

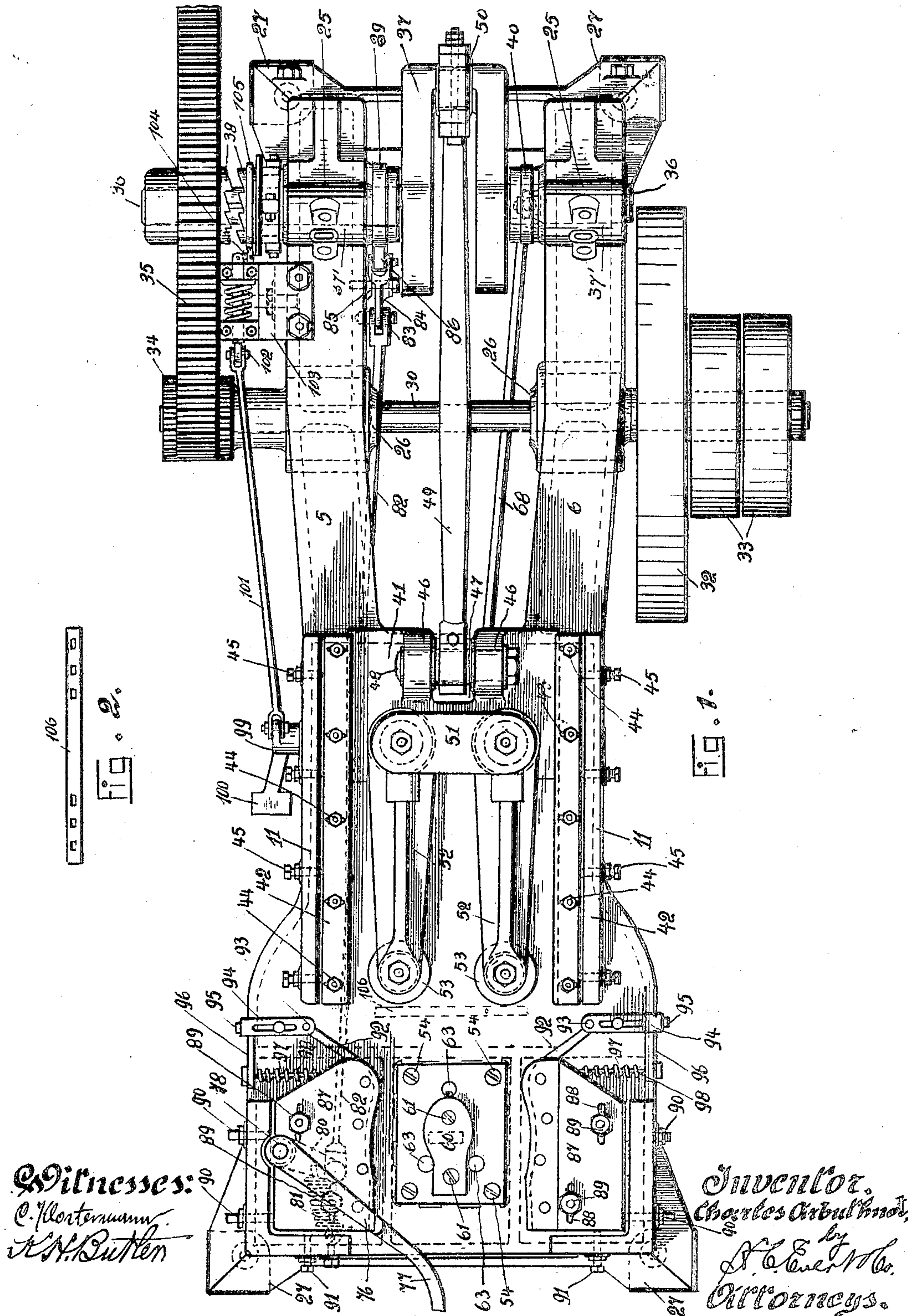
No. 813,135.

PATENTED FEB. 20, 1906.

C. ARBUTHNOT.
HORSESHOE SHAPING MACHINE.

APPLICATION FILED FEB. 16, 1905.

4 SHEETS—SHEET 1.



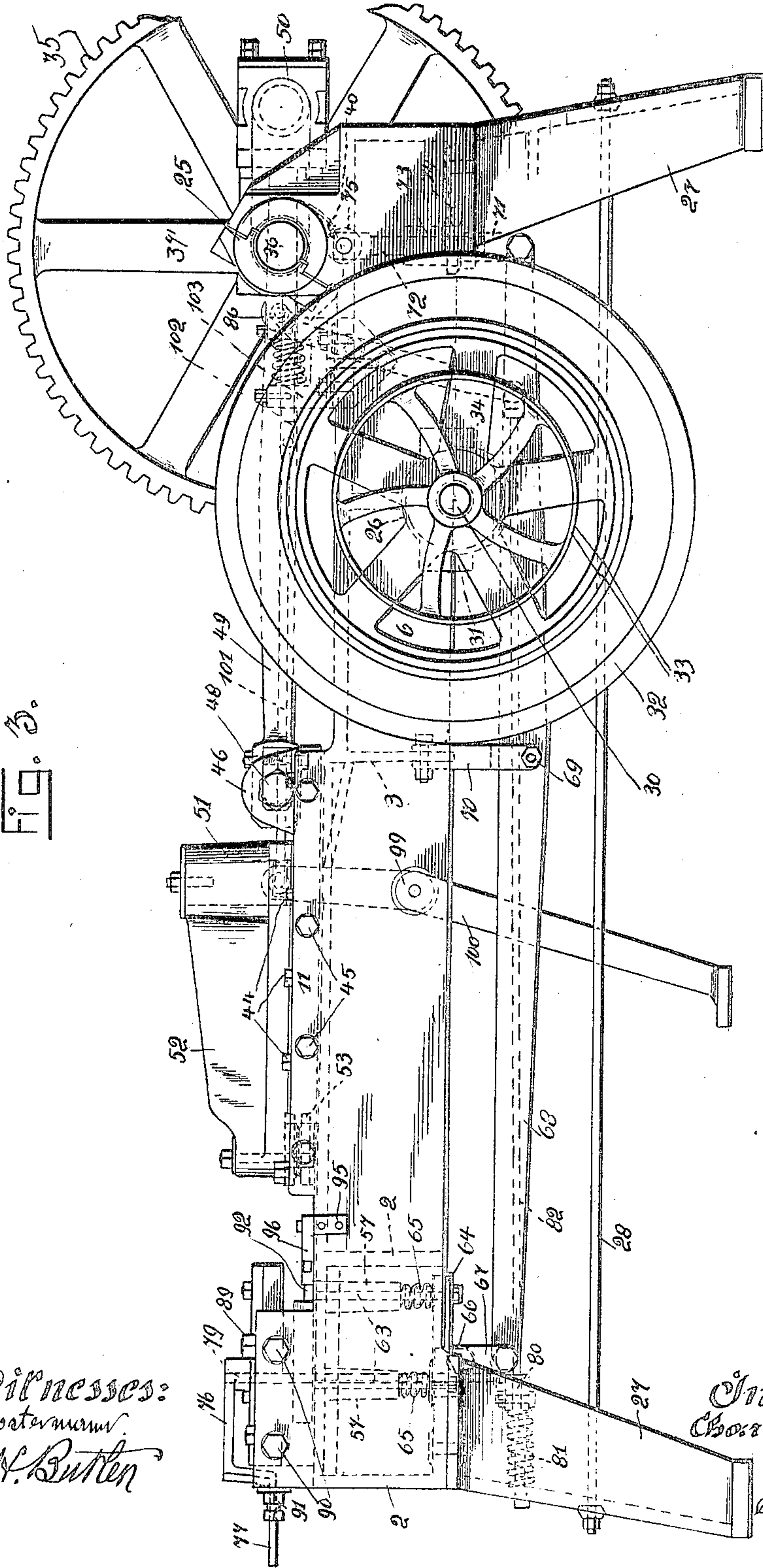
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4 SHEETS—SHEET 2.



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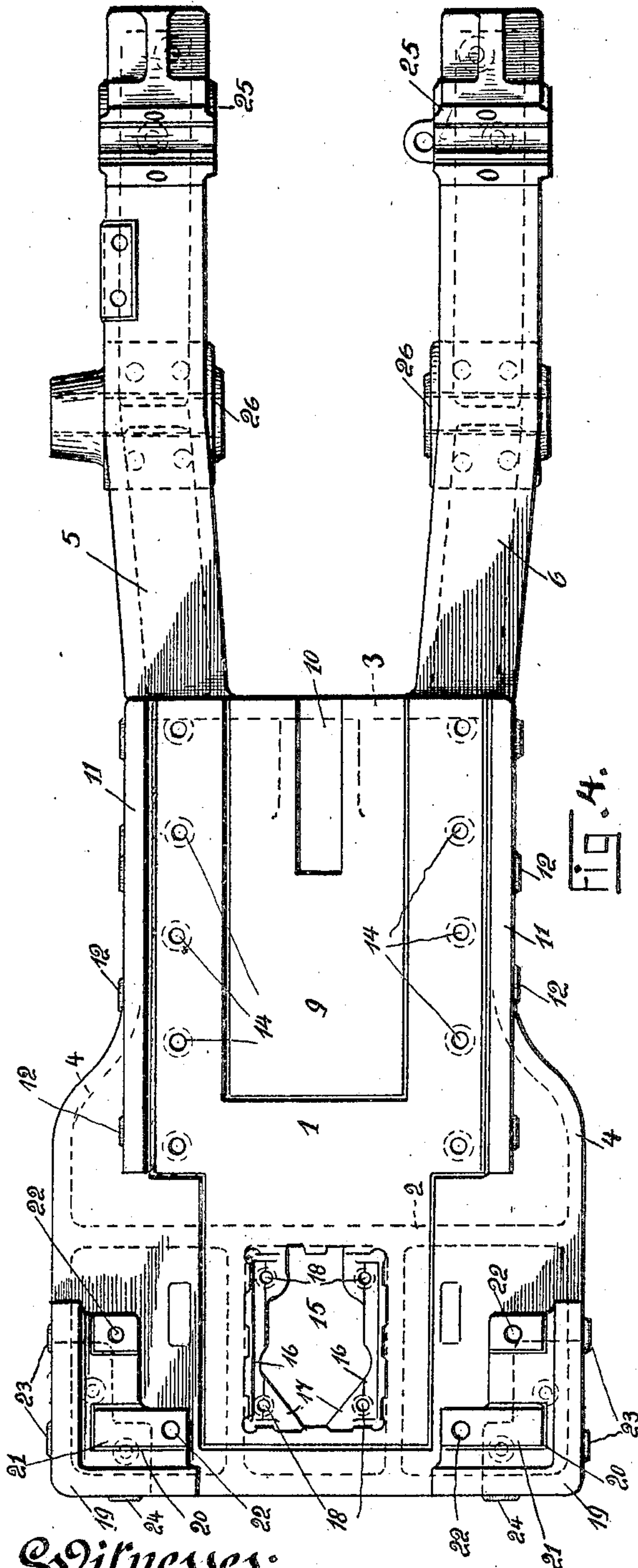


FIG. 4.

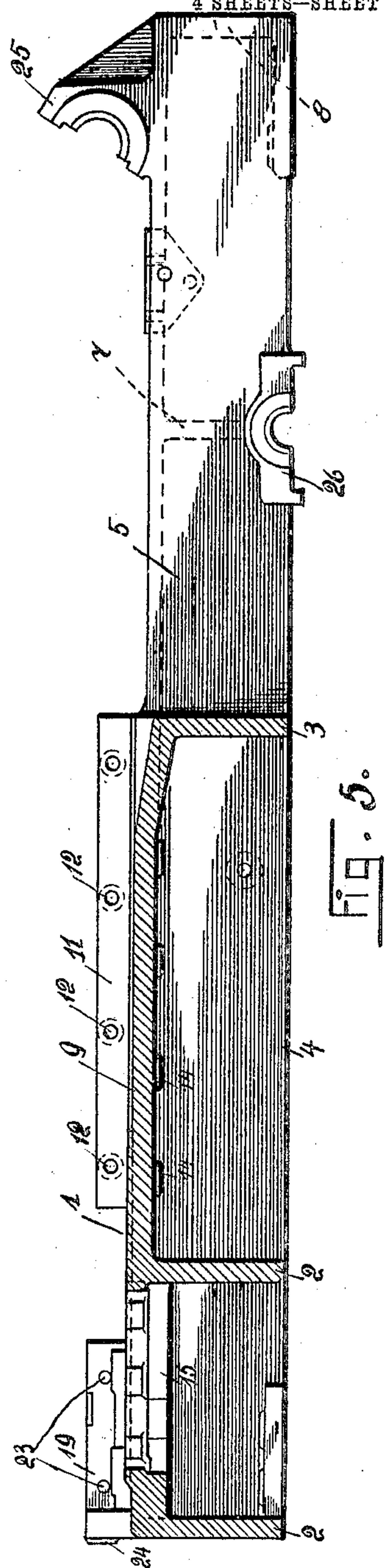


FIG. 5.

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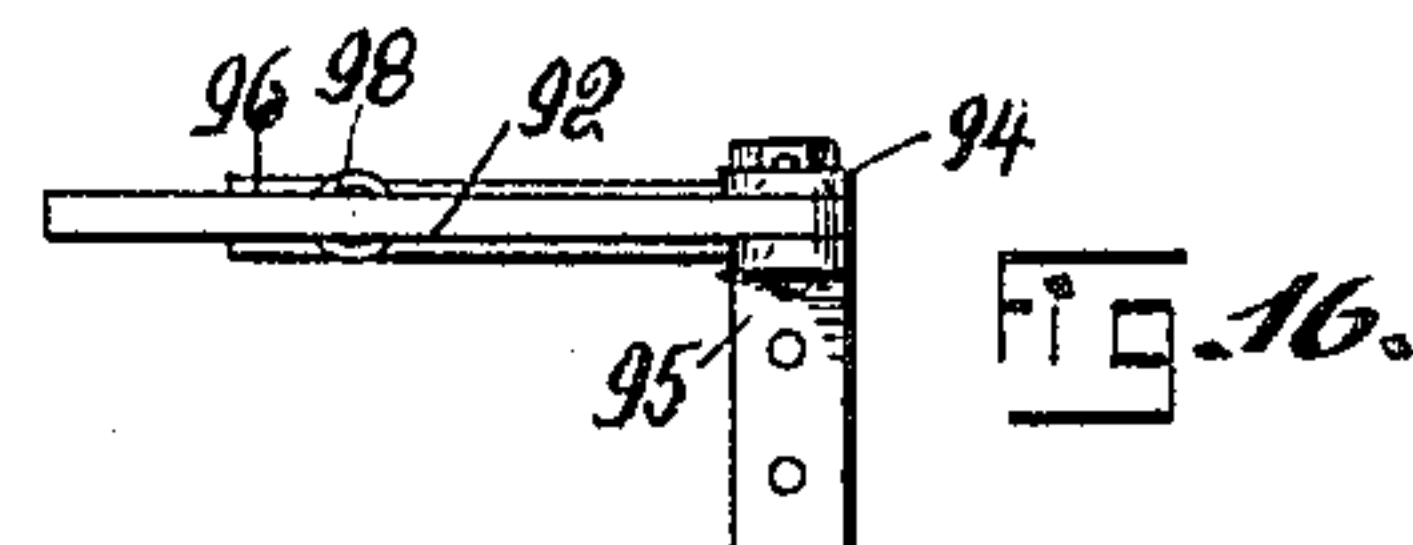
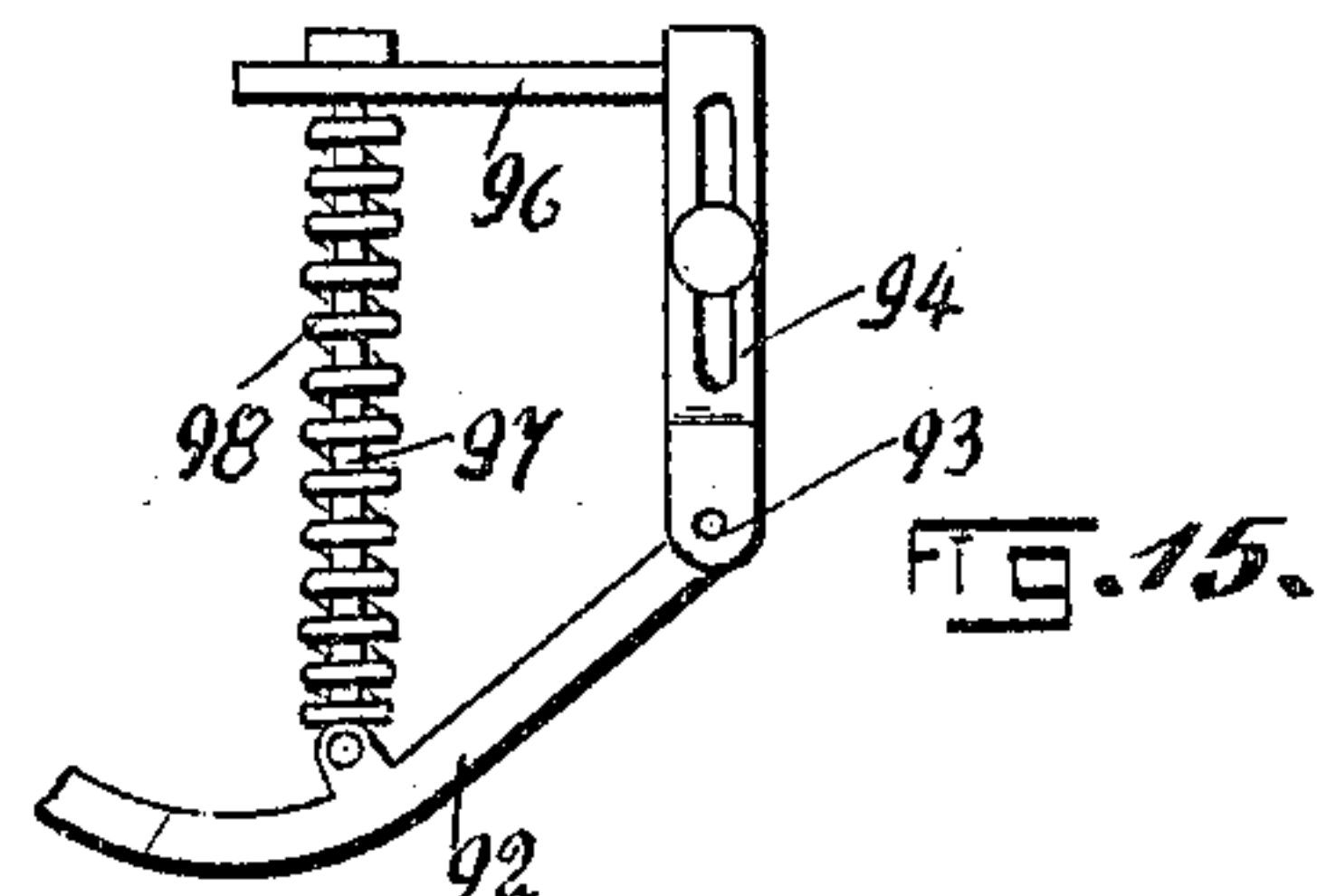
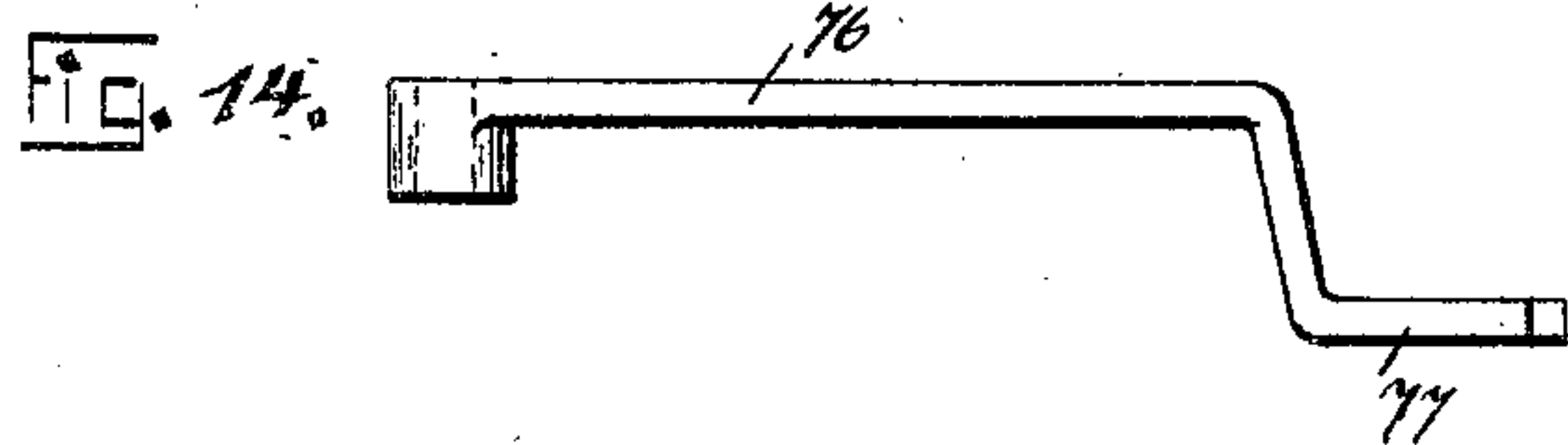
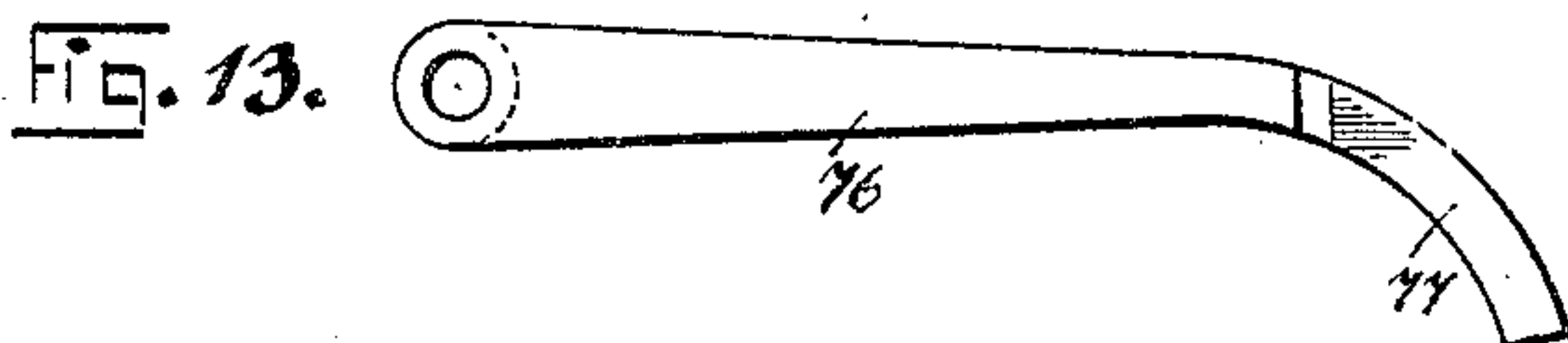
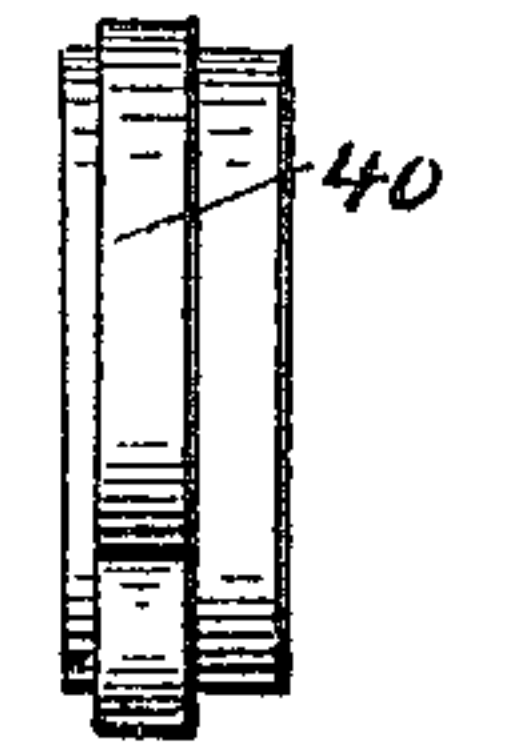
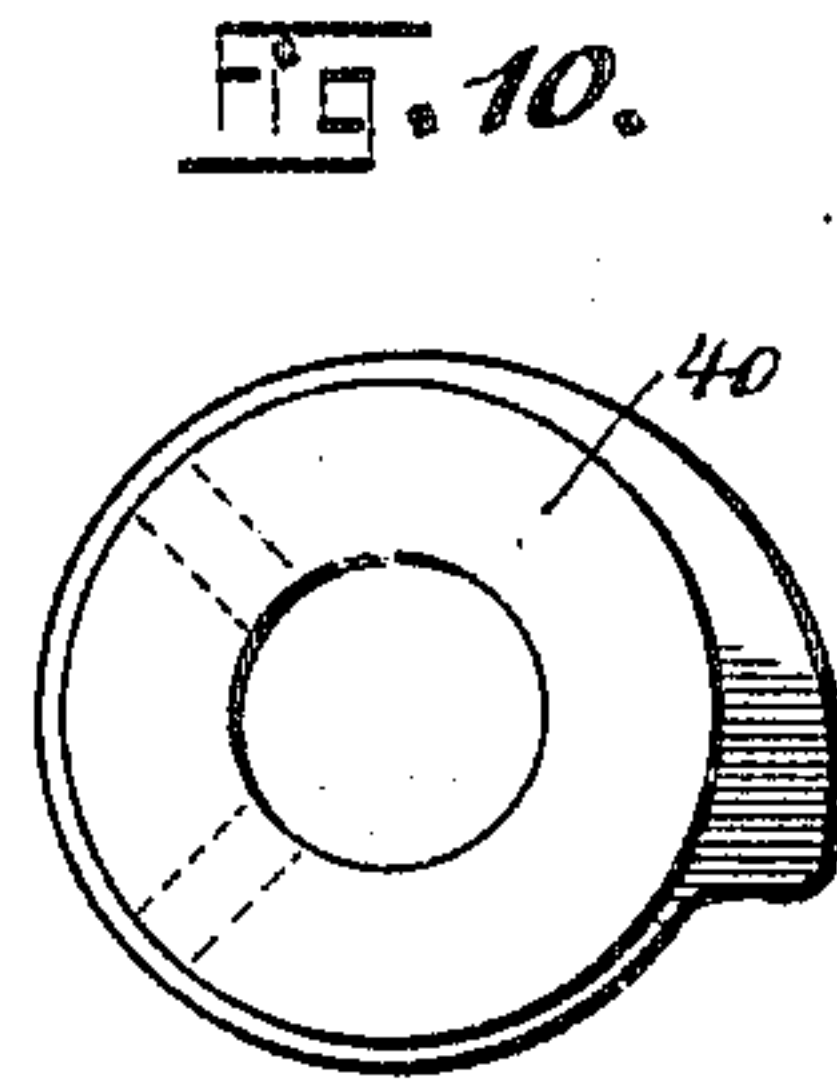
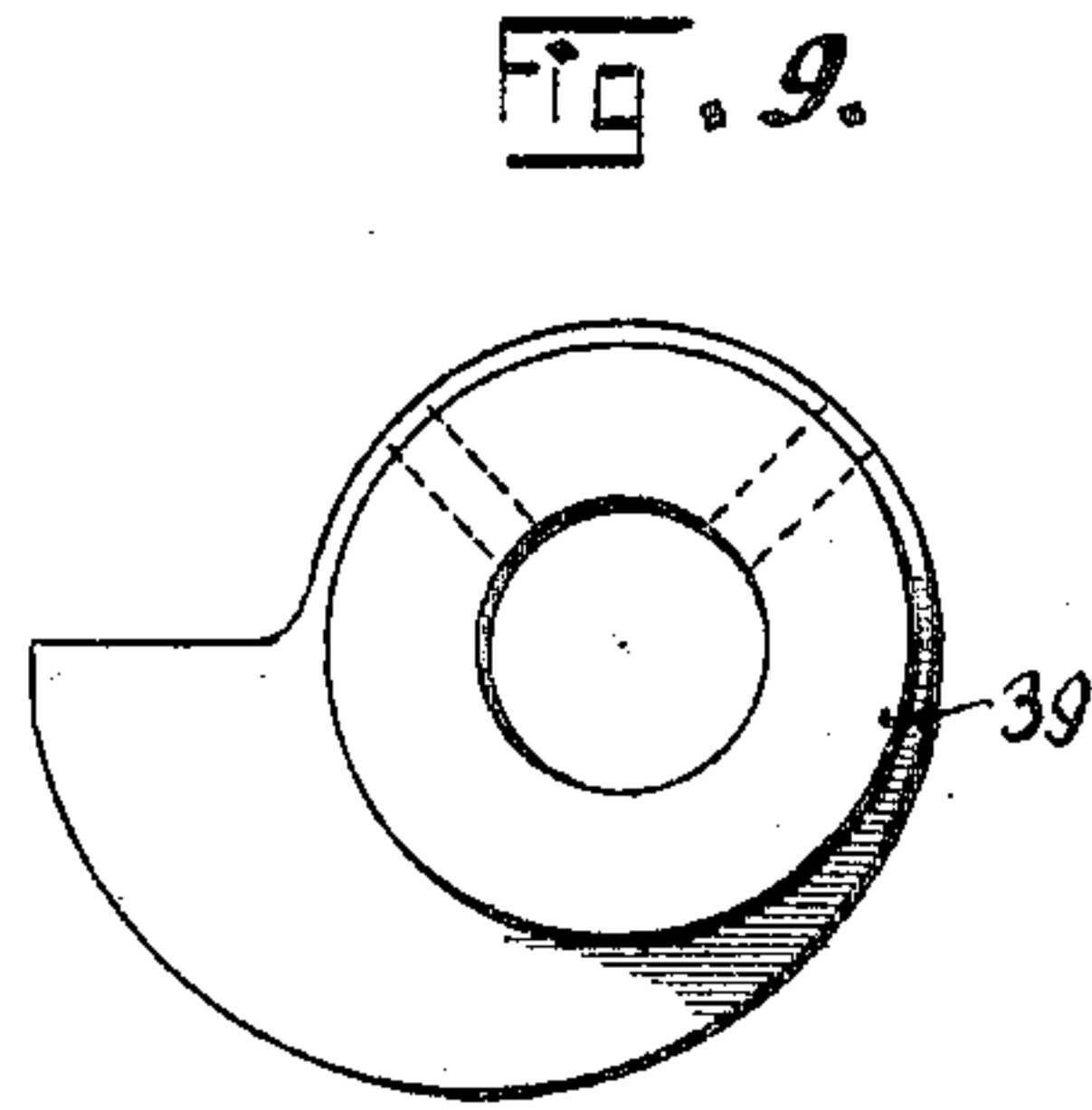
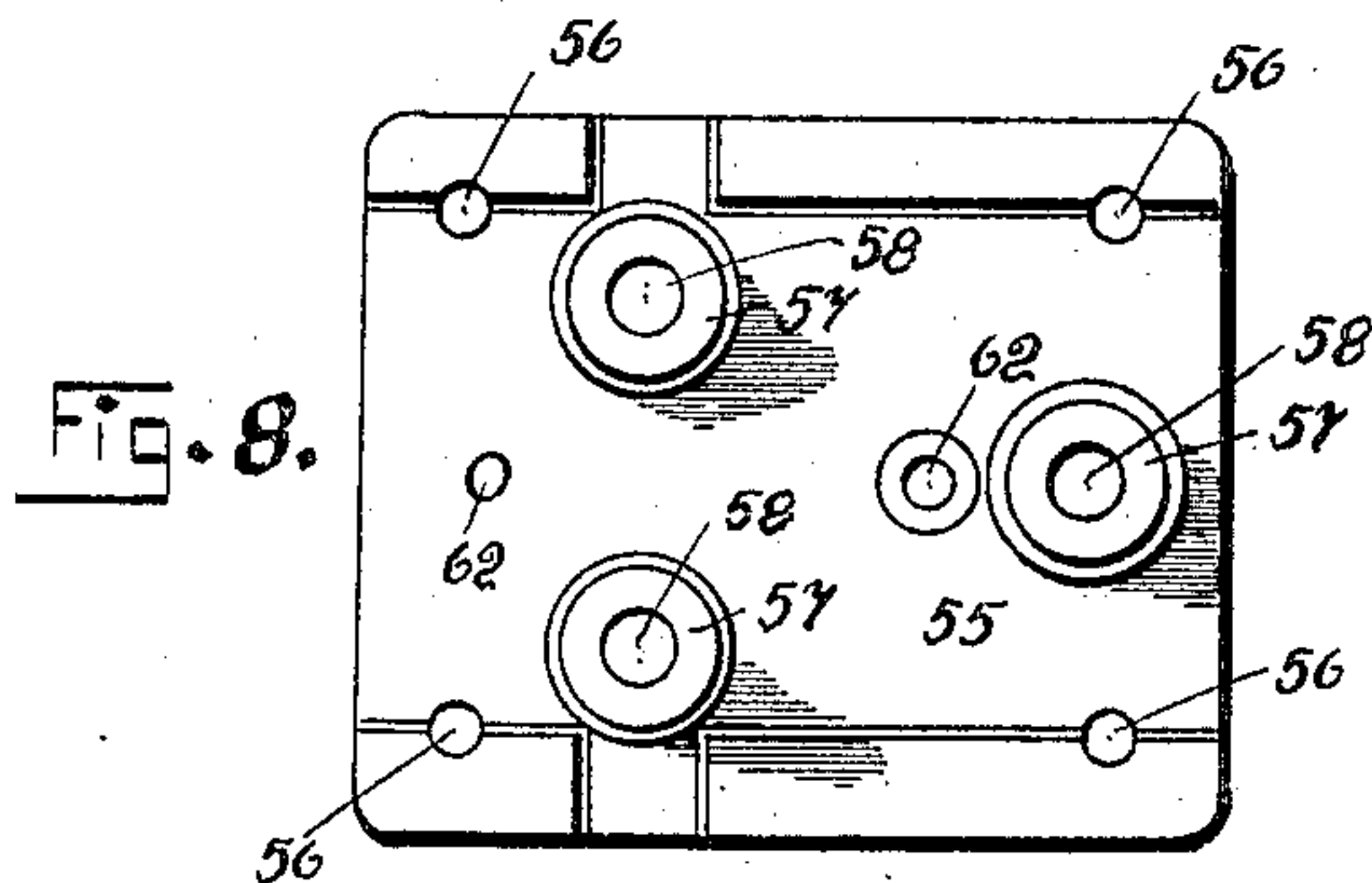
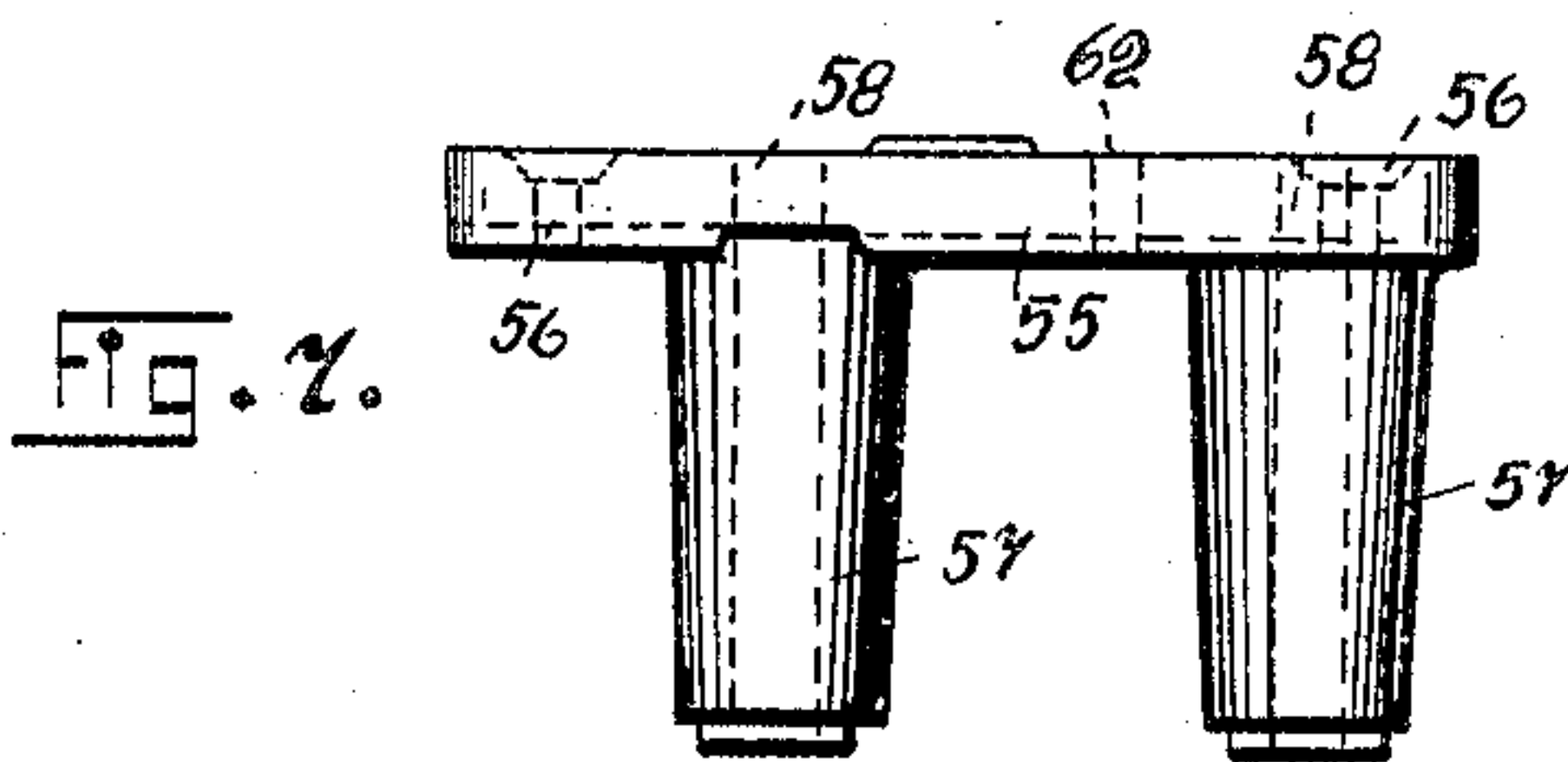
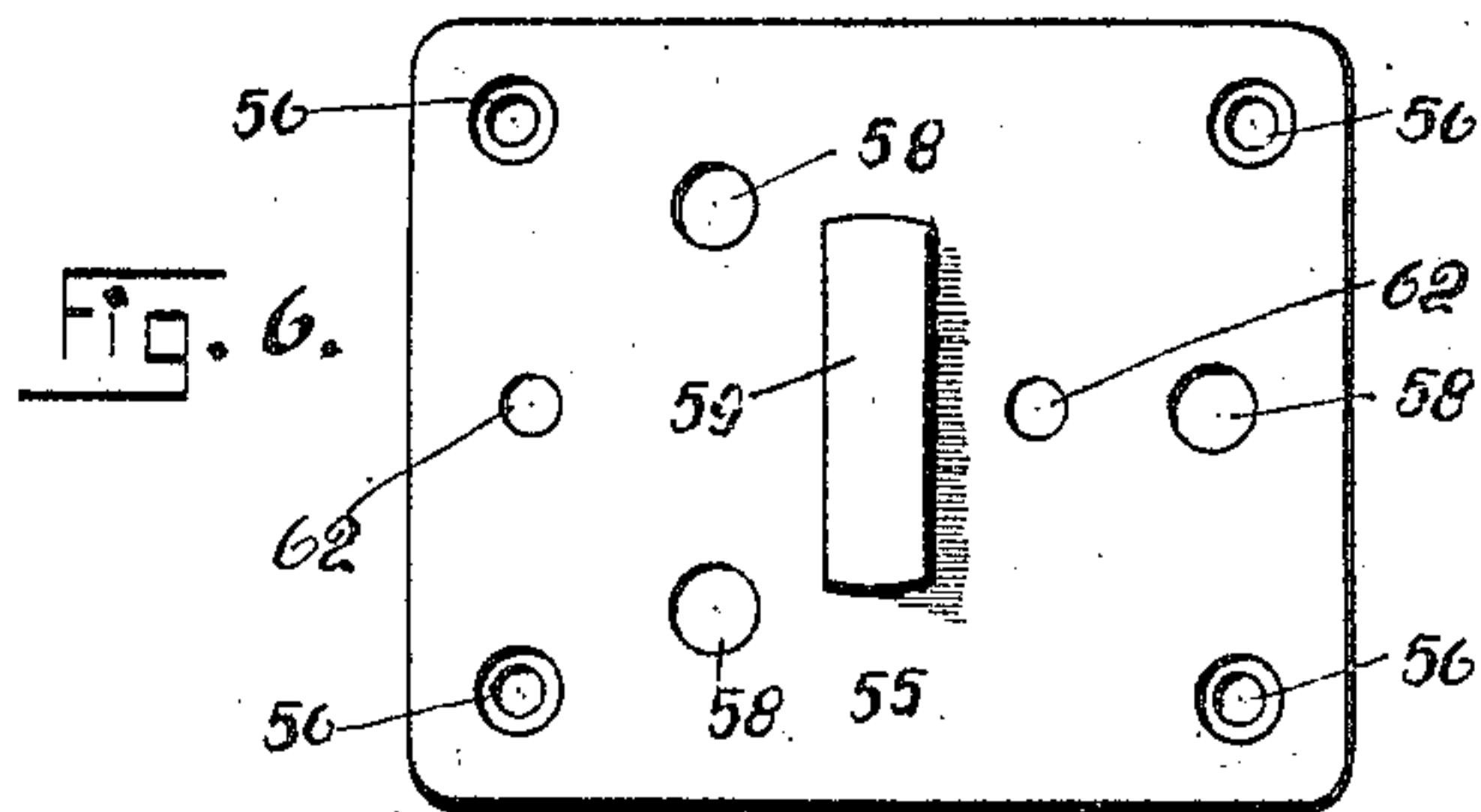
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

CHARLES ARBUTHNOT, OF McKEES ROCKS, PENNSYLVANIA.

HORSESHOE-SHAPING MACHINE.

No. 813,135.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed February 16, 1905. Serial No. 245,873.

To all whom it may concern:

Be it known that I, CHARLES ARBUTHNOT, a citizen of the United States of America, residing at McKees Rocks, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Horseshoe-Shaping Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in horseshoe-shaping machines; and the invention has for its object to provide a novel form of machine for forming horseshoes from blank pieces of metal placed within the machine.

15 The invention aims to provide effectual and positive means for bending and shaping a blank piece of metal into the different forms desired. To accomplish this, the machine, as constructed by me, primarily involves a bending mechanism and dies upon which the blank piece of metal is shaped. In connection with the bending mechanism and the dies I employ novel means for positioning and governing the blank to be formed and novel means for ejecting the blank after it has been formed, the last-named means being actuated by the same means which operates the forming or bending mechanism.

25 The invention also aims to provide a machine which can rapidly produce horseshoes at a comparatively small cost.

30 With the above and other objects in view, the invention finally consists in the novel construction, combination, and arrangement of parts, which will be hereinafter more fully described and then specifically pointed out in the claims, and, referring to the drawings accompanying this application, like numerals of reference designate corresponding parts throughout the several views, in which—

35 Figure 1 is a top plan view of my improved machine. Fig. 2 is a plan view of a blank piece of metal adapted to be formed and shaped in my improved machine. Fig. 3 is a side elevation view of my improved machine. Fig. 4 is a top plan view of a bed-plate or table. Fig. 5 is a longitudinal sectional view of the same. Fig. 6 is a top plan view of an auxiliary die or plate. Fig. 7 is a side elevation view of the same. Fig. 8 is a bottom plan view of the die or plate. Fig. 9 is a top plan view of a cam employed in connection with my improved machine. Fig. 10 is a side elevation view of the same. Figs. 11 and 12 are

detail views of another cam employed in connection with the machine. Fig. 13 is a top plan view of an ejector arm or lever. Fig. 14 is a side elevation view of the same. Fig. 15 is a top plan view of the mechanism employed in connection with my improved machine for governing and positioning a blank to be formed, and Fig. 16 is a side elevation view of the same.

To put my invention into practice, I have constructed a bed plate or table, which comprises the body portion of my improved machine, as illustrated in detail in Figs. 4 and 5 of the drawings. The bed plate or table of the machine is preferably formed of a casting comprising a central portion 1, having depending transverse flanges 2 2 and 3 and side flanges 4 4. The central portion of the bed plate or table is provided with longitudinally-disposed side frames 5 and 6, these frames constituting the rear end of the machine. Each frame is substantially channel shape in cross-section and is formed with transverse strengthening-ribs 7 and 8.

The central portion 1 is provided with a countersunk portion 9, which terminates at the end of the central portion adjacent to the side frames 5 and 6. The one end of the countersunk portion 9 is slotted, as indicated at 10, and the edges of the central portion 1 upon each side of the countersunk portion 9 are provided with upwardly-extending flanges 11 11, having apertures 12 12 formed therein. The central portion 1 is provided with a plurality of apertures 14 14, which are disposed adjacent to each one of the flanges 11 11 and in parallel alinement therewith. The forward end of the central portion 1 is provided with an opening 15, having flanged sides 16 16, and the web portion 17 of said opening formed by said flanges is provided with a plurality of apertures 18 18. The reference-numerals 19 19 designate upwardly-extending flanges formed upon the forward corners of the central portion 1, and in the angle of the flanges are located blocks 21 21, said blocks being provided with vertically-disposed apertures 22 22. The flanges 19 are provided with horizontally-disposed apertures 23 23, which are located just above the upper surfaces of the blocks 21 21. The flanges 19 19 are also provided with apertures 24 24, the object of which will be hereinafter described.

The ends of the side frames 5 and 6 are provided with journal-boxes 25 25 upon their

top faces, and intermediate said frames and upon the under face thereof are journaled boxes 26 26.

The bed or table of my improved machine 5 is supported by legs 27 27, secured upon each end of the machine, and said legs are braced by tie-rods 28.

The reference-numeral 30 designates the main operating-shaft of my improved machine, 10 which serves functionally as a drive-shaft for the mechanism of the machine. The shaft 30 is journaled in the boxes 26 26 of the side frames 5 and 6 and is retained therein by brackets 31. The one end of the shaft 30 is 15 provided with a balance-wheel 32 and pulleys 33 33. The opposite end of the shaft 30 is provided with a pinion 34, which meshes with a gear-wheel 35, mounted upon a shaft 36, journaled in the boxes 25 25 and retained 20 therein by the housing 37', secured upon said boxes. The shaft 36 is provided with a balanced crank-arm 37, clutch members 38 38, and cams 39 and 40. The cams are arranged upon each side of the balanced crank-arm 25 37, and each cam performs a function which will be hereinafter more fully described.

The reference-numeral 41 designates a plate which is slidably mounted upon the central portion 1 between the flanges 11 11, 30 and to guide and adjust said plate upon the central portion I have provided guides 42 42, which are slotted, as indicated at 43, and these guides are adjustably secured to the body portion 1 of my improved machine by 35 bolts and nuts 44, which pass down through the slots 43 and the apertures 14. The guides are laterally adjusted by screw-bolts 45, which are mounted in the apertures 12, formed in the flanges 11 11. The plate 41 is 40 provided with bosses 46 46, and said plate is slotted between said bosses, as indicated at 47. A pin 48 is mounted in said bosses, and upon said pin is journaled one end of a pitman 49, the opposite end of said pitman being con- 45 nected to the balanced crank-arm 37, as indicated at 50.

The plate 41 is provided with an upwardly-extending portion 51, in the ends of which are pivotally mounted forming-arms 52 52, 50 having journaled in their loose ends rollers 53 53.

Reference will now be had to the dies which I employ for shaping the blank piece of metal that is formed upon said dies by the 55 arms 52 52. In the opening 15 of the central portion 1 I secure by screws 54 an auxiliary plate or die 55, having apertures 56 formed therein to receive the screws 54, that engage in the apertures 18 of the central portion 1. The auxiliary plate or die is illus- 60 trated in Figs. 6 to 8, inclusive, and the plate is provided with three depending tapering sleeves 57, and the openings of said sleeves communicate with apertures 58, formed in

the plate or die 55. Centrally of the plate 65 55 is an upwardly-extending rib 59, which is adapted to engage in a die 60, mounted upon the plate 55 by screws 61 61, that engage in apertures 62 62, formed in the auxiliary plate or die 55. I have only illus- 70 trated one of the dies 60, which I may employ for forming horseshoes, the contour of these dies depending upon the shape of horse-shoe desired.

Reference will now be had to the ejector 75 mechanism of my improved machine, and on account of the particular shape of the die 60 it is essential that means be employed for first elevating the formed piece of metal and then ejecting the same from the machine. To 80 elevate the piece of formed metal, which is now a horseshoe, I have provided pins 63 63, which extend upwardly within the sleeves 57 of the auxiliary die or plate 55. The pins 63 are carried by a plate 64, mounted beneath 85 the sleeves 57, and interposed between said plate and the ends of said sleeve are springs 65, which surround the pins 63. The plate 64 is provided with a depending lug 66, to which is connected by a link 67 a rearwardly- 90 extending bar 68. The bar 68 is pivotally mounted, as indicated at 69, in the depending bracket 70, carried by the transverse flange 3. The opposite end of the bar 68 is con- 95 nected by a link 71 to an upwardly-extending rod 72, which is mounted in a sleeve 73, carried by a plate 74, secured to the side frame 6. The upper end of the rod 72 is provided with a roller 75, and said roller is adapt- 100 ed to be actuated by the cam 40, interposed between the balanced crank-arm 37 and the side frame 6.

When the formed piece of metal has been elevated, I employ an ejector arm or lever 76 to remove the formed piece of metal from 105 the machine. This arm is illustrated in Figs. 13 and 14 of the drawings. By referring to said figures it will be observed that the outer end of the arm is bent downwardly, as indicated at 77, whereby it will engage the formed 110 piece of metal when actuated. The arm is pivoted, as indicated at 78, upon the top of the machine, at one side thereof, and the pivoted pin 79 of said arm extends downwardly through the body portion of the machine and 115 is provided with a crank-arm 80. The crank-arm 80 is connected by a spring 81 to one of the supporting-legs 27 of my improved machine and also to a rod 82, which extends rearwardly and is connected, as indicated at 120 83, to a pivoted arm 84, said arm being pivoted in a bracket 85, carried by the side arm 5 of my improved machine. The upper end of the arm 84 is bifurcated, and in said bifurcated end is journaled a roller 86, which is 125 adapted to engage the cam 39, carried by the shaft 36.

Adjustably secured to the blocks 21 21 are

plates 87 87, having slots 88 88 formed therein, and the plates 87 are secured to the blocks 21 by screw-bolts 89, passing through the slots 88 and engaging in the apertures 22 of said blocks. The plates 87 are also adjusted by screw-bolts 90 90 and 91, which pass through the apertures 23 and 24 of the flanges 19. Operating beneath the edges of said plates are guide-arms 92, one of which is illustrated in Figs. 15 and 16. These guide-arms are pivotally connected, as indicated at 93, to brackets 94, which are secured, as indicated at 95, to the flanges 4 4 of my improved machine. The brackets 94 94 each support an adjustable arm 96, and to the rear faces of the guide-arms 92 are secured rods 97, which pass through the adjustable arms 96. Mounted upon each said rod between the arm 96 and the guide-arm 92 is a spring 98, that normally retains the guide-arm 92 in the position illustrated in Fig. 1 of the drawings.

The flange 4 upon one side of the machine is provided with a boss 99, to which is pivotally connected a foot-lever 100, and the upper end of said foot-lever is connected by a link 101 to a spring-actuated bar 102. This bar is mounted in a bracket 103, carried by the side frame 5 of my improved machine. The bar 102 is connected by a bell-crank lever 104 to the clutch member 105 of the clutch 38. The clutch, which I have partly illustrated, is of a conventional form and need not be further described.

Operation: In Fig. 2 of the drawings I have illustrated a blank piece of metal, which is to be formed and shaped into a horseshoe, and these blanks are cut the desired lengths and provided with the apertures common to horseshoes to receive the nails when the same are secured upon the foot of an animal. We will assume that a blank has been placed upon my improved machine in the position indicated by dotted lines and by the reference-numeral 106. We will further assume that my improved machine is being operated by a motor or driven by an engine and that the shaft 30, pinion 34, and gear-wheel 35 are revolving. To operate my improved machine, the foot-lever 100 is actuated, which will throw in the clutch 38 and impart a revolvable motion to the crank-arm 37 and the cams 39 and 40. As the crank-arm revolves the plate 41 is moved forward by the pitman 49 and the rollers 53 engage the blank 106 and carry the same forward until it engages the die 60. A further movement of the plate 41 causes the forming-arms 52 to slightly separate and causes the rollers 53 to travel between the plates 87 87 and the die 60, gradually bending the blank 106 around the die 60, causing the same to conform to the shape of said die. A further revolution of the crank-

arm 37 causes the plate 41 to recede and the arms 42 to assume their normal position. The cam 40 now actuates the bar 68 through the medium of the rod 72, roller 75, and link 71. As the bar 68 is pivotally connected to the body portion of my improved machine, the forward end of the bar will be elevated. The elevation of the forward end causes the plate 64 to rise, carrying with it the pins 63, and these pins will raise the shaped blank above the die 60. When the shaped blank has been removed, the springs 65 will return the pins 63 and plate 64, together with the bar 68, to their normal position. To remove the shaped blank after it has been elevated, the ejector-arm 76 is actuated. This is accomplished by the cam 39 actuating the rod 82 through the medium of the pivoted arm 84 and the roller 86. The rod 82 swings the arm 76 through the medium of the crank-arm 80 and the pivoted pin 79. When the plate 41 is moved forward, carrying the forming-arms 52 52, the guide-arms 92 are adapted to govern and position the blank as it is carried against the die 60, and the resiliency of these arms can be regulated by increasing or diminishing the tension of the springs 97 by adjusting the arms 96.

I desire to call attention to the adjustment features of my improved machine. It will be observed that the plates 87 87 can be adjusted by the screw-bolts 89, 90, and 91, the guides 42 42 by bolts 43 and 45, and by removing the die 60 another die can be readily placed upon the plate 55 to produce the shape of shoe desired.

In the accompanying drawings I have illustrated the preferred manner of constructing my improved machine, it of course being understood that the same is susceptible of such structural changes as will be permissible by the scope of the appended claims.

What I claim, and desire to secure by Letters Patent, is—

1. In a metal-shaping machine, the combination with a suitable frame, pivoted forming-arms slidably mounted upon said frame, a detachable die, elevating mechanism mounted adjacent to said die, ejector mechanism carried by said frame, means to reciprocate said forming-arms, means to actuate said elevating mechanism, and means to operate said ejector mechanism substantially as described.

2. In a machine of the character described, the combination with a suitable frame, pivoted forming-arms slidably mounted on said frame, a stationary die and spring-pressed guiding-arms symmetrically converging toward and located adjacent to said die and adapted to guide a blank while it is being moved by the forming-arms toward the die.

3. In a machine for forming metal, the

combination of reciprocating forming-arms
adapted to engage a blank, a die around which
said blank is adapted to be formed, vertically-
movable pins to elevate said blank after it
5 has been formed, and a horizontally - mov-
able ejector to remove said formed blank from
said die, substantially as described.

In testimony whereof I affix my signature
in the presence of two witnesses.

CHARLES ARBUTHNOT.

Witnesses:

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K. H. BUTLER.