

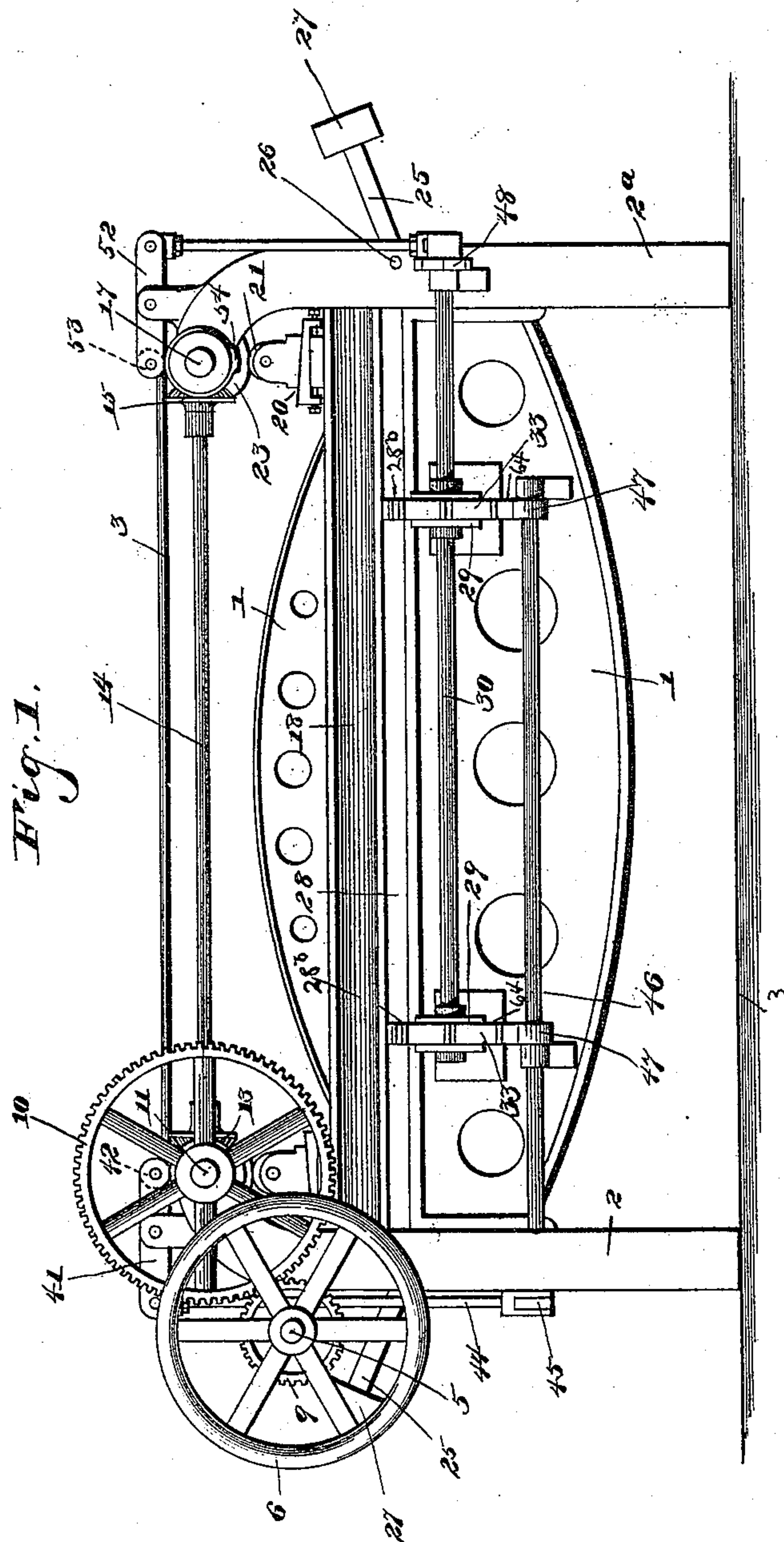
(No Model.)

4 Sheets—Sheet 1.

C. J. COLLING.  
CRIMPING MACHINE.

No. 441,399.

Patented Nov. 25, 1890.



Witnesses

*Samuel Ker*  
*Wm. Baggett*

Inventor

*Charles J. Colling.*  
By his Attorneys,

*C. A. Snow & Co.*

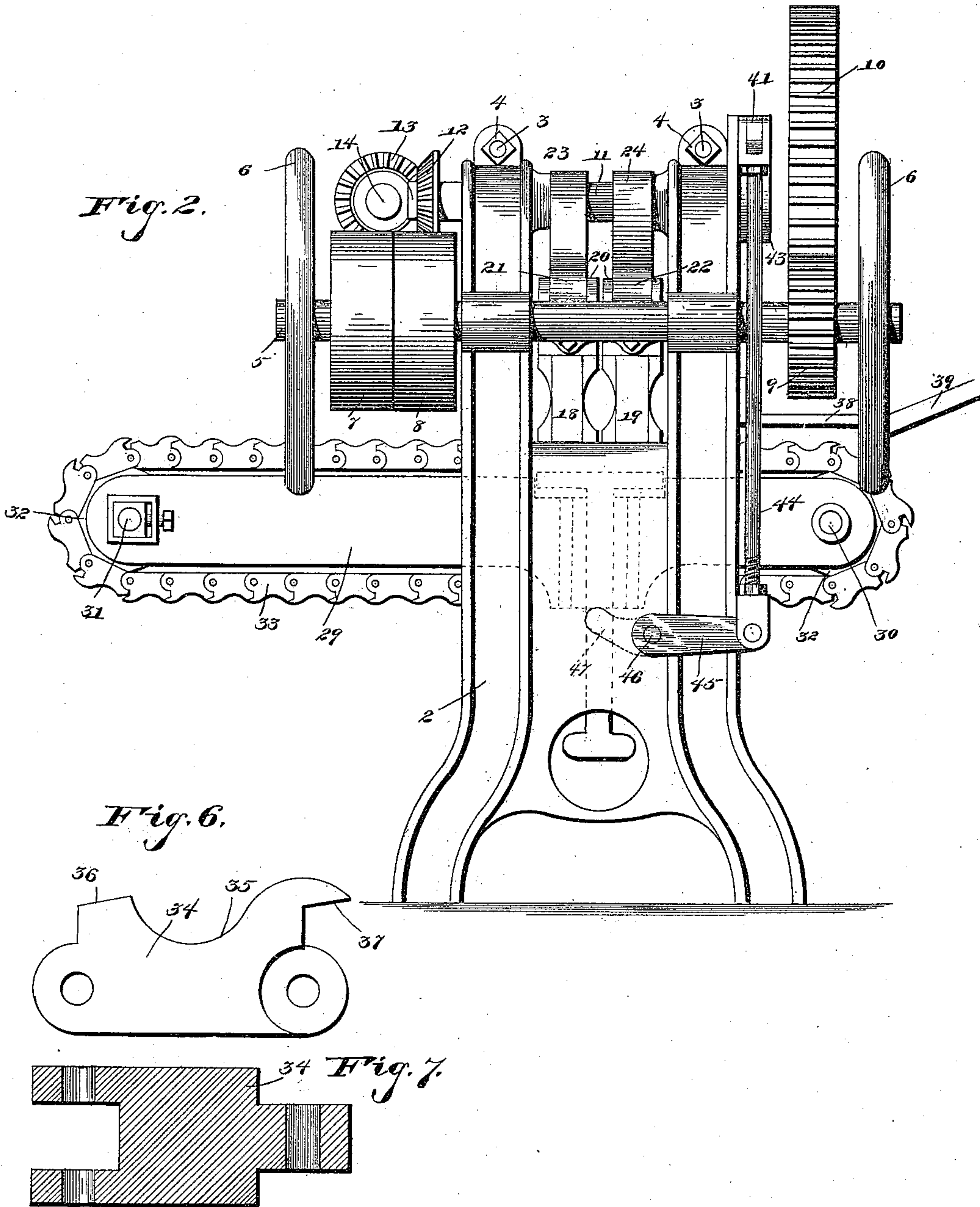
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4 Sheets—Sheet 2.

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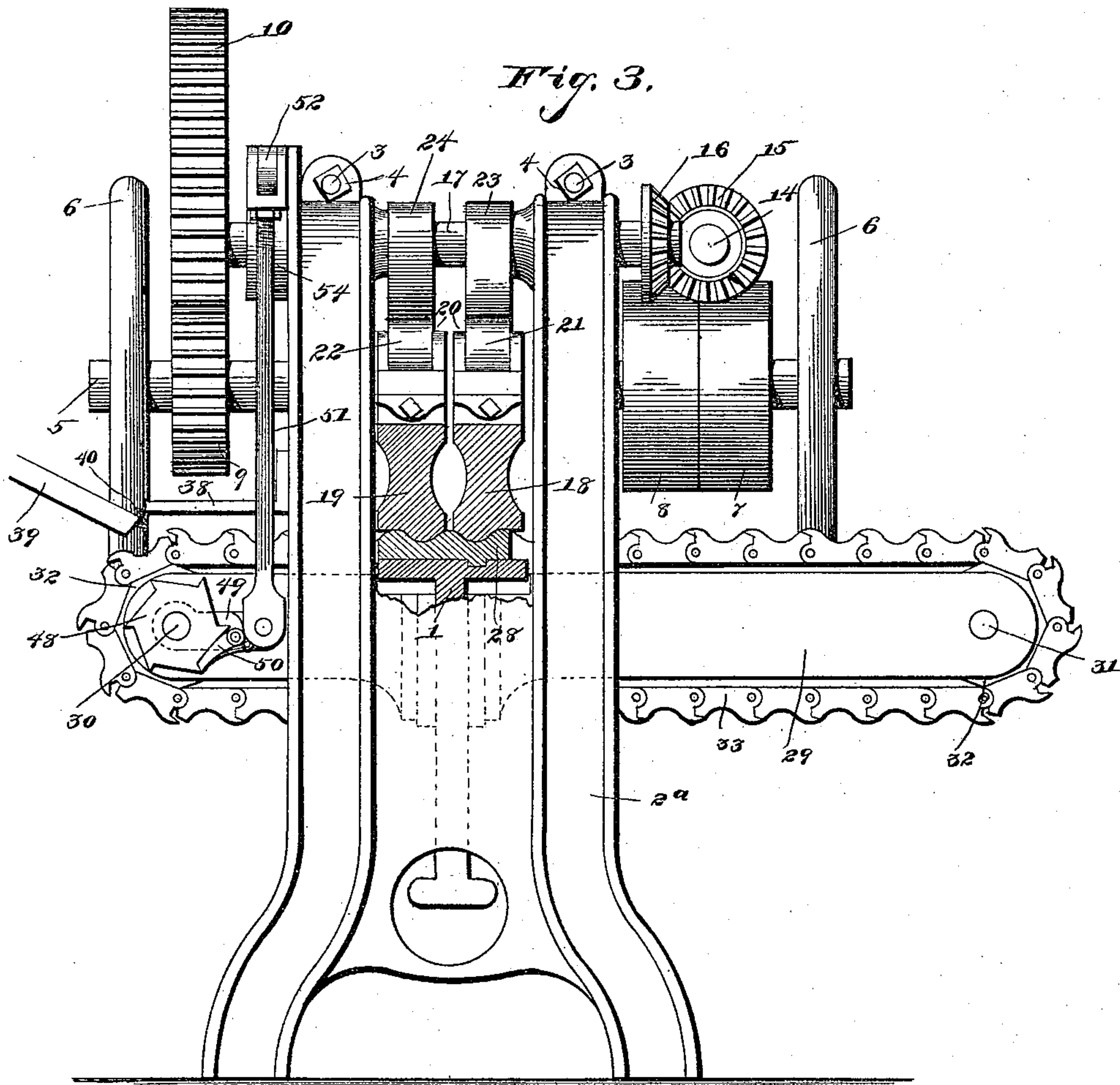
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4 Sheets—Sheet 3.

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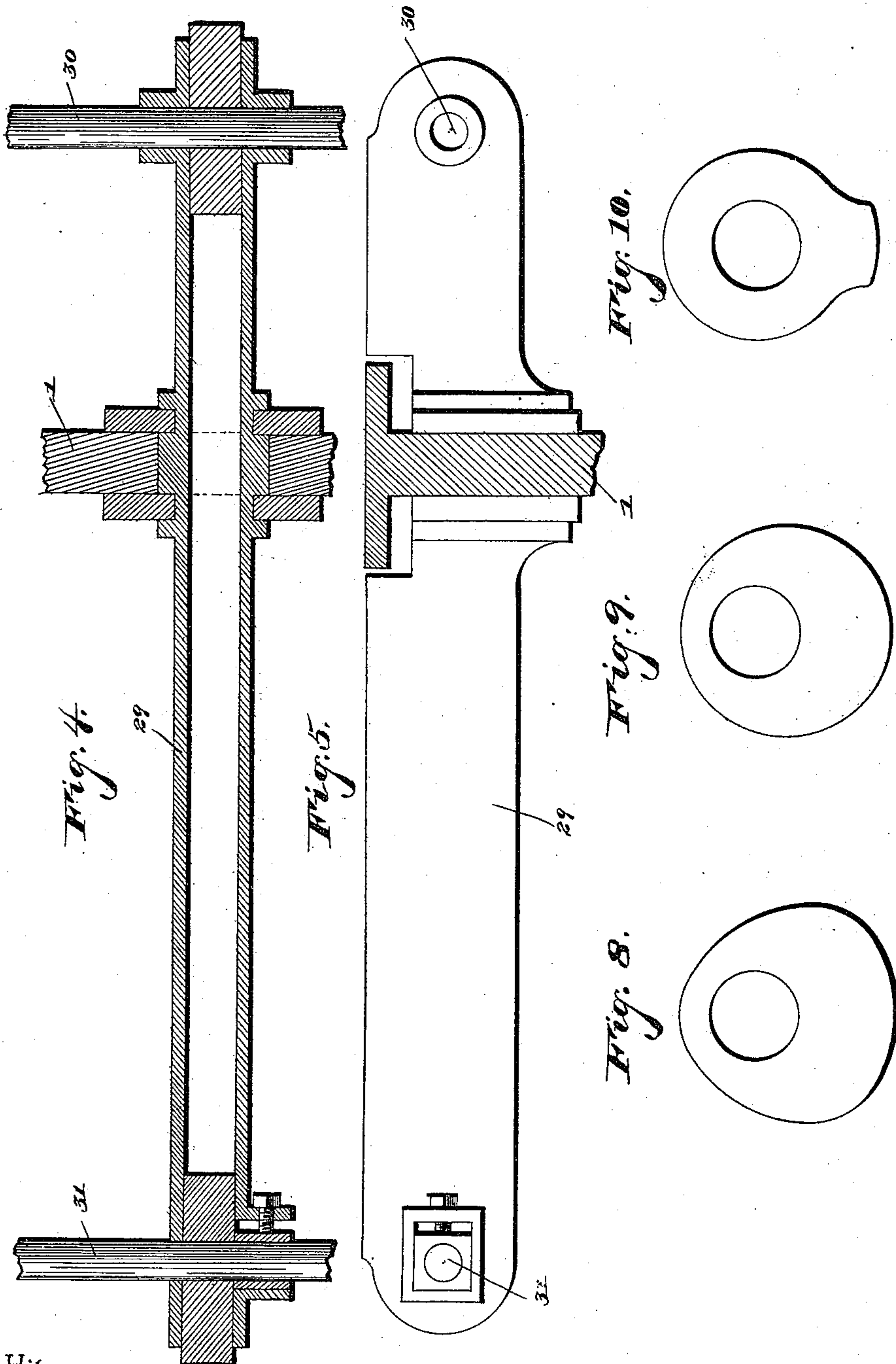
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4 Sheets—Sheet 4.

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# UNITED STATES PATENT OFFICE.

CHARLES JOSEPH COLLING, OF CINCINNATI, OHIO.

## CRIMPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 441,399, dated November 25, 1890.

Application filed August 6, 1890. Serial No. 361,149. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES JOSEPH COLLING, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Machine for Crimping Sheet Metal, of which the following is a specification.

This invention relates to machines for crimping or corrugating sheet metal, such as is used for roofing and other building purposes; and it has for its object to construct a machine of this class which shall be simple, durable, and efficient, and by means of which the sheets of metal which are being operated upon shall be fed automatically through the machine.

With these ends in view the invention consists in certain details of construction, which will be hereinafter fully described with reference to the drawings, in which—

Figure 1 is a side elevation of a machine embodying my improvements. Fig. 2 is an end view of the same. Fig. 3 is an end view partly broken away, taken from the opposite end of the machine. Figs. 4 and 5 are detail views of one of the vertical sliding frames carrying the endless chains by means of which the sheet metal is fed through the machine. Figs. 6 and 7 are detail views of one of the links of the endless chain. Figs. 8, 9, and 10 are detail views of the operating cams and eccentrics of the machine.

Like numerals of reference indicate like parts in all the figures.

The frame of my improved machine is composed of the longitudinal beams 1 1, which are suitably bolted or otherwise secured to the end pieces or uprights 2 2<sup>a</sup>, which latter are held from spreading at their upper ends by means of the connecting-rods 3, the ends of which are extended through perforations in the ends of the end pieces and provided with nuts 4.

One of the end pieces or uprights 2 is provided with boxes or bearings for a transverse shaft 5, carrying the balance-wheels 6 and the drums or band-wheels 7 and 8, the former of which is loose, while the latter is fixed upon the shaft and adapted to receive motion from any suitable motive power. The opposite end of the shaft 5 carries a pinion 9, which meshes with a spur-wheel 10 upon a transverse shaft 11, which is journaled in suitable bearings at the upper end of the upright or end piece 2

of the frame. The shaft 11 has a bevel-gear 12, meshing with a bevel-gear 13 upon one end of a longitudinal shaft 14, the ends of which are journaled in suitable boxes or bearings upon the frame of the machine. The opposite end of the shaft 14 has a bevel-gear 15, meshing with a bevel-gear 16 upon one end of a shaft 17, which is journaled transversely in suitable bearings at the upper end of the upright or frame-piece 2<sup>a</sup>. It will thus be seen that the transverse or counter shafts 11 and 17 will during the operation of the machine rotate in unison.

The ends of uprights 2 2<sup>a</sup> of the frame are provided with vertical slots, in which are mounted the ends of the vertically-sliding plungers 18 and 19, the upper sides of which are provided near their ends with suitably-constructed boxes or bearings 20, in which are mounted the friction-rollers 21 and 22, which are adapted to be engaged by the cams 23 and eccentrics 24, respectively, said cams and eccentrics being mounted upon the shafts 11 and 17 at the ends of the frame. The relative arrangement of the cams 23 and eccentrics 24 is such that the cams 23 shall first engage the friction-rollers 21 to force the plunger 18 in a downward direction, immediately after which the eccentrics 24 will engage the friction-roller 22 to force the plunger 19 downwardly. The plungers 18 and 19 are forced upwardly when the cams 23 and the eccentric 24 pass out of engagement with the friction-rollers by the action of bell-crank levers 25, which are mounted upon transverse pins or shafts 26 at the ends of the frame. The short arms of said bell-crank levers bear against the under sides of the plungers 18 and 19, and the outwardly-extending long arms of said bell-crank levers carry the weights 27, whereby the said plungers are forced in an upward direction.

Suitably arranged longitudinally in the frame is the die 28, the upper side of which is grooved or corrugated to correspond with the conformation of the under sides of the plungers 18 and 19. The grooves or corrugations may be rounded or of any desired shape in transverse section, and I prefer to mount the said die, as well as the plungers, detachably in order that they may be readily exchanged for others of a different construction.



29 29 designate a pair of frames, which are mounted to slide vertically in suitable bearings in the frame of the machine. Said frames are provided at their front and rear ends with bearings for the transverse shafts 30 and 31, carrying the chain-wheels 32, over which pass the endless chains 33. Each of these chains is made up of a series of links 34, the upper sides of which have transverse recesses or corrugations 35, which correspond in size and contour to that of the recesses or corrugations in the die 28, which latter is provided with transverse slots 28<sup>b</sup> for the accommodation of said chains. The front end of each link has a shoulder 36, adapted to support the lip or lug 37, extending from the link next in front thereof. It will be observed that while the links travel over the upper sides of the supporting-frames 29 the links are closely together, while at the time when the chains turn the chain-wheels at the ends of the frames the shoulders 36 and lugs 37 will be separated.

The front side of the frame of the machine has a shelf 38, adjacent to which is arranged an inclined table 39, upon which the sheets of metal that are to be fed into the machine may be placed one by one. Each sheet as it is placed upon the inclined table 39 is permitted to slide through the slot 40 between the said table and the shelf 38, and is thus permitted to enter into the opening between the chain-links which at the time are passing under the said slot. When the chain-links engaging the edge of the metal plate or sheet pass forward, they close together, thus gripping the edge of the metal sheet and carrying it forward between the die and plungers and through the machine.

At the upper end of the upright 2 of the frame is pivoted a lever 41, the inner end of which may be provided with a friction-roller 42, adapted to be engaged by a cam 43, mounted upon one end of the transverse shaft 11. The outer end of the lever 41 is connected by a pivoted rod or pitman 44 with the end of a crank or lever 45, which is secured upon a longitudinal shaft 46. The latter is provided with rearwardly-extending arms 47, adapted to bear against the under sides of the chain-carrying frames 29, which are mounted, as described, to slide vertically in slots 64 of the frame of the machine. It will be seen that when the lever 41 is actuated by the cam 43 it will force in a downward direction the outer or front end of the arm or lever 45, thus rocking or oscillating the shaft 46 in its bearings and causing the arms 47 of said rock-shaft to press upwardly against the under sides of the chain-carrying frames 29, which latter are thus caused to move simultaneously in an upward direction, thus raising or elevating the partially crimped or corrugated sheet of metal which is being operated upon above the level of the die 28 and enabling it to be carried forwardly through the machine by the action of the endless carrying-chains.

The endless carrying-chains 33 are oper-

ated in the following manner: One end of the shaft 30, which latter has bearings in both the frames 29, is provided with a ratchet-wheel 48. Pivoted loosely upon the said shaft adjacent to the ratchet-wheel 48 is an arm or lever 49, having a pawl 50, that engages the said ratchet-wheel. The arm or lever 49 is connected by a pivoted rod or pitman 51 with a lever 52, pivoted at the upper end of the upright 2<sup>a</sup> of the frame. The lever 52 is provided at its inner end with a friction-roller 53, lying in the path of a cam-wheel 54 upon the transverse shaft 17. It will be seen that when the latter revolves and the cam 54 actuates the lever 52 the latter will, through the medium of connecting-rod 51 and arm or lever 49, pawl 50, and ratchet-wheel 48, oscillate the shaft 30 in its bearings, thus feeding the endless carrying-chains in a forward direction for the space of one tooth upon the ratchet-wheel, which is equivalent to the space of one link in the endless chains.

From the foregoing description the construction and operation of my invention will be readily understood by those skilled in the art to which it appertains. The plate or sheet of metal which is to be operated upon is fed from the inclined table 39 through the slot 40 to the endless carrying-chains, between the links of which it is grasped and held so as to be carried forward through the machine by the action of said carrying-chains. Normally the plungers 18 and 19 are in a raised and the chain-carrying frame 49 in a lowered position. The operation of the parts is so timed that when the sheet of metal passes under the plungers 18 and 19 it shall be first engaged by the plunger 18, which engages one of the grooves or corrugations already formed in the plate by the plunger 19, thus holding the plate securely while the latter plunger 19 descends and forms an additional groove or corrugation in the sheet of metal. As soon as the friction-rollers at the upper ends of the plungers become disengaged from the cam 23 and eccentric 24 the said plungers are forced upwardly by the action of the weighted levers 25. The cams 43 and 54 next pass into engagement with the levers 41 and 52, thus actuating the rock-shaft 46 to press or force the chain-carrying frames 29 in an upward direction, and immediately afterward actuating the shaft 30 to feed the chains forward to the extent of the space of one link, thus moving the sheet of one plate of metal into position for a repetition of the operation. It will be observed that while the front edge of the sheet of metal which is being operated upon is firmly held and grasped, not only by the links of the operating-chains, but also by the action of the plunger 18, the rear edge of said sheet is free to move in a forward direction under the action of the crimping-plunger 19.

While I have in the foregoing described what I consider to be a preferable construction of my improved sheet-metal crimping or



corrugating machine, I would have it understood that I do not limit myself to the exact construction of details herein shown and described, but reserve the privilege of making any such changes and modifications as may be resorted to without departing from the spirit of my invention. I also desire to state that while the machine has been described as operating upon a single sheet or plate of metal, two or even more sheets may be simultaneously operated upon when desired. Further, I would have it understood that the dies employed may be used not merely for crimping or corrugating, but for stamping or embossing the sheet metal with a great variety of ornamental patterns.

Having thus described my invention, I claim—

1. In a machine for crimping or corrugating sheet metal, the combination of the frame, a vertically-reciprocating plunger, and vertically-reciprocating endless carrying-chains to carry the sheet of metal which is being operated upon under the plunger, substantially as set forth.

2. The combination of the reciprocating plunger, the vertically-reciprocating endless carrying-chain, and the die, substantially as and for the purpose set forth.

3. The combination, with the die and plungers, of the vertically-reciprocating endless carrying-chain having links adapted to grasp and hold the sheet of metal which is to be operated upon, substantially as set forth.

4. The combination, with the die and plungers, of the endless carrying-chain having links the outer sides of which are provided with recesses corresponding in size and shape to that of the grooves or corrugations in the die, and means for imparting a vertically-reciprocating motion to the said chain, substantially as set forth.

5. The combination, with the die and plungers, of the vertically-movable frames having the endless carrying-chains, substantially as and for the purpose set forth.

6. The combination of the die, the reciprocating plungers, the vertically-movable frames, the endless carrying-chains mounted on said frames, mechanism for moving the latter in an upward direction, and mechanism for actuating the endless carrying-chains, substantially as and for the purpose set forth.

7. The combination of the reciprocating plungers, mechanism for forcing the said plungers successively in a downward direction, the vertically-movable frames, the endless chains mounted on chain-wheels upon shafts journaled at the ends of said frames, mechanism for forcing the said frames in an upward direction after the plungers recede, mechanism for actuating the endless chains, and the grooved or corrugated die, all arranged and operating substantially as set forth.

8. In a machine of the class described, the endless carrying-chains composed of links having grooved or recessed outer sides and provided at their front ends with shoulders and at their rear ends with lips or lugs to overlap the shoulders of the next succeeding links, substantially as set forth.

9. In a machine of the class described, the combination of the die, the reciprocating plungers, the endless carrying-chains the links of which are provided with shoulders and lugs adapted to engage between them the edge of the sheet or plate of metal which is to be operated upon, the shelf or gage-plate upon the frame of the machine, and an inclined feed-table arranged in front of said shelf, between which and said feed-table is formed a slot or opening for the passage of the sheets to be operated upon, substantially as set forth.

10. In a machine of the class described, the combination of the vertically-movable frames having the endless carrying-chains, a rock-shaft having arms adapted to bear against the under sides of said frames, an arm or lever extending from said rock-shaft, a pitman connecting said arms with the lever pivoted in the top of the frame, a cam mounted upon a transverse counter-shaft and adapted to engage the said lever, and suitable operating mechanism, substantially as and for the purpose set forth.

11. The combination of the frame, the die, the vertically-reciprocating plungers, the vertically-movable frames having the endless carrying-chains, the operating-shaft having a ratchet-wheel at one end, a lever journaled loosely upon the shaft adjacent to said ratchet-wheel and having a pawl engaging the latter, and a rod connecting the said lever with a lever pivoted in the top of the frame and lying in the path of the cam-wheel mounted upon a transverse counter-shaft, substantially as set forth.

12. In a machine of the class described, the combination of the frame, the die, the vertically-reciprocating plungers, the counter-shafts arranged at the ends of the frame and having cams and eccentrics adapted to actuate said plungers against the action of weighted levers, the vertically-movable frames having the endless carrying-chains, mechanism for forcing the said frames upwardly immediately when the plungers recede, and mechanism for feeding the chains forward immediately following the upward movement of the frames, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

CHARLES JOSEPH COLLING.

Witnesses:

W. B. DAVIS,

JOHN ANTHONY.