

No. 712,882.

Patented Nov. 4, 1902.

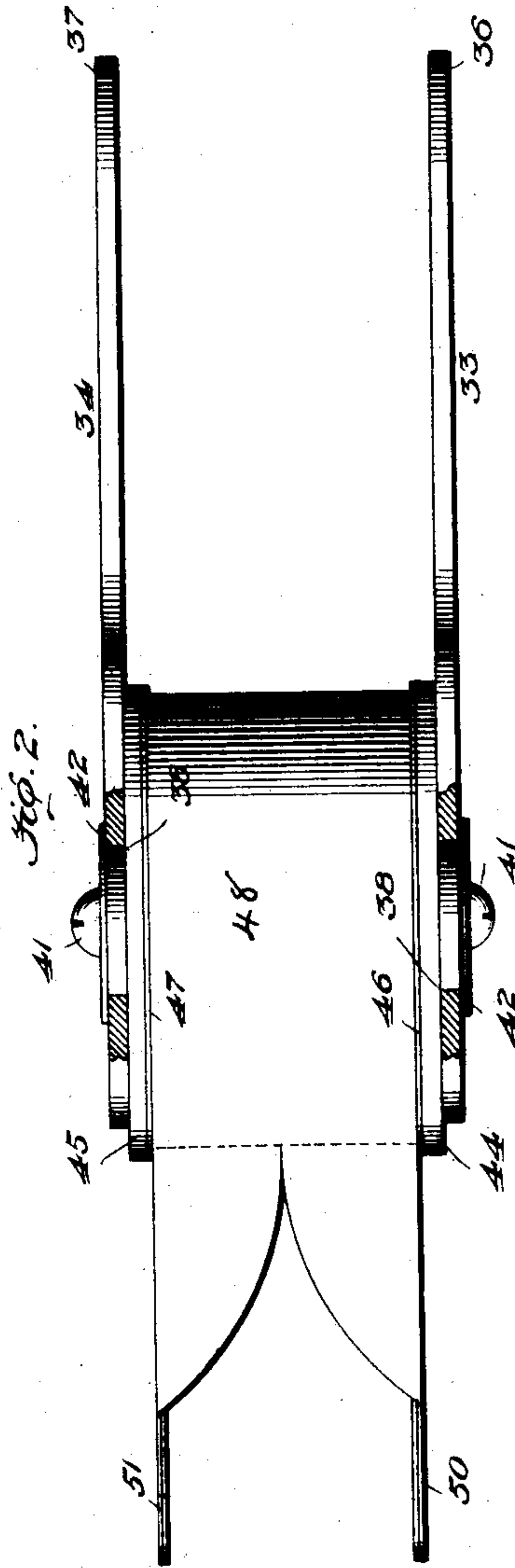
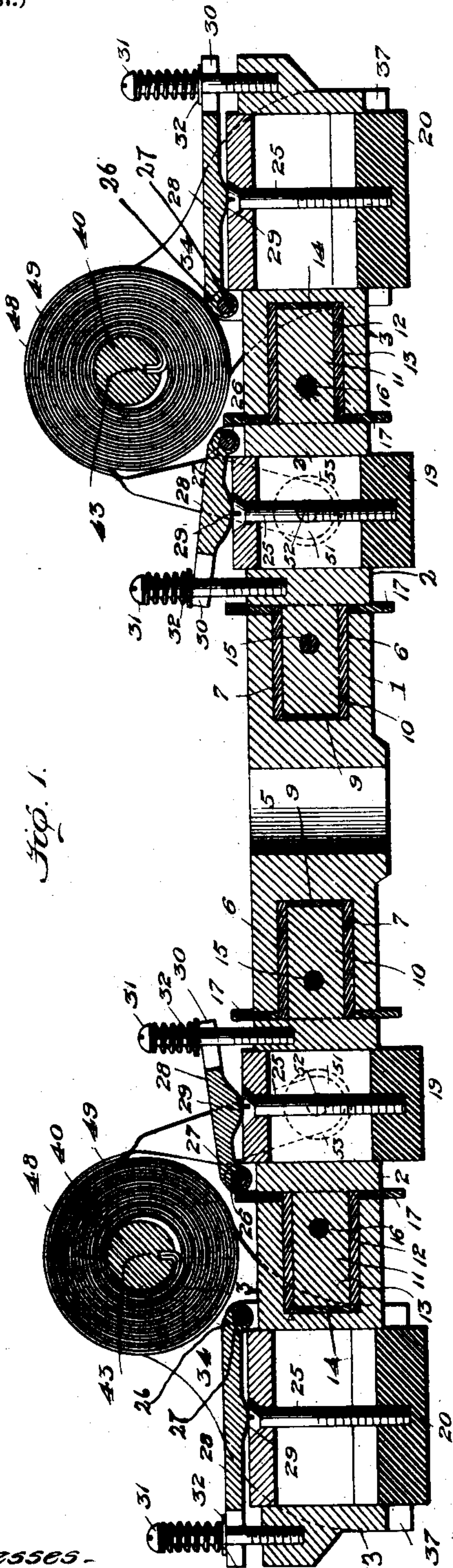
E. H. WISE.

ELECTRICAL CONTROLLER CONTACT ARM.

(Application filed May 20, 1902.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses.

J. D. Hamberger.

Intenor.

Edgar H. Wise
by Geo. E. Shackney
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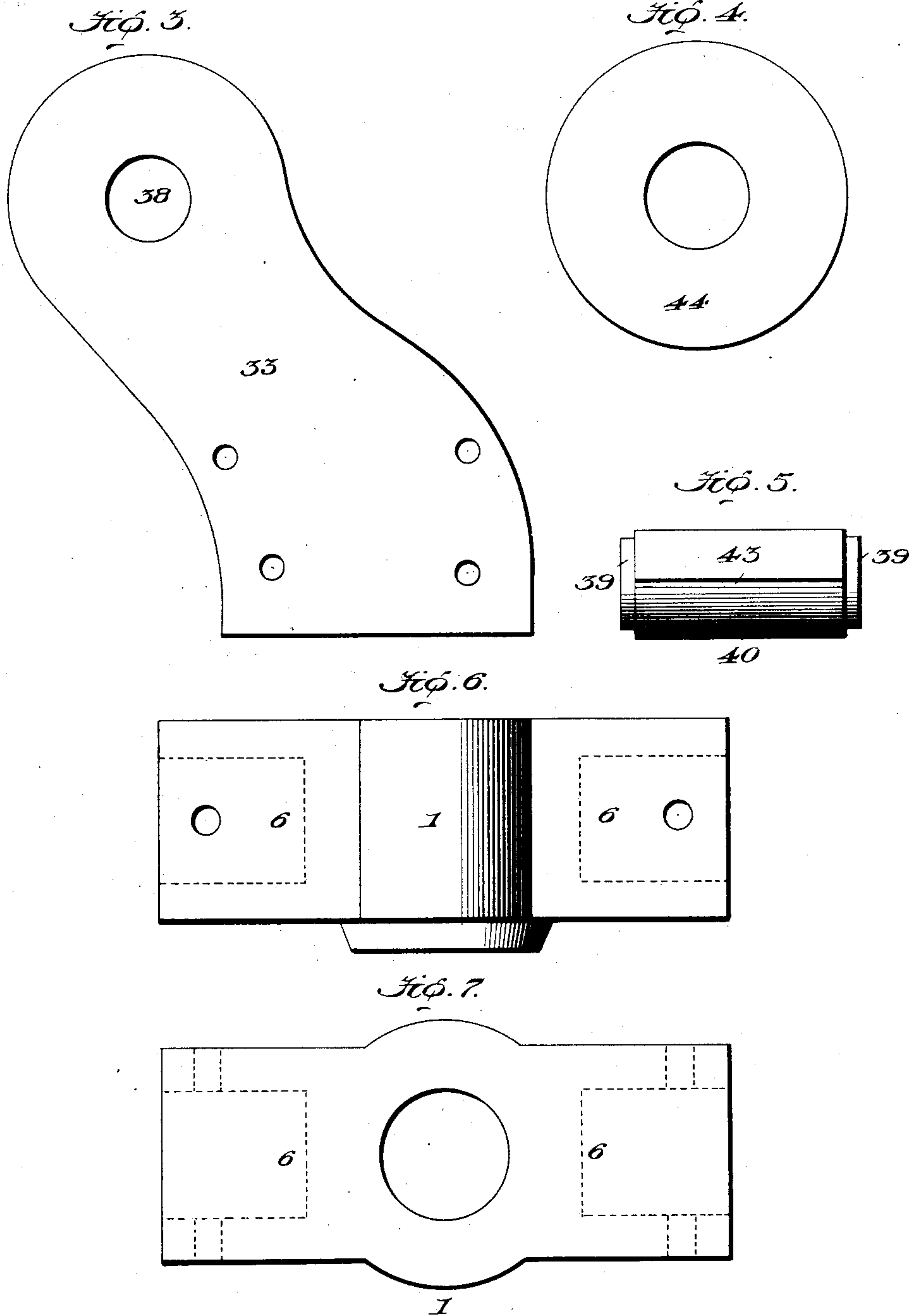
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4 Sheets—Sheet 2.



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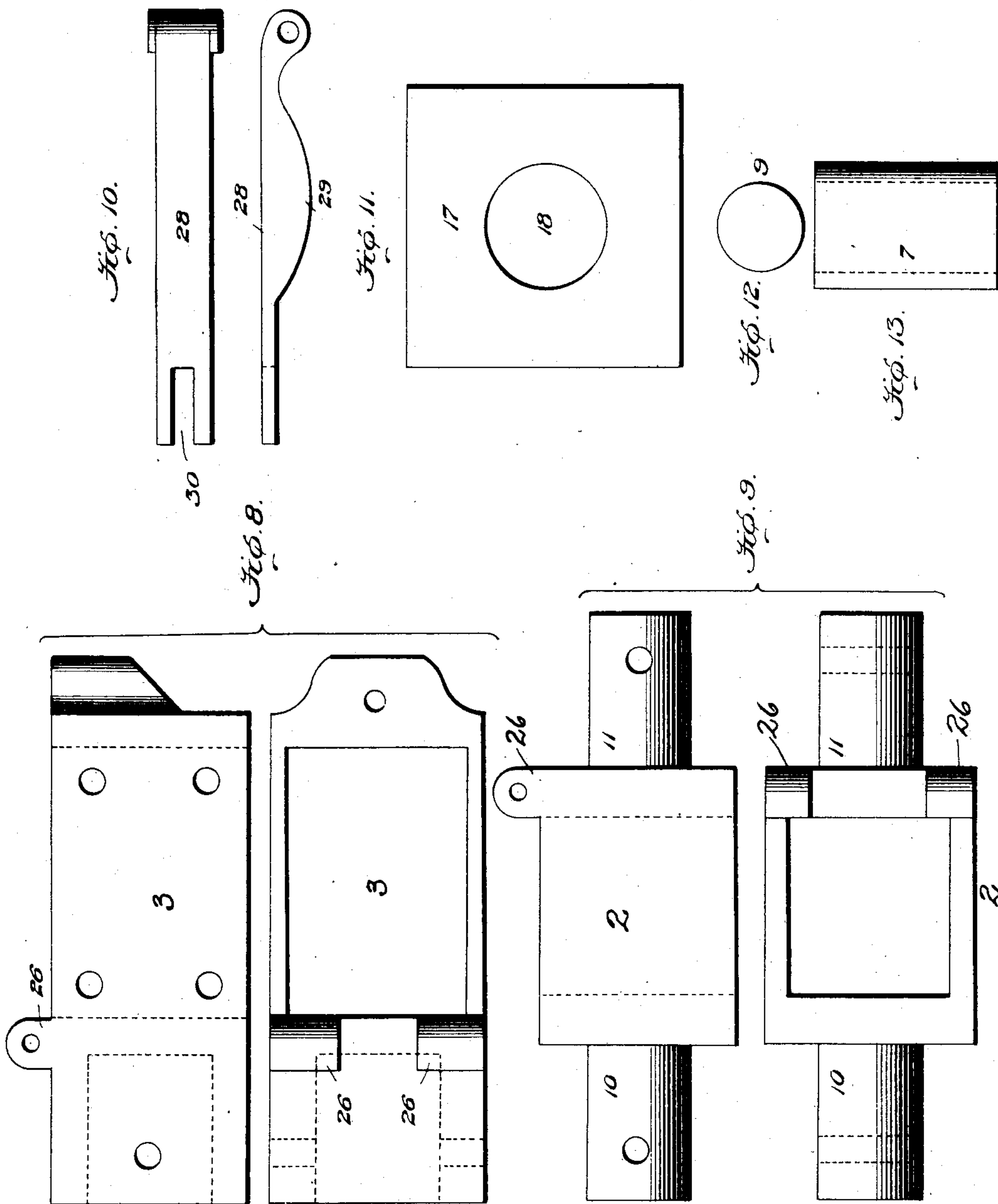
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4 Sheets—Sheet 3.



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4 Sheets—Sheet 4.

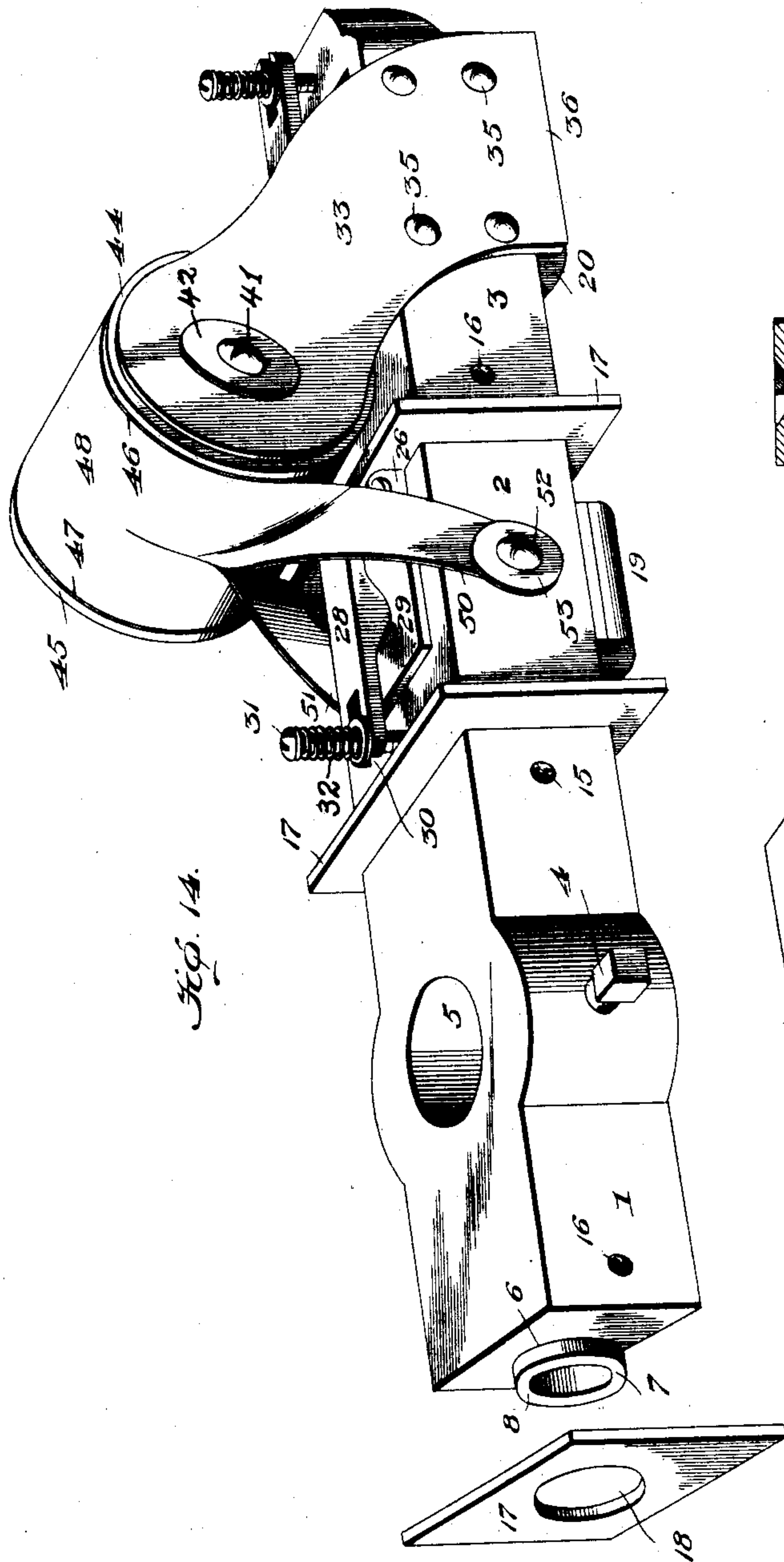


Fig. 14.

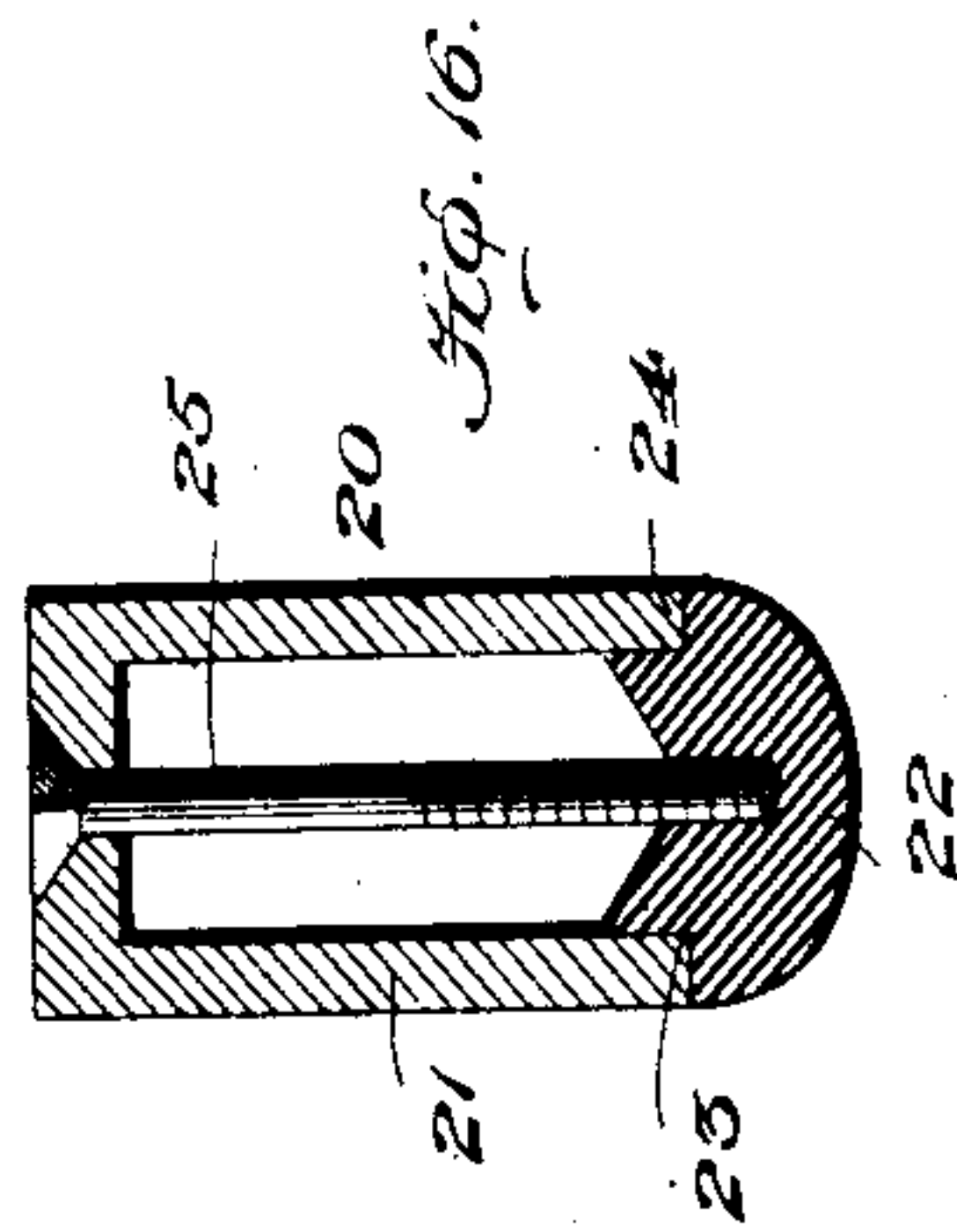


Fig. 16.

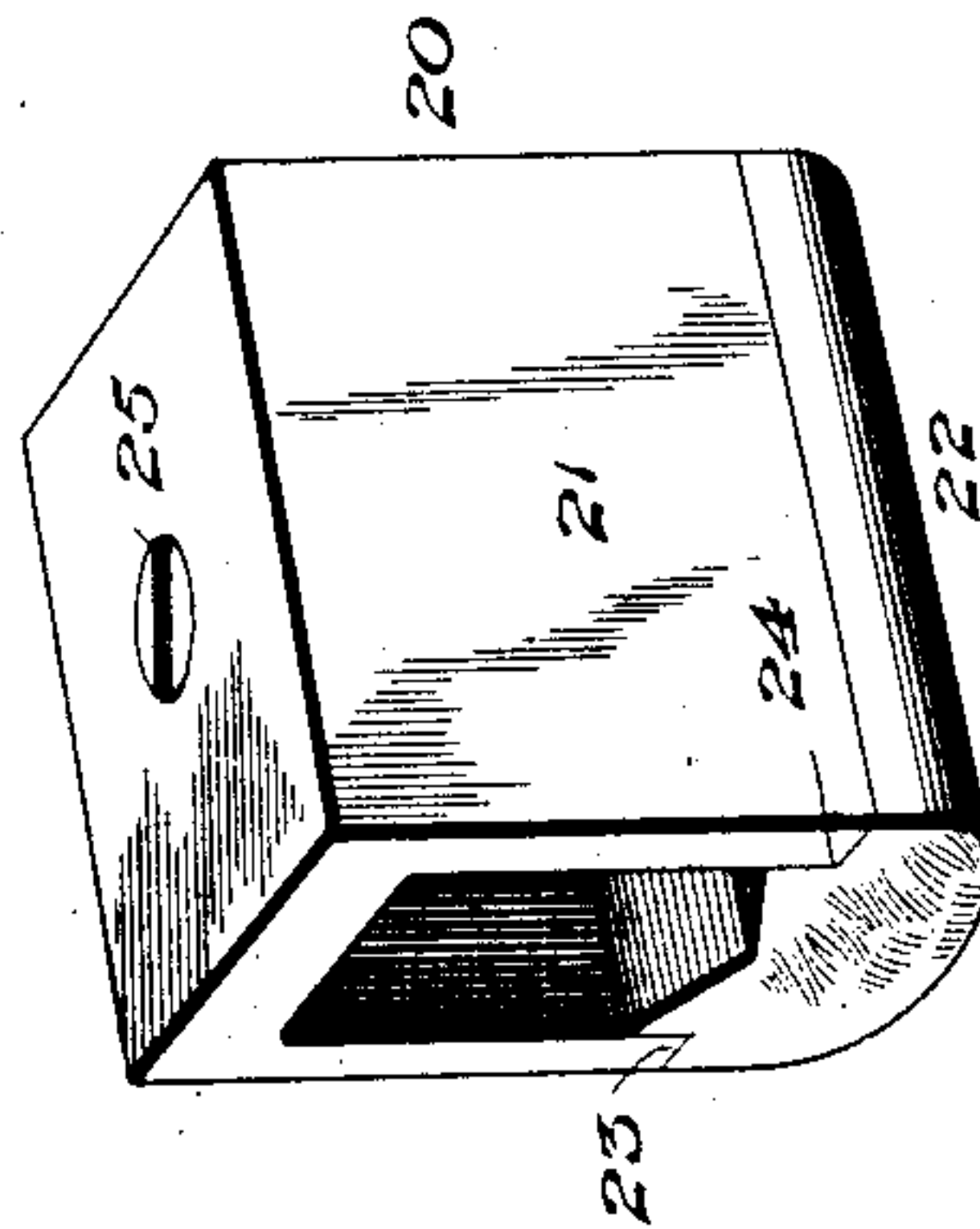


Fig. 15.

Witnesses:
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Inventor:
Edgar H. Wise
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UNITED STATES PATENT OFFICE.

EDGAR H. WISE, OF WESTMONT, PENNSYLVANIA.

ELECTRICAL-CONTROLLER CONTACT-ARM.

SPECIFICATION forming part of Letters Patent No. 712,882, dated November 4, 1902.

Application filed May 20, 1902. Serial No. 108,280. (No model.)

To all whom it may concern:

Be it known that I, EDGAR H. WISE, a citizen of the United States, and a resident of the borough of Westmont, in the county of Cambria and State of Pennsylvania, have invented new and useful Improvements in Electrical-Controller Contact-Arms, of which the following is a specification.

My invention relates to electrical-controller contact-arms, and is designed as an improvement on the controller contact-arm of my United States Letters Patent No. 653,857, dated July 17, 1900.

In electrical controllers—such, for instance, as the type of controller embodied in my patent above noted, although true of practically all controllers where heavy currents are governed—destructive sparking or arcing generally follows the breaking of the current or when commutation takes place on the manipulation of the controller contact-arm between contact points or segments differing in potential, which in the course of use damages the apparatus and impairs its efficiency. Another defect of the ordinary controller contact-arm is that the contact members on the arm have a tendency to wear out or have their conductivity impaired at the point of contact by reason of the arcing above referred to or from other causes. Another disadvantage met with in the use of the ordinary controller contact-arm is the proper insulation of the parts.

It is the purpose of the present invention to provide an improved controller contact-arm in which means will be provided for utilizing the current to create a magnetic field to blow out or destroy the arcs which may be created on the breaking of the current or commutation of parts of different potential; to provide a novel form of contact which can be renewed whenever desired on account of impairment from arcing, wear, &c., and to make provision for insulation of the parts in such manner that any leakage or short-circuiting will be absolutely prevented.

To accomplish the foregoing objects, I provide an improved and novel contact-arm for electrical controllers, the details of construction of which are set forth fully hereinafter and the novel features recited in the appended claims.

In the accompanying drawings, Figure 1 is a longitudinal section of a complete controller contact-arm constructed in accordance with the present invention; Fig. 2, a detail plan of the magnetizable plates and the winding of the magnetic blow-out; Fig. 3, a side detail view of one of the magnetizable plates of the magnetic blow-out; Fig. 4, a detail of the insulating-washer of the magnetic blow-out winding; Fig. 5, a side view of the magnetizable core of the blow-out; Fig. 6, a detail side view of the center section of the arm; Fig. 7, a detail plan thereof; Fig. 8, details of one of the end box contact-sections of the arm; Fig. 9, details of one of the other box contact-sections; Fig. 10, details of one of the spring-pressed clips or arms for the contacts; Fig. 11, a detail of one of the insulating-partitions; Fig. 12, a detail of one of the mica washers or disks used at the bottom of apertures in certain of the sections of the arm, and Fig. 13, a detail of one of the insulating-bushings. Fig. 14 is a perspective view in detail of a portion of the controller contact-arm, showing more clearly the operative connections. Fig. 15 is a detail perspective view of one of the contacts, showing the manner of attaching the shoe; and Fig. 16 is a cross-section of the same.

The application of the hereinafter-described invention will be apparent from reference to my United States Patent No. 653,857; but I wish to be understood as not confining myself to the use of the invention in connection with that specific type of controller only, as it could be used in other connections.

The construction at both ends of the controller contact-arm being the same, a description of one end thereof will suffice to a complete understanding of the invention.

The arm proper consists of a center section 1 and two box contact-sections 2 and 3 at each end of the arm, all of which are made of metal. The center section 1 has a set-screw 4, by which the arm can be secured to a shaft or spindle passing through the opening 5 and whereby the arm will be supported and journaled to the electrical controller and adapted for turning on said shaft as a center on the manipulation of the shaft by a suitable handle to throw the contact-arm around to make contact with the commutating sections or mem-

bers wired to the different coils or resistances of the controller. In each end of the center section 1 is a hole 6, in which is received a fiber or other suitable insulating-bushing 7, 5 having a slightly-protruding end 8, and at the bottom of the hole 6 is a mica disk 9. The box contact-section 2 is provided on opposite ends with the cylindrical projections 10 and 11, which are of a size to be snugly received 10 in the bushing 7 in section 1 and in a similar bushing 12, located in a hole 13 in the end of box contact-section 3. A similar mica washer 14 to the mica washer or disk 9 is at the bottom of the hole 13, while the bushing 12 protrudes from the end of the section 3, as does 15 the bushing 7.

The numerals 15 and 16 designate insulating—for instance, fiber—pins or dowels passing through the sections 1 and 3, respectively, 20 and through the projections 10 and 11, respectively, and the bushings 7 and 12. The sections 1, 2, and 3 are thus firmly held together and perfectly insulated from each other, and to prevent the ends of the metallic sections 1, 2, and 3 from touching—that is, to prevent the box contact-section 2 from touching at its ends the center section 1 and the box contact-section 3—I provide the partitions 17, which have a round hole 18 through 30 the center thereof and fit over the projecting ends 8 on the insulating-bushings 7 and 12 and are located between the ends of the box contact-section 2 and the sections 1 and 3, thus effectually separating and insulating the section 2 from sections 1 and 3, while these partitions project beyond the sides and top and bottom of the metal sections 1, 2, and 3 to prevent any possibility of an electrical connection being accidentally made between said 35 sections.

The sections 2 and 3 are of box-like form for the direct reception of the contacts, and this is of a decided advantage, because the contacts can thus be made to play in and out 45 of the boxes, and the wear being between metal members instead of against an insulating-bushing has no appreciable effect to deteriorate the contact between the boxes and the contact members moving therein, 50 while there is no danger of derangement and simplicity and durability are attained. The contacts 19 and 20 are adapted to move up and down in the box contact-sections 2 and 3, the only difference between these contacts 55 being that section 3 is larger than section 2. They consist of a rectangular but more correctly U-shaped body portion 21, arranged to snugly yet easily fit the opening in the box contact-section, and a shoe 22, provided 60 with rabbets 23 and 24 on its upper edge to receive the extremities of the legs of the body 21, while 25 is a screw extending through the top of the body 21 and having its end threaded into the shoe 22. The body will by 65 preference be made of metal, such as brass, while the shoe can be of copper; but it will be understood that these materials are men-

tioned because used to advantage, and this part of the invention is not necessarily restricted to these materials. 70

In each instance a pressure mechanism is employed to hold the contacts properly against the segments or contacts on the face of the controller, and as the mechanism is the same on both the box contact-sections 2 and 3 a 75 description of only one will be given. On the box contact-section are ears 26, into which is screwed a pivot-screw 27, while 28 is an arm pivoted on the screw between the ears and provided with a hump 29, bearing on the top 80 of the contact. The free end of the arm is slotted at 30, and the portions straddle an adjusting-screw 31, threaded into the box contact-section, and surrounded by a coil-spring and washer 32, pressing on the top of the 85 arm. The tension on the arm can thus be regulated as desired to give a proper pressure on the contact. In regard to the contact it will be understood that the employment of the improved removable shoe per- 90 mits substitution of another shoe when the usefulness of the shoe has become impaired, while the construction insures proper retention of the shoe when in use.

As heretofore explained, one of the objects 95 of the invention is to kill or eliminate the flash or arc which occurs on breaking of current in the use of a controller or when commutation is had between segments or points on the controller of different potentiality, and 100 to obviate this destructive agency I provide a novel magnetic blow-out. Secured to the sides of the contact box-section 3 are the inclined or curved iron or steel plates 33 and 34, suitable fastenings, such as screws 35, being employed. The lower ends of the plates 33 and 34 are extended downwardly below 105 the section 3 to form magnetic poles 36 and 37 adjacent the contact received in the section 3. The plates 33 and 34 are provided 110 with holes 38, in which the reduced ends 39 of an iron or steel cylindrical magnet-core 40 are received, while screws and washers 41 and 42 secure the core to the plates 33 and 34. The core is provided with a longi- 115 tudinal slit or kerf 43, and on the core and adjacent the plates 33 and 34 are insulating or fiber heads or disks 44 and 45, and against their inside faces are mica disks 46 and 47. The winding for the core 40 consists of a ribbon 48 of copper, one of whose ends is received in the slot or kerf 43, and the ribbon is then wound spirally around the core with its layers insulated from each other by a mica ribbon 49, while the outer end of the copper 125 ribbon or winding is split into the terminals 50 and 51, which are brought down to opposite sides of the contact box-section 2 and electrically and mechanically secured thereto by the screws and washers 52 and 53. With 130 this construction of magnetic blow-out the electric current will traverse the plates 33 and 34, thence through the core 40 and the copper winding or strip 48 and to the contact

box-section 2. The current in traversing the winding 48 will magnetize the core 40 and the plates 33 and 34, and the magnetic flux threading the space between the polar extremities 36 and 37 will effectually blow out any arc that may form between the contact 20 and the segments on the controller. Destructive arcing or flashing is obviated with a magnetic blow-out such as set forth, which enhances the life of the apparatus, while the use of movable contact-shoes is of particular advantage in a controller subjected to heavy service, and my manner of insulation minimizes the danger of short-circuiting and lessens liability of deterioration from wear due to the movable contacts.

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

20 1. An electrical-controller contact-arm having box-like contact-sections mechanically connected together but insulated from each other, and contact members adapted to play in said box contact-sections in direct contact
25 therewith.

2. An electrical-controller contact-arm comprising a center section adapted to be pivotally mounted, and a plurality of box-like contact-sections at each end of the center section, the box-like contact-sections being insulated from each other and from the center section and mechanically connected together, and contact members adapted to play in the box contact-sections in direct contact
35 therewith.

3. An electrical-controller contact-arm comprising sections one of which has a projection fitting into a hole in the other section and insulating material insulating the joint aforesaid.
40 said.

4. An electrical-controller contact-arm comprising sections one of which has a projection fitted into a hole in the other section, insulating material for said joint, and a pin passing through the projection aforesaid.
45 through the projection aforesaid.

5. An electrical-controller contact-arm having sections one of which has a projection fitted into a hole in the other section, insulating material for said joint, and a pin of insulating material passing through the projection aforesaid.
50 insulating material passing through the projection aforesaid.

6. An electrical-controller contact-arm having sections one of which has a projection and the other an opening or hole, an insulating-bushing in said hole and which receives the projection, and means for mechanically fastening the sections together.
55 bushing in said hole and which receives the projection, and means for mechanically fastening the sections together.

7. An electrical-controller contact-arm having sections one of which has a projection and the other an opening or hole, an insulating-bushing in said hole and which receives the projection, and a pin of insulating material passed through the section having the hole and through the bushing and projection.
60 the other an opening or hole, an insulating-bushing in said hole and which receives the projection, and a pin of insulating material passed through the section having the hole and through the bushing and projection.

8. An electrical-controller contact-arm comprising sections connected together and insulated from each other, and a partition of in-

insulating material located between the adjoining portions of the sections.

9. An electrical-controller contact-arm comprising sections one of which has a projection received in an opening in the other, and an insulating-partition encircling the projection and located between the adjoining portions of the sections.
70 comprising sections one of which has a projection received in an opening in the other, and an insulating-partition encircling the projection and located between the adjoining portions of the sections.

10. An electrical-controller contact-arm comprising sections one of which has a hole and the other a projection received in said hole, an insulating-bushing in the hole and surrounding the projection and having a protruding end, and an insulating-partition encircling the protruding end of the bushing and located between the adjoining portions of the sections.
75 An electrical-controller contact-arm comprising sections one of which has a hole and the other a projection received in said hole, an insulating-bushing in the hole and surrounding the projection and having a protruding end, and an insulating-partition encircling the protruding end of the bushing and located between the adjoining portions of the sections.

11. An electrical-controller contact-arm comprising sections one of which has an aperture, an insulating-bushing in the aperture, insulating material at the bottom of the aperture, said bushing having a protruding end, and the other section having a projection received in the bushing, an insulating-partition encircling the protruding end of the bushing and located between the adjoining portions of the sections, and an insulating-pin connecting the bushing and projection to the section of the arm in which they are received.
80 comprising sections one of which has an aperture, an insulating-bushing in the aperture, insulating material at the bottom of the aperture, said bushing having a protruding end, and the other section having a projection received in the bushing, an insulating-partition encircling the protruding end of the bushing and located between the adjoining portions of the sections, and an insulating-pin connecting the bushing and projection to the section of the arm in which they are received.

12. An electrical-controller contact-arm comprising sections connected together, and a partition of insulating material interposed between the adjoining portions of the sections and having its outer edges projecting beyond the faces of the aforesaid sections.
85 comprising sections connected together, and a partition of insulating material interposed between the adjoining portions of the sections and having its outer edges projecting beyond the faces of the aforesaid sections.

13. An electrical-controller contact-arm comprising sections having apertures, and an intermediate section having projections received in the respective apertures and insulated therefrom.
90 comprising sections having apertures, and an intermediate section having projections received in the respective apertures and insulated therefrom.

14. An electrical-controller contact-arm comprising sections, an intermediate section connected to said sections and insulated therefrom, and insulating-partitions located between the respective ends of the intermediate section and the other sections.
95 comprising sections, an intermediate section connected to said sections and insulated therefrom, and insulating-partitions located between the respective ends of the intermediate section and the other sections.

15. An electrical-controller contact-arm comprising a box-like section, a contact member movable in the box-like section, an arm or clip pivoted to the box-like section and bearing on the contact member, said clip or arm having a bifurcated portion, a screw threaded into the box-like section and which is straddled by the bifurcated portion aforesaid, and a spring encircling the screw and bearing on the clip or arm.
100 comprising a box-like section, a contact member movable in the box-like section, an arm or clip pivoted to the box-like section and bearing on the contact member, said clip or arm having a bifurcated portion, a screw threaded into the box-like section and which is straddled by the bifurcated portion aforesaid, and a spring encircling the screw and bearing on the clip or arm.

16. A contact comprising a body, a detachable contact-shoe rabbeted thereto, and a screw passing through the body into the shoe for connecting the latter to the body.
105 A contact comprising a body, a detachable contact-shoe rabbeted thereto, and a screw passing through the body into the shoe for connecting the latter to the body.

17. A contact comprising a hollow body, a detachable contact-shoe rabbeted thereto, and a screw passing through the body into the shoe for connecting the latter to the body.
110 A contact comprising a hollow body, a detachable contact-shoe rabbeted thereto, and a screw passing through the body into the shoe for connecting the latter to the body.

18. A contact comprising a U-shaped body, a detachable shoe having grooves which re-

ceive the extremities of the legs of the body, and a fastening device securing the shoe to the body.

19. A contact having a U-shaped body, a detachable shoe having grooves which receive the extremities of the legs of the body, and a screw extending through the yoke of the body and threaded into the shoe.

20. The combination with contact-holders, of magnetizable plates connected to one of said holders and having pole-pieces extending beyond the holder adjacent the contact, and means for magnetizing said plates.

21. The combination with contact-holders of electric conductivity and insulated from each other, of a magnetic blow-out electrically connected to the respective contact-holders, and contacts for the holders which bear directly thereagainst.

22. The combination with contact-holders, of magnetizable plates connected to one of said holders, a core of magnetizable material connected to said plates, a winding having

one end connected to the core and the other end connected to the other contact-holder. 25

23. The combination with contact-holders, of magnetizable plates connected to one of said holders, a magnetizable core connected to said plates and which has a slit or kerf, insulating-disks on the core adjacent the plates 30 aforesaid, and a winding for the core composed of a ribbon of insulating material, and a ribbon of electrical conductivity wound around said core, the end of the ribbon of electrical conductivity being received in the 35 kerf or slit and its other end connected to the other contact-holder, and the winding being located between the insulating-heads aforesaid.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses. 40

EDGAR H. WISE.

Witnesses:

STONE EDELEN,
HERBERT LUEBBERT.