

(No Model.)

3 Sheets—Sheet 1.

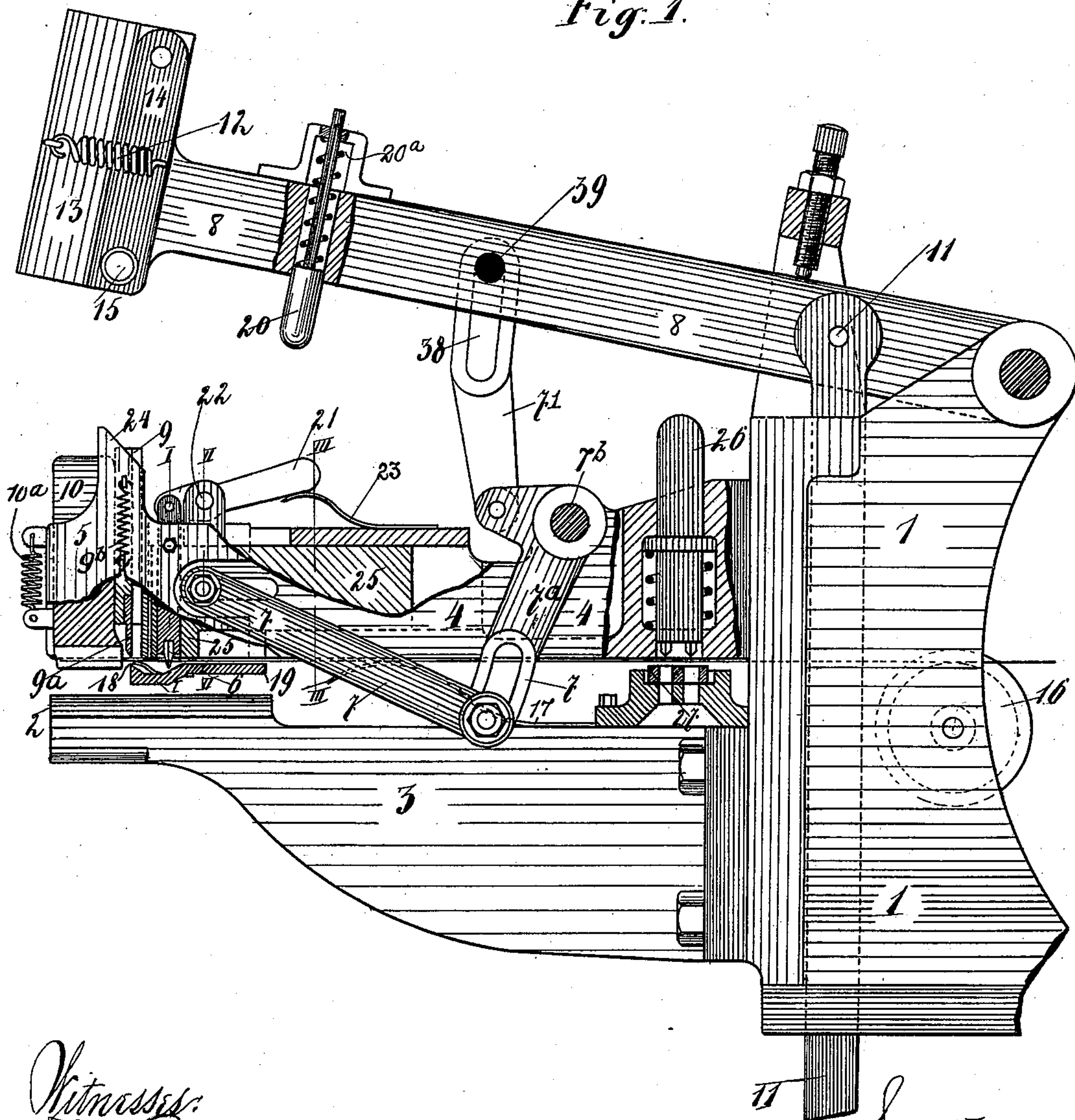
L. NICOLAI.

MACHINE FOR PUNCHING OR CLAMPING AND CUTTING METAL SHEETS.

No. 541,669.

Patented June 25, 1895.

Fig. 1.



Witnesses:
J. E. Porter
J. Henderson

Inventor:
Ludwig Nicolai
By his Attorney,
J. M. Pelle.

(No Model.)

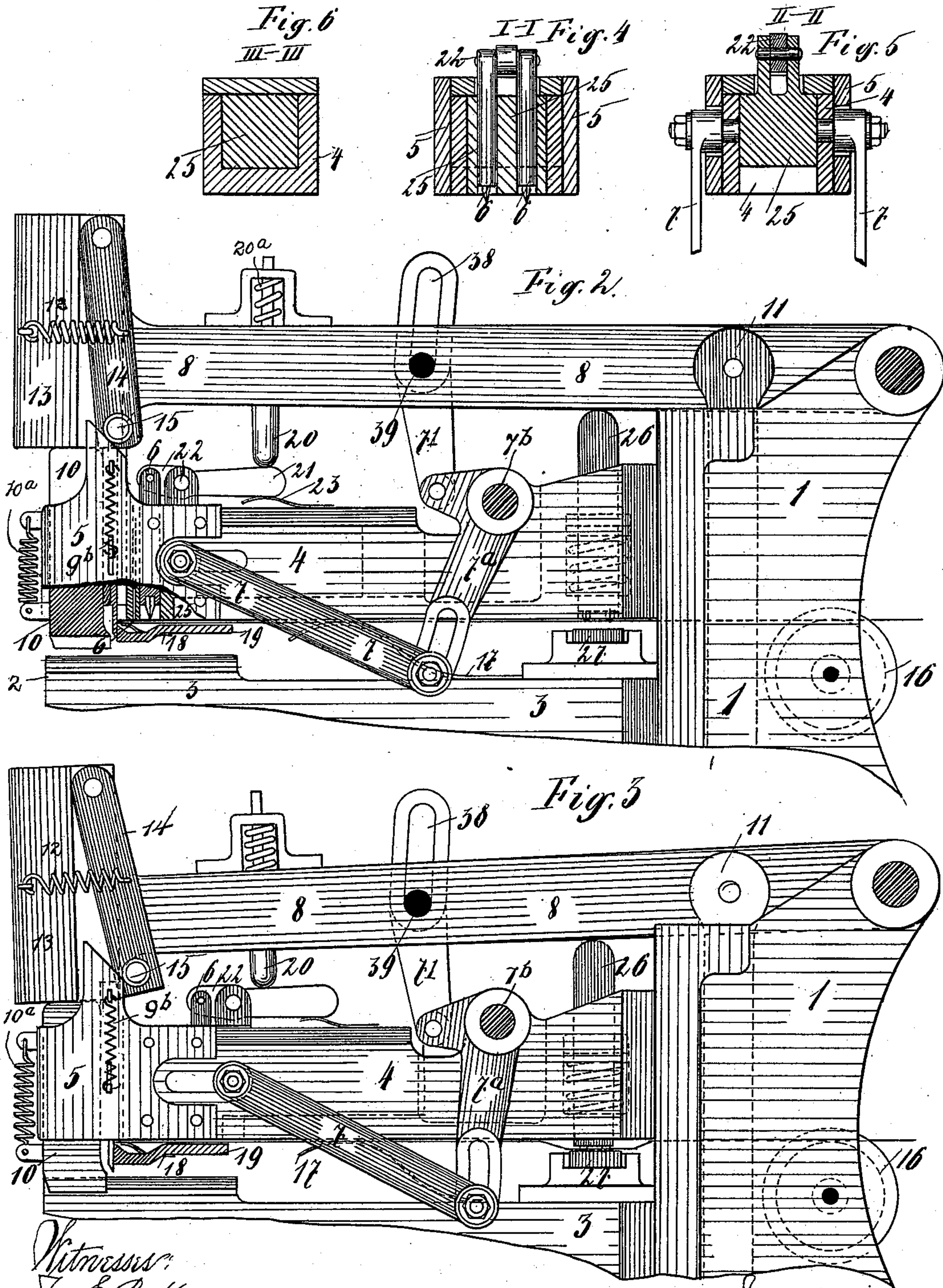
3 Sheets—Sheet 2.

L. NICOLAI.

MACHINE FOR PUNCHING OR CLAMPING AND CUTTING METAL SHEETS.

No. 541,669.

Patented June 25, 1895.



Witnesses:
J. C. Parker
J. Henderson.

Inventor:
Ludwig Nicolai
by J. M. Pettit, Attorney

(No Model.)

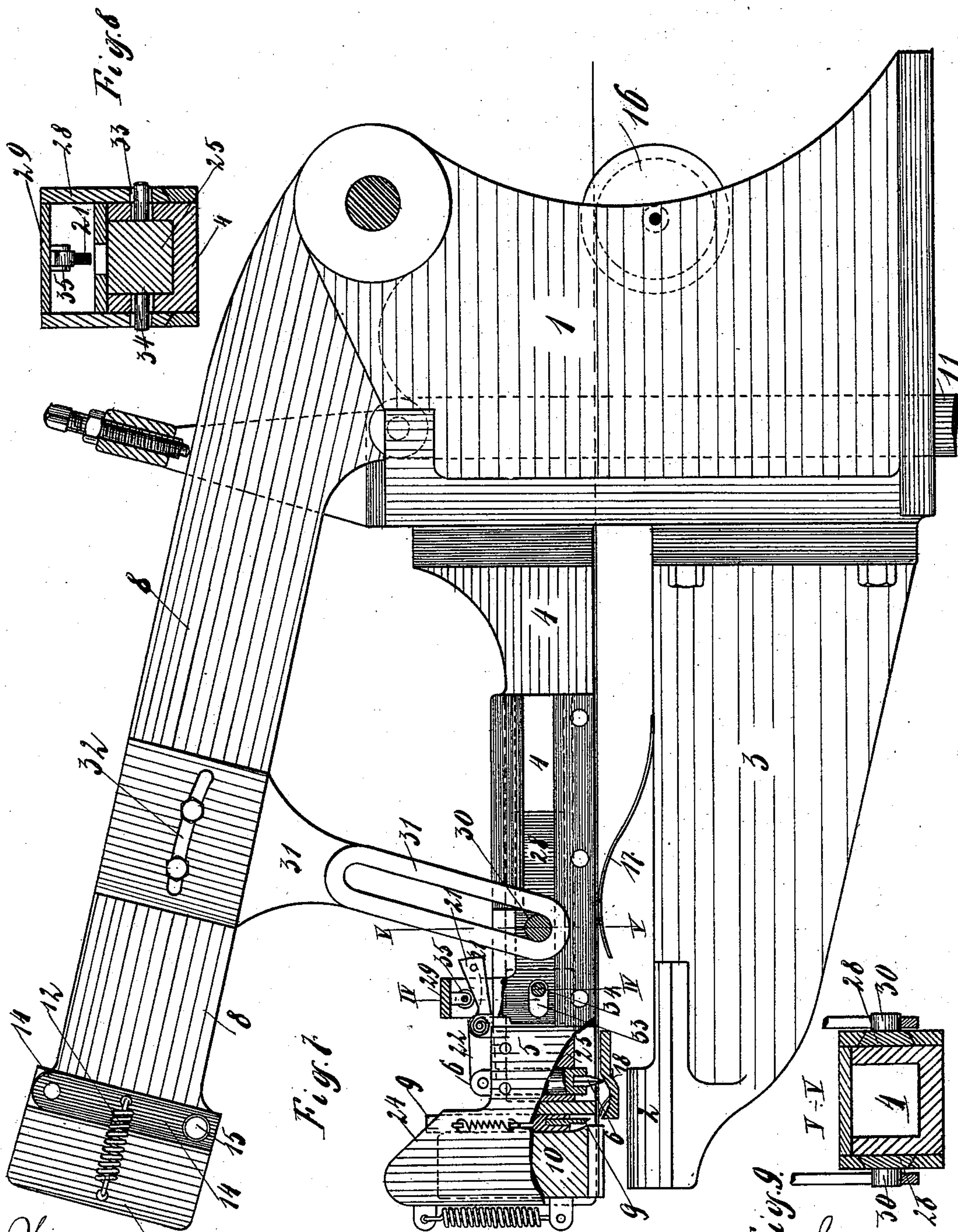
3 Sheets—Sheet 3.

L. NICOLAI.

MACHINE FOR PUNCHING OR CLAMPING AND CUTTING METAL SHEETS.

No. 541,669.

Patented June 25, 1895.



Witnesses:
J. E. Porter
J. Henderson

Fig. 2
Inventor:
Ludwig Nicolai.
By his Attorney,
James P. ...

UNITED STATES PATENT OFFICE.

LUDWIG NICOLAI, OF DRESDEN, GERMANY.

MACHINE FOR PUNCHING OR CLAMPING AND CUTTING METAL SHEETS.

SPECIFICATION forming part of Letters Patent No. 541,669, dated June 25, 1895.

Application filed August 30, 1894. Serial No. 521,717. (No model.) Patented in Germany April 12, 1894, No. 79,022; in England April 17, 1894, No. 7,608; in Belgium April 20, 1894, No. 109,552, and June 14, 1894, No. 110,466; in Austria April 27, 1894, No. 44/1,232; in France July 6, 1894, No. 237,880, and in Hungary September 29, 1894, No. 1,295.

To all whom it may concern:

Be it known that I, LUDWIG NICOLAI, a subject of the King of Saxony, residing at Dresden, Saxony, in the Empire of Germany, have invented certain Improvements in Machines for Punching or Clamping and Cutting Metal Sheets, (for which I have obtained Letters Patent as follows: in Germany, No. 79,022, dated April 12, 1894; in Austria, No. 44/1,232, dated April 27, 1894; in Hungary, No. 1,295, dated September 29, 1894; in France, No. 237,880, dated July 6, 1894; in Belgium, No. 109,552, dated April 20, 1894, and No. 110,466, dated June 14, 1894, and in Great Britain, No. 7,608, dated April 17, 1894,) of which the following is a full, clear, and exact description.

The object of my invention is to provide a machine for attaching or mounting metallic strips on cardboard, leather and similar material, the machine being more especially adapted for the securing of metallic corner pieces or guards to the corners or meeting edges of pasteboard boxes, but it is also applicable for the uniting of flat strips or bands, such as leather belting, &c., or for the ornamentation of surfaces of various kinds, as more fully set forth hereinafter.

In the present machine a continuous metallic strip is automatically fed in predetermined lengths to a cutting knife and after being severed is subjected to action of a plunger or die which forces the strip down into contact with the surface or surfaces of the material to which it is to be applied.

In the accompanying drawings, Figure 1 is a side elevation of the machine showing the parts at rest, a portion of the frame-work being broken away to more clearly illustrate details of construction. Fig. 2 is a similar view illustrating the position the various parts assume immediately after the starting of the operation of the machine. Fig. 3 is a similar view showing the machine when the actuated parts have completed their functions. Fig. 4 is a transverse sectional elevation on the line I I, Fig. 1. Fig. 5 is a transverse sectional elevation on the line II II, Fig. 1. Fig. 6 is a similar view on the line III III, Fig. 1. Fig. 7 is a side elevation, partly in section, illustrating a modified construc-

tion of the machine. Fig. 8 is a transverse sectional elevation, on the line IV IV, Fig. 7; and Fig. 9 is a similar view on the line V V, Fig. 7.

On the standard or main frame 1 of the machine is secured a horizontally extending arm 3 carrying at its outer end an anvil, 2, the surface of which is either flat or angular in accordance with the character of the work which the machine is to operate upon, a flat anvil surface being employed where the meeting edges of two flat strips or two or more superposed strips are to be united, and an angular anvil being employed where the meeting edges of a box are to be united, or any other convenient form of anvil may be employed for other kinds of work where the anvil is merely used as a lower die for the bending of the strip into any suitable form which may be desired.

Secured to the standard or frame 1, immediately above the anvil arm, 3, is a guide arm, 4, preferably in the form of a channel bar for the reception and guidance of a block, 25, which is adapted to slide to and fro within the guide arm to accomplish the feeding of the metallic strip being operated upon, as more fully described hereinafter. On the extreme outer end of the guide arm, 4, is a head 5, provided with vertical guideways for the reception of a block 9, carrying at its lower end a knife, 9^a, and with additional guides for a plunger or punch, 10, the latter being normally held in its highest position within the guiding head by a coiled tension spring, 10^a, extending from a fixed point on the head to a lug projecting from the plunger or punch, while the knife block, 9, may be similarly held by a spring, 9^b.

The guided block, 25, is provided with pins or trunnions, 25^a which project through horizontally arranged slots on either side of the guide arm, 4, these pins or trunnions being connected by bars 7, to a bell crank lever 7^a, fulcrumed at 7^b, to the upper portion of the guide arm, 4, the connection between the bars, 7, and the lever, 7^a, being slotted so that the same extent of movement of the lever, 7^a, will give to the block, 25, an extent of movement dependent upon the point of connection be-

tween the bars 7 and the lever 7^a. The smaller arm of the lever, 7^a, is connected to a bar, 71, the upper portion of which is provided with a slot 38, in which travels a pin, 39, projecting from a hammer arm, 8, fulcrumed at its rear end to the frame of the machine. The hammer arm, 8, is oscillated on its pivot by a vertical bar, 11, extending to a pedal or other operating device and as it moves, the pin, 39, will, near the opposite extremes of movement come into contact with the opposite ends of the slot, 38, in the arm, 71, and cause, through the lever, 7^a, and the bars, 7, a horizontal reciprocating movement of the block, 25, the block for the most part however, being stationary owing to the lost motion occasioned by the length of the slot, 38, in which the pin, 39, travels.

In the forward end of the block, 25, are two vertically guided pins or gripping jaws 6, connected at their upper ends to a lever 21, fulcrumed at 22, to lugs projecting from the upper portion of the guide block, 25, the rear end of the lever being operated upon by a plate spring, 23, which normally tends to depress and keep the pins or jaws, 6, in the lowest position.

The hammer arm, 8, is provided at its forward end with a hammer head comprising two parts held together by a coiled tension spring, 12, the part, 13, being formed integral with the hammer arm and being adapted to strike upon the upper end of the plunger or punch, 10, and the part, 14, being pivoted to the part, 13, and adapted to come into contact with the knife carrying block, 9. On the lower portion of the pivoted hammer, 14, is a roller, 15, adapted to come into contact with a cam-shaped projection 24, on the upper portion of the head, 5, the cam acting to force the hammer, 14, out of contact with the block, 9, after it has depressed the latter for a distance sufficient to effect the severing of the strip so that while the two hammers, 13 and 14 will practically travel the same distance, the hammer, 14, will only travel the knife block for a comparatively short distance, while the hammer, 13, is forcing the plunger, 10, into contact with the material on the anvil, 2.

At a short distance to the rear of the hammers, 13 and 14 the hammer arm, 8, is provided with a vertically guided pin, 20, adapted to come into contact with the rear portion of the lever 21, and to hold the pins or jaws, 6, in their highest position during the rearward movement of the block, 25, which occurs when the hammer arm, 8, is being depressed and the pin, 20, is in contact with the lever, 21, the lever being of sufficient length to accommodate the travel of the block, 25, while still keeping in contact with the pin, 20. The pin, 20, is provided with a compression spring 20^a, which will yield to a sufficient extent to permit further downward movement of the lever or arm, 8, after the pin has been moved into contact with the lever, 21, as shown in Figs. 2 and 3.

Immediately below the forward end of the guide arm, 4, is a table, 19, the extreme forward edge of which forms a cutting blade, which in connection with the knife, 9^a, serves to sever the strip, while to the rear of the cutting edge the upper surface of the table is slightly depressed so that the pins or jaws, 6, may engage more firmly with the strip during the cutting operation.

The strip to be operated upon is directed over a guide roller, 16, and pressed against the under side of the guide arm, 4, by plate springs 17 and 18 and is fed over the table, 19, where it is gripped by the pointed pins, 6, which either engage holes or depressions already provided in the strip or grip the strip in any suitable manner.

For convenience in operation orifices for the engagement of the pins may be provided in the strip by a die, 26, guided in the rear portion of the arm, 4, and adapted to be operated upon by the hammer arm, 8, the die, 26, coacting with a female die 27, secured to the anvil arm, 3, or this die may be employed for the purpose of providing burrs or projections on the edges of the strip as a means of connecting or securing the strip to the pasteboard or other material.

In operation, considering the parts to be in the position illustrated in Fig. 1, with the pins, 6, in engagement with the strip and a predetermined length of strip projecting beyond the forward edge of the table, 19, and under the plunger or punch, 10, the descent of the hammer arm, 8, to the position shown in Fig. 2 will first cause the engagement of the hammer, 14, with the upper portion of the block, 9, forcing the knife, 9^a, down past the edge of the table, 19, and severing that portion of the strip projecting beyond the edge of the table. The further movement of the hammer arm will cause the engagement of the roller, 15, with the cam projection, 24, the spring, 12, yielding and permitting the hammer to swing on its pivot. The hammer, 14, is thrown to one side and the spring, 9^b, raises the knife carrying block, 9, to the normal position. During this movement the continued descent of the hammer arm, 8, has forced the hammer, 13, against the plunger or punch, 10, depressing the latter and forcing the severed strip down into engagement with the material on the anvil, 2. Immediately after the knife has severed the strip, the pin, 20, engages the lever, 21, as shown in Fig. 2, and the pins, 6, are raised out of engagement with the strip and the pin, 39, has reached the lower end of the slot, 38. The continued movement will then cause the depression of the bar, 71, and the consequent rearward movement of the block, 25, the pin, 6, being held in the elevated position during the entire movement of the block as shown in Fig. 3. Meantime the die, 26, has acted to indent or punch the strip and the final positions assumed by the parts is that shown in Fig. 3. The hammer arm is then elevated, the die, 26, rising, the pin, 20, moves out of contact with

the lever, 21, and the pins, 6, are forced by the spring, 23, into engagement with the strip and the parts then remain inactive until the pin, 39, reaches the upper end of the slot, 38, and causes the forward movement of the block, 25, and the feeding of the strip.

In the modified structure illustrated in Figs. 7, 8 and 9, the block, 25, is provided with pins, 34, which project through horizontally disposed slots, 33, in slides, 28, adapted to dovetailed or other guideways on the opposite sides of the arm, 4. The forward ends of the slides, 28, are connected by a bridge piece, 29, from which depend pivot lugs for a roller, 35 adapted to engage with and depress the rear end of the lever, 21, the latter in this case having its upper surface inclined so that the first effect of the rearward movement of the slides, 28, will be to depress the lever, 21, and raise the pins, 6, from engagement with the strip, this being finally effected by the time the forward end of a slot, 33, engages with the pin 34, on the block, 25, to effect the rearward movement of the block and carry the pins back for engagement with a fresh portion of the strip. On the opposite slides, 28, are pins, 30, which are engaged by slotted bars, 31, adjustably secured by a slotted connection, 32, to the hammer arm, 8.

Instead of using the particular feeding devices consisting of the pins herein described, other mechanisms, for instance, jaws or similar means may be employed to grip the metal strip from one or both sides or edges to effect the feeding of the strip in the manner described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of the reciprocated block, vertically operated strip engaging pins carried thereby, mechanism for raising and lowering said pins and causing their engagement with and disengagement from the strip being acted upon, a table having a cutting edge, a cutting knife adapted to co-act with the edge of the table to sever the strip into pre-determined lengths, an anvil, a plunger adapted to force the severed lengths of the strip into contact with such anvil and mechanism for operating the reciprocated block, the knife, and the plunger, substantially as specified.

2. The combination of the cutting knife, a reciprocated block, strip engaging and feeding devices carried by said block and acting to feed the strip to the cutting knife, a plunger adapted to act on the severed lengths of the strip and a two-part hammer provided above the cutting knife and plunger and adapted to operate upon said knife and plunger, substantially as specified.

3. The combination of the cutting knife, a reciprocated block, strip engaging and the feeding devices carried by said block and acting to feed the strip to the cutting knife, a

plunger situated in front of the cutting knife and adapted to act upon the severed lengths of the strip, a hammer, as 13, provided above the cutting knife and plunger and adapted to operate upon said plunger, a second hammer pivoted to the first and adapted to operate upon the knife, with mechanism for effecting the disengagement of the second hammer and the knife after a partial movement of the hammer, substantially as specified.

4. The combination of the cutting knife, a carrying block therefor, a reciprocated block, strip engaging and feeding devices carried by said block and acting to feed the strip to the cutting knife, a plunger adapted to act on the severed lengths of the strip, a two-part hammer provided above the knife and plunger and comprising portions 13 and 14, said portion, 13, being adapted to engage the plunger and said portion, 14, being adapted to engage the knife carrying block, with mechanism for diverting the portion, 14, from its normal path, substantially as specified.

5. The combination of the cutting knife, a carrying block therefor, a reciprocated block, strip engaging and feeding devices carried by said block and acting to feed the strip to the cutting knife, a plunger, a hammer, 13, provided above the plunger and adapted to depress said plunger, a hammer, 14, pivoted to the hammer, 13, and adapted to depress the knife block and a cam, 24, adapted to effect the disengagement of the said hammer, 14, and the knife block, substantially as specified.

6. The combination of the guiding arm, 4, secured to the frame of the machine, a reciprocating block, 25, guided in said arm, strip engaging and feeding devices carried by said block, a guiding head, 5, situated at the end of the arm, 4, a knife block and a plunger guided in said head, a knife carried by said knife block, a stationary cam, 24, secured to or formed integral with said head, 5, a two part hammer, 13, 14, provided above the knife block and plunger and adapted to act upon said knife block and plunger and a tension spring connecting the two parts of the hammer, substantially as specified.

7. The combination with the cutting knife and mechanism for reciprocating the same, of the reciprocated block, mechanism for moving said block toward and from the knife, strip feeding pins carried by said block and mechanism for raising and lowering said pins to effect the engagement of the pins with the strip after the completion of the rearward movement of the reciprocated block and for effecting the disengagement of the pins from the strip after the completion of the forward movement of said reciprocated block, substantially as specified.

8. The combination of the reciprocated block strip feeding pins guided therein, a lever pivoted to the upper portion of the block and carrying said pins and mechanism for oscillating said lever to effect the vertical

movement of said pins, substantially as specified.

9. The combination of the reciprocated block, guides therefor, strip feeding pins adapted to vertical guiding openings in said block a lever fulcrumed to the upper portion of the block and carrying said pins, a spring extending between the upper surface of the block and the opposite end of the lever and normally acting on said lever to effect the depression of the pins and a vertically movable operating pin provided above the lever and adapted to depress the same, substantially as specified.

10. The combination of the reciprocated block, strip feeding pins guided therein, a lever fulcrumed to the upper portion of the said block and carrying said pins, a spring normally acting on said lever to depress the pins, a vertically movable operating pin provided above the lever and adapted to act on said lever to hold the same depressed and the pins elevated during the rear travel of the block and a strip-supporting table over which the strip to be operated upon is guided, substantially as specified.

11. The combination of the reciprocated block, strip feeding pins guided therein, a lever fulcrumed to the upper portion of the block and carrying said pins, a spring carried by the block and normally acting on said lever to depress the pins, a vertically movable operating pin provided above the lever and adapted to hold the lever depressed and the pins elevated during the rear travel of the block, a strip holding table situated beneath the block and having a forward cutting edge and a cutting knife adapted to be moved past the edge of the table to effect the cutting of the strip, substantially as specified.

12. The combination of the frame, a guiding arm, 4, thereon, a reciprocated block guided in said arm, a table, 19, mounted below said guiding arm, springs 17, 18, adapted to hold the strip in contact with the lower face of the guiding arm, a cutting knife adapted to be moved past the edge of the table to sever the strip, feeding pins vertically guided in the reciprocating block and adapted to engage with and feed the strip to the cutting knife, with mechanism for elevating the pins and mech-

anism for reciprocating the block, substantially as specified.

13. The combination of the frame, a hammer arm pivoted thereto, a pin, as 20, carried by said hammer arm, a cutting knife guided in the frame below the hammer and adapted to be operated upon by said hammer, a reciprocated block also guided in said frame, vertically arranged feeding pins guided in said reciprocated block, a lever fulcrumed to the upper portion of the block and carrying said pins, said lever being adapted to be operated upon by the pin, 20, as the hammer arm descends, and a spring normally tending to raise said lever to effect the depression of the feeding pins, substantially as specified.

14. The combination of the frame, 1, an anvil, 2, guiding arm, 4, a block, 25, adapted to be reciprocated in said arm, a strip holding table, 19, having a forward cutting edge, a knife co-acting with said cutting edge, a vertically guided knife carrying block, 9, a vertically guided plunger or punch, 10, a cam, 24, on the frame, strip feeding pins vertically guided in said reciprocating block, a fulcrumed lever, 21, carrying said pins, a spring, 23, a hammer arm, 8, a pin, 20, carried thereby, hammers 13 and 14 on said hammer arm, a lever 7^a, connecting bars extending therefrom to the reciprocating block, a slotted lever, 71, connecting the lever, 7^a, to the hammer arm and pin, 39, on said hammer arm adapted to operate upon the slotted lever, substantially as specified.

15. The combination of the frame, a strip cutting knife guided therein, a hammer arm pivoted to said frame at a point above the knife, a hammer carried by said hammer arm and adapted to operate upon the cutting knife, a die, 26, vertically guided in the frame, said die being adapted to be operated upon by the hammer arm and to indent or punch the strip in advance of the cutting operation, substantially as specified.

In testimony whereof I have hereunto set my hand in presence of two witnesses.

LUDWIG NICOLAI.

Witnesses:

RUD. SCHMIDT,
HERNANDO DE SOTO.