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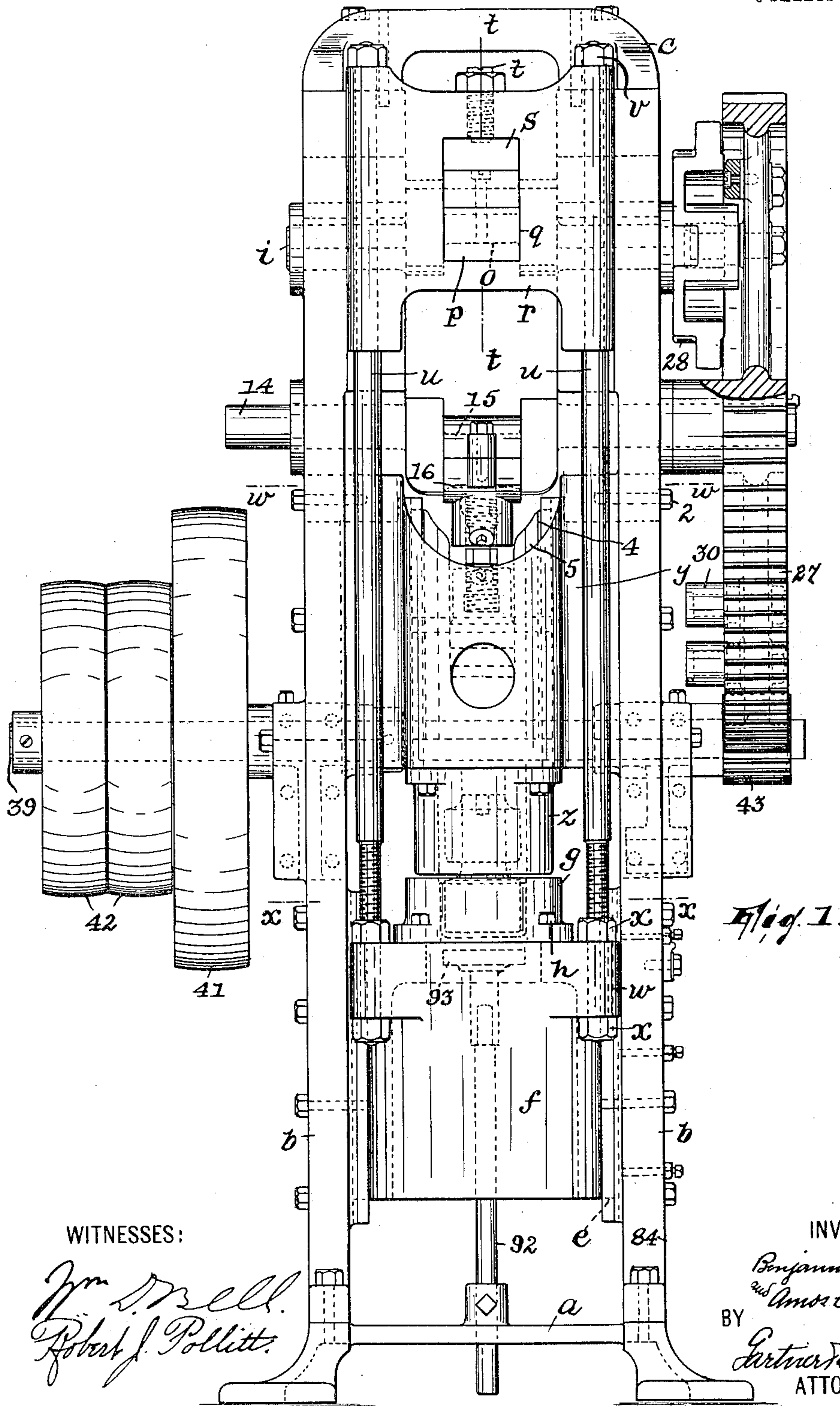
PATENTED APR. 24, 1906.

B. ADRIANCE & A. CALLESON.

DRAWING PRESS.

APPLICATION FILED JUNE 13, 1904.

8 SHEETS—SHEET 1.



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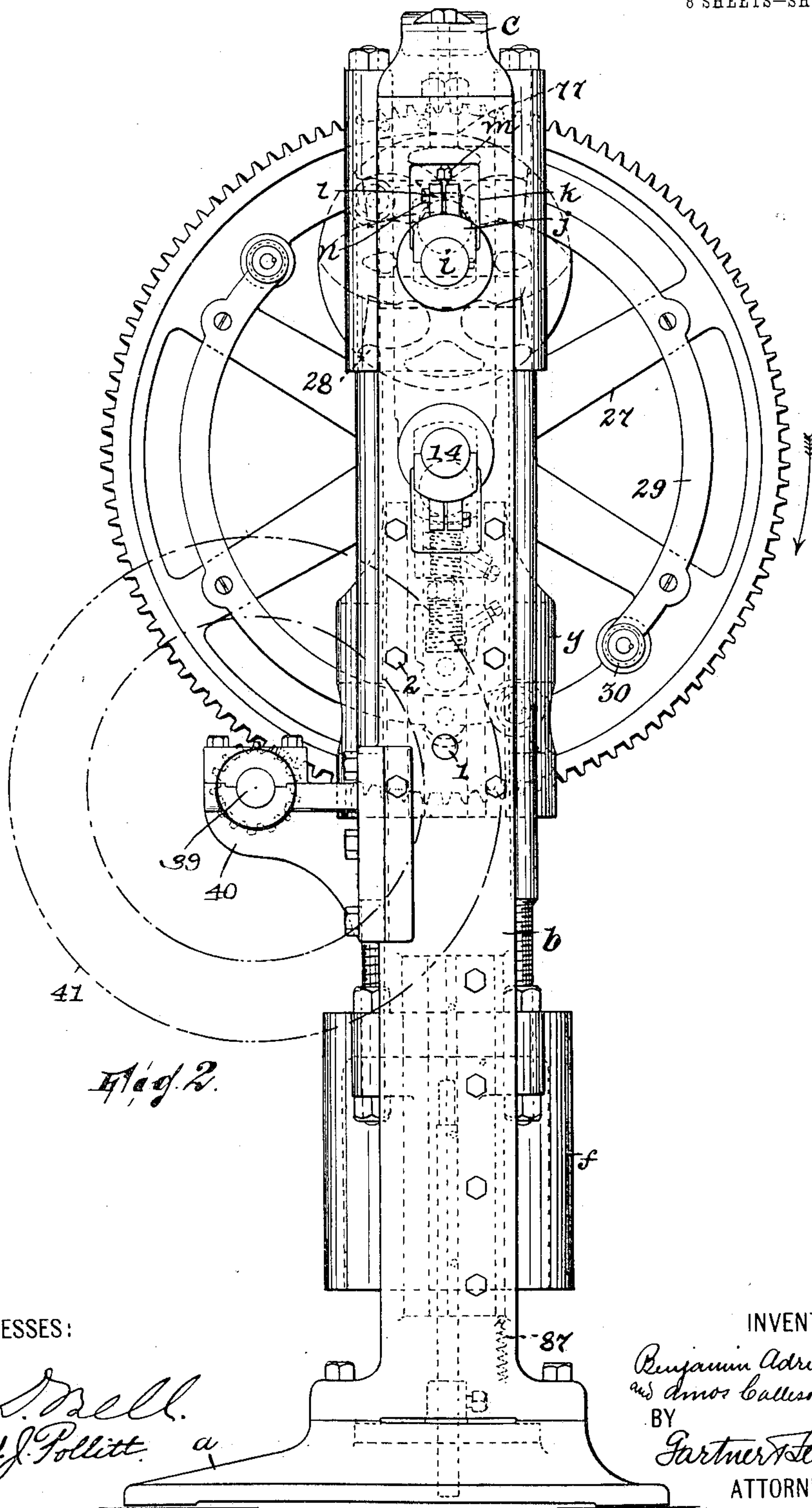
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8 SHEETS—SHEET 2.



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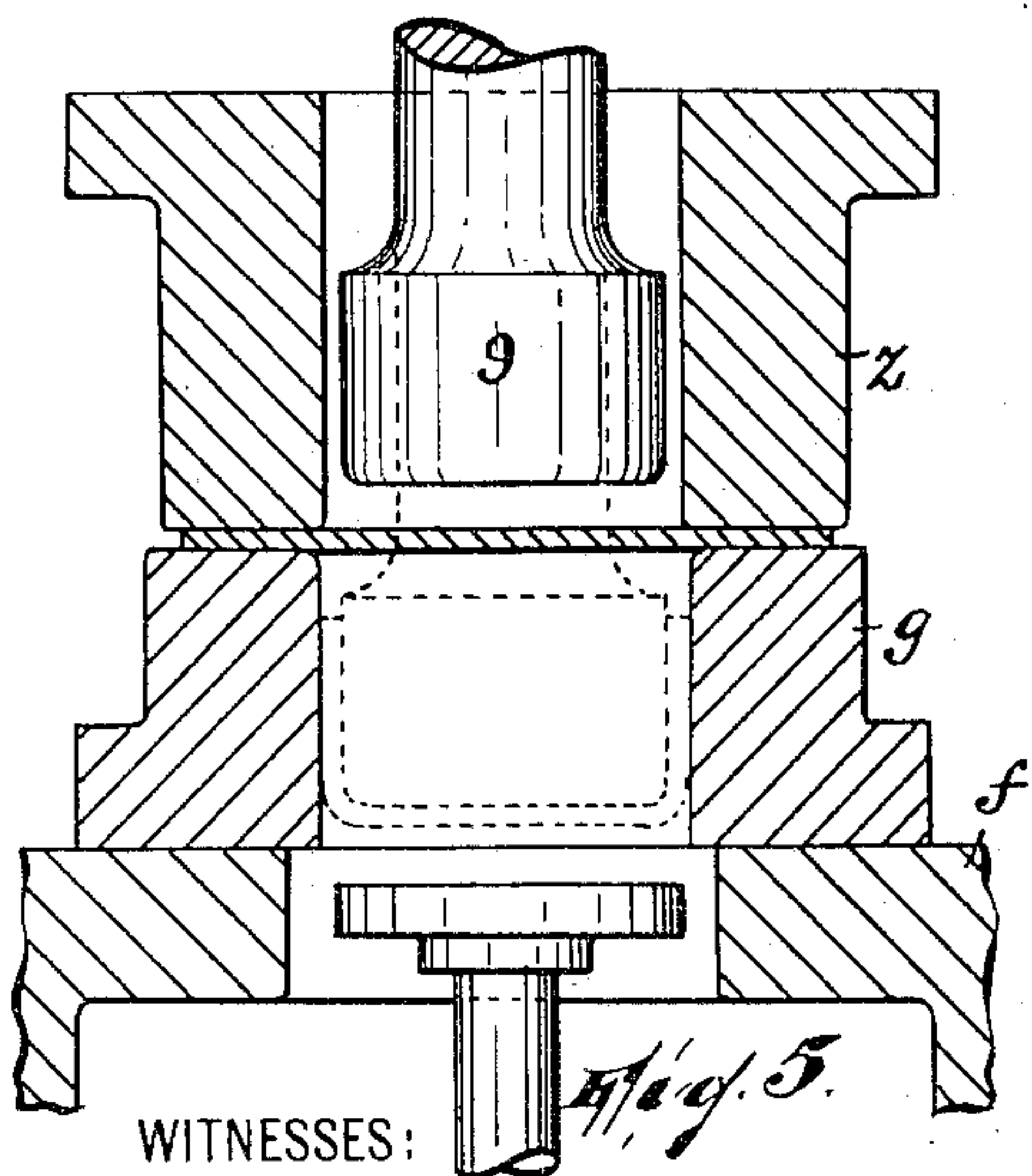
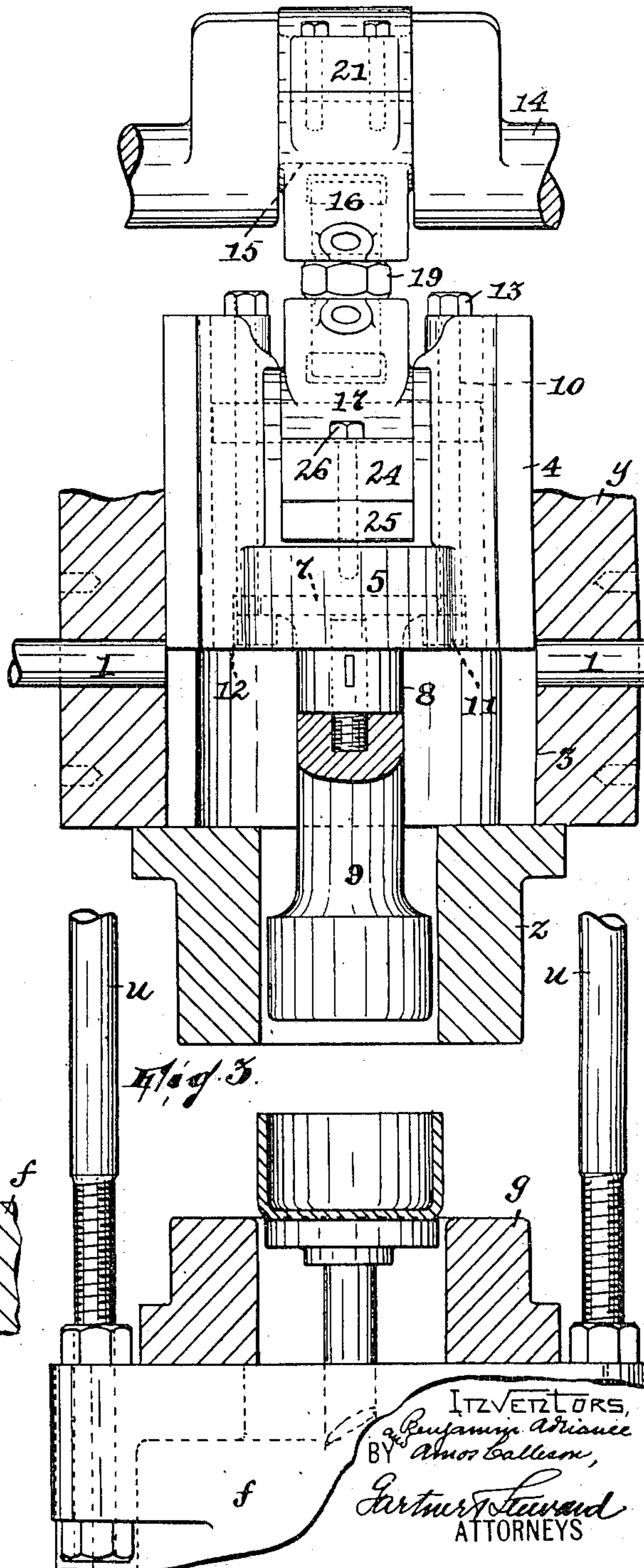
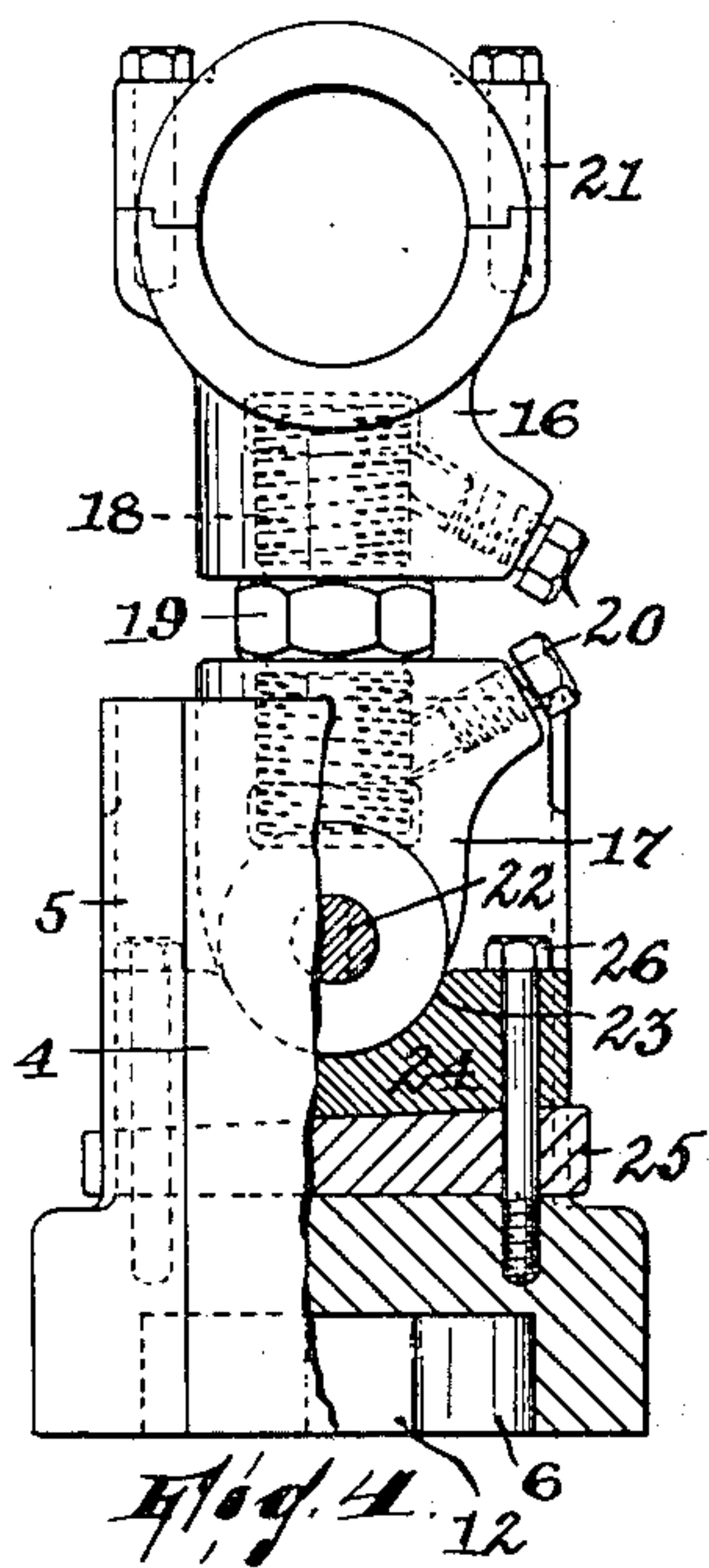
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8 SHEETS—SHEET 3.



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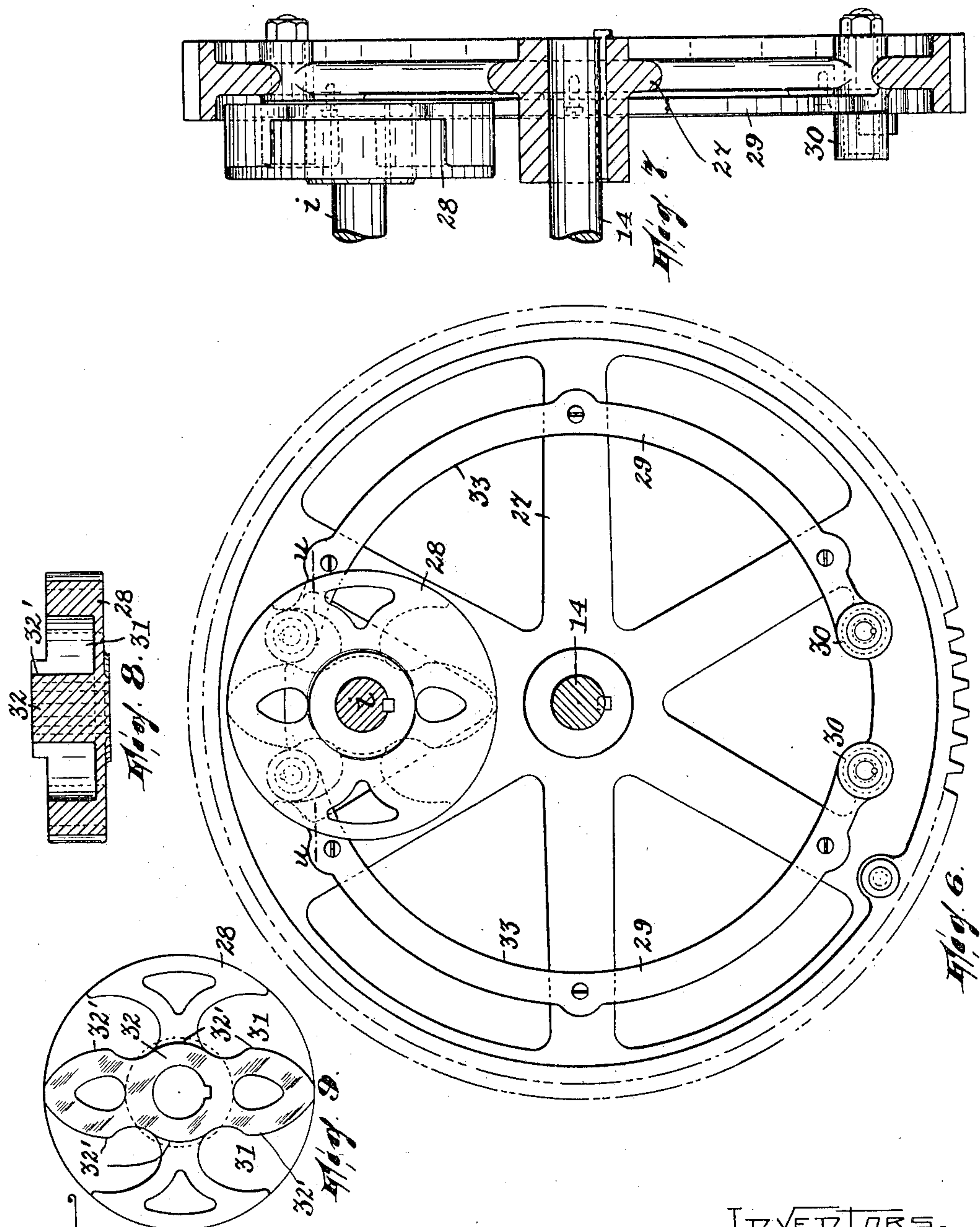
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8 SHEETS—SHEET 4.



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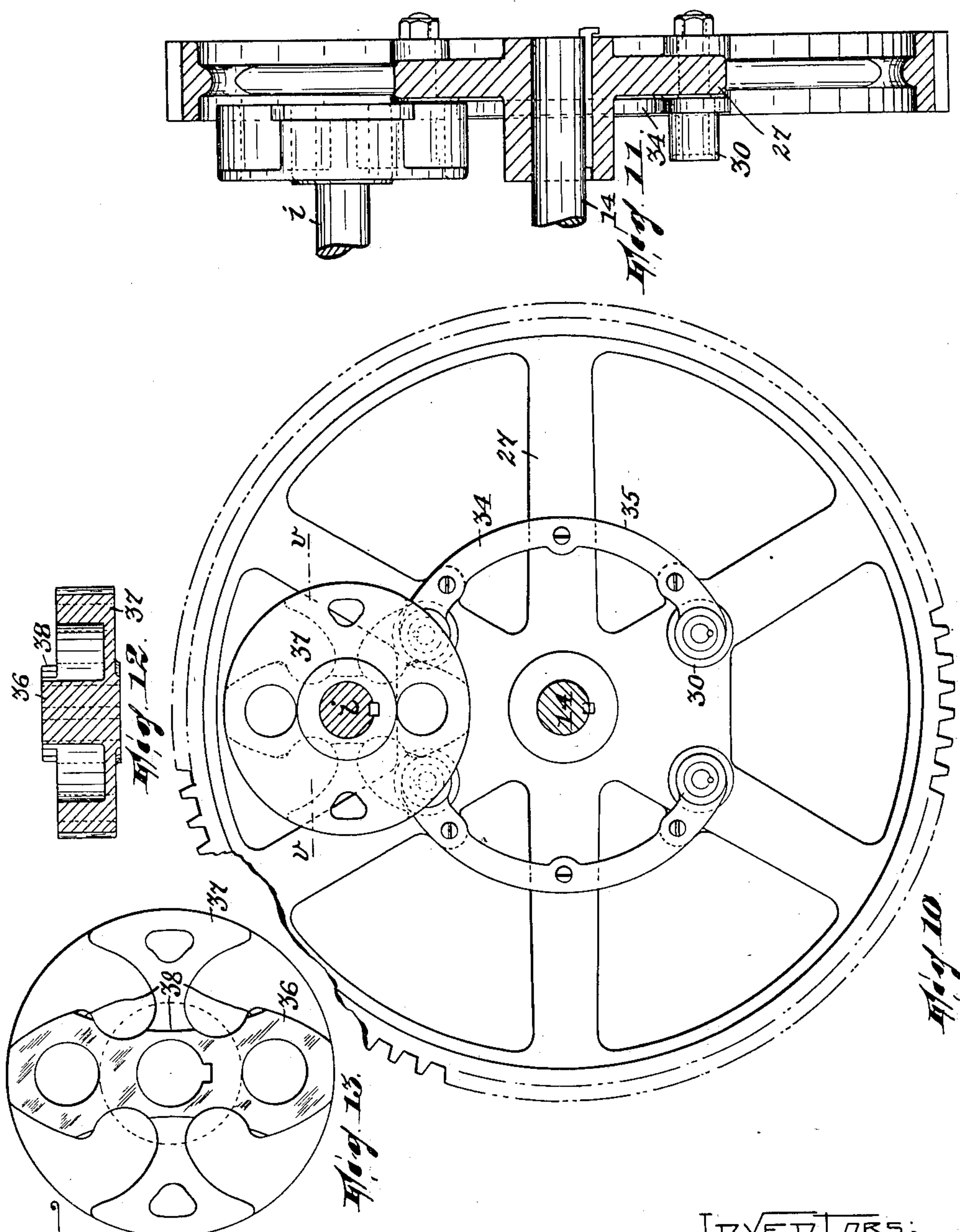
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8 SHEETS—SHEET 5.



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APPLICATION FILED JUNE 13, 1904.

8 SHEETS—SHEET 6.

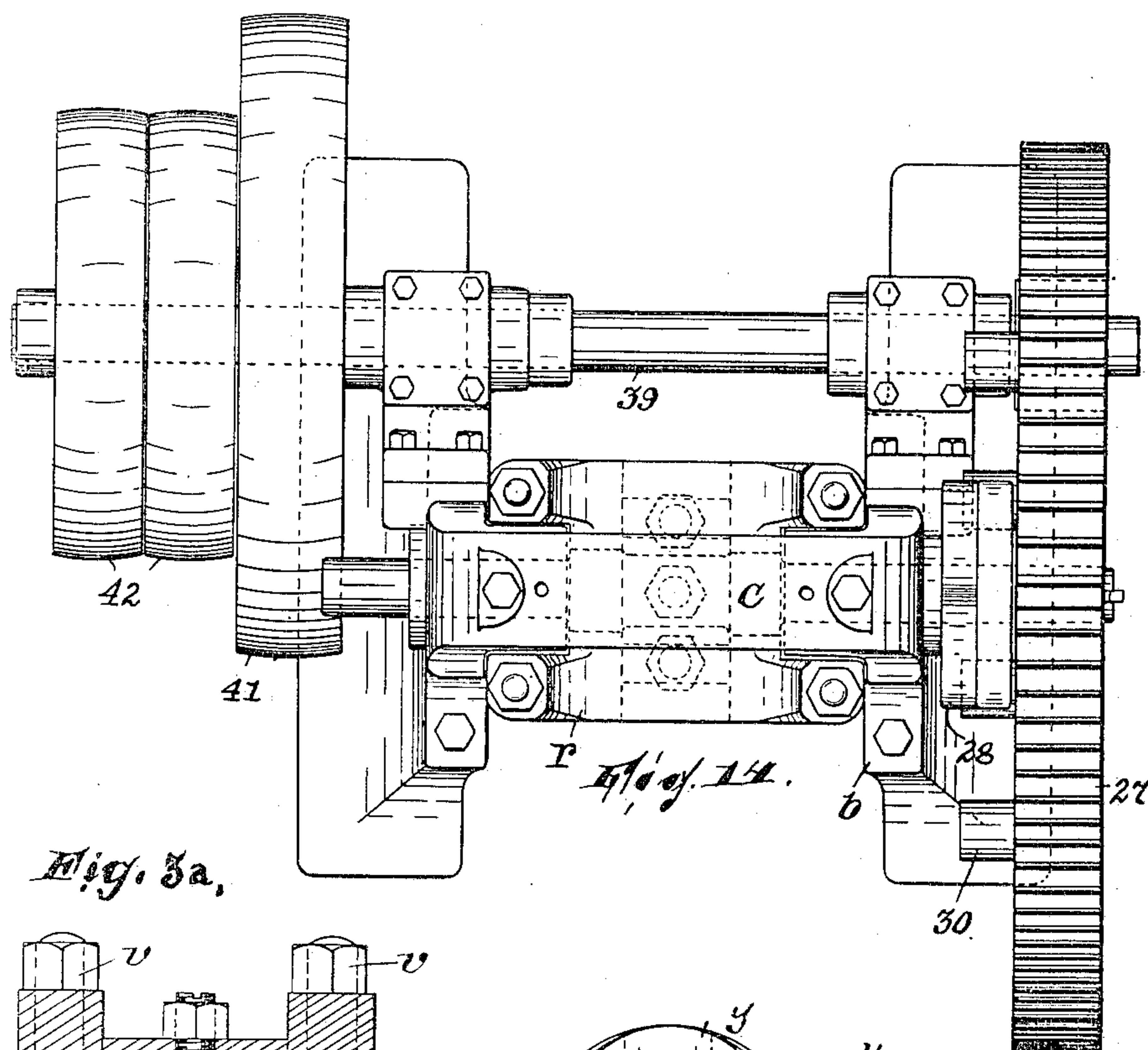
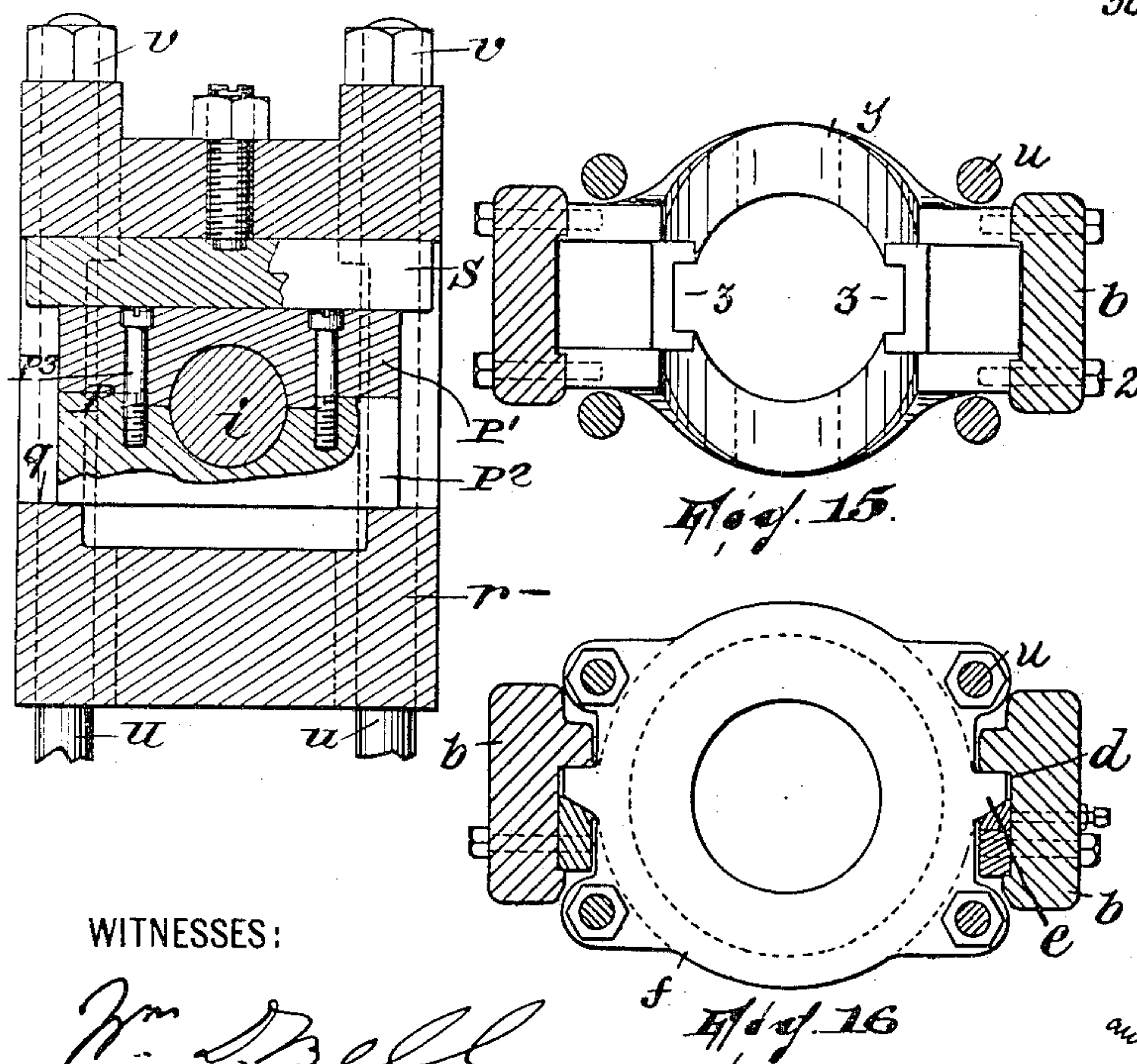
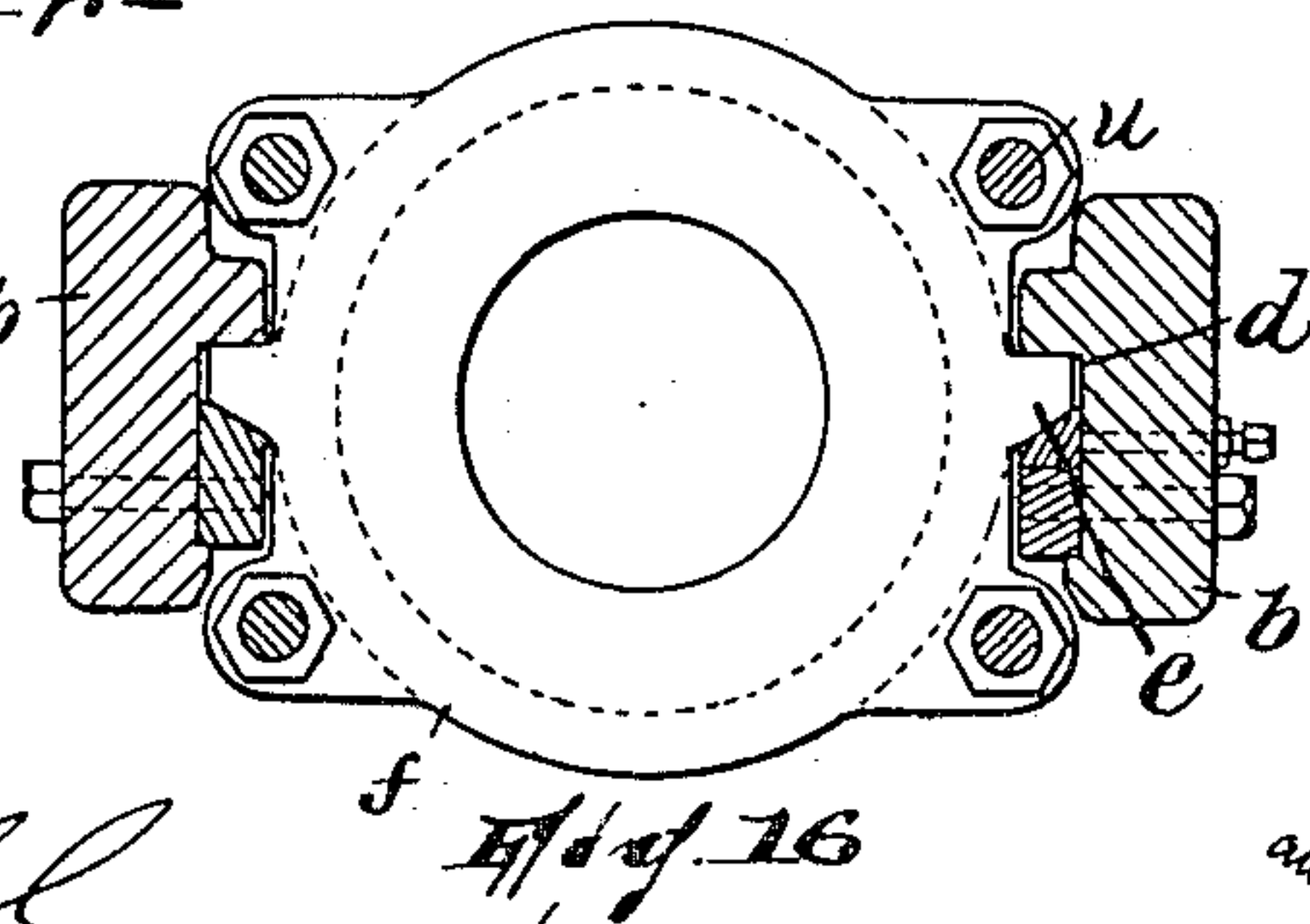


Fig. 3a.



H/d of 15.



H/d of 16.

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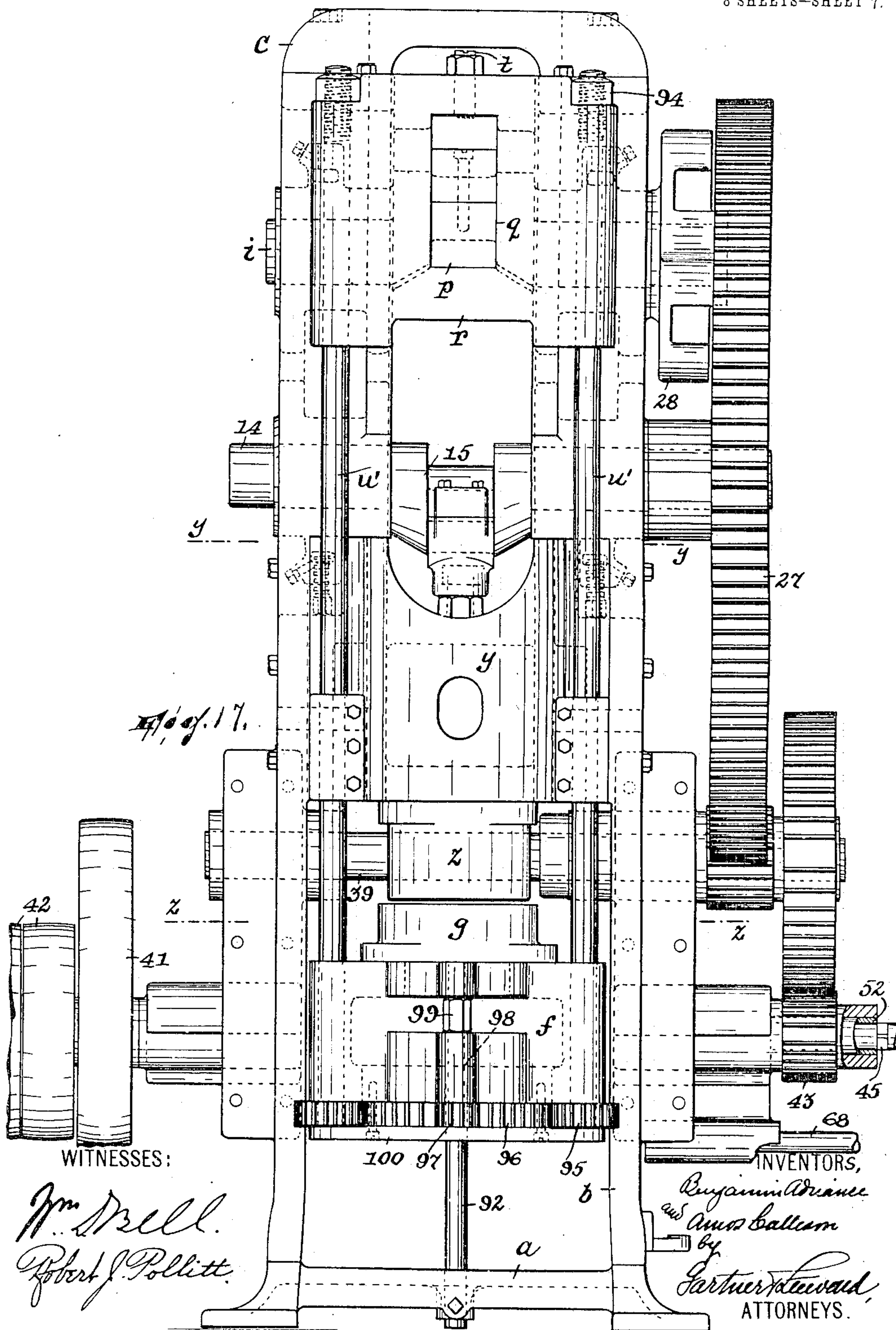
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DRAWING PRESS.

APPLICATION FILED JUNE 13, 1904.

8 SHEETS—SHEET 7.



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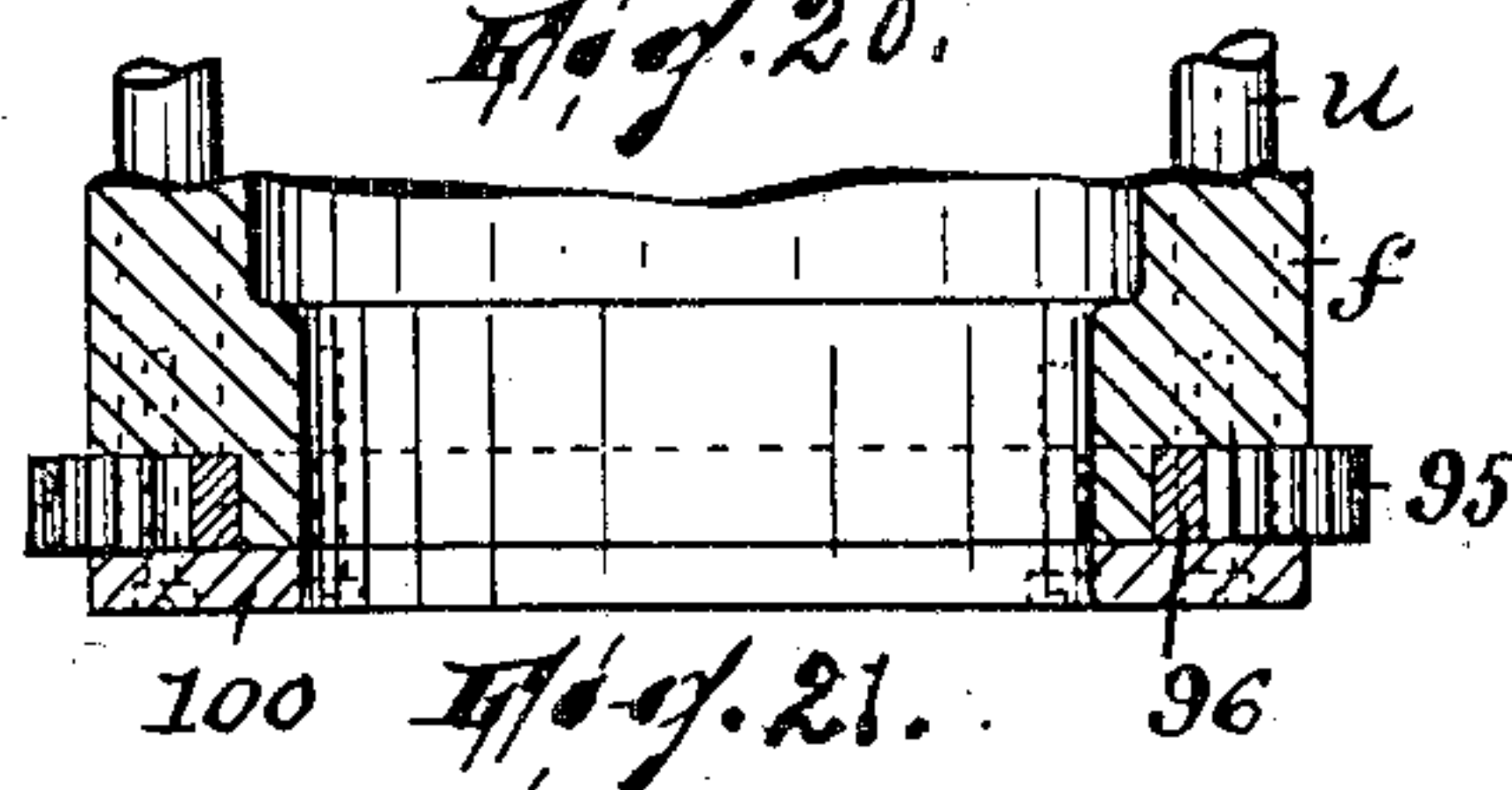
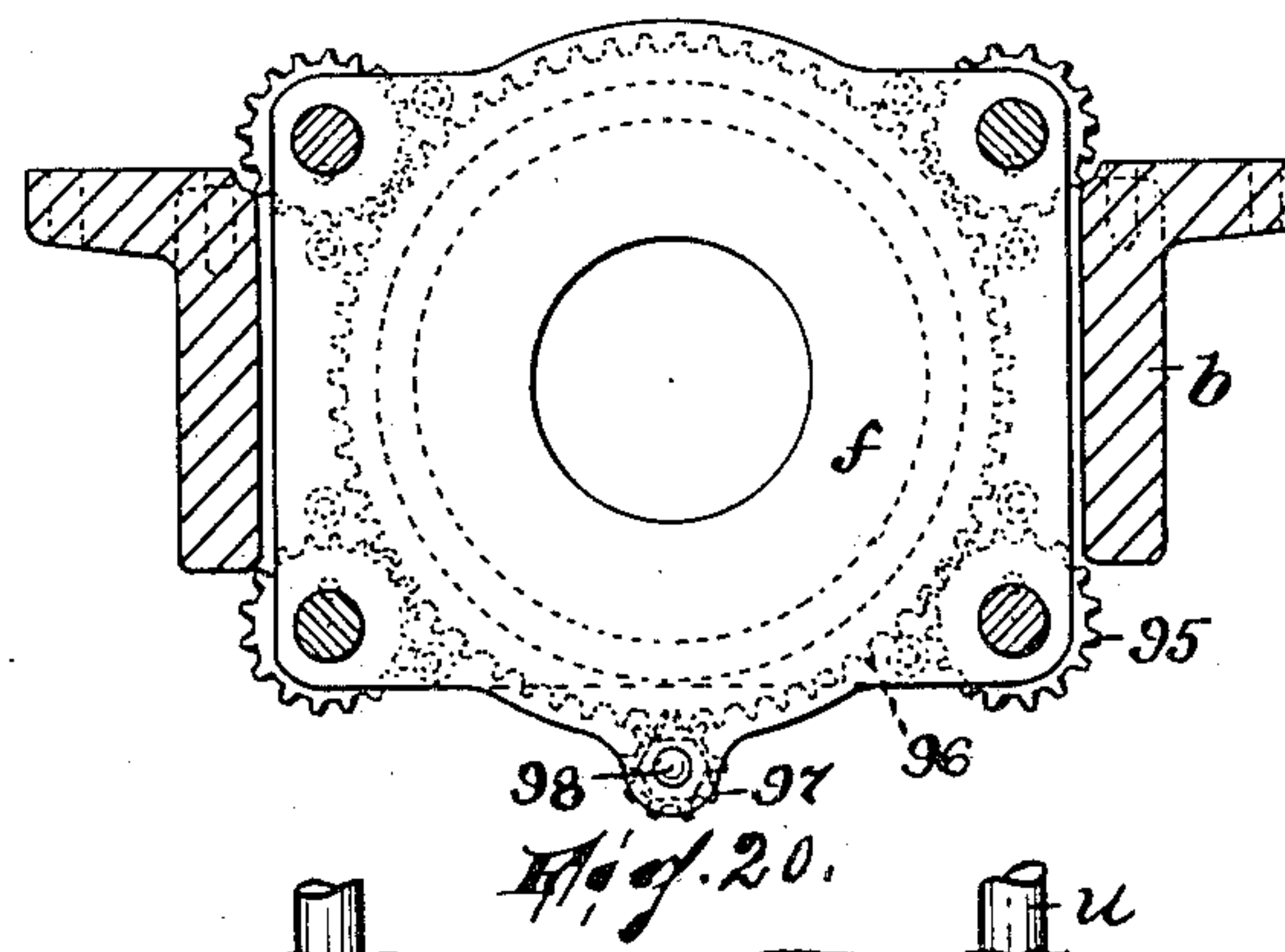
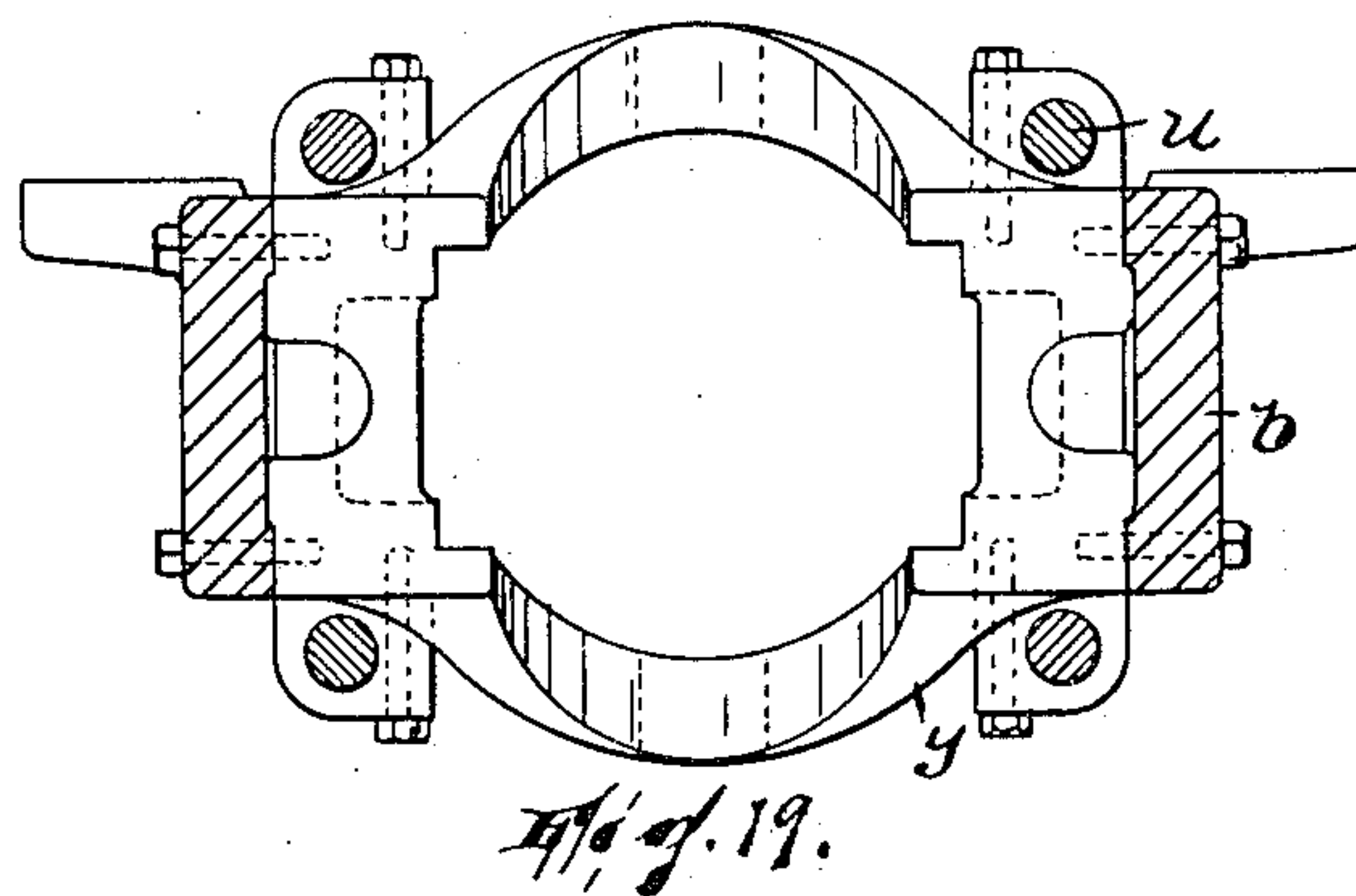
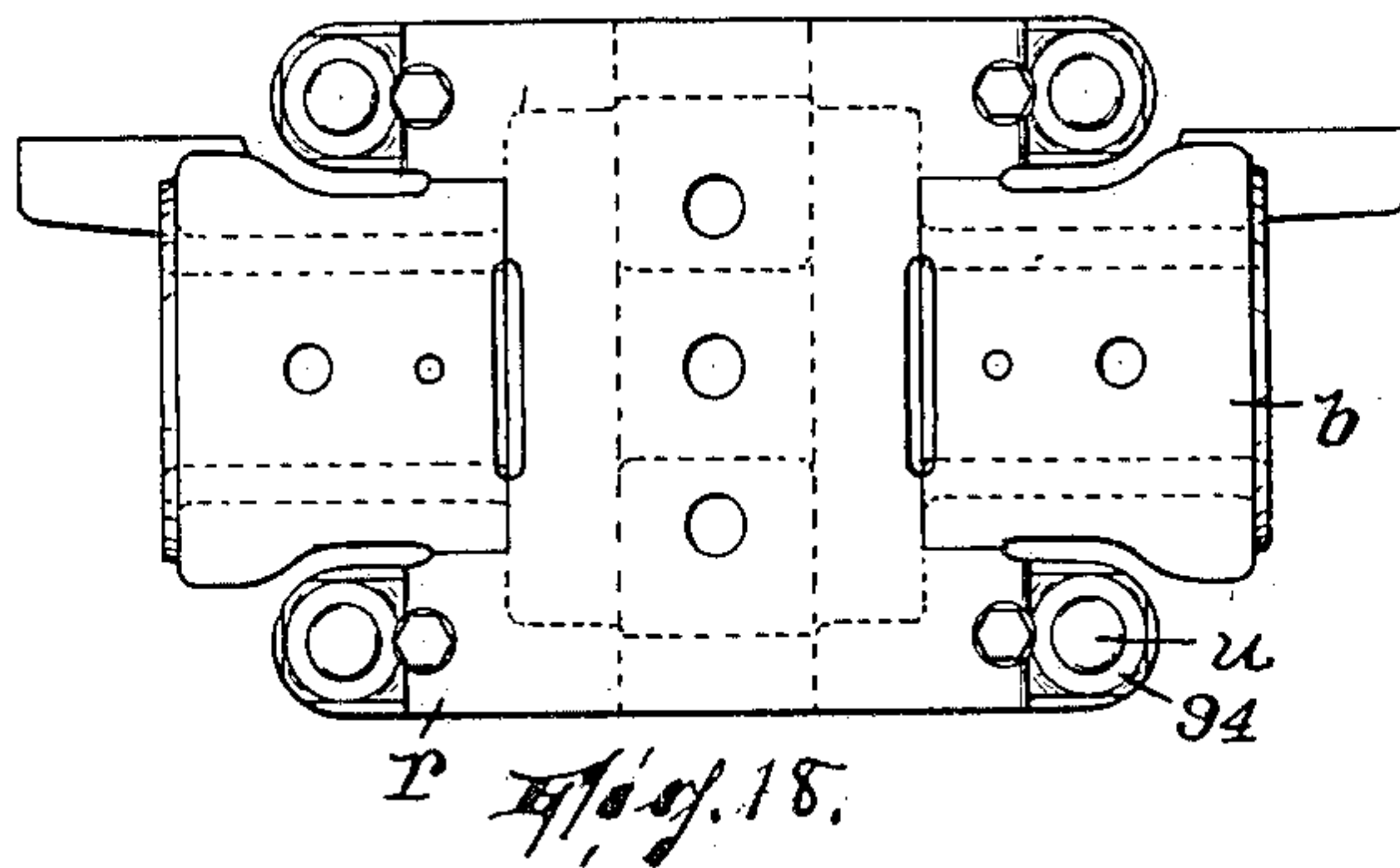
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8 SHEETS—SHEET 8.



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UNITED STATES PATENT OFFICE.

BENJAMIN ADRIANCE AND AMOS CALLESON, OF BROOKLYN, NEW YORK;
SAID CALLESON ASSIGNOR TO SAID ADRIANCE.

DRAWING-PRESS.

No. 818,807.

Specification of Letters Patent.

Patented April 24, 1906.

Application filed June 13, 1904. Serial No. 212,282.

To all whom it may concern:

Be it known that we, BENJAMIN ADRIANCE and AMOS CALLESON, citizens of the United States, residing in the borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Drawing-Presses; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to power-presses for forming cup-shaped or otherwise hollowed sheet-metal articles. In this class of machinery there are employed a drawing-punch or male die and a blank-holder—i. e., means for clamping and securing the edge portion of the blank while the punch is operating—the latter of which comprises two members, of which one is usually the female die. In some machines the lower member of the blank-holder is stationary. In others it is movable.

Broadly considered, one of the salient features of our present invention is applicable to any type of machine in which the elements aforementioned are at least to be found. The feature mentioned may be indicated briefly as follows: The points of sustaining the two members of the blank-holder and the male die or punch are all relatively so arranged in the frame that in the working of the parts under the clamping action of the male die or punch against one of said members in shaping the work said points tend to move toward instead of from each other. Therefore where, as is manifestly preferable, the main working parts are all mounted in a one-structure frame, the strains imposed thereon are crushing strains instead of tensile strains.

In the adaptation of the machine shown in the drawings the lower blank-holder member and the male die or punch is movable; but, as already intimated, any other two of the three elements involved may be movable so long as the requisite coöperation of the several parts results. Besides the advantage above indicated of arranging the sustaining means for the several parts as stated

another advantage is that the operating means for those of the three parts which move can be placed near the top of the machine-frame, and thus leave more clearance at the bottom for placing and withdrawing the work and for mounting such attachments as it may be found convenient to make use of.

Another valuable and novel feature is found in making the lower blank-holder member movable and providing for moving it by a means which suspends it from an operating means arranged in the top portion of the frame, or at least at any point therein which brings such operating means above the plane occupied by the work while held in the machine.

The invention also involves other important features, such as a novel starting and stopping mechanism, a novel means for effecting the desired operation of the blank-holding means whereby the blank is properly held stationary while the punch is operating and while the work is being removed and another blank placed in position, and a novel means for adjusting the female die.

In the accompanying drawings, Figure 1 is a front view of the improved machine. Fig. 2 is a side view looking from the left of the machine as shown in Fig. 1. Fig. 3 is a view showing the arrangement of the parts directly involved in shaping the metal in their open position, some of said parts being shown in a vertical central section taken parallel with the main shafts and others in front elevation. Fig. 3^a is a sectional view on line *t t* in Fig. 1. Fig. 4 is a view, partly in side elevation and partly in section, of the plunger and the means for connecting the same with its crank-shaft, the punch-holder proper thereof being removed. Fig. 5 is a vertical sectional view taken in substantially the same plane as that in which the section on which Fig. 3 is taken and showing the blank-holder members clamping the blank and the punch about to engage the blank. Fig. 6 is a vertical sectional view taken between the frame and the female-die-operating means and showing the inner side of the latter. Fig. 7 is a view, partly in vertical central section and partly in elevation, of what is seen in Fig. 6. Fig. 8 is a sectional view of a certain part taken on the line *u u* in Fig. 6. Fig. 9 is a face view of the part 28 looking toward the side opposite to that seen in Fig. 6. Fig. 10 is a view substan-

tially like Fig. 6, except showing a modification of the means therein shown. Fig. 11 is a view, partly in vertical central section and partly in elevation, of what is seen in Fig. 10. Fig. 12 is a sectional view of a certain part 37 taken on the line *vv* in Fig. 10. Fig. 13 is a face view of the part 37 looking toward the side opposite to that seen in Fig. 10. Fig. 14 is a top plan view of the machine. Figs. 15 and 16 are horizontal sectional views taken on the lines *ww* and *xx*, respectively, in Fig. 1, certain parts being removed. Fig. 17 is a view in front elevation of the machine, showing a modified form of the means for adjusting the bed *f*. Fig. 18 is a plan view of the top portion of the machine shown in Fig. 17 with the top cap removed. Figs. 19 and 20 are horizontal sectional views taken on the lines *yy* and *zz*, respectively, in Fig. 17, certain parts being removed; and Fig. 21 is a vertical sectional view of the lower portion of the female-die holder shown in Fig. 17.

The frame of the machine comprises the base *a*, two uprights *b* and a cap *c*, surmounting the uprights and bracing them, the whole being bolted together. In vertical guideways *d*, provided on the inner sides of the uprights near the bottom thereof, work the vertical guiding-flanges *e* of the lower member of the blank-holder, which comprises a bed *f* and a die *g*, (in the adaptation shown the female die,) having any desired form and being removably secured to the bed, as by bolts *h*, so as to be interchangeable. In the uprights *b*, near the top thereof, is journaled a horizontal shaft *i*, the bearings therefor being formed partly by the uprights and partly by plumber-blocks *j*, arranged in openings *k* in the uprights and each carrying in the split portion *l* thereof a set-screw *m*, which takes against the top of the opening. When the plumber-block has been forced down against the shaft by adjusting screw *m*, screw *m* may be secured by a screw *n*, acting to clamp the screw *m* in the split portion of the plumber-block. The shaft *i* has a crank *o*, which carries a two-part slide *p*, (comprising members *p'* and *p''*, held together by screws *p'''*,) movable in a horizontal guideway *q* in a carrier *r* and wiping in the rotations of the crank against a bearing-piece *s*, removably secured in the carrier by a set-screw *t*. The carrier sustains the blank-holder member aforesaid through the medium of four rods *u*, which penetrate the carrier and have their heads *v* taking against the top thereof, their lower ends being threaded and penetrating projections *w* on the bed *f* and provided with nuts *x*, whereby the bed *f* is clamped onto the rods. This arrangement permits of adjustment of the bed relatively to the carrier.

y is the upper blank-holder, the same being provided with a detachable part *z*, which directly coacts with the die *g* in holding the work. The blank-holder *y* is secured by

dowel-pins 1 and bolts 2 to and between the uprights *b* and is formed internally with vertical guideways 3.

In the guideways 3 work the guiding-ribs 4 of a plunger 5, (see Fig. 4,) which is bifurcated in its upper portion and which in its lower portion is formed with a recess 6, which receives the flanged or head portion 7 of the punch-holder proper, 8, to which the punch or male die 9 may be secured in any desired manner. 10 represents bolts penetrating the plunger vertically and having their heads 11, which are set in pockets 12, formed as diametric extensions of the recess 6, arranged to take against the headed portion of the punch-holder 8 to thus secure the same in the recess 6. 13 represents nuts for clamping the bolts 10 in place. The punch is movable from the position shown in full lines in Figs. 3 and 5 to the position shown in dotted lines in Fig. 5. It is reciprocated from a shaft 14, formed with a crank 15. The pitman for transmitting motion from the crank 15 to the plunger comprises two members 16 and 17, which are connected by a reversely-threaded screw 18, so as to be adjustable, the screw having intermediate the members 16 and 17 a polygonal head 19, whereby to manipulate the screw with a wrench. 20 represents set-screws which bind against the screw 18, one of which is mounted in each member 16 17 to secure the screw where adjusted. Member 16 is formed with a removable cap 21, preferably bolted thereto, permitting assembling of said member and the crank, and member 17 works on a pivot 22, traversing the bifurcated portion of the plunger. Its lower end is rounded, as at 23, and wears against a bearing-piece 24, which is held up against member 17 by a wedge 25, driven into the bifurcated portion of the plunger under the wearing-piece and there held by a screw 26. This arrangement provides for placing the thrust of the pitman directly on the plunger instead of on the comparatively weak pivoting-pin 22.

In this class of machines the punch-holder has a simple up-and-down movement imparted to it from the shaft 14, which rotates continuously in one direction, while the movable member of the blank-holder is given a reciprocating movement, in which at the end of each stroke there is a dwell of more or less duration, the one dwell being while the work is being clamped and the punch is acting on the blank and the other being while the finished work is taken off and a new blank applied. This action is accomplished in the present instance by the mechanism shown in Figs. 6 to 9 or 10 to 13.

Referring first to Figs. 6 to 9, on the shaft 14 is keyed a large gear 27, and on the shaft *i* is keyed a stop-disk 28. On the inner face of the gear is secured a pair of arc-shaped detents 29, disposed concentrically to the periphery of the gear and having their ends

equidistantly spaced and carrying against the inner faces thereof rollers 30. Each stop-disk has on the face thereof adjacent the gear two pairs of arc-shaped slots 31, the slots in each pair being relatively reversed. The corresponding slots in the two pairs are spaced by a cam portion 32 projecting beyond the face of the disk and having its acting faces 32' sufficiently distanced from the axis of rotation of the disk so that the inner or acting faces 33 of the detents will have a wiping contact with the faces 32' when the stop-disk has been turned to the position in which it appears in Fig. 2. The arrangement shown in Figs. 10 to 13 is substantially the same, except that the detents 34 are in this instance small enough so that their outer curved faces 35 are engaged by the cam portion 36 of the stop-disk 37. At 38 is indicated where the faces 35 engage the cam portion 36 in this instance. As shaft 14 rotates the rollers will engage the stop-disk in the slots thereof in an obvious manner and turn the same through a half-revolution, and until the next pair of rollers approach the stop-disk the wiping-face of one of the detents and the wiping-faces of the cam on the stop-disk will be engaged with each other, preventing the stop-disk from turning. The effect of this action is that while the punch is or may be making regular reciprocations with practically no dwells between the movable member of the blank-holder moves first in one direction, then stops, and then in the other direction and then stops, being at each stop held for a very appreciable length of time at a positively maintained dwell. Following out these movements just after the punch starts to descend the movable member of the blank-holder is drawn upward quickly, such movement of the blank-holder occupying sixty degrees of the rotation of shaft 14. The punch continues to descend through one hundred and eighty degrees of the rotation of shaft 14, meantime shaping the work while it is being held by the blank-holder. Just after the punch begins to ascend the movable member of the blank-holder quickly descends, such descending movement occupying about sixty degrees of the rotation of shaft 14. The return or ascending movement of the punch takes up the remaining one hundred and eighty degrees of rotation of shaft 14, and if the machine were stopped at this time would leave the punch at its extreme upper limit and the movable member of the blank-holder at its extreme lower limit.

The machine is driven from a drive-shaft 39, mounted in supports 40, projecting from the upright *b*. On one end of the shaft is fixed a fly-wheel 41, and alongside the fly-wheel are fast and loose pulleys 42, whereby the power is taken into the machine from a belt. On the other end portion of the shaft is loosely arranged a pinion 43, which meshes

with the gear 27 and which is loose on the shaft and may be disconnectively connected therewith, so as to rotate or not with the shaft at will by any suitable clutch mechanism.

In general construction the machine shown in Fig. 17 is substantially like that already described. It differs, however, in so far as the means for adjusting the bed *f* is concerned. The rods *u'* are in this instance threaded at the top, receiving nuts 94, and at their lower ends carry pinions 95, all in mesh with a master-gear 96, engaged by another pinion 97, carried by a shaft 98, having a squared head 99, adapted to receive a wrench. The several pinions and the gear are kept up against the bottom of the bed by a disk 100, secured to the bed. It will be obvious that the vertical adjustment of the bed may be effected by applying a wrench to shaft 98, and thereby, through the gearing, turning the rods in their nuts 94.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the frame, of the male die member and the blank-holder member with which said male die member coacts in shaping the metal, one of said members being movable relatively to the other, means for sustaining the blank-holder member in the frame, and means, arranged in the frame between said blank-holder member and its sustaining means, for sustaining said male die member, the sustaining means for the member which is movable being also the actuating means therefor, substantially as described.

2. The combination, with the frame, of the male die or punch, the blank-holder member with which said die coacts in shaping the metal and the complementary blank-holder member, one of said blank-holder members being movable relatively to the other, and separate means for sustaining said blank-holder members in the frame, the means for sustaining one blank-holder member being disposed between the other blank-holder member and its sustaining means, and the sustaining means for the movable blank-holder member being the actuating means therefor, substantially as described.

3. The combination, with the frame, of the male die or punch, the lower blank-holder member, the upper blank-holder member, means for securing said upper blank-holder member in the frame, crank-shafts, one of which is arranged above the point of securing said upper blank-holder member in the frame, means for connecting the lower blank-holder member with the crank on said last-named shaft, and means for connecting the male die or punch with the crank on the other shaft, substantially as described.

4. The combination, with the frame, of

the male die or punch, the lower blank-holder member, the upper blank-holder member, means for securing said upper blank-holder member in the frame, crank-shafts, one of which is arranged above the other and also above the point of securing said upper blank-holder member in the frame, means for connecting the lower blank-holder member with the crank on the last-named shaft, and means for connecting the male die with the crank on the other shaft, substantially as described.

5. The combination, with the frame, of the male die or punch, two blank-holder members, one of which is movable, means for operating the male die, a carrier for the movable blank-holder member, means for actuating said carrier, and means for adjustably connecting said movable blank-holder member with the carrier comprising threaded rods, threaded parts arranged in the carrier and engaged by the threaded portions of said rods, and intermeshing gearing connecting the several rods and adapted for turning the same in said threaded parts, substantially as described.

6. In a drawing-press, a male die or punch carrying and actuating means comprising a plunger, a pitman pivoted in the plunger at one end and adapted at the other end to be connected with the crank for operating the plunger, a bearing-piece interposed between a part of the plunger and the adjacent end of the pitman, and a wedge interposed between the plunger and the bearing-piece, substantially as described.

7. In a drawing-press, the combination of the frame, a male die or punch, the blank-holder comprising a movable member, a drive-shaft, a rotary part, power-transmitting mechanism operatively connecting said rotary part and the die and movable blank-holder member, disconnective connecting means between said rotary part and the shaft, a braking means for said rotary part, and a

controlling part operatively connected with, and adapted to actuate, both said disconnective connecting means and the braking means, substantially as described.

8. In a drawing-press, the combination of the frame, a male die or punch, the blank-holder comprising a movable member, a drive-shaft, a rotary part, power-transmitting mechanism operatively connecting said rotary part and the die and movable blank-holder member, disconnective connecting means between said rotary part and the shaft, a braking means for said rotary part, a controlling part operatively connected with, and adapted to actuate, both said disconnective connecting means and the braking means, said disconnective connecting means being adapted to automatically hold the parts where the power is transmissible from the drive-shaft to said rotary part, and means, comprising a part carried by said power-transmitting mechanism, for causing said controlling part to break the connection between the drive-shaft and said rotary part and release the braking means, substantially as described.

9. The combination, with the frame, of the female die, the male die or punch arranged above the female die, the upper blank-holder member coactive with the female die to hold the blank, rotary crank-shafts arranged above the plane of holding the work, operative connecting means between the male die or punch and the crank on one of said shafts, and a supporting structure for the female die suspended from the crank on the other shaft, substantially as described.

In testimony that we claim the foregoing we have hereunto set our hands this 10th day of February, 1904.

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Witnesses:

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