

No. 706,030.

Patented Aug. 5, 1902.

G. CUNIN.  
METAL CRIMPING MACHINE.

(Application filed Oct. 24, 1900.)

(No Model.)

5 Sheets—Sheet 1.

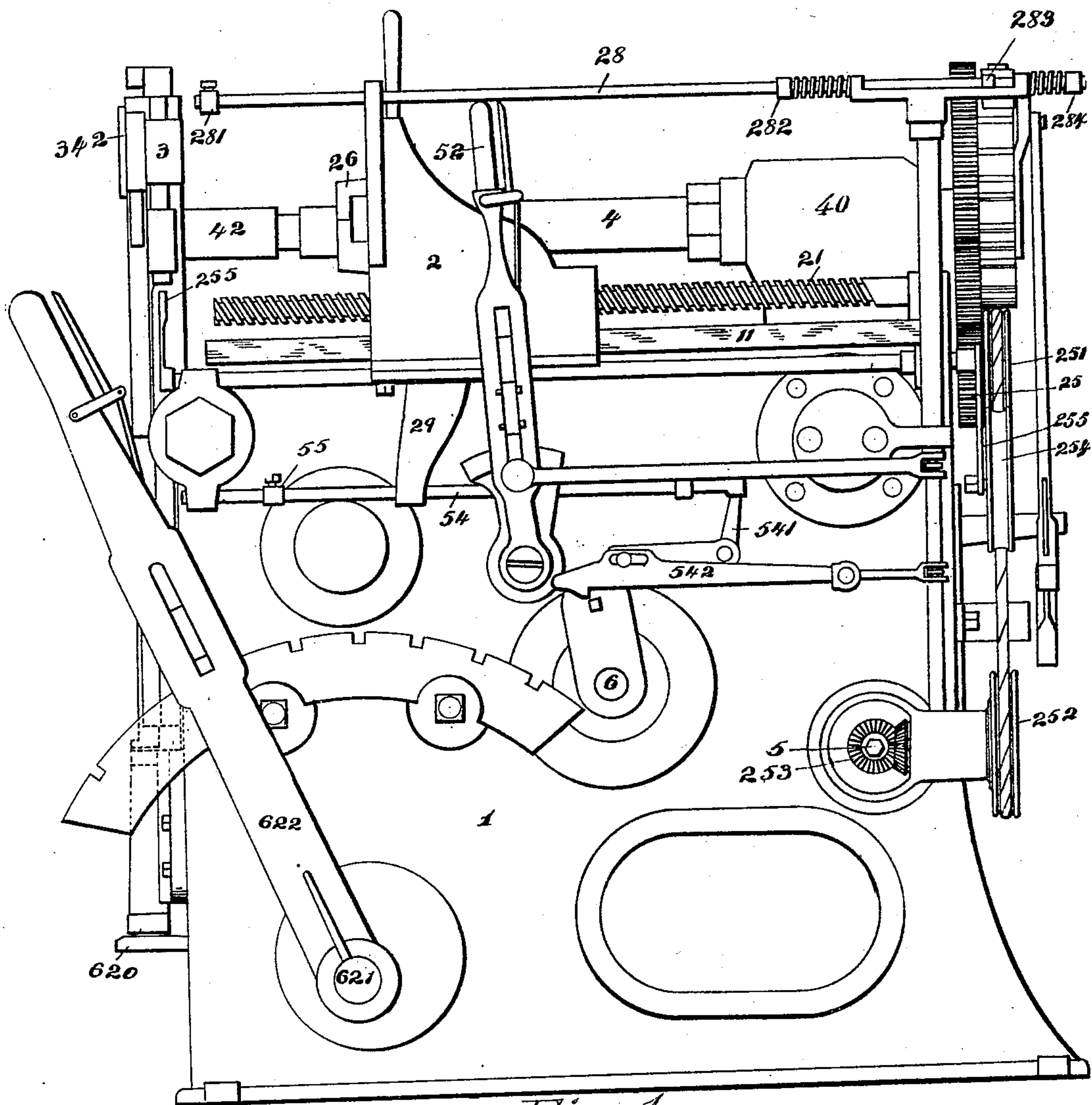


Fig. 1.

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*per H. D. Caran*

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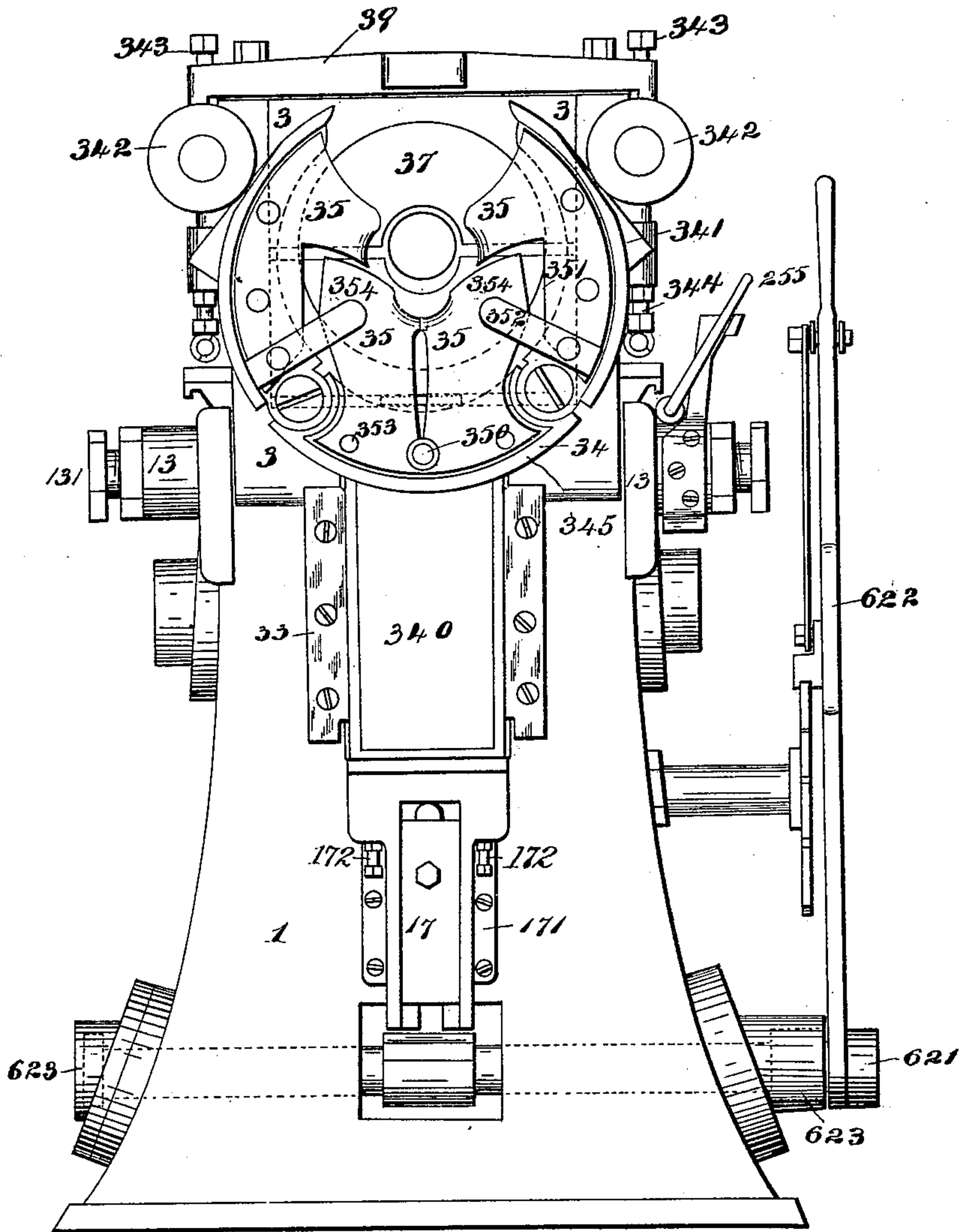


Fig. 2.

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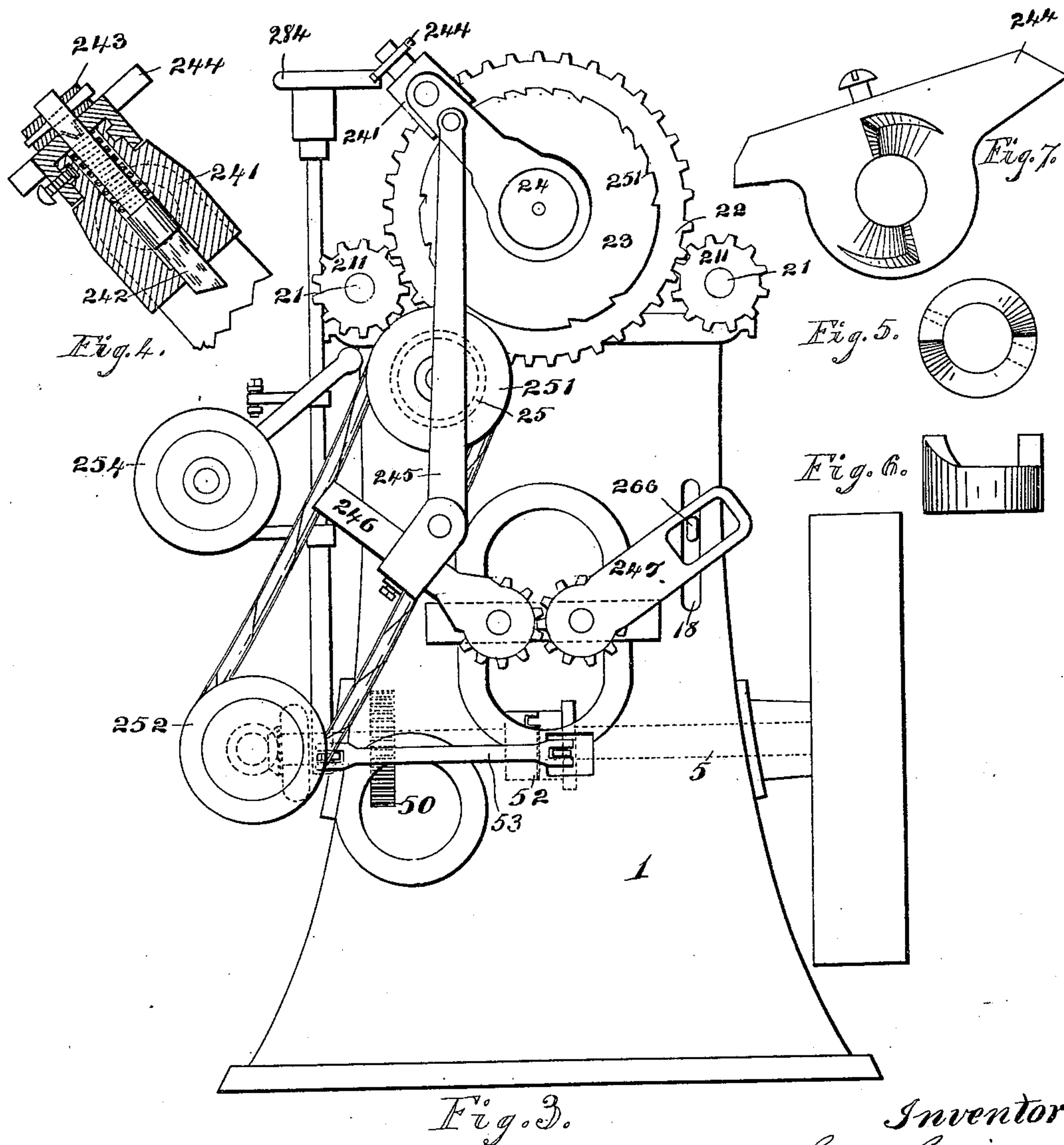
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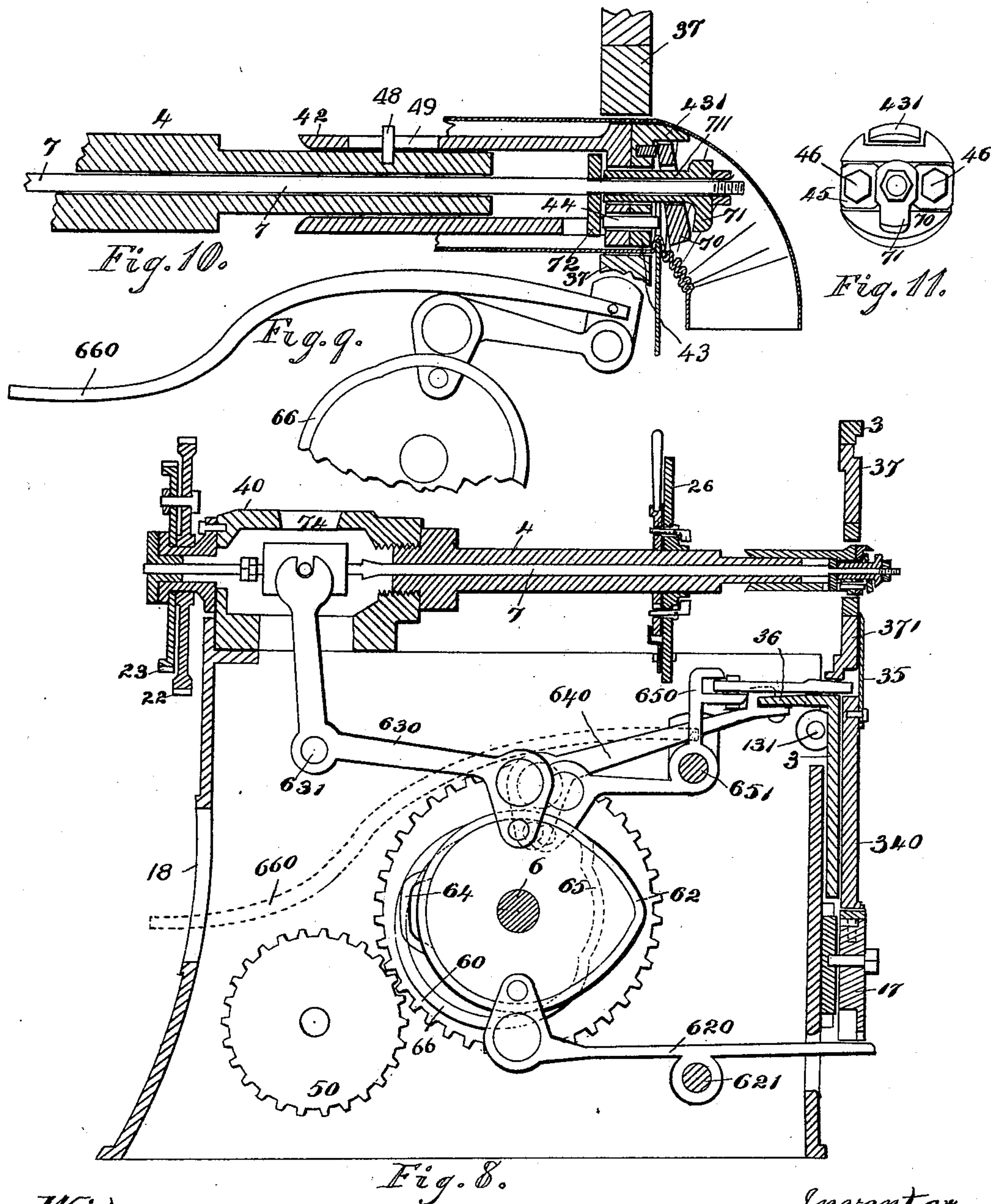
**G. CUNIN.**

**METAL CRIMPING MACHINE.**

(Application filed Oct. 24, 1900.)

(No Model.)

**5 Sheets—Sheet 4.**



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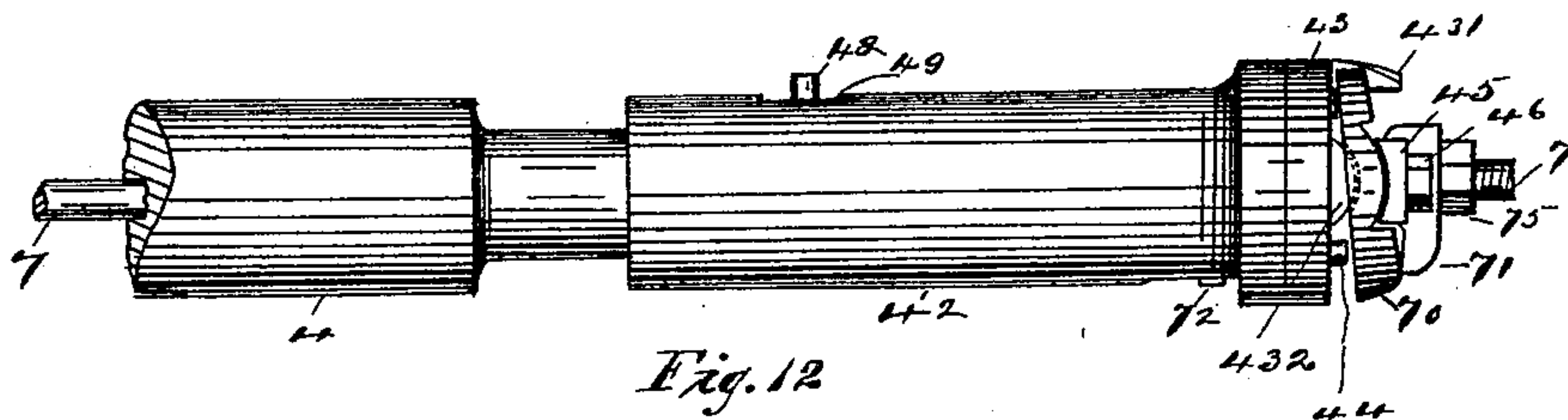


Fig. 12

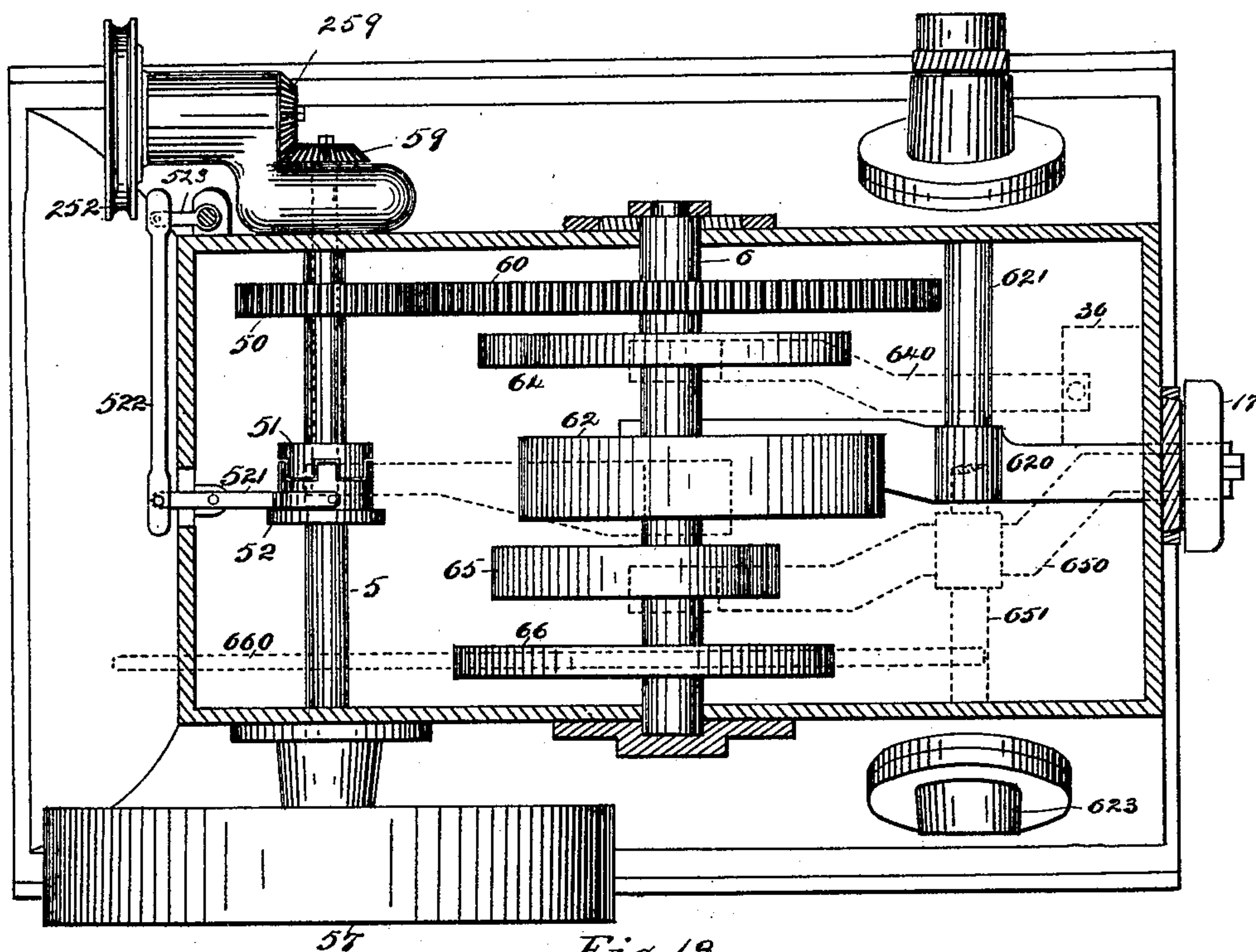


Fig. 13

Witnesses  
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# UNITED STATES PATENT OFFICE.

GEORGE CUNIN, OF MONTREAL, CANADA.

## METAL-CRIMPING MACHINE.

SPECIFICATION forming part of Letters Patent No. 706,030, dated August 5, 1902.

Application filed October 24, 1900. Serial No. 34,205. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE CUNIN, a subject of His Majesty the King of Great Britain and Ireland, residing at the city of Montreal, in the Province of Quebec and in the Dominion of Canada, have invented a new and useful Crimping-Machine, of which the following is a specification.

My invention relates to machines adapted to convert metal sheets into pipe elbows and bends, and has for its object the following improvements over such machines as are already known.

The machine is greatly reduced in size and is very compact. This permits all the working parts to be short, and they are therefore stronger. The power is applied more directly and with less loss. The parts are fewer in number and are simpler in construction. The adjustments of the various parts are more delicate and more rapid than heretofore. Several new adjustments are employed.

The machine is designed to operate on pipe of various sizes by the use of interchangeable parts, which enables it to crimp pipe of small diameter, as well as the usual sizes.

Reference will be made to the annexed drawings, in which like signs represent like parts in the various figures.

Figure 1 is a side elevation showing the mechanism for starting and reversing. Fig. 2 is an end elevation showing the crimping mechanism and its adjustments. Fig. 3 is an end elevation showing the feed mechanism. Figs. 4, 5, 6, 7, and 9 are details of the feed mechanism. Fig. 8 is a cross-section showing the crimping and creasing mechanism, the pipe-clamp, and the various cams on the main shaft. Fig. 10 is a sectional view of the mandrel-sleeve and reciprocating head. Fig. 11 is an end view of the reciprocating head. Fig. 12 is a side view of the parts shown in Fig. 10. Fig. 13 is a horizontal cross-section of the machine, showing the main cam-shaft and the position of the various cams, levers, also the power shaft and clutch.

The frame of the machine consists in a hollow standard I, of oblong form. The shafts 5, 6, 631, 651, and 621 are journaled in the opposite sides of the frame. The edges 11 of the top provide slides for the feed-carriage 2. A hollow casting 40, firmly secured to one end

of the top, supports the mandrel 4 and provides a bearing for the gear-wheel 22 of the feed mechanism. At the front end of the frame a face-plate 3 is hinged to the upper edge by means of the screw-pins 131 and the bearings 13. Beneath this is a slideway 33, forming part of the face-plate 3, and the slideway 171 on the front end of the frame I. The mandrel 4 is hollow and has a sleeve 42, slotted at 49 to engage a pin 48. A rod 7 reciprocates through the mandrel 4 and sleeve 42 and operates the creasing and smoothing mechanism. A pinion 50, meshing with a gear-wheel 60 on the cam-shaft 6, is connected and disconnected to the power-shaft 5 by the clutch 52. The shaft 6 has the cam 62 keyed to it at the middle, and the levers 620 and 630, pivoted, respectively, to the shafts 621 and 631, operate the crimping and creasing mechanism and the smoothing mechanism, as will be described in detail. Between the cam 62 and the gear-wheel 60 a cam 64 is keyed to the shaft 6 and operates a lever 640, which is secured to the projection 36 of the face-plate 3. On the other side of the central cam 62 the cam 65, through the lever 650, pivoted to the shaft 651 and having the wedge-shaped end 652, opens and closes the collar 37 of the face-plate 3, to be described below. Beyond the cam 65 on the shaft 6 is the cam 66, which actuates the feed-lever 660.

The feed-carriage 2, supported on the slides 11, travels on two screws 21 21, which are provided with pinions 211 211 beyond their bearings. These pinions 211 211 mesh with the gear-wheel 22, which controls the movement of the feed-carriage.

The manner in which the feed-lever 660 operates the gear-wheel 22 will be set forth below.

The crimping-jaws are four in number. A lower pair 357 357 are pivoted to the frame 34 by the pins 353 353, and their overlapping edges are loosely pivoted on the central pin 350, their lower edges fitting against the flange 345 of the frame 34. This frame 34 is provided with two curved segments 341 341, pivoted to its upper corners. These segments 341 have flat surfaces to bear on the rollers 342, which have adjustable bearings on each side of the upper portion of the face-plate 3 and set-screws 343 and 344 to adjust their po-



sitions. The upper pair of crimping-jaws 356 are screwed to these segments 341 341, respectively. The guide-bars 352 overlap the lower pair of jaws and are secured to the segments 341.

The tilting plate 3 is adapted to receive a divided collar 37, which can be changed for various sizes of pipe by removing the cross-head 39. The collar 37 has its upper half secured to the face-plate 3, while the lower half is adapted to reciprocate vertically to open and close the collar by means of the wedge 652, operated by the bell-crank lever 650.

The face-plate 3 tilts on its bearings 13 and is controlled by the cam-lever 640, which is secured to an angle-piece 36, extending from the face-plate 3. The guides 33 hold the lower portion 340 of the crimping-frame 34 between them.

A slide-piece 17, between the guides 171, secured to the front end of the machine-frame 1, carries the motion of the cam-lever 620 to the crimping-frame 34. Adjustment-screws 172 limit its path.

The shaft 621, on which the cam-lever 620 turns, is provided with eccentric bearings 623, so that a very slight turn by the lever 622 of the shaft 621 varies the stroke of the lever 620 and permits of a very delicate adjustment of the motion given to the crimping-jaws. This is of great importance, as it permits the crimping to be adjusted to sheets of metal of different thicknesses and of different hardnesses.

An adjustable locking-lever 622 operates the shaft 621.

The lever 620 at its inner end has an elbow carrying rollers to meet the flange of the cam 62.

The starting-lever 56 when unlocked to start the machine moves on the segment 561 with the opening and closing of the clutch without locking.

A loose crank 24 on the same pivot and outside the notched wheel 23 has an offset extension 241, in which there is a beveled spring-regulated tooth 242, which only catches the notch 231 traveling one way. Means are provided to transfer the movements of the feed-carriage to this crank.

The feed mechanism is shown to be operated by the lever 660, controlled by the cam 66, projecting through the slot 18, acting on the connecting-rod 245 through the geared levers 246 247. By adjusting the rod 245 on the lever 246 the stroke of the crank 24 can be varied to grip different sets of notches 231 on the wheel 23 and give the feed-carriage the necessary variations of feed for pipe of various sizes.

The tooth 242 is attached to a cylindrical cam 243, which fits into spiral indentations in the lever 244.

The rod 28 has stops 281 and 282 and projections 283 and 284, which turn the lever 244 and raise the tooth 242 when the feed-carriage has reached the stop 281. The car-

riage being then returned by the pinion 25 through the pulleys 251 and 252 meets the stop 282 and the rod 28 returns the lever 244, lowers the tooth 242 by the spring 245, drawing the projections 246 into the indentations 247, and the notched wheel 23 again operates the feed. The feed-carriage 2 is returned by means of another pinion 25, meshing with the feed gear-wheel 22, which, with its pulley 251, runs loosely, but is belted to a pulley 252, having a bevel-gear 253 connecting with the main power-shaft 5. A belt-tightener pulley 254, operated by a bell-crank lever 255 at the crimping end of the machine, brings the reversing-pinion 25 into play and causes the feed-screws 21 to return the feed-carriage 2 to the starting-point.

The creasing and smoothing mechanism consists of the sleeve 42, which slides on the mandrel 4 and is retained by the pin 48 in the slot 49. It is provided with a head 43, preferably integral therewith, having a projecting shoulder 431, which is rounded to allow the bend of the pipe to clear it. The reciprocating rod 7 passes through the center of the head 43 and has the projection 72 and the tube 711, with its extension 71, secured by the nut 75 to its end. The movable headpiece 70 fits over the tube 711 outside the head 43 and is rounded on each side to rest outwardly on the bearings 45 and inwardly on rounded bearings 432. The screw-nuts 46, which pass through the rounded bearings 45 and the headpiece 70, permit the adjustment of the headpiece on the bearings 45 and 432. The loose pin 44 passes through the head 43 below the rod 7 and is actuated by the projection 72 to press the lower edge of the headpiece 70 outward and is returned when the rod 7 is drawn in, bringing with it the parts 71 and 70. The headpiece 70 is therefore actuated in both directions before the sleeve begins to move.

The operation of the machine is as follows: A metal sheet is placed around the sleeve and mandrel and clamped to the feed-carriage with the overlapping edges downward. The collar 37 is closed and holds the pipe firmly at the head-plate 3, which is vertical. When the rod moves forward, the pin 44 pushes the movable head 70 outward and a groove is provided in which the crimp is to be formed. The jaws now close in and press the metal, first the lower pair and then the upper pair, and a crimp is formed deep at the bottom and diminishing toward the top on each side. The jaws then expand by the frame descending and the rod 7 starts to retire. The extension 71 presses the movable head 70 inward and creases the sides of the crimp together, while the head-plate 3 tilts slightly forward. The rod, head, and sleeve then retire farther and the crimp is turned down and flattened by the head, while the head-plate 3 returns to its vertical position. The collar 37 releases the pipe by the lower segment descending and the feed-carriage moves forward and brings the pipe



with it in position for the next crimp, when the collar closes again around the pipe and the operations are repeated. When the desired number of crimps have been made, a stop 281 meets the feed-carriage and cuts off the feed mechanism, while the arm 29 meeting the stop 55 releases the clutch and the machine stops working. The operator then looses the clamp 26, removes the elbow, and inserts a fresh sheet, which he clamps, and then turns the lever 255, which brings the reversing-gear into play. The tightener-pulley 254 tightens the belt connecting the pulley 252, geared by the bevel-gears to the shaft 5, with the pulley 251, which operates the pinion 25. This pinion meshes with the gear-wheel 22 and actuates the screw-pinions 21 21, which bring the feed-carriage back till the stop 282 starts the feed mechanism and the stop 56 closes the clutch 25 and starts the crimping mechanism again.

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

1. In a pipe-elbow machine, the combination with crimping mechanism and creasing mechanism, and a cam-wheel geared to the power-shaft within the machine-frame and operatively connected by means adapted to crimp and crease alternately, as described.

2. In a pipe-elbow machine, the combination with crimping mechanism and creasing and folding mechanism, and a rotating oval cam adapted to actuate each mechanism alternately, a face-plate pivotally supported on the edge of the frame, and means for tilting the face-plate, as described.

3. In a pipe-elbow machine, the combination with crimping mechanism and creasing and folding mechanism, and a tilting face-plate provided with a supporting-collar, and means for tilting same, as described.

4. In a pipe-elbow machine, the combination with crimping mechanism and creasing and folding mechanism, and a sliding collar supported on a tilting face-plate, and means to open and close collar upon pipe.

5. In a pipe-elbow machine, the combination with crimping mechanism and creasing and folding mechanism, a tilting face-plate and means for tilting same, and a sliding collar supported on face-plate and means to open and close collar, as described.

6. In a pipe-elbow machine, the combination with a tilting face-plate, of a reciprocating frame with crimping-jaws attached thereto, and a sliding collar, as described.

7. In a pipe-elbow machine, a feed mechanism comprising a carriage provided with a pipe-clamp traveling on two screws, each having a pinion meshing with a gear-wheel, and means to rotate the gear-wheel, as described.

8. In a pipe-elbow machine, the combination of a hollow stationary mandrel, with a

reciprocating rod therein, a slotted sleeve on the end of the mandrel, a movable head pivotally supported on the outer end of the sleeve and operatively connected with the rod, and a forked bell-crank lever in sliding contact with a cam mounted on a counter-shaft beneath the mandrel, as described.

9. In a pipe-elbow machine, a stationary hollow mandrel, having a slotted sleeve, a headpiece thereto having a projecting shoulder, a movable headpiece having bearings on the sleeve, and means to reciprocate the sleeve and operate the movable headpiece, as described.

10. In a pipe-elbow machine, a stationary hollow mandrel having a slotted sleeve, a headpiece thereto having a projecting shoulder, a movable headpiece having bearings on the sleeve, and means to reciprocate the sleeve and operate the movable headpiece, a loose pin in headpiece, and a reciprocating rod with projections adapted to operate the movable head as described.

11. In a pipe-elbow machine, the combination with crimping mechanism of an actuating-lever provided with eccentric bearings adapted to adjust the stroke of the crimping-jaws, as described.

12. In a pipe-elbow machine, the combination of a feed-carriage provided with a pipe-clamp, and screw-threaded bearings, two parallel screws adapted to operate feed-carriage with pinions thereto, a gear-wheel meshing with the pinions and means to rotate the gear-wheel intermittently when feeding, and continuously when returning feed-carriage, as described.

13. In a pipe-elbow machine, a stopping and starting mechanism consisting of a rod reciprocated by feed-carriage by means of stops, and means of connecting and disconnecting feed gear-wheel with feed-operating mechanism, as described.

14. In a pipe-elbow machine, the combination of a feed-carriage provided with a pipe-clamp traveling on two screws, each having a pinion meshing with a gear-wheel and means to vary the amount of rotation of the gear-wheel, as described.

15. In a pipe-elbow machine, a reciprocating sleeve provided with a projecting shoulder curved to support the uncrimped portion of the pipe-bend beyond the movable head of the creasing mechanism.

And I have hereunto set my hand in the presence of the two undersigned witnesses.

Montreal, October 11, 1900.

GEORGE CUNIN.

Witnesses:

HENBURY A. BUDDEN,  
A. L. CARON.