

No. 694,083.

Patented Feb. 25, 1902.

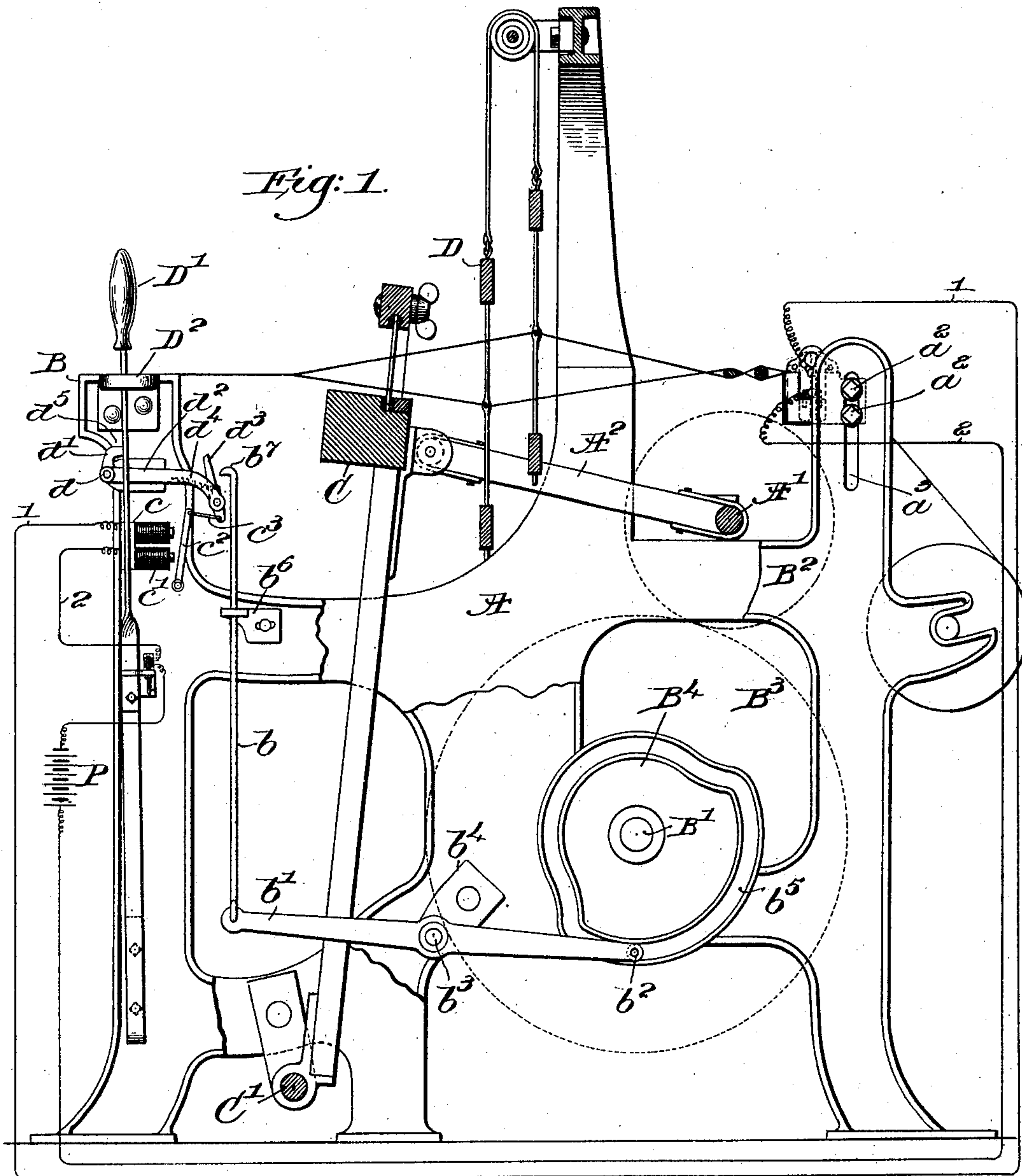
H. WYMAN.

WARP STOP MOTION FOR LOOMS.

(Application filed Apr. 16, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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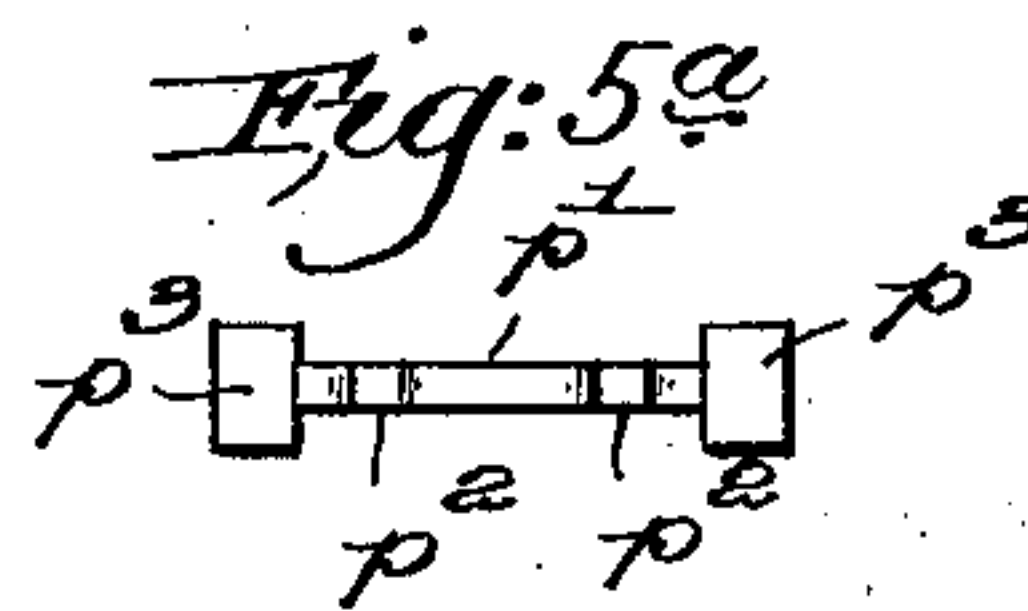
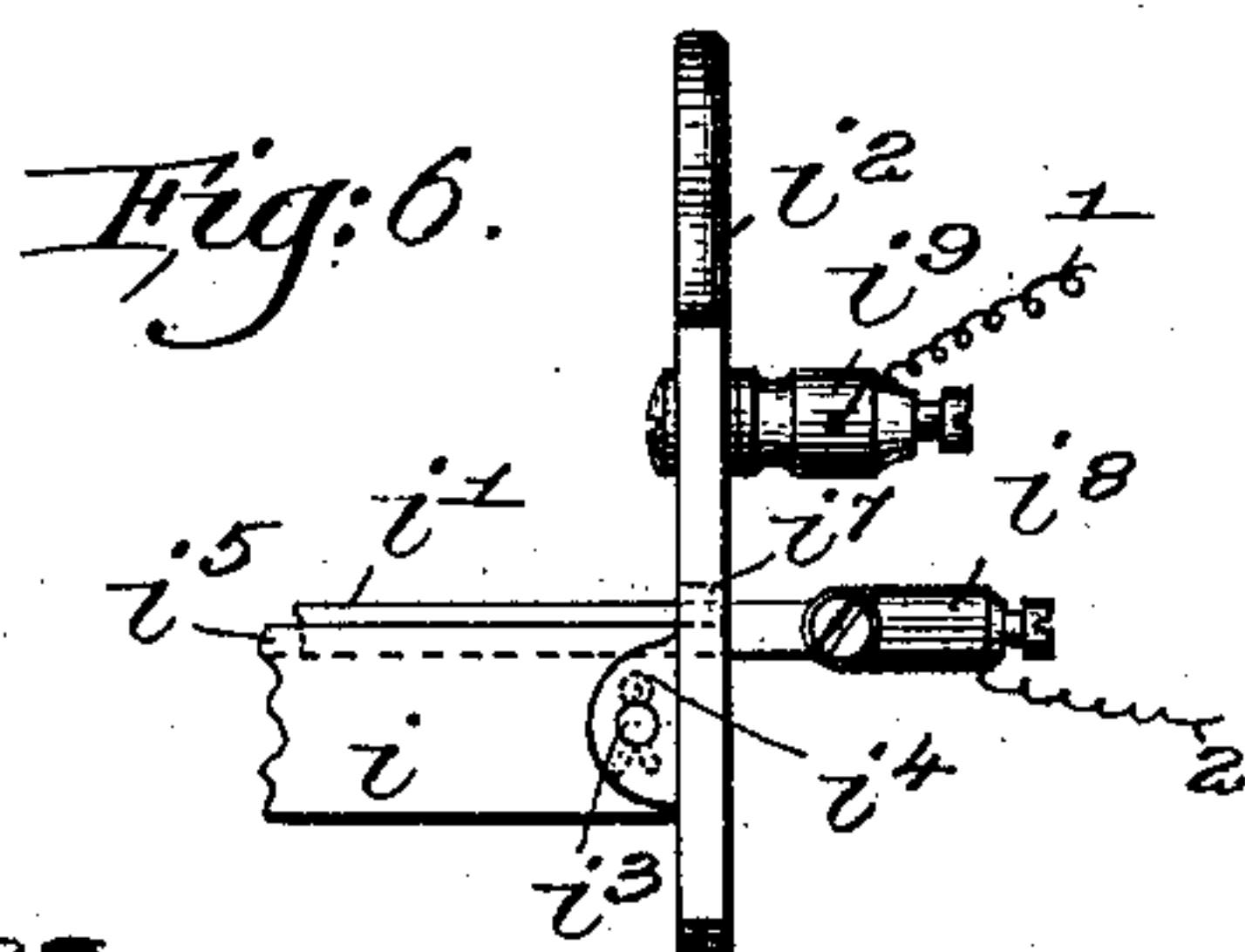
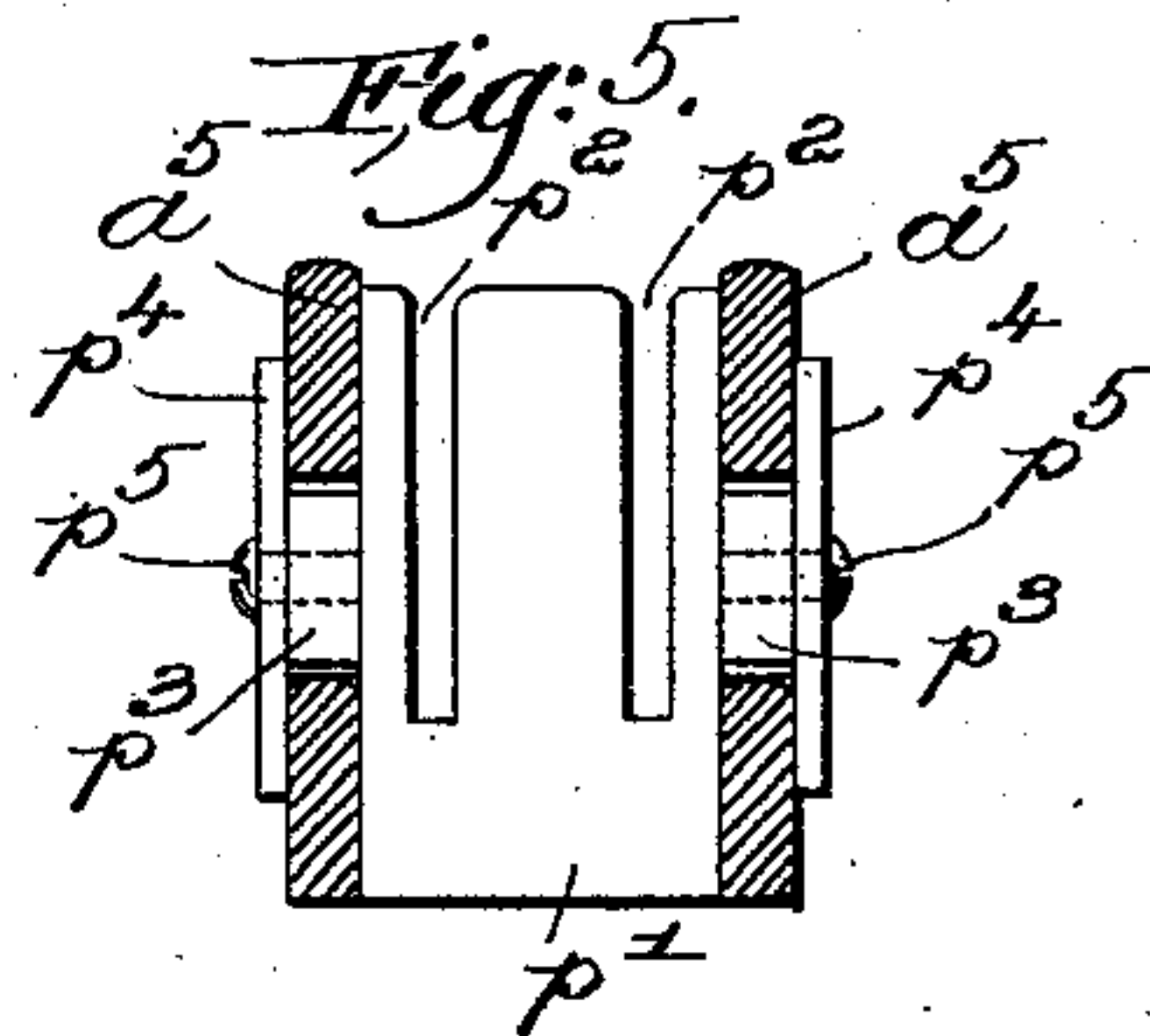
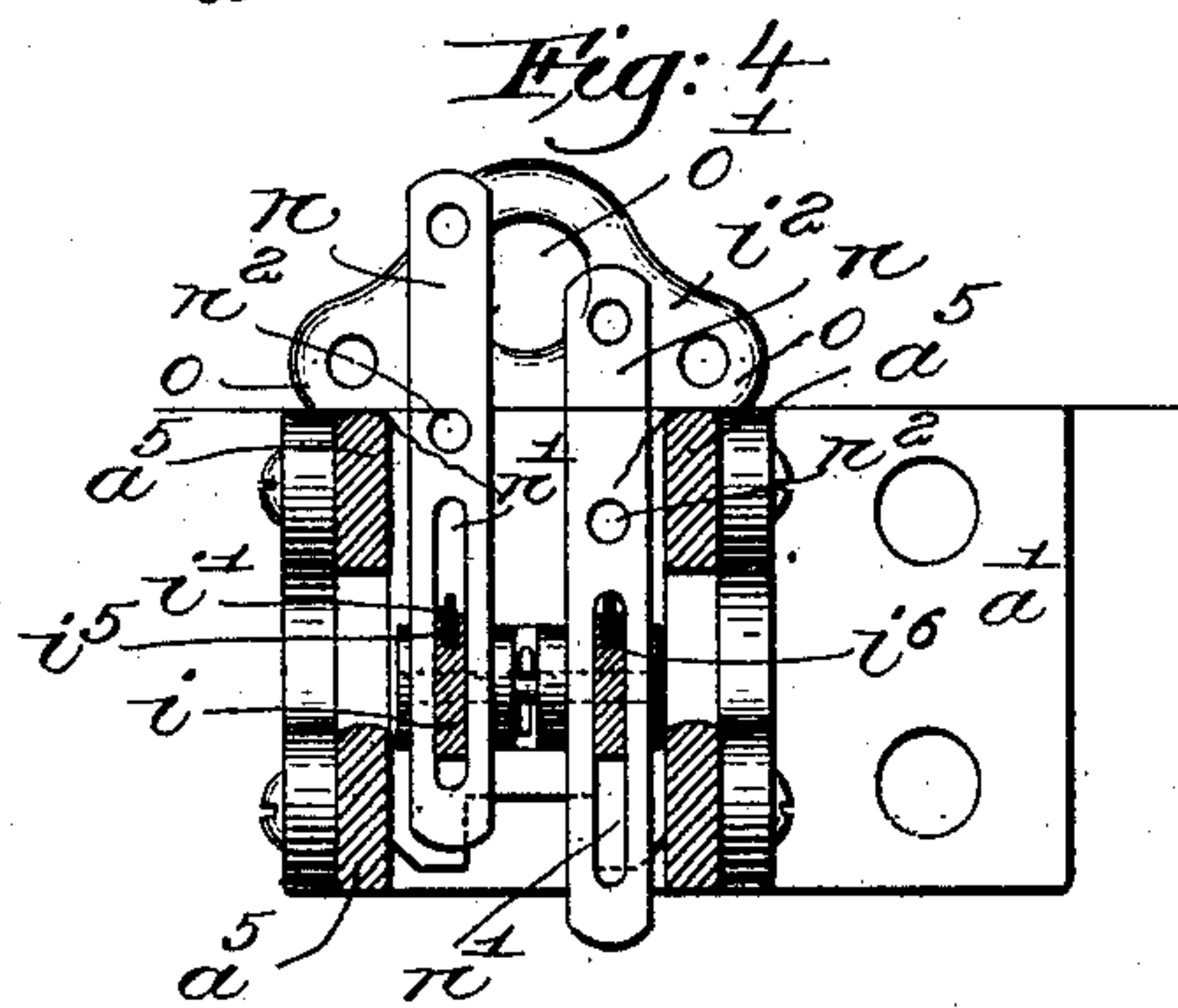
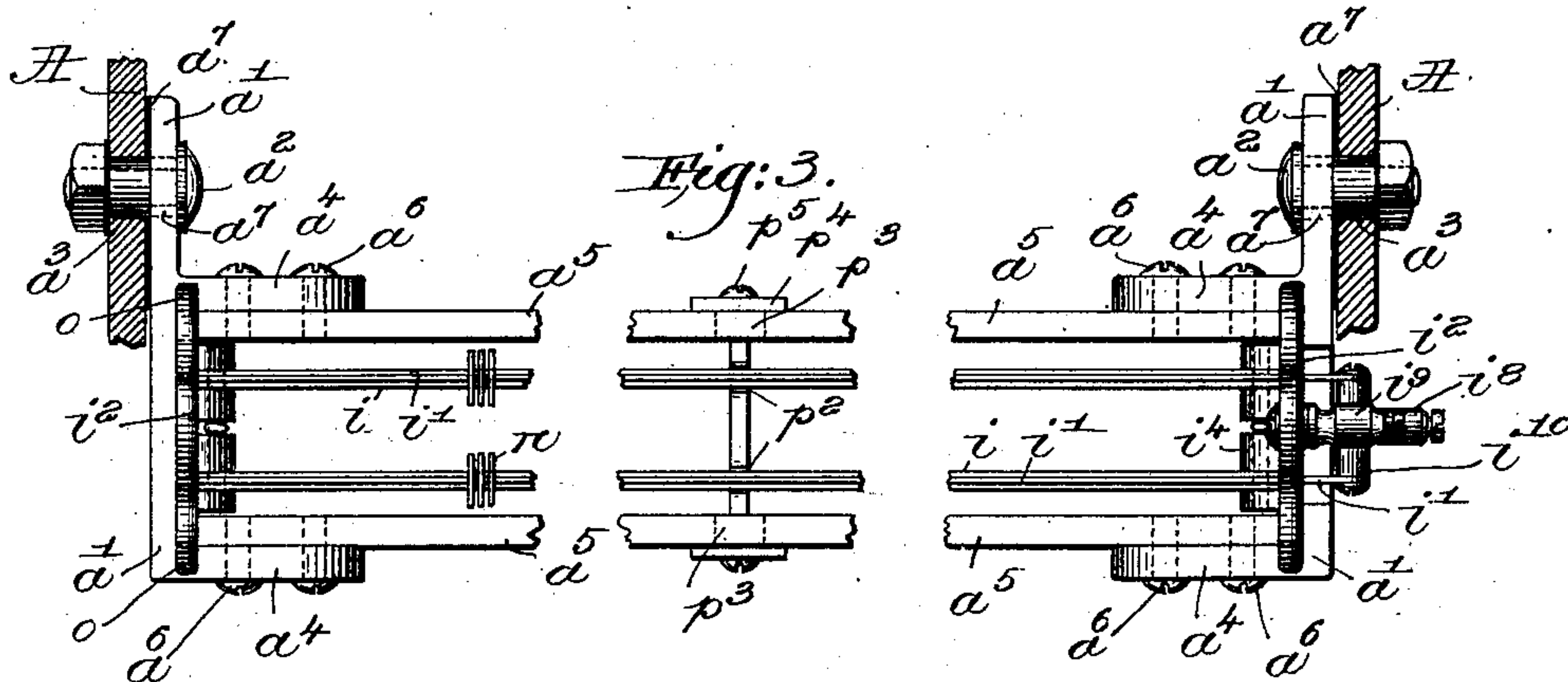
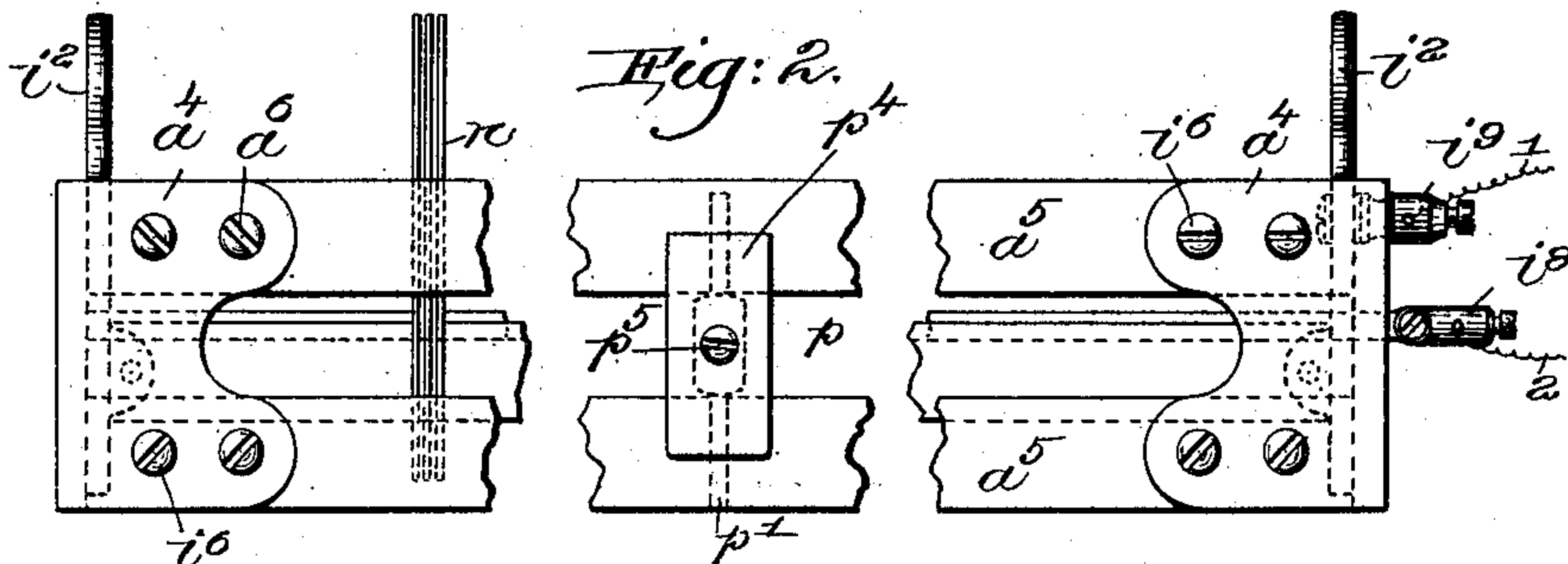
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3 Sheets—Sheet 2.



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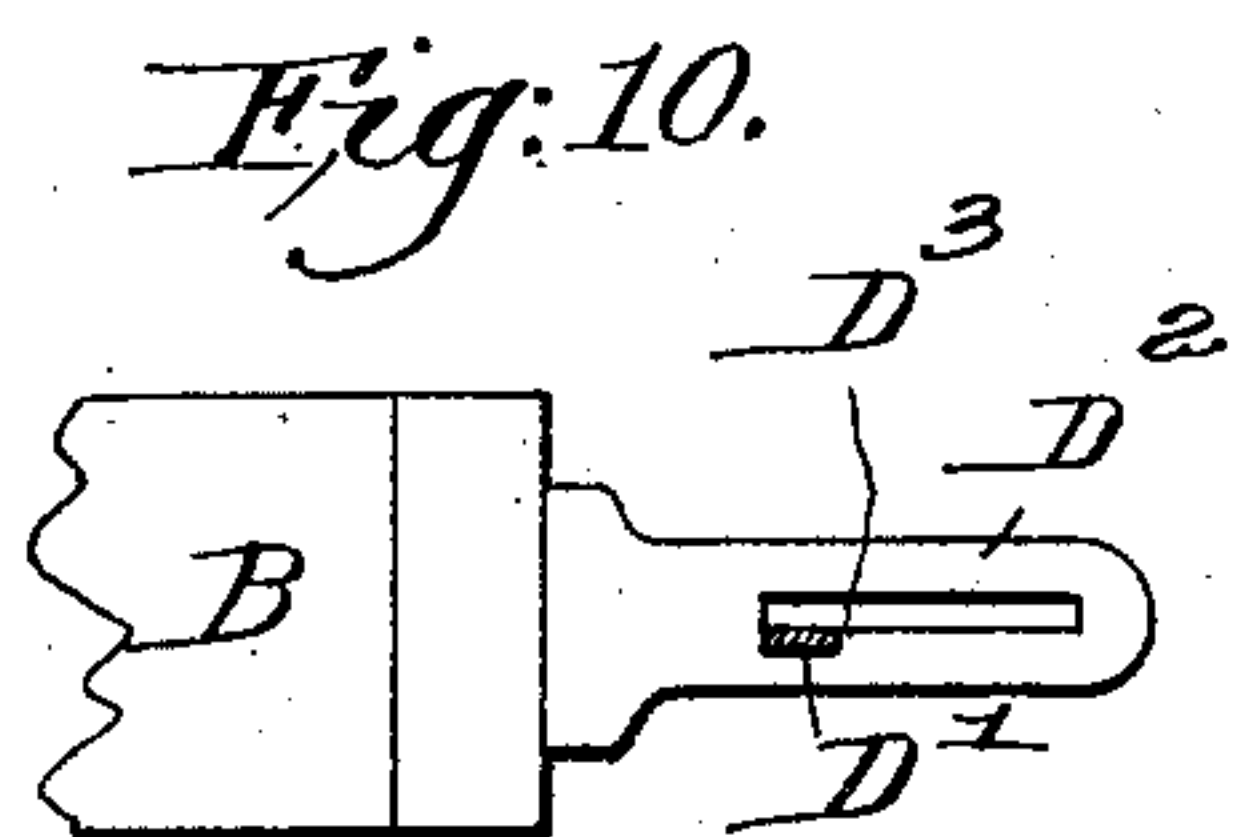
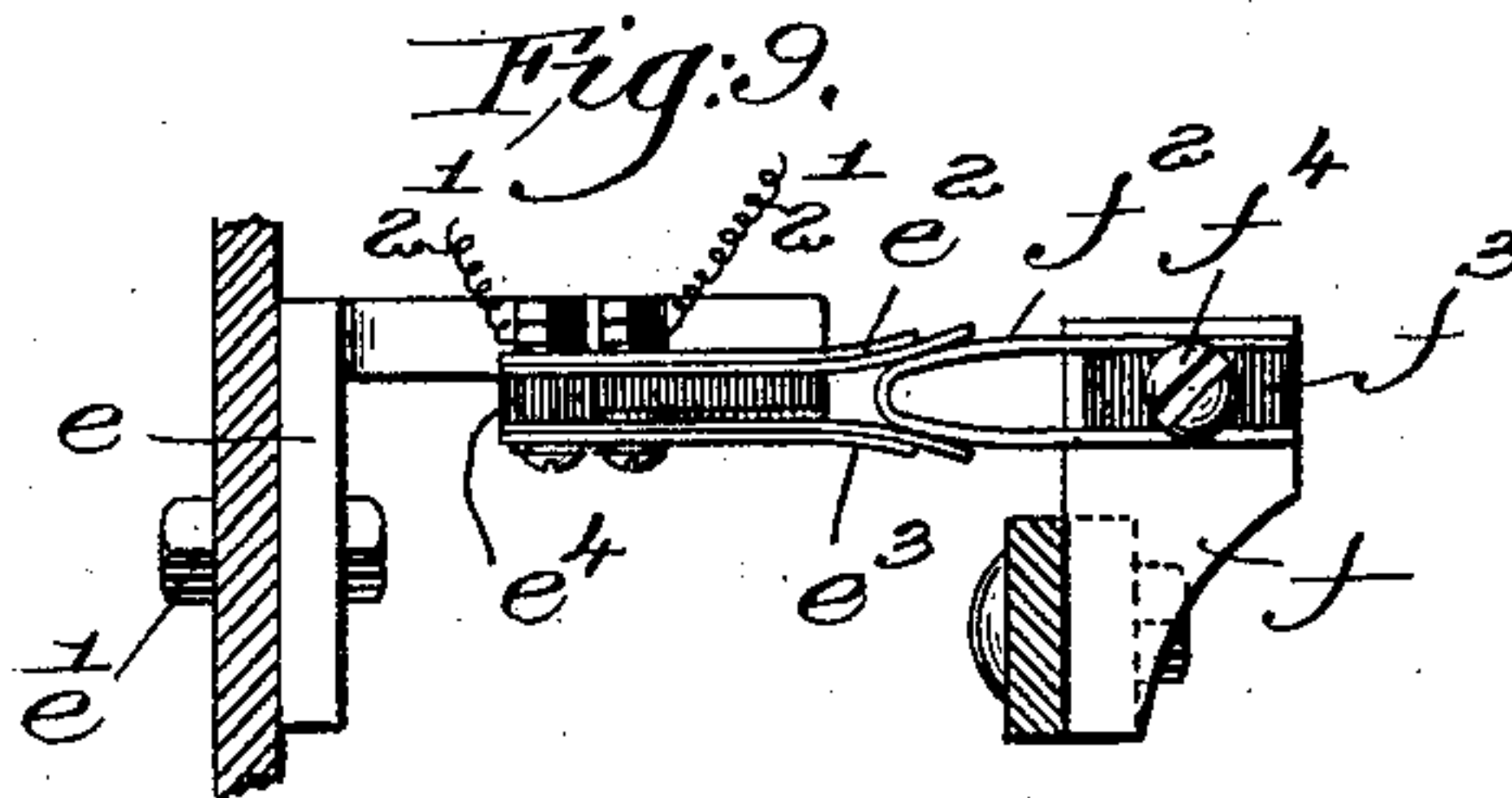
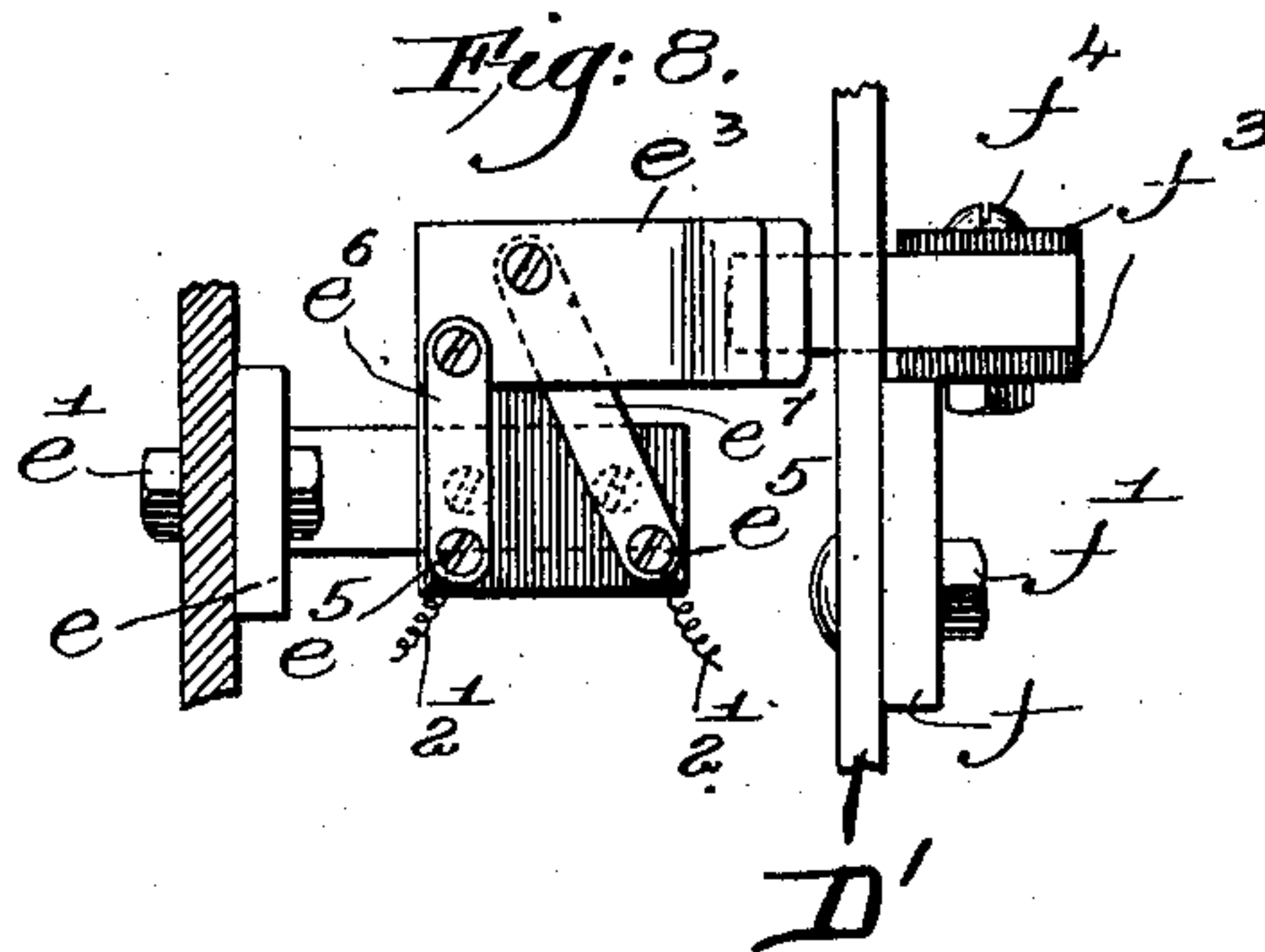
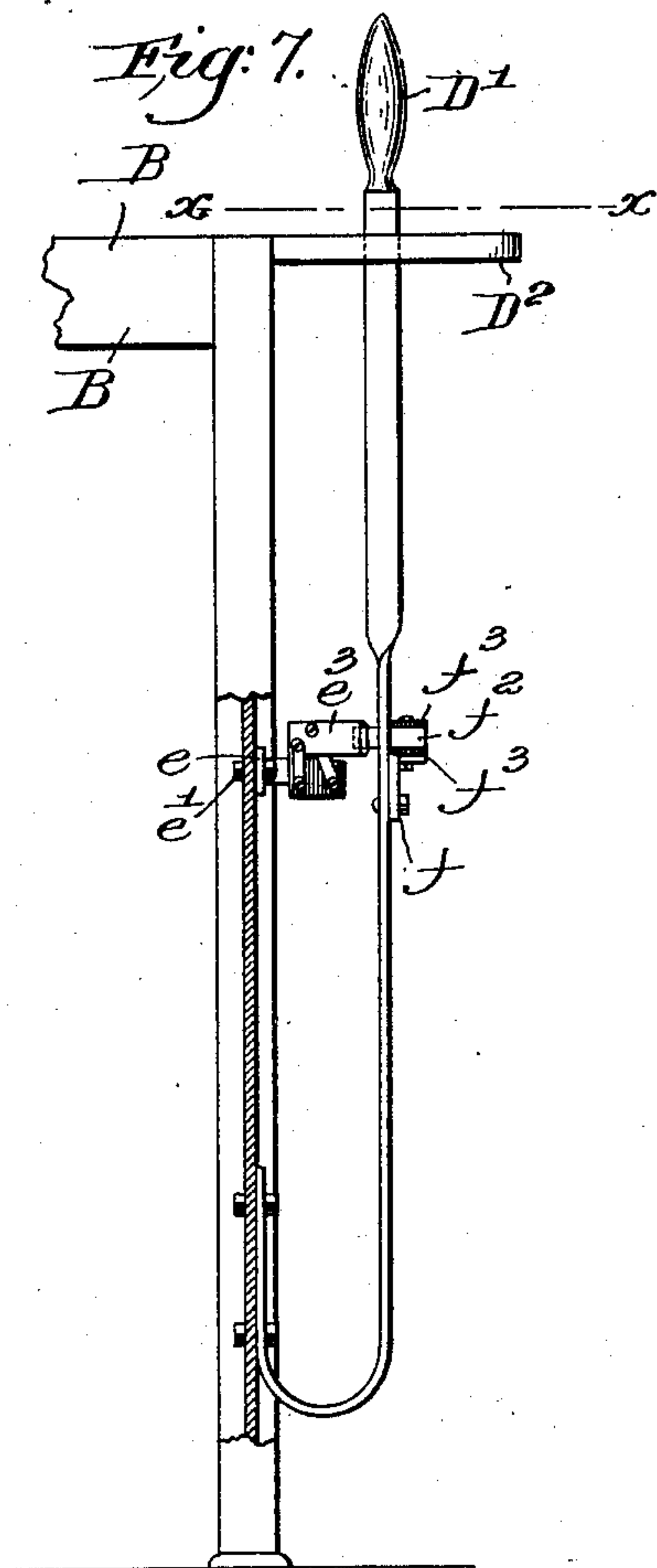
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

HORACE WYMAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 694,083, dated February 25, 1902.

Application filed April 16, 1900. Serial No. 13,088. (No model.)

To all whom it may concern:

Be it known that I, HORACE WYMAN, a citizen of the United States, and a resident of Worcester, county of Worcester, State of Massachusetts, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing
10 like parts.

This invention relates to warp stop mechanism for looms wherein a drop device suspended one on each of the warp-threads moves from a normal to an abnormal position
15 when a warp-thread breaks or becomes too slack, and thus completes an electric circuit which puts into operative condition certain instrumentalities to cause the loom to stop; and the objects of my present invention are
20 to simplify the general construction of parts, to render them more certain in operation, and to improve the warp-supporting frame and the means for guiding the drop devices.

With these objects in view my invention
25 consists of the parts and combinations, as will be hereinafter fully described, and definitely pointed out in the claims.

In the drawings, Figure 1 is a right-hand elevation of a loom embodying my improvements. Figs. 2 and 3 are broken detail side
30 elevation and sectional plan views, respectively, of the warp-supporting frames, drop devices, electric terminals or electrodes, and their connected parts. Fig. 4 is a cross-section thereof. Fig. 5 is a cross-section of the
35 warp-supporting frame and adjustable brace with drop devices and electrodes or terminals omitted. Fig. 5^a is a plan view of parts shown in Fig. 5. Fig. 6 is a detail in elevation of one end of the guide-bar frame removed
40 from the warp-supporting frame, showing the binding-posts. Fig. 7 is a sectional elevation of one end of the loom on line *x x*, showing the shipper and switch or cut-out. Figs.
45 8 and 9 are side and plan views of the switch or cut-out, parts being shown in section. Fig. 10 is a detail showing the shipper-handle retained in its holding-notch.

The loom-frame A, breast-beam B, lay C,
50 pivoted at C' and connected to the crank-shaft A' by the rod A², the shed-forming devices D, cam-shaft B', gears B² and B³, by

which motion is transmitted from one to the other of shafts A' and B', and the shipper D', movable in the notched and slotted bracket D², are and may be all as heretofore common
55 in this class of devices and need not be further described.

Mounted on the cam-shaft B' is a cam B⁴, in the groove b⁵ of which travels a pin or roller b² on the end of a lever b', pivoted at b³ to a
60 bracket b⁴ and carrying at its end an actuator b, having a hooked end b⁷. Secured to the loom-frame is a guiding-bracket b⁶, through which the actuator b passes and by which it
65 is guided in its rising-and-falling movement due to the action of the cam B⁴.

Secured to a bracket c adjacent the shipper-handle D' is an electromagnet c', connected to the devices for detecting an abnormal
70 condition of the warp-threads, as will hereinafter more fully appear, by the conducting-wires 1 and 2, having electrical connection with the opposite poles, respectively,
75 of an electrical generator P or other source of electric energy, as desired.

The shaft or stud d supported, preferably, in any usual form of bearings on the breast-beam B, has secured thereto a pusher or arm d', which bears at its free end on a lever of
80 usual construction, (not necessary to show, as it is well understood,) which in turn bears against the shipper and serves to detach the same from the holding-notch D³, as will presently appear. The shaft or stud has fixed
85 thereto the arm or lever d², which at its free end has pivoted thereto a pawl or latch d³, normally held with its free upper end in position, as indicated in Fig. 1, by a spring d⁴, the lower end of the pawl or latch being con-
90 nected to the free end of the armature c² by the link c³.

From the above construction it will be seen that upon the energization of the electromagnet c' by the completion of the circuit
95 the armature c² will be drawn to the magnet, thereby moving the upper end of the pawl or latch d³ into the path of movement of the actuator b, which will engage the same and on its downward movement turn the shaft or
100 stud d and through the pusher or arm d' detach the shipper from its holding-notch D³ and stop the loom.

When the loom has been stopped, as above

described, it is desirable that the circuit be interrupted or broken, and to this end I provide any usual form of switch or cut-out, as shown in Figs. 7, 8, and 9. In the present instance I mount upon the bracket e , secured to the loom-frame by any suitable means, as the bolt e' , one member of the switch or cut-out, which consists of two terminals $e^2 e^3$ in the form of plates separated by insulation e^4 , and to these plates are electrically connected the ends $2' 2'$ of the wire 2 by means of the usual binding-posts $e^5 e^5$, which connect with the plates $e^2 e^3$, respectively, by the arms $e^6 e^7$, insulated from each other. Mounted upon the bracket f , secured to the shipper D' by any suitable means, as the bolt f' , is the other member f^2 of the switch, insulated therefrom by the insulation f^3 and secured to the said bracket by a bolt or screw f^4 . This member of the switch, as will be seen from Fig. 9, comprises a bent plate the end of which is adapted to enter between the terminals $e^2 e^3$ and form an electrical connection therebetween when the shipper-handle is retained in the holding-notch D^3 during the operation of the loom. Should the circuit be completed by a warp drop device, as will hereinafter appear, the shipper D' will through the pusher d' , as already explained, detach the shipper from its holding-notch D^3 , whereupon said shipper will move to the outer portion of the slotted bracket D^2 and stop the loom, and thus also move the member f^2 of the switch from between the terminal plates $e^2 e^3$ and break or interrupt the circuit, as will be evident.

Mounted, preferably, on the rear portion of the loom-frame and adjustably secured thereto by the bolts $a^2 a^2$ passing through slots $a^3 a^3$ in the loom-frame A is the warp-supporting frame, comprising end brackets $a' a'$, having the separated side flanges $a^4 a^4$, to which are secured the warp-supporting bars $a^5 a^5$ by means of suitable bolts or screws $a^6 a^6$. Said warp-supporting frame is also preferably insulated from the loom-frame by means of suitable insulating material $a^7 a^7$, interposed between the bracket a' , bolts a^2 , and the loom-frame A, as will be readily understood from Fig. 3.

Disposed between the warp-supporting bars $a^5 a^5$ and substantially parallel thereto are the guides for the drop devices in the form of electrodes of any desired number, but preferably shown as two pairs, each of which comprises a positive and negative terminal i and i' , respectively. The terminals i consist of broad flat pieces of conducting material secured to end brackets i^2 by means of pins i^3 and bearing-lugs i^4 , as will be obvious from Fig. 6, and in the top portions of said terminals i are preferably formed grooves i^5 , in which are supported the terminals i' , properly insulated therefrom by any suitable insulating material i^6 . The terminals i' preferably extend the entire length of the terminals i and at one end project through holes i^7

in the bracket i^2 and are connected by a pin i^{10} , to which is secured a binding-post i^8 , connected to the source of electrical supply, as P, by a wire 2. To the bracket i^2 , which is in electrical connection with the terminal i , is secured another binding-post i^9 , connected to which is the other wire 1 of the electric circuit. It will be obvious from this construction that so long as the terminals i and i' , constituting one of the electrodes, are not electrically joined there will be an interruption in the circuit through the wires 1 and 2; but should they be electrically connected the circuit would be completed and current established through the electromagnet c' to cause the loom to stop.

Mounted upon each of the electrodes are drop devices n , having elongated slots n' , through which the electrodes pass and by which the drop devices are guided in their rising-and-falling movements. Above the elongated slots n' the drop devices are provided with holes or perforations n^2 , through which the warps are threaded, one warp-thread being passed through such hole or perforation in a drop device. By reference to Fig. 4 it will be seen that the electrodes are preferably located below the top of the warp-supporting bars $a^5 a^5$, over which the warp-threads pass and on which they rest when in normal condition for weaving. The disposition of the holes or perforations n^2 in the drop devices is such with respect to the elongated slots n' and electrodes that said drop devices will be held by normal warp-threads in position indicated on the left of Fig. 4 with the top portion of the slot n' above the terminal i' of the electrode; but should a warp-thread become too slack or break the drop device will fall, as indicated on the right of Fig. 4, and, contacting with both terminals i and i' of the electrode, establish an electrical connection between them, and thus complete the circuit to stop the loom.

The brackets $i^2 i^2$ and their connected electrodes are preferably removable from the warp-supporting frame, and each bracket is provided with side projections $o o$, which are adapted to rest upon and be supported by the warp-supporting bars a^5 , holes or suitable lifting means o' being provided in each end bracket i^2 , by which the brackets, electrodes, and drop devices may be readily lifted from the warp-supporting frame.

In order to properly brace the electrodes, which is desirable, especially when they are formed of light flexible material or when the loom is of considerable width, I preferably form the warp-supporting bars a^5 on each side of the warp-supporting frame with a space p between them, or, as is obvious, they might be a single bar with an elongated slot, and between the bars a^5 on each side of the frame I interpose a brace p' , consisting of a plate having slots $p^2 p^2$, adapted to receive the electrodes, as indicated in Figs. 3 and 5. The brace p' is preferably provided as a thin plate

having enlarged bosses $p^3 p^3$, adapted to travel in the slots p of the warp-supporting bars, and to the outside faces of said bosses p^3 are secured the enlarged bearing-plates $p^4 p^4$, secured thereto by set-screws $p^5 p^5$ or other suitable means. It will be noticed that the brace or plate p' preferably extends the full width of the space between the side or warp-supporting bars a^5 and also extends the substantial depth of said bars, as clearly shown in Fig. 5, and while this is the preferred construction it is obvious that it may be varied as to size and shape as desired, it being necessary only that the brace shall be provided with portions to engage and brace the electrodes.

By slacking the screws p^5 the brace p' may be adjusted to any position lengthwise of the warp-supporting bars, and by reason of the open-ended slots p^2 the electrodes and end brackets i^2 , carrying the same, may be readily lifted bodily from the warp-supporting frame without disturbing the brace p' or its adjustment.

From the construction described, which may be varied in its specific character without departing from the spirit of my invention, it will be seen that I provide a simple form of device in which the electrodes perform the function of guide-bars for the warp drop devices and in which also the electrodes are braced at any point intermediate their ends and yet may be readily and expeditiously removed from the warp-supporting frame, together with the connected drop devices, and while I have disclosed as the preferred embodiment of my invention a brace formed of an open-slotted plate it is to be understood that such brace may be varied in construction. It is also to be noted that the brace not only maintains the guides or electrodes in proper alinement, but also serves this purpose with respect to the warp-supporting bars, and while only one brace is shown any suitable number may be employed.

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

1. In a warp stop-motion for looms, a warp-supporting frame, drop devices supported by the normal warp-threads, guides to retain the drop devices from moving longitudinally with

the warp-threads and an adjustable brace intermediate the ends of the guides and connected to the frame and engaging said guides to preserve the same in proper alinement.

2. In a warp stop-motion for looms, drop devices, guide-bars for said drop devices, warp-supporting bars connected to the loom-frame and a brace intermediate the ends of and connected to the warp-supporting bars and engaging the guide-bars to maintain the parts in proper alinement.

3. The combination of warp-supporting bars, guides for drop devices adjacent said bars, and a brace interposed between said warp-supporting bars and having slots to receive the said guides.

4. The combination of warp-supporting bars, guides for drop devices adjacent said bars, and a brace interposed between said warp-supporting bars and having open-ended slots for the reception of the said guides, said braces being adjustable lengthwise of the bars.

5. The combination of a warp-supporting frame having warp-supporting bars, removable end brackets carried by said frame and having guides for the drop devices connected thereto, a brace interposed between the warp-supporting bars and having provisions for engagement with the said guides, and means for adjusting the braces lengthwise of the bars.

6. A brace for the bars and guides of a warp-stop-motion device consisting of a plate having open-ended slots and provided with means on each edge of the plate for securing it adjustably in position.

7. A warp-support, a series of drop devices, a guide for said drop devices, and a slotted brace engaging said guide between its ends.

8. A warp-support, a series of drop devices, a guide for said drop devices, and a slotted brace sustained by said warp-support and engaging said guide between its ends.

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

HORACE WYMAN.

Witnesses:

JUSTIN A. WARE,

SAMUEL B. SCHOFIELD.