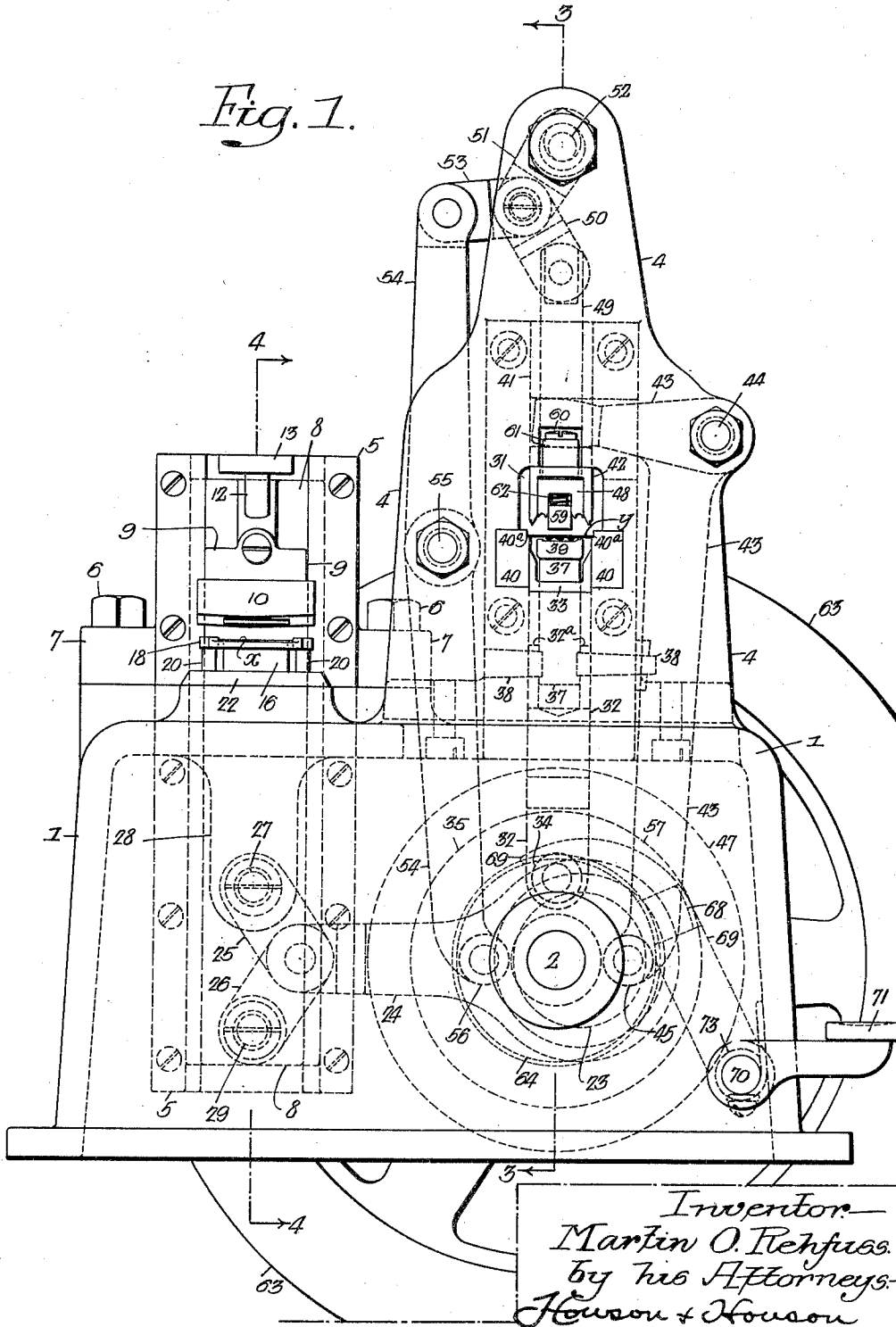


M. O. REHFUSS.
 PLATE FORMING MACHINE.
 APPLICATION FILED DEC. 5, 1917.

1,341,589.

Patented May 25, 1920.
 5 SHEETS—SHEET 1.

Fig. 1.

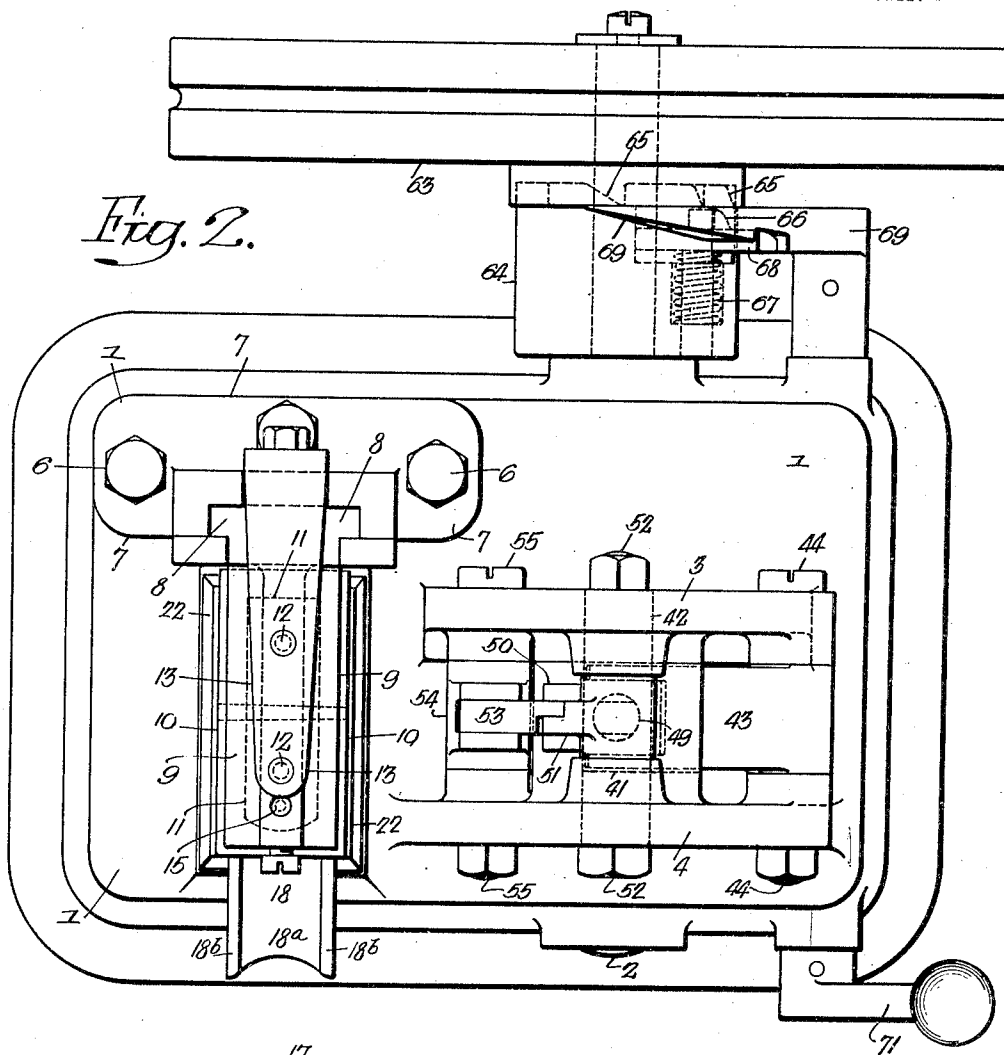
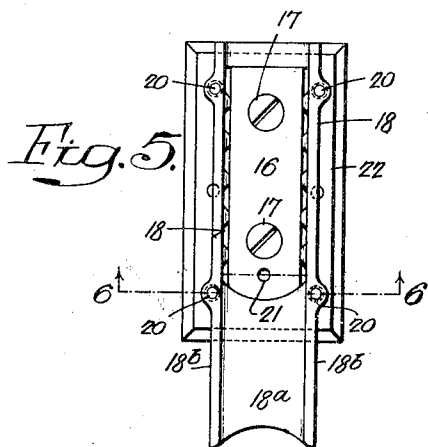
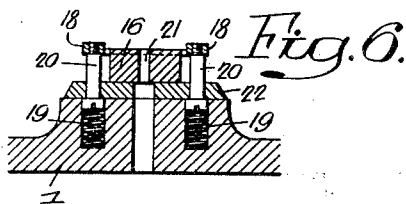


M. O. REHFUSS.
 PLATE FORMING MACHINE.
 APPLICATION FILED DEC. 5, 1917.

1,341,589.

Patented May 25, 1920.

5 SHEETS—SHEET 2.



Inventor—
 Martin O. Rehfuß.
 by his Attorneys—
 Howson & Howson

M. O. REHFUSS.
 PLATE FORMING MACHINE.
 APPLICATION FILED DEC. 5, 1917.

1,341,589.

Patented May 25, 1920.

5 SHEETS—SHEET 3.

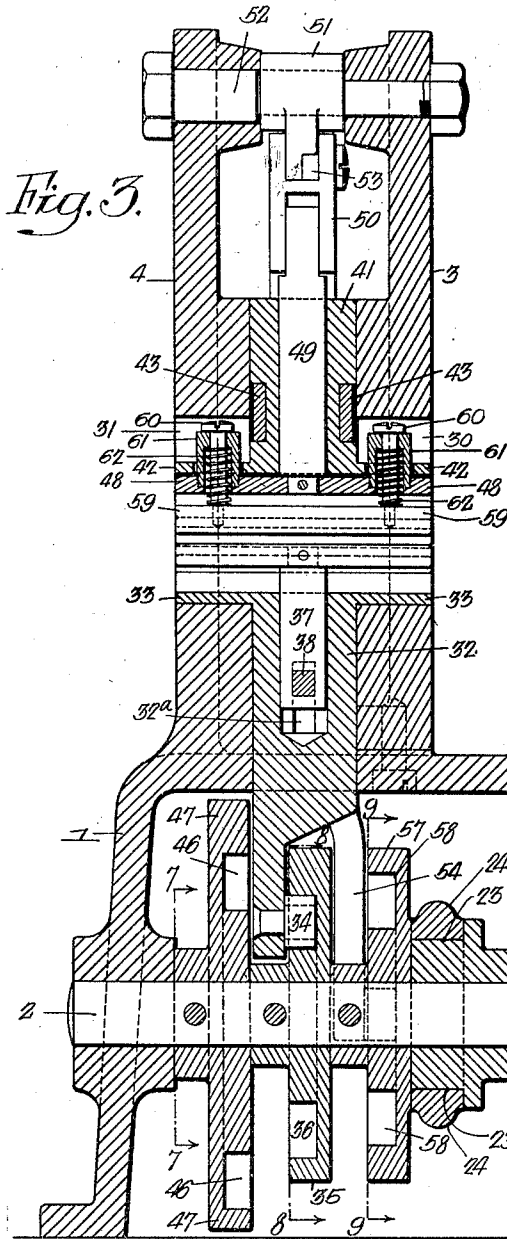
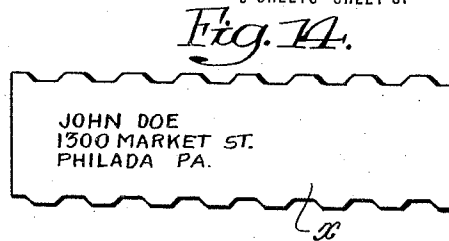
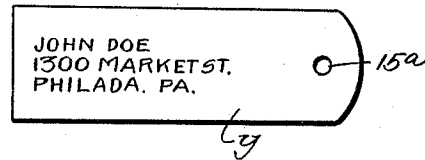
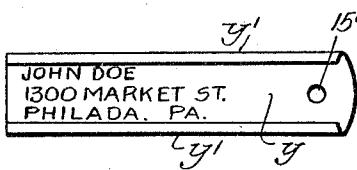
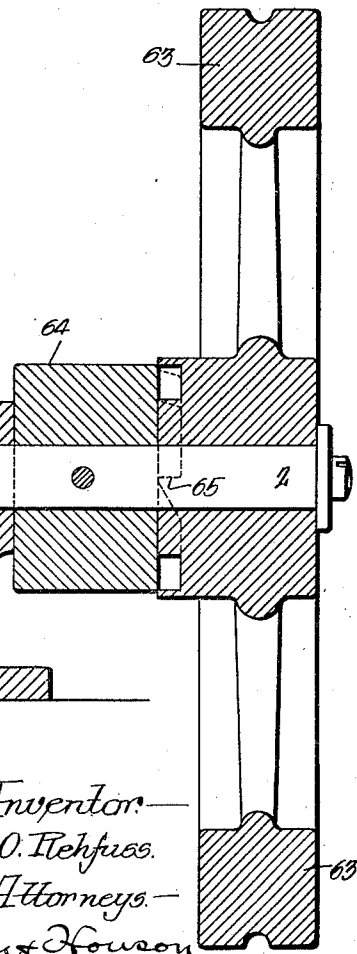


Fig. 15.



Inventor—
 Martin O. Rehfuß.
by his Attorneys—
 Howson & Howson



M. O. REHFUSS.
 PLATE FORMING MACHINE.
 APPLICATION FILED DEC. 5, 1917.

1,341,589.

Patented May 25, 1920.
 5 SHEETS—SHEET 4.

Fig. 4.

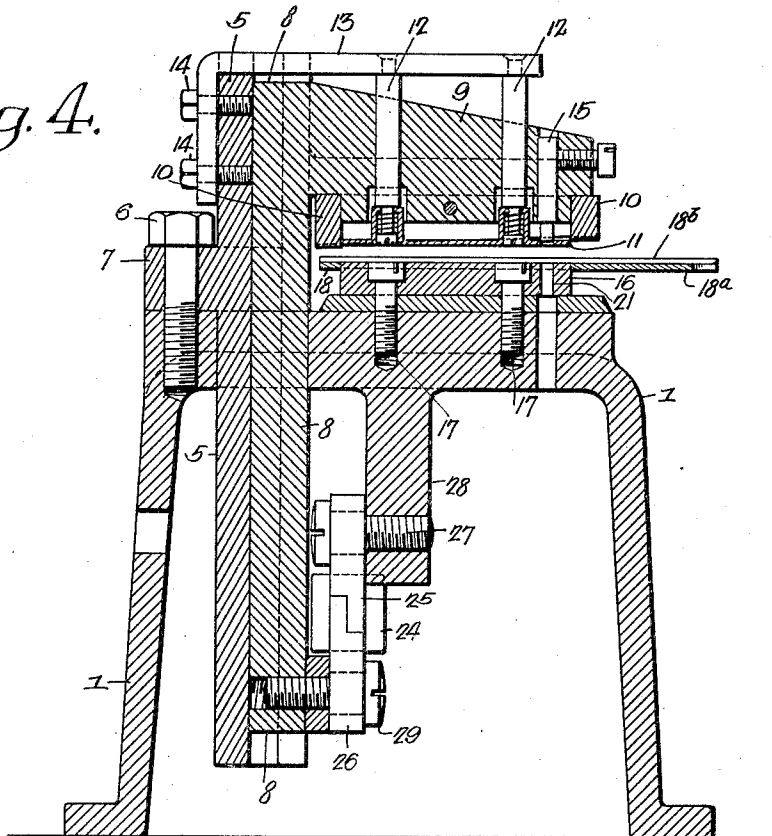


Fig. 8.

Fig. 9.

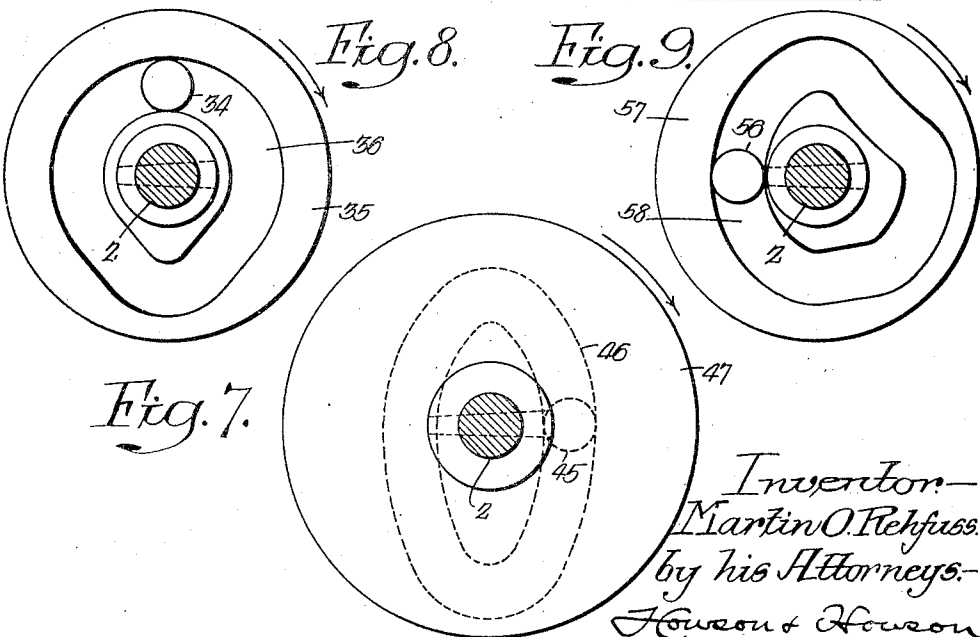


Fig. 7.

Inventor—
 Martin O. Rehfuß.
 by his Attorneys—
 Howson & Howson

M. O. REHFUSS.
 PLATE FORMING MACHINE.
 APPLICATION FILED DEC. 5, 1917.

1,341,589.

Patented May 25, 1920.
 5 SHEETS—SHEET 5.

Fig. 10.

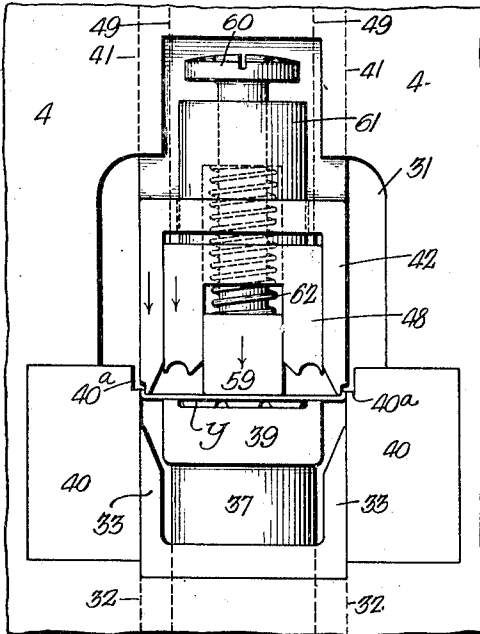


Fig. 11.

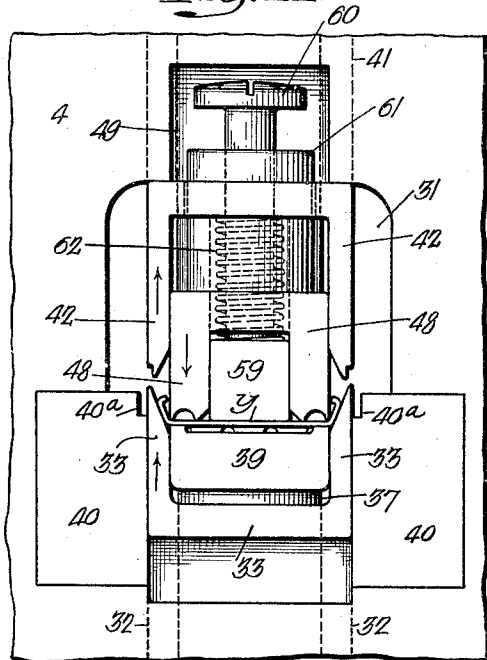


Fig. 12.

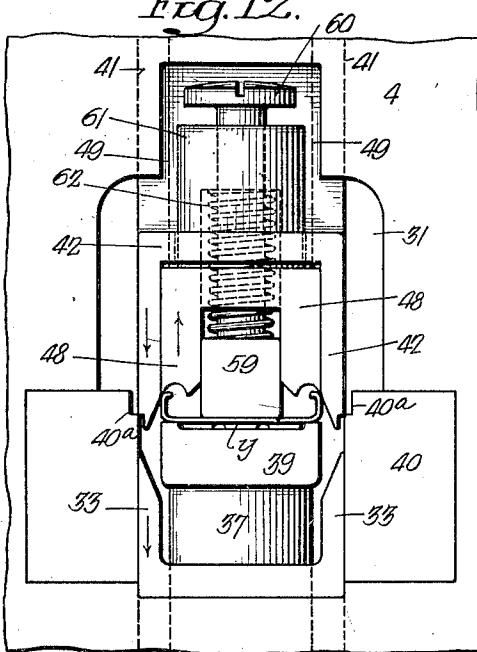
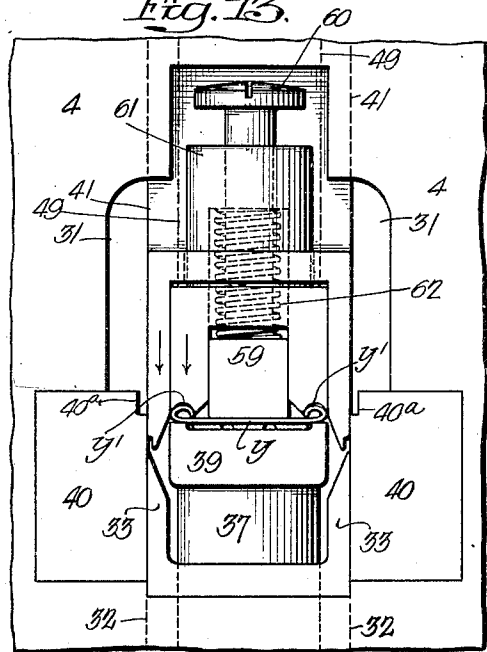


Fig. 13.



Inventor—
 Martin O. Rehfuß.
 by His Attorneys—
 Howson & Howson

UNITED STATES PATENT OFFICE.

MARTIN O. REHFUSS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO JOHN WANAMAKER, PHILADELPHIA, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

PLATE-FORMING MACHINE.

1,341,589.

Specification of Letters Patent.

Patented May 25, 1920.

Application filed December 5, 1917. Serial No. 205,518.

To all whom it may concern:

Be it known that I, MARTIN O. REHFUSS, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented a Plate-Forming Machine, of which the following is a specification.

One object of this invention is to provide a machine for trimming and thereafter so shaping metallic address plates as to reinforce and stiffen their side edges as well as to adapt these latter to serve as guiding ribs when the plate is used in a printing machine;—the invention contemplating a novel arrangement of forming dies and mechanism for actuating the same in the proper order, for bending up and turning over the longitudinal side edges of a trimmed plate in order that said edges shall not only be reinforced and the plate as a whole stiffened, but also in order that said edges shall present a rounded surface as well as have such a form as will permit the plate being properly guided into operative position in a machine for printing from it.

I also desire to provide a novel form of punching press particularly adapted for trimming sheet metal plates which shall be characterized by its compact, substantial and relatively simple arrangement and construction of parts.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which,

Figures 1 and 2 are respectively a front elevation and a plan of a machine constructed according to my invention;

Figs. 3 and 4 are vertical sections respectively taken on the lines 3—3 and 4—4, Fig. 1;

Fig. 5 is a plan of the lower die for that part of the machine illustrated in Fig. 4;

Fig. 6 is a transverse vertical section on the line 6—6, Fig. 5;

Figs. 7 to 9 inclusive are vertical sections taken respectively on the lines 7—7, 8—8 and 9—9, Fig. 3;

Figs. 10 to 13 inclusive are elevations of the forming dies showing them in the several positions occupied during the operation of turning up and bending over the edges of the plate;

Figs. 14 and 15 are plans of the plate before and after it has been trimmed, respectively; and

Fig. 16 is a plan of the finished address plate.

In the above drawings 1 represents a hollow box-like casting constituting a supporting base providing bearings for a horizontal main shaft 2 and having formed integral with it a pair of upwardly projecting standards 3 and 4 in the form of substantially parallel plates. To one side of these standards the table-like top of the base structure is provided with a vertically extending opening through which a vertical guide 5 projects both above and below said top to which it is removably held by bolts 6 passing into it through a flange or collar 7.

Within or upon this guide 5 is mounted a vertically reciprocable slide 8 whose upper end has formed integral with it an arm 9 projecting horizontally forward over the top of the base structure 1 and carrying on its under face a die 10 which in the present instance has an elongated rectangular outline. Within said die is mounted a stripper plate 11 yieldingly suspended from a pair of rods 12, projecting downwardly from a supporting bracket 13 held by bolts 14 to the rear vertical face of the structure 5;—the arrangement being such that said stripper plate is free to move upwardly within the die 10. Also mounted in the arm or head 9 is a punch 15 whose lower end terminates in or immediately adjacent the plane of the lower face of the die 10 which it is noted is inclined downwardly from front to rear of the machine.

The top of the base immediately under the die 10, has fixed to it a rearwardly elongated substantially rectangular plate 16 constituting a die or punch designed to cooperate with the die 10 and held in place by a pair of screws 17.

The lower die 16 (Figs. 5 and 6) is surrounded by a stripper plate 18 yieldingly supported on springs 19 through studs 20 whose heads enter recesses in the base structure 1 in which said springs are mounted and whose upper ends are threaded into said plate. It is noted that the sides of the latter adjacent the sides of the die 16 are

preferably provided with teeth-like projections which extend toward and into engagement with said die whose body is provided with a hole or passage 21 designed to co-operate with the punch 15. The studs 20 and the stripper plate 18 carried thereby are retained in place by a plate 22 mounted between the die 16 and the top of the base casting 1.

For actuating the vertical movable slide 8, I provide an eccentric 23 fixed to the main shaft 2 and having operative upon it a strap formed with a projecting rod 24 whose outer end is pivotally connected to a pair of toggle links 25 and 26. The first of these is pivotally connected by a bolt 27 to a lug or arm 28 projecting downwardly from the underside of the top of the base, while the second link 26 is connected by a bolt 29 to the lower end of the slide 8,—the arrangement being such that when by revolution of the shaft 2, the eccentric through the rod 24 straightens the toggle formed by the links 25 and 26, the slide 8 is drawn down with sufficient force to cause the die 10 to properly coact with the die 16 in trimming a plate.

The lower portions of the standards 3 and 4 have formed in them transverse openings 30 and 31 at the bottom of which extends a passage or guideway having reciprocable within it a rod 32 whose upper end has the form of a trough-shaped structure or die 33 operative within and extending between said two openings 30 and 31. The lower end of this rod 32 extends into the hollow of the base 1 and carries a roller 34 operative in the groove 36 of a cam 35 fixed on the main shaft 2, said groove having such a form that at each revolution of the shaft the cam moves the rod 32 with the die 33 upwardly.

Said rod 32 has an axially formed cylindrical bore or passageway into which extends a cylindrical rod 37 fixed to the standards by a transverse key 38 projecting through suitably formed vertical slots 32^a in the sides of said first rod 32. This fixed rod 37 has on its upper end a head 39, which like the die 33, is extended into the openings 30 and 31 and has a length practically equal to the distance between the front and rear faces of the two standards 3 and 4.

As shown in Figs. 10 to 13, the side members of the die 33 are outwardly beveled or inclined at their upper ends or edges and operate between the plane sides of the fixed head 39 and a pair of cheek pieces 40, set in the sides of and extending from front to rear through the openings 30 and 31, where they are rigidly held by any suitable means. Above the openings 30 and 31 there is provided a vertically extending guideway for a rod or plunger 41 on whose lower end is fixed, in the present instance integrally, an inverted trough-shaped die 42 having its

lower edges outwardly beveled and of the same general dimensions as the similar lower die 33.

This upper die 42 is designed to be reciprocated by means of a lever 43 pivoted on a bolt 44 extending between the standards 3 and 4 and formed with a short arm (Fig. 3) having branches which enter an annular groove of the rod or plunger 41. The second and long arm of the lever 43 extends downwardly into the hollow of the base 1 where it is provided with a roller 45 operative within the groove 46 of a cam 47 fixed to the main shaft 2. This cam groove 46 is of such form that it oscillates the lever 43 on its pivot or fulcrum 44 twice to each revolution of the shaft 2, though one of these movements embraces a larger angle than the other.

Between the side members of the upper guide 42 is slidably mounted a short horizontally elongated die 48 also of an inverted trough-shaped section and fixed to the lower end of a rod or plunger 49 which extends axially through the plunger 41 and at its upper end is pivoted to a toggle link 50. A second toggle link 51 is pivoted at one end to a bolt 52 extending transversely between the upper ends of the standards 3 and 4, while its lower end is pivoted to the link 50 and also to one end of a third link 53 whose second end is likewise pivoted to the upper end of a lever 54. The latter is pivoted or fulcrumed on a bolt 55 extending between the standards 3 and 4 and having on its lower end a roller 56 operative in the groove 58 of a cam 57 pinned to the main shaft 2. This cam groove 58 is of such design as to oscillate the lever 54 and therefore straighten the toggle 51—50 twice for each revolution of the shaft 2.

Slidably operative within the hollow of the die 48 is a pressure block 59 suspended from a pair of bolts 60 whose heads normally rest upon the upper ends of cylinders 61 which loosely pass through openings in the upper part of the die 42 and are screwed into the top of the inner die 48;—there being springs 62 confined between the upper ends of these cylinders and the block so that this is free to yield vertically relatively to the die 48 to a limited extent.

It is noted that the bolt 52 has a central eccentric portion on which the link 51 is mounted so that by rotating it in its supporting structures 3 and 4, said link and therefore the toggle of which it forms a part, may be conveniently adjusted to compensate for wear, etc. Thereafter the nut on said bolt may be set up so as to immovably clamp it in its adjusted positions.

While the main shaft 2 may be operated by any desired or suitable mechanism, I preferably loosely mount on its outer or projecting rear end a flywheel 63 and pin or

key to said shaft adjacent the hub of this wheel a collar 64. The face of said hub adjacent the collar is provided with an annular series of teeth 65 and said collar has slidably mounted within it a tooth 66 normally pressed toward the teeth of the hub by a spring 67. Said tooth forms part of or is attached to a head or projection 68 normally engaged by a tapering arm 69 fixed to a shaft 70 journaled in the base structure 1 and having fixed to it a second arm 71 designed to be conveniently operated by hand to raise the arm 69 out of engagement with said head.

A suitable spring 73 normally holds the tapering arm in toward the main shaft 2 but when the arm 71 is depressed, the consequent raising of the arm 69 frees the tooth 66, which is then forced by the spring 67 outwardly into engagement with one of the hub teeth 65. Since the flywheel 63 is constantly driven from a suitable source of power, it is thus clutched to the collar 64 which with the main shaft is consequently rotated. As the latter completes one revolution the tapering arm 69 engages the head 68 and forcibly withdraws the tooth 66 from engagement with one of the teeth 65, thereby operatively disconnecting the shaft from the flywheel by the time it has made one full revolution.

The plates upon which my machine is designed to operate are formed of thin sheet metal and while having a generally elongated rectangular form, are serrated on their longer sides;—each having pressed up in their bodies the name and address of an individual. In order to bring such a plate to the form and shape required to fit it for use in a printing machine, it is first delivered to that part of my invention shown in Figs. 1 and 4, being placed upon the forwardly projecting end 18^a of the stripper plate and then moved rearwardly under the die 10 until its inner end strikes the vertical face of the slide 8. In being so moved it is guided by the side flanges 18^b of the stripper plate and when it has reached the desired position, a depression of the arm 71 releases the tooth 66 and as above explained, permits the shaft 2 to be turned through one revolution.

This operation, through the eccentric 23, causes the toggle members 25 and 26 to be first straightened out and then returned to the angular positions shown in dotted lines in Fig. 1, and consequently causes the slide 8 with the arm 9 and die 10 to be forcibly moved down and then raised. As a result said die coöperates with the lower die 16 to cut away the marginal portions of the plate *x*, Fig. 14, so that it is given the shape indicated at *y*, Fig. 15, the punch 15 forming a hole 15^a in the plate adjacent one end thereof. The plate is then drawn outwardly

from the stripper plate 18^a and is inserted between the heads 39 and 59 so that its longitudinal edges rest upon a pair of shoulders 40^a formed in the adjacent upper corners of the members 40.

A second plate *x* to be trimmed is then placed upon the stripper plate 18^a and the clutch-controlling arm 71 is again depressed, causing said second plate to be trimmed as above described and resulting in the previously formed plate *y* being given the form shown in Fig. 16, in which it is provided with turned-over beads or edge flanges *y*'.

In order to accomplish this end, the various cams 35, 47 and 57 are so designed and set on the shaft 2 that as the die 48 is lowered, its pressure block 59 is first brought into engagement with the plate *y* so as to clamp it against the fixed head 39. At the same time the outer die 42 is brought into engagement with the longitudinal edges of the plate and forces these down between the shoulders 40^a so that they are bent at right angles in the form of narrow upwardly extending flanges.

Immediately thereafter the die 48 is lowered into engagement with the plate *y*, and the lower die 33 is moved up from the position shown in Fig. 10 to that of Fig. 11, causing a second set of bends to be made in the longitudinal edges of the plate so that these are inclined upwardly some distance from the first formed flanges.

As the lower die 33 recedes to the position shown in Fig. 12, the upper die 48 is raised and the second or outer upper die 42 is lowered, thus turning the second set of side flanges from outwardly inclined positions to positions in planes practically at right angles to the general plane of the body and the plate under process of formation. While the lower die and the outer upper die 42 remain in the positions shown in Fig. 12, the inner upper die 48 is now lowered to the position shown in Fig. 13, and during this movement its concave lower edges engage the first formed flanges of the plate and forces these toward each other, continuing the bending of the second set of flanges until these are curved over into such positions that the longitudinal edges of the plate engage its body.

The plate is thus provided with two longitudinally extending edge beads *y*', after which the cams so act that the upper dies 42 and 48 with the pressure block 59, are raised away from the finished plate which they have the form shown in Fig. 16. The side beads *y*' not only serve to materially stiffen it against longitudinal as well as against lateral bending, but serve as guiding ribs for insuring the proper placing of the plate in a machine for printing on a given body of paper or the like the address engraved or pressed up in said plate.

From the above description it will be understood that by means of the relatively simple machine disclosed, it is possible to trim and thereafter so shape an address plate that it is in such form as to allow of its proper entrance into and positioning in a printing machine.

I claim:—

1. The combination in a press, of a supporting frame having a top with an opening therein; a vertical guide fixed in said opening and extending for a substantial distance above and below the same so as to form a continuous long bearing; a substantially rectangular plate slidable in said guide and extending above and below the top and operating through the opening thereof, said plate having a laterally projecting arm at the upper end; a shaft journaled in the frame; a toggle having links one pivotally connected to the lower end of the plate; and another connected to a fixed part of the frame; means connecting the shaft and the toggle for actuating the latter; and co-acting dies, one on the frame and the other on said laterally projecting arm.

2. The combination in a press of a supporting frame having a top portion with an opening intermediate of its ends and sides; a guide of substantial and continuous width and of such length that it projects above and below the table, said guide passing vertically through said opening and having a flange on an intermediate portion by which it is secured to the frame; a slide operating in the guide and having substantial length and width, said slide extending above and

below the table and having a laterally extending arm at the upper end; coacting dies on the arm and frame; and means for operating the slide.

3. In a press of the character described, the combination of a frame having a substantially flat top with an opening therein intermediate of the sides and ends; a vertical guide passing through said opening and having a bearing surface extending for a substantial distance above and below the top of the frame, and having a flange removably secured to said top; a slide having an extended bearing on the guide and also extending above and below said top, and having a transversely extending arm; co-acting dies on said arm and frame; and means for operating the slide.

4. In a press of the character described, the combination of a frame having a substantially flat top with an opening therein intermediate of the sides and ends; a vertical guide passing through said opening and having a bearing surface extending for a substantial distance above and below the top of the frame, and having a flange removably secured to said top; a slide having an extended bearing on the guide and also extending above and below said top, and having a transversely extending arm; co-acting dies on said arm and frame; means for operating the slide; a second arm, secured to the fixed guide and overlying the first-named arm; a stripper and rods therefrom extending through the first-named arm and fixed to said second arm.

In witness whereof I affix my signature.

MARTIN O. REHFUSS.