch operatively connected with mechanism for moving it in opposite directions; in combination with controlling mechanism therefor carried by a car; together with locking and releasing means for regulating the movements of the controlling mechanism and stationary means for automatically restoring the controlling mechanism to its normal or locked position after each switch has been operated, substantially as described.

9. A railway-switch operatively connected with mechanism for moving it in opposite directions; in combination with controlling mechanism therefor, in the nature of a pin supported in a guiding-sleeve carried by a car and adapted to fall by its own weight, when released; together with locking and releasing means adapted to hold the pin in its upper or inoperative position and stationary means located in the road-bed adapted to automatically restore the controlling mechanism to its normal position after each switch has been operated, substantially as described.

10. Switch-controlling mechanism carried by a car consisting of a guiding-sleeve and a switch-controlling pin carried thereby, said sleeve and pin being so constructed relatively that when the former is lifted to its extreme height and rotated a partial revolution and then released, it will be held normally permanently out of operation; together with locking means so related to the sleeve and pin that when the latter is rotated a further definite distance in either direction and lowered, it will be locked and may be released at pleasure and allowed to fall by its own weight into operative position and will be locked, when so released, against rotation in either direction, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES J. KINTNER.

Witnesses:

JAMES P. J. MORRIS,
M. F. KEATING.