

No. 667,697.

Patented Feb. 12, 1901.

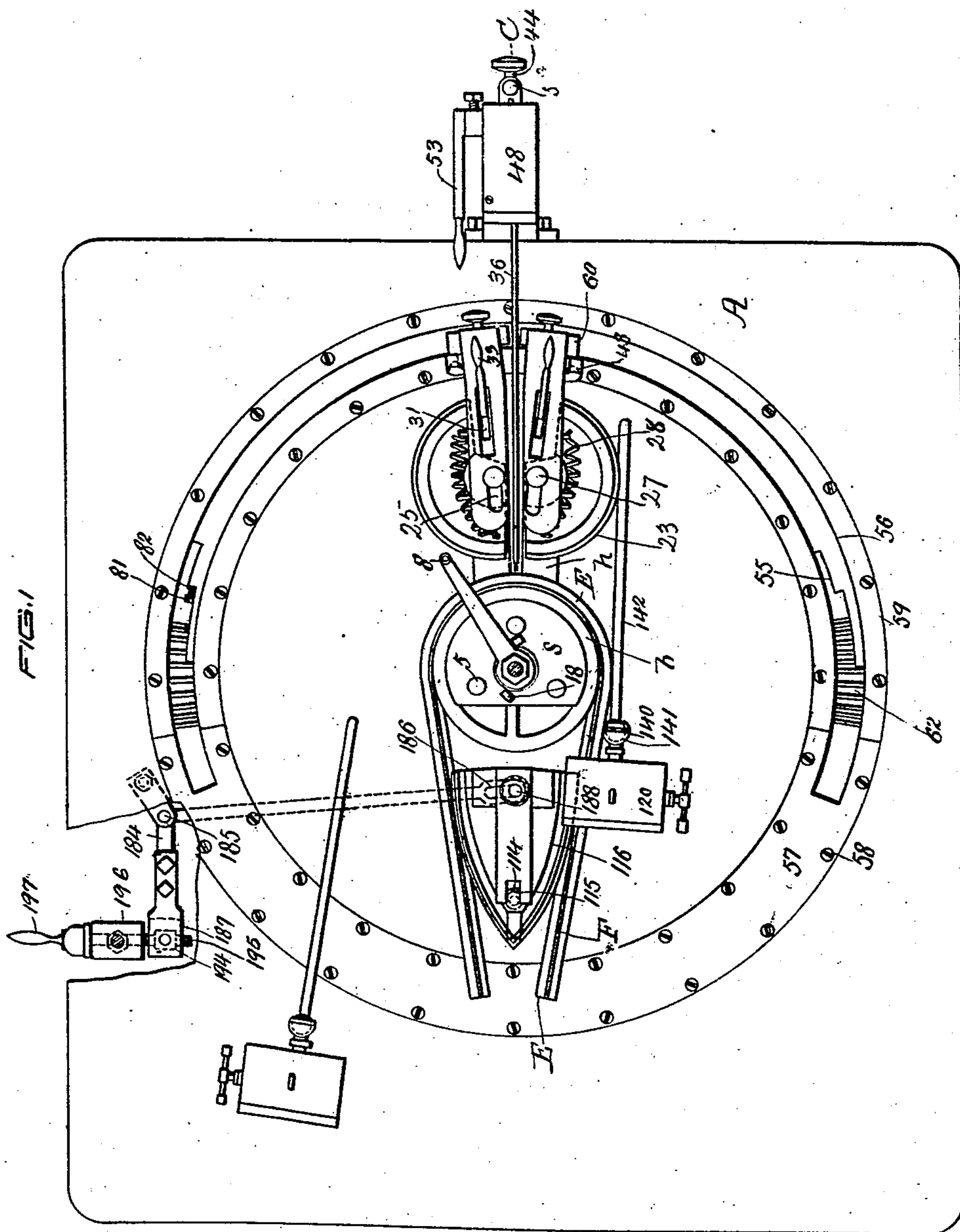
H. L. GULLINE, I. E. HUTCHINS & A. I. GILLIES.

METAL FORMING MACHINE.

(Application filed Apr. 11, 1900.)

(No Model.)

6 Sheets—Sheet 1.



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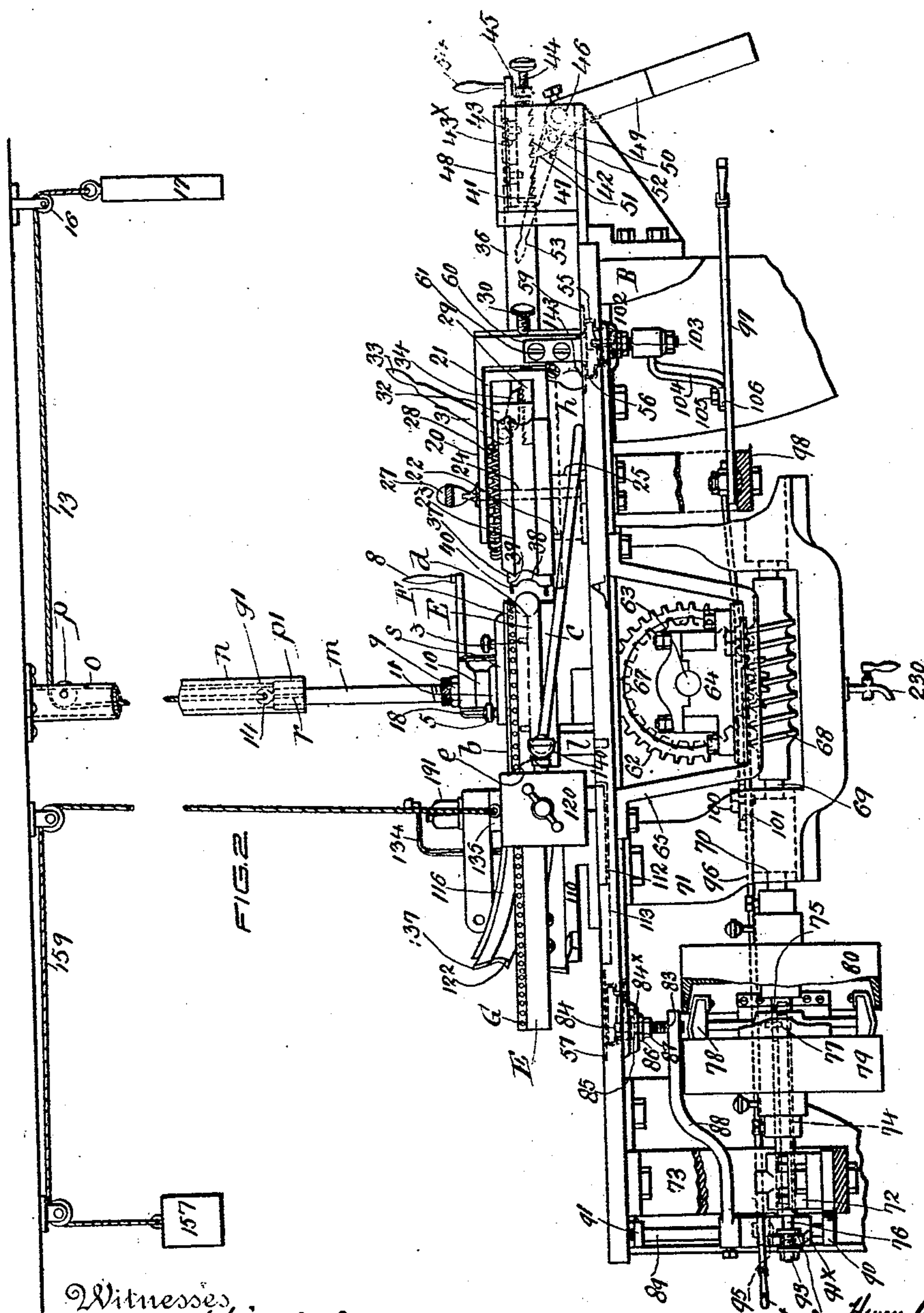
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**METAL FORMING MACHINE.**

(Application filed Apr. 11, 1960.)

**6 Sheets—Sheet 2.**

(No Model.)



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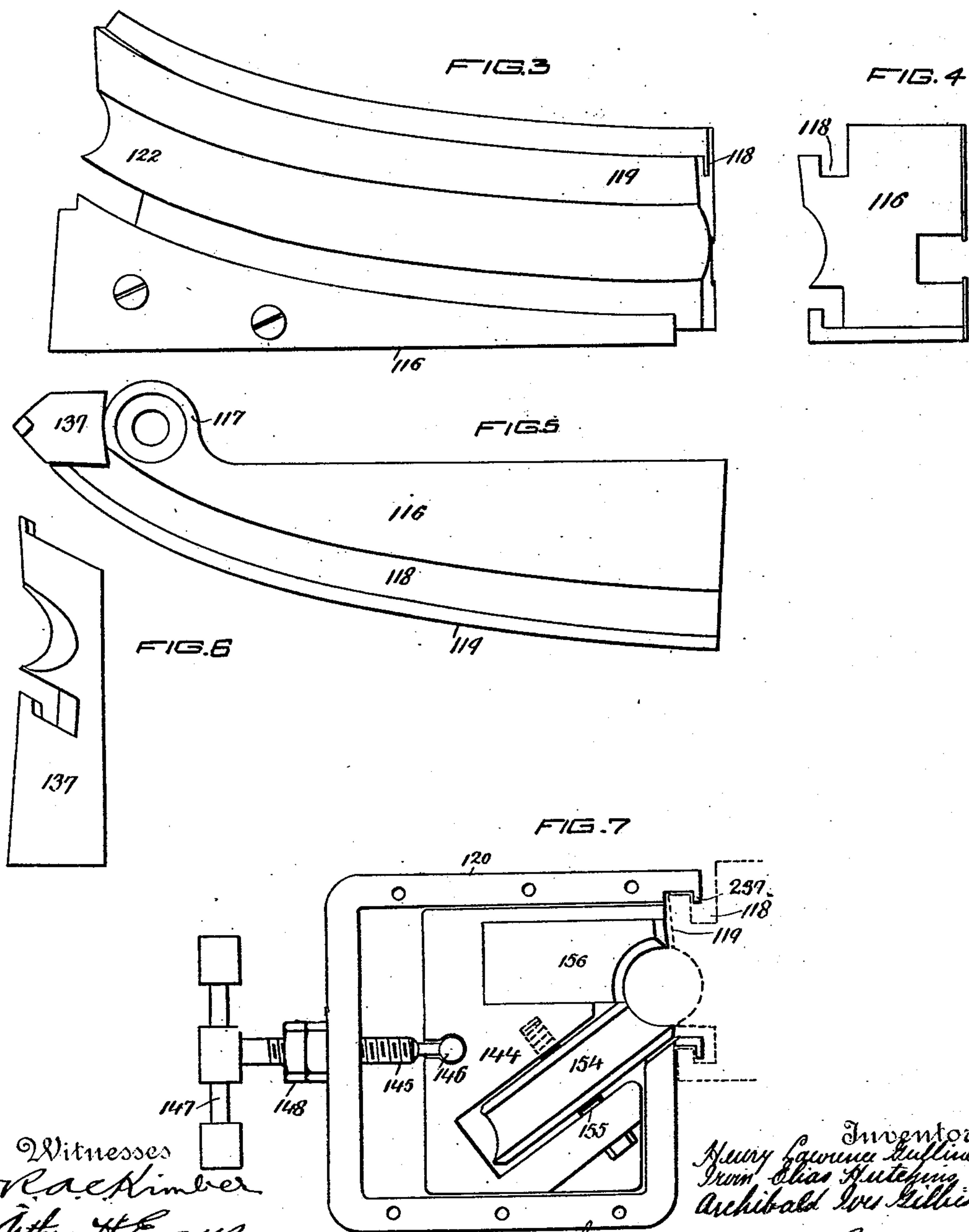
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**METAL FORMING MACHINE.**

(Application filed Apr. 11, 1900.)

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**6 Sheets—Sheet 3.**



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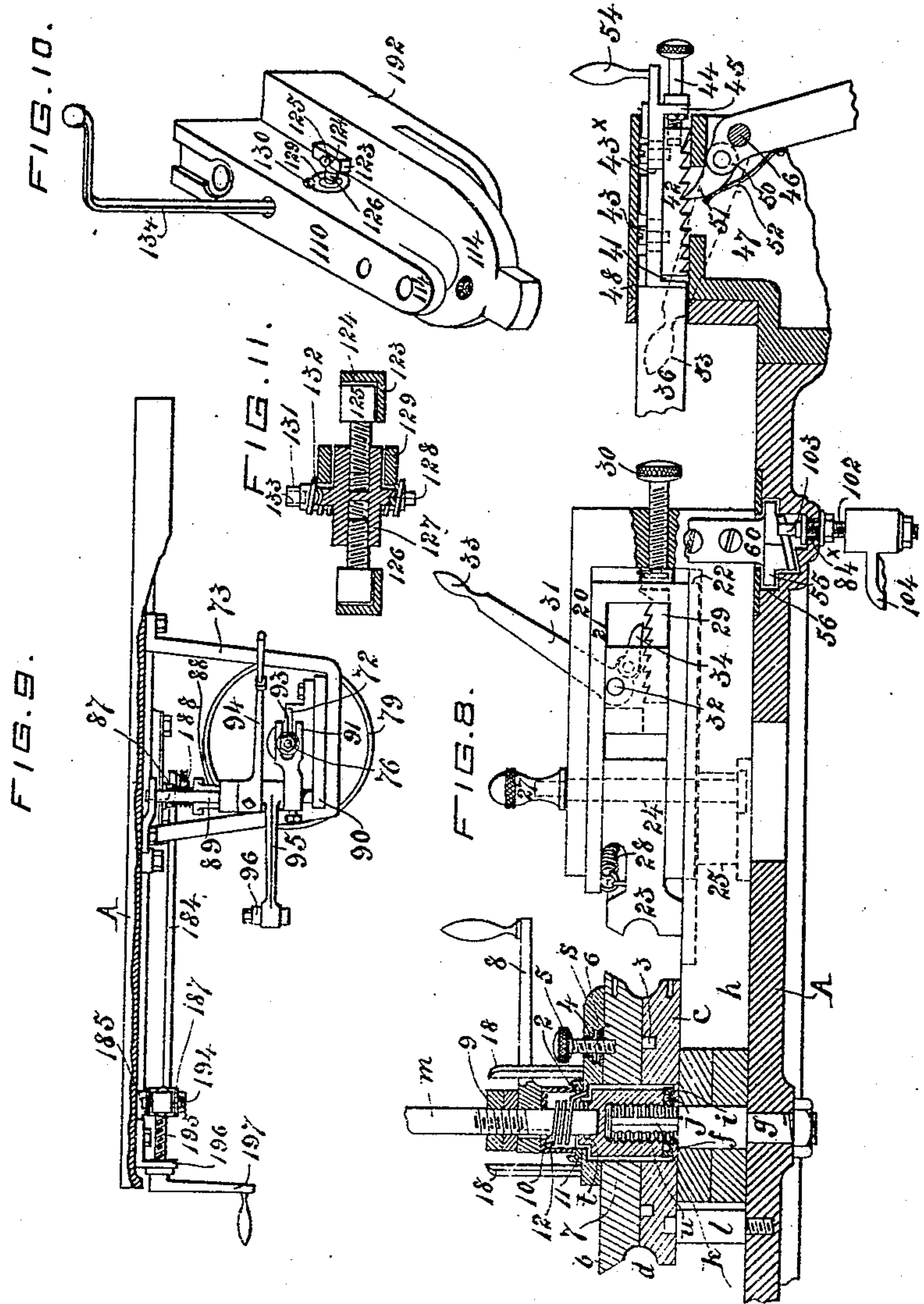
H. L. GULLINE, I. E. HUTCHINS & A. I. GILLIES.

METAL FORMING MACHINE.

(Application filed Apr. 11, 1900.)

(No Model.)

6 Sheets—Sheet 4.



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H. L. GULLINE, I. E. HUTCHINS & A. I. GILLIES.

METAL FORMING MACHINE.

(Application filed Apr. 11, 1900.)

(No Model.)

6 Sheets—Sheet 5.

FIG. 12.

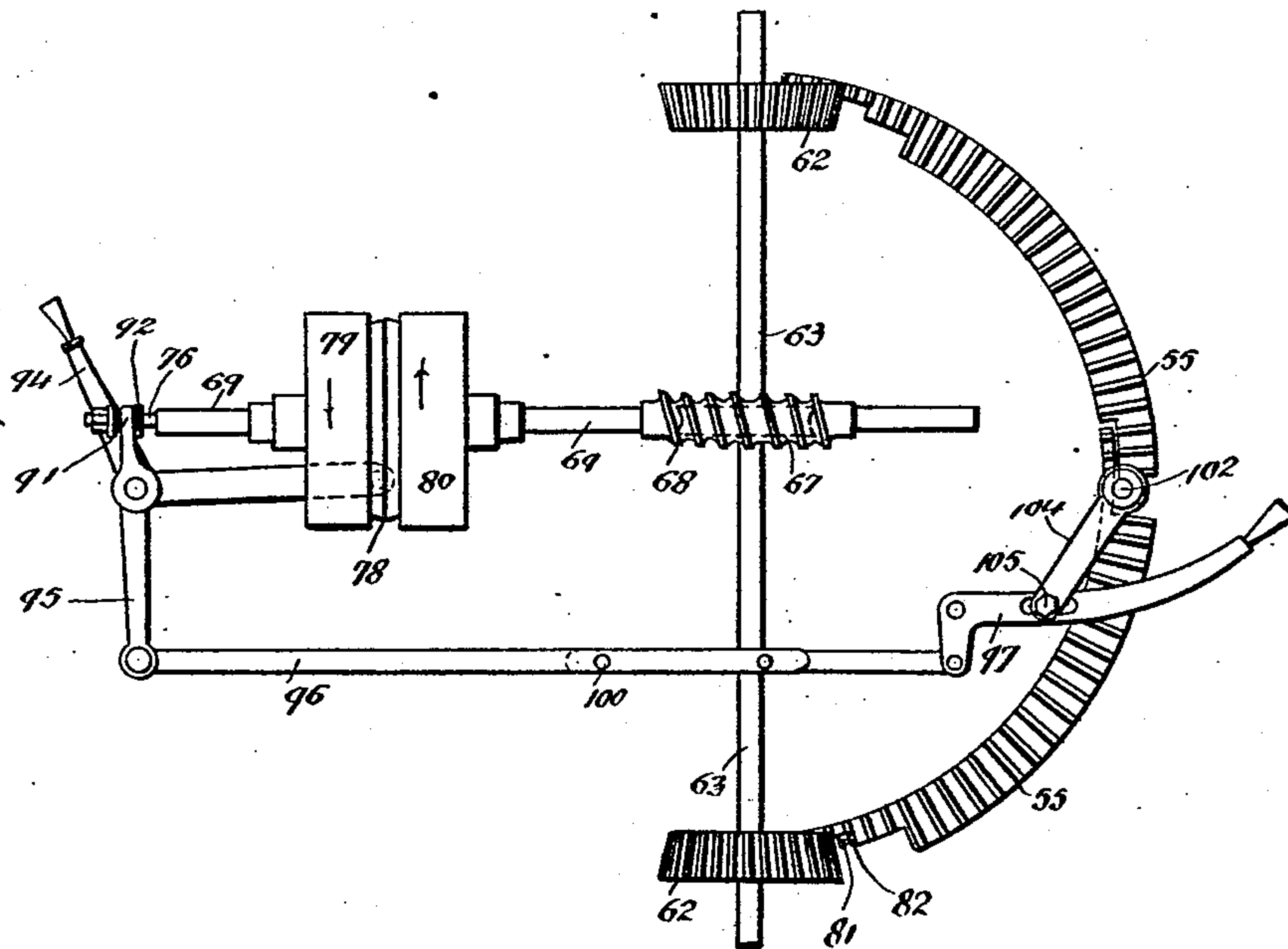
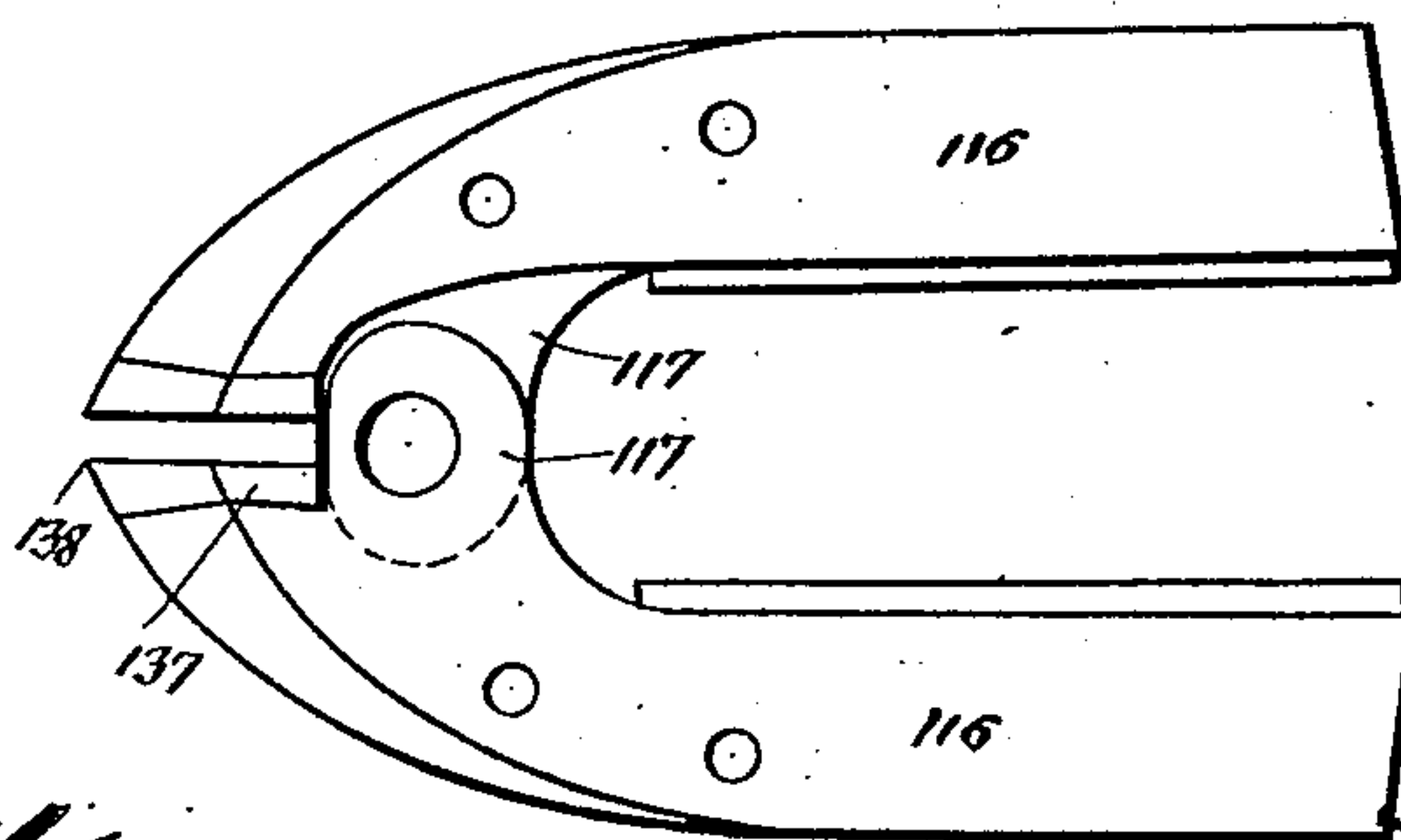


FIG. 13.



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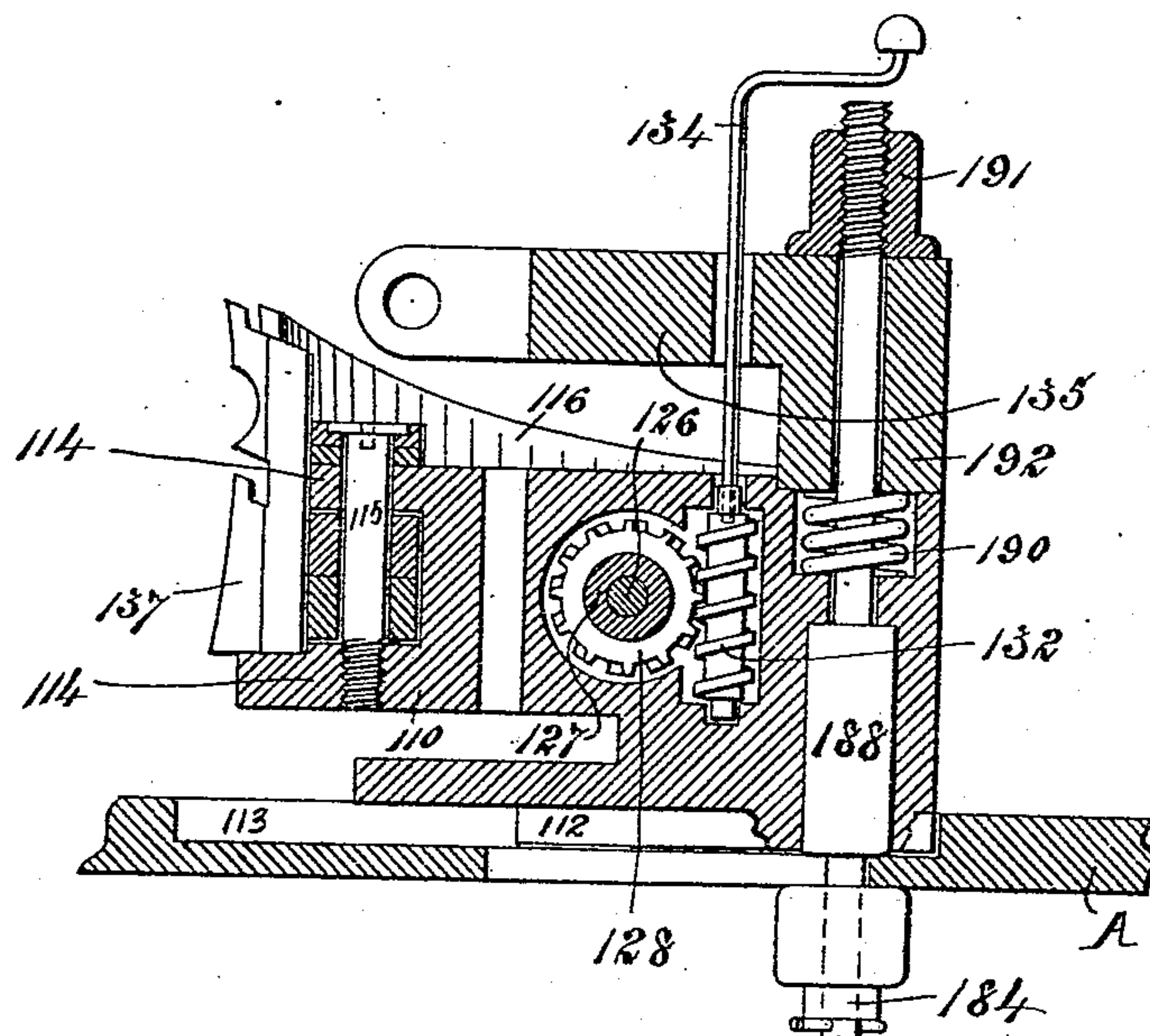
METAL FORMING MACHINE.

(Application filed Apr. 11, 1900.)

(No Model.)

6 Sheets—Sheet 6.

FIG. 14.



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# UNITED STATES PATENT OFFICE.

HENRY LAWRENCE GULLINE AND IRVIN ELIAS HUTCHINS, OF GRANBY,  
AND ARCHIBALD IVES GILLIES, OF SHERBROOKE, CANADA; SAID  
HUTCHINS AND GILLIES ASSIGNORS TO SAID GULLINE.

## METAL-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 667,697, dated February 12, 1901.

Application filed April 11, 1900. Serial No. 12,490. (No model.)

*To all whom it may concern:*

Be it known that we, HENRY LAWRENCE GULLINE and IRVIN ELIAS HUTCHINS, of the town of Granby, and ARCHIBALD IVES GILLIES, of Sherbrooke, in the Province of Quebec, Canada, have invented certain new and useful Improvements in Metal-Forming Machines; and we do hereby declare that the following is a full, clear, and exact description of the same.

Heretofore in the manufacture of horse-collar rims or like frames for other purposes it has been necessary to form the said rims by hand, and this, besides requiring skilled labor, has taken considerable time.

Our invention relates to the type of metal-forming machine set forth and claimed in our pending application, filed under Serial No. 11,557 on the 4th of April, 1900; and the object thereof is to provide an entirely mechanically-operated mechanism whereby a complete horse-collar rim or other like frames for other uses can be produced.

The invention may be said, briefly, to consist of a stationary adjustable part of a contour to give the required shape to the article to be formed and mechanically-operated traveling forming mechanism to travel around and in close proximity to the stationary part to coact therewith, and thereby form the complete article from a length of metal by entirely mechanically operated means.

As in the above-mentioned pending application we elect to set forth our invention as applied to a machine for the manufacture of the rims of horse-collars where a flanged tubular length of metal is utilized. To this end the stationary forming part is divided into throat and peak forming portions adjustable toward and from one another to accommodate different lengths of rims, and independent mechanism is provided and mechanically operated to travel around and in close proximity to the forming portion of the contour of said stationary peak and throat forming portions. The throat-forming mechanism is entirely the same as illustrated and described in our said pending application, and the same may be said of the means for supporting and adjusting the stationary peak-forming portions.

The traveling peak-forming mechanism of the present embodiment of our invention is operatively connected to the traveling portion of the throat-forming mechanism and is consequently actuated thereby and simultaneously therewith, means being provided to automatically guide said traveling peak-forming mechanism during the performance of its function. The throat-forming mechanism is, as before mentioned, similar in every respect to that disclosed in our said pending application filed on April 4, 1900, under Serial No. 11,557. For full comprehension, however, of our invention reference must be had to the accompanying drawings, wherein—

Figure 1 is a plan view of our improved machine. Fig. 2 is substantially a side elevation with parts shown in cross-section. Figs. 3, 4, and 5 are detail views of the masking portions forming a part of the present machine. Fig. 6 is a detail side elevation of the filling-piece located between the ends of said masking portion. Fig. 7 is a detail view of the traveling peak-forming block forming a part of the present machine. Fig. 8 is a longitudinal sectional view taken on line C, Fig. 1, of the rear half of the machine. Fig. 9 is a rear end elevation of the portion of the machine beneath the bed-plate. Fig. 10 is a detail perspective view of the frame-piece supporting the stationary peak-forming portions. Fig. 11 is a detail sectional view of the means for adjustably connecting the stationary peak-forming portions to their frame-piece. Fig. 12 is a detail plan view of the racks, means for moving the racks, and means for automatically stopping the machine. Fig. 13 is a detail view of the expansible peak-block, and Fig. 14 is a longitudinal vertical sectional view of the peak-forming mechanism.

The metal we prefer to utilize in forming collar-rims is of tubular cross-section E with a flange F, having perforations G, whereby it can be stitched to the body of the collar. The stationary portion of this throat-forming mechanism consists of a circular block divided horizontally into upper and lower parts b and c, respectively, the edges of the adjoining faces whereof are grooved to conjointly



constitute a circumferential groove *d*, while the perimeter of the upper part *b* is beveled, as at *e*. The lower part *c* of this block has a concentric boring which is contracted at its lower end to form a collar *f* and is supported upon a pin *g*, set rigidly in the bed-plate A of the table B at about the middle of said bed-plate. This pin *g* is of sufficient length to provide a fulcrum for a pair of swinging arms *h*, to be hereinafter described, and a portion thereof projects above said arms and is diminished to form a shoulder upon which the collar *f* of the part *c* rests and further diminished and screw-threaded to receive an annular nut *i*. The upper end of this nut is formed with a pair of spanner-holes *j*, whereby it can be turned into or out of place by any approved form of spanner, (not shown,) and the said screw-threaded portion of said pin is formed on diametrical opposite sides with a pair of keyways *k*, while the portion of said lower part *c* of the stationary forming-block which overhangs the ends of the swinging arms is supported upon a short standard *l*, diminished at both ends and screw-threaded at its lower end to take into a tapped boring in the table and into a boring in the under side of the said part *c*. The upper part *b* of this stationary forming-block is carried upon the lower end of a rod *m*, sliding in a vertical tube *n*, secured rigidly at its upper end to the ceiling, and slotted, as at *o*, near its upper end, in which a pulley *p* is mounted. The interior of this tube has its lower end enlarged in diameter, as at *p'*, and a keyway *g'* extends longitudinally thereof from said enlargement for a distance within the tube greater than the length of the rod *m*, while said rod has a key *r* near the upper end thereof to, under certain conditions, take into said keyway and retain said rod against rotation and under other conditions to be located in the said enlargement *p'* to allow of the rotation of said rod, as will be presently pointed out. This upper part *b* of the stationary forming-block has a series of dowel-pins 3, projecting from its under side to take into borings in the upper side of the part *c*, and is connected to the lifting-rod *m* by a disk *s*, centrally perforated to take over the hub *t* of a sleeve *u*, rigidly secured through said hub by a pin 2 to the lower end of said rod, said disk when the parts *b* and *c* of the forming-block are separated being supported upon said sleeve *u*. This disk *s* has a series of perforations 4 with diminished upper ends, in which are carried a series of thumb-screws 5, having transverse pins 6 to retain them against complete withdrawal from the said disk, while the upper face of the part *b* of the stationary forming-block has a series of tapped borings into which said screws take.

The interior of the sleeve *u* has a pair of keys 7 with their inner faces screw-threaded, and a handle 8 is keyed upon the rod *m* a short distance above the disk *s*, where it is held against upward displacement by a pair

of jam-nuts 9, taking upon the rod, which is screw-threaded at that point. Between this handle 8 and the disk *s* is located a circular box 10, also keyed to the rod *m* and resting upon a washer 11, which in turn rests upon the top of the disk. A retractile helical spring 12 is located within said box and has its ends taking, respectively, into a perforation in the inside of the top thereof and in the disk *s*, while a rope 13 is connected to an eye 14 in the top of said rod and taken upwardly through the tube *n* and over a pair of suitably-mounted pulleys *p* and 16 and has a weight 17 at its end to counterbalance and lift said rod and all the parts connected thereto when the sleeve *u* is free of the pin *g*.

To secure the part *b* firmly in place, the sleeve *u* is inserted in the central opening until the parts *b* and *c* come into contact with one another. The handle 8 is then moved thereby through the connection between the screw-threads upon the interior of the keys 7 and the screw-threaded portion of the pin *g*, drawing said parts *b* and *c* firmly together and retaining them in place, and the reverse action will disengage the parts from one another and allow the weight to raise the upper part *b*, a pair of rigid stops 18, carried by the disk *s*, limiting the movement of the handle 8 in either direction.

To enable the semicircular blocks 23 to be adjusted toward or away from the stationary block *b c* to accommodate different diameters of tube from which the rims are made, we provide means for adjusting the slides 21. This adjusting means is the same for each slide and consists of a ratchet-bar 29, resting loosely in a slot in the under side of the slide and upon the top of the swinging arm. The outer end of this ratchet-bar is rotatably connected to the inner end of a thumb-screw 30, taking through a tapered boring in the vertical portion of the bracket 21. To enable these semicircular blocks to be moved and locked into close engagement with the rim metal, which is inserted between them and the stationary throat-block, as will be presently shown, a bell-crank lever 31 is fulcrumed in a block 32, carried rigidly in each slide. The end of one arm of this bell-crank lever is elongated and formed with a handle 33, and the end of the other arm has a pawl 34 pivotally connected thereto and rests in engagement with the teeth of the ratchet-bar 29. A clamp is provided to hold the rim metal in place when it is first inserted between the stationary and movable parts of the throat-forming mechanism, and consists of a flat bar 36, set on edge and having one end piece 37 secured rigidly thereto and formed with a semicircular recess 38 at its end to fit over the tubular portion of the rim metal, and a beveled portion 39, corresponding in angle to the beveled upper portion *b* of the stationary throat-forming block, to fit against the flange of the rim metal and having a pair of dowel-pins 40, the upper one of which takes through the middle perfora-



tion in the flange and the lower end into a guiding perforation in the lower portion *c* of said stationary throat-forming block. This bar 36 is forced into tight engagement with the rim metal to secure it firmly in place upon the stationary block *b c* by the following means: The outer end of the bar is thickened and formed with a guideway 41, in which an adjustable ratchet-bar 42 is supported by a pair of screws 43, taking downwardly through slots 43<sup>x</sup> in said bar and into screw-threaded perforations in said ratchet-bar. The outer end of the ratchet-bar has a tapped boring therein, into which takes the end of a screw 44, rotatably mounted, but held against longitudinal movement, in a bracket projection 45 upon the under side of said ratchet-bar and constituting the end of the guideway 41. A bell-crank lever is fulcrumed upon a spindle 46, carried in vertically-arranged bearing-plates 47 upon the bed-plate of the machine. These bearing-plates are braced together at their upper ends by a cover in the form of a plate 48, secured in place by screws. One arm 49 of the bell-crank lever is elongated and weighted, and the other arm 50 thereof has a pawl 51 pivotally connected thereto and kept yieldingly in engagement with said ratchet-bar by a bow-spring 52, while a handle 53 is secured upon one end of said spindle 46, and a handle 54 is secured rigidly upon the outer end of the bar 36.

The arms *h* are caused to swing upon the fulcrum-pin *g* by means of a pair of quadrantal racks 55 of T cross-section, set in a circular guideway 56, also of T cross-section, in the bed-plate. Half of this guideway is covered by a semicircular plate 57, secured in place by screws 58, and the other half is partially covered by a pair of semicircular strips 59 to retain the racks 55 against vertical displacement and accommodate a vertical bracket-piece 60, formed integrally with one end of each quadrantal rack 55 and rigidly connected to the outer ends of the arms *h* by screws 61. These racks are moved in opposite directions in their guideway 56 by a pair of bevel-gears 62, rigidly mounted upon a shaft 63, arranged transversely of the machine and mounted at each end in bearings 64, supported upon brackets 65, hung from the underside of the bed-plate and about midway of its length in a bearing secured also upon the under side of the bed-plate. A worm-wheel 67 is mounted rigidly upon the transverse shaft and intermeshes with a worm 68, rigidly upon a main driving-shaft 69, bearing adjacent to said worm in bearings 70, supported in a hanging bracket 71, bolted to the under side of the bed-plate and at one end in a bearing 72, supported in a hanging bracket 73, bolted to the under side of the bed-plate near the front thereof. This shaft 69 is bored, as at 74, longitudinally from its forward end to a point about midway between said brackets 71 and 73 and is transversely slotted, as at 75. A rod 76 takes into and is movable

longitudinally within said boring 74 and is connected by a pin 77 to the hub of a gland 78, movable by means of said rod into engagement with the friction-faces either of a pair of oppositely-driven loose pulleys 79 and 80. A small adjustable screw-bolt 81 takes into a tapped boring in the inner end of one of the racks 55 and held against inward movement by a jam-nut 82, and this inner end of the said rack acts through bolt 81 upon a slide connected on its under side to means to be now described for shifting said rod 76. The slide consists of a screw-bolt 83, having its head projecting into the T-guideway 56 and constituting a dog 84 and supported in a slot 84<sup>x</sup> in the bed-plate by a washer 85, while a washer 86 and nut 87 retain said bolt against vertical displacement. The lower end of the bolt is threaded into one end of a lever-arm 88, the opposite end whereof is mounted rigidly upon a vertical spindle 89, set in bearings 90 upon the under side of the bed-plate and the upper side of a bracket 91, hung from said bed-plate. A lever-arm 91<sup>x</sup> is connected rigidly at one end to said vertical spindle near the lower end thereof, and the other end of said arm 91<sup>x</sup> is forked and straddles the outer end of the rod 76 between a rigid collar 92 and a nut 93 upon said rod. By this mechanism the gland of the clutch will be automatically shifted from one to the other of the pulleys 79 and 80.

In order to enable the gland to be shifted by hand and from either end of the machine, a hand-lever 94 is mounted upon said vertical spindle 89, by which the clutch can be shifted from the rear end of the machine. A second lever-arm 95 is also mounted rigidly upon said vertical spindle and connected by a link 96 to a hand-lever 97 of bell-crank form and fulcrumed to a bracket 98 upon the under side of the bed-plates, whereby the clutch can be shifted from the front of the machine. This link is divided, and its divided ends overlap and are connected together by screws 100, taking into one end through slots 101 in the outer end to allow of its being adjusted as to length.

To automatically shift the gland of the clutch to leave the machine at rest after the swinging arms *h* and the parts connected therewith have assumed their normal positions, a slide 102, similar to that above described, is mounted with its dog 103, corresponding to the dog 84 of said outer slide, projecting in the way of one of the racks 55, and the under side of said slide 102 is connected by a link 104 rigidly to said hand-lever 97 by an adjustable connection consisting of the screws 105 and slot 106 to accommodate the difference in movement due to the adjustment of link 96.

The stationary peak-forming block, which, with the throat-block *b c*, constitutes the normally stationary rim-forming mechanism, is interchangeable with other blocks of different formation to enable rims of different sizes



and of different patterns to be made. The interchangeable blocks for different sizes are of the same construction excepting as to size, and the traveling mechanism working in conjunction therewith to form the peak is the same except for the forming part proper, to be presently described, and this part is interchangeable for the sole purpose of allowing other forming parts of the same construction but of different size to be substituted therefor. The stationary peak-forming block, however, for forming a different pattern of peak is of somewhat different construction to that to be presently described and requires traveling mechanism of different construction to work in connection therewith. Consequently this coacting stationary and traveling peak-forming mechanism of different construction forms the subject-matter in combination with the means which coact therewith to form the throat portion of the before-mentioned application filed on the 4th day of April, 1900, under Serial No. 11,557.

The stationary peak-forming block which forms a part of the present embodiment of our invention consists of a frame-piece 110 of inverted-T cross-section and formed on its under side with a flange 112 to take into a guideway 113 in the bed-plate. This frame-piece is cast with a pair of projecting portions 114 to form bearings for a hinge-pin 115, the upper bearing portion having a boring to receive said pin and the lower bearing portion having a tapped boring to receive the lower screw-threaded end of said pin. This hinge-pin 115 pivotally connects together the adjustable parts 116 of this peak-forming block, which rest upon the horizontal portion of the frame-piece 110 and are formed with perforated lugs 117 to take into the space between said bearing portion 114 and through which said pin 115 takes. These adjustable parts 116, as is evident, serve to mask the frame 110 and present matrix-faces to coact with a pair of traveling blocks to be hereinafter described to form the peak. The joint exterior of these two masking parts 116 is of a contour to impart the required shape to the peak of the rim, and said exterior is grooved, as at 122, in a line at its end adjacent to the traveling forming-block with the groove upon the periphery of the said stationary throat-forming block, and this groove 122 is curved upwardly from its end adjacent to the throat-block to its rear end, while a pair of keyways 118 are formed in the exterior of said masking parts along the upper edges thereof and along the lower edges of the grooves 122. The spaces between the upper edges of the grooves 122 and the upper keyways are flat to provide surfaces 119 to shape the flange of the rim. These masking parts 116 are adjustable (to enable peaks or rims of different sizes to be made) by a sliding block 123, set in a T-groove formed in the inside of each of said parts, said sliding blocks being each formed with a transverse slot 124 of almost circular cross-section, into each of

which takes the cylindrical head 125 of a screw-bolt 126. These screw-bolts take into the opposite ends, which are oppositely screw-threaded, of a sleeve 127, formed with a worm-wheel 128 about midway of the length thereof and set in a transverse horizontal boring in the web of the frame-piece 110, wherein it is held against displacement by a bushing 129, held in place by a retaining-screw 130. A spindle 131, with a worm 132 formed thereon, is set in a vertical boring in the said web in a position to engage said worm-wheel 128, and the upper end of this spindle 131 is formed with a square socket 133 to receive the squared end of a removable crank 134, to accommodate which the trimmer-bracket 135, to be presently described, has an opening 136. The space between the adjacent ends of the parts 116 is filled by a dovetailed piece 137, interchangeable with other similar pieces of different sizes to fill this space as it is increased or diminished by the adjustment of the said parts 116. The traveling mechanism of the peak-forming means to coact with this expandible block consists of a pair of boxes 120, with one end of each open and the side thereof facing the stationary forming-block formed with bayonet-keys 137 to take into and slide along the keyways 118. The side of each of these boxes facing the throat-forming mechanism has a socket 140 upon the center thereof, into which takes a ball 141, which constitutes, with the socket 140, a ball-and-socket joint, the ball being formed upon one end of each of a pair of rods 142, the opposite ends whereof at times rest in sockets 143 upon the swinging arms *h*. A block 144 is located in each of these boxes and is adjusted therein toward and from the side adjacent to the stationary forming-block by means of a screw 145, threaded through the opposite side of the box and connected at one end by a ball-and-socket joint 146 to said block, while the outer end thereof is furnished with an adjustment-handle 147. A pair of jam-nuts 148 take upon this screw 145 outside of its box, and the function thereof is to set the predetermined distance it is necessary to adjust the block 144. Each of said adjustable blocks 144 carries an antifriction-roller 154, mounted therein, diagonally thereof, upon a spindle 155, and a bearing-block 156, rigidly set therein at right angles to the outer face thereof. The outer edge of this block and the complete edge of the roller are grooved to correspond to and register with the groove in the stationary peak-forming block. A pair of counterbalancing weights 157 are connected by cords 159 to the boxes 120 to prevent their falling to the table after leaving the grooves 122, as will be presently pointed out. The whole of this peak-forming mechanism—that is to say, the stationary peak-forming block and the traveling forming-blocks—is adjusted toward or from the throat-forming mechanism to enable rims of different lengths to be made by a bell-crank lever 184, fulcrumed, as at 185,



to the under side of the bed-plate of the machine, and the end of one arm thereof being slotted, as at 186, and the end of the other arm being forked, as at 187. The slotted end 186 takes over the lower end of a pin 188, carried rigidly in the peak-block, as will be presently described, and the forked end 187 has an interiorly-screw-threaded sleeve 194, pivotally mounted between the prongs thereof. A screw-threaded spindle 195 takes into this pivoted sleeve and is rotatably mounted in a bracket 196 upon the under side of the bed-plate, but retained against longitudinal displacement therein, and the outer end of this screw-threaded spindle has a crank-handle 197 rigidly mounted thereon. The pin 188 is diminished at its upper and lower ends and screw-threaded at its upper end and takes through a boring 189, extending through the peak-block frame and increased in diameter at both ends to accommodate at its lower increased end the enlarged portion of the pin 188 and at its upper increased end an expansile coiled spring 190. The upper end of this pin 188 projects above the top of the peak-block frame 110 and through a bracket 135 for retaining the masking parts 116 of the stationary peak against displacement and receives a nut 191, which serves to secure the pin rigidly in the said frame-piece 110 of the peak-block and said bracket 135 rigidly upon the top of the web of said frame-piece and the masking-pieces, thereby securing all of said parts rigidly together. The under side of this bracket is formed with a tongue and the upper face of the web with a groove to receive said tongue and retain the bracket when the nut 191 is tightened against lateral displacement. By turning this crank-handle the normally stationary peak-forming block and all the parts connected thereto can be adjusted toward or away from the throat-forming mechanism to enable rims of different lengths to be made.

The bracket 71 besides serving as a support for the shaft-bearings serves also as a receptacle to catch the lubricant dripping from the worm, worm-wheel, and the bearings 70, from which receptacle it can be drawn off by the drip-cock 230 and again utilized.

The operation of our machine is as follows: The length of flanged tubular metal is first set in place between the stationary and traveling parts of the throat-forming mechanism and with the middle perforation G of the flange of said tubular length in line with the clamping-bar. This bar is then jammed by its lever into tight contact with the flange of the rim metal and with the pin on the end of said clamping-bar projecting through the said middle perforation in the flange into a hole in the upper portion of the throat-block. The semicircular throat-forming blocks are then moved by their levers into bearing relation with the rim metal, thereby bending the middle portion of the flange to extend at a tangent from the tube. Upon the machine be-

ing then started, said semicircular blocks will roll the rim metal upon the stationary throat-forming block for slightly more than one-half of the circumference of said block, at which point the machine will be automatically stopped, thereby leaving the ends of said rim metal projecting on each side of the stationary peak-forming block. The levers and pawls for locking the semicircular blocks are then released and the machine reversed, when it will return to its normal position and be automatically stopped. One of the boxes 120 is then set in place with its keys 237 in the keyways at one side of the stationary peak-forming block, and the bearing parts in said box are adjusted by the adjustment-handle into bearing relation with the rim metal. The machine is then again started, and after the arms have moved a short distance the free end of the rod is lifted into and borne upon by the socket 143 of the adjacent swinging arm, and the said box is pushed along the full length of said keyways and out of the opposite ends thereof, thereby impressing the rim metal upon the stationary peak-forming block and imparting thereto the form necessary to the rim of a collar bent at its peak. When this traveling forming mechanism reaches the limit of its travel, the machine will, as before mentioned in the first cycle of operation, be automatically stopped, and when reversed the arms will return to their normal positions and the machine be again automatically stopped. The other box is then set in place and the above operation repeated to form the other side of the peak, the side just formed of the peak being sprung upward at its end to accommodate this other box as it is pushed out of the ends of its keyways.

What we claim is as follows:

1. In a machine for forming or shaping a metallic length, the combination of a pair of stationary parts; a portion of the conjoint contour of the opposite sides of which is of the form to impart to a portion of said metallic length the required shape or form, means traveling partially around the forming portion of the contour; of one of said parts; means for guiding said traveling means; means for moving said traveling means; means traveling partially around the forming portion of the contour of the other of said stationary parts; and means for connecting the said last-mentioned traveling means to the means for moving the first-mentioned traveling means for the purpose set forth.

2. In a machine for forming or shaping a metallic length, the combination of a pair of stationary parts; a portion of the conjoint contour of the opposite sides of which is of the form to impart to a portion of said metallic length the required shape or form, means traveling partially around the forming portion of the contour of one of said parts; means for guiding said traveling means; means for moving said traveling means; means traveling partially around the forming portion of



the contour of the other of said stationary parts; and means for connecting the said last-mentioned traveling means to the means for moving the first-mentioned traveling means during its movement in one direction for the purpose set forth.

3. In a machine for forming or shaping a horse-collar rim from a single length of metal, the combination of a stationary throat-forming block a portion of the contour whereof is of the form to impart the required form or shape to the throat portion of the rim, means traveling around said portion of the block and in close proximity thereto; means for moving said traveling means; a peak-forming block a portion of the contour whereof is of the form to impart the required form or shape to the peak portion of the rim, means traveling around said portion of the peak-block and in close proximity thereto; and means for operatively connecting said means for moving the traveling throat-forming mechanism, to said traveling peak-forming mechanism, substantially as described and for the purpose set forth.

4. In a machine for forming or shaping a horse-collar rim from a single length of metal, the combination of a stationary throat-forming block a portion of the contour whereof is of the form to impart the required form or shape to the throat portion of the rim, means traveling around said portion of the block and in close proximity thereto; means for moving said traveling means; a peak-forming block a portion of the contour whereof is of the form to impart the required form or shape to the peak portion of the rim, means traveling around said portion of the peak-block and in close proximity thereto; and means for operatively connecting said means for moving the traveling throat-forming mechanism, to said traveling peak-forming mechanism during the movement of said throat-forming mechanism in one direction substantially as and for the purpose set forth.

5. In a machine for forming or shaping a horse-collar rim from a single length of metal, the combination of a stationary throat-forming block a portion of the contour whereof is of the form to impart the required form or shape to the throat portion of the rim; means for retaining said metallic length against displacement upon said block; means traveling around said portion of the block and in close proximity thereto means for moving said traveling means; a peak-forming block a portion of the contour whereof is of the form to impart the required form or shape to the peak portion of the rim means traveling around said portion of its peak-block and in close proximity thereto, and means for operatively connecting said means for forming the traveling throat-forming mechanism, to said traveling peak-forming mechanism substantially as described and for the purpose set forth.

6. In a machine for forming or shaping a horse-collar rim from a single length of metal,

the combination of a stationary throat-forming block a portion of the contour whereof is of the form to impart the required form or shape to the throat portion of the rim; means for retaining said metallic length against displacement upon said block; means traveling around said portion of the block and in close proximity thereto means for moving said traveling means; a peak-forming block a portion of the contour whereof is of the form to impart the required form or shape to the peak portion of the rim means traveling around said portion of its peak-block and in close proximity thereto, and means for operatively connecting said means for forming the traveling throat-forming mechanism, to said traveling peak-forming mechanism during the movement of said throat-forming mechanism in one direction substantially as and for the purpose set forth.

7. In a machine for forming or shaping a horse-collar rim from a single length of metal, the combination of a throat-forming block a portion of the contour whereof is of the form to impart the required form or shape to the throat portion of the rim means for retaining said metallic length at one point against displacement upon said block; means traveling around said portion of the block in opposite directions from said retaining means and in close proximity to said block; means for moving said traveling means; a peak-forming block a portion of the contour whereof is of the form to impart the required form or shape to the peak portion of the rim means traveling around said portion of the peak-block and in close proximity thereto, and means for operatively connecting said means for moving the traveling throat-forming mechanism, to said traveling peak-forming mechanism during the movement of said throat-forming mechanism in one direction, substantially as and for the purpose set forth.

8. In a machine for forming or shaping a horse-collar rim from a single length of metal, the combination of a stationary expansible throat-forming block a portion of the contour whereof is of the form to impart the required form or shape to the throat portion of the rim means for retaining said metallic length at one point against displacement upon said block; means traveling around said portion of the block in opposite directions from said retaining means and in close proximity to said block; means for moving said traveling means; a peak-forming block a portion of the contour whereof is of the form to impart the required form or shape to the peak portion of the rim and means traveling around said portion of the peak-block and in close proximity thereto, and means for operatively connecting said means for moving the traveling throat-forming mechanism, to said traveling peak-forming mechanism during the movement of said throat-forming mechanism in one direction, substantially as and for the purpose set forth.



9. In a machine for forming or shaping a horse-collar rim from a single length of metal, the combination of an adjustable stationary expansible throat-forming block a portion of the contour whereof is of the form to impart the required form or shape to the throat portion of the rim means for retaining said metallic length at one point against displacement upon said block; means traveling around said portion of the block in opposite directions from said retaining means and in close proximity to said block; means for moving said traveling means; a peak-forming block a portion of the contour whereof is of the form to impart the required form or shape to the peak portion of the rim, means traveling around said portion of the peak-block and in close proximity thereto, means for adjusting said stationary peak-block toward and from the stationary throat-block, and means for operatively connecting said means for moving the traveling throat-forming mechanism, to said traveling peak-forming mechanism during the movement of said throat-forming mechanism in one direction, substantially as and for the purpose set forth.

10. In a metal-forming machine an expansible forming-block consisting of a frame-piece secured against displacement a pair of masking portions located one upon each side of said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite end of said masking portions toward and from the said frame-piece; and traveling forming mechanism carried by said expansible block and coacting with the masking portions thereof, for the purpose set forth.

11. In a metal-forming machine an expansible forming-block consisting of a frame-piece secured against displacement a pair of masking portions located one upon each side of said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite end of said masking portions toward and from the said frame-piece; and traveling forming mechanism carried by said masking portions and coacting therewith; substantially as described and for the purpose set forth.

12. In a metal-forming machine an expansible forming-block consisting of a frame-piece secured against displacement a pair of masking portions formed with keyways and located one upon each side of said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite ends of said masking portions toward and from the said frame-piece; and traveling forming mechanism consisting of bearing-blocks formed with keys taking into the keyways of said masking portions and said bearing-blocks coacting with the said masking portions, and means for moving said blocks,

substantially as described and for the purpose set forth.

13. In a metal-forming machine an expansible forming-block consisting of a frame-piece secured against displacement a pair of masking portions formed with keyways and located one upon each side of said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite ends of said masking portions toward and from the said frame-piece; and traveling forming mechanism consisting of bearing-blocks formed with keys taking into the keyways of said masking portions and said bearing-blocks coacting with the said masking portions, means for adjusting said bearing-blocks to and from said masking portions; and means for moving said blocks, substantially as described and for the purpose set forth.

14. In a metal-forming machine an expansible forming-block consisting of a frame-piece secured against displacement a pair of masking portions located one upon each side of said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite end of said masking portions toward and from the said frame-piece; and traveling forming mechanism having an opening in one side of each thereof consisting of a pair of boxes; keys formed upon the edge of the open side of each of said boxes and taking into said keyways; a block located in each of said boxes; a bearing-piece set rigidly in each of said blocks with its bearing edge toward its carrying masking portions; a bearing-roller rotatably set in each of said bearing-blocks with its outer edge in close proximity to said bearing-piece and the outer edges of said bearing-piece and roller being grooved to conjointly conform to and register with grooves in said masking portions substantially as described and for the purpose set forth.

15. In a metal-forming machine an expansible forming-block consisting of a frame-piece secured against displacement; a pair of masking portions located one upon each side of said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite side of said masking portions toward and from the said frame-piece; and traveling forming mechanism consisting of a pair of boxes having an opening in one side of each thereof; keys formed upon the edge of the open side of each of said boxes and taking into said keyways; a block located in each of said boxes; means for adjusting said blocks toward and from the open sides of said boxes; a bearing-piece set rigidly in each of said blocks with its bearing edge toward its carrying masking portion; a bearing-roller rotatably set in each of said bearing-blocks with its outer edge in close



proximity to said bearing-piece and the outer edges of said bearing-piece and roller being grooved to conjointly conform to and register with grooves in said masking portions, substantially as described and for the purpose set forth.

16. In a metal-forming machine an expansible forming-block consisting of a frame-piece secured against displacement; a pair of masking portions located one upon each side of said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite ends of said masking portions toward and from the said frame-piece; and traveling forming mechanism consisting of a pair of boxes having an opening in one side of each thereof; keys formed upon the edge of the open side of each of said boxes and taking into said keyways; a block located in each of said boxes; a screw taking through the opposite side of said boxes to the said open sides thereof; a turning-handle on the outer ends of each of said screws and a ball-and-socket connection between the inner ends thereof and said blocks; a bearing-piece set rigidly in each of said blocks with its bearing edge toward its carrying masking portions; a bearing-roller rotatably set in each of said bearing-blocks with its outer edge in close proximity to said bearing-piece and the outer edges of said bearing-piece and roller being grooved to conjointly conform to and register with grooves in said masking portions, substantially as described and for the purpose set forth.

17. In a machine for forming or shaping a horse-collar rim from a single length of flanged tubular metal the combination of a suitably-supported stationary throat-forming block presenting a side of semicircular contour, said semicircular side being formed with a circumferential groove semicircular in cross-section and said block being divided on a plane extending at right angles to its axis through said groove; a pair of swinging arms each having a rigid bracket projection and said arms being pivotally connected at one end concentrically of the circular side of said throat-forming block; a pair of sockets upon said arms; a pair of quadrantal racks connected at one end to the outer ends of said arms; a driving-shaft; a train of gears operatively connecting said driving-shaft to said quadrantal racks for moving said arms away from one another in opposite directions; means for retaining the lower part of the throat-block against displacement and said lower part being formed with a central opening; a screw-threaded pin within and of less diameter than said opening and formed longitudinally thereof with a keyway; a rotatable lifting-rod located above said pin and yieldingly held a short distance above said pin; means for holding said rod against rotation in its elevated position; a sleeve carried rigidly upon the lower end of said lifting-rod

and formed with a screw-threaded key on the interior thereof; a handle for turning said sleeve; a disk carried by the said lifting-rod at the upper end of said sleeve and means for detachably connecting said disk to the upper part of said forming-block and said upper part being formed with a concentric opening to accommodate said sleeve; a slide mounted upon each of said swinging arms; a semicircular block rotatably mounted in each of said slides; means for yieldingly retaining said swinging blocks in a predetermined position and means for forcing said semicircular blocks into tight contact with the rim metal upon said stationary throat-block; means for automatically reversing the direction of travel of said arms at the completion of their movement away from one another; means for automatically stopping the machine at the completion of its travel in the reverse direction; an expansible peak-forming block consisting of a frame-piece secured against displacement; a pair of masking portions located one upon each side of said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite ends of said masking portions toward and from the said frame-piece; and traveling mechanism carried by said expansible block and coacting with the masking portions thereof, substantially as described and for the purpose set forth.

18. In a machine for forming or shaping a horse-collar rim from a single length of flanged tubular metal the combination of a suitably-supported stationary throat-forming block presenting a side of semicircular contour, said semicircular side being formed with a circumferential groove semicircular in cross-section and said block being divided on a plane extending at right angles to its axis through said groove; a pair of swinging arms each having a rigid bracket projection and said arms being pivotally connected at one end concentrically of the circular side of said throat-forming block; a pair of sockets upon said arms; a pair of quadrantal racks connected at one end to the outer ends of said arms; a driving-shaft; a train of gears operatively connecting said driving-shaft to said quadrantal racks for moving said arms away from one another in opposite directions; means for retaining the lower part of the throat-block against displacement and said lower part being formed with a central opening; a screw-threaded pin within and of less diameter than said opening and formed longitudinally thereof with a keyway; a rotatable lifting-rod located above said pin and yieldingly held a short distance above said pin; means for holding said rod against rotation in its elevated position; a sleeve carried rigidly upon the lower end of said lifting-rod and formed with a screw-threaded key on the interior thereof; a handle for turning said sleeve; a disk carried by the said lifting-rod



at the upper end of said sleeve and means for detachably connecting said disk to the upper part of said forming-block and said upper part being formed with a concentric opening  
 5 to accommodate said sleeve; a slide mounted upon each of said swinging arms; a semicircular block rotatably mounted on each of said slides; means for yieldingly retaining said swinging blocks in a predetermined position  
 10 and means for forcing said semicircular blocks into tight contact with the rim metal upon said stationary throat-block; means for automatically reversing the direction of travel of said arms at the completion of their  
 15 movement away from one another; means for automatically stopping the machine at the completion of its travel in the reverse direction; an expansible peak-forming block consisting of a frame-piece secured against displacement;  
 20 means for adjusting said frame-piece toward and from said throat-block; a pair of masking portions located one upon each side of said frame-piece; means for pivotally connecting said masking parts together  
 25 and to the frame-piece at one end; means for adjusting the opposite ends of said masking portions toward and from the said frame-piece; and traveling forming mechanism carried

ried by said expansible block and coacting with the masking portions thereof, for the purpose set forth. 30

19. In a metal-forming machine, an expansible forming-block consisting of a frame-piece secured against displacement, a pair of masking portions located one upon each side of  
 35 said frame-piece; means for pivotally connecting said masking parts together and to the frame-piece at one end; means for adjusting the opposite ends of said masking portions toward and from the said frame-piece;  
 40 and traveling forming mechanism carried by said masking portions and coacting with the masking portions; and means for automatically lifting the traveling forming mechanism away from the expansible block at the completion of the function of said traveling mechanism,  
 45 substantially as described and for the purpose set forth.

In testimony whereof we have affixed our signatures in presence of two witnesses.

HENRY LAWRENCE GULLINE.

IRVIN ELIAS HUTCHINS.

ARCHIBALD IVES GILLIES.

Witnesses:

S. DESLIERRES,

J. A. PORÉ.