

No. 847,683.

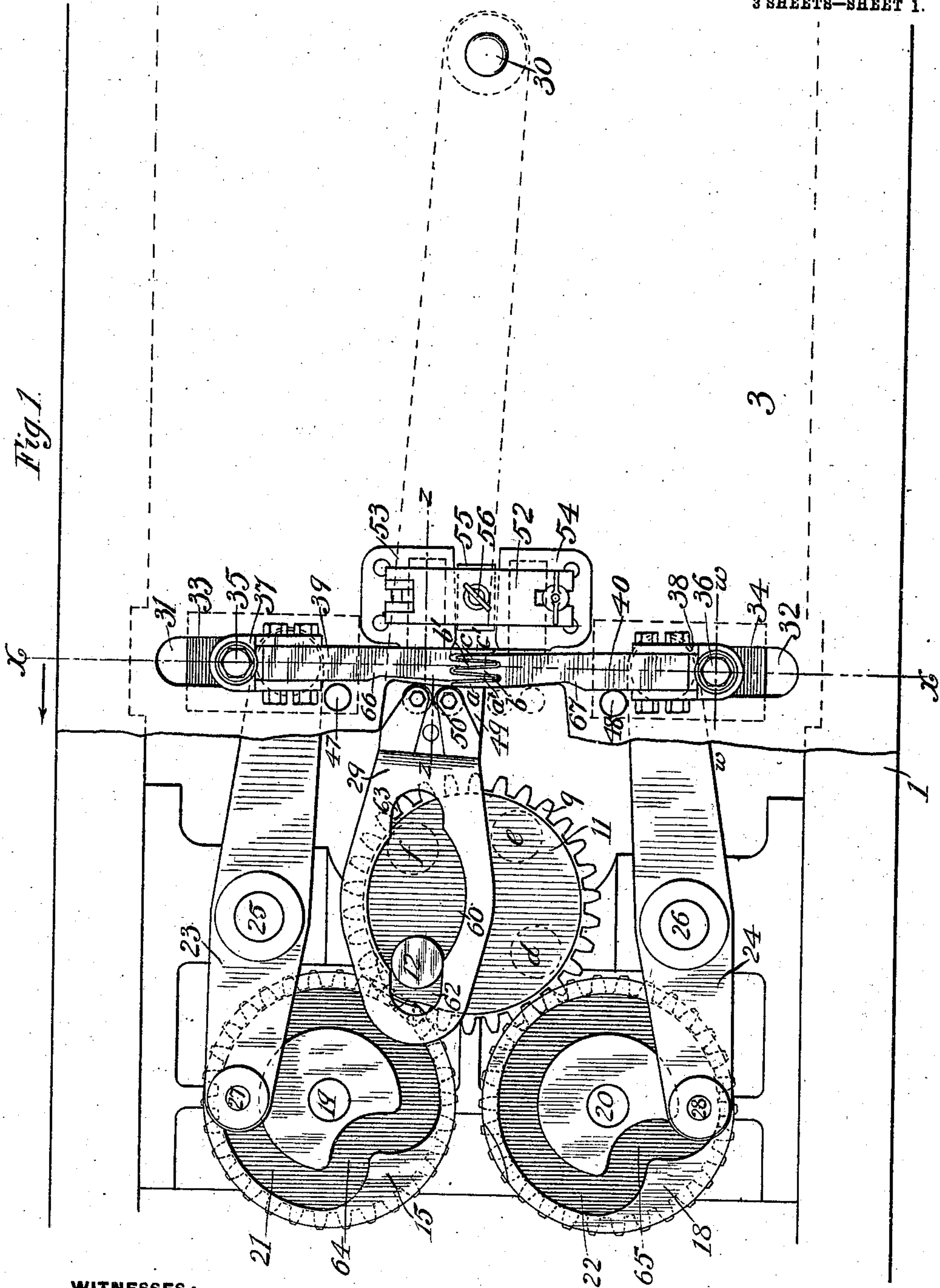
PATENTED MAR. 19, 1907.

F. C. NEWELL & A. ENGLAND.

CRIMPING MACHINE.

APPLICATION FILED APR. 24, 1902.

3 SHEETS—SHEET 1.



WITNESSES:

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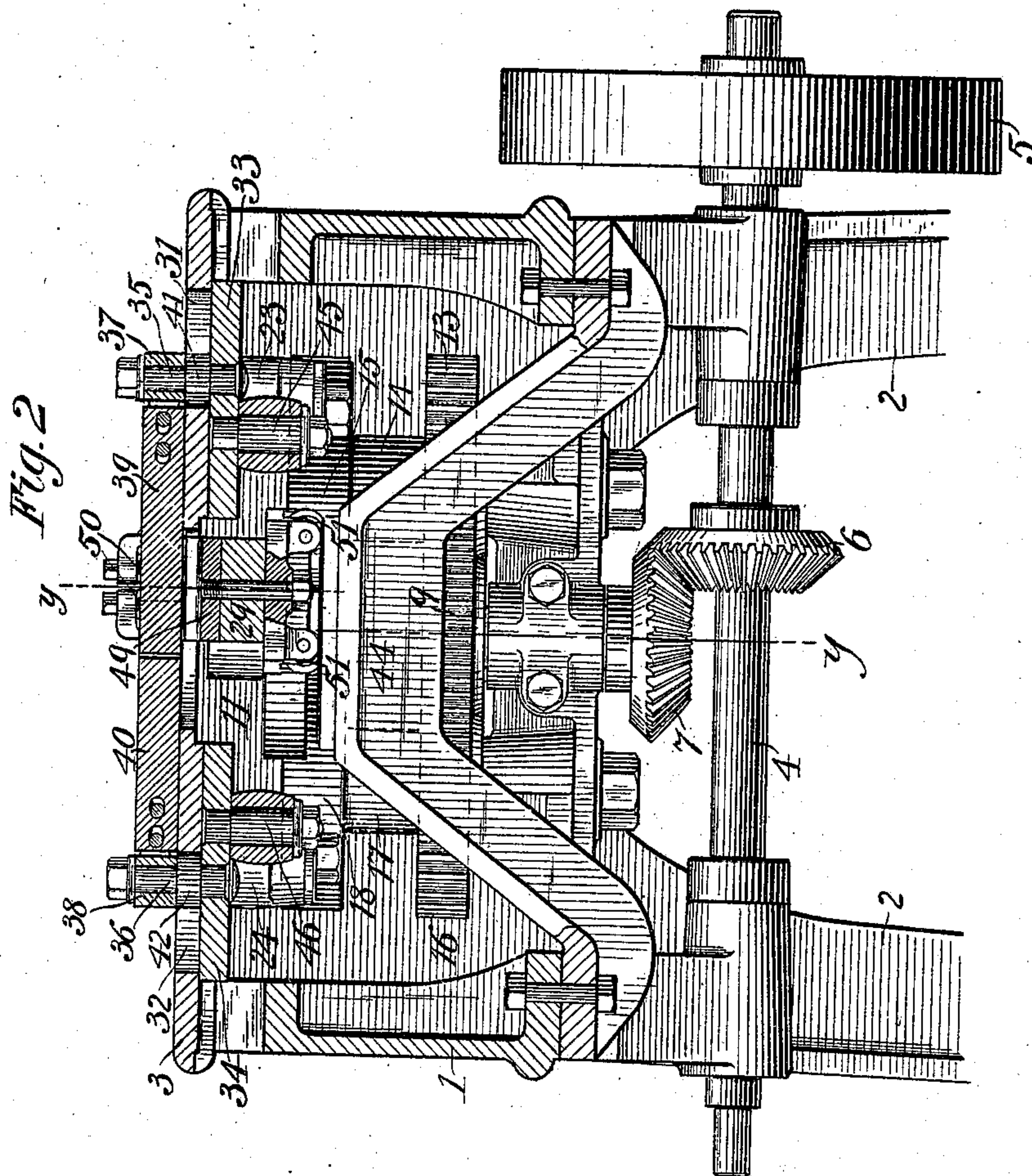
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

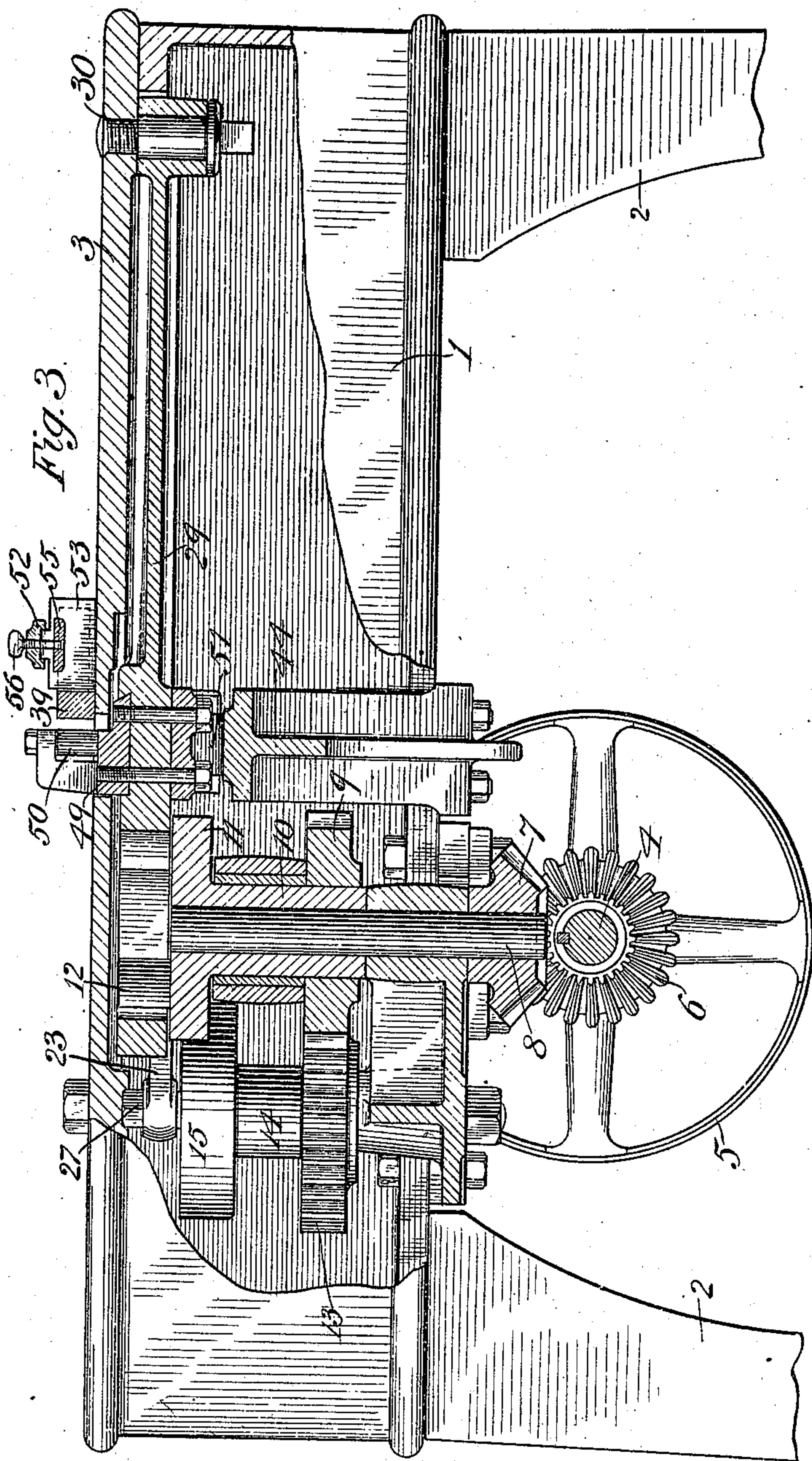


Fig. 3

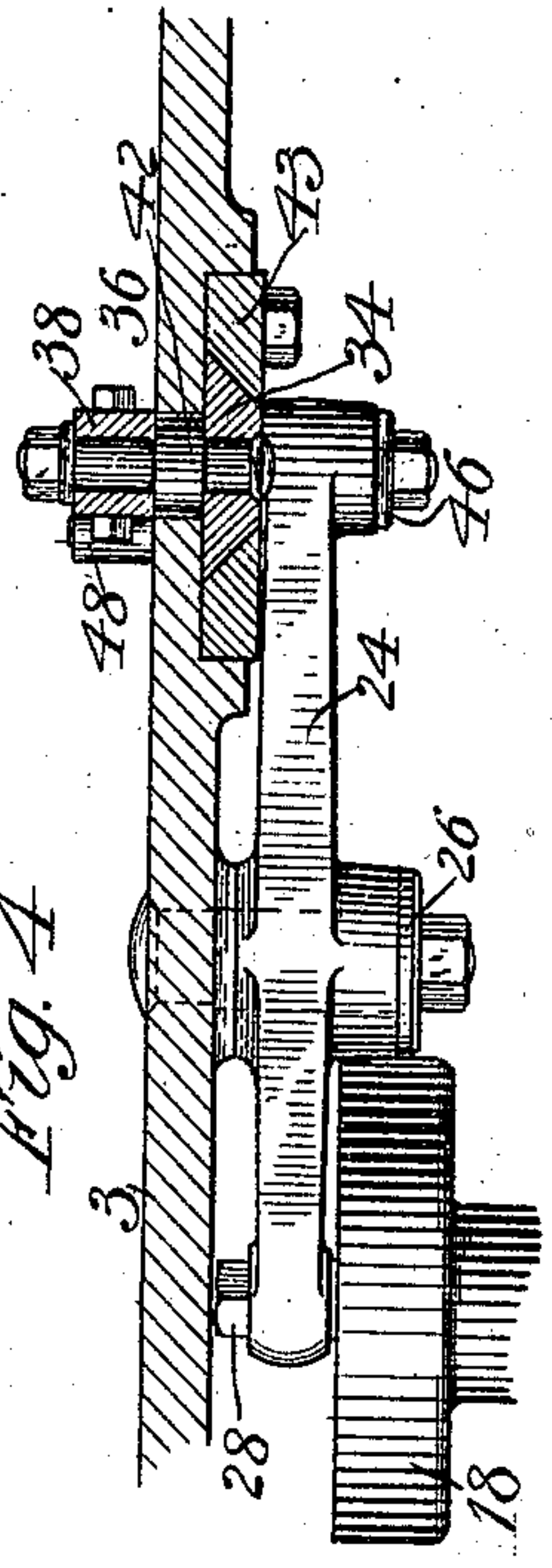


Fig. 4

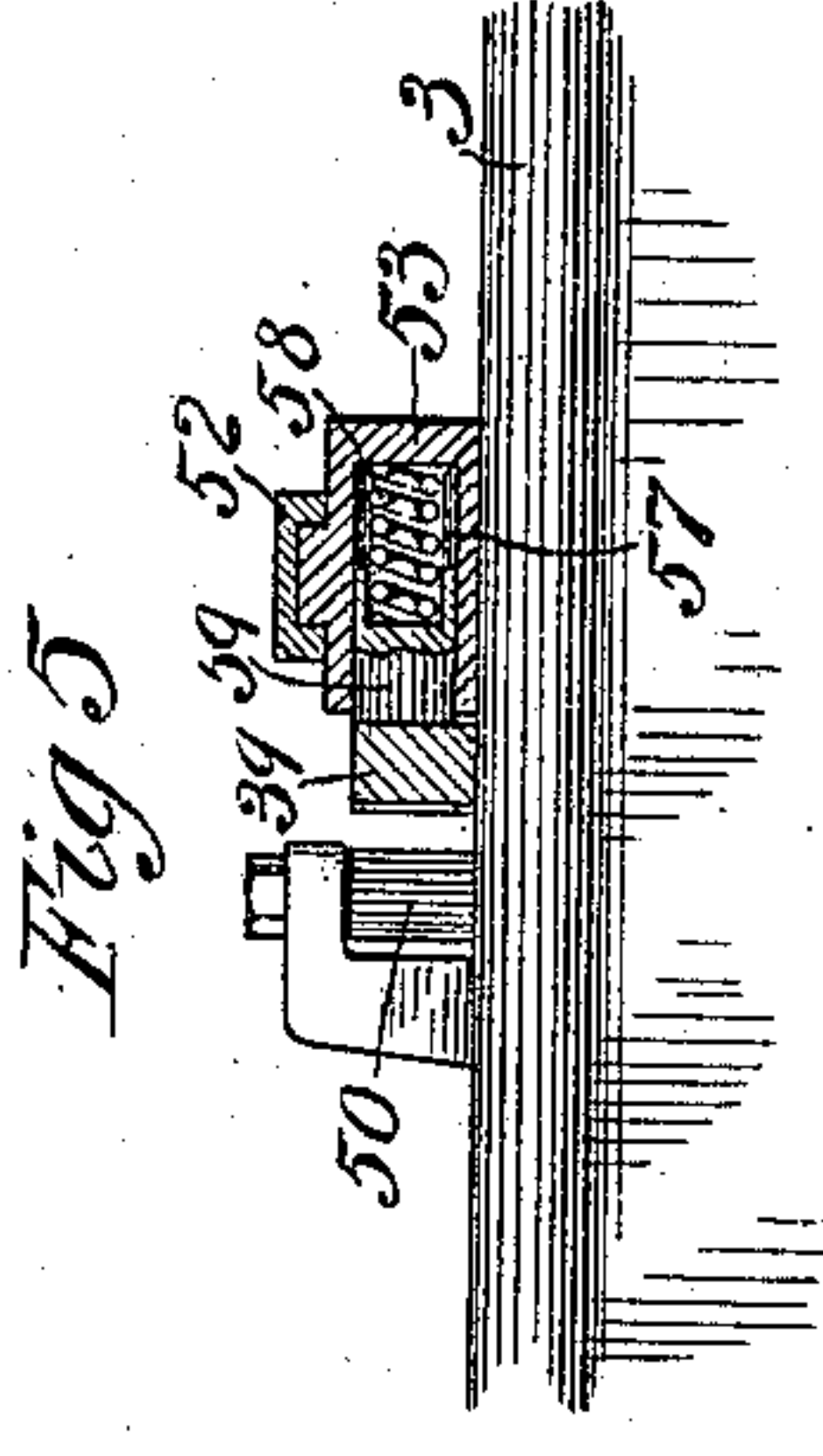


Fig. 5

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# UNITED STATES PATENT OFFICE.

FRANK C. NEWELL AND ALEXANDER ENGLAND, OF WILKINSBURG, PENNSYLVANIA, ASSIGNORS TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## CRIMPING-MACHINE.

No. 847,683.

Specification of Letters Patent.

Patented March 19, 1907.

Application filed April 24, 1902. Serial No. 104,468.

*To all whom it may concern:*

Be it known that we, FRANK C. NEWELL and ALEXANDER ENGLAND, citizens of the United States, residing in Wilkinsburg, county of Allegheny, State of Pennsylvania, have invented a certain new and useful Improvement in Crimping-Machines, of which improvement the following is a specification.

This invention has for its object to provide a machine by means of which a thin metal strip or ribbon may be crimped or folded back and forth upon itself to form a flexible conductor which may be used as a resistance-coil for an electric heater or rheostat or for other purposes.

With this object in view the invention consists in certain novel combinations and improved features of construction, as herein-after more fully described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a plan view of our improved machine, a part of the frame being broken away to more clearly show the mechanism beneath. Fig. 2 is a transverse sectional view taken on the line *x x* of Fig. 1 and looking in the direction indicated by the arrow. Fig. 3 is a longitudinal section taken on the line *y y* of Fig. 2. Fig. 4 is a fragmentary sectional view taken on the line *w w* of Fig. 1, and Fig. 5 is a detail view showing the parts above the top plate in section on the line *z z* of Fig. 1.

As shown in the drawing, a suitable frame 1, having legs 2 and a top plate 3, is provided for supporting the mechanism. A shaft 4 is mounted in bearings supported by the frame and carries a pulley 5, by which power may be applied to operate the machine, and a bevel-gear 6, which meshes with bevel-gear 7, carried on the lower end of vertical shaft 8, this shaft 8 and also corresponding vertical shafts 19 and 20 being suitably mounted in bearings carried by the frame.

Secured on the upper part of shaft 8 is the sleeve 10, having a circular flange forming a disk 11 and carrying the pin 12, which projects up through an opening in the operating-lever 29, which is pivoted at 30 to the top plate 3. On the shafts 19 and 20 are mounted the gears 13 and 16 and the

sleeves 14 and 17, carrying the cam-disks 15 and 18, respectively, the gears 13 and 16 meshing with gear 9 and adapted to be driven thereby.

Levers 23 and 24 are pivoted at 25 and 26 to the under side of the top plate and at their forward ends carry pins 27 and 28, respectively, which project down into the cam-grooves 21 and 22 of the respective disks 15 and 18. At their front ends the levers 23 and 24 are pivotally connected to pins 45 and 46, carried by the respective slides 33 and 34, which are adapted to reciprocate in suitable guides 43, secured beneath the top plate 3. The slides are also provided with pins 35 and 36, which project up through slots 31 and 32, respectively, in the top plate and carry collars 41 and 42.

On the upper ends of the pins 35 and 36 above the top plate are pivotally secured the respective yokes 37 and 38, which are adjustably connected, by means of bolts and elongated holes, with the arms 39 and 40. These arms are provided at their adjacent ends with one or more projecting fingers, such as *a*, *b*, and *c* and *a'*, *b'*, and *c'*, the fingers of each arm being adapted to overlap and project into and be withdrawn from the spaces between the fingers of the other arm as these parts are reciprocated. A piece 49, having a pair of rollers 50, suitably mounted thereon, is secured on the operating arm or lever 29 and extends up through an opening in the top plate and in close proximity to the arms 39 and 40, the rollers being adapted to engage the arms and end fingers when oscillated by means of the pin 12. This operating arm or lever 29, with its rollers 50, constitute a movable member adapted to loosely engage the ribbon and swing the same from side to side as it is oscillated or reciprocated by the pin 12. It is obvious that any other means may be employed for causing the reciprocatory movement of the said member without departing from this invention.

In order to prevent friction between the disk 11 and the end of the lever 29, the weight of the lever may be carried by friction-rollers 51, which are supported and adapted to roll on a bridge-piece 44, carried by the frame.

On the top of plate 3 are rigidly mount-



ed the two blocks 53 and 54, each having a cylindrical recess 57, containing spring 58 and plunger 59, bearing against the respective arms and tending to force the same against the stationary rollers 47 and 48, respectively, which are positioned on the top plate on the other side of the arms. The blocks 53 and 54 are spaced apart a distance about equal to the length of the fingers, and over this space is located a bridge-plate 52, which is hinged at one end to one of the blocks and is fastened at its other end to the other block by means of a removable clamp or equivalent connection. The plate 55 is secured to the bridge-plate 52 by an adjusting-screw 56, whereby its distance above the top plate 3 of the machine may be adjusted according to the width of the strip or ribbon that is being crimped.

The opening in the operating-lever 29, in which the pin 12 operates, is somewhat elliptical in shape, having two opposite curved walls 60 and 61, with a radius corresponding to that of the path of the pin 12, and two opposite recesses 62 and 63, adapted to be engaged by the pin 12, whereby the lever is moved only when the pin is passing through two small arcs on opposite sides of its circular path.

The operation of the machine is as follows: The end of a metal strip or ribbon being inserted between the rollers 50 and into the narrow space over the tip of the finger *a*, power is applied to the pulley 5 to start the machine. The shafts 8, 19, and 20 then begin to revolve by means of the intermediate gears, and the pin 12 engages in recess 62 and swings the operating-lever 29 until the pin arrives at the point *d*. During this movement the circular portion of the grooves 21 and 22 in cam-disks 15 and 18, respectively, have been passing the pins 27 and 28, so that levers 23 and 24 have remained stationary. This movement of lever 29 causes one of the rollers 50 to press upon the metal ribbon and roll it against the outside face of finger *a*, the ribbon meanwhile feeding in between the rollers 50, which now occupy the position indicated in dotted lines, Fig. 1. As the pin 12 continues on through the arc from *d* to *e* it passes by the curved wall 60 of the opening, but causes no movement of the lever 29. During this movement of the pin 12, however, the cam-shaped portion 64 of the groove 21 engages the pin 27, causing the lever 23 to swing on its pivot 25 and actuate the slide 33 to draw the arm 39 and its fingers out from engagement with the fingers of the arm 40. The spring-pressed plunger in the block 53 keeps the arm bearing against the roller 47 during this outward movement, so that when the inclined face 66 arrives at the roller the arm is turned slightly on its pivot 35, sufficiently to bring the space between fingers *a'* and *b'* substantially opposite the finger *a*.

Then as the lever swings back to complete its oscillation the fingers are again engaged with each other, but with the finger *a'* on the outside and the first crimp of the ribbon held clamped between the fingers *a* and *a'*. As the pin 12 continues on in its rotation from the point *e* to the point *f* it engages the recess 63 of the lever 29 and swings it back to its first position, causing the other roller 50 to fold the ribbon back over the outside face of the finger *a'*. During this movement the levers 23 and 24 remain stationary, as the pins engage the circular portions of the grooves 21 and 22 in the respective cam-disks 15 and 18. The pin 12 then enters upon the arc of curve 61, and lever 29 remains stationary, while the pin 28 engages the cam portion 65 of groove 22 in cam-disk 18, causing the lever 24 to oscillate about pivot 26 and reciprocate slide 34, with its arm 40. When the inclined face 67 arrives at roller 48, the spring-actuated plunger in the block 54 forces the arm 40 to swing, so that when the fingers next come together finger *a* is again on the outside adjacent to the rollers 50. This completes one revolution of the disks 11, 15, and 18, and the same operations are repeated with each revolution.

The metal strip or ribbon is fed in between the rollers 50 and in its crimped condition passes out between the blocks 53 and 54 beneath the adjustable plate 55. In order to facilitate the slight swinging movement of the arms as they are reciprocated, the fingers *c* and *c'* may be made a little shorter than the other fingers. When it is desired to remove the ribbon for any reason, the bridge-plate 52 may be released and swung back on its hinge, permitting the raising of the crimped ribbon from the machine. The position of the arms in their yokes may be adjusted within certain limits to vary the depth of the folds or crimps of the ribbon.

From the foregoing description it will now be observed that the essential features of the machine comprise means for holding or clamping one portion of the ribbon stationary and a movable member engaging both sides of the ribbon and adapted to be reciprocated or oscillated to and fro, the point at which the ribbon is clamped or held fixed being changed from one fold or crimp of the ribbon to the next at each successive movement of the arm or member engaging the ribbon.

Various forms of mechanism involving the essential features of our invention may be devised, and this invention is not, therefore, limited to the specific construction shown and described, but covers any mechanical structure for carrying out the several operations substantially in the manner above indicated.

Where a ribbon is to be used as a resistance conductor for an electric current and is to



have a given current-carrying capacity, it is important that the ribbon should not be cracked, broken, or abraded in any way during the process of crimping or bending, but that its cross-sectional area must be retained uniform throughout its length, and it will be observed that the construction above set forth is especially adapted to secure this result, since by rolling or bending the ribbon over the rounded ends and faces of the fingers the required shape is given to the ribbon without abrading its surface or in any way affecting its cross-sectional area.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A crimping-machine comprising means having an intermittent movement for clamping stationary one portion of the strip to be crimped, and a transversely-reciprocating member engaging both sides of the strip for alternately bending the same from one side to the other.

2. A crimping-machine comprising means having an intermittent movement for clamping stationary one portion of the strip to be crimped, and a transversely-reciprocating member loosely engaging both sides of the strip for bending the same.

3. In a crimping-machine, the combination of two arms having overlapping fingers for clamping the ribbon, means for alternately reciprocating said arms, a movable member loosely engaging the ribbon, and means for reciprocating said member.

4. In a crimping-machine, the combination of an arm for holding the ribbon, means for reciprocating and swinging said arm, a movable member loosely engaging the ribbon, and means for reciprocating said member.

5. In a crimping-machine, the combination of two arms having overlapping fingers, means for intermittently and alternately reciprocating said arms, a movable member for bending the ribbon, and means for reciprocating said member.

6. In a crimping-machine, the combination with two arms having overlapping fingers and means for intermittently and alternately reciprocating said arms, of a movable member for bending the ribbon, and means for causing an intermittent motion of said member between the movements of said arms.

7. In a crimping-machine, the combination of two arms having overlapping fingers, means for alternately reciprocating said arms, a movable member for bending the ribbon, and means for reciprocating said member.

8. In a crimping-machine, the combina-

tion of two arms having adjacent ends for holding the ribbon, said arms having an alternate and intermittent movement, a movable member carrying rollers in close proximity to the ends of said arms, and means for reciprocating said member.

9. In a crimping-machine, the combination of a pivotally-mounted arm, means for reciprocating said arm, a spring for swinging the arm during its reciprocatory movement, a movable member for bending the ribbon, and means for reciprocating said member.

10. In a crimping-machine, the combination of a pivotally-mounted arm, means for reciprocating said arm, a stop or roller, a spring pressing the arm against the roller, a movable member for bending the ribbon, and means for reciprocating said member.

11. In a crimping-machine, the combination of two arms having overlapping fingers, pivoted levers connected to said arms for reciprocating the same, cams for intermittently and alternately operating said levers, a movable member for bending the ribbon, and means for reciprocating said member.

12. In a crimping-machine, the combination with means having an intermittent movement for holding the ribbon, of a pivoted arm or lever for bending the ribbon and having a substantially elliptical-shaped opening therein, and a revolving disk having a pin projecting into said opening for oscillating said lever.

13. In a crimping-machine, the combination of a top plate, two reciprocating arms having overlapping fingers, a movable member with means for reciprocating the same, two blocks secured to the top plate and spaced apart, and a removable bridge-plate extending over the space between the blocks.

14. In a crimping-machine, the combination of two arms for holding the ribbon, slides on which said arms are mounted, levers pivotally connected to said slides for reciprocating the same, cams for alternately operating said levers, a movable member for bending the ribbon, and means for reciprocating said member.

15. In a crimping-machine, the combination of a pivotally-mounted arm having an inclined face or cut-away portion on one side, a stop or roller engaging this side of the arm, a spring for forcing the arm against the roller, a movable member for bending the ribbon, and means for reciprocating said member.

In testimony whereof we have hereunto set our hands.

FRANK C. NEWELL.  
ALEXANDER ENGLAND.

Witnesses:

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JAS. B. MACDONALD.