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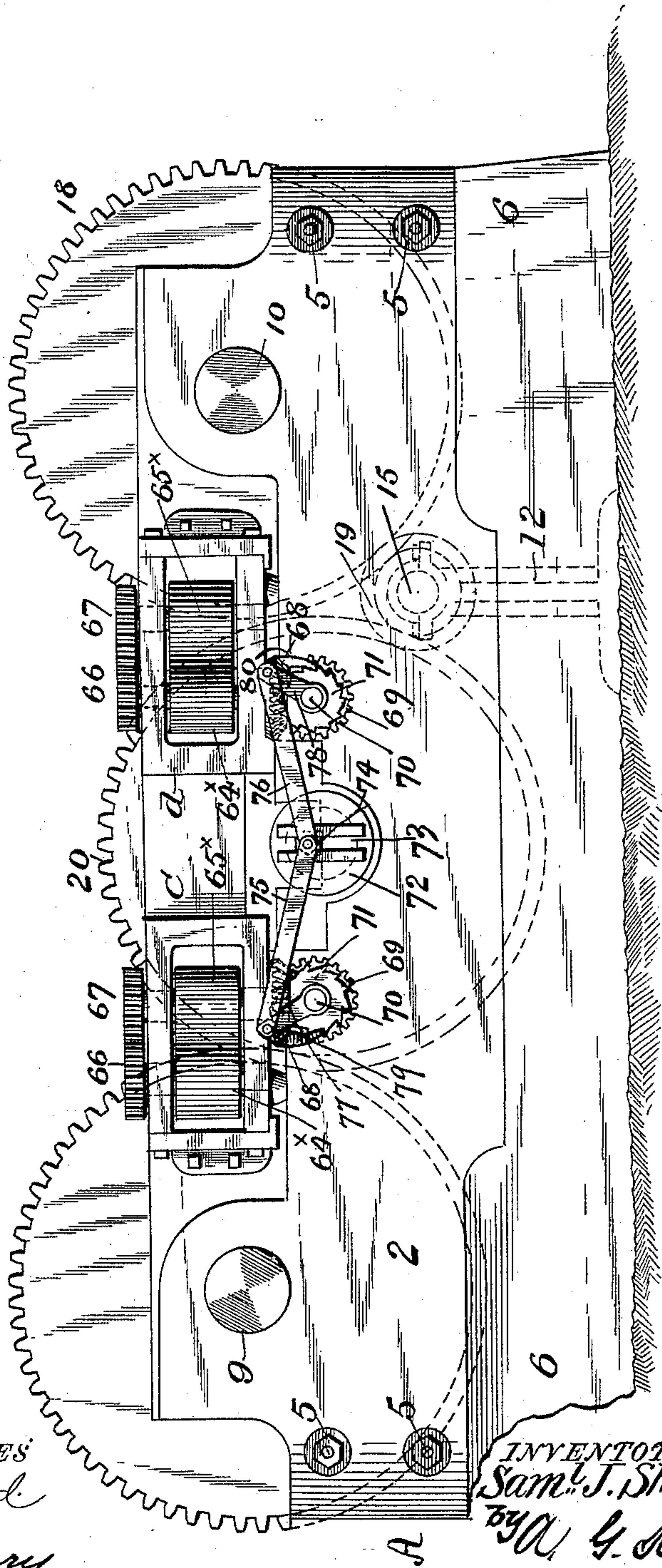
7 Sheets—Sheet 1.

S. J. SHIMER.  
MACHINE FOR MAKING METAL WASHERS.

No. 466,705.

Patented Jan. 5, 1892.

*Fig. 1.*



WITNESSES  
*J. L. Ourand*  
*J. M. Cleary*

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by *A. G. Heyman*  
Attorney

(No Model.)

7 Sheets—Sheet 2.

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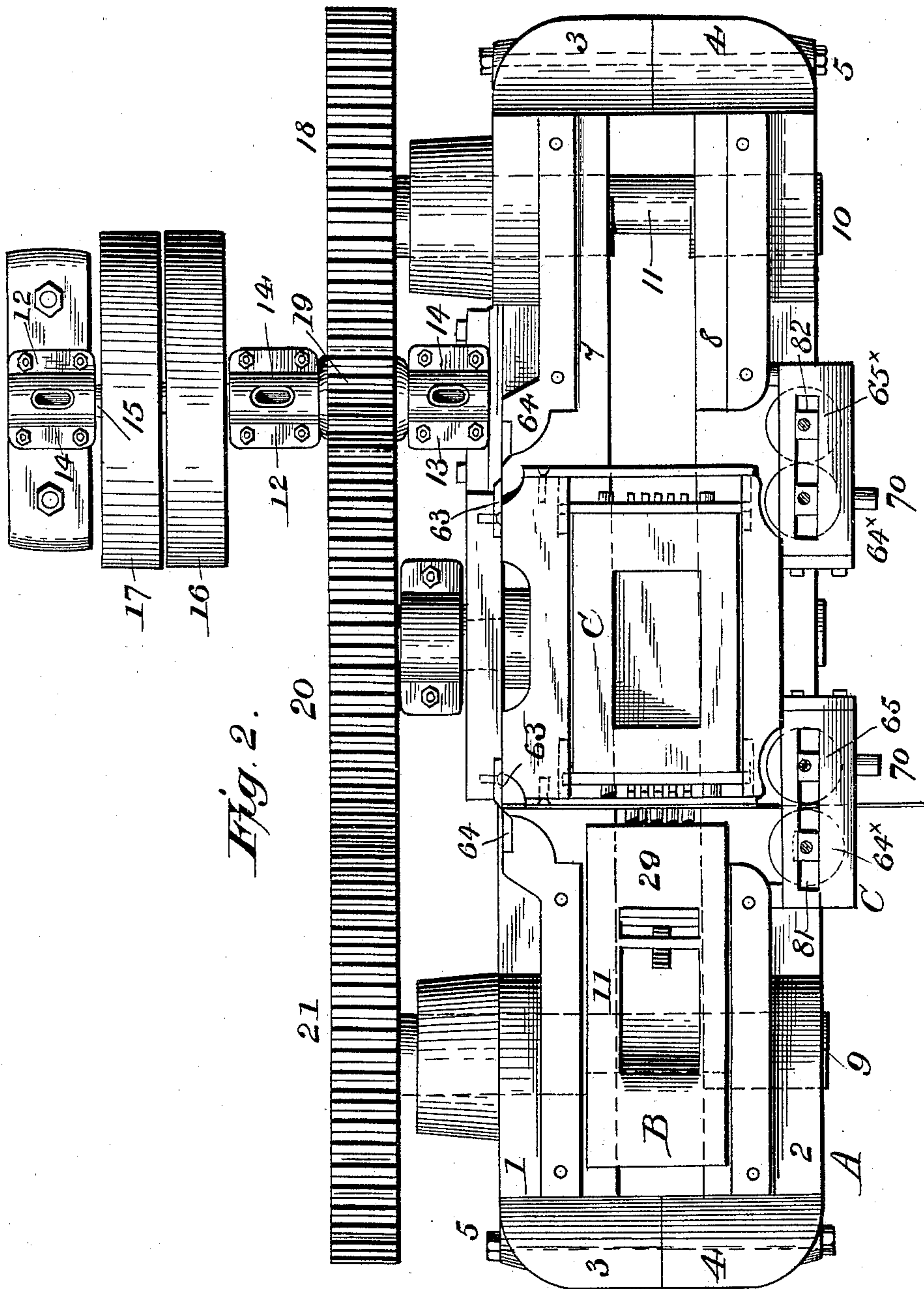


Fig. 2.

WITNESSES  
F. L. Curand  
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(No Model.)

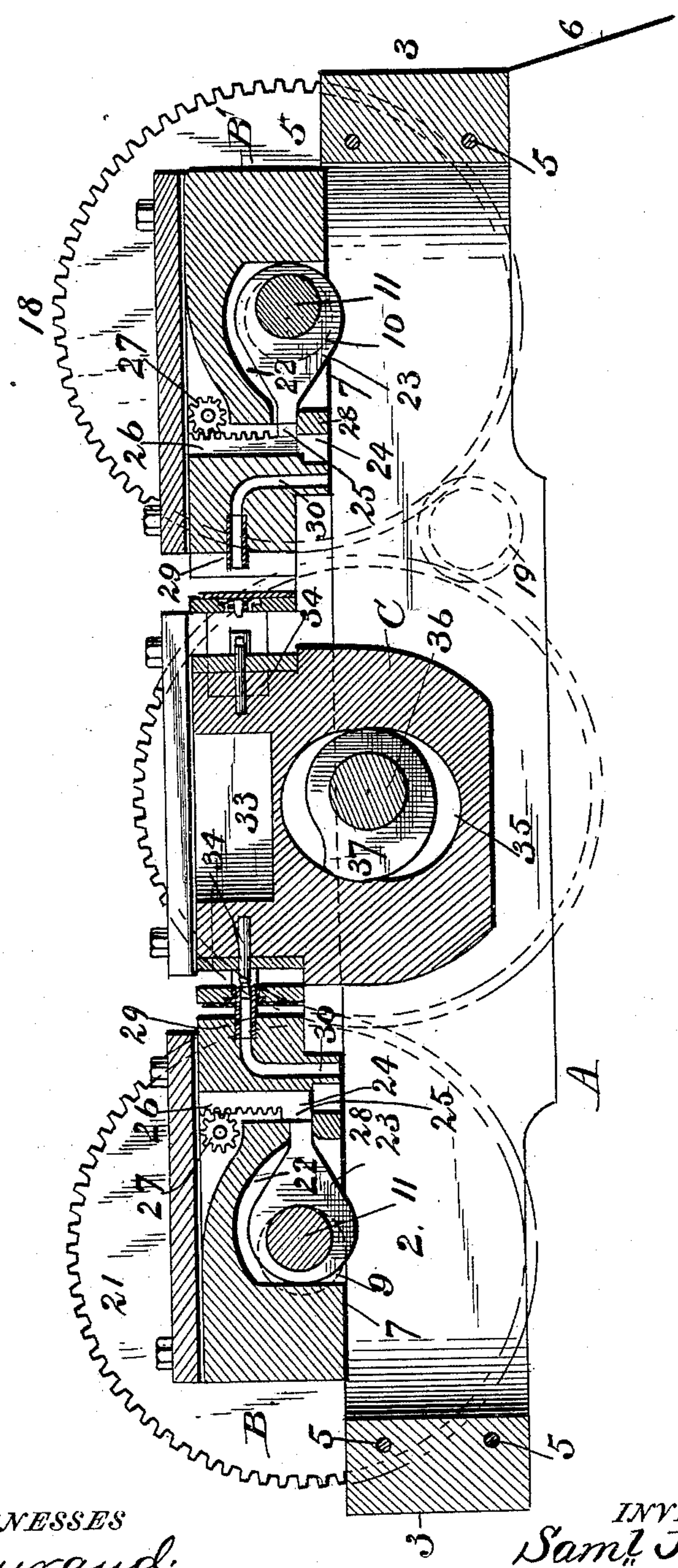
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S. J. SHIMER.  
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Patented Jan. 5, 1892.

Fig. 3.



WITNESSES  
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(No Model.)

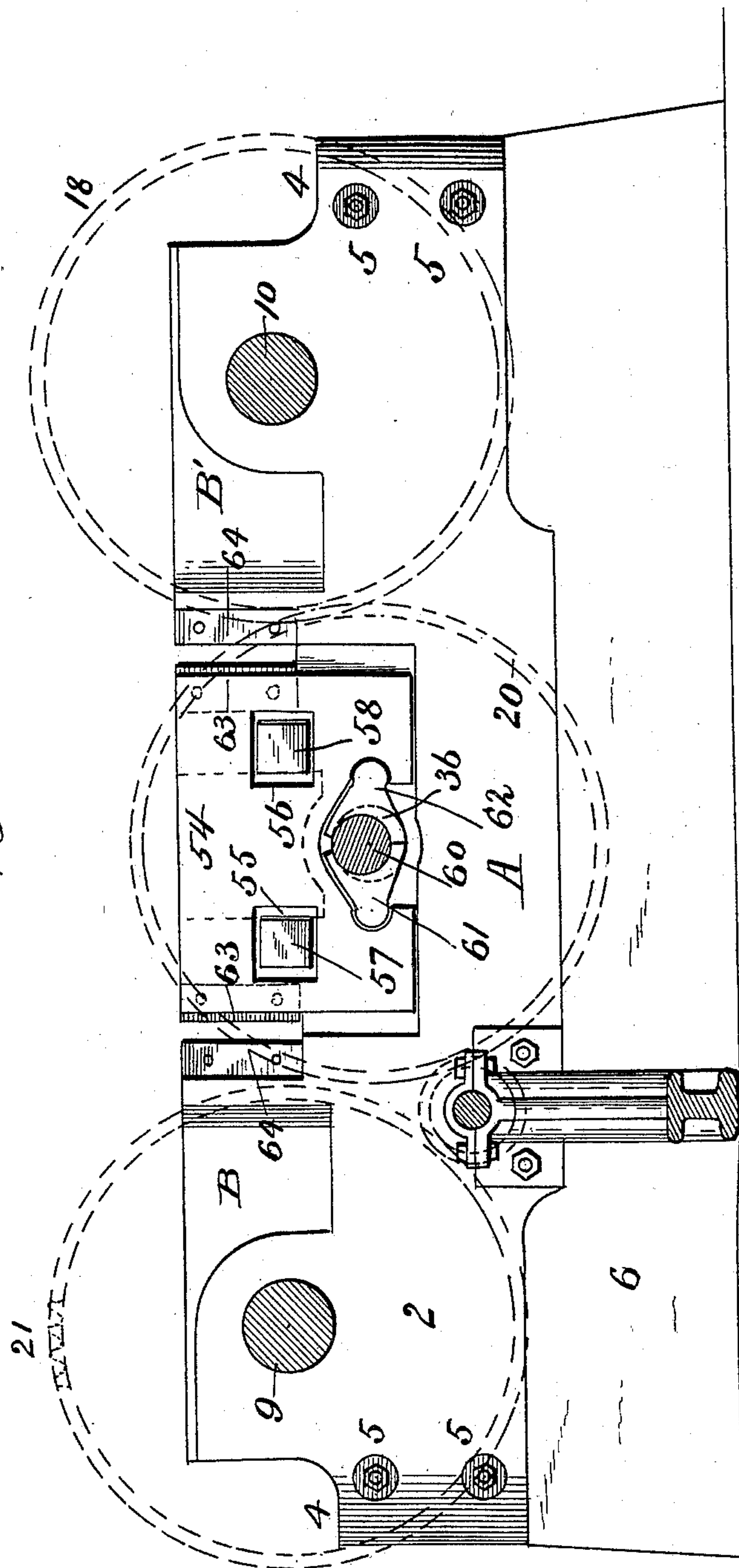
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Patented Jan. 5, 1892.

Fig. 4.



WITNESSES  
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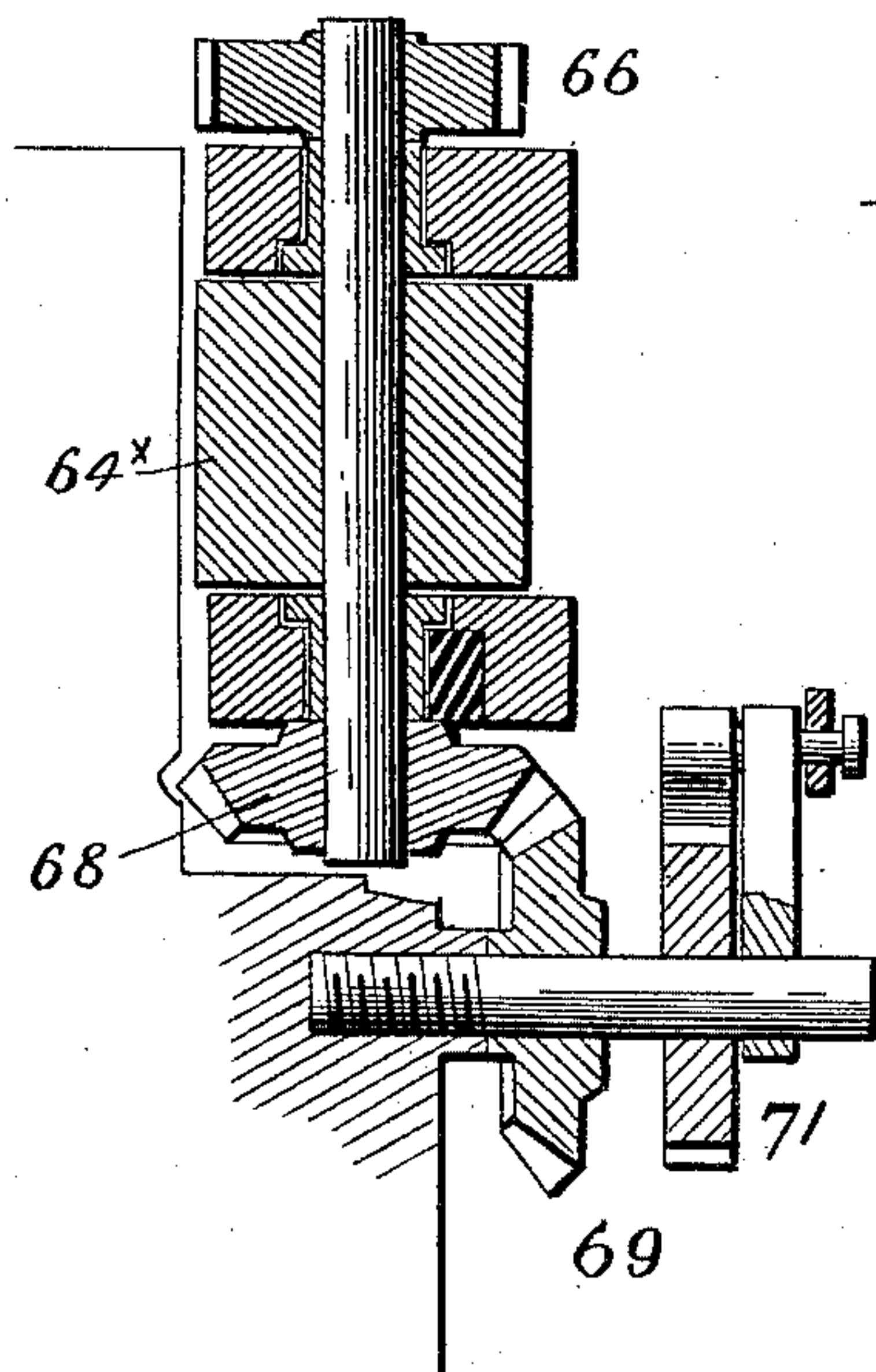
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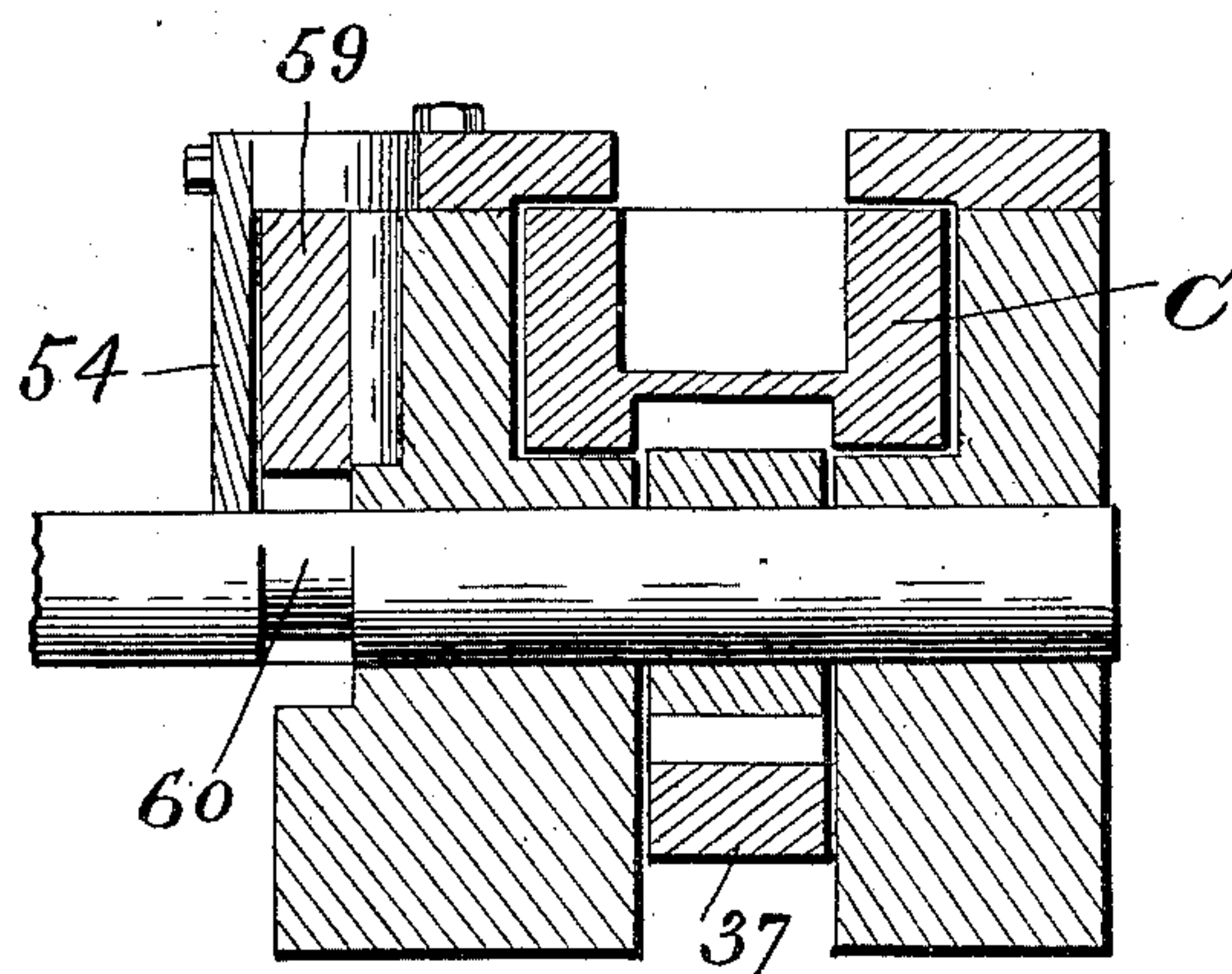
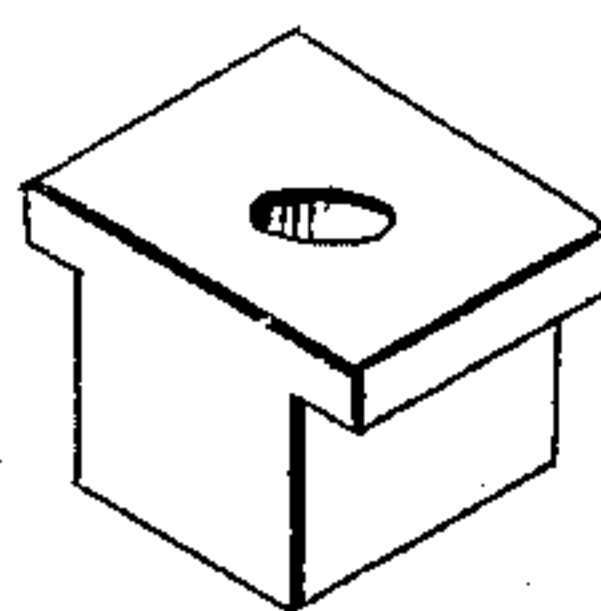
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*Fig. 5.*



*Fig. 6.*

WITNESSES

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*J. M. C. C. C.*

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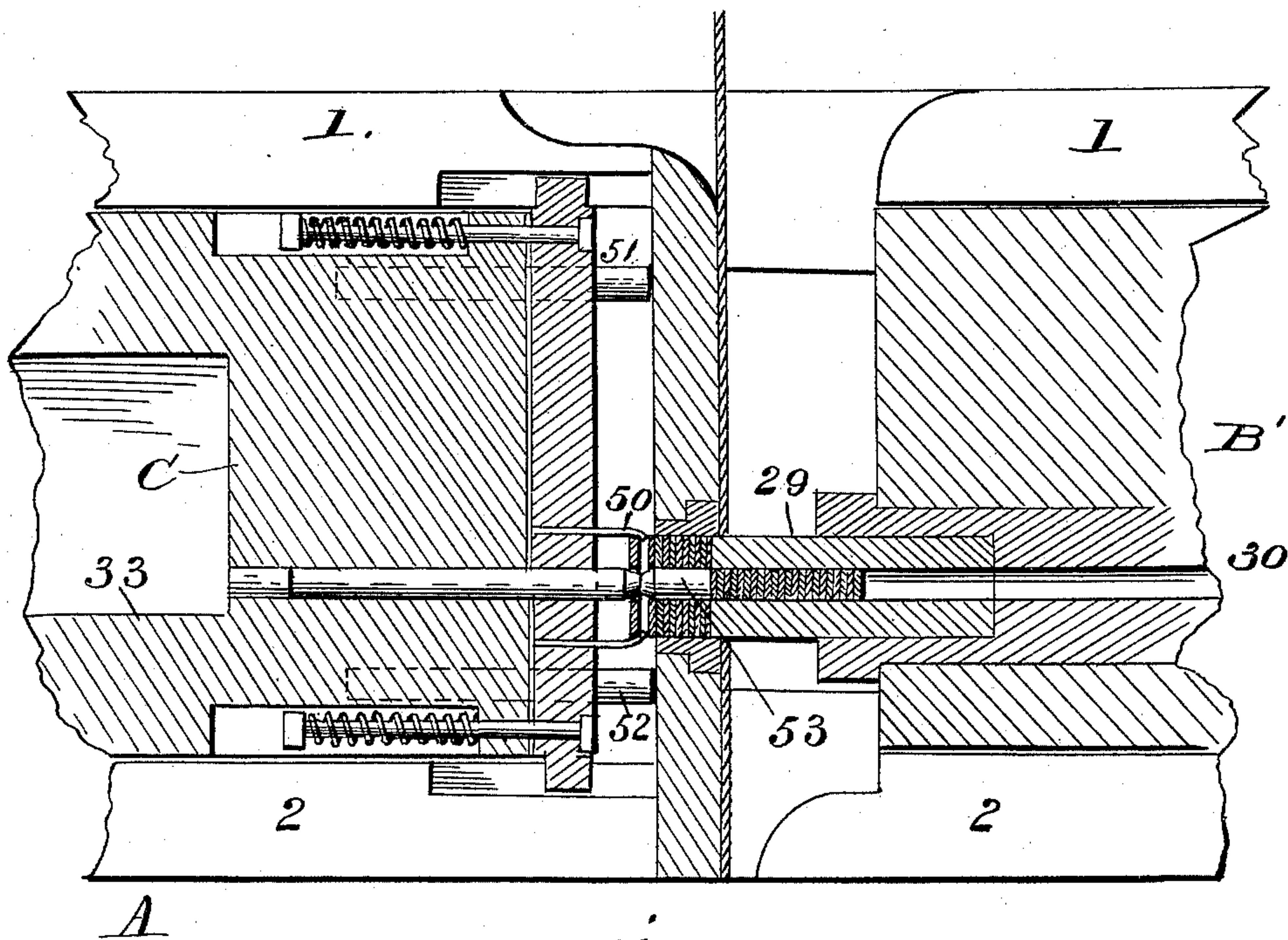
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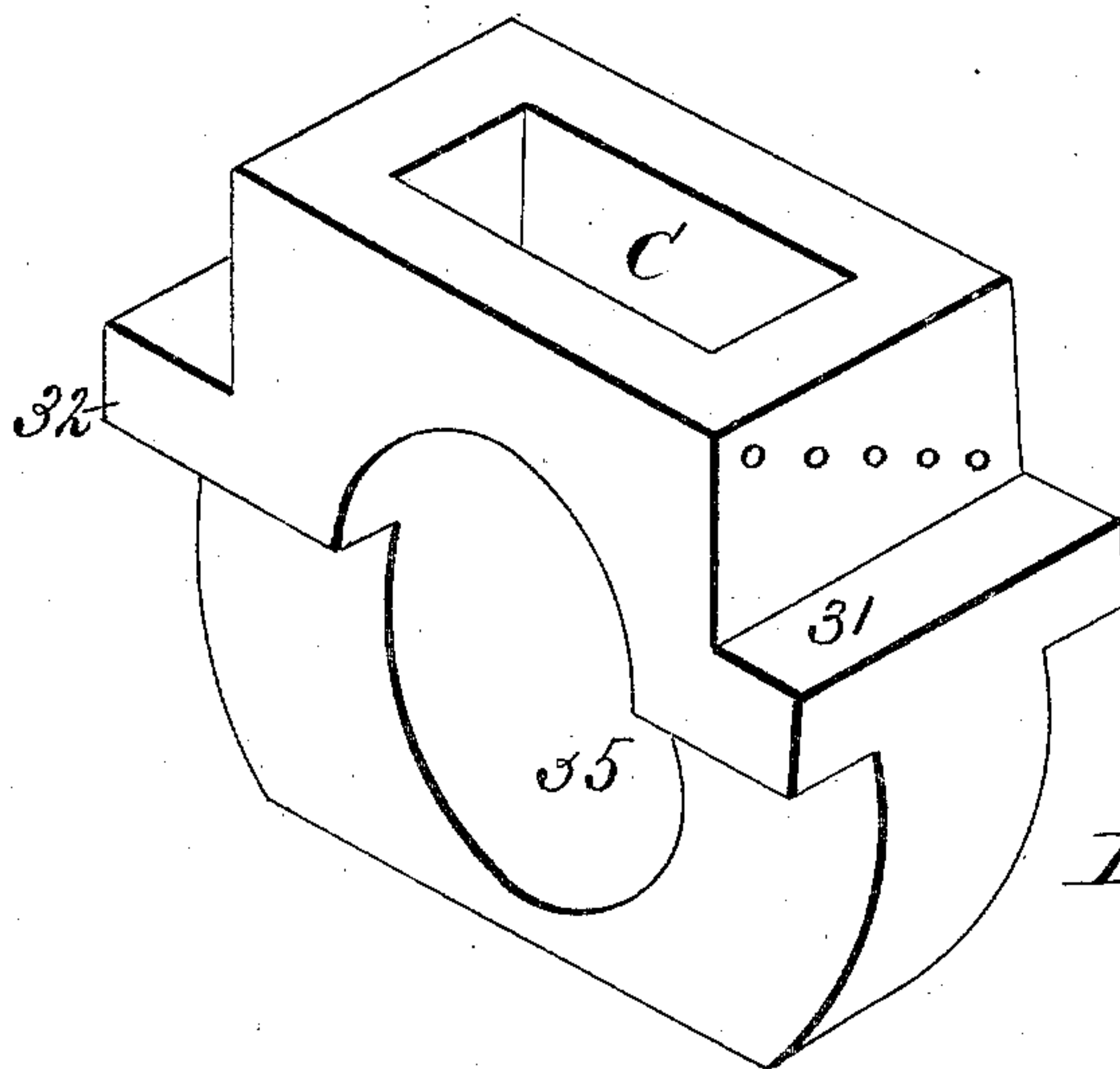
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MACHINE FOR MAKING METAL WASHERS.

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*Fig. 10.*



*Fig. 7.*

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(No Model.)

7 Sheets—Sheet 7.

S. J. SHIMER.  
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Fig. 8

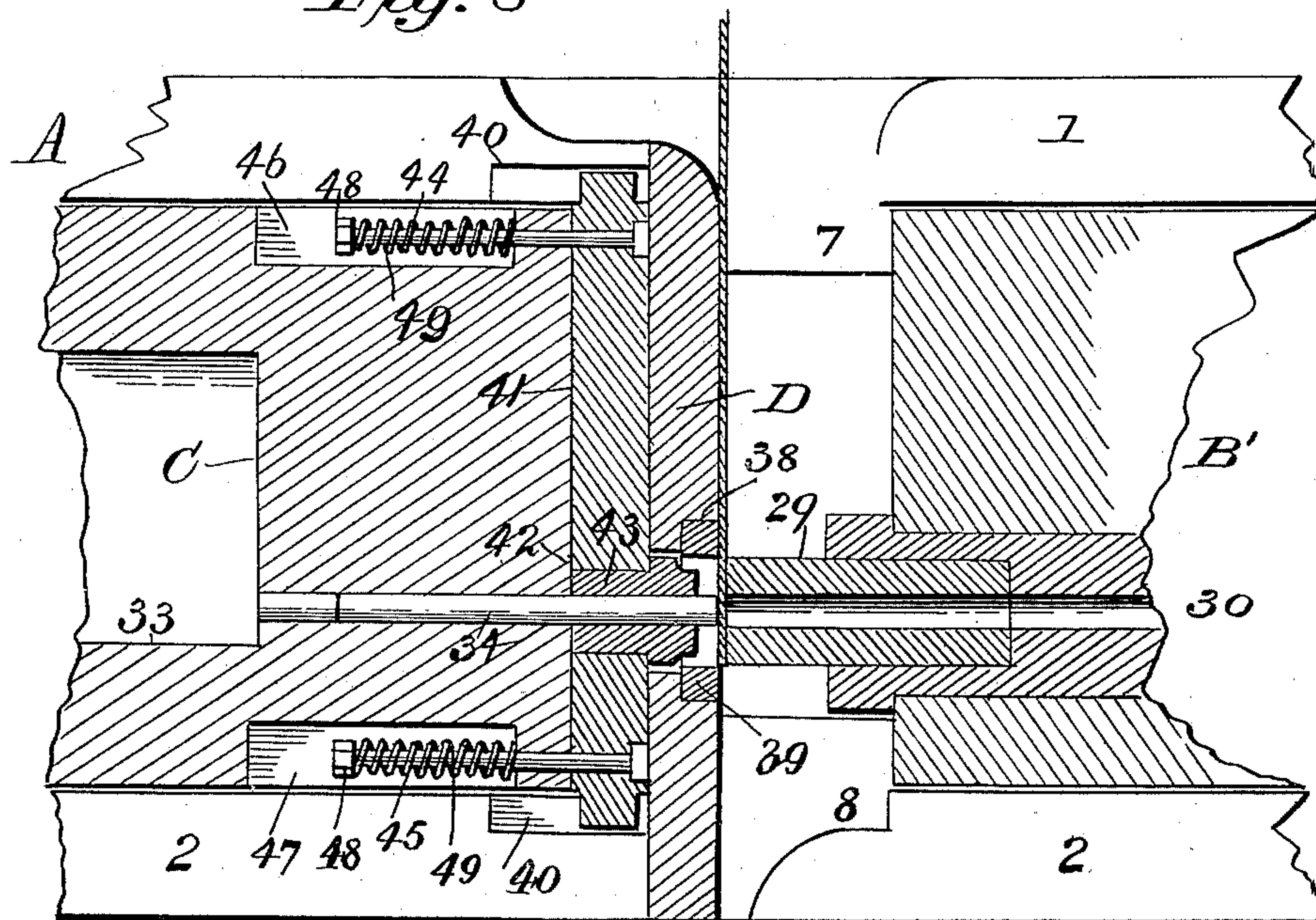
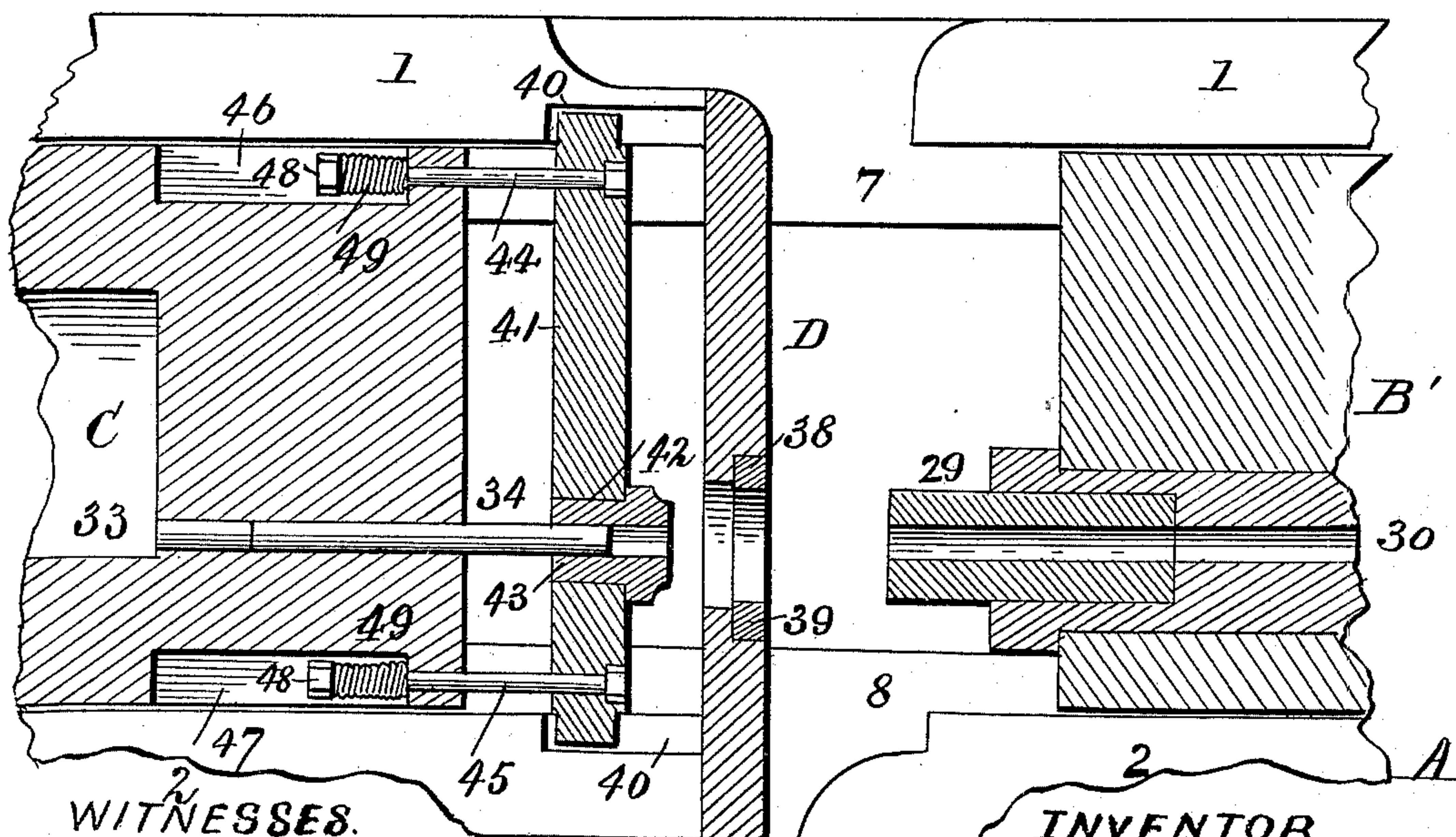


Fig. 9.



WITNESSES.

F. L. Oursaud  
P. M. Clary.

***INVENTOR.***

Sam<sup>l</sup> J. Skimer.  
by A. G. Heyman  
Attorney



# UNITED STATES PATENT OFFICE.

SAMUEL J. SHIMER, OF MILTON, PENNSYLVANIA.

## MACHINE FOR MAKING METAL WASHERS.

SPECIFICATION forming part of Letters Patent No. 466,705, dated January 5, 1892.

Application filed June 5, 1891. Serial No. 395,277. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL J. SHIMER, a citizen of the United States of America, residing at Milton, in the county of Northumberland and State of Pennsylvania, have invented a new and useful Machine for Making Metal Washers, of which the following is a specification.

My invention relates to improvements in machines for making metal washers, and the object is to simplify the construction and increase the capacity of machines of this class to which my present invention is analogous or to which it pertains.

I have fully described my invention hereinbelow and have specified the same in the claims. I have also clearly and fully illustrated my invention in the accompanying drawings, wherein—

Figure 1 is a side view of the machine, showing the feed mechanism. Fig. 2 is a plan view of the machine, one of the end punch-heads being removed. Fig. 3 is a longitudinal vertical section through the frame, the rams or punch-heads, and showing the cam-blocks. Fig. 4 is a side view taken from the opposite side to that shown in Fig. 1, showing the knives or shearing mechanism. Fig. 5 is a vertical section of one of the feed-rollers and its gearings. Fig. 6 is a transverse section through the center punch head or block. Fig. 7 is a perspective of the middle punch-head. Fig. 8 is a transverse horizontal section through the middle punch-head, the die-bed, stripper, and one of the outer or end punch-heads, the punch-heads being only partially shown and the punches being shown as about to engage the plate from which the washers are cut. Fig. 9 is a similar view showing the punches separated; and Fig. 10 is a sectional view showing the machine adapted to punches of the style, kind, or character shown and described in my patents, Nos. 392,886 and 430,892.

Referring to the drawings, A designates the frame of the machine, consisting of heavy side pieces 1 2, having the end pieces 3 4, formed at right angles, and rods 5, projected through them to hold them in fixed relation. The frame being part of or mounted on a base 6, substantially as shown in the drawings, has inwardly-directed flanges or shoulders 7 8, on which the respective punch-heads

rest and reciprocate. In the opposite end portions of the frame are journaled shafts 9 10, each shaft being formed with an eccentric 11, the central part of which extends across the frame and through the punch-heads to take the wedge-shaped block hereinafter described. On standards 12 and a bracket 13, provided with bearing-boxes 14, is journaled the driving-shaft 15, having a fast pulley 16 and a loose pulley 17, which may be connected to the power. (Not shown). On the shaft 15, adjacent to the side of the frame, is a gear-wheel 19, meshing with a gear-wheel 18 on the end shaft 10, and the gear 19 also meshes with a gear-wheel 20 on the shaft of the middle punch-head, and this last meshing with a gear-wheel 21 on the end shaft 9. This system of gearing communicates motion to the respective end punch-heads and to the middle ram or punch-head. In the respective ends of the frame, with their under edges resting on the flanges of the frame, are mounted the end rams or punch-heads B B', having the shafts 9 10 projecting through them. These punch-heads B B' are duplicates in construction, and hence the following description of one applies equally to the other. These punch-heads are chambered out in the under side, as at 22, to take a wedge-shaped block 23, mounted loosely on the eccentric portion of the shaft, as shown in Fig. 3 of the drawings. The chambers of the punch-heads open out into a vertical recess 24, and the free end of the wedge-shaped block extends into the opening and engages with a lug 25 on a rack-bar 26 in the vertical recess. At the upper end of the vertical recess is journaled a small gear-wheel 27, which meshes with the rack and serves to move the lug of the rack in and out of engagement with the free end of the wedge-shaped block. By shifting the rack so that the lug engages the end of the wedge-shaped block the eccentric, through the agency of the block, reciprocates the punch-head, and by shifting the rack until the lug is drawn from the opening and away from the end of the block the block is free to reciprocate in the recess or chamber of the punch-head and the latter remains motionless. In the under side of the punch-blocks is a cross-piece 28, on which the free end of the wedge-shaped block rests, and also the end of the



rack-bar, as shown in Fig. 3 of the drawings. This prevents the rack-bar and the wedge-shaped block from dropping down, and the vertical recess being open at the lower end any dirt may drop down. In the inner end faces of the end punch-heads are formed one or more punch-seats, in which are fixed punches 29, and leading from the punches are ways 30, through which the center clip-pings of the washers find their way and are eventually discharged. Except as the changes of construction, adaptation, arrangement, and combination with the other parts of these end punch-heads and the wedge-shaped blocks involve novelty, they form no part of my present invention, they being already patented to me in my patent, No. 430,982, above cited.

C designates the center ram or punch-head. This consists of a heavy metal body having side flanges 31 32, which rest on the flanges of the frame on which the ram or punch-head reciprocates. The center of the upper face of the ram is chambered out, as at 33, and in the end faces are formed punch-seats 34, in which the center punches of the washers are secured. In the lower central part of the center ram or punch-head is formed a transversely-arranged opening 35, of elliptical shape, the sides of which, when carried to their respective limits of movement, are concentric to the axis of the shaft 36, which is mounted across the frame and carries a cam 37, which engages the faces of the opening in the ram. The shaft 36 is operated by the gear-wheel 20, and by means of the cam in the opening of the ram the ram is reciprocated. It will be observed that the arrangement of the opening in the ram and the action of the cam therein operate to reciprocate the ram longitudinally to its opposite limits by opposite turns of the cam at the ends of the opening, the movements of the ram being effected by a quarter-turn of the cam, which is then at the horizontal radius of the axis, and the ram moved so that the curve of the opening is concentric to the curve traversed by the cam, and the result is the ram stands motionless in position to receive the force of the cut, punch, or impact made by the end punch-head. This arrangement of the ram, being held motionless by the cam while the cut or punch is made, operates to make the ram a support to the die-bed plate that carries the dies, which, being thus supported, can be made thinner or lighter than when not so supported. The dies can thus be shorter and the punches arranged to traverse shorter distances, and if a center pin is used in the die it can be made shorter than in the ordinary machine.

In Figs. 8 and 9 of the drawings the punch-heads are shown in different relative positions to the die bed or plate, and, referring to these figures specially, D designates the die bed or plate, secured across the machine-frame and formed with a die-seat 38, in which is a die 39. I have shown but one die in the illustrations in Figs. 8 and 9; but it will be under-

stood that the dies and punches may be increased in number, according to the capacity of the machine. In the side pieces of the frame are formed recesses or mortises 40, in which the ends of a stripper-plate 41 are arranged. This stripper-plate is supplied with seats 42, in which is a center-punch guide and rest 43, the punch being rather loosely disposed therein. The stripper-plate is provided with rods 44 45, which project through the end of the middle ram into recesses 46 47 and have nuts 48 on their ends. On the stems of the rods in the recesses are springs 49, the force of which is to draw the stripper away from the die-bed when the cam has receded therefrom.

In Fig. 8 the ram is shown moved up with the stripper-plate against the die-bed and the punches in the position of encountering the plate from which the washers are cut, and in Fig. 9 the punches are shown as in receded or retracted position, with the stripper-plate lodged at its backward limit and the ram as having drawn the end of the center punch past the mouth of the punch-rest and stripper, and the washer consequently has been pulled off by the center punch.

In Fig. 10 of the drawings the invention is shown as applied to a punch-pin sustained in a die by the impacting washers. In this the elements are all identical with those shown and described in Figs. 8 and 9, except, because of the center punch consisting of the pin in the die, I use a center pin 53 and have provided pickers 50 for taking the washers off the center punch in the die and thus permitting them to be discharged. These pickers consist of spring-fingers having their free ends directed inward to engage a washer as it is pushed out of the die and off the center punch, as shown in the drawings; and I have also provided the middle ram with projecting abutting rods 51 52, projected through the stripper and serving to back or support the die-bed during the punching. The ends of these rods lodge against the die-bed, as shown, and sustain it while the center-punch pin is pressed on the end of the pin 53 in the ram. After the washer-pickers have taken in the washer it lodges on the tapering end of the pin 53 and is drawn back and knocked off by the stripper or drops off before carried back that far.

It is necessary that the punched plate be utilized for scrap and prepared for piling as expeditiously and economically as possible; and that this may be accomplished I have devised the following means for cutting the scrap and arranged them in operative combination with the punching-machine. On the side of the frame adjacent to the middle ram is secured a strong plate 54, arranged with a space between it and the face of the frame and formed with openings 55 56 to take bearing-lugs 57 58 of a plate 59, (see Fig. 6,) arranged in the space between the plate 54 and the frame and having a limited sliding move-



ment on the lugs in the openings of the outer plate. The plate 59 is reciprocated by means of an eccentric 60 on the shaft 36 engaging loosely-disposed blocks 61 62 in a recess in the plate, as shown in Fig. 4 of the drawings. On the ends of the plate 59 are fixed knives 63, which shear or engage with knives 64 on the side pieces of the frame. It will be perceived that as the punched plate is carried outward beyond the side of the frame it is engaged by the knives and cut into pieces ready to be carried away for piling or packing into fagots.

The means for feeding the plate to the punches consist of the following described mechanism: In frames *c d*, (see Fig. 1,) secured to the outer side of the frame, are journaled vertically-arranged rolls  $64 \times 65$ , having their shafts extended above their bearings, and provided with intermeshing pinions 66 67, by which the outer roll of each pair is rotated. On the downward extended journal of each of the inner rolls is mounted a bevel gear-wheel 68, meshing with bevel gears 69 on short shafts 70, projected from the frame, and on the face of the gears 69 are ratchets 71. On the end of the shaft of the middle ram is a disk 72, formed with a radially-arranged way 73, in which a pin 74 pivotally unites the ends of two bars 75 76, having their outer ends jointed to arms 77 78 on the shafts 70. On the pins connecting the bars and arms are pivoted pawls 79 80, the free ends of which engage the ratchets 71 on the bevel-gears. As the shaft turns, the sliding pin joining the bars is moved from side to side, which alternately move the pawl-arms carrying the pawls with them, and when the pawls are moved in engagement with the ratchets the gearing is moved and the rolls turned to feed the plate to the punches such a distance as may be necessary to present an uncut or unpunched surface. The boxes of the journals of the feed-rollers are supported in ways 81 82 (see Fig. 2) in the frames, and are made adjustable therein in order that the feed-rolls may be adjusted to plates of different thicknesses. One of these boxes is shown as detached in Fig. 5 of the drawings.

The operation is as follows: The plate is fed through the feed-rollers across the frames, openings being formed therein opposite to the feed-rollers across the frame, in line with the face of the die-bed, and when in position in front of the dies the washer-cutting dies are moved up, as shown in Fig. 8, and start the washer from the plate. At substantially the same time the middle ram moves up, carrying the center punches against the plate, and brings the stripper-plate with the punch guide and rest up to back up or support the die-bed, at which point the ram stands as the washer-punches advance to cut the washers and force them over the center punches, which being accomplished the middle ram recedes, carrying with it the center punches and the stripper-plate until the latter lodges against

the ends of the recesses in which its ends slide, when, the ram still continuing to recede, the center punches are drawn beyond the face of the stripper and the washers are stripped off and discharged. The middle ram has now moved up at the other end and the same operation of punching there occurs. The receding of the middle ram operates the feed mechanism and the plates are alternately fed to the punches, and as the plates are punched and carried forward the knives clip or cut the punched portions into fragments.

Having thus described my invention, what I claim is—

1. In a washer-making machine, the combination, with a middle ram or punch-head, of punch-heads arranged on opposite sides of the middle ram, mechanism for reciprocating said middle ram, and mechanism for alternately reciprocating the punch-heads, substantially as set forth.

2. In a washer-making machine, the combination of two reciprocating punch-heads arranged at opposite ends of a frame and carrying punches, a reciprocating punch-head arranged between the end punch-heads and carrying punches on its opposite ends, and die-beds between the ends of the middle punch-head and the end punch-heads, substantially as set forth.

3. In a washer-making machine, the combination of two reciprocating punch-heads arranged at opposite ends of a frame and carrying punches, die-beds adjacent to the punch-heads, a reciprocating punch-head arranged between the die-beds and carrying punches on its ends, and a cam to reciprocate the middle punch-head and arranged to move it up to support the die-beds when the punches are engaged, substantially as set forth.

4. In a washer-making machine, the combination of the end punch-heads carrying punches, die-beds arranged in front of the punches, a middle ram or punch-head between the end punch-heads, carrying punches, means, substantially as described, to reciprocate the middle punch-head, and stripper-plates and punch-supports secured to the ends of the middle ram, substantially as set forth.

5. In a washer-making machine, the combination of the reciprocating end punch-heads carrying punches, the die-beds provided with dies, the intermediate punch-head carrying punches, and the stripper-plates provided with punch-rests yieldingly secured on the opposite ends of the intermediate punch-head, substantially as set forth.

6. In a washer-making machine, the vertically-arranged feed-rollers, gears on the rollers provided with ratchets, pawls to engage the ratchets, rods to operate the pawls, whereby the feed-rollers will be intermittently rotated, said rods being pivotally connected by a pin which slides vertically, substantially as set forth.

7. In a washer-making machine, the combi-



nation, with the punch-heads, of two sets of vertically-arranged feed-rollers, and mechanism for rotating the rollers intermittently and the sets in alternation, substantially as set forth.

8. In a washer-making machine, the combination of a reciprocating plate carrying a knife on its end, and a stationary knife fixed on the frame of the machine, whereby the punched plate is cut into pieces as it progresses from the punches, substantially as set forth.

9. In a washer-making machine, the combination, with oppositely-arranged reciprocating punch-heads and a punch-head interposed between said punch-heads, of a recip-

rocating plate carrying knives on its ends, stationary knives to engage with those on the plate, and means, substantially as described, for reciprocating the plate, all as specified.

10. In a washer-making machine, the combination, with the bed-die and the center punch, of washer-pickers consisting of spring-fingers arranged to take the washers as they are pushed from the die, substantially as set forth.

In witness whereof I have hereto set my hand in the presence of two attesting witnesses.

SAMUEL J. SHIMER.

Attest:

N. W. WALTER,  
E. S. SHIMER.