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PATENTED JULY 28, 1908.

C. A. HUSE & J. G. DOUTY.

CONTACT SWITCH BOX FOR ELECTRIC RAILWAY SYSTEMS.

APPLICATION FILED SEPT. 17, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

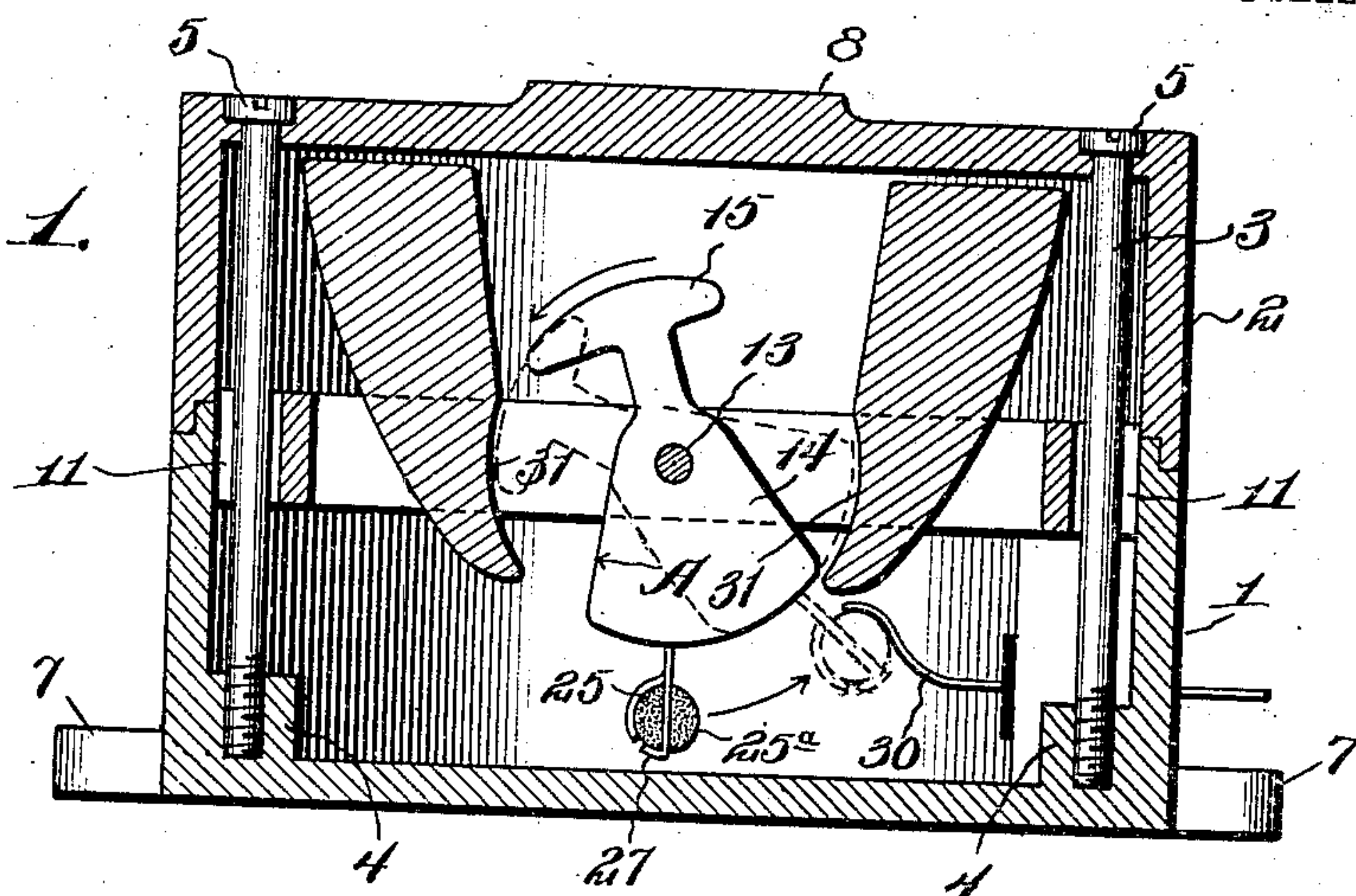
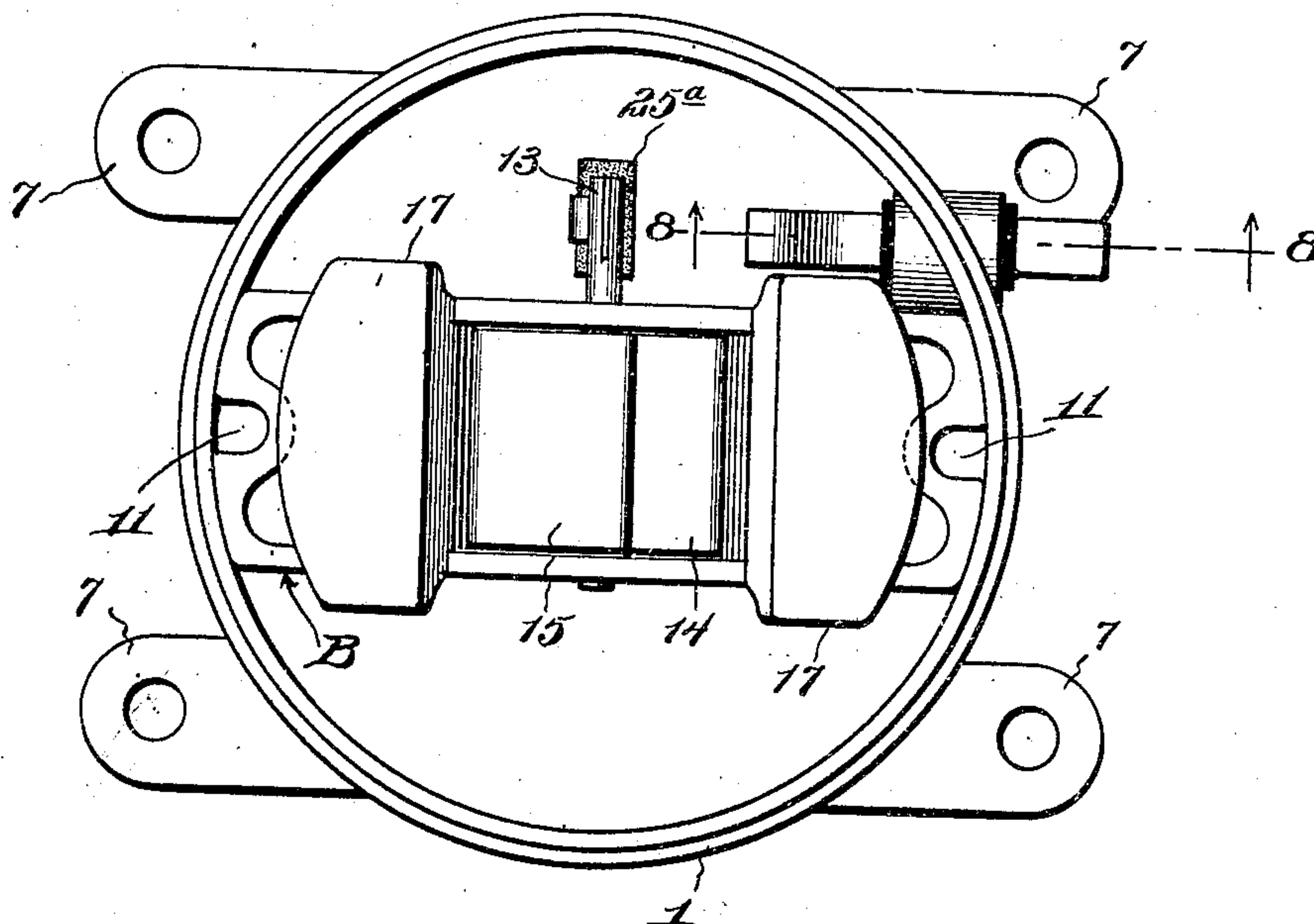


Fig. 2.



Witnesses

Louis R. Heinrichs
Wm. Bagger

Inventors
Charles A. Huse
John G. Douty
By Victor J. Evans

Attorney

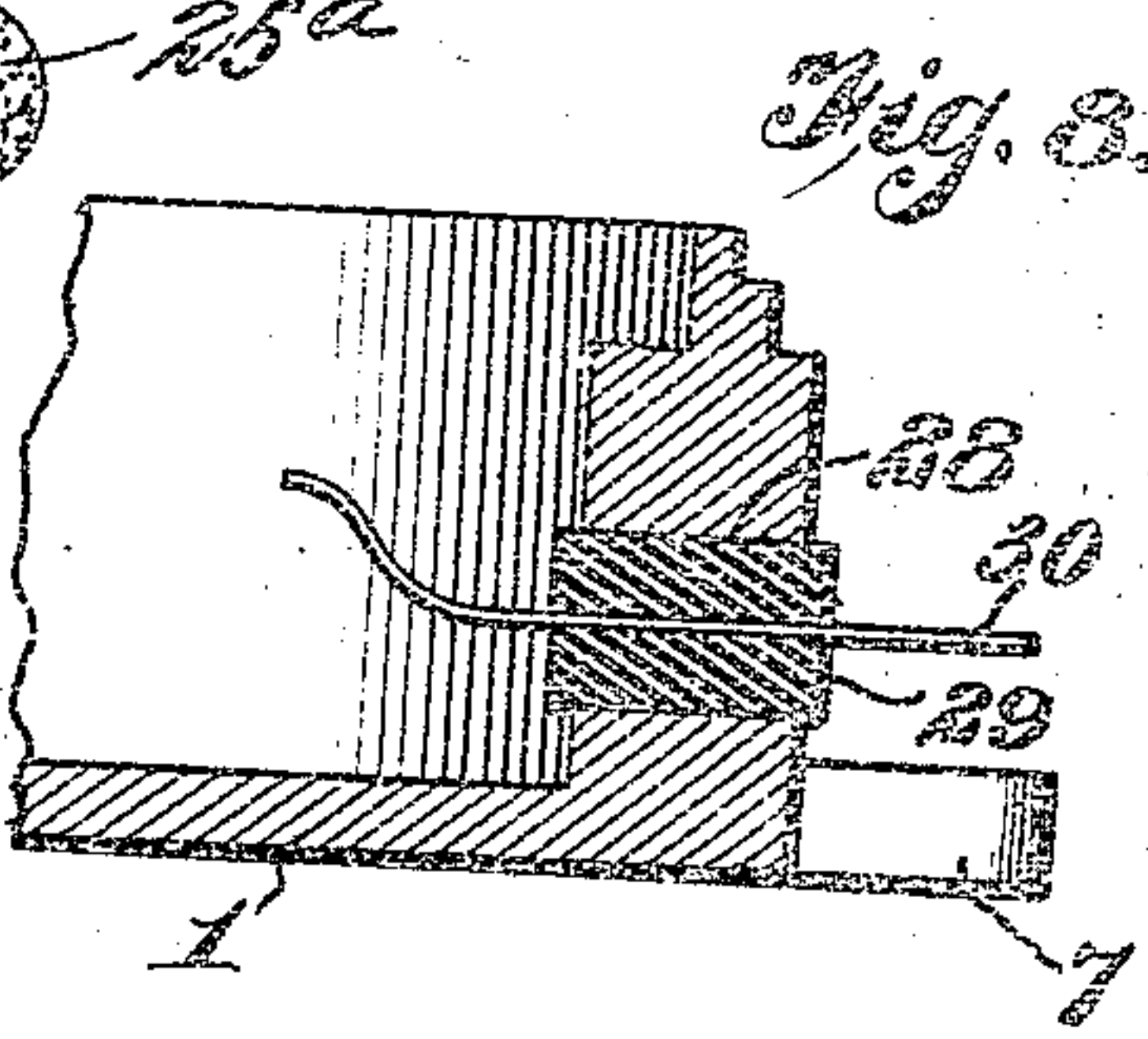
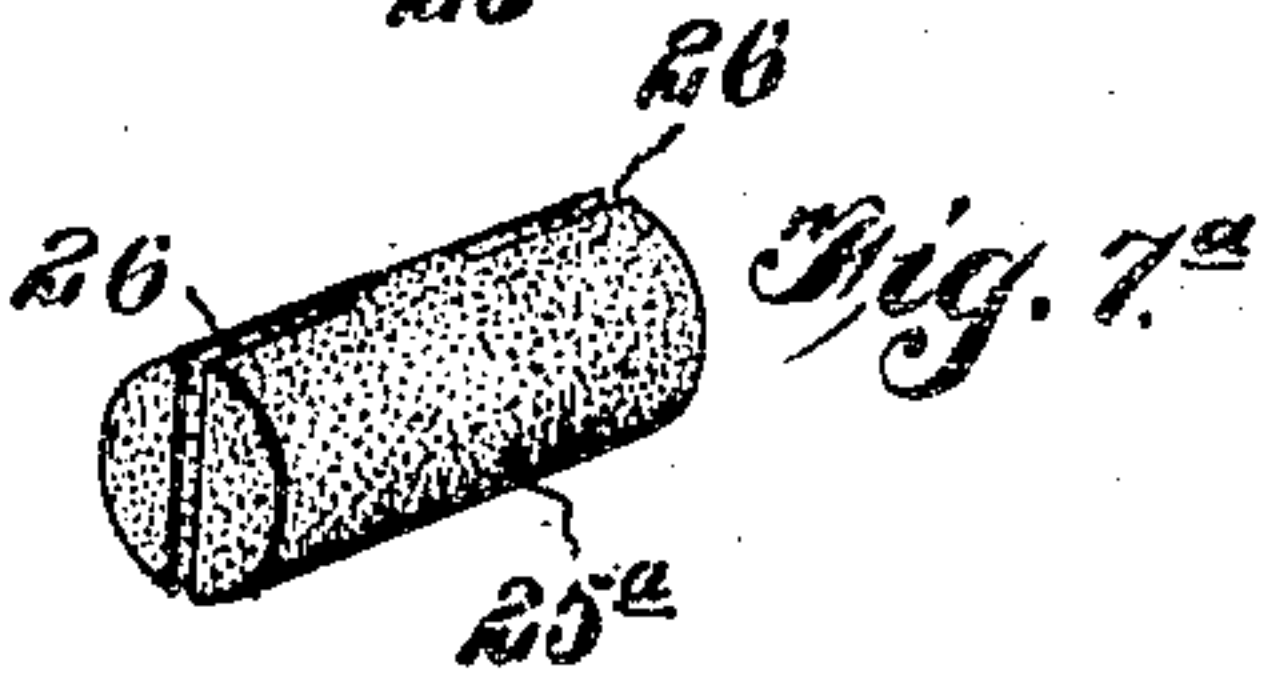
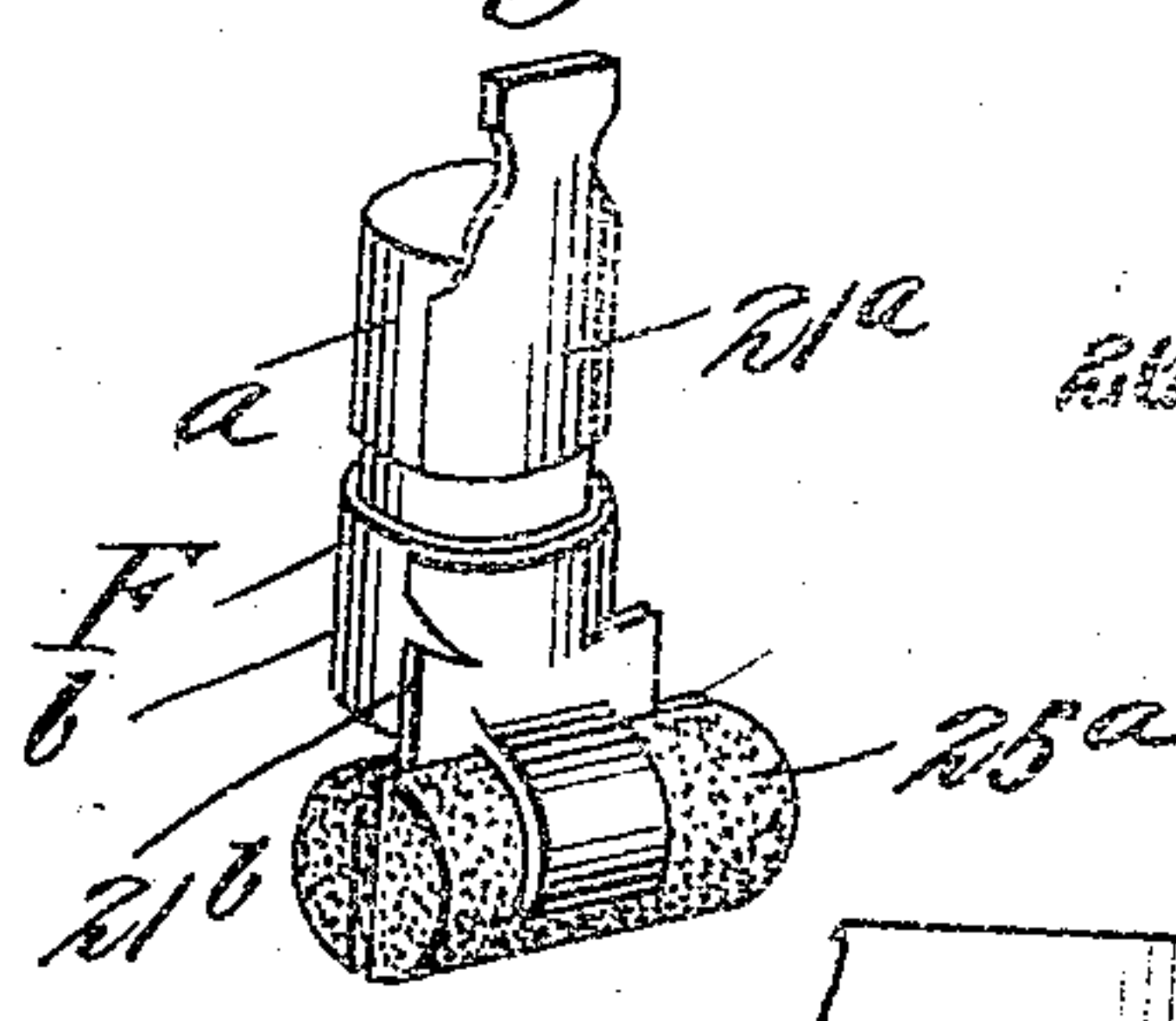
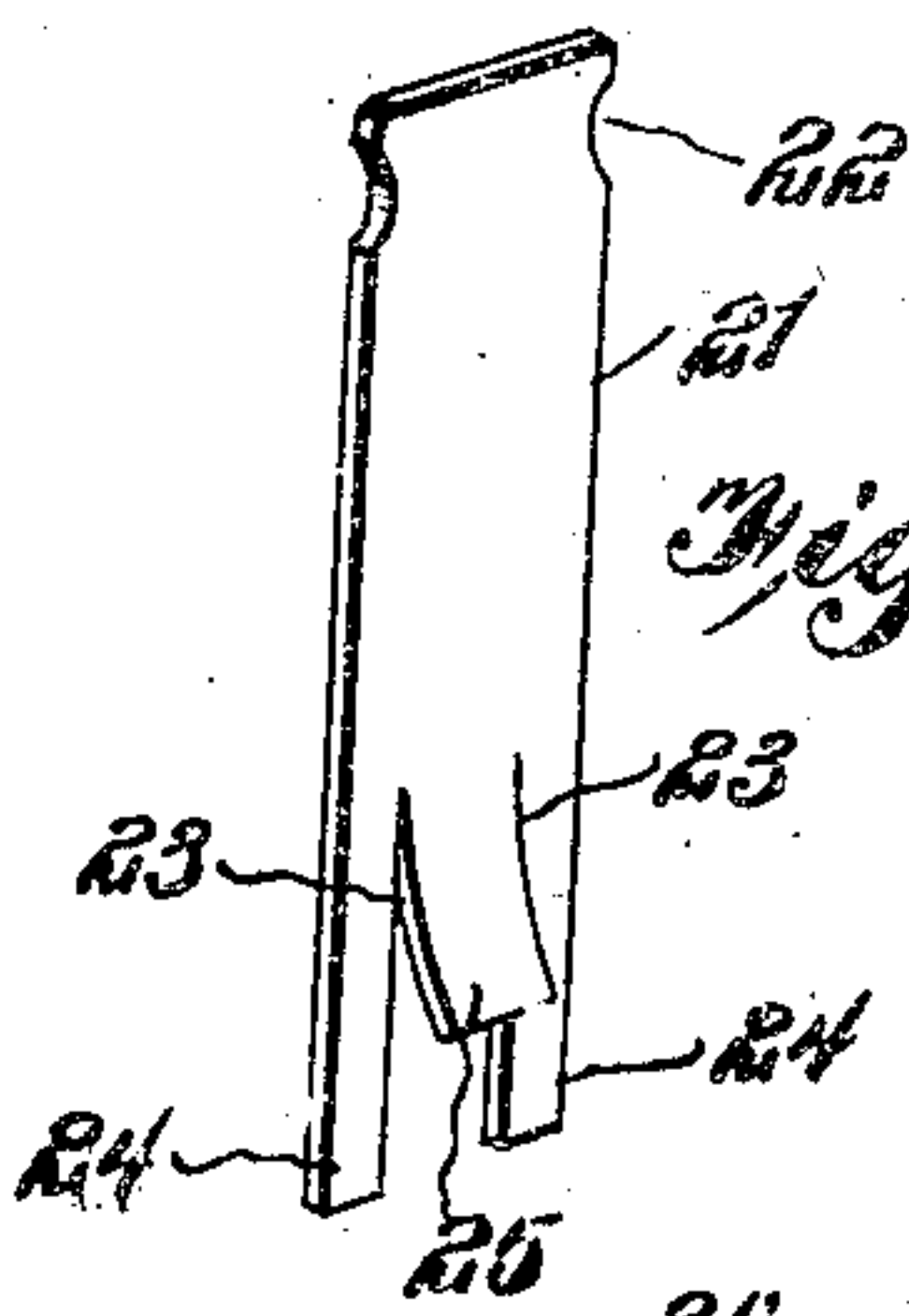
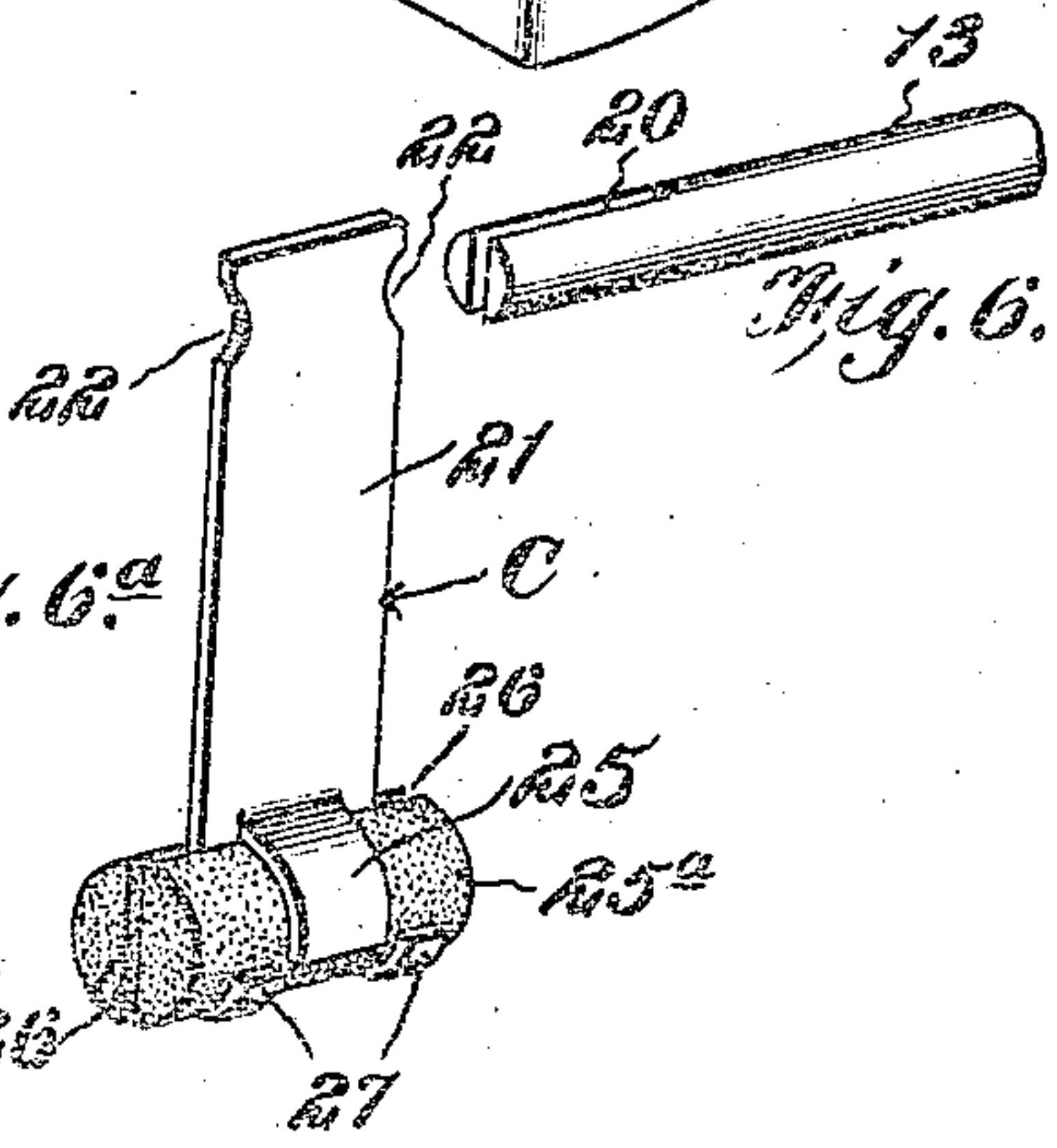
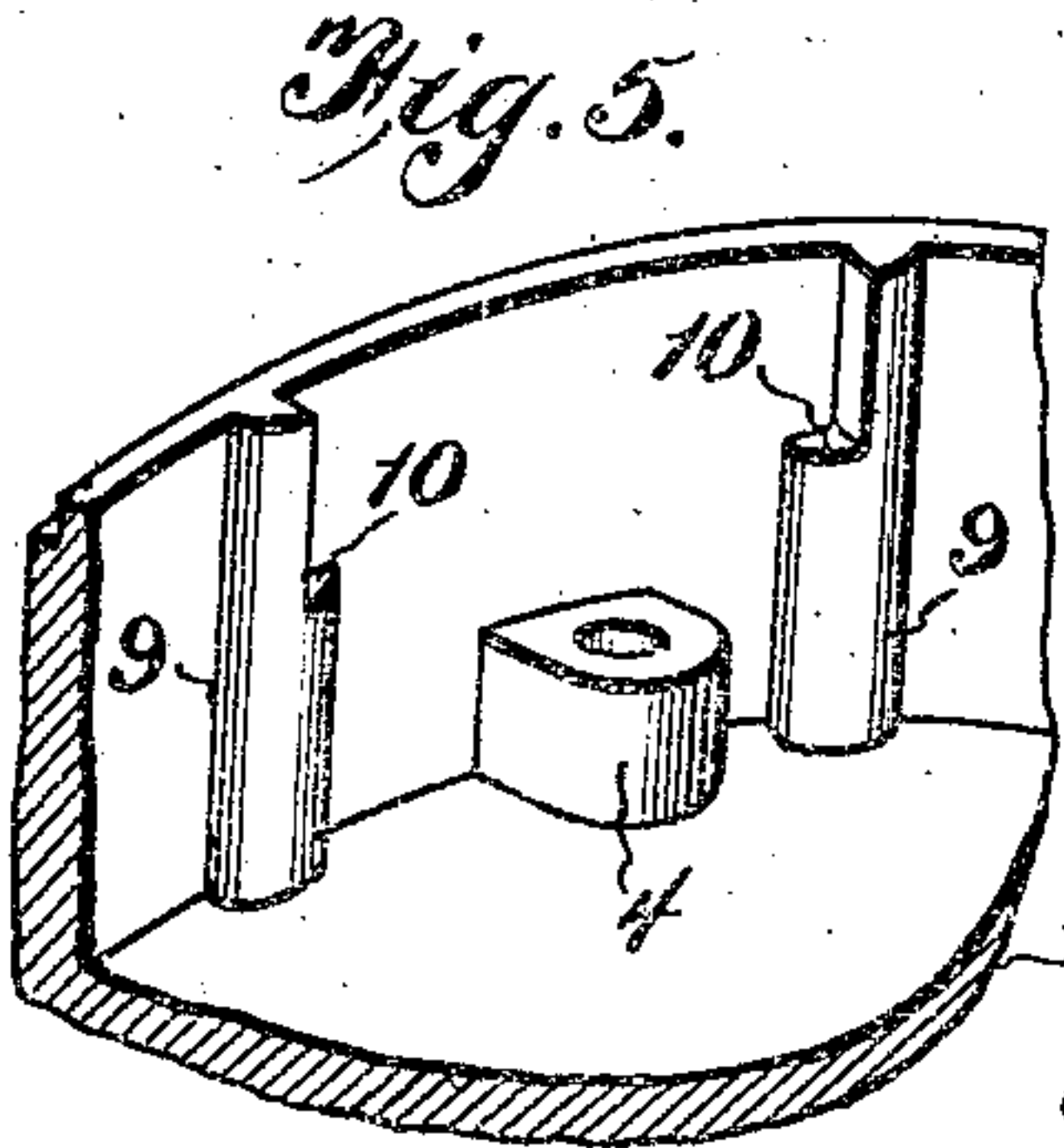
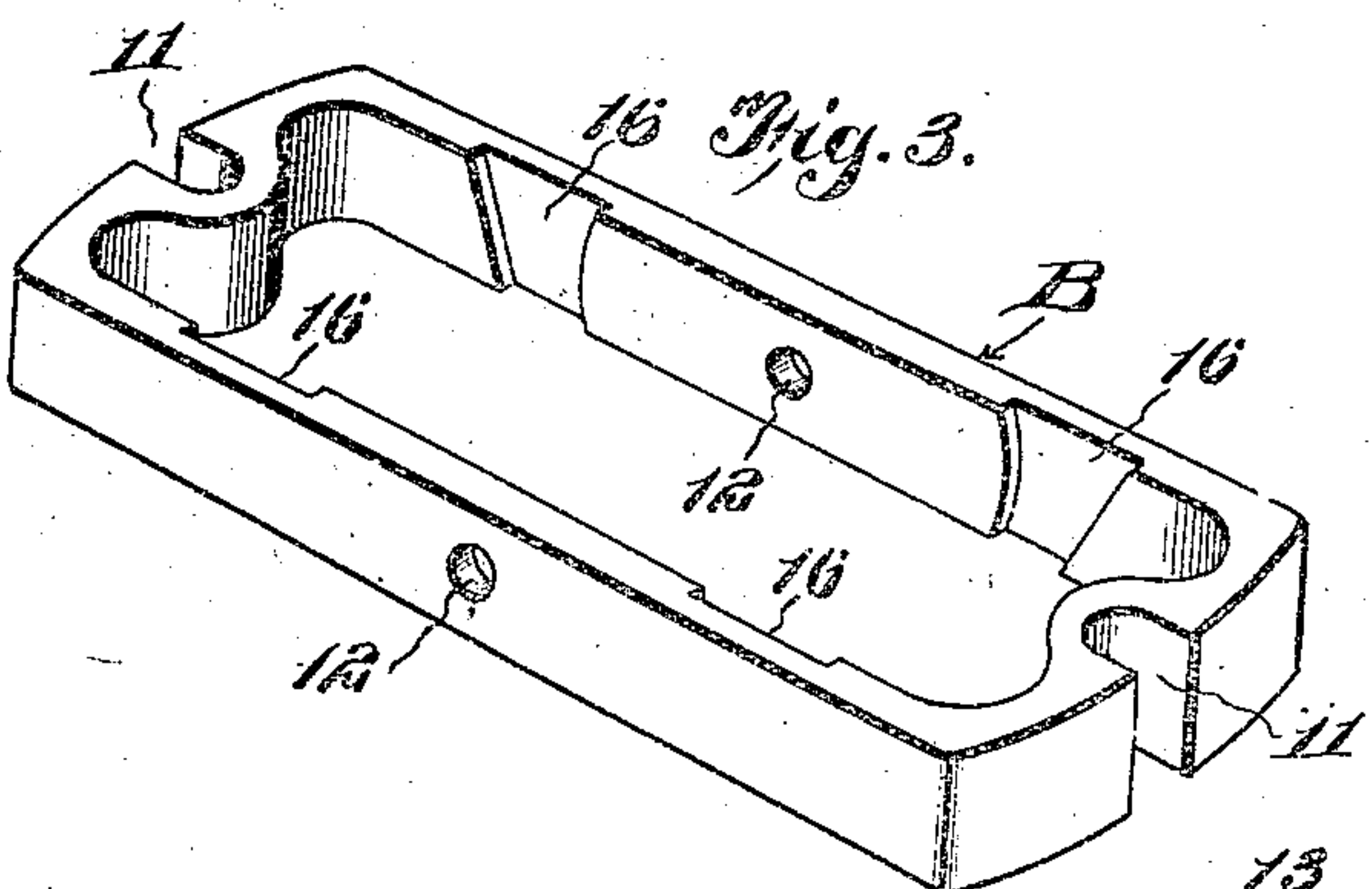
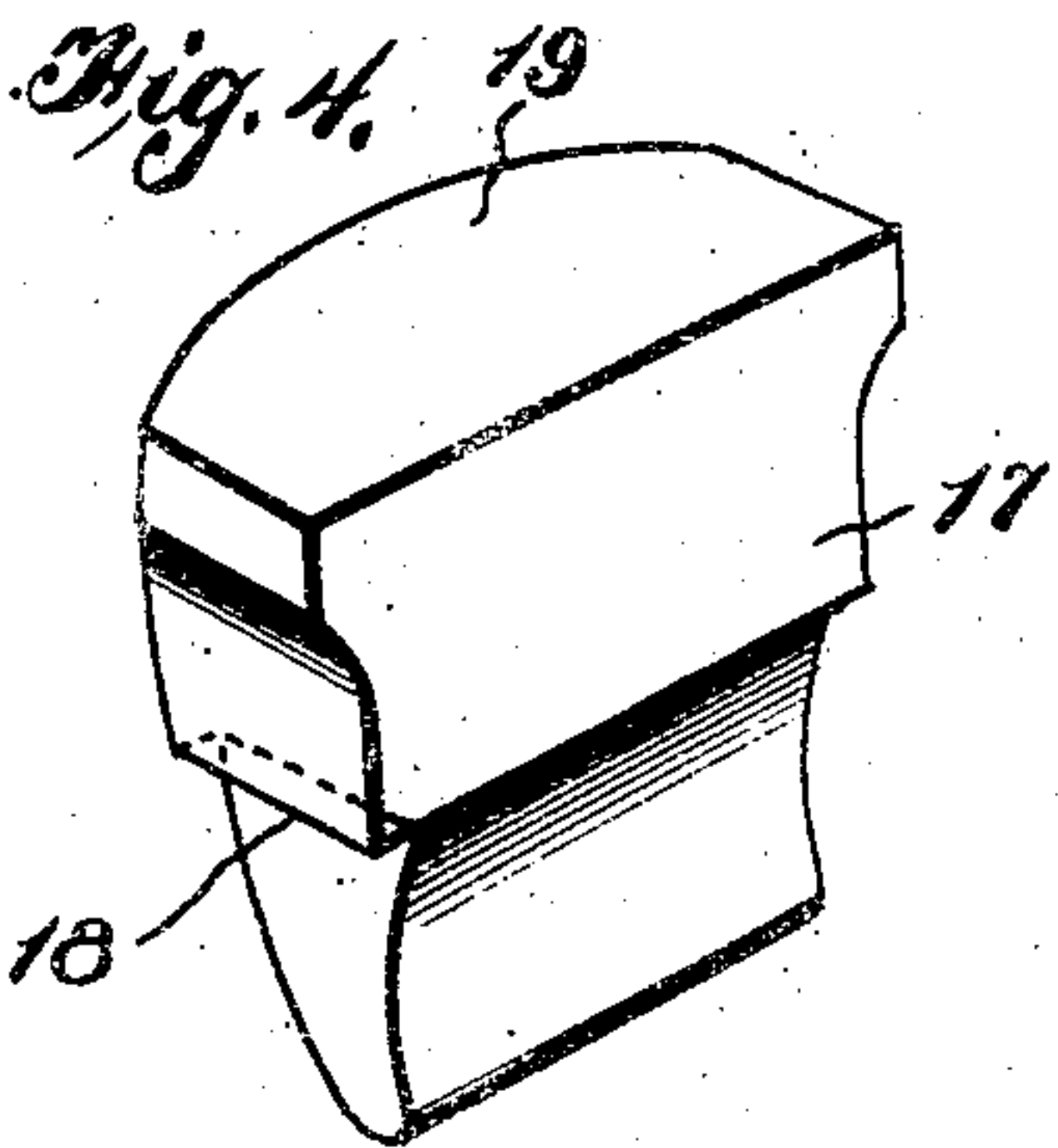
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Witnesses
Louis S. Heinrichs
Wm. Ragger

Inventors
Charles A. Huse
John G. Douty
By Victor J. Ennis
Attorney

UNITED STATES PATENT OFFICE.

CHARLES A. HUSE AND JOHN G. DOUTY, OF WILLIAMSPORT, PENNSYLVANIA, ASSIGNORS,
BY DIRECT AND MESNE ASSIGNMENTS, TO SIMPLEX SURFACE CONTACT COMPANY, A
CORPORATION OF DELAWARE.

CONTACT SWITCH-BOX FOR ELECTRIC-RAILWAY SYSTEMS.

No. 894,382.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed September 17, 1907. Serial No. 393,298.

To all whom it may concern:

Be it known that we, CHARLES A. HUSE and JOHN G. DOUTY, citizens of the United States, residing at Williamsport, in the county of Lycoming and State of Pennsylvania, have invented new and useful Improvements in Contact Switch-Boxes for Electric-Railway Systems, of which the following is a specification.

10 This invention relates to electric railway systems of that class in which contact switch-boxes are arranged at intervals along the roadbed, said switch-boxes being success-
15 or feed wire by the movement of the switches from the attractive influence of magnets from the motor car so that they will deliver their current to a collecting shoe carried by the car; said contact switch-boxes being by a
20 succeeding movement of the switch after the car has passed, deprived of their electrical connection so as to leave them inert and harmless in the roadbed.

25 More specifically, the invention relates to that species of this class in which the actuation of the switch is effected by an oscillating armature working between suitably arranged pole pieces under the temporary influence of the electro-magnets of the passing car.

30 The objects of the invention are to simplify the construction, mainly by dispensing with all wire wound electro-magnets and armatures in the contact switch-boxes; also to dispense with bolts, screws and all similar
35 fastening and connecting members with the exception of the bolts which are needed to connect the cover with the switch-box, such fastening and connecting devices being objectionable on account of their liability to be-
40 come loosened and detached by the shaking and rattling to which the parts are subjected.

45 Further objects are to simplify and improve the general construction and manner of assembling the operative parts of the device.

50 With these and other ends in view which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts which will be hereinafter fully described and particularly pointed out in the claims.

In the accompanying drawings has been illustrated a simple and preferred form of

the invention; it being, however, understood 55 that no limitation is necessarily made to the precise structural details therein exhibited, but that changes, alterations and modifications within the scope of the invention may be resorted to when desired. 60

In the drawings, Figure 1 is a vertical transverse sectional view of a switch-box constructed in accordance with the invention. Fig. 2 is a top plan view of a switch-box from which the cover has been removed. Fig. 3 65 is a perspective view of the detachable bridge member constituting the seat of the pole pieces. Fig. 4 is a perspective view of one of the pole pieces, detached. Fig. 5 is a perspective detail view of a portion of the switch-box, showing the seats for one end of the bridge member. Fig. 6 is a perspective detail view showing one end of the armature shaft. Fig. 6^a is a perspective detail view of the contact member carried by the armature 75 shaft showing said contact member detached and in position to be connected with the armature shaft. Fig. 7 is a perspective detail view of a metal strip constituting the arm of the contact member. Fig. 7^a is a 80 perspective detail view of a piece of carbon constituting the body of the contact member showing the same notched and ready to be connected with the strip constituting the carrying arm. Fig. 8 is a sectional detail 85 view taken through one side of the switch-box and showing the supporting member for the conductor wire or feed wire which coöperates with the contact member carried by the armature shaft. Fig. 9 is a perspective view 90 of a modified form of contact member carried by the armature, therein being a fuse included in the contact member.

Corresponding parts in the several figures are denoted by like characters of reference. 95

The switch-box, which may be of any suitable shape and dimensions, and which is preferably made of cast metal, consists of a receptacle or body 1 having a neatly fitting cap or cover 2, detachably connected with 100 said body by means of screws or stud bolts 3 engaging threaded lugs or bosses 4 in the bottom of the box; the heads 5 of said bolts being countersunk in the cap or cover so as to be flush with the upper surface of the 105 latter. The body 1 is provided with laterally extending apertured lugs 7 for the passage of fastening members whereby it may be

secured in position for operation; and the cap or cover is preferably constructed with a raised portion or boss 8 constituting a contact portion adapted for engagement with the collector shoe of the car.

The body of the box is provided at opposite sides with interiorly disposed projections 9, the upper ends of which have recesses forming shoulders 10 affording seats for the bridge member B. The latter consists of an approximately rectangular frame, made preferably of cast metal, and of suitable size and shape to fit neatly in the box across which it extends; the ends of said bridge member being provided with notches 11 to accommodate the bolts or connecting members 3. The sides of the bridge member are provided with perforations 12 constituting bearings for a stem or shaft 13 carrying the oscillating armature A, which latter is constructed with a weighted body 14 tending, by gravity, to sustain said armature normally in an approximately vertical or upright position; said armature being also provided with a curved or arcuate head 15 which is disposed mainly to one side of a vertical plane coinciding with the axis of the shaft 13. The bridge member B is provided in the inner faces of the sides thereof with notches or recesses 16 affording seats for the pole pieces 17 which latter are made of soft iron, and of the shape clearly represented in Figs. 1 and 4 of the drawings, by reference to which it will appear that said pole pieces are in the form of wedges having curved or arcuate faces and provided at the sides thereof with shoulders or offsets 18 adapted to rest upon the upper edges of the side pieces of the bridge member; the lower ends of the wedge shaped pole pieces being shaped to fit the recesses 16. By this construction, the pole pieces may be assembled with the bridge member by simply dropping them into the seats; they being supported by the shoulders 17 as will be readily understood. The upper ends of the pole pieces have flat faces 19 which lie closely adjacent to the underside of the cap or cover when the latter is in position, and said cap or cover will positively prevent displacement of the pole pieces, thus keeping the parts securely assembled.

The rod which constitutes the shaft 13 projects at one side of the bridge member, and is provided with a notch 20 for the reception of the contact member C. The latter includes a metal strip 21 provided near its upper end with recesses or indentations 22 which, when the said strip is inserted into the notch 20 and the notched end of the shaft is compressed upon the strip, will receive a portion of the metal which is forced or upset into said notches, thus securely assembling the strip 21 with the shaft 13 without the use of bolts, rivets or other fastening

devices. The lower end of the strip 21 is provided with two approximately parallel notches or incisions 23 forming adjacent to the sides of the strip a pair of prongs 24, and an intermediate tongue 25, the extremity of which latter is preferably cut or trimmed off so that said tongue will be shorter than the prongs. This is for the purpose of enabling the strip to be readily connected with the body of the contact member, which consists of a cylindrical piece of carbon 25^a provided at the ends thereof with kerfs or notches 26 for the reception of the prongs 24 which latter are bent beneath and adjacent to the body 25^a so as to form retaining hooks 27 as will be clearly seen in Figs. 1 and 6^a; the tongue 25 is bent outward above and adjacent to the body 25^a, which latter will thus be held very securely upon the strip 21, without the use of separate fastening or attaching devices. The method of constructing the contact member, and of assembling the parts thereof, is regarded as a valuable feature of the invention, inasmuch as by this construction, separate fastening members are entirely dispensed with; the parts are securely connected and assembled, without liability to displacement or loss; and the construction is much simplified.

One side of the body of the switch-box is provided with an aperture 28 in which is fitted an insulating plug or bushing 29 holding a contact strip 30, one end of which projects beyond the box. The opposite end of the strip 30 extends into the switch-box, where it is disposed in a suitable position to be engaged by the body portion 25^a of the contact member C when the armature carrying rock shaft with which the contact member is connected is oscillated under the magnetic influence of the pole pieces when the latter are energized by the electro-magnets connected with a passing car.

From the foregoing description taken in connection with the drawings hereto annexed, the operation and advantages of this invention will be readily understood by those skilled in the art to which it appertains.

The switch-boxes, constructed as herein described, are arranged in the roadbed between the traffic rails at suitable distances apart; usually about 8 feet, although the distance may be varied to suit varying conditions. The motor car is equipped with electro-magnets arranged in series and supported in suitable relation to the switch-boxes and to the pole pieces within the latter to energize said pole pieces; the motor car is also provided with a collecting shoe adapted to engage the raised portions or bosses 8 of the switch-boxes for the purpose of establishing the requisite electrical connection. When, under the influence of the electro-magnets, the pole pieces become energized, the armature A will swing to the position in-

indicated in dotted lines in Fig. 1, until arrested by the body portion 25^a of the contact member C engaging the contact strip 30. It may be stated, that the contact member C is connected with the rod constituting the shaft of the armature at an angle to the central longitudinal plane of the armature which latter, when at rest, will thus be supported in a slightly tapered or inclined position, as clearly shown in full lines in Fig. 1 of the drawings. This, in connection with the fact that the head 15 of the armature is offset slightly to one side, will cause the armature to be supported, when at rest, in such a position that the body of the armature will be much nearer to the pole piece in the direction of which it is intended to swing than to the opposite pole piece; and consequently, when the pole pieces become energized, the armature will naturally positively and unfailingly swing in the direction of the least resistance, and the contact member C will unfailingly engage the contact strip 30. It will moreover be noted that the lower ends of the pole pieces are formed with curved or arcuate concave inner faces, designated 31; the curvature of which corresponds with that of the convexly curved head 15 of the armature; the dimensions of the parts being so proportioned that when the armature rocks or oscillates, the curved head will assume a position very closely adjacent to the concave face 31 of the proximate pole piece, thus placing a considerable portion of the respective areas of the pole piece and armature in very close proximity, and correspondingly increasing the certainty and efficiency of the action of the device.

As soon as the pole pieces become deenergized owing to the electro-magnets of the car passing beyond the switch-box, the armature will be restored, by gravity, to the normal or initial position shown in full lines in Fig. 1 of the drawings, in which position it remains ready for a repetition of the operation.

In order to prevent the contact switch box from remaining alive for any reason after the car has passed, it has been proposed to employ a metal brush at the rear of the car which is adapted to contact with the switch box and produce a short circuit to ground so that the rush of current due to the full voltage of the system will blow a fuse usually arranged in the supply conductor connected with the box. In adapting the present device for operation in this manner, the fuse is arranged within the box and preferably directly on the contact member C, as shown in Fig. 9. The metal strip, such as 21, Fig. 6^a, is made in two parts. The upper part 21^a is secured to the top cap *a* of the fuse F, while the lower part 21^b is secured to the lower cap *b*, the carbon contact piece 25^a is mounted in the usual manner. With a contact switch box equipped with a safety device in this manner, the short circuit of a live box will

cause the fuse to burn out and thus open the path through the contact member C mounted on the oscillating armature. It will thus be seen that the switch box forms a housing for the fuse and the fuse is not connected in circuit by means of binding posts or the like.

By the construction and arrangement of parts herein described, we are enabled to dispense entirely with wire wound pole pieces and with wire wound armatures as well; this feature of the invention is regarded as of extreme importance, not only owing to the lessening of expense for initial construction, but also owing to the extreme simplicity of construction whereby certainty of operation is at all times insured without liability to accidental derangement of the parts. The component parts of the device are few in number which is obviously connected and assembled with an entire absence of rivets, screws, bolts and other fastening and connecting members with the exception of two bolts for securing the cap or cover in position upon the box. The cap, when in position, practically abuts upon the upper ends of the pole pieces, thus securing the latter and the bridge member in position without the need of other fastening devices. The rock shaft supporting the armature is mounted for oscillation in simple perforations in the sides of the bridge piece; and the contact member C is likewise constructed and assembled with the rock shaft without the use of separate fastening devices. Thus, the general construction is simple, inexpensive, and thoroughly efficient for the purposes for which it is designed.

Having thus fully described the invention, what is claimed as new is:—

1. A contact switch-box comprising a casing, bare and unwound pole pieces supported in the casing and suitably spaced apart, a bare and unwound armature supported for oscillation intermediate the pole pieces, a contact member connected and movable with the armature, a stationary contact strip, and a fuse carried by the armature.

2. A contact switch-box for an electric railway system, comprising a casing including a box or body and a cap detachably connected therewith, bare and unwound pole pieces supported in the casing and suitably spaced apart, a bare and unwound armature supported for oscillation intermediate the pole pieces, and a fuse supported on the armature.

3. A contact switch-box of the class described, comprising a body, a cap detachably connected therewith, a bridge member seated in the body, pole pieces seated upon the bridge member in proximity to and retained in their seats by the cap, and an armature carrying rock shaft supported for oscillation upon the bridge member intermediate the pole pieces.

4. A contact switch-box of the class de-

scribed, comprising a body, a cap detachably connected therewith, a bridge member seated in the body, pole pieces seated upon the bridge member in proximity to and retained in their seats by the cap, an armature carrying rock shaft supported for oscillation upon the bridge member intermediate the pole pieces, a contact member connected with the rock shaft at an angle to the longitudinal center of the armature, and a stationary contact strip adapted to be engaged by the contact member.

5. In a device of the class described, a box having oppositely disposed interior projections provided with recesses forming shoulders adjacent to their upper ends, a bridge member consisting of an approximately rectangular frame extending across the box and supported upon the shoulders, pole pieces seated upon the bridge member and a cap secured detachably upon the box in proximity to the pole pieces which latter together with the bridge member are thereby retained in position.

6. In a device of the class described, a box having interior shoulder projections, a bridge member consisting of a frame supported upon the shoulders and having recessed side pieces affording seats, pole pieces engaging the seats and having shoulders supported upon the bridge member, and a cap detachably connected with the box in proximity to the pole pieces which latter together with the bridge member are thereby retained in position.

7. In a device of the class described, a box having a detachable cap, a bridge member supported in the box, pole pieces supported upon the bridge member with their upper ends in proximity to the cap, an armature carrying rock shaft supported for oscillation in the bridge member, and a contact member radiating from the rock shaft at an angle to the central longitudinal plane of the armature.

8. In a device of the class described, a rock shaft, having a notch at one end, an armature carried by the rock shaft, and a contact member including a metal strip having notches or indentations adjacent to one end which is inserted into the notch of the rock shaft and assembled therewith by compression.

9. In a device of the class described, an armature carrying rock shaft having a notch at one end, in combination with a contact member including a metal strip having a notched end inserted into the notch of the rock shaft and secured by compression of the latter, and a body portion of carbon or analogous material connected with the end of the metal strip distant from the rock shaft.

10. In a device of the class described, an armature carrying rock shaft and a contact member connected with and extending radially from said shaft, said contact member

including a metal strip having terminal incisions forming hooked prongs and an outwardly bent tongue, and a cylindrical body portion having notched ends engaged by the hooked prongs, said cylindrical body portion being intermediately engaged by the outwardly bent tongue.

11. In a device of the class described, an armature supported for rotation and having a weighted body and a convexly curved head, in combination with pole pieces supported adjacent to said armature and consisting of curved wedge-shaped bodies having concaved arcuate inner faces.

12. In a device of the class described, a bridge member consisting of an approximately rectangular frame, the sides of which are provided with notches forming seats, in combination with curved wedge-shaped pole pieces engaging seats and having shoulders bearing upon the upper edges of the sides of the bridge member, a rock shaft supported for oscillation in the bridge member intermediate the pole pieces, an armature carried by the rock shaft, and a contact member also connected with the rock shaft and serving by gravity to support the armature in a normally tilted position.

13. In a device of the class described, a box provided with female threaded lugs or bosses in the bottom thereof and having interiorly disposed shouldered projections, a bridge member consisting of a frame supported upon the shoulder and having notches at the ends thereof, pole pieces supported upon the bridge member, a detachable cap supported in proximity to the pole pieces, and assembling bolts extending through the cap and having heads countersunk in and flush therewith, said bolts being accommodated in the notches at the ends of the bridge member and threaded into the lugs in the bottom of the box.

14. A contact switch-box of the class described, comprising a body, a cap detachably connected therewith, a bridge member loosely supported in the body of the box, bare and unwound pole pieces loosely supported upon the bridge member with their upper ends in proximity to the underside of the cap, a bare and unwound armature supported for oscillation upon the bridge member intermediate the pole pieces and having a convexly curved head adapted to swing in close proximity to the concavely curved face of the proximate pole piece, a contact member operatively connected with the armature at an angle to the central longitudinal plane of the latter and serving by gravity to maintain the armature in a normally tilted position, and a stationary insulated contact strip extending through a side wall of the box in the direction of the armature.

15. In a device of the class described, the combination of a magnetically actuated ar-

mature, a switch opened and closed by the movement of the armature, and a fuse connected in the circuit between the switch and armature and supported on the latter.

5 16. In a device of the class described, the combination of an armature magnetic means for operating the same, a switch controlled by the movement of the armature, and a fuse movable with the armature and electrically
10 connected between the same and switch.

17. In a device of the class described, the combination of an armature, a contact member carried thereby, a stationary contact member cooperating with the first member
15 to open and close the circuit, a fuse included in the first contact member, and means for actuating the armature.

18. In a device of the class described, the combination of a pivoted armature having its mass so distributed as to cause the arma- 20
ture to assume a definite position, magnetic means arranged to operate on the armature for movement in only one direction, a fuse carried by the armature, and a switch opened
25 and closed by the movement of the armature and normally held open by the normal position of the latter.

In testimony whereof we affix our signatures in presence of two witnesses.

CHAS. A. HUSE.
JOHN G. DOUTY.

Witnesses:

EMMA KNAPP,
JOHN K. HOOVER.