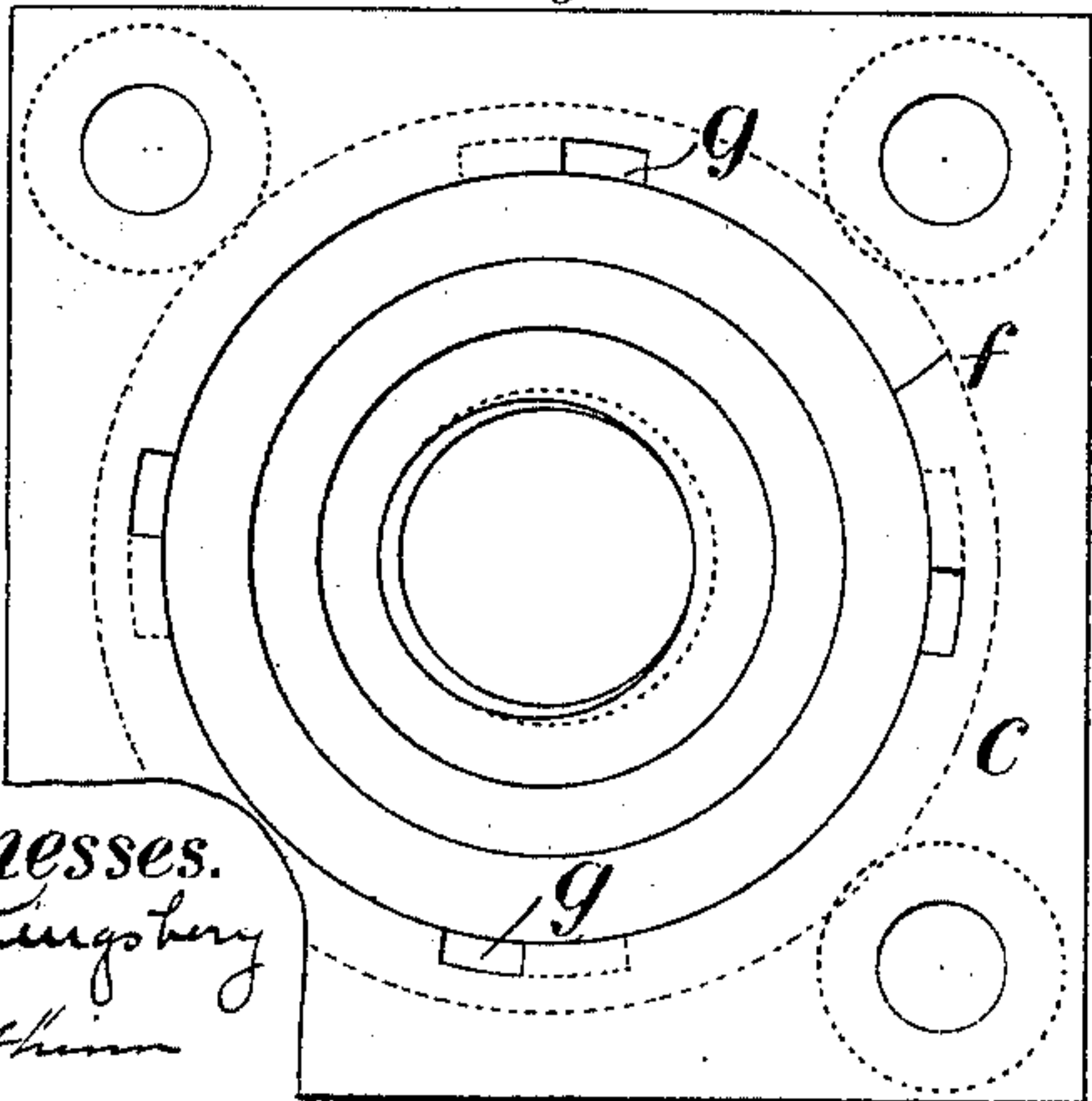
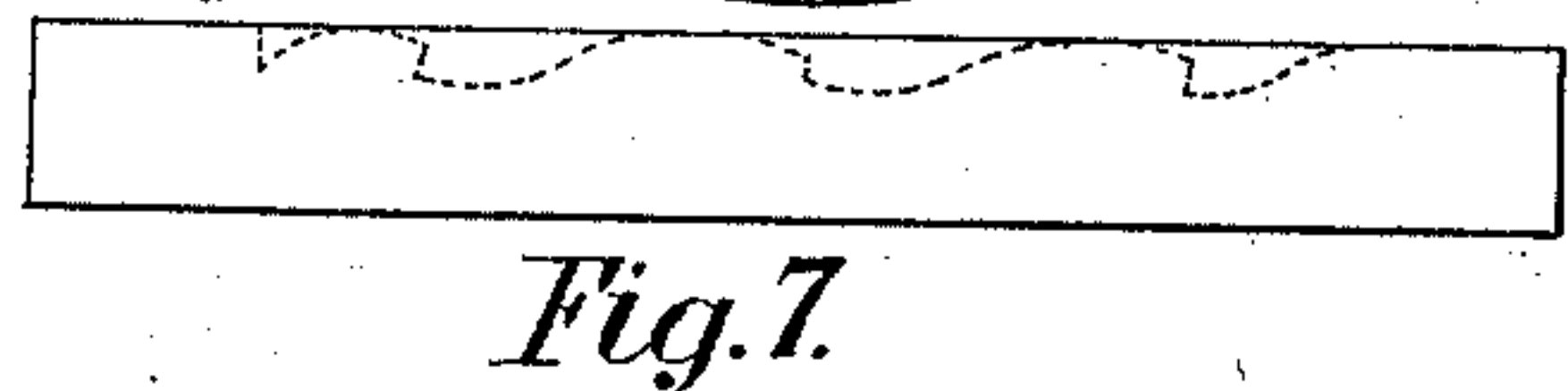
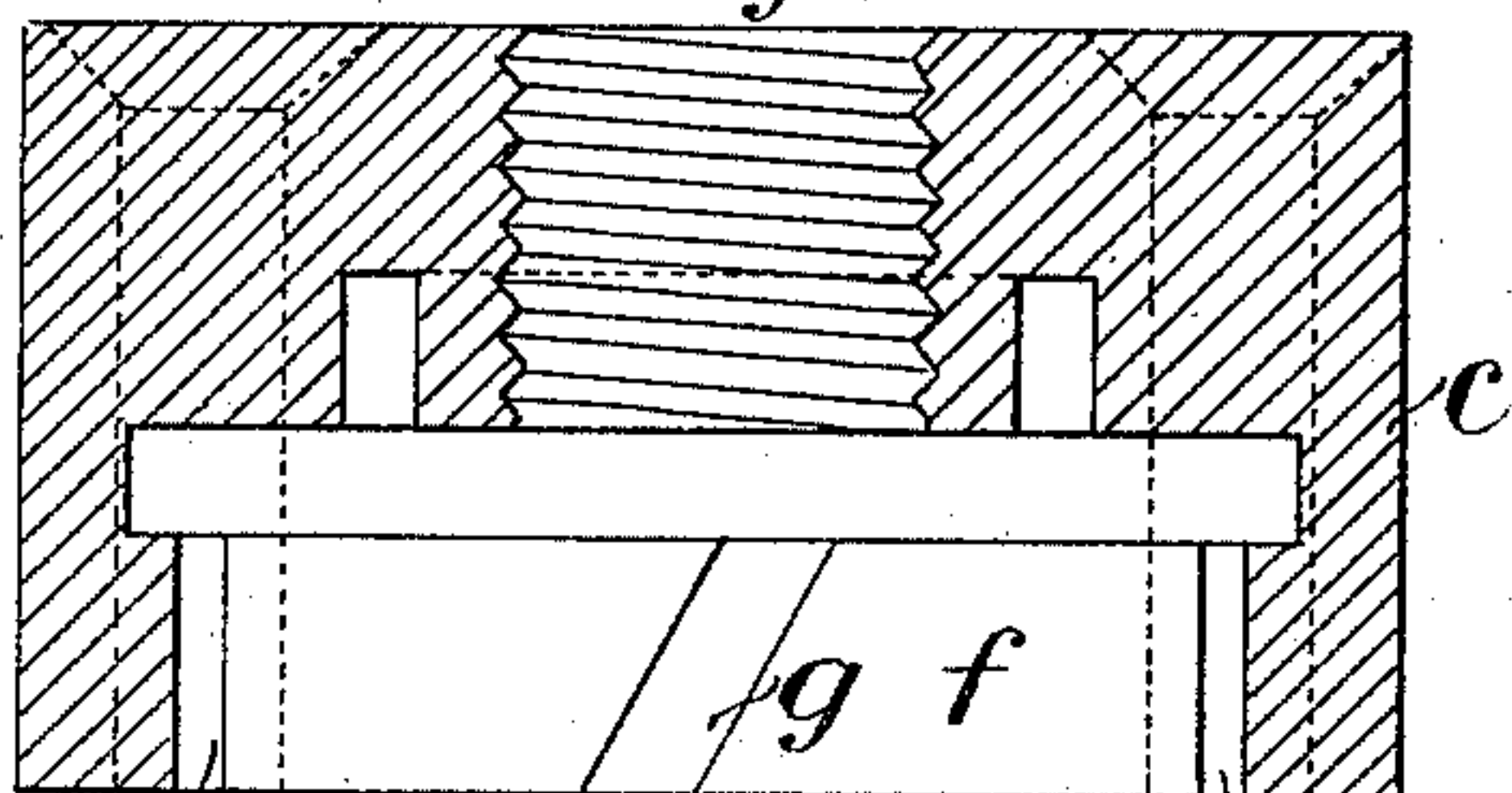
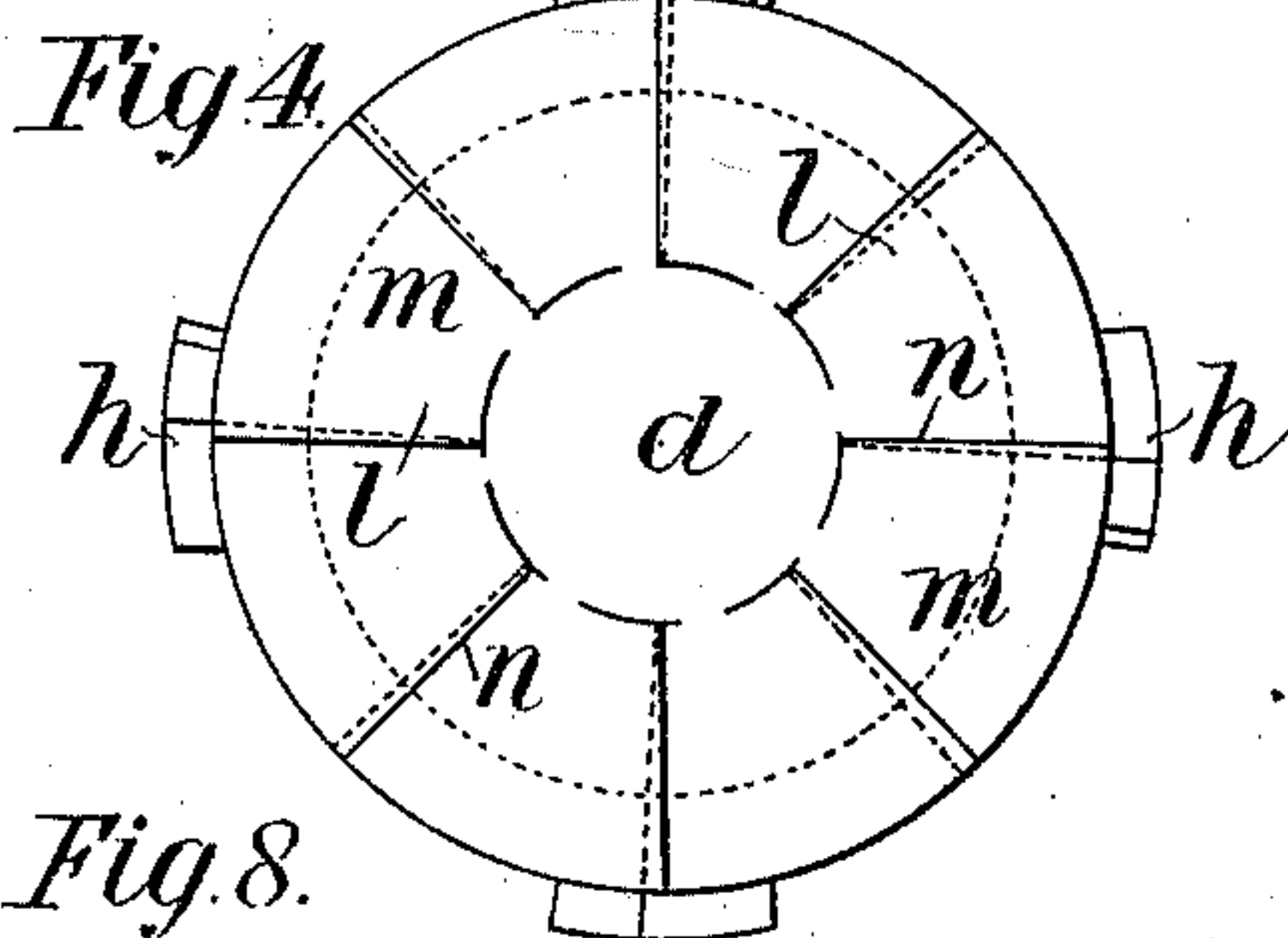
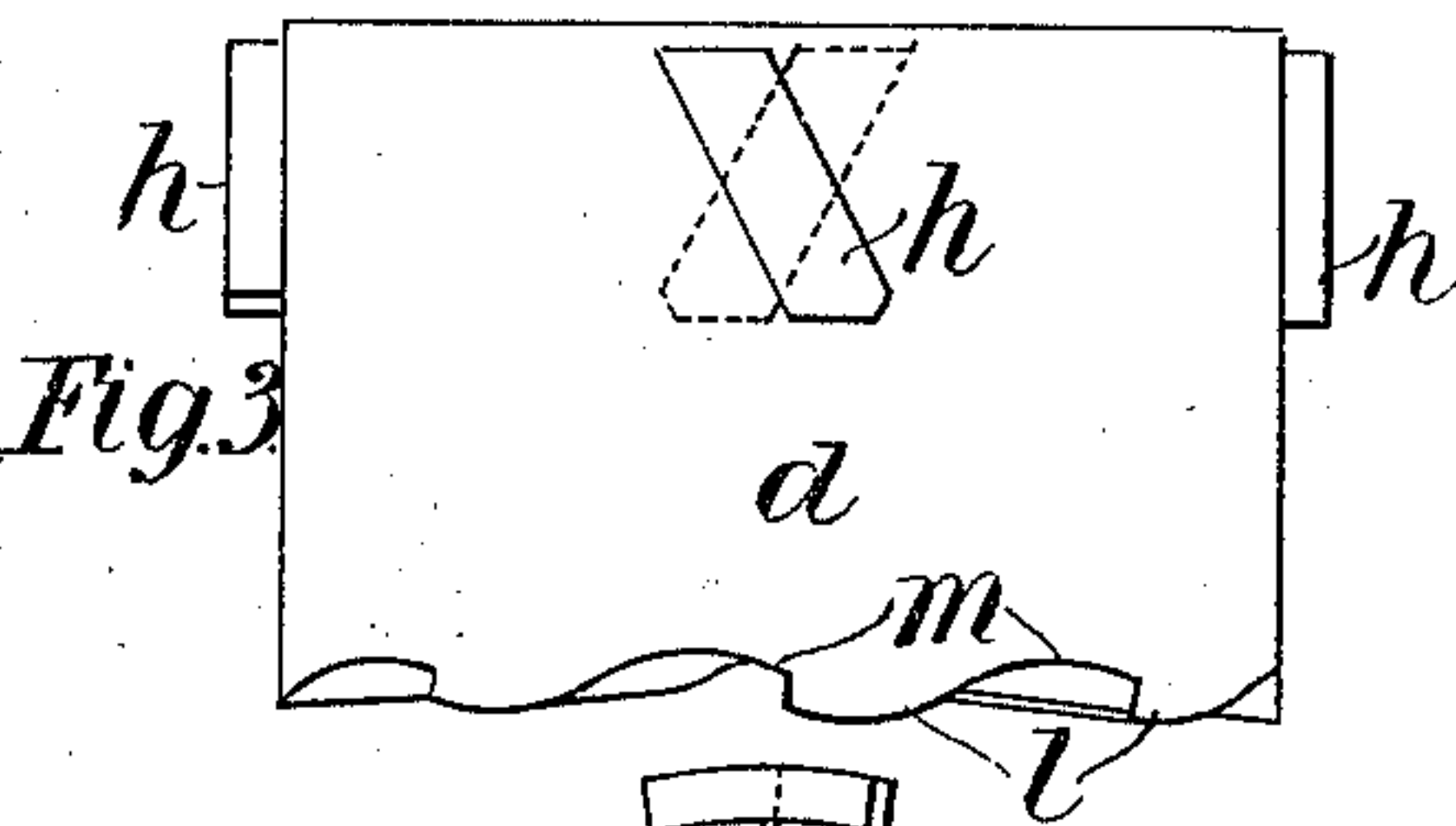
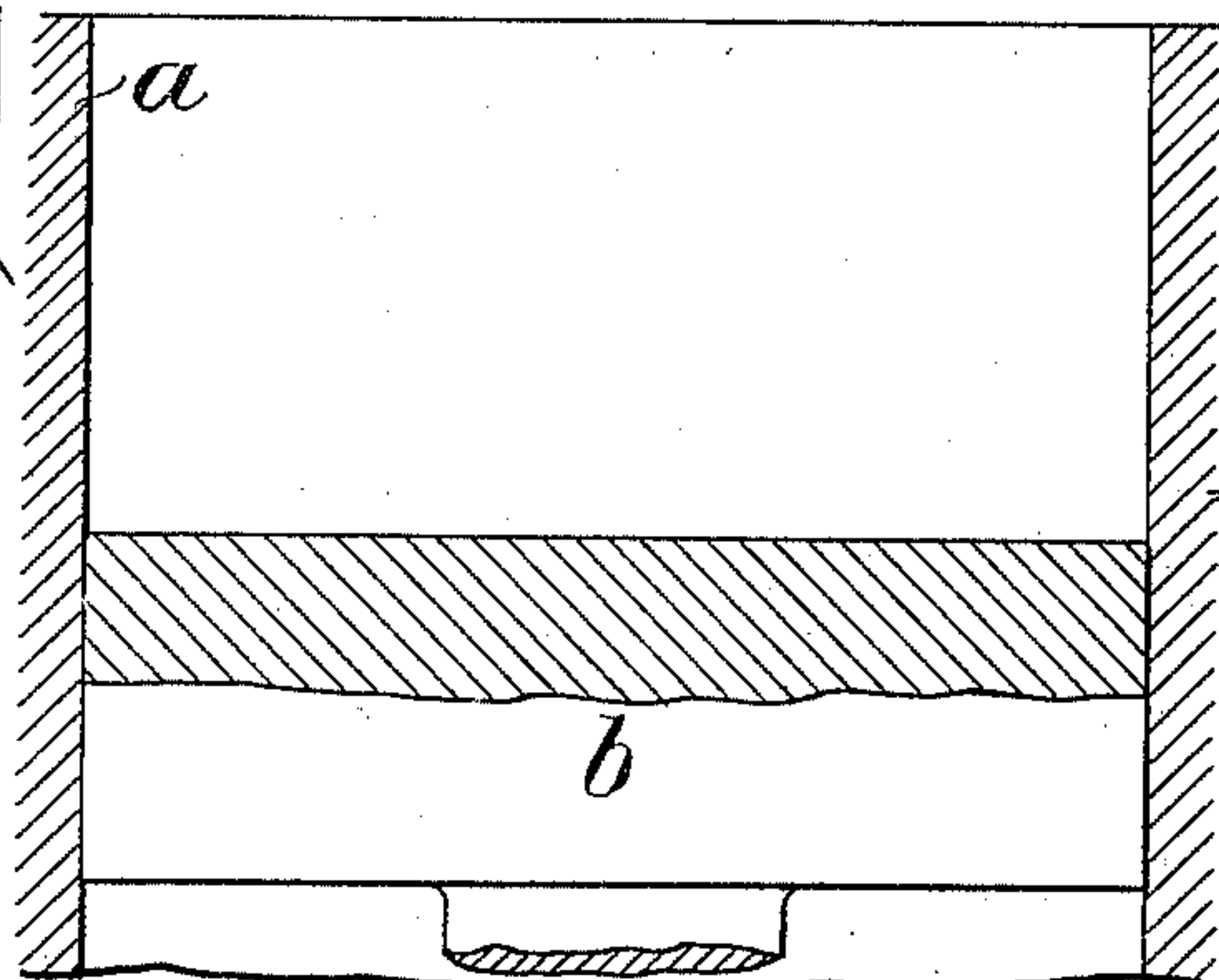
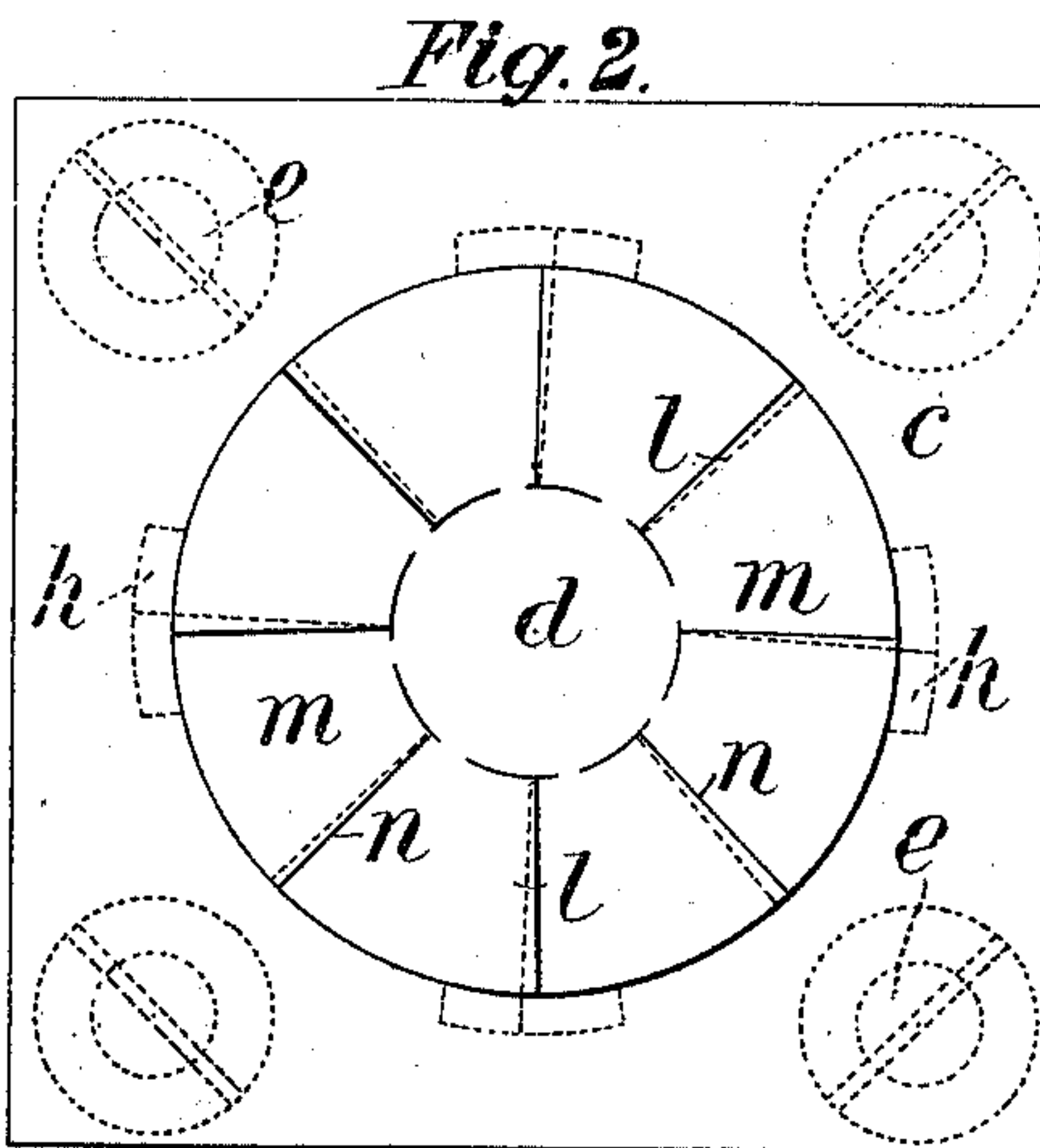
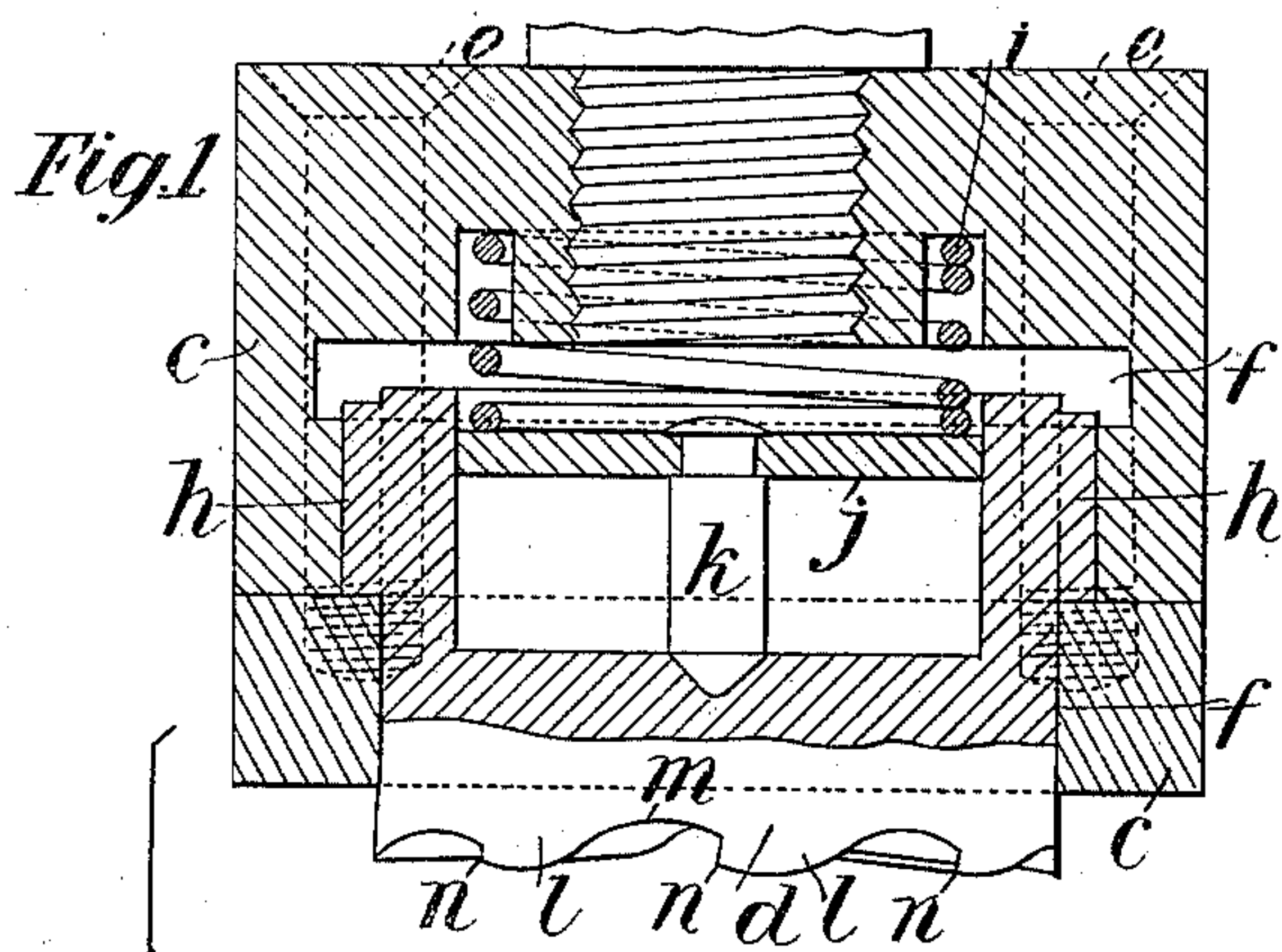


W. HEWITT.

MANUFACTURE OF TILES AND APPARATUS THEREFOR.

No. 598,781.

Patented Feb. 8. 1898.



Witnesses.
J. D. Kingsbury
E. C. Quinn

Inventor.
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by his attys
Whitaker, Brewster

(No Model.)

3 Sheets—Sheet 2.

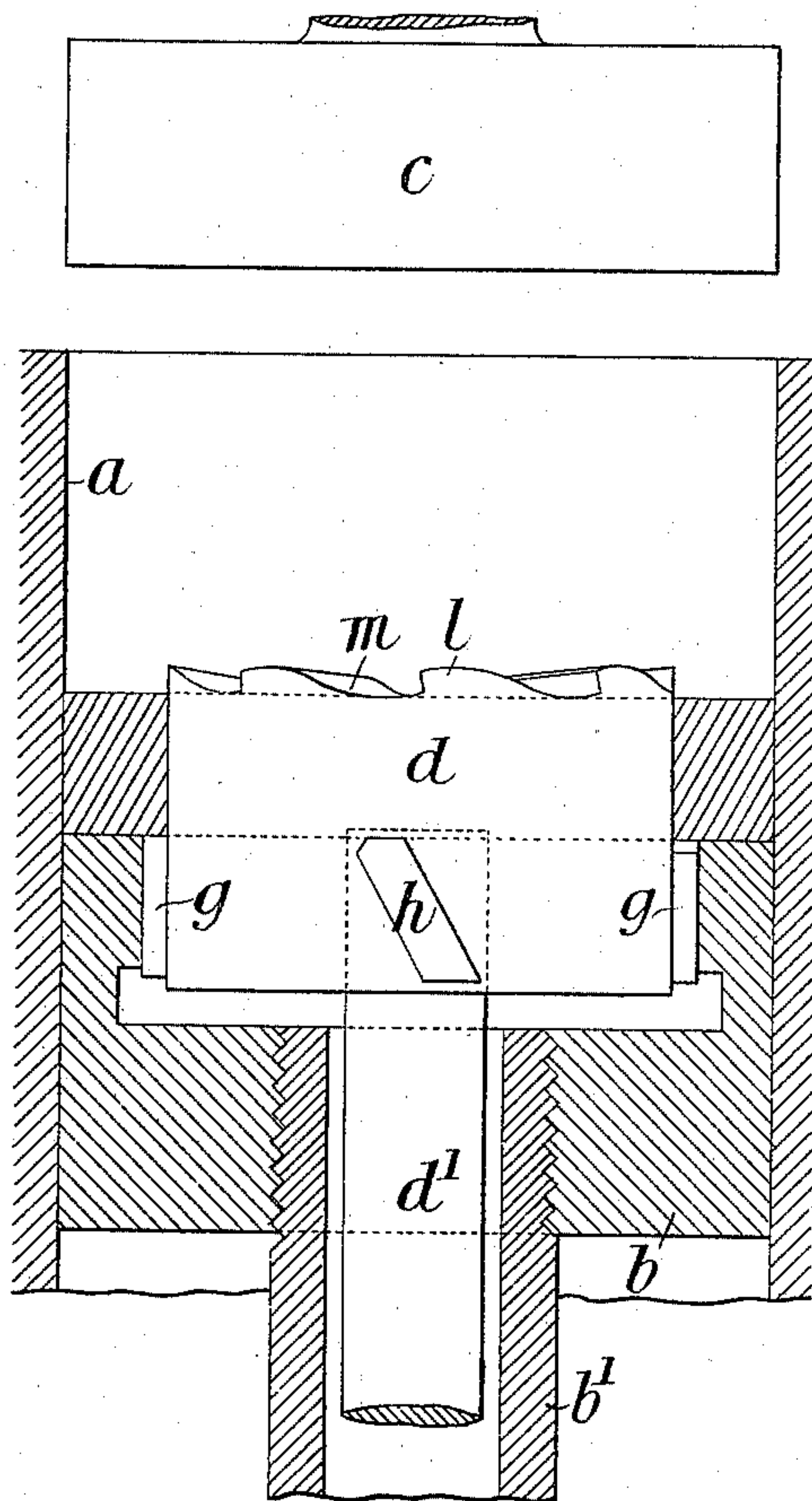
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Fig. 9



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(No Model.)

3 Sheets—Sheet 3.

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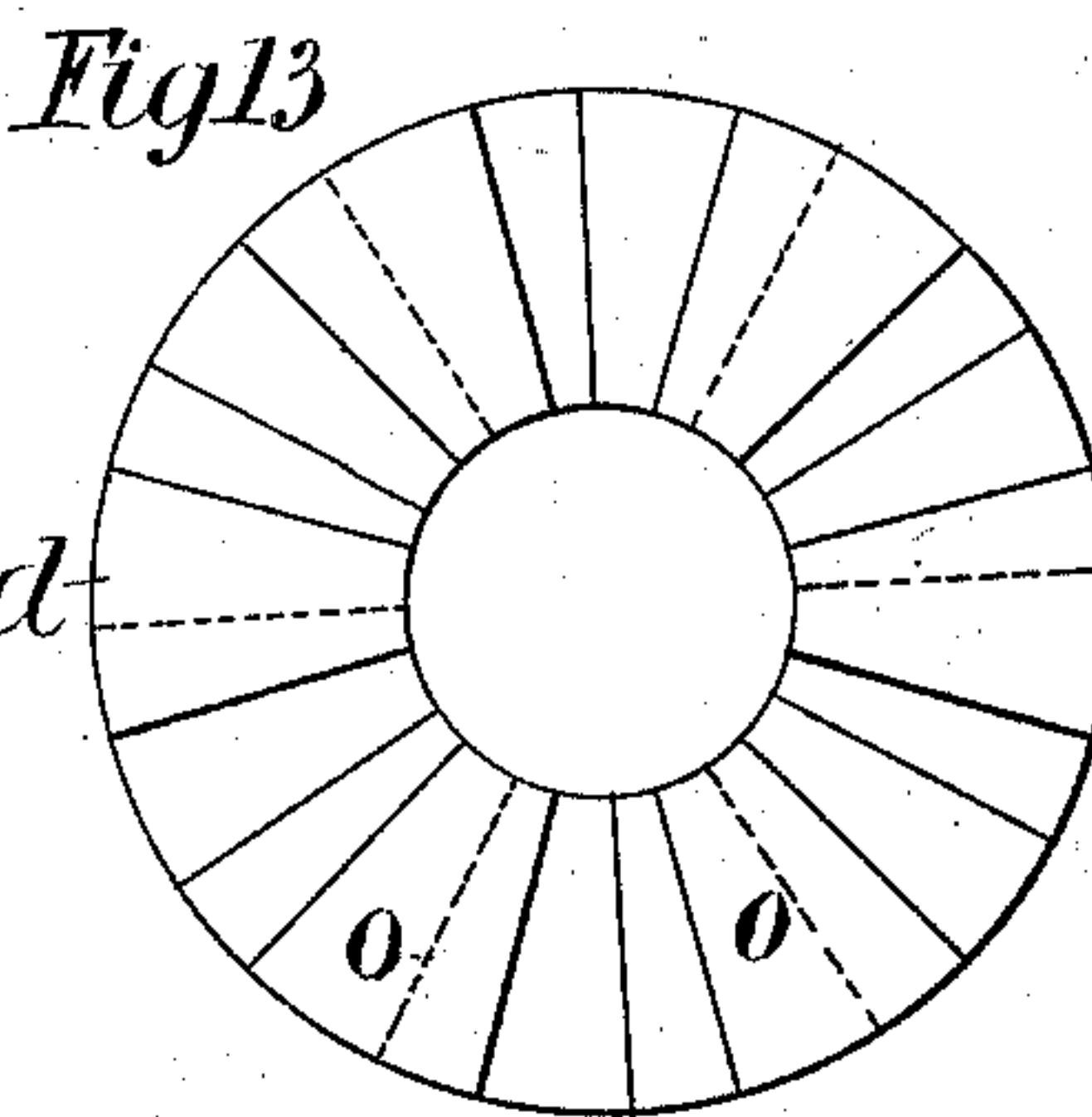
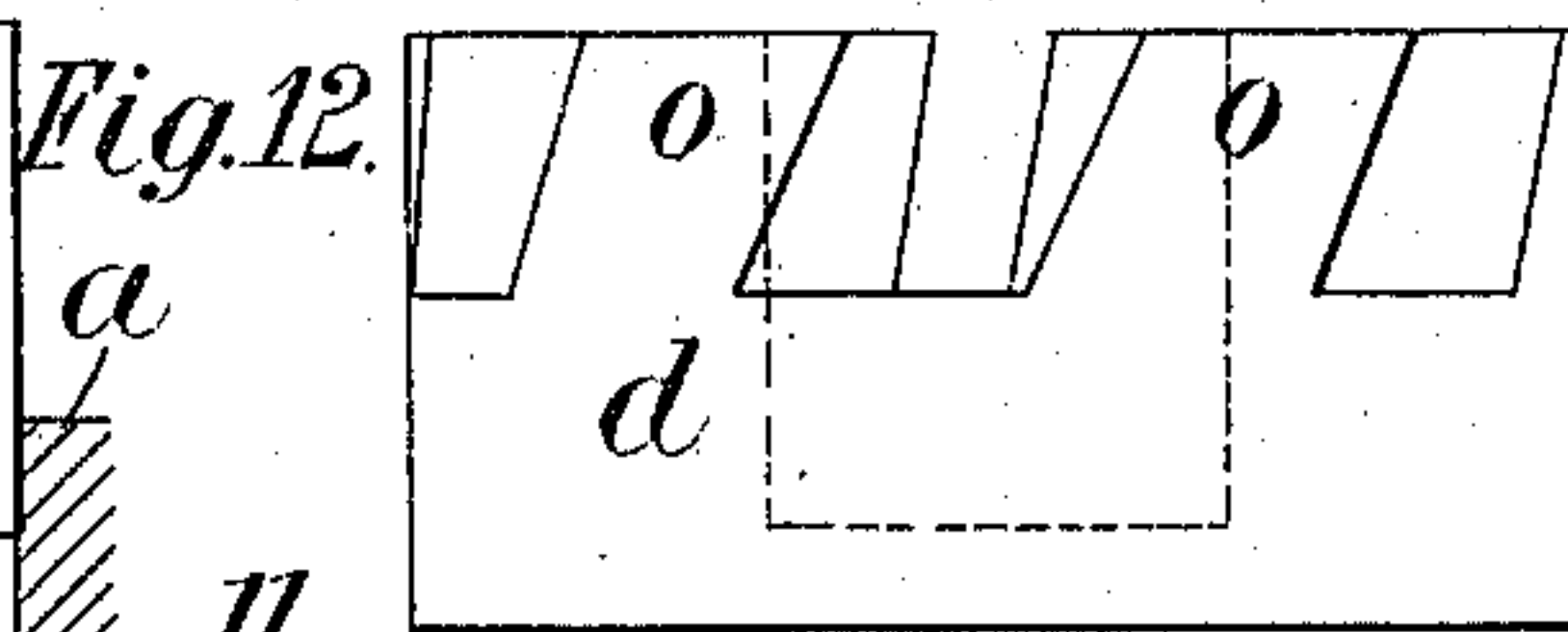
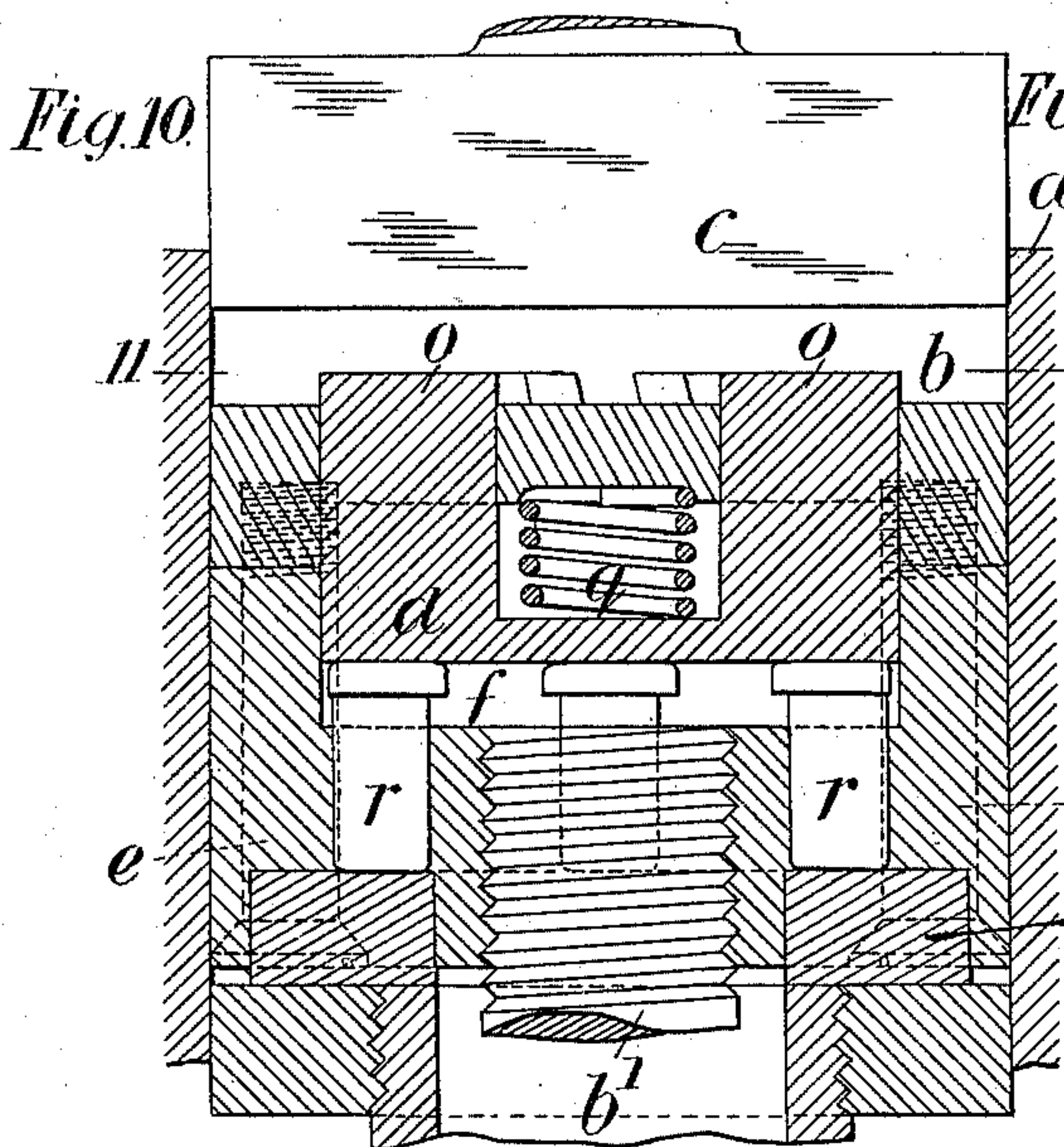


Fig. 14.

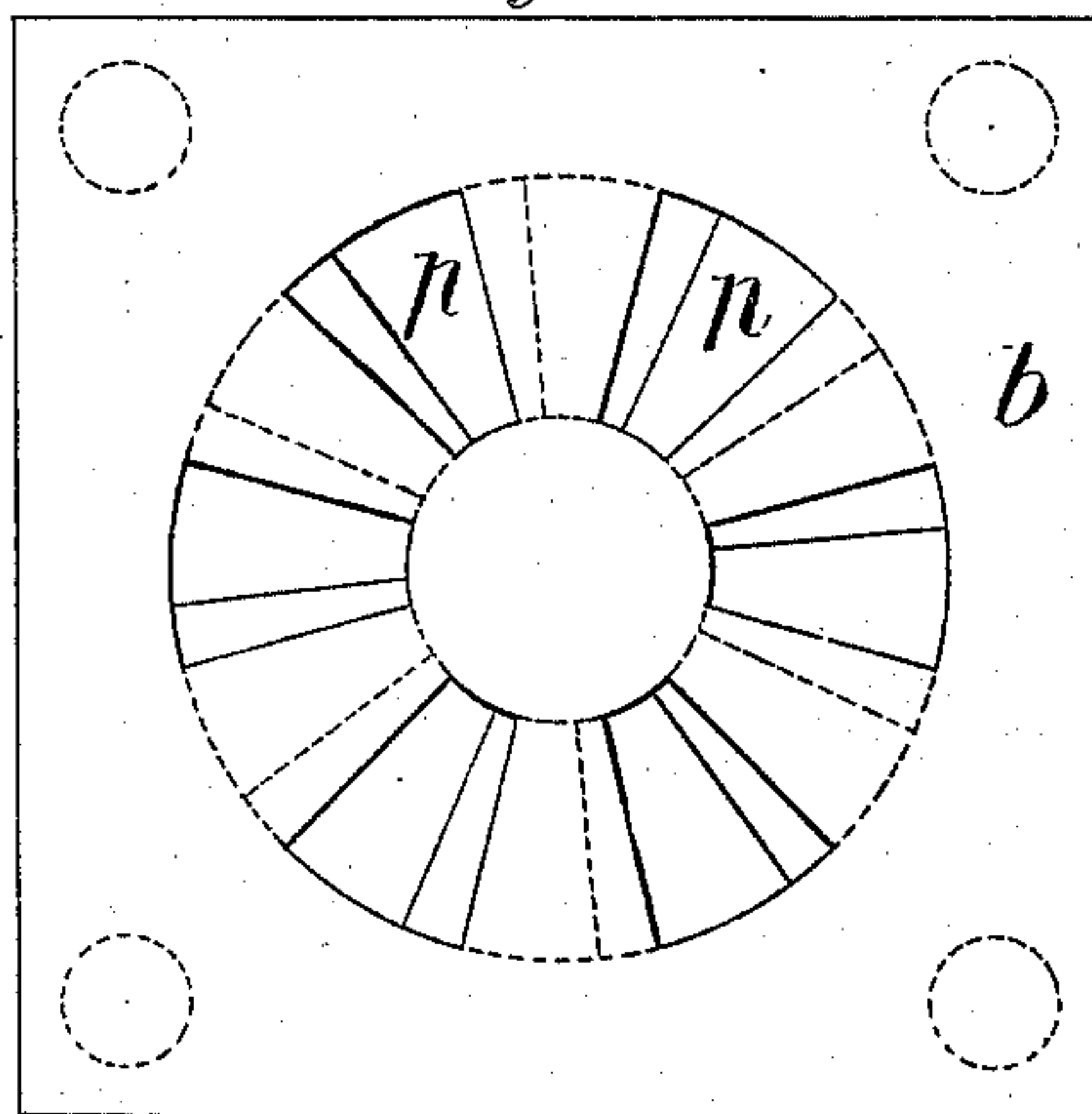
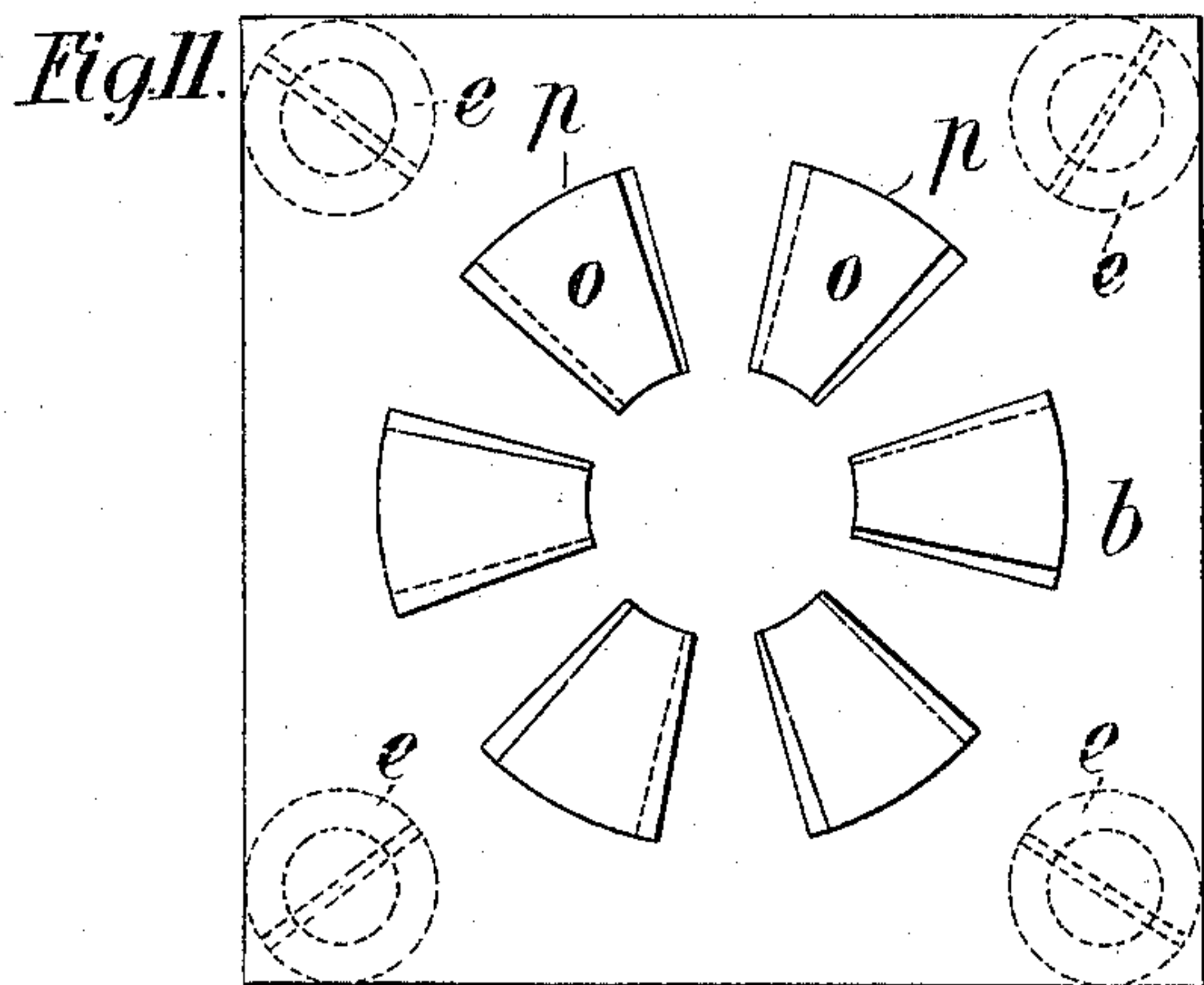
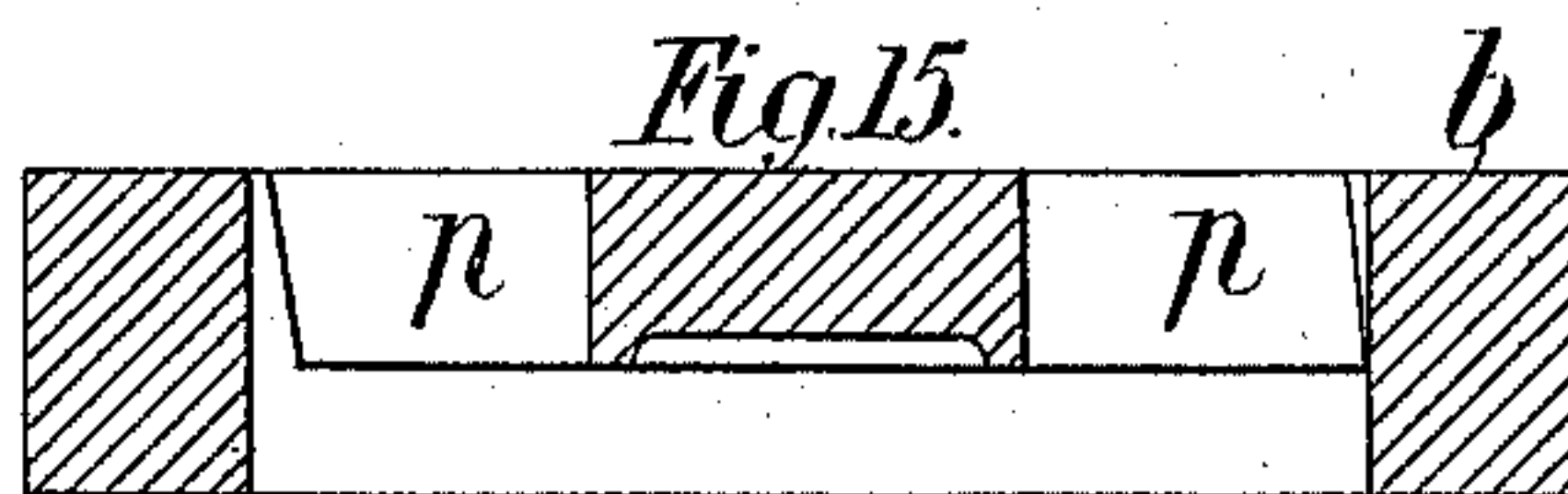


Fig. 16.



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UNITED STATES PATENT OFFICE.

WILLIAM HEWITT, OF HEREFORD, ENGLAND.

MANUFACTURE OF TILES AND APPARATUS THEREFOR.

SPECIFICATION forming part of Letters Patent No. 598,781, dated February 8, 1898.

Application filed June 21, 1897. Serial No. 641,700. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HEWITT, a subject of the Queen of Great Britain, residing at Hereford, England, have invented new and useful Improvements in the Manufacture of Tiles and Apparatus Therefor, of which the following is a specification.

This invention relates to the manufacture of tiles with undercut recesses therein and to apparatus for forming such recesses.

In carrying out my invention I employ a circular block the face of which is formed with a number of undercut serrations or ribs, the said block being provided on its periphery with spirally-arranged lugs adapted to work in corresponding recesses or grooves in the top or bottom plate of the die, as the case may be. Suitable means, such as springs, normally keep the ribbed surface of the block projected the required distance beyond the surface of the plate upon which the back of the tile is molded and known as the "back plate." The ribs on the block are so shaped that they will free themselves from the recesses in the tiles. In some cases the back plate is depressed to form the undercut recesses in the tile.

To enable my invention to be fully understood, I will describe the same by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of a tile-mold constructed according to my invention and of the kind wherein the circular block for forming the undercut recesses in the tiles is on the top die and adapted to free itself from the undercut recesses formed in the tile by moving outward relatively with the said die, and Fig. 2 is an under side or face view of the top die. Fig. 3 is an elevation of the circular block detached, and Fig. 4 is a face view of the same. Fig. 5 is a sectional view of the back plate in which the circular block works, and Fig. 6 is an under side view of the said back plate. Fig. 7 is a view of the back of a tile formed in the above-described apparatus, and Fig. 8 is an edge view of the same. Fig. 9 is a sectional elevation of a tile-mold wherein the circular block is arranged in the lower die and adapted to free itself from the undercut recesses in the tile by moving inward relatively with the said die. Fig. 10 is a view, similar to Fig. 9, of a mold wherein

a modified form of circular block is used and wherein the die is adapted to be moved outward relatively with the said circular block to free the latter from the tile. Fig. 11 is a plan view of the same below the line 11 11, Fig. 10. Figs. 12 and 13 are respectively an elevation and a plan of the circular block detached, and Figs. 14 and 15 are respectively a plan view and a transverse section of the plate in which the said block works. Figs. 16 and 17 are respectively a plan view and an edge view of a tile formed in the modified mold.

Similar letters of reference indicate corresponding parts in the several figures.

a is the mold-box. *b* is the bottom die, which fits into and slides within the said mold-box. *c* is the top die for compressing the material of which the tiles are formed into the mold-box, and *d* is the circular block for forming the undercut recesses.

In the arrangement of my invention shown in Figs. 1 to 6 the top die *c*, which is formed in two parts connected by screws *e e*, has formed in it a circular recess *f* to receive the circular block *d*, Figs. 3 and 4. In the walls of the said recess in the back part of the die is a series of spirally-arranged slots *g g*, in which work the spirally-arranged lugs *h h* on the circular block *d*, the front or face part of the die *c* serving as an abutment against which the lugs *h h* impinge, as shown in Fig. 1, to limit the outward movement of the circular block *d* under the action of a spring *i*, arranged behind the said block. As shown, this spring does not bear directly against the block *d*, but against a plate *j*, pivotally mounted upon a pin *k* on the back of the said block in order that the spring shall not have a tendency to impart a rotary movement to the block in either direction, but leave it absolutely free to partially rotate in the desired manner under the action of the slots and lugs *h*. If desired, however, the said plate and pin can be dispensed with, the spring, which may be of any suitable kind, acting directly upon the block.

It will be noticed that the recess *f*, in which the circular block *d* moves, is of such depth as to permit of a backward movement of the said circular block against the pressure of the spring *i*.

5 $l l$ are the radial ribs or projections upon
 the surface of the circular block d , and $m m$
 are the grooves between the said ribs. These
 ribs are undercut on one side to form lips n
 10 n , and the tops or shoulders of the ribs and
 the bottoms of the grooves are rounded, as
 shown in Fig. 1, so that the highest parts of
 the shoulders and the deepest parts of the
 grooves are a short distance back from the
 15 lips, as clearly shown in Fig. 1. The object
 of this formation of the ribs and grooves is
 that when the circular block rotates in the
 required direction to free itself from the re-
 cesses formed in the tile there should be no
 20 abrading of the bottoms of the recesses in the
 tile or destruction of the sharpness of the lips
 upon the undercut edges of the said recesses.
 The said ribs $l l$ and the lugs $h h$ must be ar-
 25 ranged in such relation to each other that
 when in the downward movement of the die
 to compress the material in the mold the cir-
 cular block is pressed back into the recess f
 against the pressure of the spring i and there-
 by partially rotated. The lips n of the ribs
 30 l shall be forced toward the material in order
 to insure the molding of sharp edges to the
 recesses in the tile, and that when the pressure
 upon the molded tile is relieved the said block
 shall rotate so as to move the lips n away from
 the correspondingly-molded lips upon the tile.
 The upper die having been lifted, the lower
 die is raised to bring the tile out of the mold.

The tile made in the apparatus hereinbe-
 fore described is shown in Figs. 7 and 8.

35 Although I have shown the upper die as the
 back plate, the arrangement of the dies may
 be reversed, so that the lower die is the back
 plate.

In the modification of my invention shown
 40 in Fig. 9 the circular block d , instead of be-
 ing carried in the upper die c , is carried in
 the lower die b , and is designed to be moved
 below the surface of the said die b in order
 to withdraw it from the molded tile. To per-
 45 mit of this, I employ what is known as "dou-
 ble discharging-gear"—that is to say, of mech-
 anism which is capable of positively moving
 the die b and the circular block d relatively
 with one another, the die b being connected
 50 by a tube b' with one part of the discharging-
 gear and the circular block d by a rod d' ,
 passing through the said tube and connected
 to another part of the discharging-gear. It
 is to be understood that the circular block
 55 when moved relatively with the die b rotates
 slightly upon its axis, owing to the arrange-
 ment of the spiral lugs h thereon working in
 grooves $g g$. In making a tile in this appa-
 ratus the die b and circular block d being in
 60 the relative position shown in Fig. 9, the re-
 quired quantity of material is introduced into
 the mold and compressed to the desired ex-
 tent by the top die c . The circular block d is
 then drawn below the surface of the die b to
 65 free it from the tile, and then the die b , with
 the block d still below its surface, is raised
 to bring the tile out of the mold. The tile

made in this mold is the same as that shown
 in Figs. 7 and 8.

In the modification of my invention shown 70
 in Figs. 10 to 15 the circular block d is rep-
 resented as provided with a series of spiral
 lugs $o o$, Figs. 12 and 13, which are adapted
 to work in corresponding openings $p p$, formed
 in the die b , as shown in Figs. 14 and 15, in 75
 such a manner that the relative movement
 of the die and circular block causes the axial
 rotation of the latter. The said lugs $o o$ are
 of such length that when the surfaces of the
 circular block between the said lugs are in 80
 contact with the under side of the surface-
 plate of the die b the ends of the lugs $o o$ will
 project above the surface of the die, as indi-
 cated in Fig. 10, the desired extent to form
 the recesses in the tile. A spring q , which 85
 may be of india-rubber or other suitable ma-
 terial, is arranged in a recess in the cir-
 cular block d and with its upper end against
 the under side of the upper part of the die b
 tends to draw the said projecting ends of the 90
 lugs $o o$ into the die. In the die b , below the
 circular block d , is a series of stop-pins $r r$,
 which rest upon a rigid base-ring s and are
 of such length that when the die b is in its
 lowest position the ends of the lugs $o o$ will 95
 project to the desired extent above the sur-
 face of the die b . The discharging mechan-
 ism connected to the die b by the rod b' serves
 by its weight to normally retain the said die
 in its lowest position, as shown in Fig. 10. 100
 The tile having been molded in the usual
 manner, the die b is raised, the circular block
 remaining stationary as regards a vertical
 movement, (owing to the spring q holding it
 down against the pins $r r$,) but rotating 105
 slightly upon its axis. When the top of the
 die is level with the top of the lugs $o o$, the
 bottom of the recess f in the die b comes into
 contact with the heads of the pins $r r$, so that
 the continued upward movement of the said 110
 die to lift the tile out of the mold carries the
 circular block upward with the die. The
 shape of the recesses formed in the tile by
 the circular block used in this modification
 will be clearly understood by reference to 115
 Figs. 16 and 17.

Having now particularly described and as-
 120 certained the nature of my said invention and
 in what manner the same is to be performed,
 I declare that what I claim is—

1. The combination with the upper and
 lower dies, one of said dies having spirally-
 arranged recesses, of a movable circular block,
 engaging said recessed die and having spi-
 125 rally-arranged lugs engaging said recesses,
 whereby the movement of said block with
 respect to said die will cause said block to ro-
 tate, substantially as described.

2. The combination with the upper and
 lower dies, one of said dies being provided 130
 with a circular recess, and spirally-arranged
 grooves, of a movable block located in said
 recess and having lugs engaging said grooves,
 said block being provided on its face with a

series of undercut projections or ribs and means for moving said block longitudinally in said recessed die whereby said block is caused to rotate on its longitudinal axis, substantially as described.

3. The combination with the upper and lower dies, one of said dies being provided with a circular recess and spiral grooves, of a circular block in said recess provided with lugs engaging said grooves, said block being provided on its face with projections having undercut edges for making recesses with overhanging walls in a tile, and a spring operatively connected with said block for moving it in line with its axis, whereby said block will be rotated about its axis by said spiral grooves and lugs, substantially as described.

4. The combination with the upper die provided with a central circular recess, and spirally-disposed grooves in the walls of said recess, of a circular block in said recess having lugs engaging said grooves and having its

face provided with undercut projections for forming recesses with overhanging projections, in a tile, a spring in said recess in rear of said block and the lower die, substantially as described.

5. The combination with the upper die provided with a circular recess, and spirally-disposed grooves in the walls of said recess, of a circular block in said recess having lugs engaging said grooves, said block having its face provided with projections provided with undercut edges for forming recesses with overhanging walls in a tile, a plate in said circular recess of the die provided with a pin engaging said block in line with its axis of rotation, a spring in said recess engaging said plate, and the lower die, substantially as described.

WILLIAM HEWITT.

Witnesses:

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T. CAREY GRIFFITHS.