(No Model.)

4 Sheets—Sheet 1.

H. A. CHASE.

ELECTRIC CONDUIT.

No. 410,150.

Patented Sept. 3, ~~1889~~.

Fig. 1.

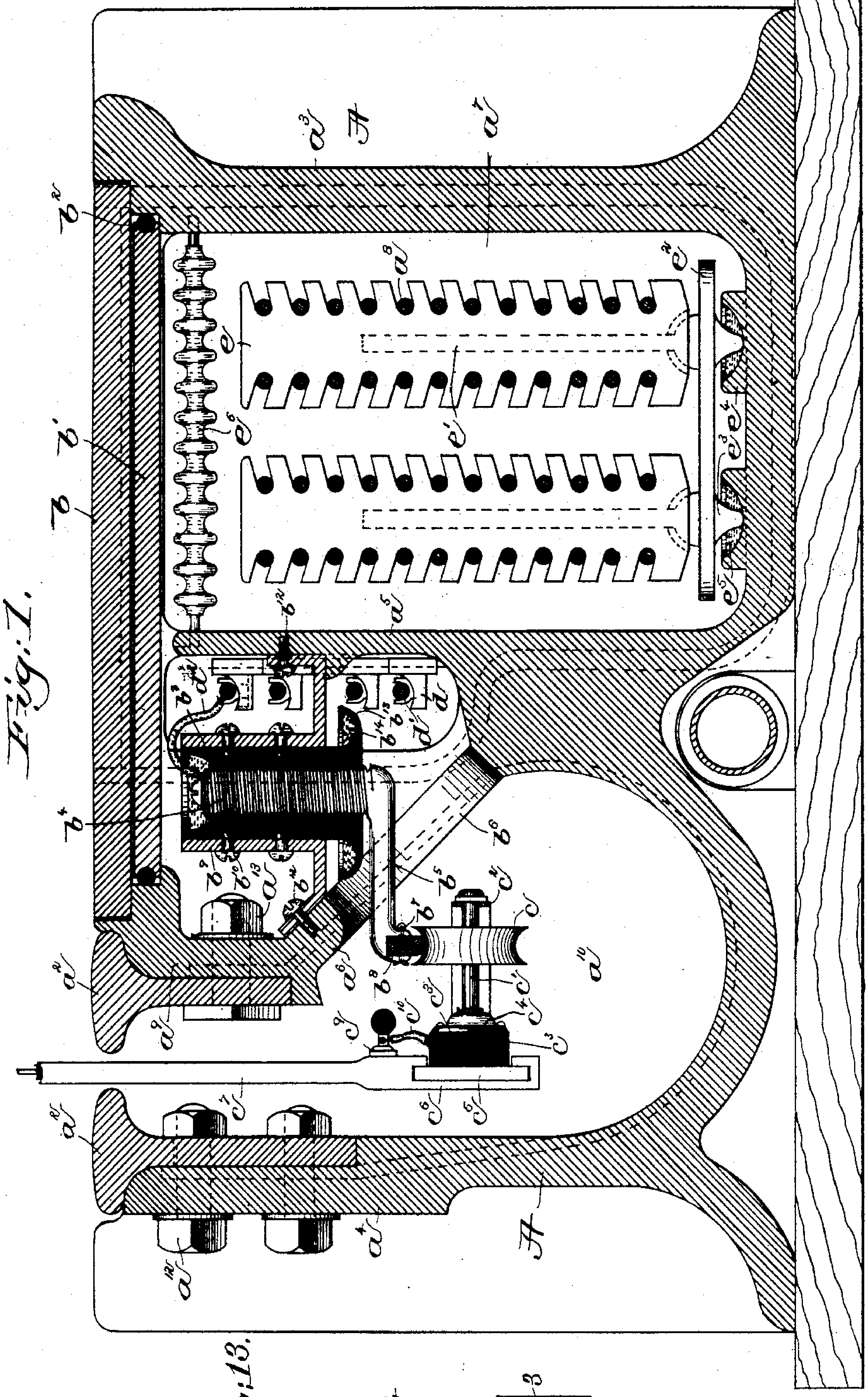
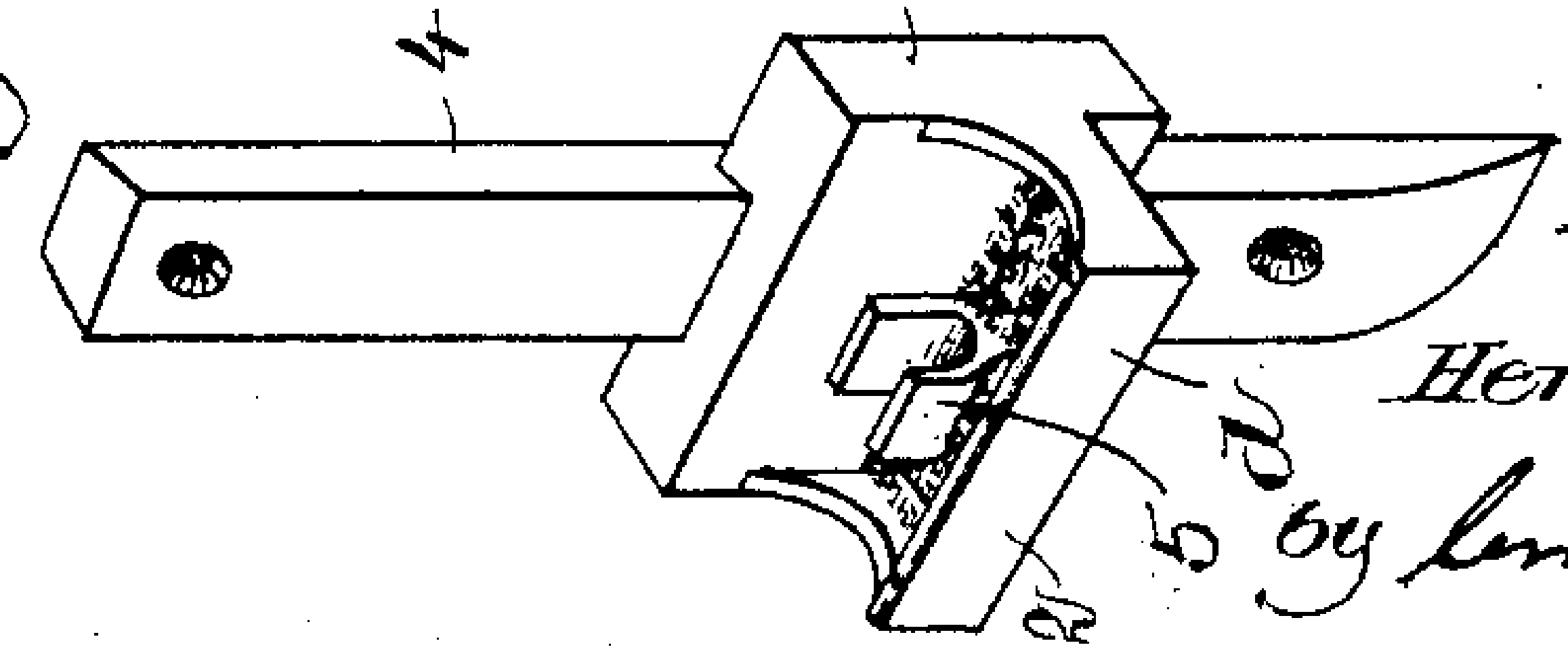


Fig. 13.



Witnesses.
Howard F. Eaton.
Frederick L. Emery.

Inventor.
Henry A. Chase,
by Crosby & Gregory
Attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 4 Sheets—Sheet 2.

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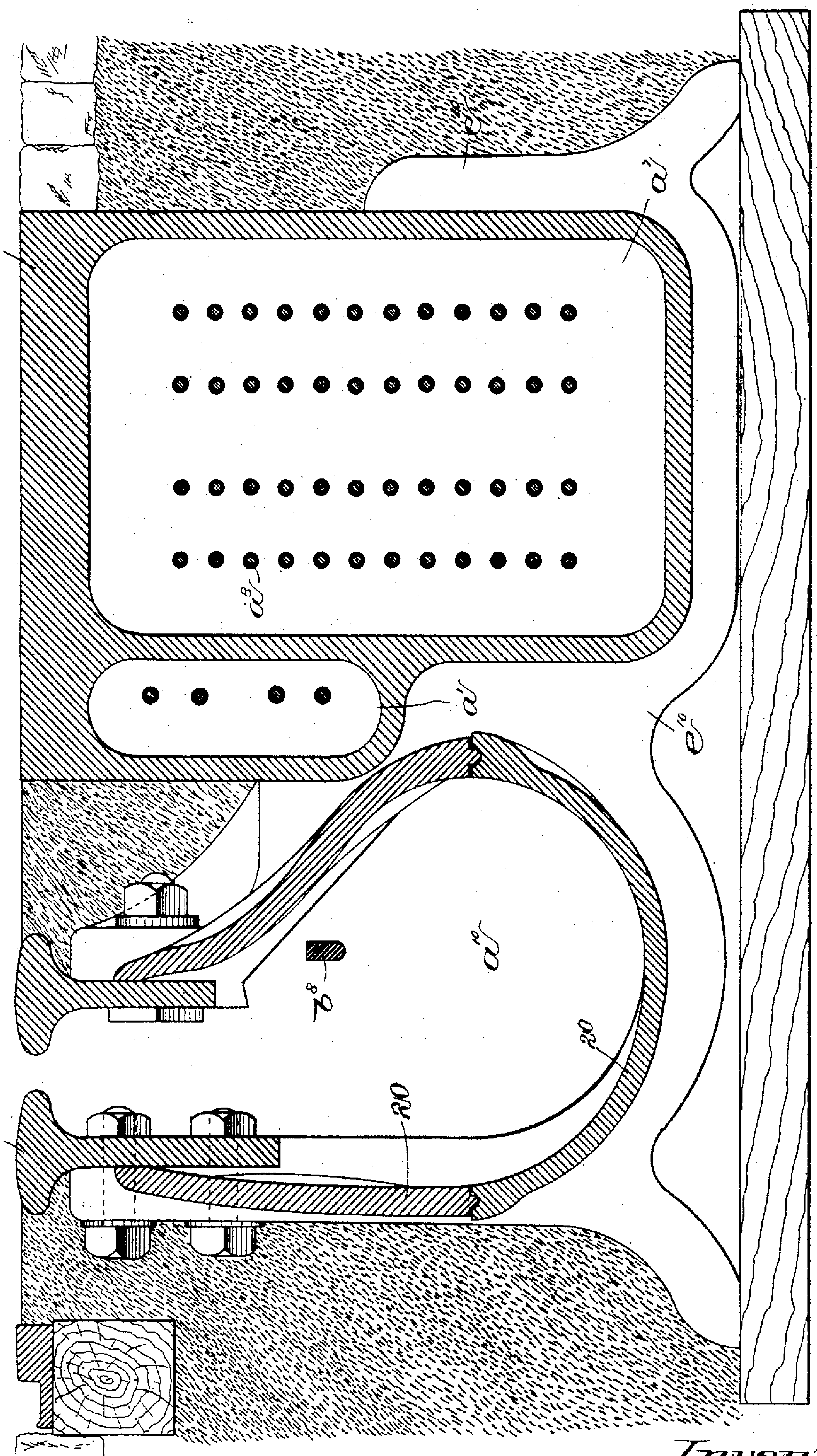

Fig. 2.

Witnesses.
Howard F. Eaton.
Frederick L. Emery.

Inventor:
Henry A. Chase,
by Crosby & Gregory Attys.

(No Model.)

4 Sheets—Sheet 3.

H. A. CHASE.

ELECTRIC CONDUIT.

No. 410,150.

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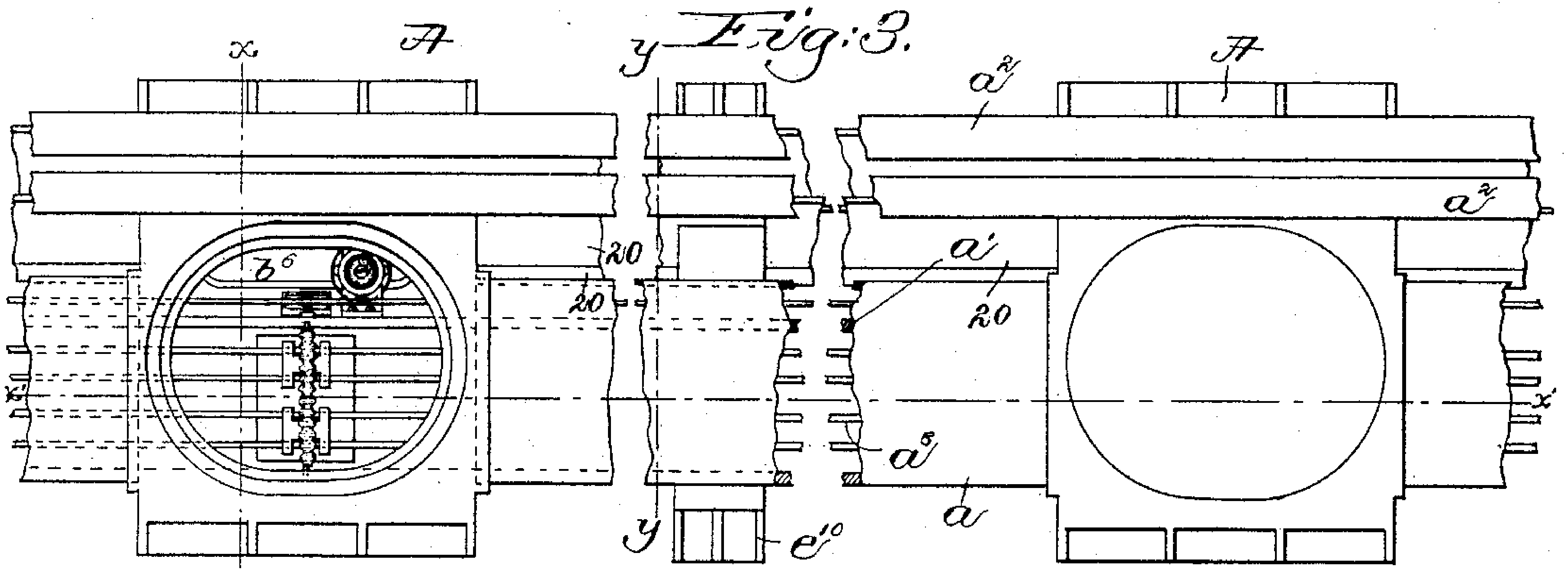
Fig: 3.



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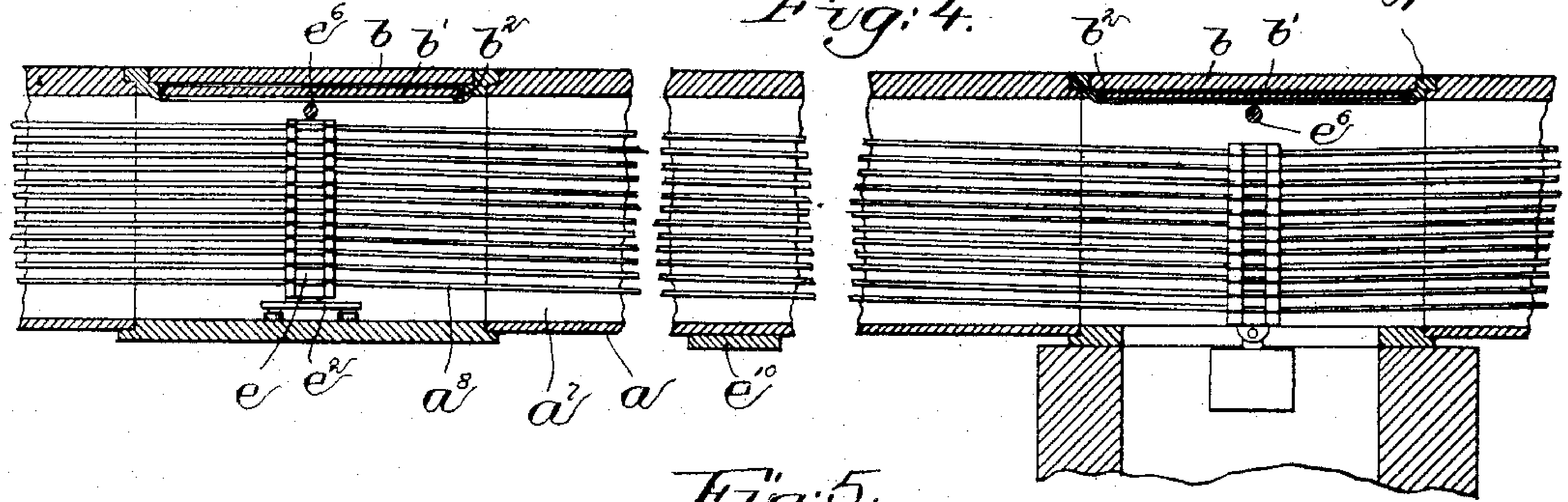
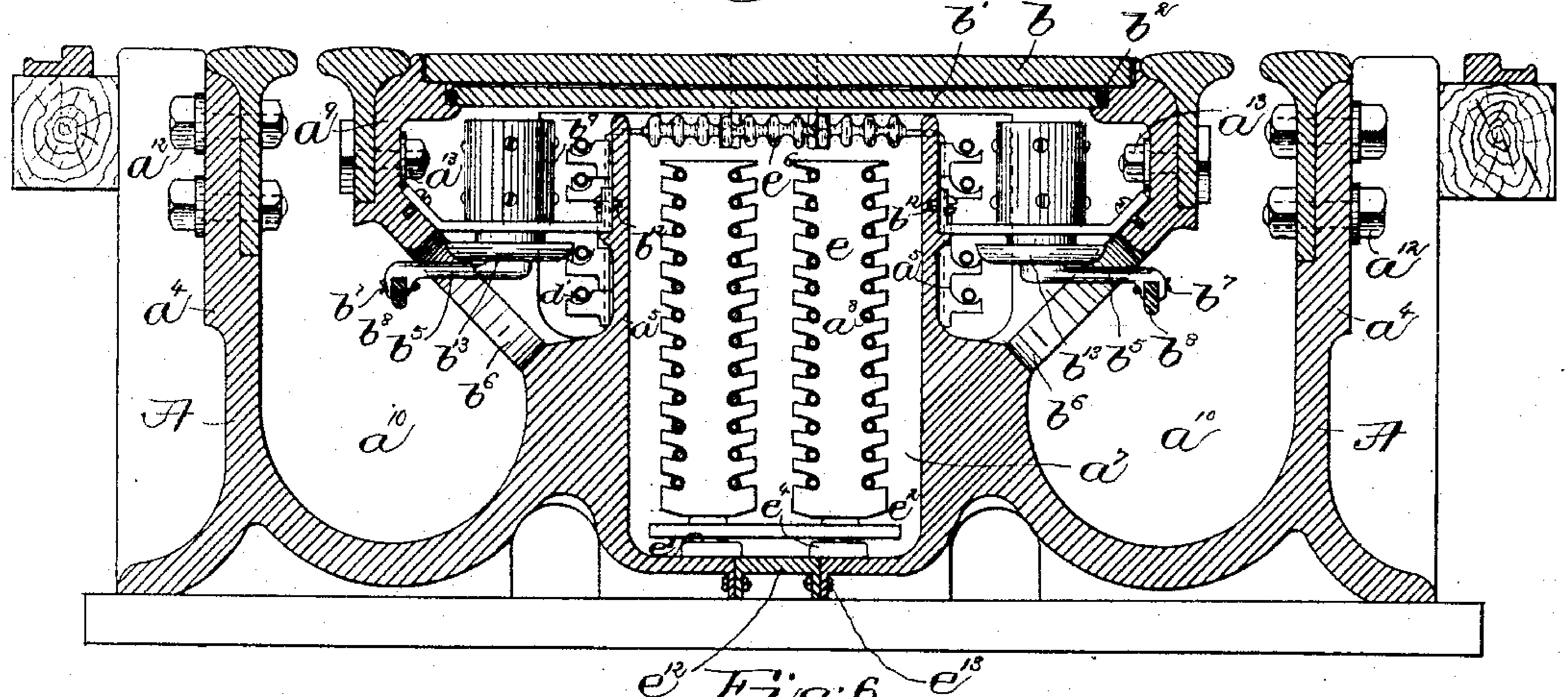


Fig: 5.



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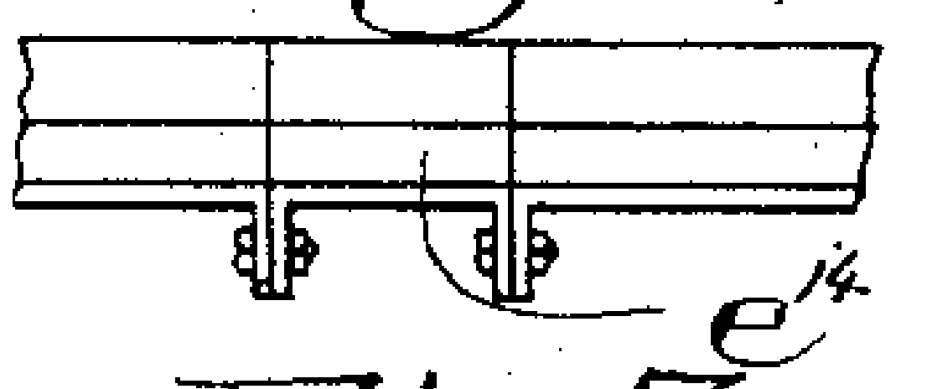

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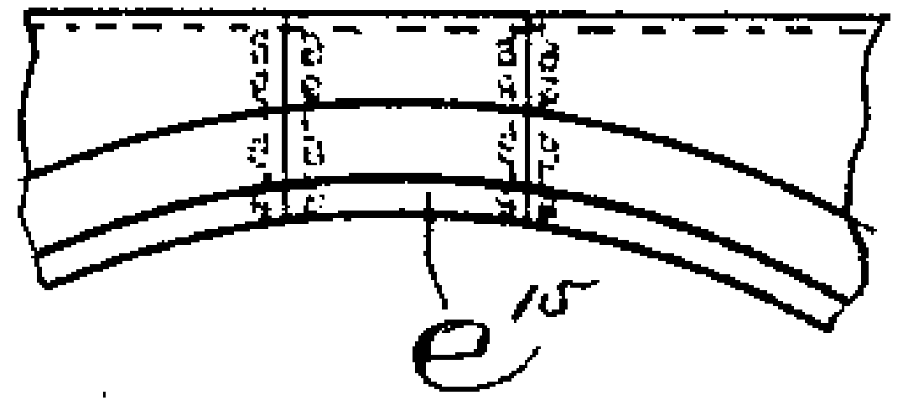

Witnesses.
Howard F. Eaton.
Frederick L. Emery

Inventor:
Henry A. Chase,
by Crosby & Gregory Attys.

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.)

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Fig: 8.

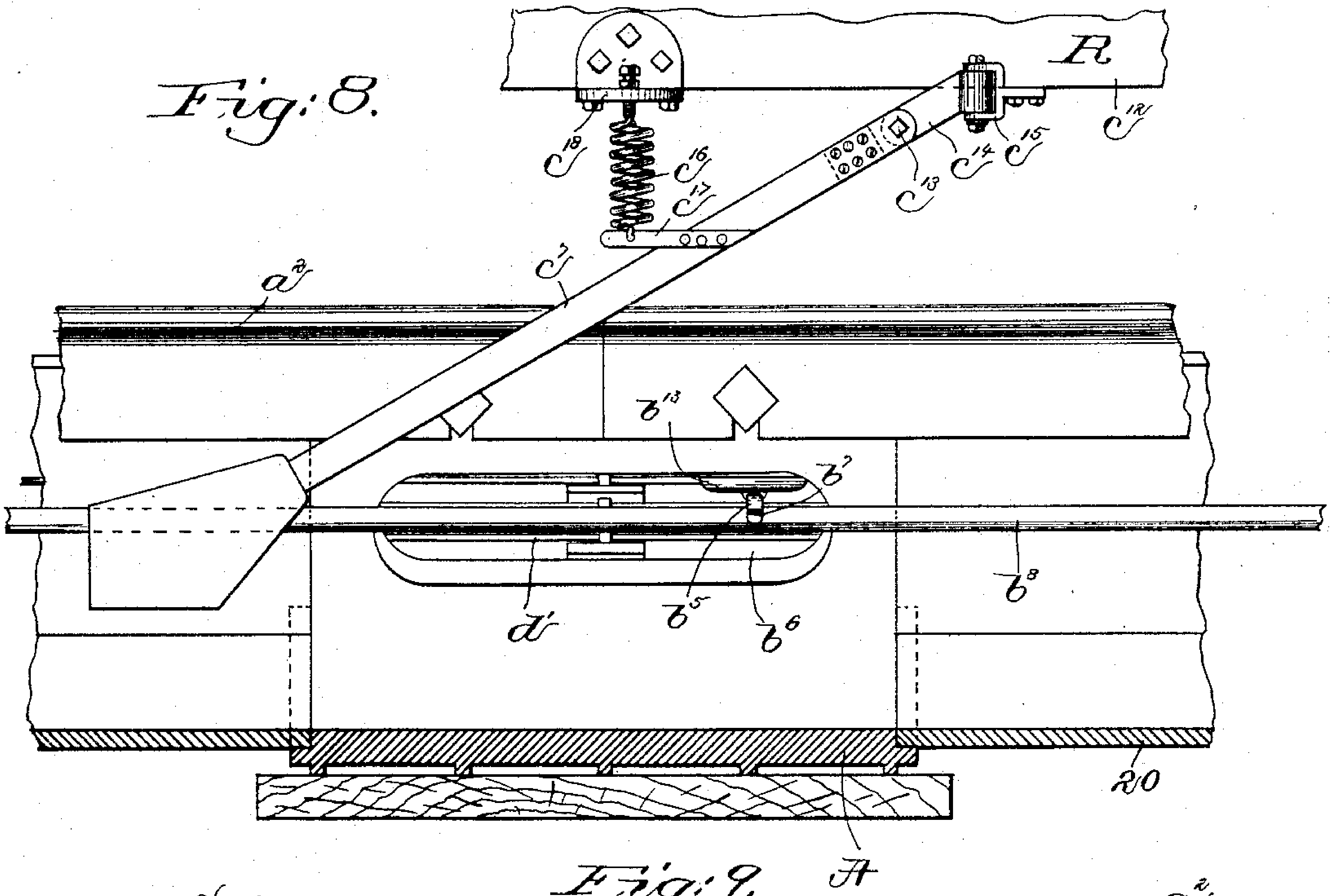


Fig: 9.

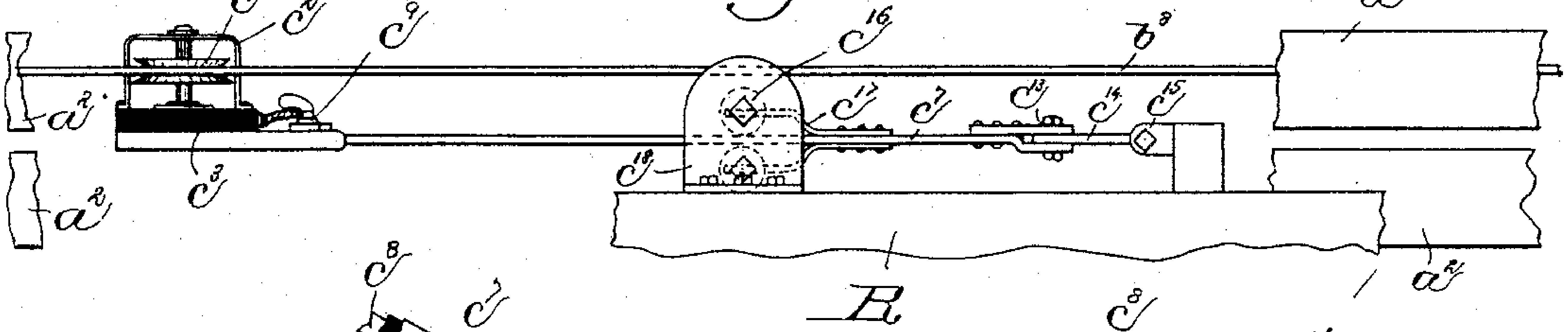


Fig: 10.

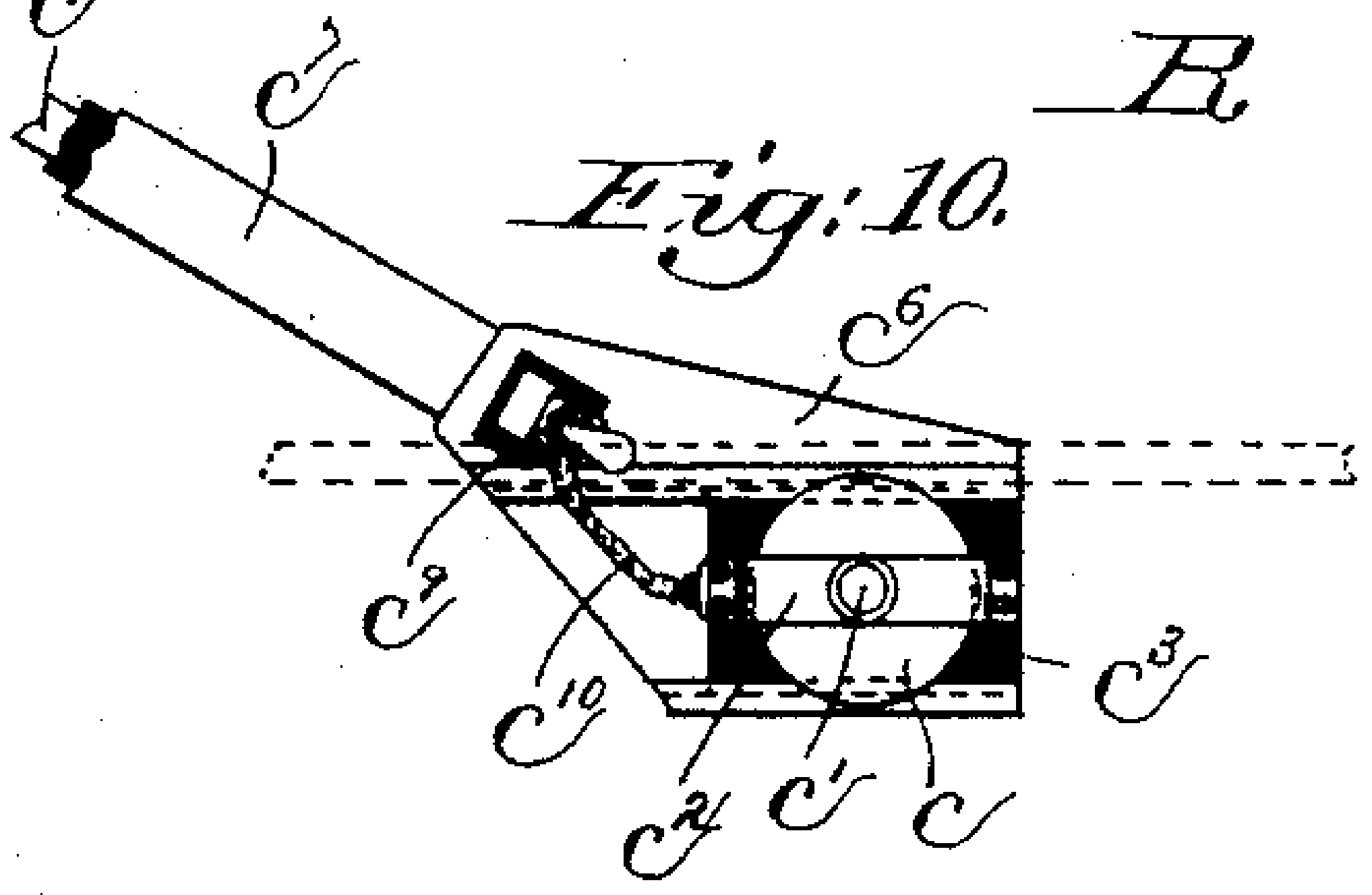


Fig: 11.

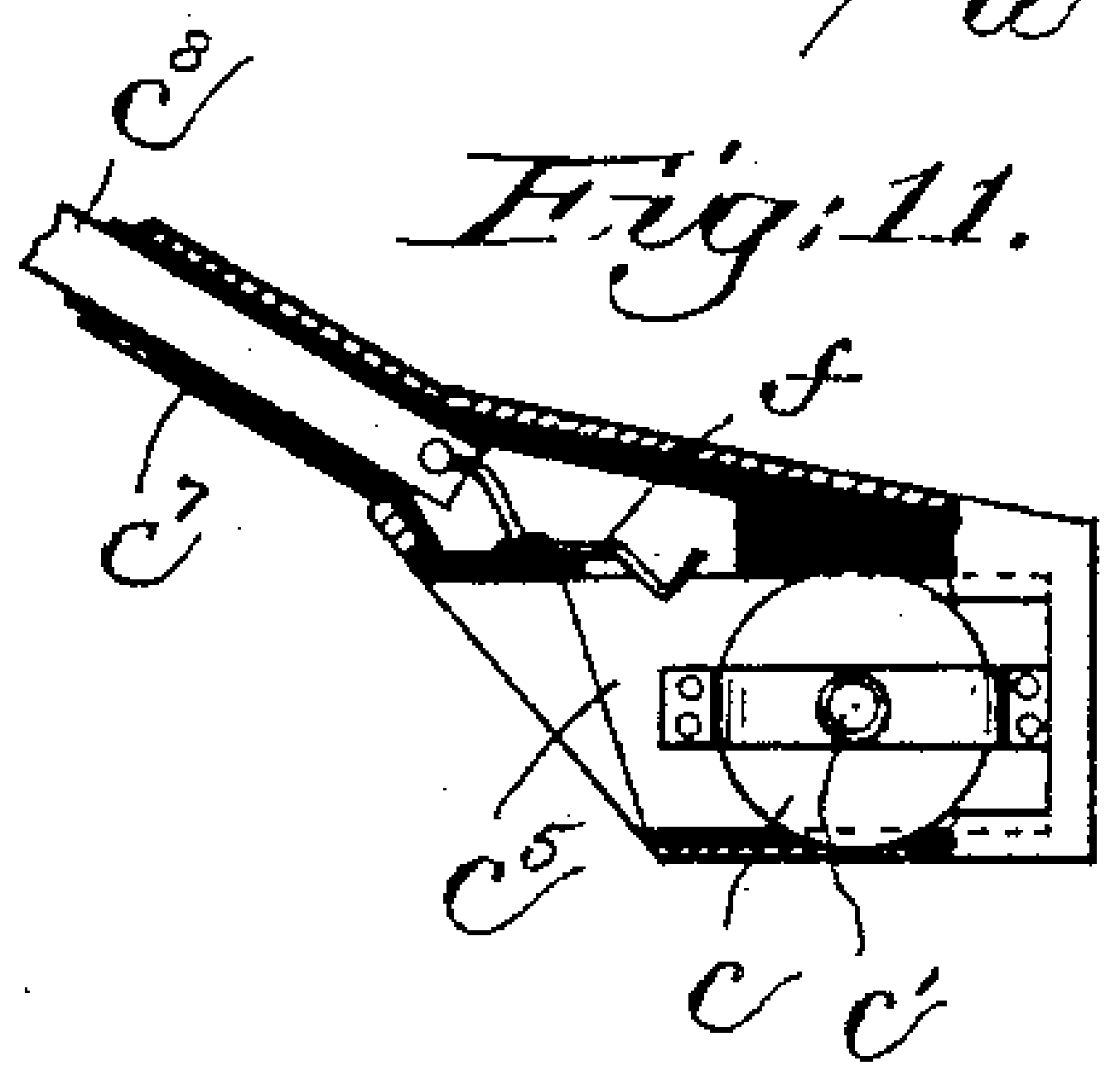
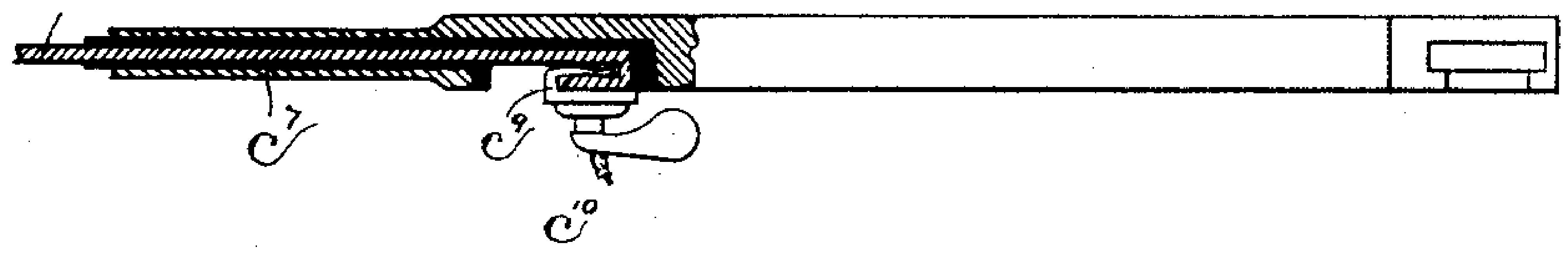


Fig: 12.



Witnesses.

Howard F. Eaton.

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Inventor:

Henry A. Chase.

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UNITED STATES PATENT OFFICE.

HENRY A. CHASE, OF BOSTON, MASSACHUSETTS.

ELECTRIC CONDUIT.

SPECIFICATION forming part of Letters Patent No. 410,150, dated September 3, 1889.

Application filed May 28, 1889. Serial No. 312,429. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. CHASE, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Electric Conduits, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to conduits for electric railways, and is an improvement on the conduit shown and described in United States Patent No. 400,300, granted to me March 26, 1889.

In accordance with my present invention the conduit is composed, preferably, of a series of castings or supporting-frames shaped to form a slot-chamber, in which is located the main conductor, an accessible chamber, and a power-chamber. The slot-chambers of adjacent castings will be provided with rails to form a slot, through which an arm secured to or carried by the car is extended, the lower portion of the slot-chambers of adjacent castings being connected, preferably, by sheet metal to form a continuous slot-chamber between adjacent castings or frames, and the said castings or frames will also be connected by a suitable pipe or pipes to form a continuous power-chamber and a continuous accessible chamber. Each casting or supporting-frame is provided with one or more removable covers, by which access may be had to the accessible chamber and power-chamber, and each power-chamber below the removable covers will be provided with one or more supports for wires carrying large currents, and technically known as "power-wires," the said supports being preferably of porcelain, wood, or other insulating material, preferably supported in cup-shaped sockets containing, preferably, hydrocarbon oil, by which the power-wires are completely insulated from the conduit. The part of the conduit between the adjacent castings or supporting-frames will preferably be supported by a suitable bracket, as will be described. The power-chamber below the removable covers of each casting or frame has located in it, as herein shown, a corrugated roller, which constitutes a guide and an auxiliary support upon which the power-wires are placed, and by which they are fed from casting to casting, the said rollers being made removable, so that when a power-wire has been extended through the conduit for a sufficient distance the said roller may be removed and the said power-wire allowed to drop down, in order that it may be placed in position on its insulating support. The arm, which is extended through the slot into the slot-chamber, has detachably secured to it a current-collector, preferably a trolley-wheel, and the said arm above the said slot is pivotally secured to the car or a support thereon, so that the said arm, when the trolley-wheel is detached therefrom, may be moved up out of the slot to permit the car to be changed from the conduit system to an overhead system, and a trolley-wheel may be removed from the conduit through the accessible chamber.

The particular features in which my invention consists will be pointed out hereinafter in the claims at the end of this specification.

Figure 1 is a transverse section of the conduit through one of the castings or supporting-frames on line *x x*, Fig. 3; Fig. 2, a transverse section of the conduit on the line *y y*, Fig. 3, to more clearly show the bracket supporting the parts between adjacent castings. Fig. 3 is a top or plan view partially broken out of the conduit embodying my invention. Fig. 4 is a longitudinal section of the conduit through the power-chamber, the section being supposed to be taken on line *x' x'*, Fig. 3. Fig. 5 is a transverse section through the casting or supporting-frame of a modified form of conduit. Figs. 6 and 7, details to be referred to; Fig. 8, a sectional detail, on an enlarged scale, to more clearly show the trolley-arm connected to the car, the latter being only partially shown; Fig. 9, a top or plan view of the parts shown in Fig. 8; Fig. 10, a detail to more clearly show the manner of connecting the trolley-wheel with its arm to establish electrical connection between the parts; Fig. 11, a modification to be referred to; Fig. 12, a top or plan view, on an enlarged scale, of the arm shown in Fig. 10; and Fig. 13, a detail to be referred to, on an enlarged scale.

The conduit is composed, preferably, of a number of castings or supporting-frames A, located at convenient distances from each other, and connected, as shown in Fig. 3, by pipe-sections a a' and rails a^2, the said pipe-sections, as represented in Fig. 2, being herein made integral. Each casting or frame A is preferably shaped substantially as shown in Fig. 1, it being provided with outer walls a^3 a^4, an inner wall a^5, and an inclined wall a^6, the walls a^3 a^5 constituting the side walls of a chamber a^7, in which are located, as will be described, wires a^8, adapted to carry large currents, and known as "power-wires," the said chamber being hereinafter designated by me as the "power-chamber." The inclined wall a^6 and a short upright wall a^9, forming part thereof, form, with the side wall a^4, the slot-chamber a^{10}, provided with the slot-rails a^2, which are secured to the side walls of the said chamber, as herein shown, by suitable bolts a^{12}. The inclined wall a^6 and the upright wall a^9 form, with the upright wall a^5, a smaller chamber a^{13}, which I shall designate as the "accessible chamber." The walls a^3 a^9 are provided, as herein shown, with ledges upon which rest covers b b', the cover b' being provided with an annular packing-ring b^2 of rubber or other usual material, by which a water-tight joint is effected, substantially as in the patent referred to.

The accessible chamber a^{13} contains within it an insulator b^3 of rubber or other usual material, provided, preferably, with a threaded central opening to be engaged by the threaded shank b^4 of an arm b^5, extended through an opening or slot b^6 in the wall a^6, the said arm having secured to it, as by the pin b^7, a main conductor b^8 of copper or other usual material. The insulator b^3 is supported, as herein shown, by brackets b^9, secured to it, as by screws b^{10}, the said brackets being fastened, as herein shown, by screws b^{12} to the side walls a^5 a^6 of the accessible chamber. The insulator b^3 is provided at its lower end with an annular upturned lip b^{13}, to form a trough or receptacle in which a hydrocarbon or oily barrier b^{14}, preferably a light hydrocarbon oil, is placed, the said insulator being also preferably made cup-shaped at its upper end to contain hydrocarbon oil. The main conductor b^8 has co-operating with it, as herein shown, a trolley-wheel c, mounted upon a shaft c', having bearings in a trolley-carriage, herein shown as a preferably metallic yoke c^2, secured to a block c^3 of insulating material, to which is secured a metal plate c^4, having a boss which forms an end bearing for the shaft c'. The block c^3 of insulating material has secured or forming part of it a metal plate c^5, adapted to be inserted in a guideway, formed, as herein shown, in the enlarged lower end c^6 of the trolley-arm c^7, said guideway being open at its ends, as clearly shown in Fig. 10, so that the plate c^5 may be readily removed therefrom for a purpose, as will be described. The trolley-arm c^7 is preferably made hollow to contain within it the conductor c^8, to which is secured, as by a spring jack, clasp, or fastening c^9, (see Fig. 12,) the conducting-wire c^{10}, connecting the said spring jack or clasp with the metal yoke c^2, and through the said yoke establishing electrical connection with the trolley-wheel. The trolley-arm c^7, above the conduit, is pivotally connected to the car c^{12}, it being shown as pivoted at c^{13} to an arm c^{14}, so as to move vertically, and the said arm is itself pivoted in a bracket c^{15}, secured to the car R, the arm c^{14} being adapted to move horizontally. The trolley-wheel c is kept pressed up against the main conductor b^8 to insure good electrical connection, preferably by one or more springs c^{16}, having one end fastened to a bracket c^{17}, secured to the arm c^7, (see Fig. 8,) and its other end secured to a bracket c^{18}, fastened to the car.

By constructing the trolley-arm substantially as described, and making the carriage carrying the trolley-wheel detachable from the said arm, the car may be readily changed from the underground or conduit system to the overhead system, or vice versa, for to make the change it is only necessary to remove the covers b b' and insert the hand through the accessible chamber and slot b^6 into the slot-chamber, withdrawing the spring jack or clasp from engagement with the trolley-arm, and then sliding the trolley-carriage out of the guideway in the said arm, leaving the latter free to be turned upward through and above the slot. The accessible chamber of each casting or supporting-frame preferably contains within it one or more insulators d of porcelain, wood, or other suitable material. The insulator d is preferably made as a trough 2, (see Fig. 13,) secured to or forming part of a back piece 3, provided, as shown, with a dovetail slot, by which the insulator is slipped over a support 4, preferably a bar or rod secured to the side wall a^5. The sides of the support or bar are made beveled to correspond to the dovetail slot of the back piece. The trough 2, herein shown as oblong in form, but which may be round or of other shape, has secured to its bottom a forked arm or upright 5, into which a feed-wire d' is placed and by which it is supported. In practice a number of insulators d may be placed on one bar or support 4, and adjacent insulators are separated, as herein shown, by making the back 3 of greater height than the trough 2 is deep, as clearly shown in Fig. 1. The power-chamber a^7 of each casting or frame, below the removable covers thereof, is provided with one or more insulating-supports e, preferably made as an upright frame provided with side notches, into which the power-wires a^8 are laid, the said bar being provided with a socket or opening, which is fitted over a post or rod e', (see dotted lines, Fig. 1,) secured to or forming part of a base frame or bar e^2, provided on its under side with a foot or projection e^3, which rests upon the bottom of a cup-shaped socket or receptacle e^4, secured to or forming part of the casting, the said cup-shaped socket containing a hydrocarbon or oily barrier, preferably a light fluid oil e^5, by which any leakage of current from the power-wires is cut off from escaping to the casting. As an additional precaution against leakage, the central socket is not made as long as the post e', so that when the frame e is fitted upon the said post the said frame will be above the frame or bar e^2.

The power-chamber a^7 contains within it a supporting guide-bar for the power-wires, herein shown as a corrugated roller e^6, having journals in the side walls of the chamber. The corrugated roller e^6 serves as a support for the power-wire, by which the latter may be readily run from one section to the other until it is in position to be placed in a notch of the insulating-support e, and when in position the said rollers may be removed and the power-wire dropped down into place.

As shown in Fig. 3, the power-chamber and the accessible chamber of adjacent castings or frames are connected by pipe-sections $a\ a'$, which are integral; but it is evident that the said chambers may be connected by single pipes of proper diameter. The portion of the conduit between adjacent castings or frames is preferably supported by a bracket e^{10}.

As shown in Fig. 1, the casting or frame is made so as to include a single power-chamber, a slot-chamber, and an intervening accessible chamber; but, if desired, the power-chamber may be located centrally between two slot-chambers, substantially as shown in Fig. 5, wherein two independent castings A are formed so as to include in each a slot-chamber and one-half or any other portion of the power-chamber, the said castings being united at the bottom by a longitudinal strip or piece e^{12}, secured to the castings A, as by bolts e^{13}, (see Fig. 5,) the end walls and a portion of the top walls being completed by the strips or pieces e^{14} e^{15}. (See Figs. 6 and 7.)

If desired, the casting A may be shaped so as to include only the slot-chamber and power-chamber, in which case the wall a^5 will be provided with suitable openings, through which the auxiliary wire d^2 may be extended and connected to a power-wire in the chamber a^7, or the said casting or frame may be made to include the slot-chamber and the accessible and power chamber, the power-chamber and the slot-chamber of adjacent castings being connected.

Instead of securing the trolley-carriage to the trolley-arm by a spring jack, clasp, or fastening—such as shown in Figs. 10 and 12—the said carriage may be secured by other forms of spring-fastening—such, for instance, as shown in Fig. 11, wherein the trolley-arm has secured to it a spring-arm f, bent to engage a notch in the top of the plate c^5. The lower portion of the slot-chambers of adjacent castings may be connected by sheet-metal plates 20, bent or made in usual manner to conform to the shape of the slot-chamber of the castings and form a continuous slot-chamber.

I claim—

1. In an electric conduit, a frame or casting provided with a slot-chamber and an accessible chamber communicating therewith, and a power-chamber, substantially as described.

2. In an electric conduit, the combination, with the series of castings or frames, each comprising a slot-chamber, an accessible chamber, and a power-chamber, of means to connect the chambers of adjacent castings, substantially as described.

3. The combination, with an electric conduit having a slot-chamber and an accessible chamber communicating therewith, and a conductor located in said slot-chamber, of a trolley-arm adapted to be inserted into said slot-chamber through the said slot and a trolley-carriage and means to positively secure said trolley-carriage to the trolley-arm within the slot-chamber, the said trolley-carriage being readily detachable from the trolley-arm to permit the carriage to be removed through the accessible chamber and to allow the trolley-arm to be withdrawn from the slot-chamber, substantially as described.

4. The combination, with an electric conduit having a slot-chamber and a power-chamber, of an insulating support in said power-chamber and a supporting-guide, substantially as described, located in the said power-chamber above the insulating-support, substantially as and for the purpose specified.

5. The combination, with an electric conduit having a slot-chamber, and a main conductor located therein, and an insulating-support for said conductor, of a feed-wire and an insulating-support for said feed-wire consisting of a trough, an oily barrier therein, and an upright or arm extended upward from said trough, substantially as described.

6. In an electric conduit, the combination, with a support or bar 4, of an insulator consisting of a trough, an oily barrier therein, and a back piece provided with a dovetail slot to enable the said insulator to be slipped over the said bar or support, substantially as described.

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

HENRY A. CHASE.

Witnesses:
JAS. H. CHURCHILL,
MABEL RAY.