

No. 689,478.

Patented Dec. 24, 1901.

C. H. FISH.
FEED GATE.

(Application filed June 14, 1900. Renewed Oct. 31, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1,

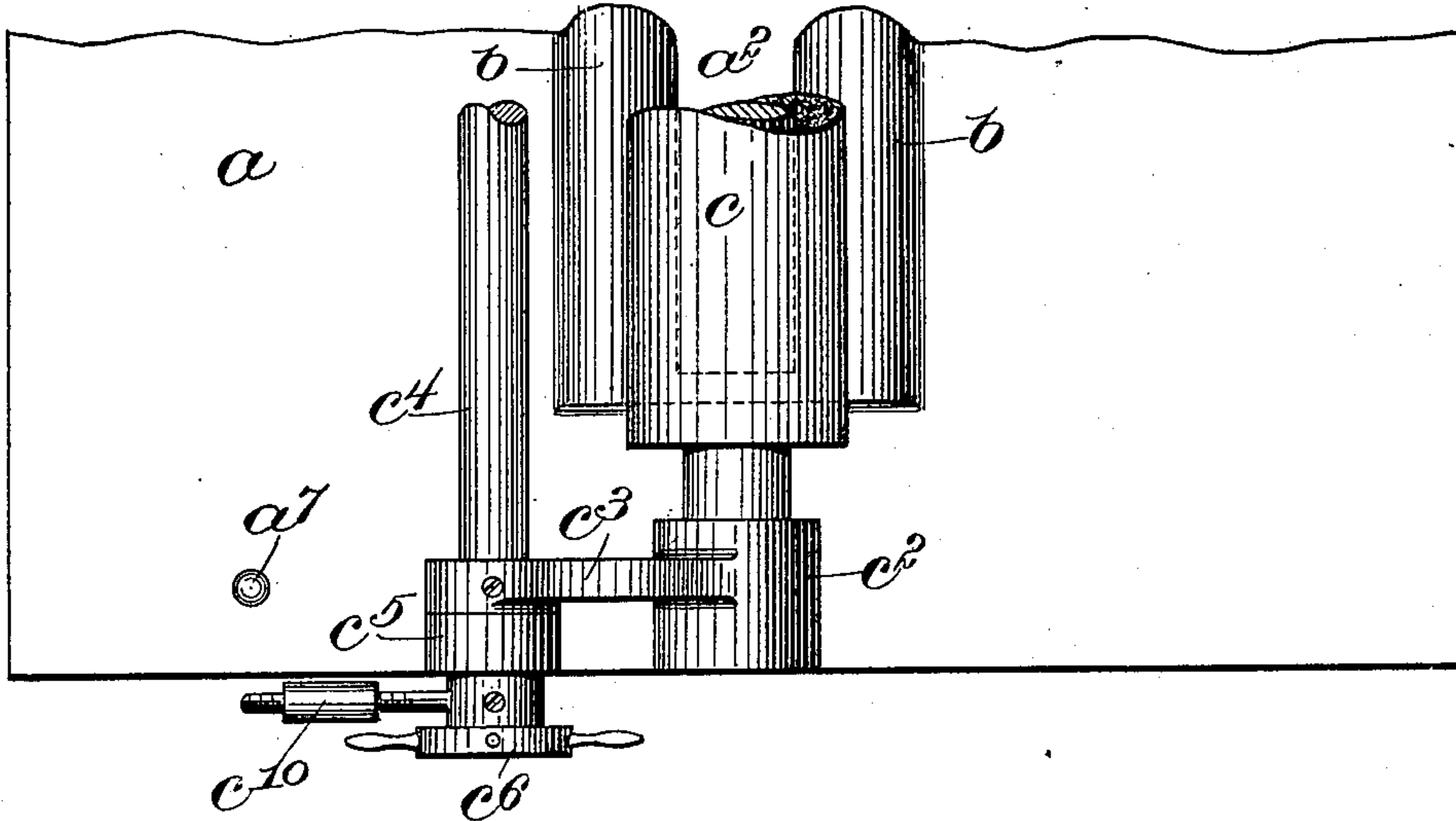


Fig. 2,

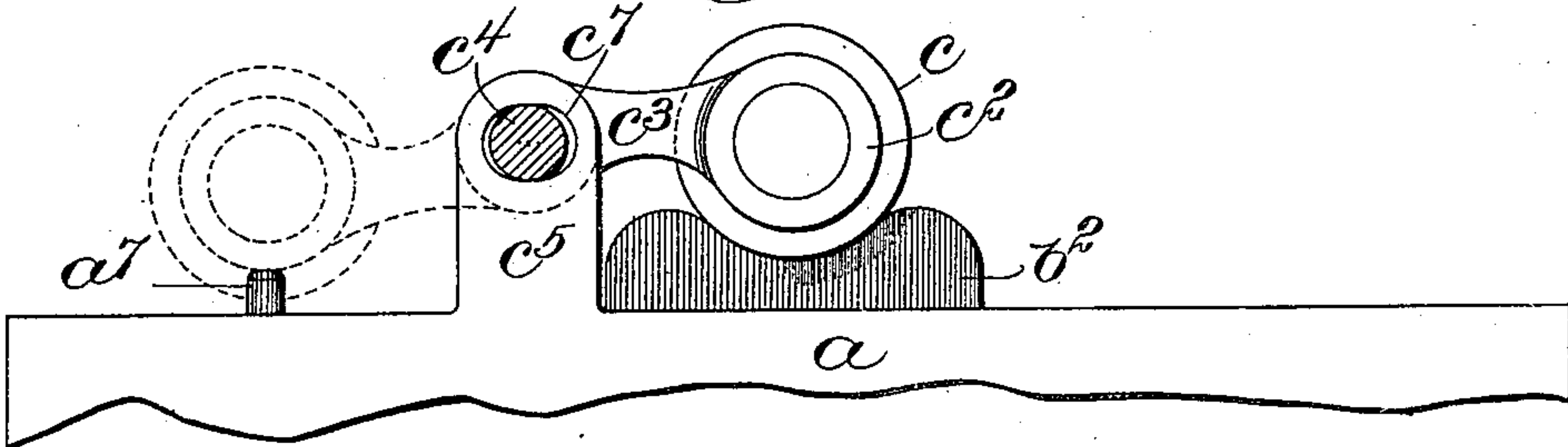
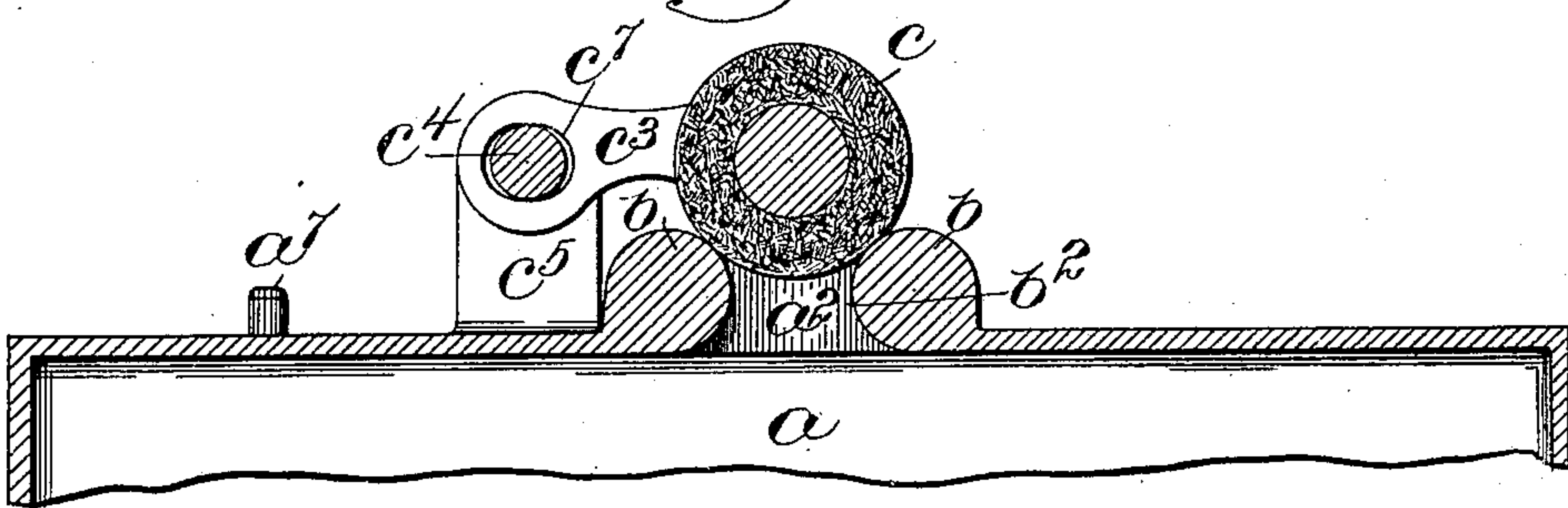


Fig. 3,



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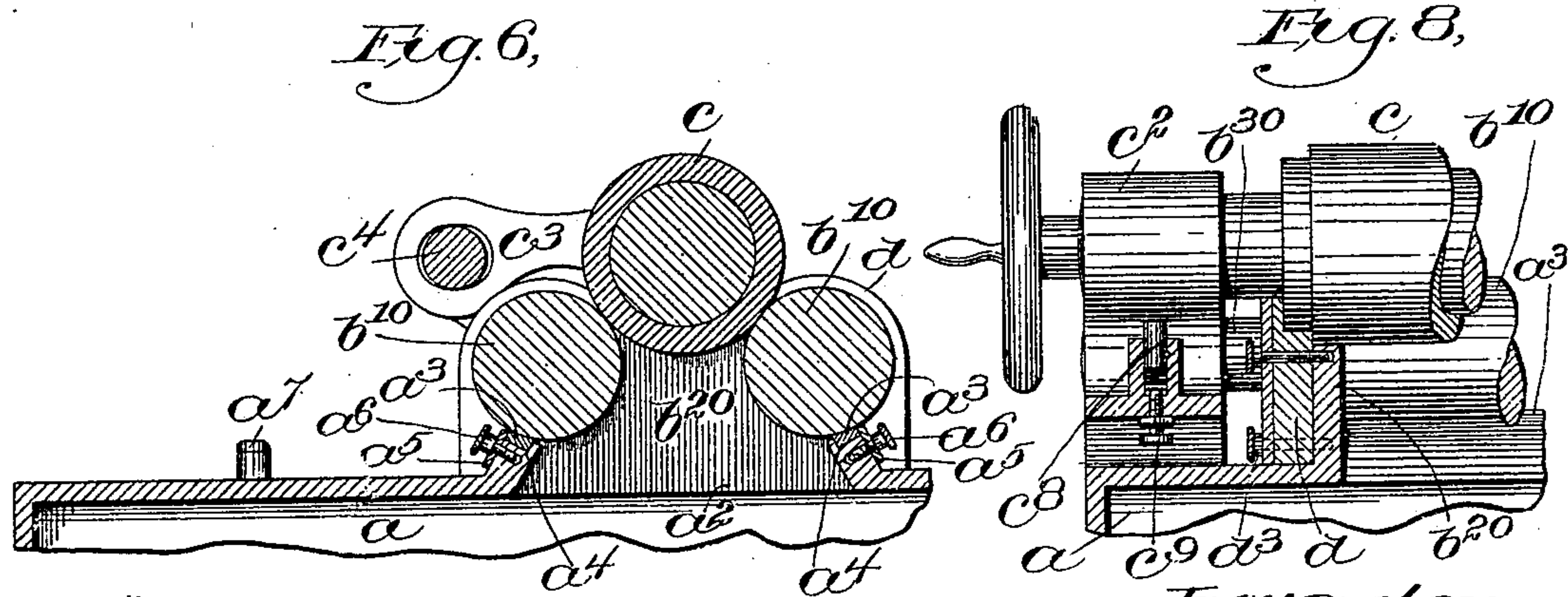
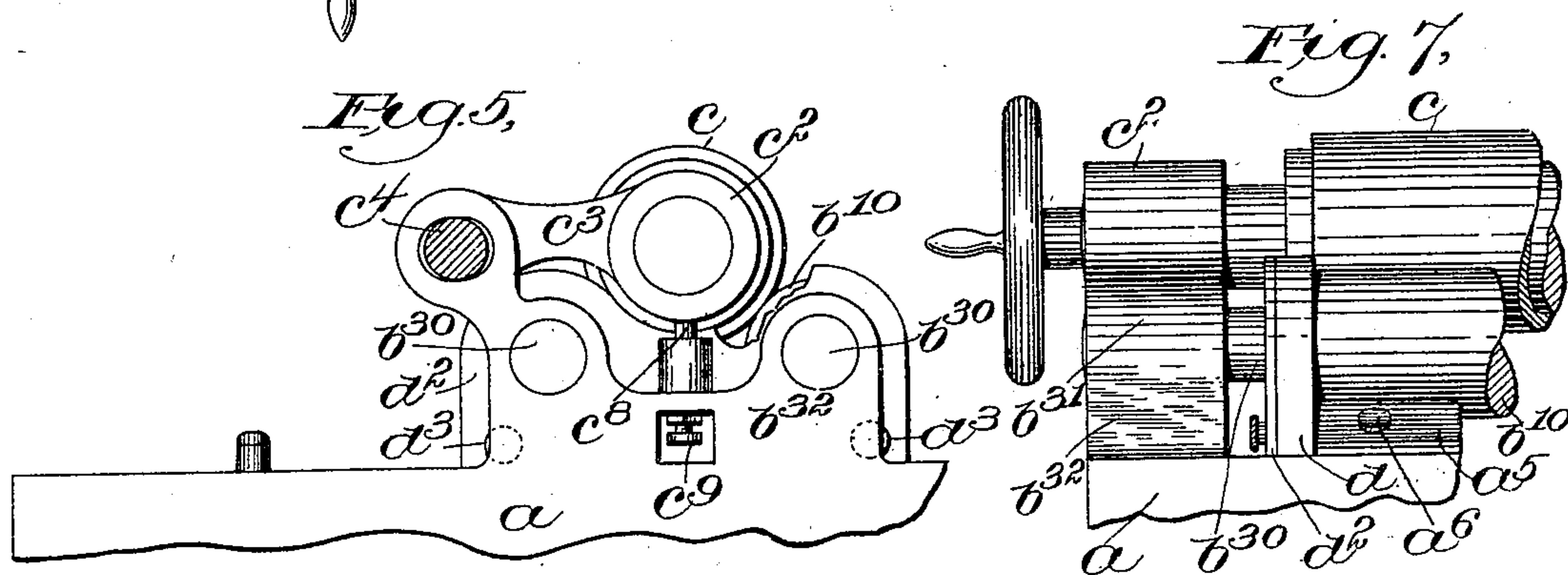
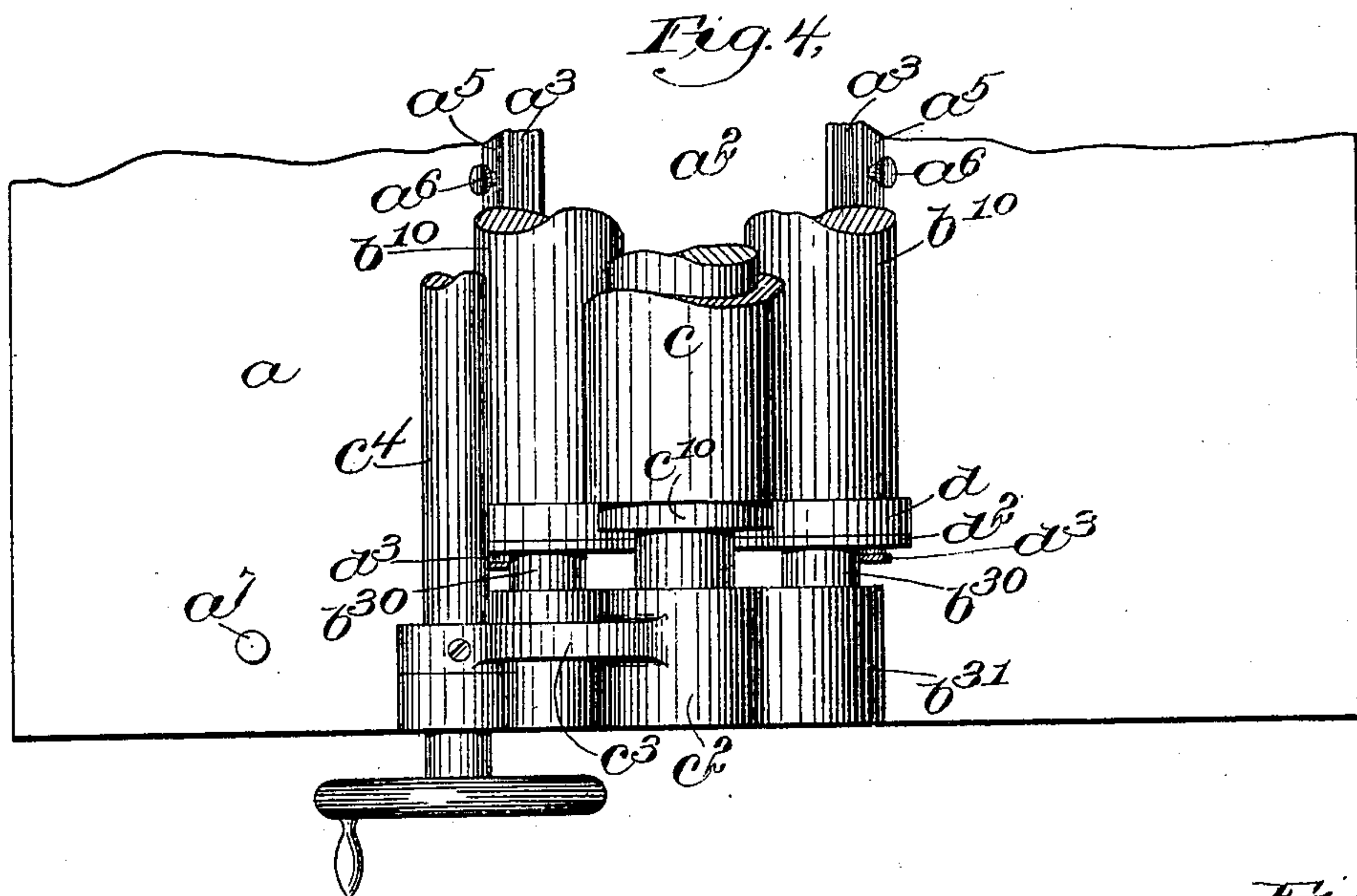
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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FEED-GATE.

SPECIFICATION forming part of Letters Patent No. 689,478, dated December 24, 1901.

Application filed June 14, 1900. Renewed October 31, 1901. Serial No. 80,681. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. FISH, of Dover, county of Strafford, and State of New Hampshire, have invented an Improvement in Feed-Gates, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The present invention relates to a feed-gate for a chamber where there is inequality between the pressure outside and the pressure inside, the invention being mainly intended for use in an apparatus for drying material in web form in a vacuum-chamber by causing the said web of material to travel into, through, and out of the said chamber. The invention, however, may obviously be used to advantage in apparatus in which the excess of pressure is within the chamber instead of outside of the chamber, the object of the invention being to provide means for drawing the web of material into and out of the chamber without any substantial leakage at the opening through which the said web is drawn. It is desirable that the travel of the web should not be impeded, and in accordance with the invention the feed-controlling device comprises closing members, between the surfaces of which the web travels, the said surfaces being of such a nature as to lie in close contact with the web, but without offering any great frictional resistance, one of the objects of the invention being so to arrange the said controlling device that it can effectually be packed to prevent leakage and can also readily be opened for inspection and cleaning or for the initial introduction of the web.

A further object of the invention is so to arrange the parts that they will be self-adjusting, whereby the surfaces between which the web travels will remain in close contact with the web between them under all conditions and also to arrange the said surfaces so that the pressure will tend to force them together instead of separating them, thereby aiding in preventing leakage.

The invention is herein shown as applied to a vacuum-drier which consists of a chamber provided with heating devices and means for partially exhausting the air therefrom, these parts of the apparatus not being herein shown, since they form no part of the inven-

tion. The controlling devices are accordingly shown as arranged especially for use with an apparatus in which the excess of pressure is outside of the chamber, it being understood, however, that substantially the same controlling devices might be used, for example, with a steaming-chamber or other appliances in which the excess of pressure is within, in which instance a reversal of some of the parts might be desirable, though not essential.

In carrying out the invention the opening in the chamber is provided along its sides with a pair of suitably-shaped surfaces, preferably cylindrical, which surfaces may be formed on rotating cylinders or may be stationary. To seal the opening and at the same time to assist the travel of the web into and out of the chamber, the space between the said surfaces is closed by a cylindrical roller member larger in diameter than the space between the said surfaces, so as to rest against the same, the said roller member being herein shown as outside of the chamber. To readily gain access to the opening in order to clean the surfaces between which the web normally travels or to start the machine, the said roller member is mounted upon a movable frame so arranged as to be easily operated to lift the roller, the bearings for said frame being shown as provided with lateral arms connected with a rotatable shaft, so that by rotating the said shaft the said bearings are lifted and may be carried back out of the way, thus leaving all the surfaces accessible for cleaning. To permit the said roller to properly center itself when in working position, it is arranged to be laterally movable with relation to its support, the operating-shaft whereby it is lifted being shown as provided with an elongated bearing which permits the whole frame to move laterally until the cylindrical member lies in snug contact with the other surfaces.

Figure 1 is a partial plan view of an apparatus embodying the invention; Fig. 2, an end elevation of the same; Fig. 3, a transverse vertical section; Fig. 4, a plan view similar to Fig. 1, showing a modification; Fig. 5, an end elevation, partly in section, of the same; Fig. 6, a transverse section; Fig. 7, a partial side elevation; and Fig. 8, a longitudinal vertical section, partly in elevation.

The chamber a is provided in accordance with the invention with an opening a^2 , which is arranged to constitute both the ingress and egress passage for the web, the said web passing in at one side of the said opening and out at the other side thereof. The said opening is provided at the opposite sides with members b , which constitute bearing-surfaces for the said web, and, as indicated in Figs. 1, 2, and 3, the said surfaces are stationary and may advantageously be formed integral with the walls of the chamber a , being suitably shaped to permit the web to travel over them easily—that is, without undue friction. The opening is closed by a rotatable member c , which lies against the said surfaces, the diameter of said rotatable member being greater than the distance between the said surfaces, so that the said member will lie snugly against the said surfaces and effectually close the opening. The said rotatable member may be power-driven, if desired, to assist in the travel of the web, or it may be simply mounted in bearings, so as to rotate in response to the movement of the web. The web travels into the chamber along the surface of one of the members b and out of the chamber in the opposite direction along the surface of the other member, so that the rotation of the member c will cause its surface to travel past the members b , respectively, in the direction of travel of the web. To render the several surfaces readily accessible for cleansing purposes, (as is desirable, since the said surfaces become covered with lint, &c., when cloth or like material is being dried,) the member c is mounted so as to be readily removable from the members b , the said member c being herein shown as supported in bearings c^2 , suitably connected with a frame which is so arranged that by moving the said frame the member c may be carried away from the members b . As herein shown, the said frame comprises arms c^3 , which are connected with a rock-shaft c^4 , having suitable bearings in lugs c^5 , supported by the body of the machine, the said rock-shaft being provided with a hand-wheel or similar actuating device c^6 , whereby it may be rocked or rotated, so as to carry the member c from the position shown in full lines, Fig. 2, to the position shown in dotted lines therein. In this construction the weight of the member c causes the said member to lie snugly against the surfaces of the members b , and by providing the said member with a yielding surface portion of suitable material, such as felt or rubber, as indicated in the drawings, a substantially air-tight fit is obtained, so as to prevent leakage into or out of the chamber when the apparatus is in operation. In the case of a vacuum drying apparatus, moreover, the excess of pressure is at the outside, the tendency therefore being to press the member c firmly against the members b . In order that the said member c may find its proper middle position in contact with both of the members b , the said member c is

arranged to be laterally movable, and, as herein shown, the rock-shaft c^4 , which carries the supporting-frame for the said member, is provided with elongated bearings c^7 in the lugs c^5 , so that the said member c , or “roller,” as it will be hereinafter termed, is free to move in either direction until it finds its proper middle position with relation to the members b .

In the construction thus far described it is obvious that no packing devices are necessary, the wall of the chamber a at the ends of the members b being extended upward, as shown at b^2 , Fig. 2, and shaped to conform to the surface of the cylindrical member c , which projects beyond the ends of the opening a^2 , as indicated in Fig. 1, so that it prevents leakage at the ends as well as along the sides of the said opening.

While the construction above described possesses certain advantages, it may be desirable in some cases to arrange the feed-controlling device so that both of the adjacent surfaces between which the web is drawn will travel in the direction of movement of the said web. As indicated in Figs. 4, 5, and 6, the members b^{10} , which are the equivalent of the members b , already described, may be arranged to rotate, the said members being shown as consisting of rollers provided with journals b^{30} , having bearings in journal-boxes b^{31} , which are supported upon the top of the chamber a . As herein shown, the said journal-boxes are formed in a lug or projection b^{32} , and between the said lug or projection and the ends of the rollers the wall of the chamber is provided with an upward extension b^{20} , so shaped as substantially to occupy the space between the members b^{10} and the member c . To prevent leakage, the rollers b^{10} are provided with suitable packing devices, the wall of the chamber a being shown as extended upward at each side of the opening a^2 and provided with packing-strips a^3 , lying in channels a^4 , the said strips being held in position by means of plates a^5 , secured, as by screws a^6 , to the wall of the chamber. The channels a^4 are adapted to be closed in by the plates a^5 , so that the said plates when drawn snugly into position will press the packing firmly against the surfaces of the rollers b^{10} . To pack the ends of the rollers, a suitably-shaped piece of packing material d is shown as pressed into contact with the ends of all of the rolls and with the surface of the upward projection b^{20} by means of a plate d^2 , which is held in position by means of screws d^3 , which may be secured to that part of the wall of the chamber a which projects upward adjacent to the side of the opening a^2 . The end of the member c in this construction is shown as turned to a smaller diameter at c^{10} , and the packing is recessed or cut away to receive the part c^{10} , so that a portion of said packing will overlies the end of the said roll which is adjacent to the rolls b^{10} and to the upward projection b^{20} .

By this construction the opening is securely packed at the ends, while the member *c* is free to be lifted from the opening, as in the construction already described.

5 It may be found in some cases that the weight of the roller or the atmospheric pressure or both are excessive, so as to afford too much resistance to the travel of the web, and in this case the apparatus may advantageously be provided, as shown, with means for counterbalancing a portion of the weight of the roller—as, for example, by means of a spring-support *c*⁸ for the journal-boxes *c*².
 10 The said support may be provided with means, such as a set-screw *c*⁹, for adjusting the tension of the spring, so that the parts may be arranged to the best advantage with regard to the travel of the web and the sealing of the chamber. The same result may be accomplished by providing the shaft *c*⁴ with an adjustable counterbalancing-weight *c*¹⁰, as indicated in Fig. 1.

To support the weight of the member *c* when thrown back to uncover the opening *a*², the chamber may be provided with upwardly-projecting bumpers *a*⁷ to underlie the ends of the roller or the journals therefor, so that the packing material upon the surface of the main portion of the roller will not be injured
 25 by contact with the casing.

I claim—

1. A feed-gate for a pressure-chamber comprising stationary members extending along the opening in said chamber; and a cylindrical member or roller larger in diameter than the space between said stationary members and supported thereon, substantially as described.

2. A feed-gate for a pressure-chamber comprising stationary members extending along the opening in the said chamber; a cylindrical member or roller larger in diameter than the space between said stationary members, said roller lying in contact with the stationary members at the side thereof where the pressure is in excess; and means for permitting a lateral movement of said roller to permit the same to seek a middle position

with relation to the stationary members, substantially as described.

3. A feed-gate for a pressure-chamber comprising a pair of members extending along the opening to the said chamber; a roller larger in diameter than the distance between the said members, said roller being at the outside of the chamber and lying in contact with said members; and a frame connected with said roller whereby the said roller may be lifted from the said members to expose the opening, as set forth.

4. The combination with the feed members extending along the sides of the opening, of a roller larger in diameter than the distance between said members, said roller having its surface covered with yielding material such as felt or rubber; journals for said roller connected with an oscillating frame; a shaft connected with said frame and provided with an actuating device; and elongated bearings for said shaft whereby the said roller is free to center itself with relation to the other members, as set forth.

5. A feed-gate for a pressure-chamber comprising members extending along the opening to said chamber; and a roller or cylindrical member larger than the space between said members and lying in contact therewith.

6. A feed-gate for a pressure-chamber comprising a pair of members extending along the opening to said chamber; a roller or cylindrical member larger in diameter than the distance between the said members, the said roller lying in contact with the said members at the side thereof where the pressure is in excess; and means for permitting a lateral movement of said roller to permit the same to seek a middle position with relation to the said members.

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

CHARLES H. FISH.

Witnesses:

SARA C. HAMILTON,
 MARTHA E. VICKERY.