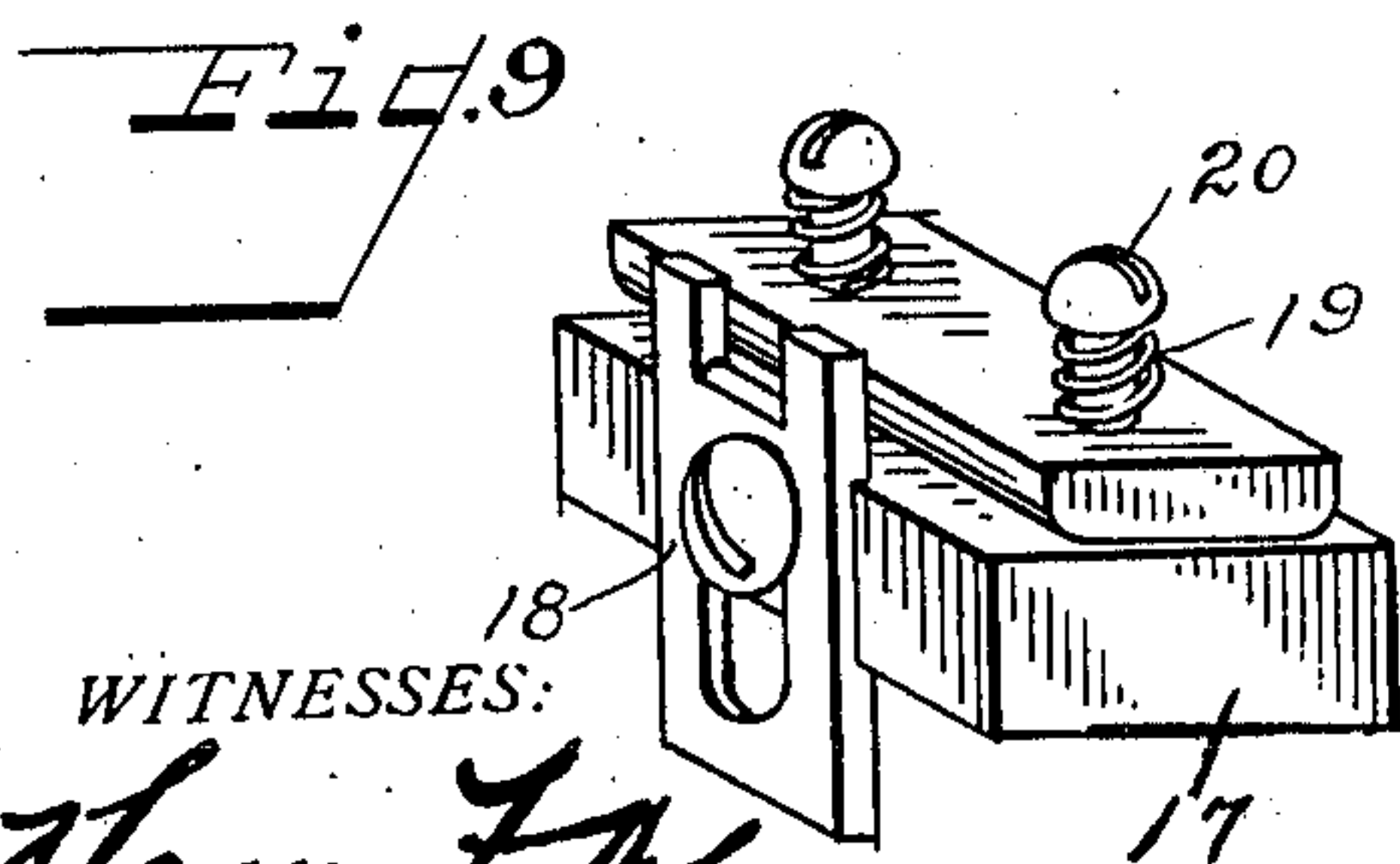
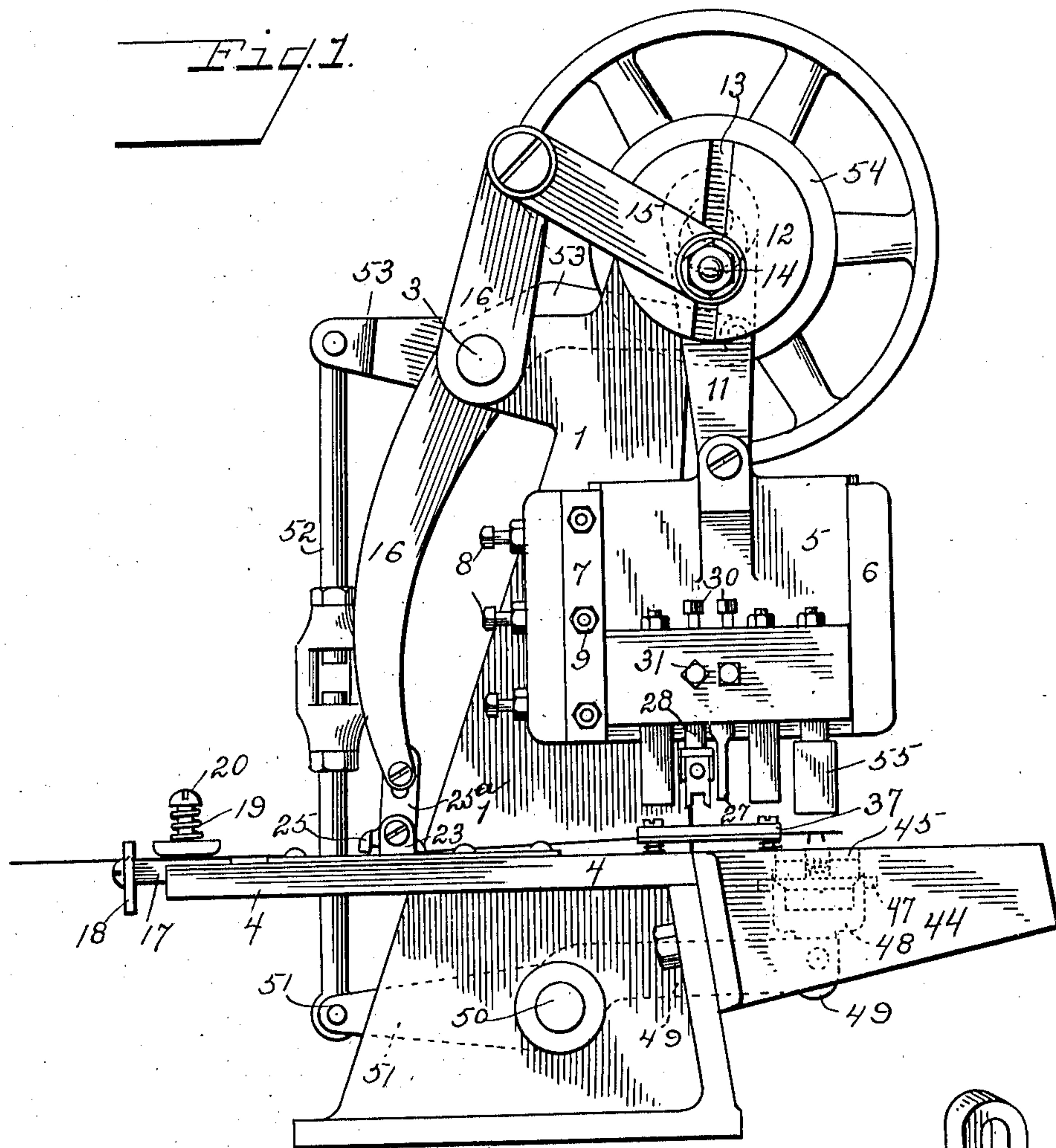
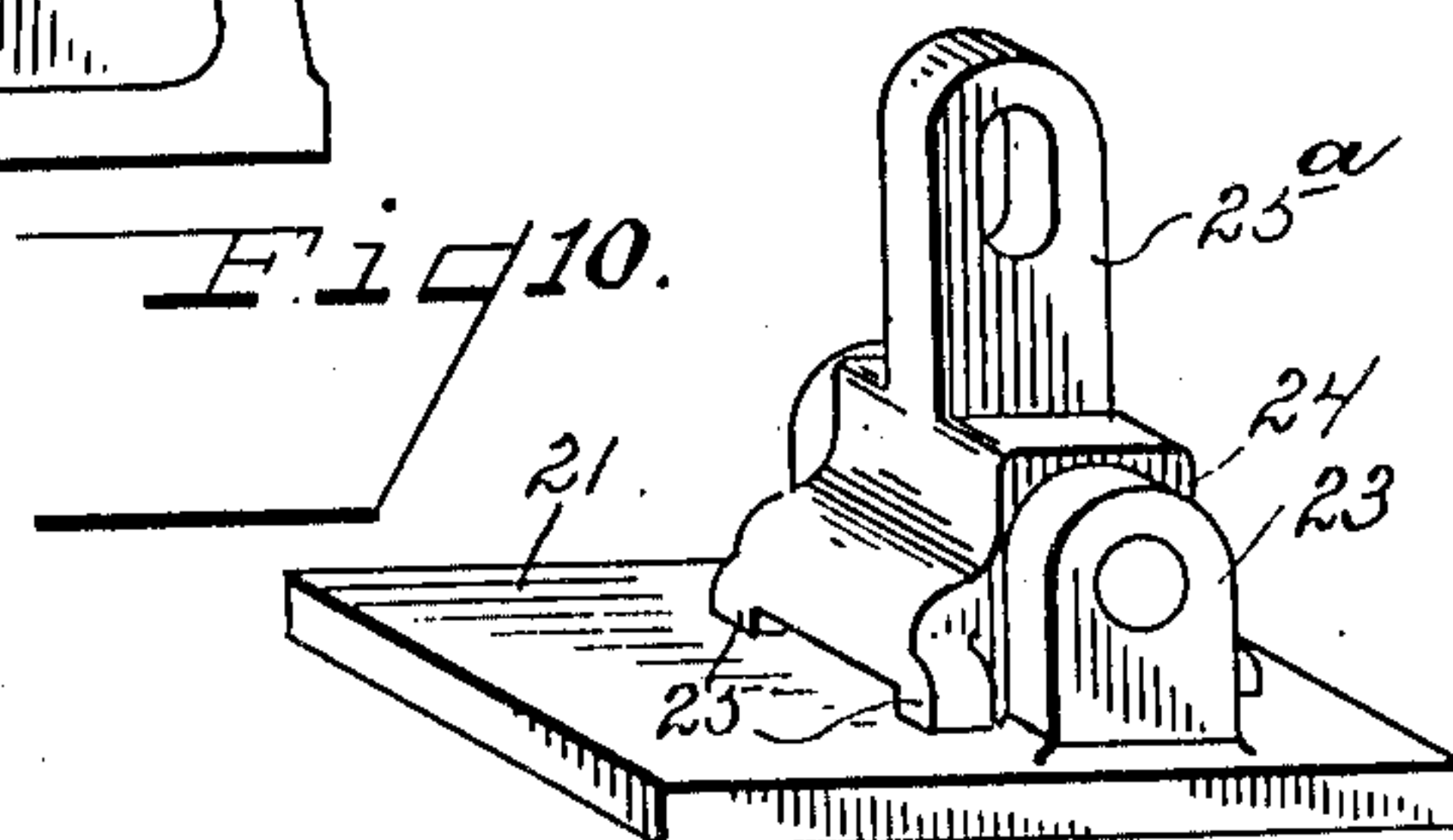


C. D. GRIMES, DEC'D.
 H. E. DILL, ADMINISTRATOR.
 MACHINE FOR FORMING AND ATTACHING FASTENERS TO PAPER RECEPTACLES.
 APPLICATION FILED JULY 18, 1907. Patented Sept. 13, 1910.
 970,314. 3 SHEETS—SHEET 1.



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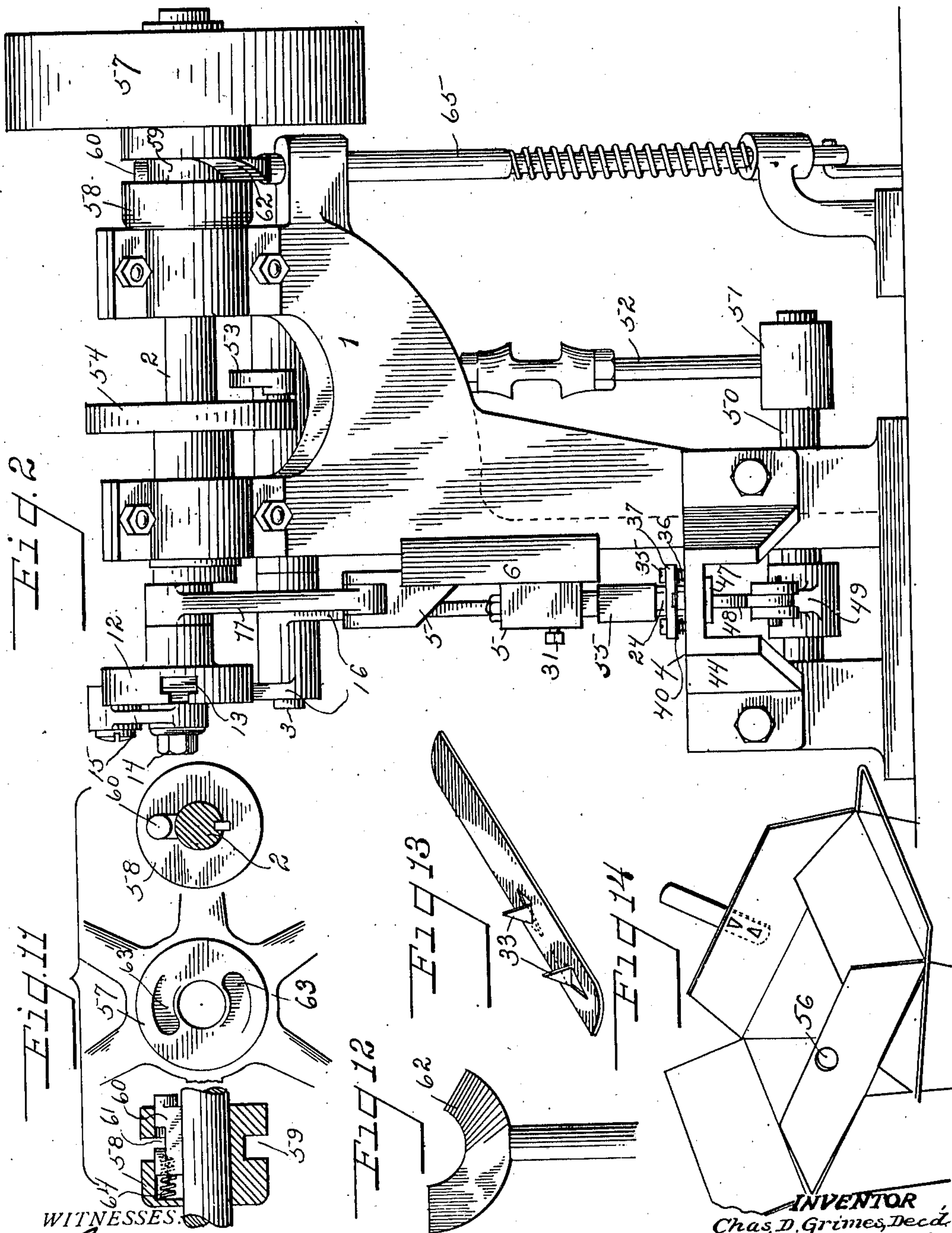
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3 SHEETS—SHEET 2.

970,314.



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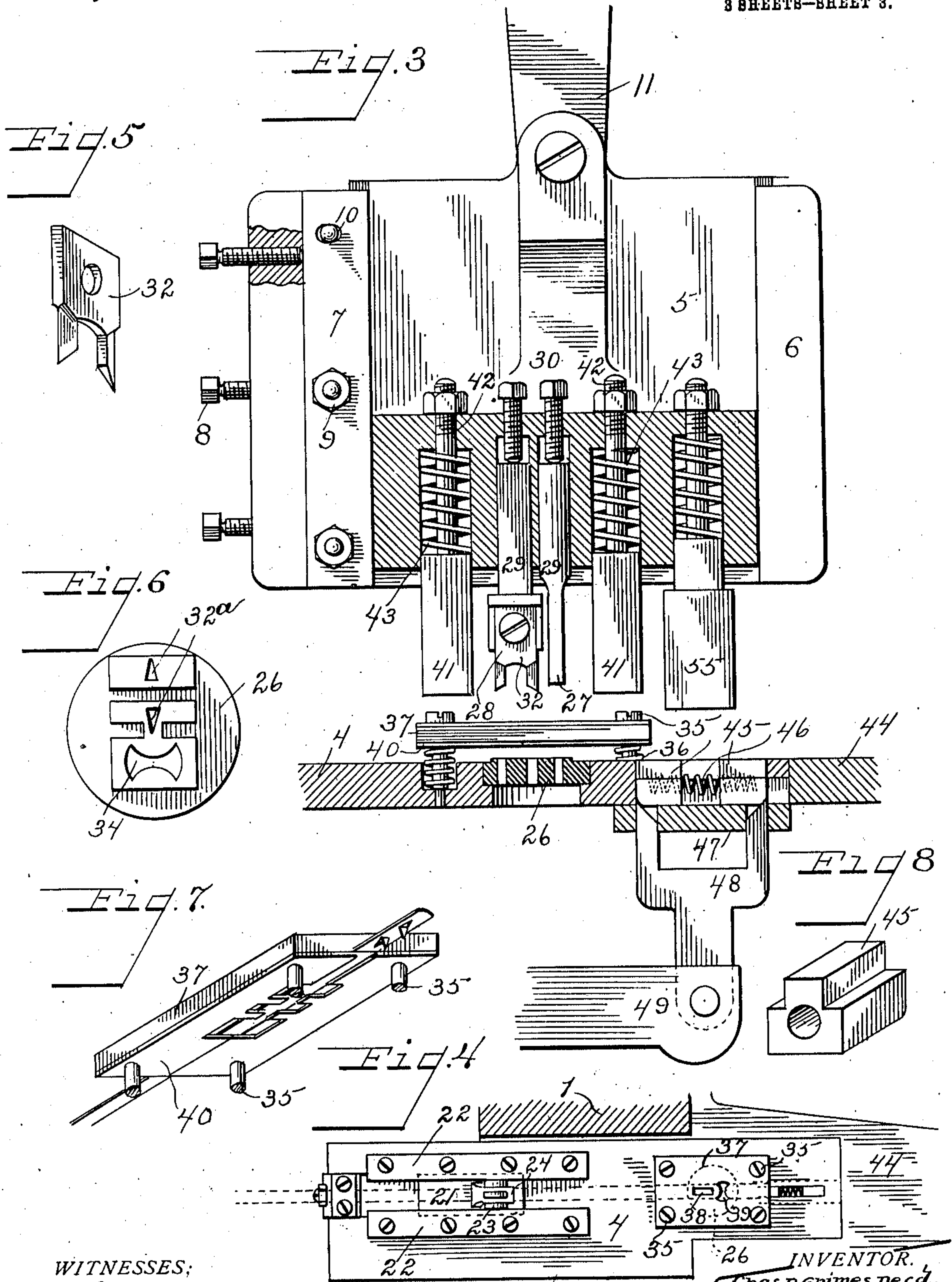
MACHINE FOR FORMING AND ATTACHING FASTENERS TO PAPER RECEPTACLES.

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Patented Sept. 13, 1910.

3 SHEETS—SHEET 3.

970,314.



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UNITED STATES PATENT OFFICE.

HARRY E. DILL, OF DAYTON, OHIO, ADMINISTRATOR OF CHARLES D. GRIMES,
DECEASED, ASSIGNOR TO MARY B. GRIMES, OF DAYTON, OHIO.

MACHINE FOR FORMING AND ATTACHING FASTENERS TO PAPER RECEPTACLES.

970,314.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed July 18, 1907. Serial No. 384,408.

To all whom it may concern:

Be it known that CHARLES D. GRIMES, deceased, late a citizen of the United States, and resident of Dayton, in the county of Montgomery and State of Ohio, did invent certain new and useful Improvements in Machines for Forming and Attaching Fasteners to Paper Receptacles, of which the following is a specification.

The invention relates to punch presses and particularly to such machines especially adapted for forming and securing metallic fasteners to paper boxes and similar purposes.

The object of the invention is to simplify the structure as well as the means and mode of operation of such devices whereby they not only will be cheapened in construction, but are rendered more efficient and positive in operation and unlikely to get out of repair.

A further object is to provide a machine which will be rapid and automatic in operation, adapted to sever from a supply strip, a piece of material of proper shape, form tines thereon, thrust said tines through the sides of the box or bucket and clench the same as is hereinafter described.

With the above primary and other incidental objects in view, as will appear from the specification, the invention consists of the means, mechanism, construction and mode of operation or their equivalents hereinafter described and set forth in the claims.

In the drawings, Figure 1 is a side elevation of the assembled machine. Fig. 2 is a front elevation from the right in Fig. 1. Fig. 3 is a detail sectional view of the reciprocating head showing the various punches and plungers, and the clenching mechanism. Fig. 4 is a plan view of the table of the machine. Figs. 5—6—7 and 8 are detail views of a punch, the die, the stripper, and one of the clincher slides respectively. Figs. 9 and 10 are perspective views of the material straightener and feed device respectively. Figs. 11 and 12 are detail views of the non-repeating clutch. Fig. 13 is a perspective view of one form of fastener formed by the machine, but the machine is not limited to this particular form of device. Fig. 14 shows a portion of a folded paper box with the fastener attached.

Like parts are indicated by similar char-

acters of reference throughout the several views.

Referring to the drawings, 1 is the main frame formed bifurcated and provided with bearings in the upper portion as best shown in Fig. 2 for the main shaft 2. Mounted in suitable brackets on the main frame is a counter shaft 3 which forms the fulcrum for certain levers hereinafter mentioned. The main frame is provided with a table 4 at one side thereof, over which the material is passed and on which the forming and securing operations are performed. Formed in the main frame above the table 4 are suitable ways, in which is mounted a reciprocating head 5 carrying various punches and plungers. The ways of the reciprocating head 5 comprise one stationary gib 6 formed integral with the frame and an adjustable gib 7, which may be adjusted to take up wear by a series of adjusting screws 8, and is secured in place by lock nuts 9. The stud holes in the gib 7 are oblong as at 10 to permit the said adjustment.

The main shaft 1 is formed at one end into a crank or wrist pin to which the reciprocating head 5 is connected by a pitman 11. The head 5 is thus given a vertical movement by the rotation of the shaft 1. Also secured on the crank of the main shaft 1 is head 12 having therein an undercut slot 13 within which is engaged the head of a bolt 14 forming the pivotal connection of a link 15 attached at its opposite end to the feed lever 16 which is pivoted at the counter shaft 3. The bolt 14 is adjustable within the slot 13, thereby providing for adjustment of the stroke of the feed lever 16. At its lower end the feed lever engages and actuates a feed device for the strip of tin or other material which is passed to the machine from a suitable supply reel. The material in entering the machine first passes through a straightening device, best shown in Figs. 1 and 9. The straightener consists of a stationary block 17 secured to the rear end of the table 4 having secured thereto an adjustable gage plate 18 having a recess in the upper end through which the material passes. A spring pressed presser block surmounts the block 17 and is forced downward on the material by springs 19 located about studs 20 on which the presser block is adapted to slide. The gage plate 18 is preferably ad-

justed slightly above the block 17 as indicated in Fig. 1. By this device all kinks and bends or indentations are removed from the strip. The material next passes to the feeding device shown in Figs. 1 and 10 which consists of a reciprocating member 21, slidably mounted in gibs 22 near the rear of the table 4. The member 21 is provided with lugs 23 to which is pivoted a gripper jaw 24 provided with the upward extending arm 25^a having a slotted connection with the lower end of the feed lever 16. The construction is such that the initial forward movement of the lower end of the feed lever, due to the eccentric connection of the link 15 with the main shaft 1, causes the gripper jaw 24 to move on its pivotal connection with the lugs 23 and the strip of material which passes below the jaw and between the lugs 23 will be impinged between the forward lower edge of the jaw 24 and the upper surface of the member 21. Additional movement of the feed lever causes a corresponding forward movement of the feed slide 21, drawing the metal strips from the reel, and advancing the forward end over the die 26 located in the forward part of the table 4.

Upon the return movement of the feed lever and slide the strip will be released by the jaw 24 and the slide 21 will return independent of the material. To prevent the engagement of the jaw 24 with the material on the return stroke, the jaw is provided with downward projecting lugs 25 adjacent to its rear edge which limit the rearward movement of the jaw by engaging the slide on opposite sides of the strip.

By the action of the feeding device the forward end of the strip of material is advanced over the die block 26 located in the table 4. The punches corresponding to the die block 26 are two in number, and are carried by the reciprocating head 5. They are the cutting off punch 27 and the perforating punch 28, by which the securing tines are formed. Each of the punches are provided with shanks 29 which extend into suitable openings in the head 5 and are adjusted by adjusting screws 30 bearing on the ends of the shanks, and are secured by set screws 31.

The perforating punch is preferably formed with a removable bit 32 (see Fig. 5) to facilitate sharpening and renewal of the punch. This punch is bifurcated having triangular legs, the lower ends being inclined inward. The perforations formed being in shape of two isosceles triangles arranged base to base as shown by the orifices 32^a in the die block 26 with which the punch coöperates. The two outer faces of the respective legs of the punch form the cutting edges while the inner or adjacent sides have a bending effect on the triangular

flaps bending them perpendicular to the plane of the strip to form the tines as at 33, Fig. 13.

The cutting off punch 27 is preferably double convex in cross section as shown by the orifice 34 in the die block 26. By this form both ends of the finished fastener are rounded as shown; however, any other shape punch may be used giving to the fastener one round and one square end, or two square ends or those of the other shapes as may be desired.

The punches operate simultaneously to cut off the end of the strip which has been previously perforated, and to perforate the end of the strip for the next fastener.

Spring pressed upward on four studs 35 by springs 36 and extending over the die 26 is a stripper plate 37 having openings 38—39 therein through which the respective punches pass and a shallow groove in the under side for the strip of material. A second plate 40 is similarly mounted below the plate 37 and extends under the strip of stock material to raise it with the stripper. The plate 40 is cut away to permit the passage of the tines 33 after being formed and so as not to interfere with the die block 26. The construction of the stripper is best shown in Fig. 7.

Mounted in the head 5 on either side of the punches 27—28 are spring pressed vertically movable plungers 41 having reduced shanks 42 which extend through chambers within the head 5 and are provided with springs 43. Upon the initial downward movement of the head 5 the plungers 41 engage the stripper plate 37 and force it down against the compression of its elevating springs. Upon further movement of the head the plungers 41 are depressed within the head and the punches 27—28 pass through the openings in the stripper plate and coöperate with the die block 26 to sever the finished fastener and form the tines on the next succeeding device. On the upward movement of the parts the punches will be withdrawn from the work and the upward movement of the stripper will be limited by the heads of the studs 35.

Secured to the forward end of the table 4 is a cone 44, shaped to fit the box or bucket to which the fastener is to be attached. The machine is preferably equipped with a series of such interchangeable cones of different sizes.

Located forward of the die block 26 in the table 4 is the clenching mechanism comprising two sliding clencher blocks 45 normally spring pressed apart by an intermediate spring 46. The clencher blocks 45 are formed as in Fig. 8 to fit a rabbeted slot in the table 4 within which they slide. They are retained within the slot by a plate 47 secured to the under side of the table which

further forms a guide for the bifurcated member 48 by which the blocks 45 are caused to approach each other. The upper ends of the member 48 are inclined as best shown in Fig. 3 forming cam faces which engage the respective blocks 45 as indicated. The member 48 is actuated by a rock arm 49 on a counter shaft 50 in the base of the machine. There is also on said counter shaft 50 a rearward extending rock lever 51 connected by a link 52 with a lever 53 pivoted on the counter shaft 3. The lever 53 at its forward end engages a suitable cam 54 on the main shaft 1. Thus upon rotation of the main shaft 1, the cam 54 will operate the lever 53 to rock the counter shaft 50 through the link 52 and rock arm 51. The rock arm 49 being secured on the shaft 50 will be elevated and so move the member 48 upward through the plate 47; the inclined inner faces of the member engaging and forcing together the clencher blocks 45.

In practice the receptacle is placed on the cone 44 with the portion to which the fastener is to be attached over the clencher blocks 45.

Upon operation of the machine the end of the stock material having the tines formed thereon as before described is advanced until the tines 33 are over the space intermediate the blocks 45. Located in the head 5 immediately over the clencher mechanism is a vertically movable spring pressed plunger 55 which as the head 5 moves downward in performance of the operations before described, bears on the fastener about to be cut from the strip and forces the tines 33 through the side of the receptacle and into the space between the blocks 45. The member 48 then acts to operate the blocks 45 thereby bending the tines 33 to parallelism as indicated in Fig. 14 and by dotted lines, Fig. 13 which completes the operation. The fastener is adapted to the thrust through a suitable opening 56 in the opposite lid of the receptacle and bent to secure the parts in closed position.

Inasmuch as the complete cycle of operations is performed during each revolution of the main shaft, a non-repeating clutch is provided. The drive pulley 57 is loose upon the main shaft. Secured to the main shaft adjacent thereto is a clutch body 58 having an annular groove 59. A spring pressed plunger or bolt 60 is located within the body 58 and intersecting the groove 59. The plunger 60 is provided with an inclined notch 61 with which engages, as the body rotates the inclined head 62 of a vertically movable spring pressed plunger 65 which extends within the groove 59. The plunger 60 normally extends beyond the body 58 and engages an inclined depression 63 in the hub of the pulley 57. As the body in rotating reaches the inclined head 62 the advance

edge of said head engages the notch 61 in the bolt and withdraws the bolt from engagement with the pulley against the tension of the spring 64. The lower end of the spring pressed plunger 63 is connected to a foot treadle of ordinary type, not shown in the drawing. Upon operation of said treadle the head 62 is withdrawn from engagement with the bolt 60 and permits the bolt to spring outward into engagement with the pulley 57 until the end of the next revolution, when it is again engaged and withdrawn by the inclined head 62.

It will be seen that there is thus provided a machine possessing the particular features of advantage before enumerated as desirable, and which obviously is susceptible of modification in its form, proportion, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

The invention having been thus described, it is claimed:—

1. In a machine as described, feeding devices for intermittently advancing the metal strip, a reciprocating head, forming, driving, and severing devices carried by said head, and adapted at each downward movement of said head to form projecting tines on the advance end of the metal strip, to drive through the work the tines formed at the previous operation thereby attaching the metal strip, and to sever a predetermined length of the metal strip, and clenching mechanism operating prior to the severing operation, substantially as specified.

2. In a machine as described, feeding devices for the stock supply, a reciprocating head, yielding holding plungers carried by said head, a tine forming punch, a severing device and a driving punch also carried by said head, said parts being so arranged that the holding plungers will first engage the work, the driving punch will then engage the metal strip and force the tines formed by the previous operation through the work which will be followed by the tine forming punch, forming additional tines in the strip to be engaged by the next operation, the severing device subsequently severing the attached portion of the strip from the stock supply, and clenching devices cooperating with the driving device, substantially as specified.

3. In a machine as described, feeding devices adapted to feed a straight flat ribbon of metal, a reciprocating head, punching devices carried on said head adapted to punch from said strip triangular flaps located in pairs, and oppositely disposed, and to bend said triangular flaps perpendicular to the plane of the metal ribbon to form projecting tines, severing and driving devices also carried by said reciprocating head, clenching mechanism cooperating with the

driving mechanism, the driving and clenching mechanism being adapted to operate prior to the severing of the punched portions of the metal ribbon, substantially as specified.

4. In a machine as described, a main frame, a reciprocating head carried thereon, punches carried on said head, a die block with which said punches cooperate, a depressible stripper plate intermediate said head and the material operated upon, spring pressed depressible plungers carried by said head and adapted upon the initial movement of said head to engage and depress said stripper plate, and upon further movement of said head to telescope therein, and means for passing a stock supply over said block, and means for attaching the fastener to the desired article substantially as specified.

5. In a machine as described, a main frame, driving mechanism, a reciprocating head, a forming punch and a severing device fixedly secured in said head, two spring pressed yielding plungers carried by said head and located on opposite sides of the punching and severing devices, and a spring pressed yielding driving plunger also carried by said head, means for feeding a strip of metal, and clenching mechanism cooperating with the driving mechanism, substantially as specified.

6. In a machine as described, a main frame, driving mechanism, feeding mechanism for the metal strip, punching, severing and driving devices, a spring pressed depressible member through which the metal strip passes beneath the punching and severing devices, said members inclosing the metal strip by extending both above and below the strip means for depressing the member at each operation, and springs to elevate the member after each operation, substantially as specified.

7. In a device as described the combination with punching and severing mechanism of a feed device comprising a reciprocating base member, a gripper jaw pivoted thereto, the rear of said jaw being bifurcated thereby forming projections on the rear of said jaw engaging the base member on opposite sides of the material operated on limiting the reverse oscillation of the jaw and preventing the engagement of the jaw with the material on the return stroke of the feed device and actuating mechanism for said feed device, and means for attaching the fastener to the desired article substantially as specified.

8. In a machine as described, the combination with feeding mechanism, tine forming

mechanism and severing devices, of a support for the article, a driver to force the tines through the side of the article, reciprocating clencher blocks between which the tines project when so driven, a spring normally holding said blocks separated, a bifurcated member having internal inclined faces engaging the blocks, and means to elevate the bifurcated member to cause said blocks to approach each other, substantially as specified.

9. In a machine as described, the combination with feeding mechanism, tine forming mechanism and severing devices, of a support for the article, a driver to force the tines through the side of the article, reciprocating clencher blocks between which the tines project when so driven, a spring yieldingly holding said blocks apart, cams engaging the exterior faces of said blocks and means to operate said cams to cause the blocks to approach each other, substantially as specified.

10. In a machine as described, the combination with feeding mechanism, tine forming mechanism and severing devices, of a support for the article, a driver to force the tines through the side of the article, reciprocating clencher blocks between which the tines project when so driven, a spring yieldingly holding said blocks separated, a bifurcated member having cam shaped adjacent faces engaging said blocks, a rock shaft, a rock arm thereon supporting said bifurcated member, a cam and connections therefrom to said rock shaft adapted to give said rock shaft an oscillatory movement, substantially as specified.

11. In a machine as described, means for feeding a continuous strip of metallic stock, means for forming tines on said stock by cutting triangular flaps therein and bending said flaps at right angles to the plane of the strip said flaps being arranged in pairs and oppositely disposed, means for driving said tines through the sides of a receptacle positioned to receive them, and means for bending the tines to parallelism and means to sever a predetermined length of stock after same has been attached to the receptacle, substantially as specified.

In testimony whereof, I have hereunto set my hand this 10th day of July 1907.

HARRY E. DILL,
Administrator of the estate of Chas. D. Grimes, deceased.

Witnesses:

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