

No. 610,630.

Patented Sept. 13, 1898.

H. E. MILLER.

DIE FOR MAKING FRAMES FROM SHEETS OF CELLULOID, &c.

(Application filed Mar. 9, 1898.)

(No Model.)

3 Sheets—Sheet 2.

Fig. 11.

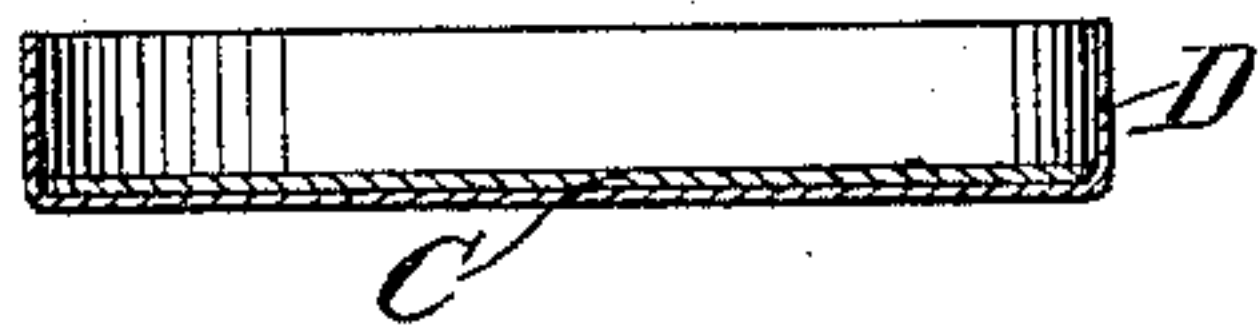


Fig. 12.

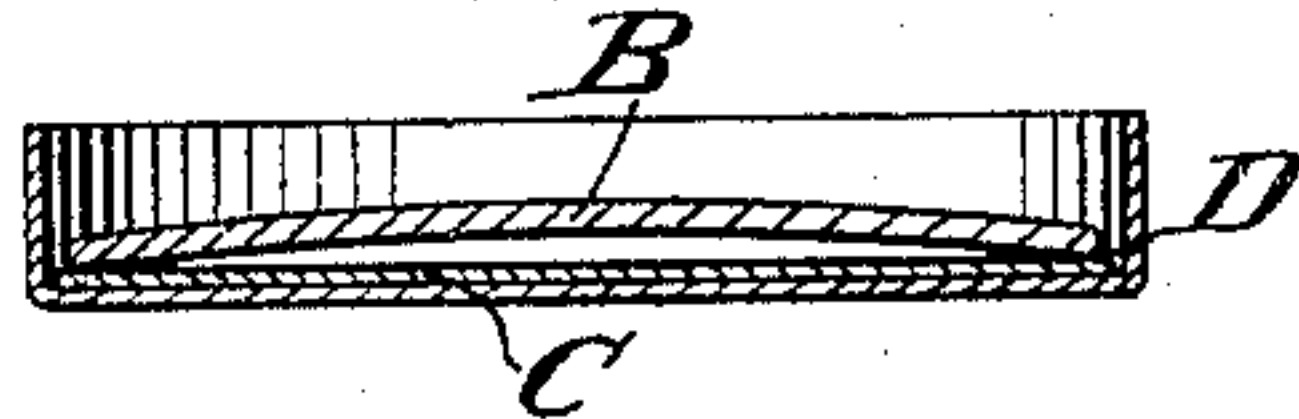


Fig. 13.

Fig. 14.

Fig. 15.

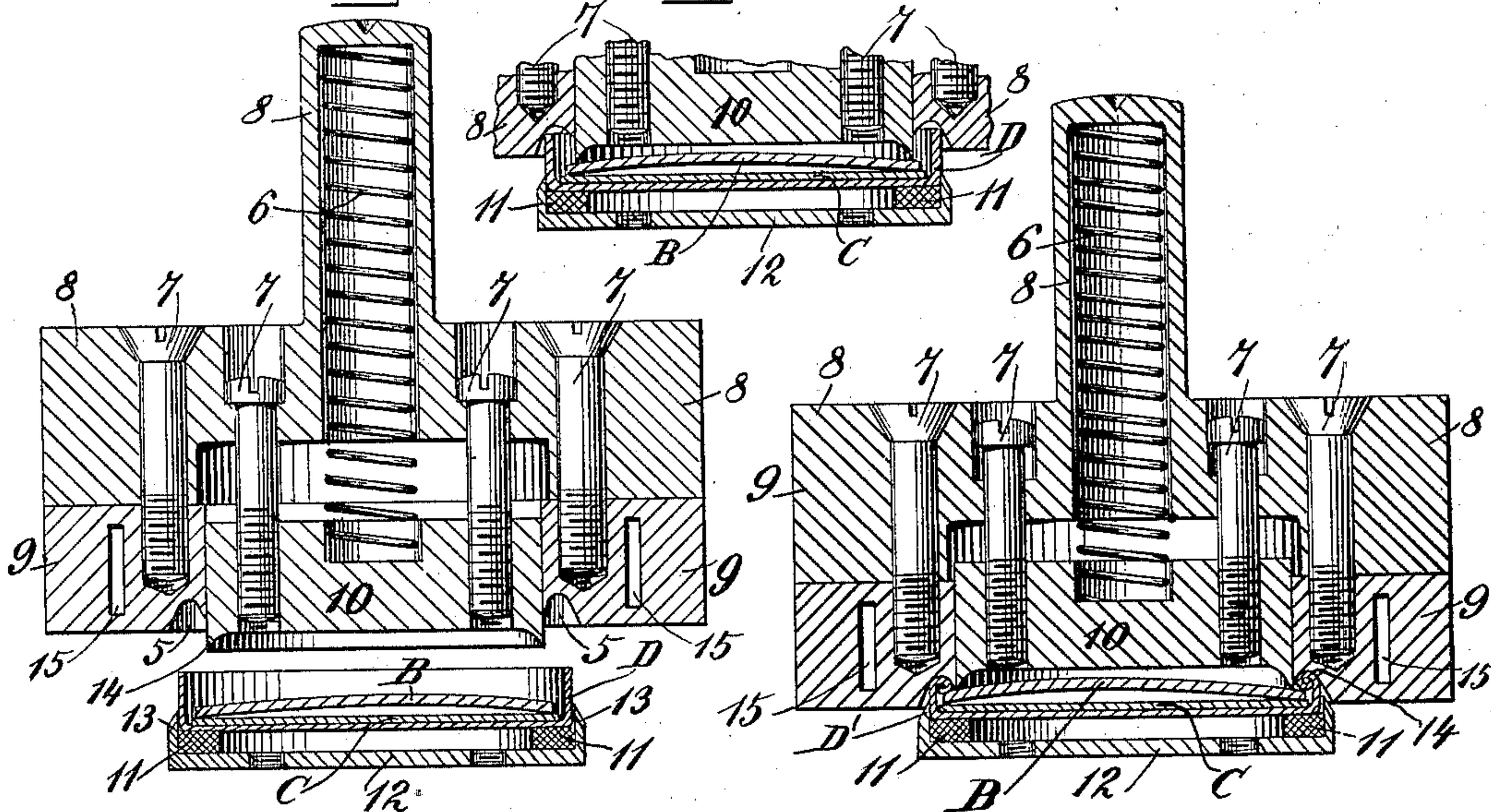


Fig. 16.

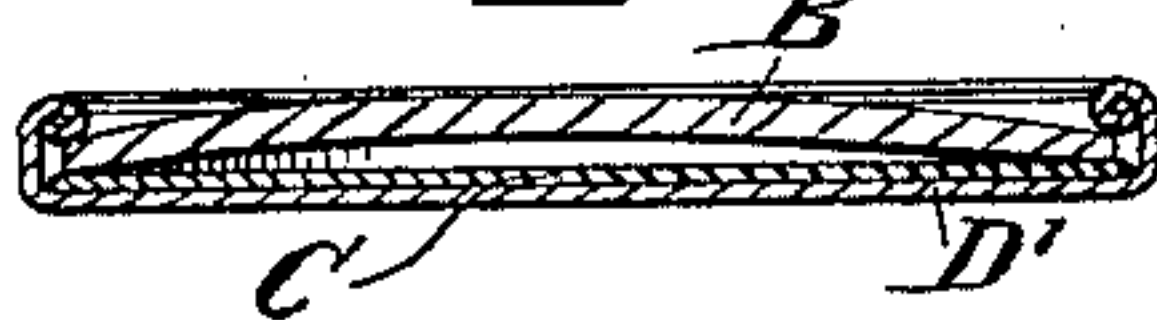
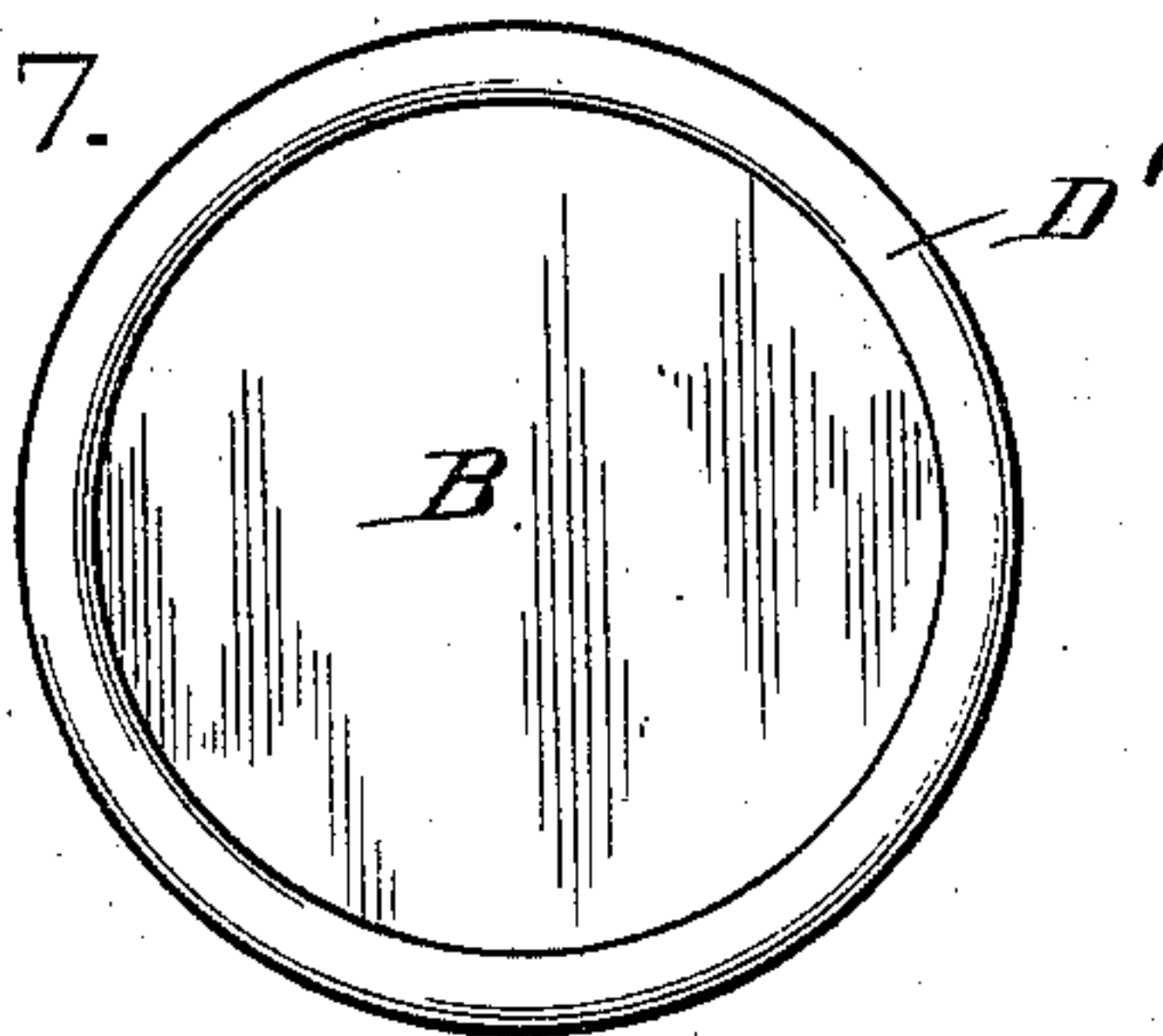


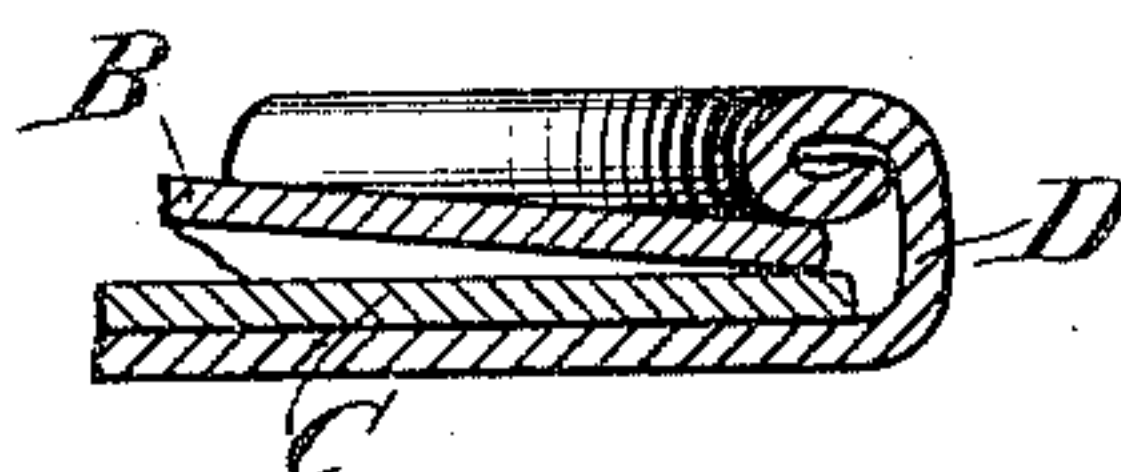
Fig. 17.



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Fig. 18.



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3 Sheets—Sheet 3.

Fig. 19.

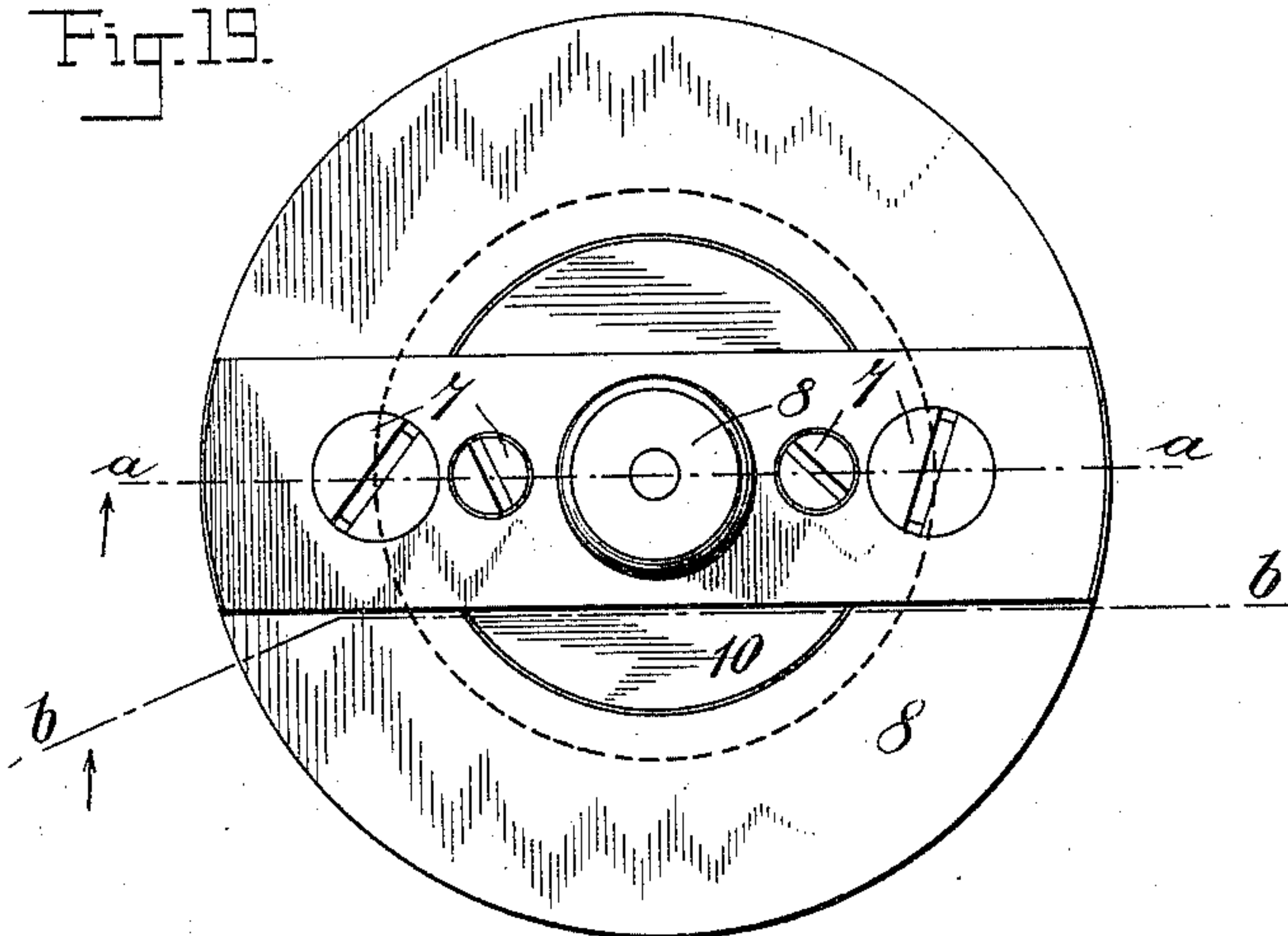


Fig. 20.

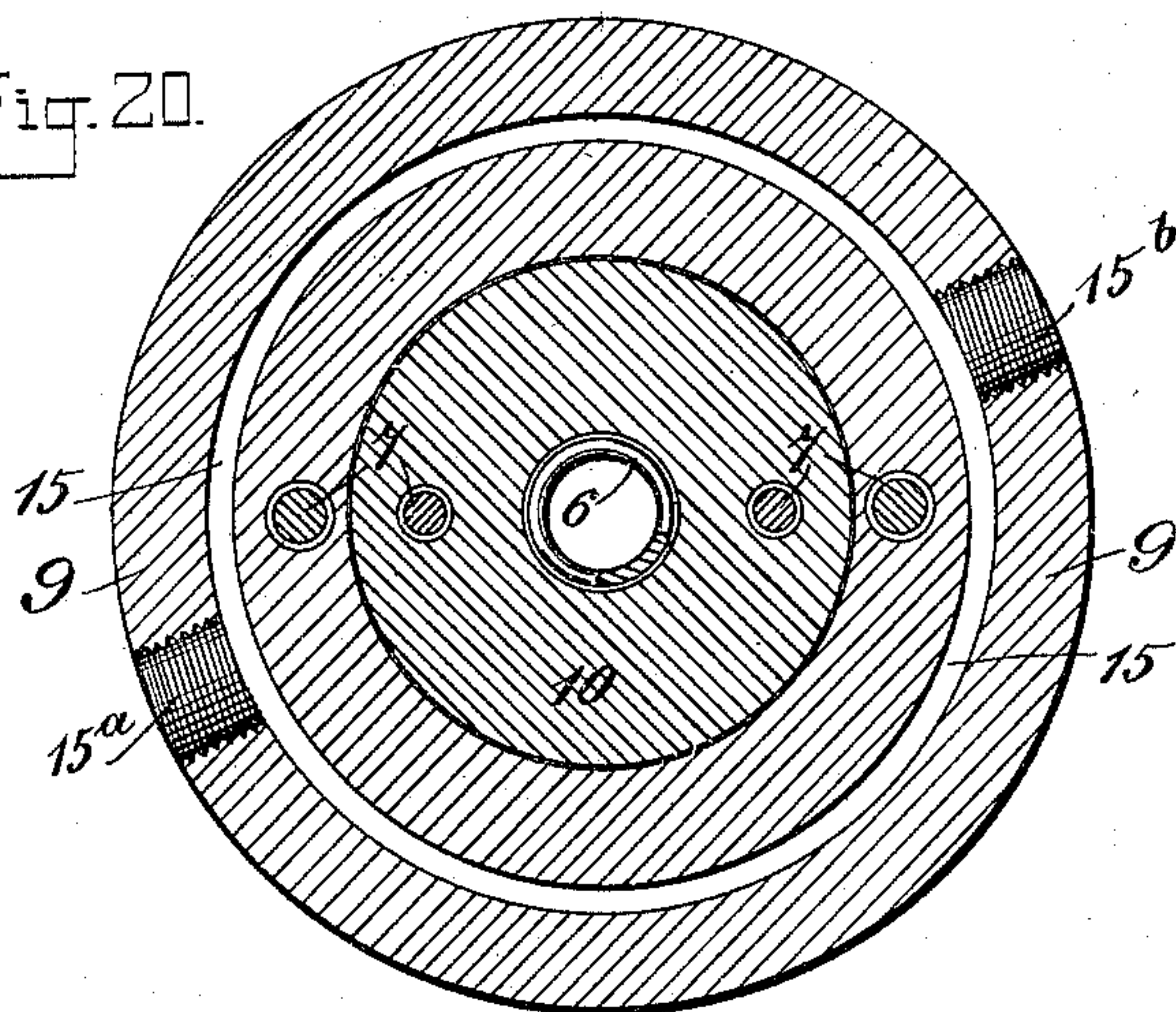
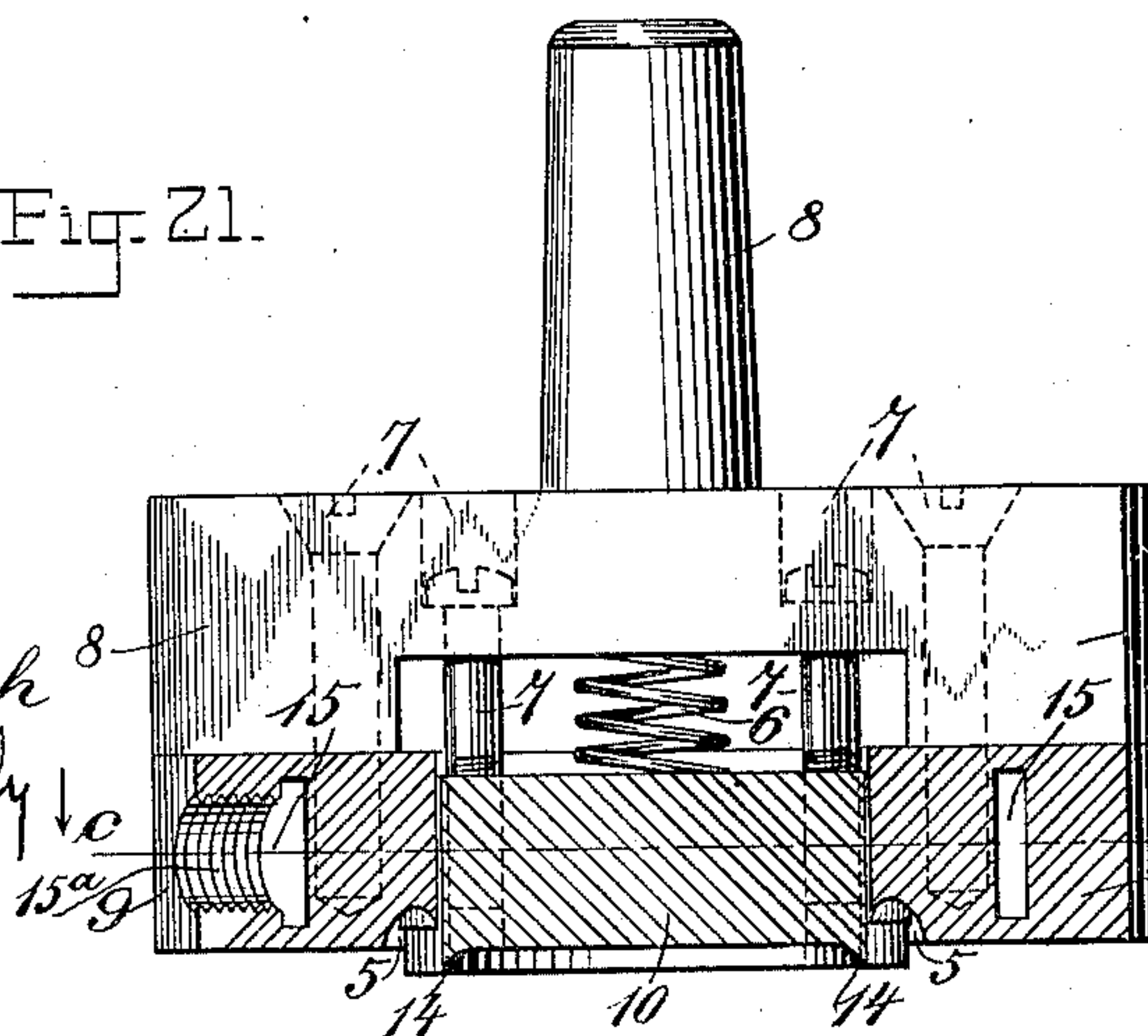


Fig. 21.



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UNITED STATES PATENT OFFICE.

HORACE E. MILLER, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE CELLULOID COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

DIE FOR MAKING FRAMES FROM SHEETS OF CELLULOID, &c.

SPECIFICATION forming part of Letters Patent No. 610,630, dated September 13, 1898.

Application filed March 9, 1898. Serial No. 673,202. (No model.)

To all whom it may concern:

Be it known that I, HORACE E. MILLER, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, having invented certain new and useful Improvements in Dies for Making Frames from Sheets of Celluloid or Similar Material for Mirrors, Medallions, Badges, &c., of which the following is a specification, reference being had to the accompanying drawings for purposes of illustration.

The object of my invention is to provide a continuous backing and frame of "celluloid" or similar material which shall retain the mirror, medallion, &c., within itself by means of the upturned edge of the backing, which edge is turned over and under interiorly upon itself, so as to constitute a strong, durable, tubularly-shaped frame which secures the mirror, medallion, or other inclosed article to the backing, so that the same is securely held to the back without liability of dislodgment.

I am aware that it is not new to make a combined back and frame for mirrors from sheets of celluloid or similar material; but so far as I am aware all of such articles heretofore made from a thin sheet have been open to the objection that they do not firmly secure the inclosed article within the frame, for the reason that the upturned edge of the backing was not turned over and under upon itself, so that it did not have the requisite strength and finish, but showed the raw edge without having the proper resiliency. This form of construction has very serious objections, inasmuch as it is deficient in strength, in security, and in not giving a neat finish to the product. My invention is designed to obviate these defects.

The method of using the die which I have invented is as follows: First, I take a blank or thin sheet of celluloid or similar composition and by means of heated dies press it into the shape of a box with perpendicular sides; second, I place the mirror or other article to be framed within this box with the side to be exposed uppermost; third, I place the box and its contents upon the base-plate, prefer-

ably placing a rubber cushion under the box, although other elastic cushions may be used, such as a coiled spring; fourth, I place upon the exposed surface of the mirror or tablet to be framed a block of metal or other material conformed to the shape of the article and which is nearly the same size, but not quite, as the interior diameter of the celluloid box, this block of metal being held preferably against the face of the mirror by spring-pressure or by a weight, so as to speed the operation; fifth, while the box and its contents are held in this position between the lower base-plate and the spring-pressed upper block resting upon the face of the mirror I next subject the projecting edges of the celluloid box to the pressure of the forming-die, (one form of which is shown in the drawings annexed hereto,) at the same time subjecting the edges of the box to a degree of heat sufficient to make it plastic under pressure, and then by causing the forming-die to descend I cause the edge of the box to follow the outline of the groove in the forming-die as it descends, and thereby turn the edge of the box over and under and in upon itself, substantially as illustrated in the drawings, the edge being compelled to follow the interior groove and to turn over and under upon itself, because the sides of the spring-pressed block rest upon the mirror, thus preventing the curvature of the material in any other direction than outward toward the sides of the box or frame, the upright edges being sufficiently high to secure this result.

Referring to the drawings, in which similar letters and numbers of reference refer to similar parts throughout the several views, Figure 1 represents a blank of celluloid or similar material before being molded into shape. Fig. 2 represents a side view of the same blank. Fig. 3 represents a sectional view of the male die in position to stamp or press the celluloid blank into its box-like form. Fig. 4 represents a sectional view of the two parts of the die after the male die has entered the female die and pressed the celluloid blank into its preliminary box shape and cut off the projecting edge. Fig. 5 is a

sectional view of the celluloid blank after it has been molded by the dies into its first form. Fig. 6 is a plan of the view represented in Fig. 5. Figs. 7 and 8 represent, respectively, a plan view and a side view of a thin sheet of paper which I preferably place in the bottom of the blank shown in Fig. 5 before placing the mirror or medallion therein, the object being to prevent the dark color of the bottom of the mirror or medallion showing through the thin sheet of celluloid constituting the back and frame of the article. Figs. 9 and 10 are a plan view and a side view of the mirror to be placed in the blank shown in Fig. 5. Fig. 11 represents the blank shown in Fig. 5 with the paper shown in Fig. 7 placed in the bottom thereof, and Fig. 12 is a view of the blank shown in Fig. 5 containing the paper and the mirror within it, the mirror being shown as a convex mirror for the purpose of decreasing the apparent size of the object reflected, so as to enable a complete reflection of the object in a small mirror. Fig. 13 is a sectional view of the celluloid blank containing the paper backing and the mirror resting upon the base-plate and rubber cushion and ready to be submitted to the operation of the dies which give the turned-over edge of the blank and also a sectional perpendicular view of the forming-die on the line *a a* of Fig. 19. Fig. 14 is a perpendicular sectional view of the forming-die after the spring-pressed block has descended so as to be in contact with the mirror or medallion and after the forming-die has descended into a position to be ready to begin the turning over of the perpendicular edge of the celluloid blank upon itself to form the frame of the inclosed mirror or medallion. Fig. 15 is a perpendicular sectional view on the line *a a* of Fig. 19 of the spring-pressed block, the forming-die, the base-plate with its rubber cushion, and the celluloid blank after the forming-die has performed its office of turning over and under interiorly upon itself the surrounding edge of the celluloid blank so as to form a frame for the inclosed article. Fig. 16 exhibits a sectional view of the finished article, and Fig. 17 shows a plan view of the completed article. Fig. 18 is an enlarged sectional view of a portion of the frame with its turned-over edge inclosing the paper backing and the mirror. Fig. 19 is a top plan view of the forming-die and its head by which it is secured in the machine. Fig. 20 is a plan sectional view of the forming-die on the line *c c* of Fig. 21. Fig. 21 is a part elevation and a part perpendicular sectional view on the line *a b* of Fig. 19 of the forming-die.

Referring to the several figures, A shows a flat blank of celluloid or similar material, which is illustrated as circular in this case.

B is a mirror or medallion or other article to be inclosed within the back and frame constituted by the celluloid blank.

C represents the disk of paper, which I preferably insert underneath the mirror or medallion to prevent its color appearing through the thin sheet of celluloid which constitutes the back and frame, and, when desired, I print an advertisement on this paper.

D represents the celluloid blank after it has been stamped or molded into shape to receive the article to be inclosed and framed therein.

D', Figs. 15, 16, and 17, represents the celluloid blank after the edge thereof has been turned over and under interiorly upon itself to constitute the frame of the article inclosed.

Referring to the machine illustrated, 1 is the metal die for molding the celluloid blank within the female die 2 during the first operation of the machine. 3 3 is the cutting edge upon this metal die for cutting off the edge of the celluloid blank.

16 is an air-hole for the escape of air during the operation of molding, and it communicates with a hole 17 in the metal die, the object of the latter being also for the insertion of a tool to hold the die in position during its being secured to the movable part of the machine by which it is operated.

20 is a screw-threaded recess within the metal die 1 for the reception of and securing to of the screw-threaded bolt upon the actuating part of the machine.

4 represents an annular ring upon the upper portion of the interior of the female die 2, the object of forming the female die in this way being to enlarge the female die below the annular ring 4, thereby decreasing the frictional contact between the celluloid blank and the interior surface of the female die 2, thus avoiding strain upon the celluloid blank in being pressed into shape.

5, Fig. 13, represents the annular groove in the bottom of the forming-die, which is connected to the head 8 by the screws 7. This groove 5 is the groove which turns over and under the projecting edge of the celluloid blank when the forming-die descends upon it, as shown in Figs. 14 and 15.

6 is a coiled spring contained within the forming-die 8 9 and serving to give a spring-pressure to the block 10. It will be noticed that the spring-pressed block 10 has perpendicular sides at its exterior periphery, which are maintained in contact with the mirror during the operation, thus preventing the outer edges of the celluloid blank D, Figs. 13, 14, and 15, from spreading out toward the center of the mirror or other inclosed object when the annular ring 5 in the forming die 9 descends.

11 is a sectional view of the rubber or elastic ring upon which the blank D rests during the operation of turning over the edge thereof, and 12 represents the base-plate in which this rubber ring rests.

13 13, Fig. 13, shows the chamfered edge of the base-plate 12, which is thus formed to en-

able it to make a close entrance into the annular groove 5 of the forming-die 9.

14, Figs. 13 and 15, shows the block 10, which is dished in the center to prevent the heated surface from coming in contact with the article to be framed.

The dies shown in Figs. 3 and 4 and in Figs. 13, 14, and 15 should be heated during their operation to a degree of heat sufficient only to make the material ductile.

A convenient method of heating the forming-die is illustrated in the drawings.

Referring to Figs. 13, 15, 20, and 21, 15 represents an annular steam-chamber in the forming-die 9, this chamber being provided with the inlet and outlet ports 15^a and 15^b; but I do not limit myself to any particular means of applying the heat during the operation of the dies.

I have not deemed it necessary to illustrate or describe the mechanism used for operating the dies, as it forms no essential part of my invention, and it may be of any suitable construction to operate the parts in the manner described. I have illustrated the celluloid blank of which the frame is formed as circular in shape; but it may be elliptical, a rectangle with rounded corners, ovoid, or of any other suitable form.

What I claim is—

1. A die for articles made of "celluloid" or similar plastic material having a curved rim; said die consisting of the combination of a base-plate for supporting the article, a movable block of a smaller diameter than that of the article, and a forming-die having a groove in the bottom thereof adapted to turn over and under upon itself the upright edge of the

article, and means for operating the same, substantially as described.

2. A die for articles made of "celluloid" or similar plastic material having a curved rim; consisting of the combination of a base-plate containing an elastic cushion for supporting the article, a movable block of a smaller diameter than that of the article, and a forming-die having a groove in the bottom thereof adapted to turn over and under upon itself the upright edge of the article, and means for operating the same, substantially as described.

3. A die for articles made of "celluloid" or similar plastic material having a curved rim; said die consisting of the combination of a base-plate for supporting the article, a movable spring-pressed block of a smaller diameter than that of the article, and a forming-die having a groove in the bottom thereof adapted to turn over and under upon itself the upright edge of the article, and means for operating the same, substantially as described.

4. A die for articles made of "celluloid" or similar plastic material having a curved rim; said die consisting of the combination of a base-plate containing an elastic cushion for supporting the article, a movable spring-pressed block of a smaller diameter than that of the article, and a forming-die having a groove in the bottom thereof adapted to turn over and under upon itself the upright edge of the article, and means for operating the same, substantially as described.

HORACE E. MILLER.

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