No. 766,879. PATENTED AUG. 9, 1904.

J. P. & J. FRUGOLI & H. FORNACI.

HAT DIES.

APPLICATION FILED AUG. 31, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

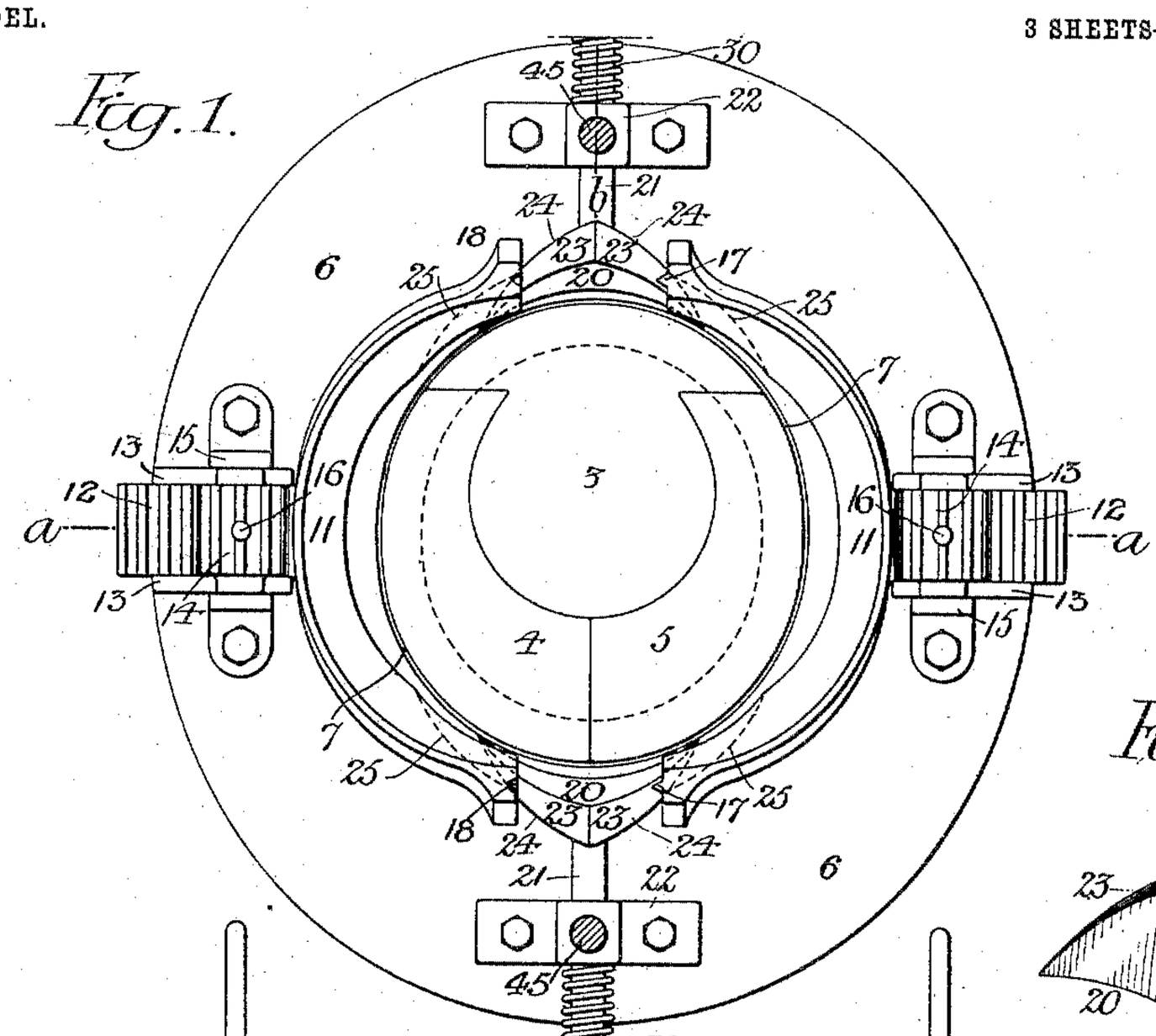


Fig. 5.

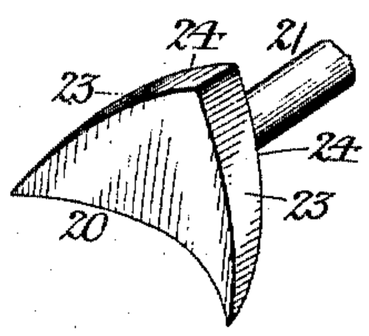
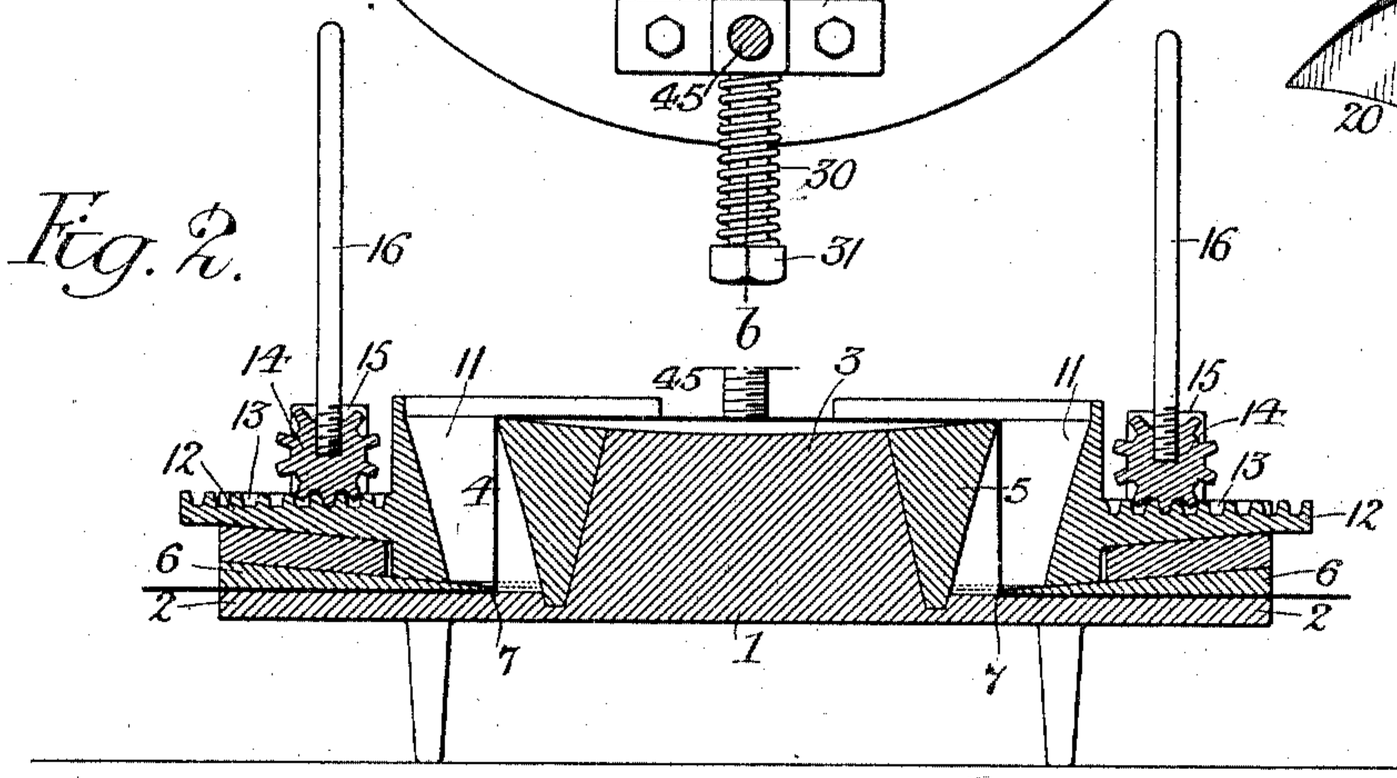


Fig. 2.



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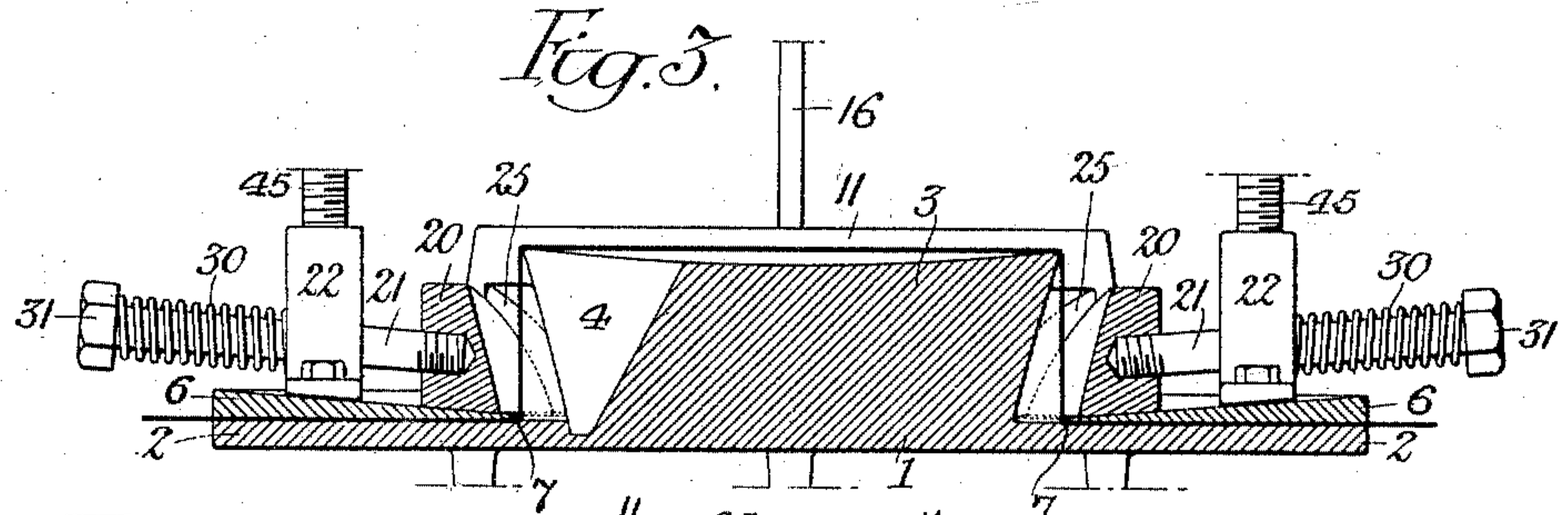

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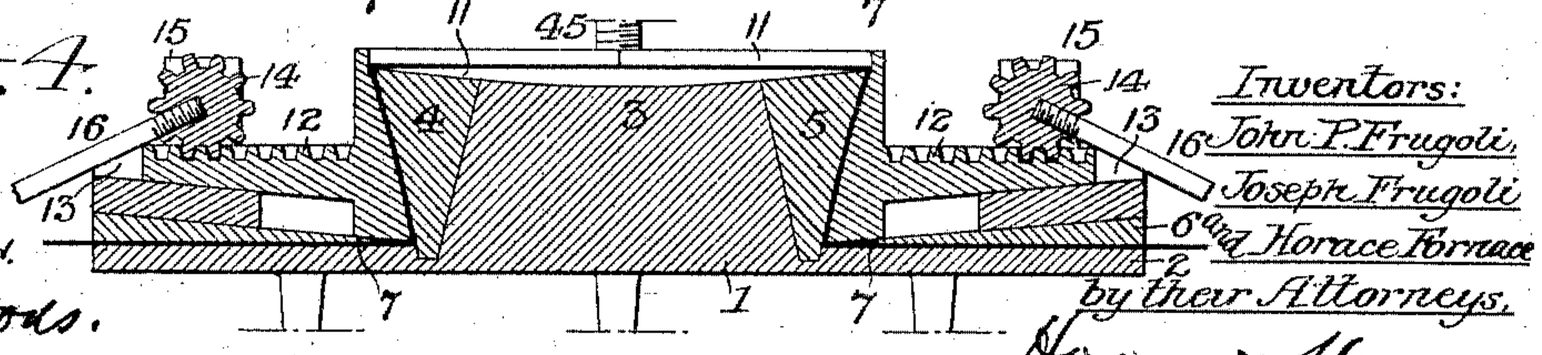

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NO MODEL. 3 SHEETS—SHEET 2.

Fig. 6.

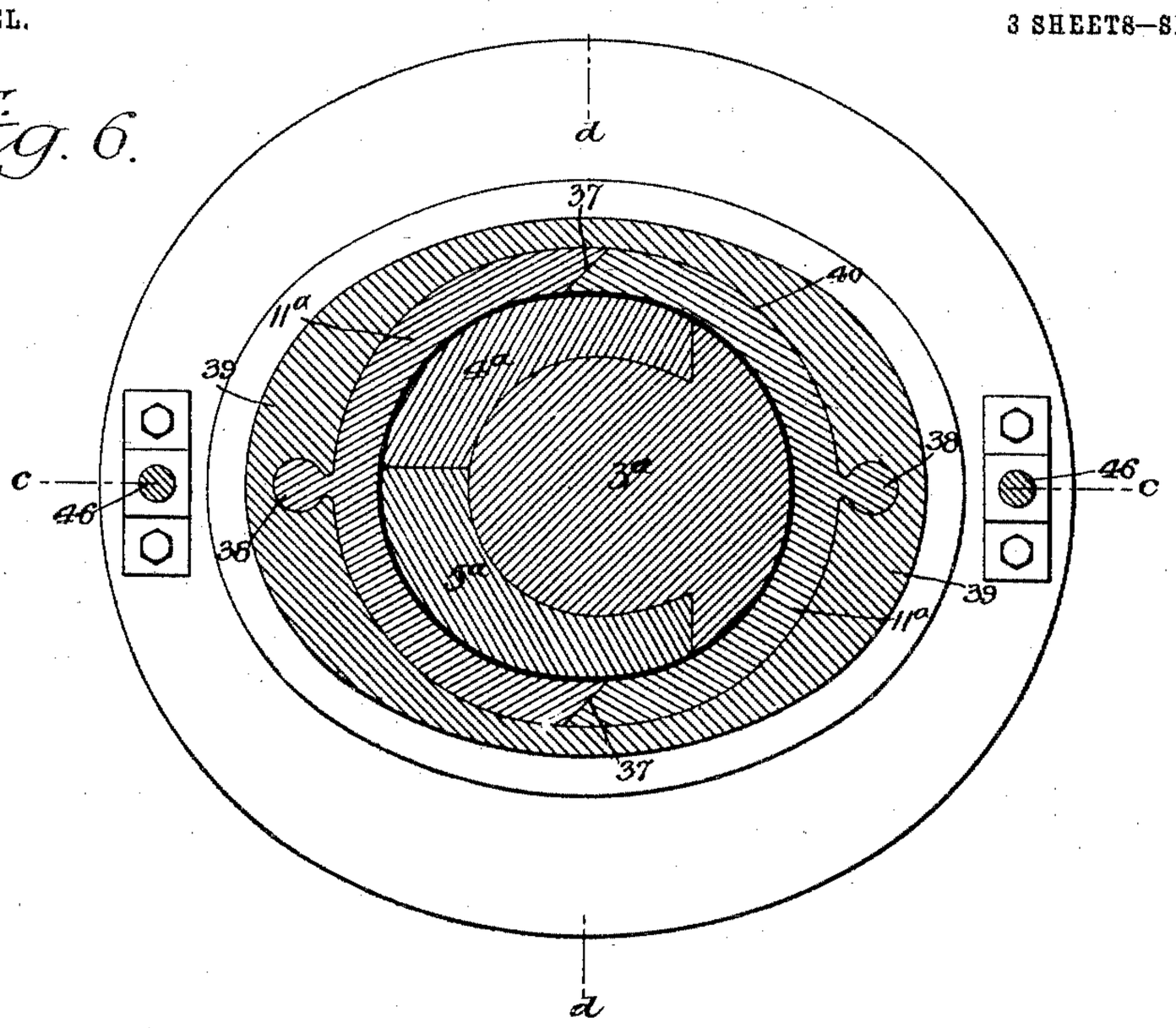
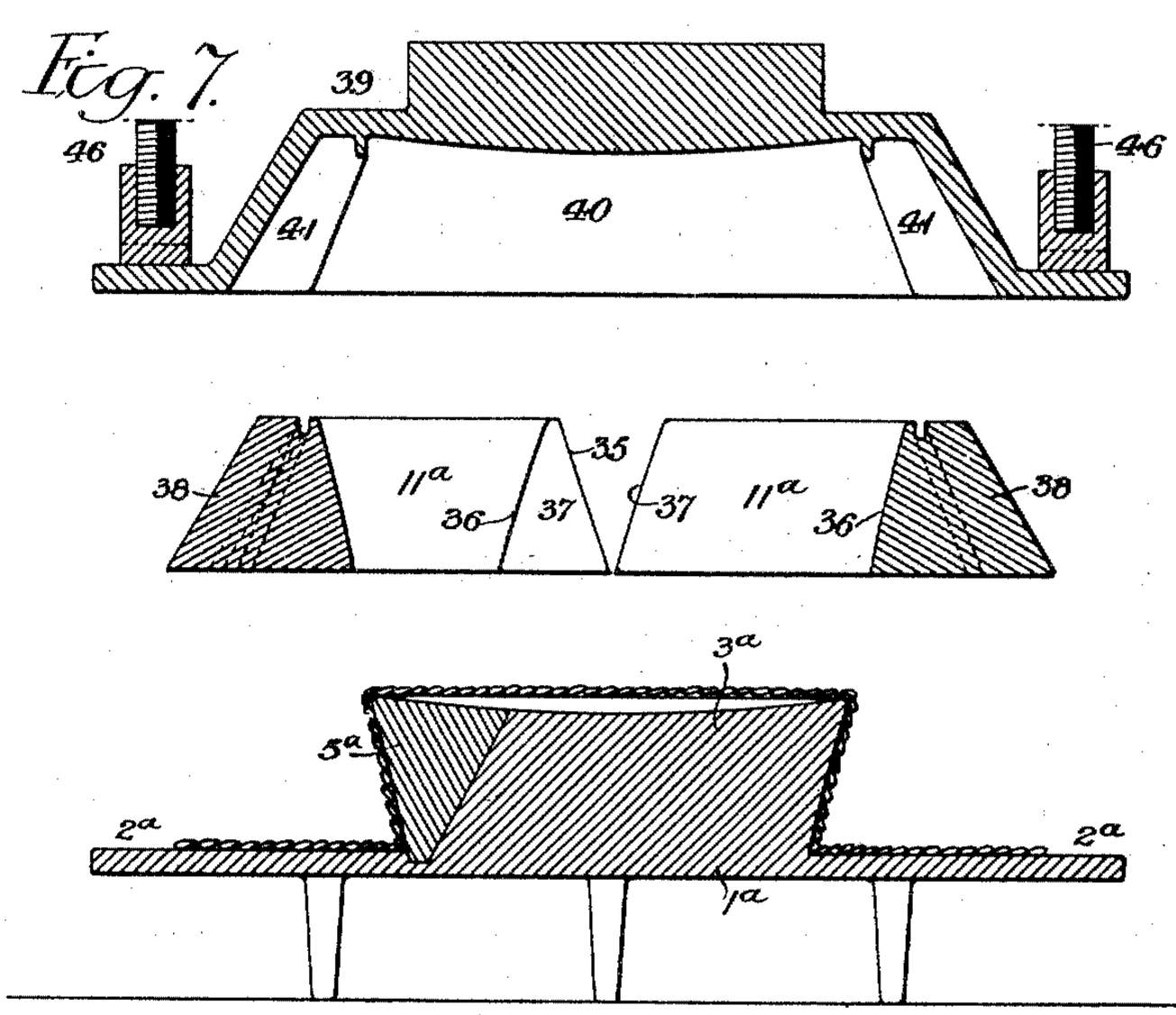


Fig. 7.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 8.

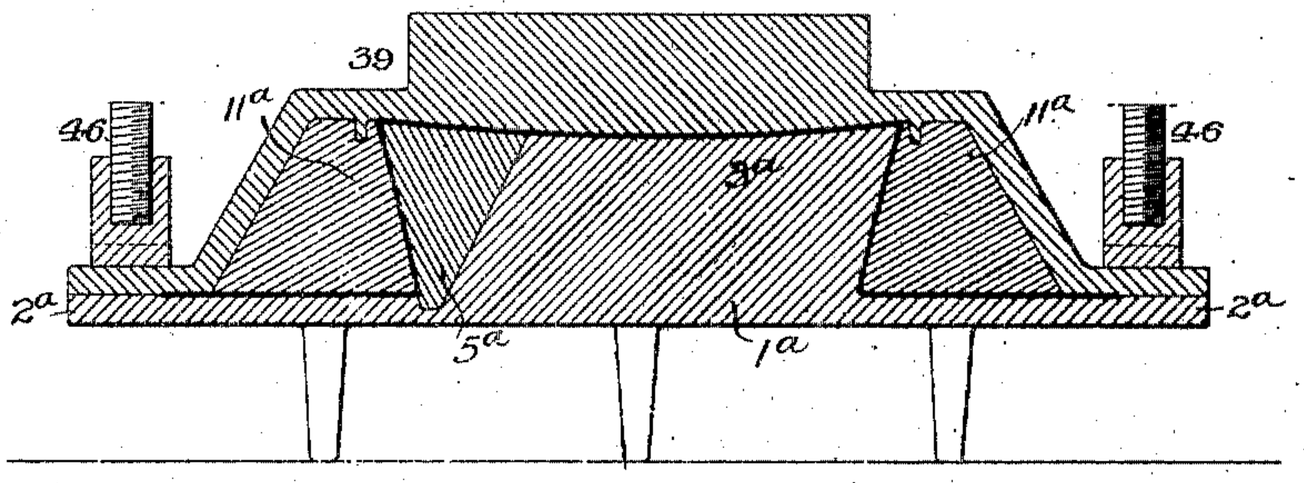


Fig. 9.

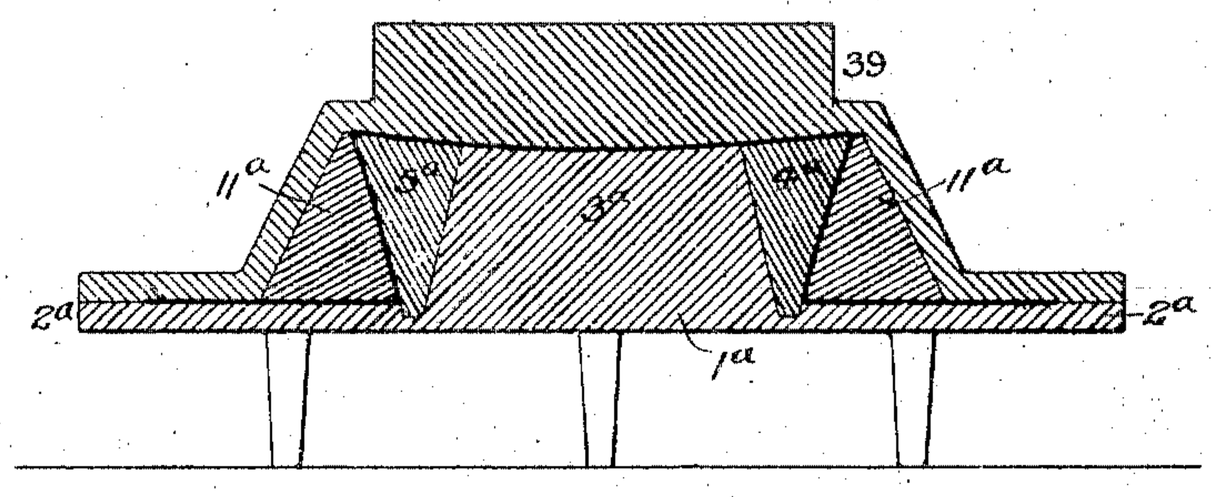
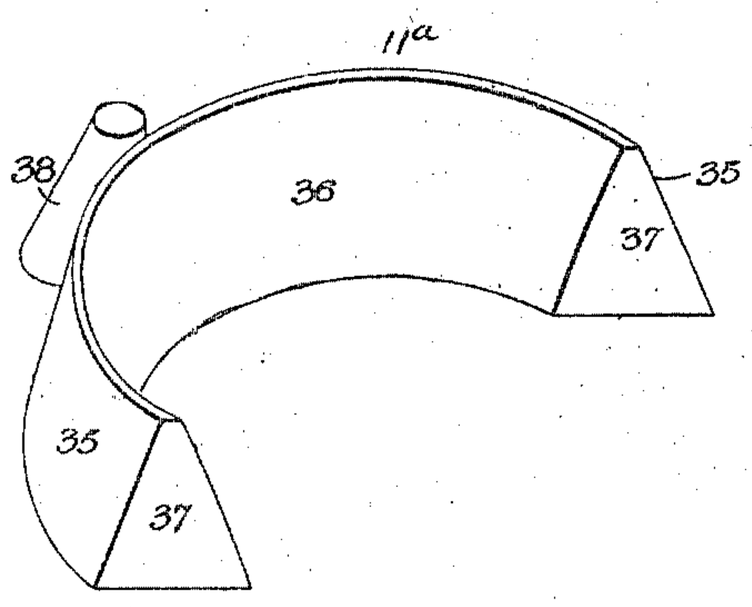


Fig. 10.



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No. 766,879. Patented August 9, 1904.

UNITED STATES PATENT OFFICE.

JOHN P. FRUGOLI, JOSEPH FRUGOLI, AND HORACE FORNACI, OF PHILADELPHIA, PENNSYLVANIA.

HAT-DIE.

SPECIFICATION forming part of Letters Patent No. 766,879, dated August 9, 1904.

Application filed August 31, 1903. Serial No. 171,434. (No model.)

To all whom it may concern:

Be it known that we, JOHN P. FRUGOLI, JOSEPH FRUGOLI, and HORACE FORNACI, citizens of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Hat-Dies, of which the following is a specification.

Our invention relates to dies for hat-pressing machines designed to press bell-shaped or undercut crowns, the object of our invention being to provide means that will make a perfect crown with as few wrinkles as possible.

The class of work to which this invention is applicable may be the usual hats of felt, straw, or other material which are complete in themselves or the hat-bodies made of buckram or other sized material which are intended to be afterward trimmed.

One form of die is intended to press the entire hat, crown, and brim from the flat material, while another form of die is intended to be used with partially-formed hats or hat-bodies—that is to say, it is a supplemental die for forming the bell-shaped or undercut contour after the crown has been formed in any manner.

Our invention is fully shown in the accompanying drawings, in which—

Figure 1 is a plan view of one form of our improved hat-forming dies. Fig. 2 is a sectional view on the line *a a*, Fig. 1. Fig. 3 is a sectional view on the line *b b*, Fig. 1. Fig. 4 is a sectional view similar to Fig. 2, showing the forming members pressed against the lower die. Fig. 5 is a perspective view of a detail of the structure shown in Figs. 1, 2, 3, and 4. Fig. 6 is a sectional plan view of a modified form of die. Fig. 7 is a view in sectional elevation on the line *c c*, Fig. 6, illustrating the parts of the die shown in Fig. 5 in detached position. Fig. 8 is a sectional view on the line *c c*, Fig. 6, showing the parts in the same relative position as illustrated in Fig. 7, but assembled. Fig. 9 is a cross-sectional view on the line *d d*, Fig. 6; and Fig. 10 is a perspective view of a portion of the structure illustrated in Figs. 6, 7, 8, and 9.

In the structure shown in Figs. 1, 2, 3, 4, and 5 we have shown a series of dies and coacting mechanism designed to produce hats with bell-shaped or undercut crowns directly from the flat material. The structure shown in Figs. 6, 7, 8, 9, and 10, however, is designed to press the bell-shaped or undercut crowns of straw hats which have previously been formed in the rough in the usual manner.

In Figs. 1, 2, 3, 4, and 5 the lower die proper comprises the base 1, having a flange 2 and an upwardly-projecting centrally-disposed portion 3, which, with the interlocking sections 4 and 5 fitting the same, form the crown or head of the die, the outer walls of which are bell-shaped or undercut. Arranged to be brought down on top of this lower die is the upper die or former for pressing and shaping the complete hat and giving the crown the bell-shaped or undercut contour. This upper die comprises a base member or plate 6, preferably of the same size as the flange 2 of the lower die and having an internal opening 7 just large enough to pass over the crown and the material to form the hat disposed over the same and draw the latter down around the head of the lower die when said upper die is lowered. The base member or plate 6 is beveled from its outer edge to the opening 7 and carries a number of operative elements, which may be described as follows: Disposed on the opposite side of the base block or plate 6 and preferably on the longer sides of the crown are the segmental formers 11, which are arranged to be moved from and toward the center of the crown and to meet when at the center. Each of these members carries a rack-section 12, arranged at or about the center of its longest side, and these rack-sections are disposed between ribs 13, carried by the base member or plate 6, and are moved by means of rocking pinions 14, journaled in brackets 15 and having operating-handles 16. When in use, after the upper die has been brought down over the lower die to form the crown the operator grasps a handle in each hand and moves them away from the structure in order to close the forming members 11 of the upper die, and these formers serve to give the crown the bell-shaped or undercut contour. To insure the centering of the formers when

moved against the crown, the ends of such formers are provided with pins or ribs 17 and sockets or grooves 18, fitting each other. Inasmuch as the material under operation would tend to bunch at the ends of the former 11 if they were designed to effect the entire work, we provide the supplemental members 20, which engage the material and form the ends of the bell-shaped or undercut crowns, which members are carried by rods 21, arranged to slide in brackets 22. The members 20 are crescent-shaped, having bevelled and curved faces 23 and 24, and the side formers have their ends curved and beveled at the points 25 to engage the curved and beveled faces of the members 20. In the normal open position these members are in loose engagement; but as soon as the pinions are rocked in engagement with the racks, thereby bringing said formers 11 into position against the crown, the faces 25 of said formers will engage the faces 23 and 24 of the members 20, acting on the same after the nature of cams, and will thereby cause such members 20 to engage the fabric or other material being pressed and with the formers 11 hold it tightly against the crown member of the die. These members 20 are forced into place against the tension of springs 30, which are carried by stems or rods 21, interposed between the head 31 of said stems or rods and the brackets 22, so that as soon as the side formers 11 are retracted after the pressing operation the end members 20 will automatically resume their normal open position.

In Figs. 6, 7, 8, 9, and 10 of the drawings, 1^a represents the lower die-section, having a flange 2^a and the head 3^a, with undercut walls, and the adjustable and removable sections 4^a and 5^a, also provided with undercut walls. On this structure the article to be pressed is placed, for instance, as shown in Fig. 7, in which a straw hat in the rough is in position over the head of the lower die. The formers are illustrated at 11^a and comprise simply segmental blocks having the beveled outer and inner faces 35 and 36, the inner bevel corresponding to the undercut walls of the head. These blocks have beveled meeting faces 37 and are provided with end members or keys 38 for a purpose shortly to be described.

The upper die is shown at 39 and has beveled walls 40, so as to engage the forming-blocks 11^a and by such engagement with the beveled walls or faces 36 of the same cause the latter to be forced toward the head of the lower die, and thereby press and finish the bell-shaped or undercut contour of the crown. This upper die has recesses 41 to engage the keys or end members 38 of the formers 11^a and insure that the movement of said formers toward the head member of the die shall be true and to hold them in place during the pressing operation; otherwise imperfect work would be produced.

Both forms of the upper and lower dies shown and described herewith will be carried by an ordinary hat pressing or forming machine—such, for instance, as that shown in the companion application filed of even date herewith—and the connections whereby said dies may be secured to such machine are shown at 45 and 46. In both forms of the die structures the blocks 4 and 4^a and 5 and 5^a are removable in order to effect changes in the size of the crown, and with such changes new formers or forming-blocks 11 and 11^a (of a larger size only, however) will be employed. In all other respects each structure and its mode of operation is the same.

The manner of using the dies shown in Figs. 1, 2, 3, 4, and 5 is as follows: The dies when in the machine will be normally separated, and when in such position the material to be formed into a hat having the bell-shaped or undercut crown will be placed over the lower die and held by the clamps described in our companion application. The upper die will then be brought down, forming a straight-walled crown, the material being under considerable tension. As soon as this has been done the handles 16 will be grasped by the operator and moved away from the dies, thereby causing the side formers to engage the material and press it against the walls of the crown, forming the bell-shaped or undercut contour.

In the device shown in Figs. 6, 7, 8, 9, and 10 the article to have a bell-shaped or undercut crown pressed will be made in the usual manner and will be placed on the lower or crown die and the former 11^a placed against it by hands and then the upper die will be brought down into engagement with the same, insuring the pressing of the bell-shaped or undercut contour.

Having thus described our invention, we claim and desire to secure by Letters Patent—

1. In dies for forming hats, the combination of a head having undercut walls, and a series of independent forming members for engagement with the walls of said head and movable from and toward the latter, certain of said forming members being automatically operated by the movement of the other members.

2. In dies for forming hats, the combination of the crown-die having a head with removable sections for effecting changes in size, said head having undercut walls, and a series of independent forming members for engagement with the walls of said head and movable from and toward the latter, certain of said forming members being automatically operated by the movement of the other members.

3. In dies for forming hats, the combination of the lower die having a head with undercut

walls, and a series of independent forming members for engagement with said walls and movable from and toward the latter, certain of said forming members being automatically operated by the movement of the other members.

4. In dies for forming hats, the combination of the lower die having a head with undercut walls, an upper die having an aperture fitting over the head of the lower die, and a series of forming members carried by the upper die for engagement with the walls of the head and movable from and toward the latter, certain of said forming members being automatically operated by the movement of the other members.

5. The combination in dies for forming hats, of a crown-die having a head member with undercut walls, an upper die carrying laterally-movable side members having walls to conform to the walls of the head member, means for moving the same, and end members arranged to engage the ends of the head, said end members lying in the path of the side members and brought into engagement with the head by the movement of said side members.

6. The combination in dies for forming hats, of the crown-die having a head member with undercut walls, an upper die carrying laterally-movable side members having walls to conform to the walls of the head member, means for moving the same, and end members arranged to engage the ends of the head, said end members having curved faces disposed in the path of the side members, whereby the movement of the latter will cause the end members to engage the ends of the head, said side members being also curved at the ends to engage the end members.

7. The combination in dies for forming hats, of the crown-die having a head member with undercut walls, laterally-moving side members having walls to conform to the walls of the head member, means for moving the same, members arranged to engage the ends of the head, and having walls to conform to the contour of the same, said end members having curved faces disposed in the path of the side members, whereby the movement of the latter will cause the end members to engage the ends of the head, and means for automatically retracting said end members as the side members are retracted.

8. The combination in a die for forming hat-crowns, of a head, side members arranged to engage said head, end members loosely mounted and arranged to be carried into position by the movement of the side members, racks carried by said side members, and movable pinions for engaging said racks.

9. The combination in a die for forming hat-crowns, of a head having undercut walls, side members arranged to move from and toward said walls and having flaring surfaces to engage the latter, end members engaged by said side members, said members each having contacting cam-faces, stems carrying the end members and springs carried by said stems for retracting said end members automatically as the said side members are retracted manually.

10. The combination in dies for forming hat-crowns, of the lower die having an undercut head with adjustable sections, an upper die carrying a series of forming members arranged to engage the undercut walls of the head, means carried by the upper die for moving said forming members, and automatically-operated end forming members arranged to be carried into place by the movement of the side members and to be carried into the inoperative position by the aid of springs.

11. In a die for forming hat-crowns, the combination of the lower die having a head member, independent forming-sections arranged adjacent to said head members and means for drawing said sections into engagement with the head member, certain of said forming-sections being automatically operated by the movement of the other sections.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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JOSEPH FRUGOLI.
HORACE FORNACI.

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