

No. 828,226.

PATENTED AUG. 7, 1906.

P. A. LORENZ.
METHOD OF PRODUCING BUCKET BLANKS.

APPLICATION FILED JAN. 8, 1906.

3 SHEETS—SHEET 1.

Fig. 1.

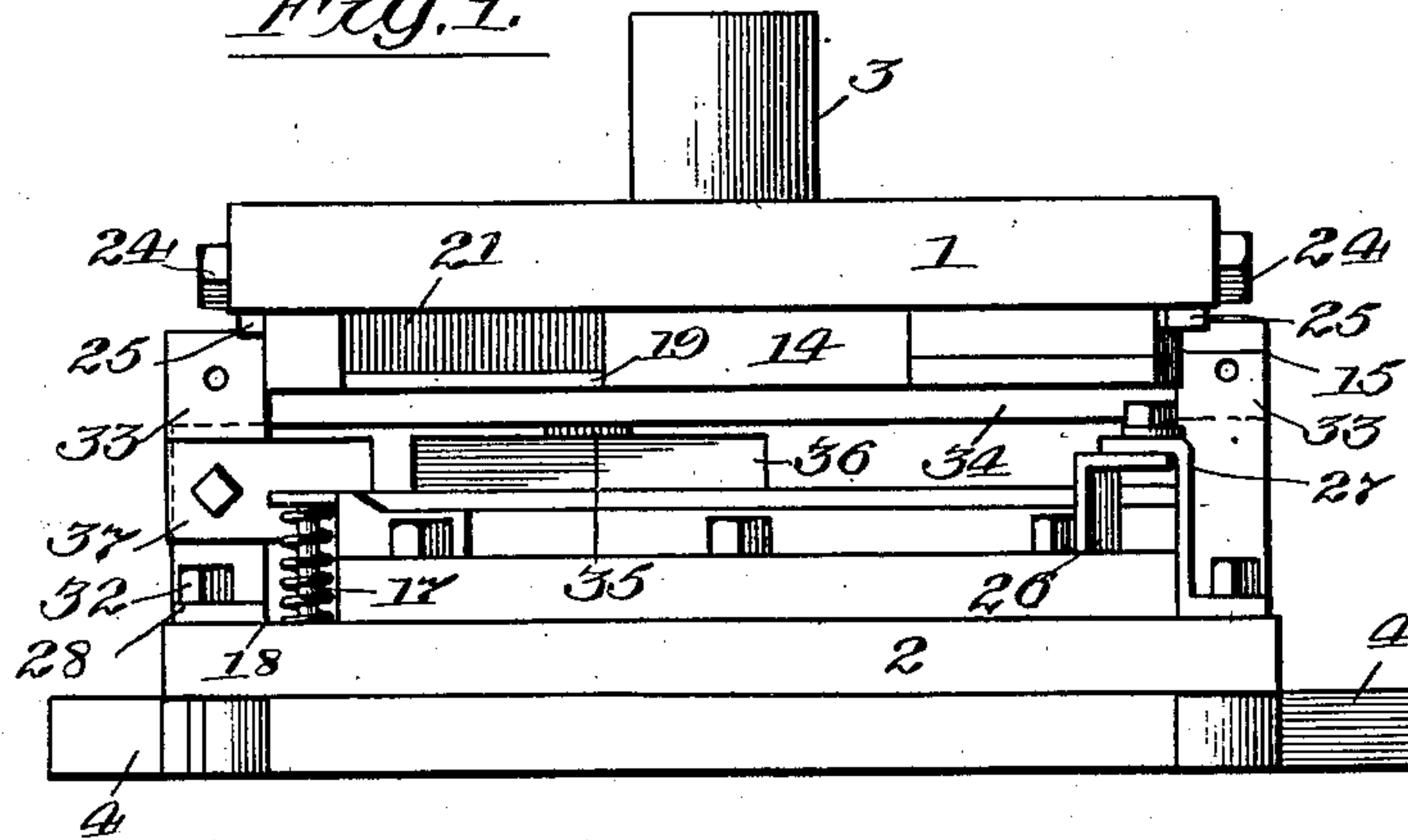


Fig. 2.

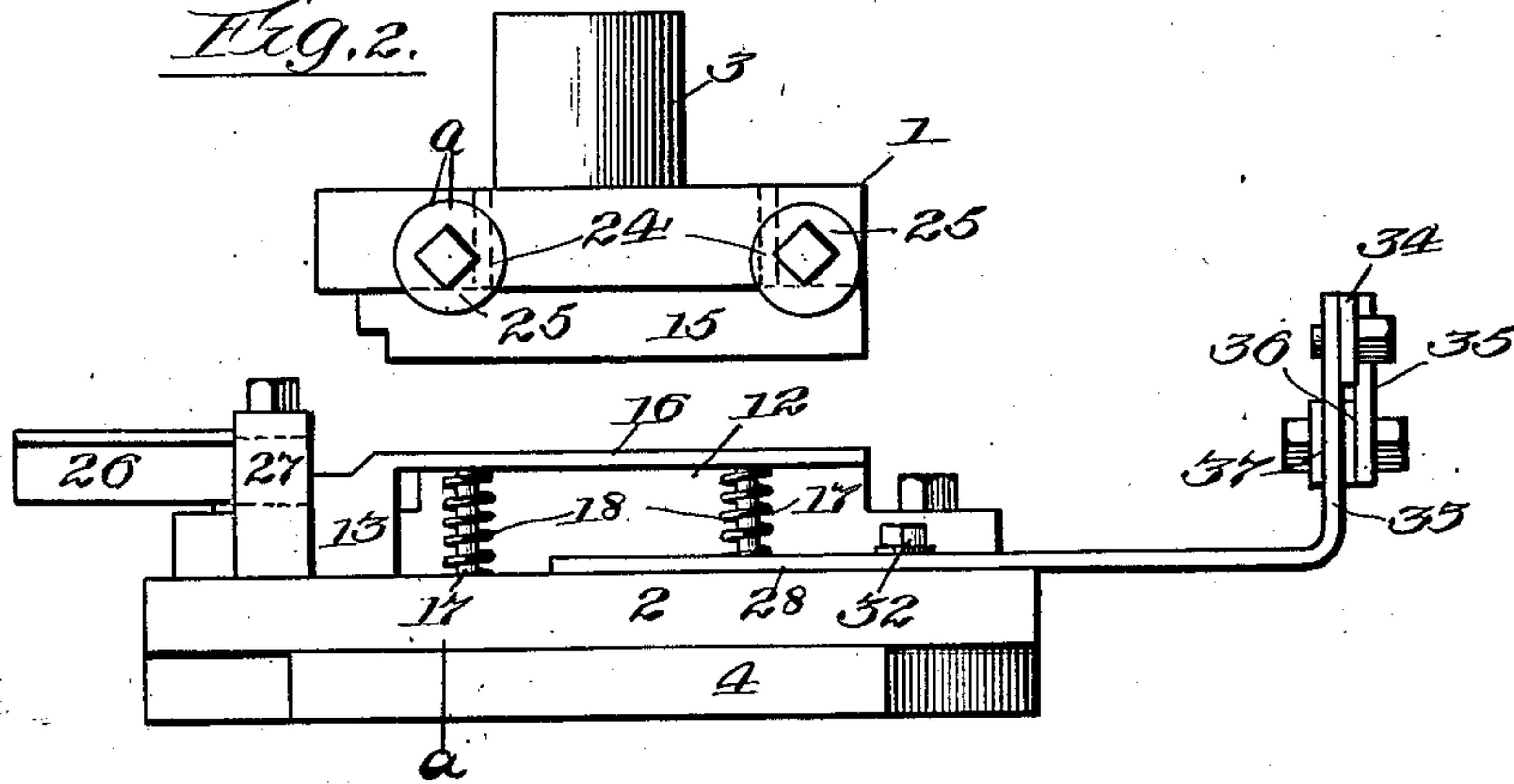
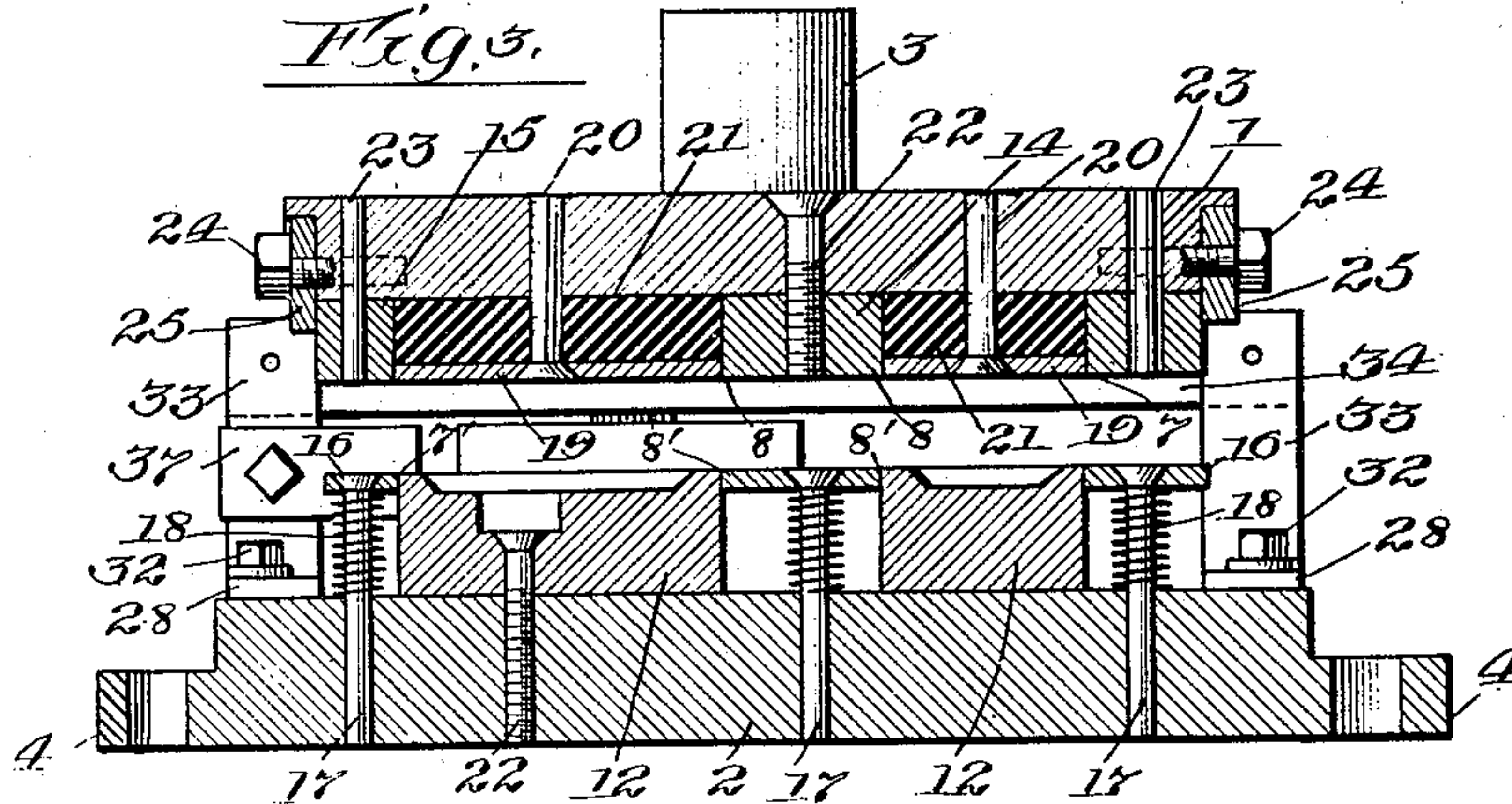


Fig. 3.



Witnesses:

One Witness

A. S. Phillips

Inventor:

Peter A. Lorenz
by Arthur M. Mankin

Att'y

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3 SHEETS—SHEET 2.

Fig. 4.

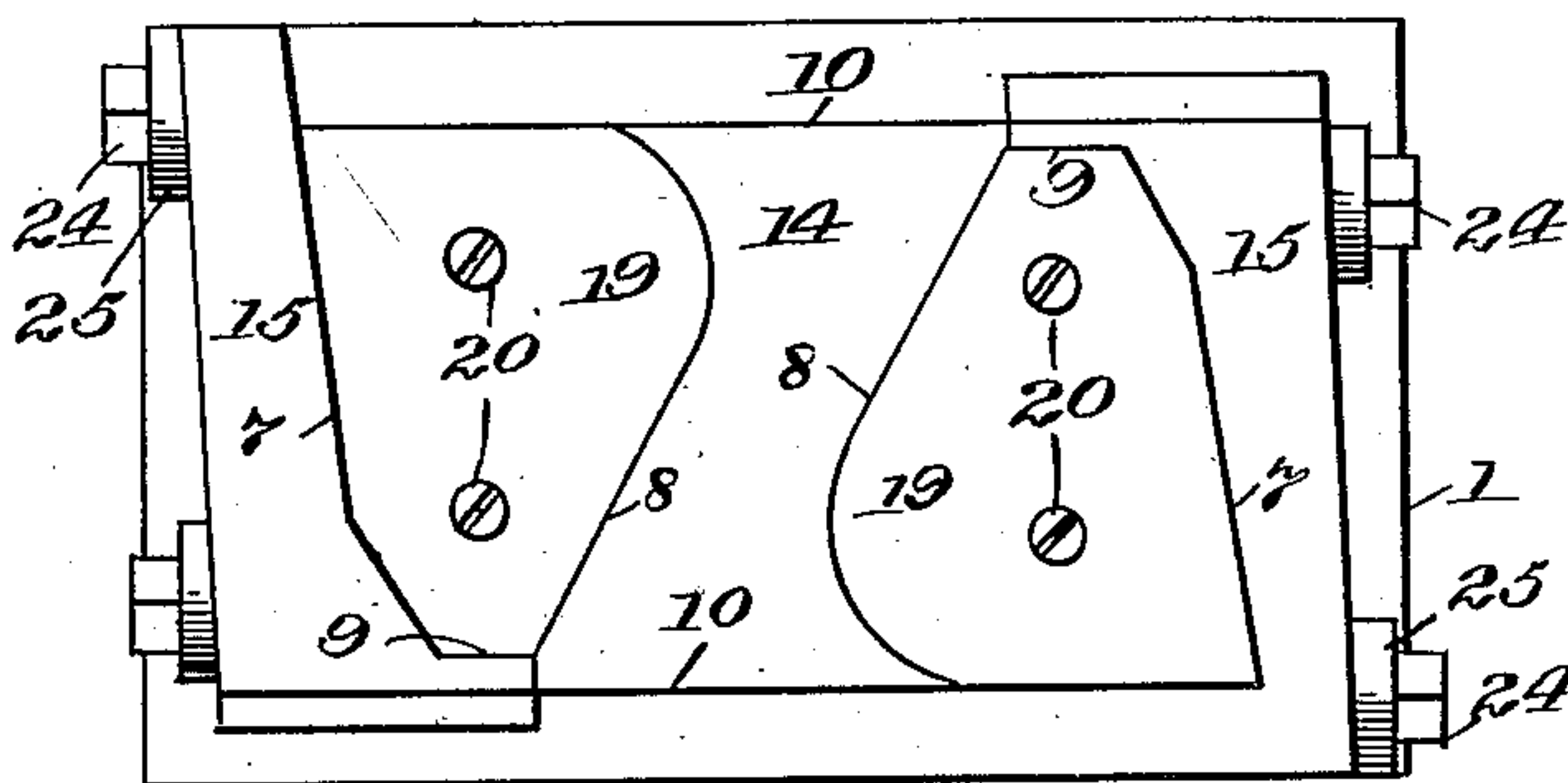
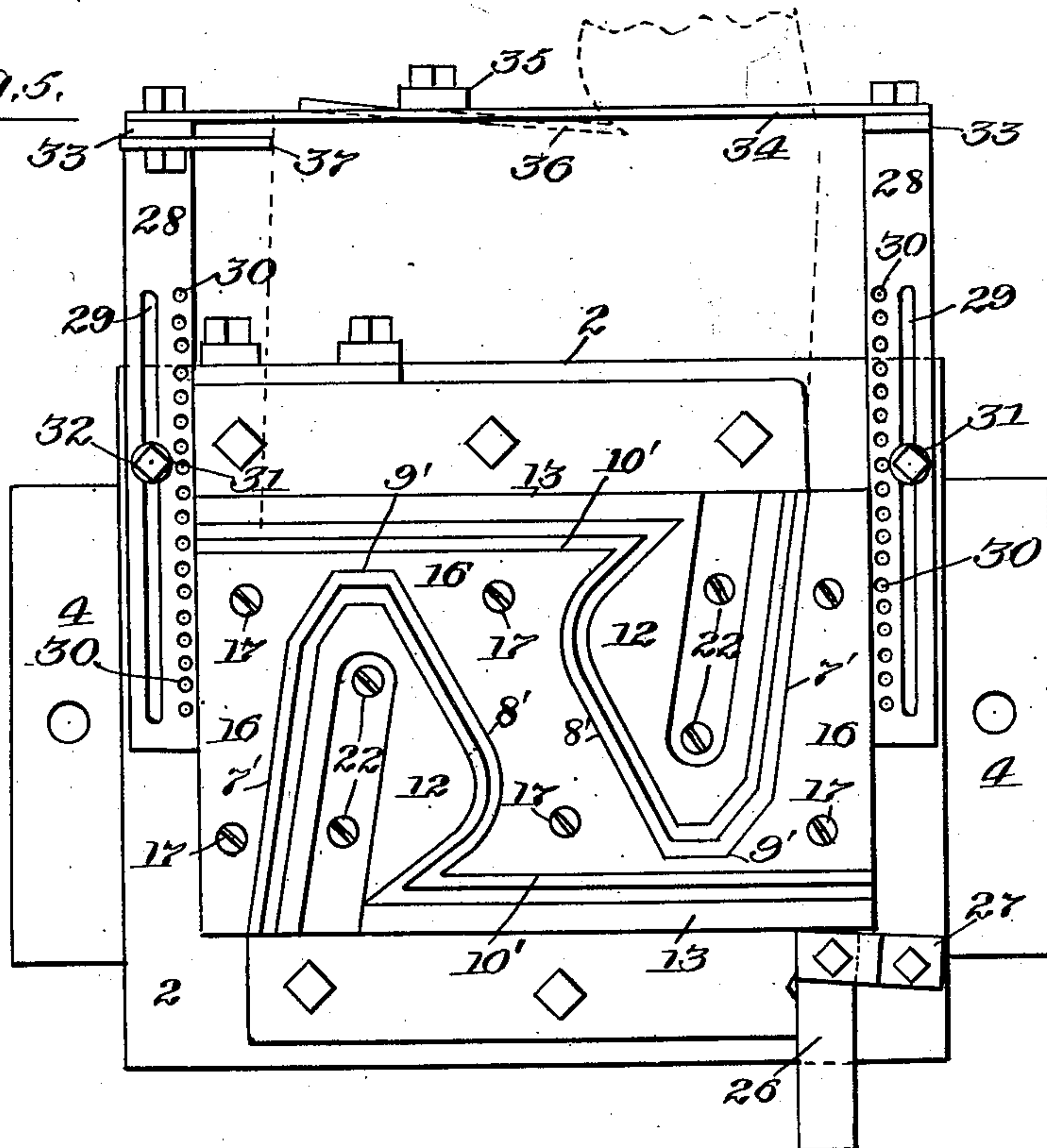


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

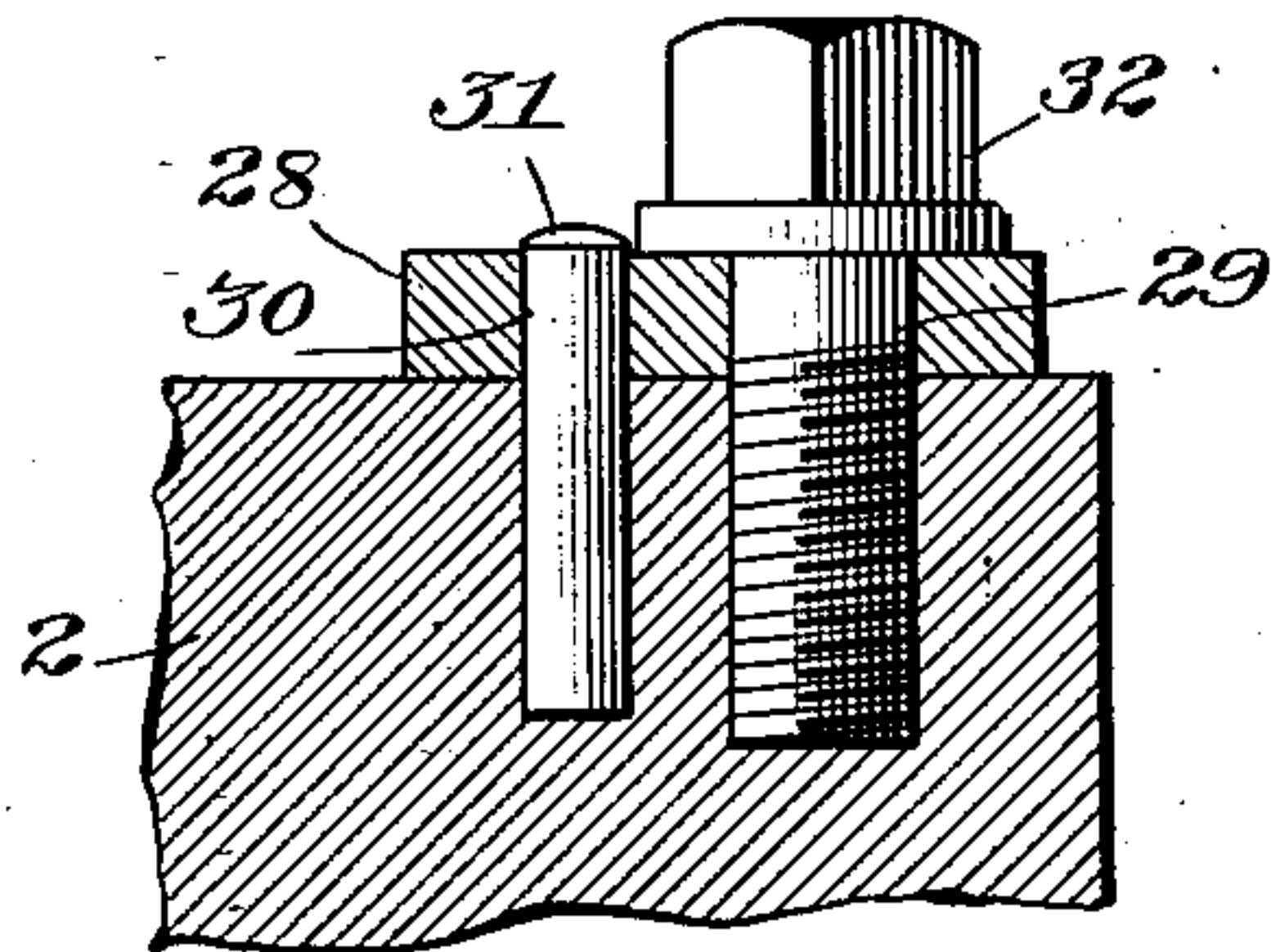


Fig. 7.

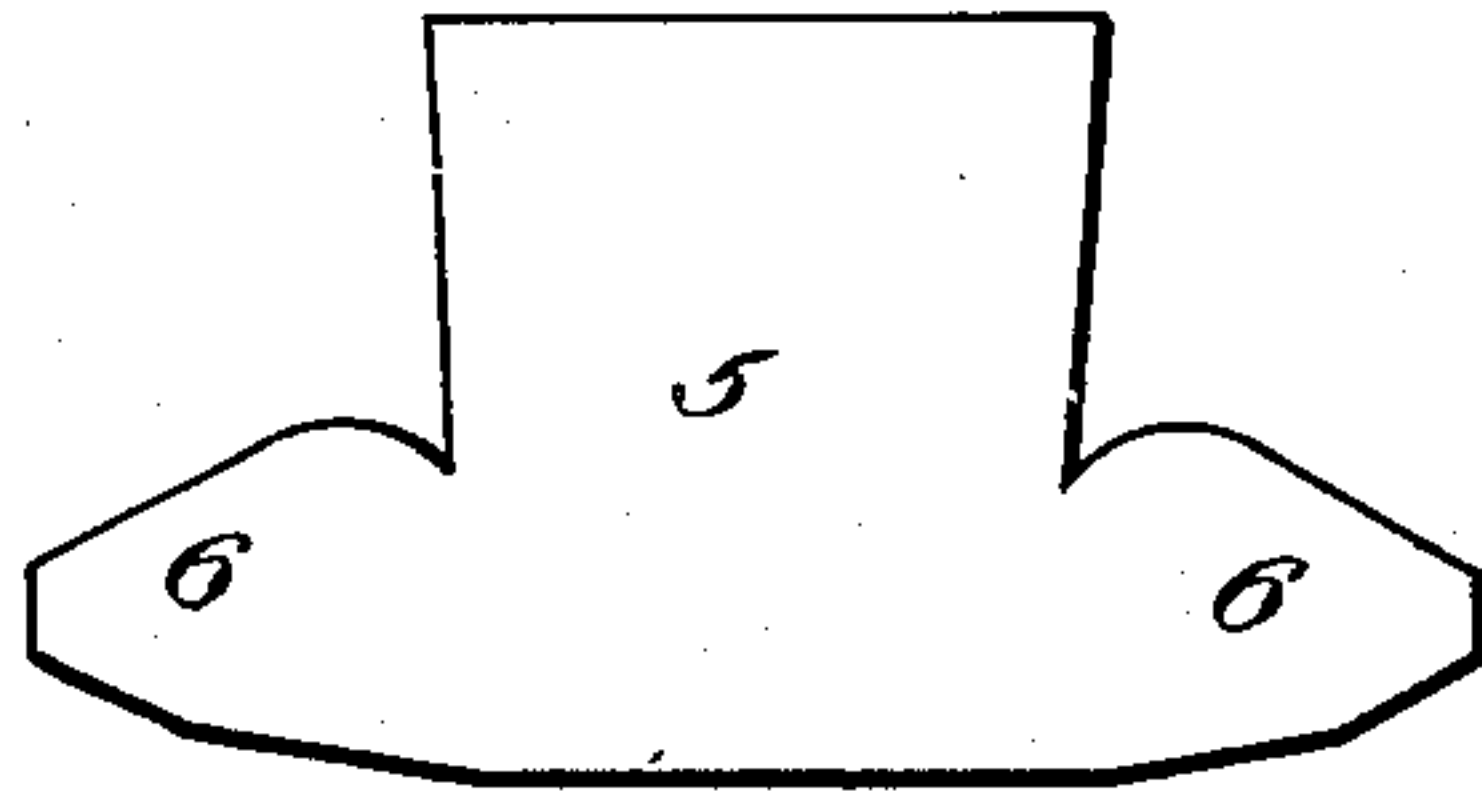


Fig. 9.

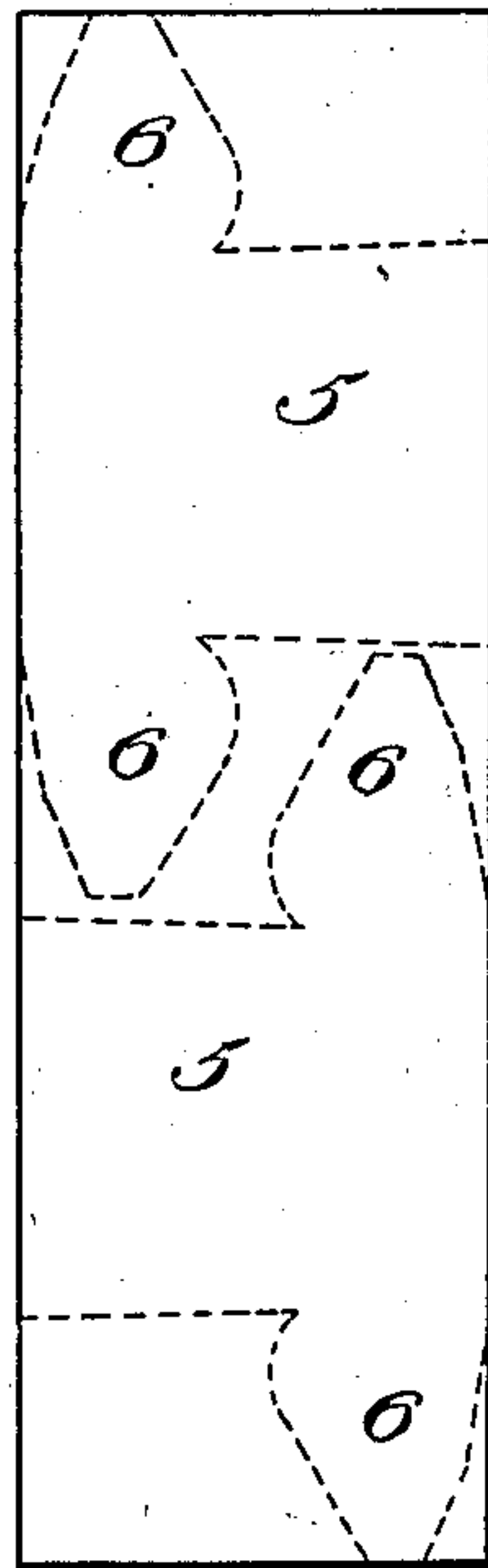
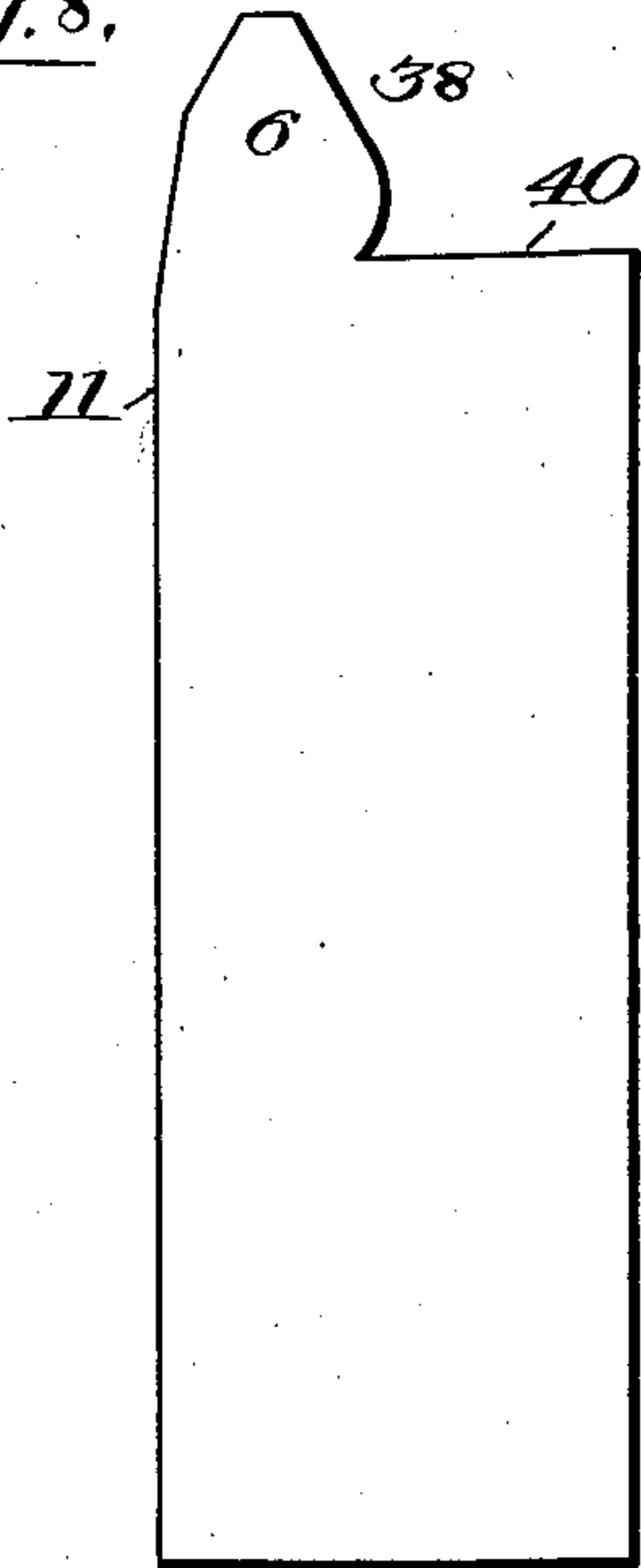


Fig. 8.



Witnesses:

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UNITED STATES PATENT OFFICE.

PETER A. LORENZ, OF CHICAGO, ILLINOIS.

METHOD OF PRODUCING BUCKET-BLANKS.

No. 828,226.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Original application filed June 30, 1903, Serial No. 163,696. Divided and this application filed January 8, 1906. Serial No. 295,086.

To all whom it may concern:

Be it known that I, PETER A. LORENZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Methods of Producing Bucket-Blanks, of which the following is a specification.

My invention relates to the manufacture of blanks from which elevator buckets or cups may be formed by subsequent operations.

The object of my invention is to provide a method by which such bucket-blanks may be formed from a continuous sheet of metal with the greatest possible economy of time and material.

This application is a division of my former application, Serial No. 163,696, filed June 30, 1903.

That my invention may be clearly understood I illustrate the same by reference to the accompanying drawings, by which is represented a practical means for putting the principles thereof into effect.

In the drawings, Figure 1 is a front view of a pair of dies. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional view taken vertically through the two dies in the plane indicated by the line *a-a* of Fig. 2. Fig. 4 is an under side view of the upper die. Fig. 5 is a plan view of the lower die. Fig. 6 is an enlarged fragmentary detail view showing, in section, devices for holding the guiding means in adjusted position. Fig. 7 is a view showing one of the blanks cut by means of my improved dies. Fig. 8 is a view showing an end portion of a metal strip when the first or initial cut of the dies has been effected thereon for finishing one end portion of a blank; and Fig. 9 is a view showing one of the strips or pieces of metal from which blanks are to be cut by means of the improved dies, the manner in which the blanks are to be cut from the strip being indicated in dotted lines.

As shown in the views, 1 is the upper and 2 the lower die, the upper die having a stem 3, by means of which it may be connected with a plunger (not shown) and the lower die 2 having lateral portions 4 4, by means of which it may be bolted or otherwise secured to a suitable bed above which the upper die is adapted to reciprocate in a vertical direction.

The upper die 1 is provided with a die-sur-

face extended beneath it and provided with two series of operative parts formed of cutting edges, each of the series conforming to an end portion of one of the blanks to be cut. The lower die 2 is also formed with an upper die-surface reciprocal with the surface of the upper die and also having two series of operative parts formed of cutting edges conforming to an end portion of one of the blanks to be cut by means of the dies. Each die also has its two series of cutting edges aligned in the direction or path in which material is to be fed through between the dies, one series of cutting edges being in front of the other series in each die.

As shown in Fig. 7, the blank is of symmetrical form and comprises a body portion 5 of general rectangular form and from which the body portion of the elevator-bucket is to be produced and similar end portions or wings 6 6, located opposite each other at one side of the body portion 5 and adapted to form the ends of the elevator-bucket when finished.

The upper die 1 carries two series of continuous cutting edges. Each series comprises the edges 7, 8, and 9, corresponding to the external outline of one of the wings 6 of the blank, and the edge 10, corresponding to one side of the body portion 5 of the blank. In like manner and conforming thereto the lower die 2 carries two series of continuous cutting edges. Each series comprises the edges 7', 8', and 9', corresponding to the internal outline of one of the wings 6 of the blank, and the edge 10' corresponding to one side of the body portion of the blank, as hereinafter more fully explained.

For cutting blanks of this nature it is customary to employ elongated strips or pieces of sheet metal, as indicated at 11 in Figs. 8 and 9, the strips or pieces 11 having a width equal to the width of the body portion 5 of the finished blanks, which latter are successively cut from the strips. In Fig. 9 I have illustrated in dotted lines the manner in which the piece or strip 11 is cut or divided by the dies to produce a plurality of blanks. As indicated by these dotted lines, an end portion 6 of one blank overlaps the adjacent end portion 6 of another blank, the alternate blanks being arranged with their end portions or wings 6 6 at opposite sides of the strip 11 to permit this overlapping arrangement.

To permit of cutting the blanks in this manner from the strips or pieces 11 of sheet

metal, the reciprocal series of cutters on each of the dies 1 and 2 are also arranged to overlap one another, and the cutters of one series are in an order exactly opposite or reverse to the cutters of the other series, as clearly shown in Figs. 4 and 5. This arrangement of the cutters is such that the straight cutters 10 10 are extended parallel with each other along the front and rear sides of the upper die, while the other cutters 7, 8, and 9 of the two series stand between these two straight cutters 10 10, the cutters 7, 8, and 9 of one series being at the left-hand ends, while those of the other series are at the right-hand ends of the dies, and the same relative arrangement exists in the several series of cutters which are carried by the lower dies.

The die-surface of the lower die 2 comprises parts 12 12, extended above the body of the die and conforming to the end portions or wings 6 6 of the blanks, and parts 13 13 extended laterally from said parts 12 and conforming to the end edges of the body portion 5 of the blanks, the cutters 7', 8', and 9' being formed around the edges of the parts 12 and the cutters 10' being formed upon the straight edges of the parts 13.

The die-surface of the upper die 1 comprises a central part 14, adapted for engagement between the parts 12 of the lower die-surface and parts 15 15, located at opposite sides of said upper die and adapted to engage beyond the opposite sides of the respective parts 12 12 of the lower die-surface. The opposite edges of the central part 14 form the cutters 8 8 for forming the end portions or wings of the blanks, and the parts 15 15 have on their inner edges the cutters 7 and 9 for forming said end portions of the blanks, while the cutters 10 10 are formed partly on parts 15 and partly on parts 14.

The spaces upon the lower die 2 and intervening parts 12 and 13 thereof are adapted to be closed and covered over by a stripper-plate 16 of suitable contour, which plate 16 is arranged for sliding movement toward the body portion of the die 2, being guided on headed pins or screws 17 17 and backed by springs 18, coiled on said pins or screws and serving to hold the plate 16 normally pressed up from the die-body and flush with the die-surface of the parts 12 and 13.

When in the operation of the devices the upper die approaches the lower die it will be evident that the pressure of the said upper die will come to bear upon the stripper-plate while the sheet metal is being cut, so as to force said plate 16 toward the body of the lower die against the tension of the springs 18. After the pressure of the upper die is relaxed the springs 18 will serve to uplift the stripper-plate 16 and free the die-surfaces of the lower die from the cut metal. The stripper-plate 16 may, if desired, be formed in sections instead of integrally, as herein shown.

The recesses in the upper die intervening the parts 14 and 15 and corresponding with the parts 12 and 13 of the lower die are filled or closed by metal plates or strippers 19 19, held on headed pins or screws 20, and backed by an elastic means (herein shown as formed of cushions 21) of india-rubber, which are to be compressed on contact of plates 19 with the sheet metal resting on the die-surface of the lower die 2 in the operation of the devices in such a way as to permit the sheet metal to be properly cut. When the die 1 is again uplifted, the elastic backing of plates 19 serves to press said plates down flush with the parts 14 and 15 of the upper die, so as to clear the die-surface thereof from the cut metal.

The parts of the die-surfaces for the dies 1 and 2 may be held to the bodies of the dies by any convenient means, such as the screws 22, as shown in Fig. 3, while the outer parts 15 15 of the die-surface for the upper die have dowel-pins 23 extended up into the die-body. The pressures upon the opposite sides of the central part 14 of the upper die-surface are equalized, so that liability of breakage of this part and its connections is avoided; but the strains upon the outer parts 15 15 are exerted outwardly and tend to break these parts or to loosen their connections with the die-body. To prevent damage incident to such outward strains, I provide on the ends of the die-body screws 24 24, on which are held collars 25, taking against the outer surfaces of the parts 15 15 at opposite ends thereof.

For guiding the insertion of the metal strip or piece 11 between the dies I provide at one side of the forward part of the lower die a side guide 26, which may be formed of a piece of angle-iron held on a bracket 27 and upon one flange of which the edge of the piece or strip 11 is adapted to contact when properly inserted between the dies.

In connection with the improved dies constructed as above described I provide an adjustable gage or guiding means for gaging the longitudinal movement of the metal piece or strip 11 after each succeeding cutting operation. This gaging or guiding means comprises slide bars or arms 28, extended over and adjustable upon the side portions of the lower die 2 in the direction of their length and of the length of the piece or strip 11 when inserted between the dies.

For the adjustable connection of the bars or arms 28 with the die 2 each bar or arm has a longitudinal slot 29 and also a series of perforations 30 parallel with and at one side of said slot, and the die 2 has pins 31, adapted to engage in perforations 30, and set-screws 32, passed through the slots 29 and adapted to be screwed down to hold the pins 31 engaged in the perforations. When the screws 32 are loosened, the bars or arms may be raised to disengage the pins 31 from perforations 30, after which the bars or arms may be

adjusted lengthwise to any desired position and may be again held in such adjusted position by tightening the screws 32.

The length of the bars or arms 28 is such that the ends thereof extend beyond the lower die 2, and said extended ends are upturned, as shown at 33, a tie-bar or cross-piece 34 being extended between the upper extremities of said upturned end portions 33, the cross-piece being at such an elevation above the upper face of the die 2 that the end of a strip or piece of metal rested on said die will pass underneath the cross-piece.

Upon the cross-piece is secured a downwardly-directed bar or arm 35, upon the lower end of which is secured a gage-block 36 in line with the die-surface of die 2 and which may have an inclined face, as shown in Fig. 5, adapted to engage by the straight but inclined end edge of the strip of metal being operated upon.

37 indicates another gage held on one of the upturned parts 33 and adapted to be engaged by the lateral edge of the metal strip or piece being operated upon. The gage 37 and block 36 are in the same plane, and the block 36 has one end closely adjacent to said gage 37; but the opposite end of the block 36 is separated from the upturned part 33 of the arm 28 at the opposite side of the device by an interval or space adapted for the free passage of one of the wings or end portions 6 of the blanks.

The arrangement of the cutters on the dies is such that one series of cutters is nearer to the forward or feeding side of the dies and is in advance of the other series, which is arranged nearer to the rear side of the dies, and it will be evident that the order in which these series of cutters stand relative to each other is exactly the reverse of the order in which the ends or wings produced by them stand in the finished blank, for the cutters 7, 8, and 9, corresponding with the wings 6 of the blanks, project inwardly in the space between the two parallel straight cutters 10 10, which cut the straight end edges of the blank and are reversely and oppositely arranged to the wings 6 6, which project outwardly beyond said end edges of the blank.

In the operation of the dies shown a strip or piece 11 of metal, as shown in Fig. 9, of a width equal to the width of the body portion 5 of the blanks to be cut and of any desired length, is applied between the dies at the front or feeding side of the same with one of its end portions between the reciprocal die-faces of the upper and lower dies, with one lateral edge contacting with the side guide 26 at the forward part of the lower die. The upper die 1 is then moved downward to cut the inserted end portion of the strip or piece 11, whereupon an end portion or wing 6 of one blank will be produced upon the extremity of the strip 11, as shown at 38 in Fig.

8, this end portion being formed by that series of cutters 7, 8, and 9 and 10 which is nearest to the forward or feeding side of the dies.

When the upper die 1 has been lifted, the end of the strip 11 is removed from between the dies, and said strip is turned half-way around upon its longitudinal axis until what was before its upper surface shall have become lowermost, whereupon the cut end 38 of the strip or piece is again inserted between the dies, being rested flush on the die-surface of the lower die 2, with one lateral edge engaged by the side guide 26. When the strip or piece 11 is in this position, it is pushed rearward between the dies in a path or direction with which the respective series of cutters of each die are alined until the wing or projecting part 6 at the cut end 38 of the strip passes through the space or opening beneath cross-piece 34 and between the gage-block 36 and the upturned part of arm 28, whereupon the straight portion 40 of the cut end 38 of the strip 11 will be flush on the inclined face of gage-block 36, and the other lateral edge of the strip will be engaged on the end of gage 37 in the position indicated by the dotted lines in Fig. 5.

When the strip or piece 11 has been set in this position, the upper die 1 is again allowed to descend and again cuts the strip or piece 11, cutting off from the end thereof, by means of that series of cutters 7, 8, 9, and 10 nearest the rear side of the dies, a finished blank and also producing at the same time and by means of the cutters 7, 8, 9, and 10 nearest the forward or feeding side of the dies the finished end portion of another blank, which is left projecting at the cut end of the strip 11. The foregoing operations are then repeated until the entire piece or strip 11 has been cut into finished blanks, the strip being turned at each successive cutting operation to compensate for the opposite or reverse arrangement of the successive blanks. Each blank has its opposite end portions produced by successive cuts of the dies, and the gaging or guiding devices are adapted for operation in connection with the dies at each successive actuation thereof.

I have described my invention as practiced by the application of a specific instrumentality adapted to meet the contingencies of practical manufacture; but the definite mechanism shown will be understood as illustrative of principles rather than required means, and those skilled in the art will be able to apply these principles in various ways, as occasion therefor may arise, and to practice them by other and appropriate means.

I claim—

1. The method of producing a series of blanks of the character described, which consists in cutting away an intermediate portion of a strip of metal by dies which have two se-

ries of operative parts, the parts of one series being arranged to form those parts of one blank which are opposite to the similar parts of the next blank formed by the other series, reversing the strip and advancing the strip by the length of the to-be-formed blank, and again cutting away an intermediate portion of metal by the operation of said dies.

2. The method of producing a series of blanks of the character described, which consists in cutting a strip of metal between the members of one of two series of symmetrically-formed dies, the several parts of which overlap each other, and which are adapted to separate each blank of the series from the adjacent blank, reversing the strip, advancing the strip to the length of the to-be-formed blank, and then cutting the strip of metal by the two series of dies to separate a completed blank and to make the initial cut on the next blank.

3. The method of producing a series of blanks of the character described, which consists in cutting a metal strip between two dies each having two cutting-surfaces of the same form but inverted relatively to each other so as to form a straight edge and an extended wing, then turning the strip over, advancing it to the length of the blank to be next cut, and then again cutting the strip between the said dies to complete the blank and to form a straight side and extended wing on the next blank.

4. The method of producing a series of blanks of the character described, which consists in cutting a metal strip between two

dies each having two cutting-surfaces of the same form but inverted relatively to each other so as to form a straight edge and an extended wing, then turning the strip over, advancing it to the length of the blank to be next cut, and then again cutting the strip between the said dies to complete the blank and sever it from the strip and to form a straight side and extended wing on the next blank.

5. The method of forming bucket-blanks, which consists in severing a strip of metal simultaneously on two conformable but inverted transverse lines, each line corresponding to the one end of a blank having a straight portion and a wing, then turning over the strip and again severing it at a point removed from the first point of section on the same lines as before.

6. The method of forming bucket-blanks, which consists in severing a strip of metal simultaneously on two conformable but inverted transverse lines, each line corresponding to one end of a blank having a straight portion and a wing, then turning over the strip again severing it at a point removed from the first point of section on the same lines as before, and again turning the strip thereby restoring it to the first position and again severing the strip as before.

In witness whereof I have hereunto set my hand, this 4th day of January, A. D. 1906, in the presence of two subscribing witnesses.

PETER A. LORENZ.

Witnesses:

C. K. CHAMBERLAIN,
A. S. PHILLIPS.