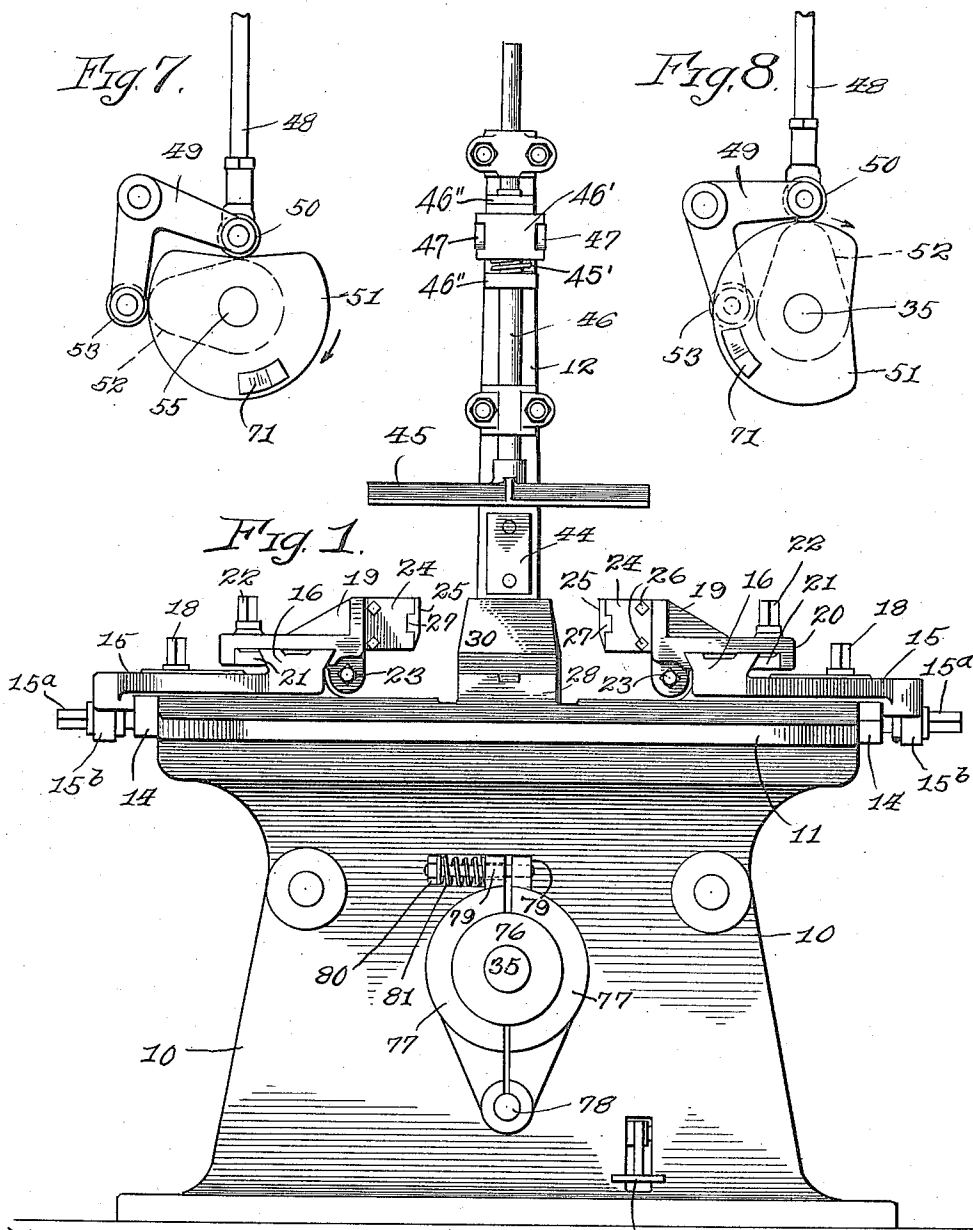


E. KATZINGER.
MACHINE FOR FOLDING THE CORNERS OF PANS AND THE LIKE.
APPLICATION FILED JUNE 27, 1914.

1,153,313.

Patented Sept. 14, 1915.
5 SHEETS—SHEET 1.



Witnesses:
L. B. Gabau
L. H. Seem

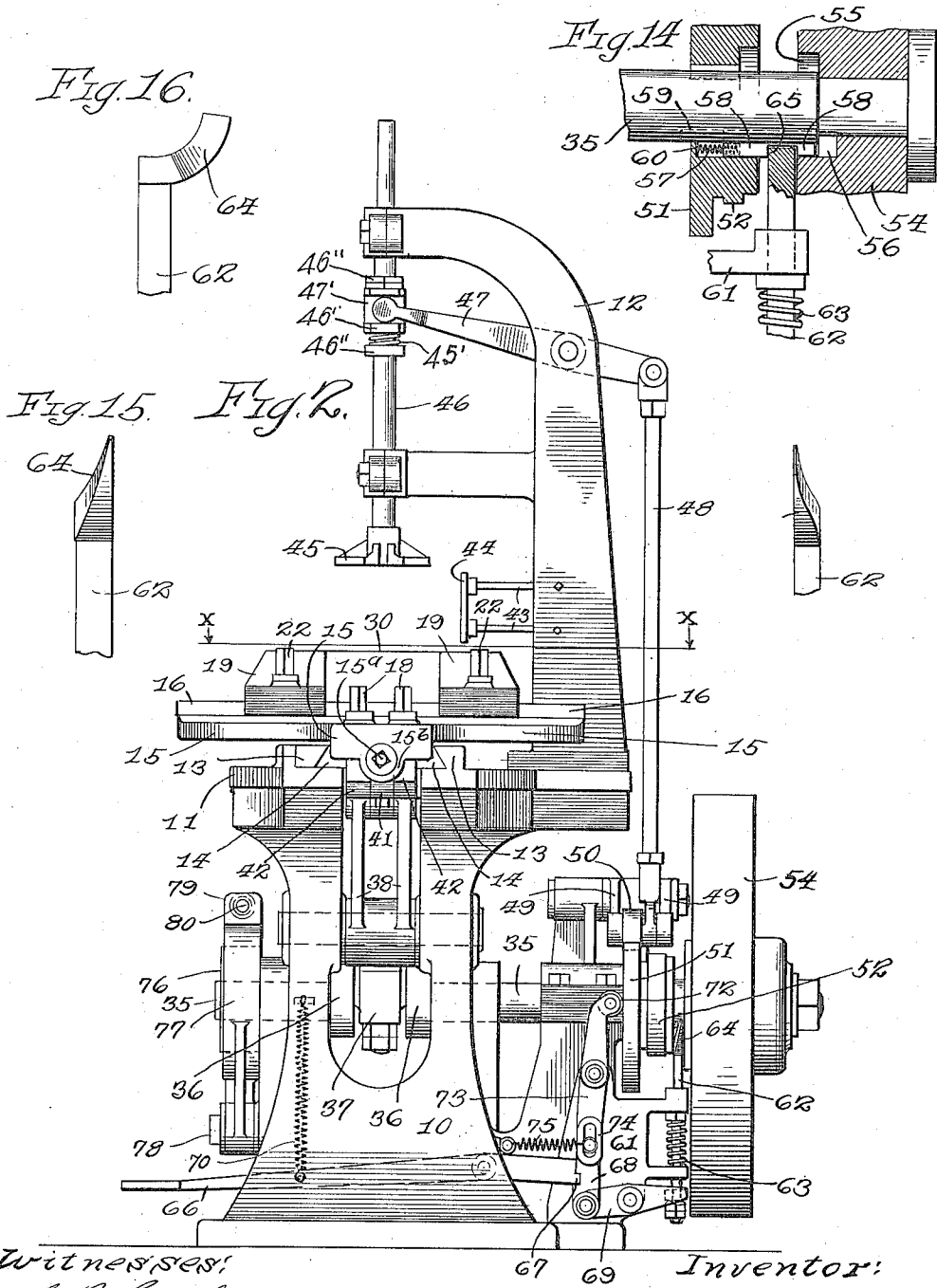
Inventor:
Edward Katzinger
By Brown, Nissen & Sprinkle
Attys.

E. KATZINGER.
MACHINE FOR FOLDING THE CORNERS OF PANS AND THE LIKE.
APPLICATION FILED JUNE 27, 1914.

1,153,313.

Patented Sept. 14, 1915.

5 SHEETS—SHEET 2.



Witnesses:
L. B. Graham
C. H. Seem

Inventor:
Edward Katzinger
By Brown, Nissen & Sprinkle
Attys.

E. KATZINGER.
MACHINE FOR FOLDING THE CORNERS OF PANS AND THE LIKE.
APPLICATION FILED JUNE 27, 1914.

1,153,313.

Patented Sept. 14, 1915.

5 SHEETS—SHEET 3.

Fig. 3.

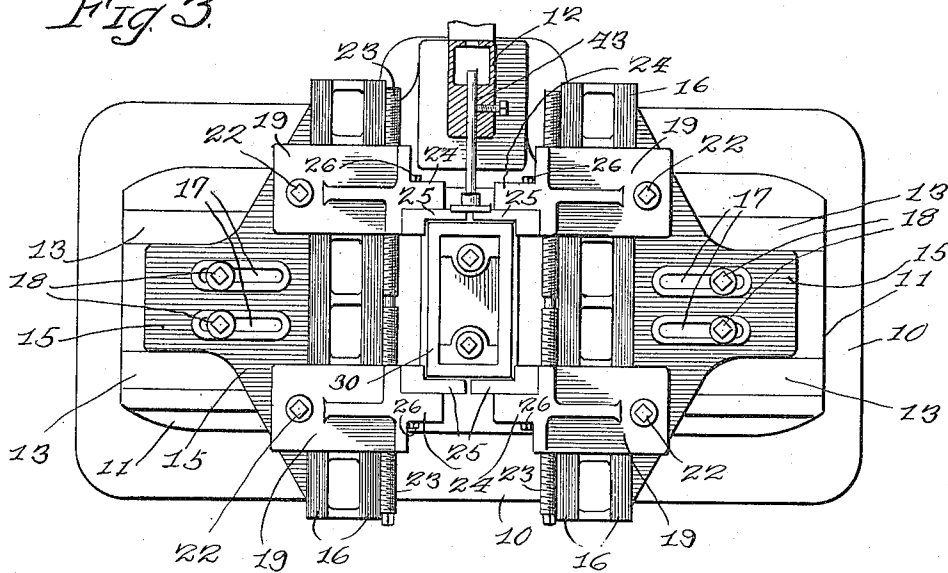
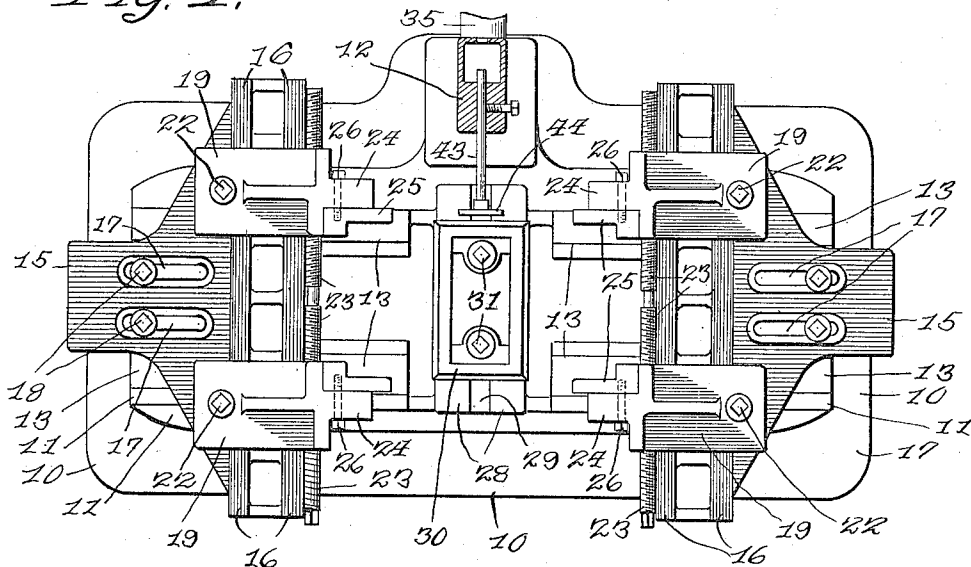


Fig. 4.



Witnesses:
L. B. Graham
C. H. Seem

Inventor:
Edward Katzinger
By Brown, Nissen & Sprinkle
Attys.

E. KATZINGER.
MACHINE FOR FOLDING THE CORNERS OF PANS AND THE LIKE.
APPLICATION FILED JUNE 27, 1914.

1,153,313.

Patented Sept. 14, 1915.
5 SHEETS—SHEET 4.

Fig. 9.

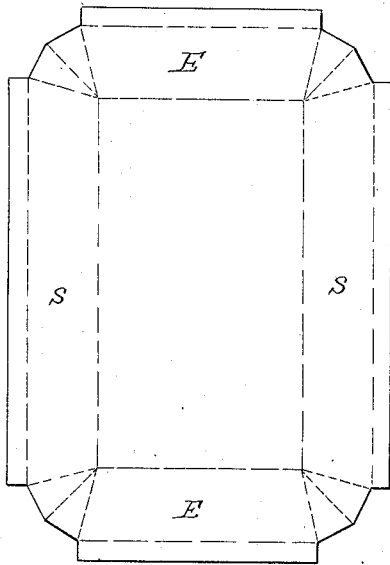


Fig. 10.

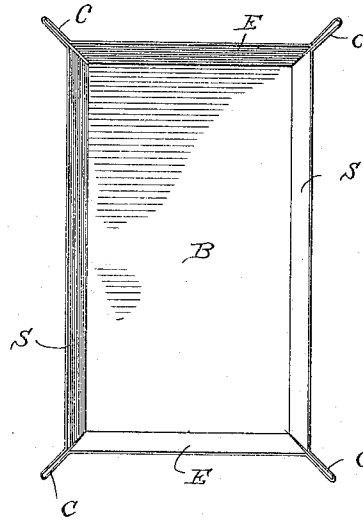


Fig. 11.

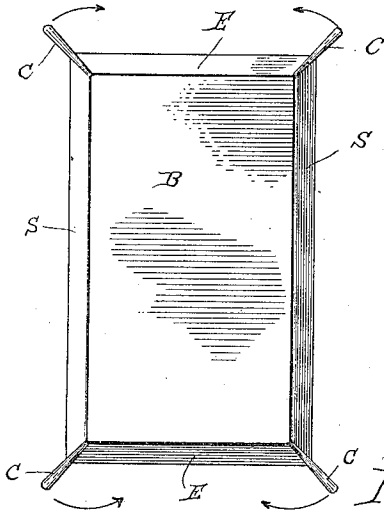


Fig. 12.

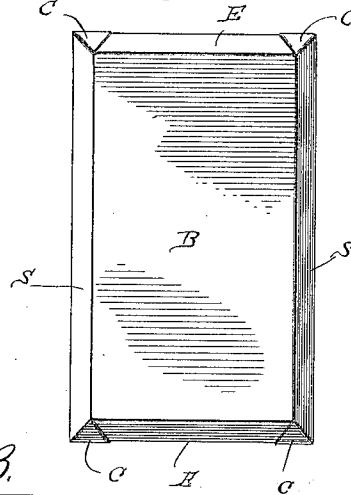
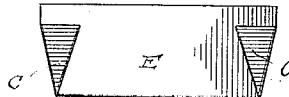


Fig. 13.



WITNESSES:

L. B. Graham

C. H. Seem

INVENTOR:

Edward Katzinger

By Brown, Nissen & Sprinkle

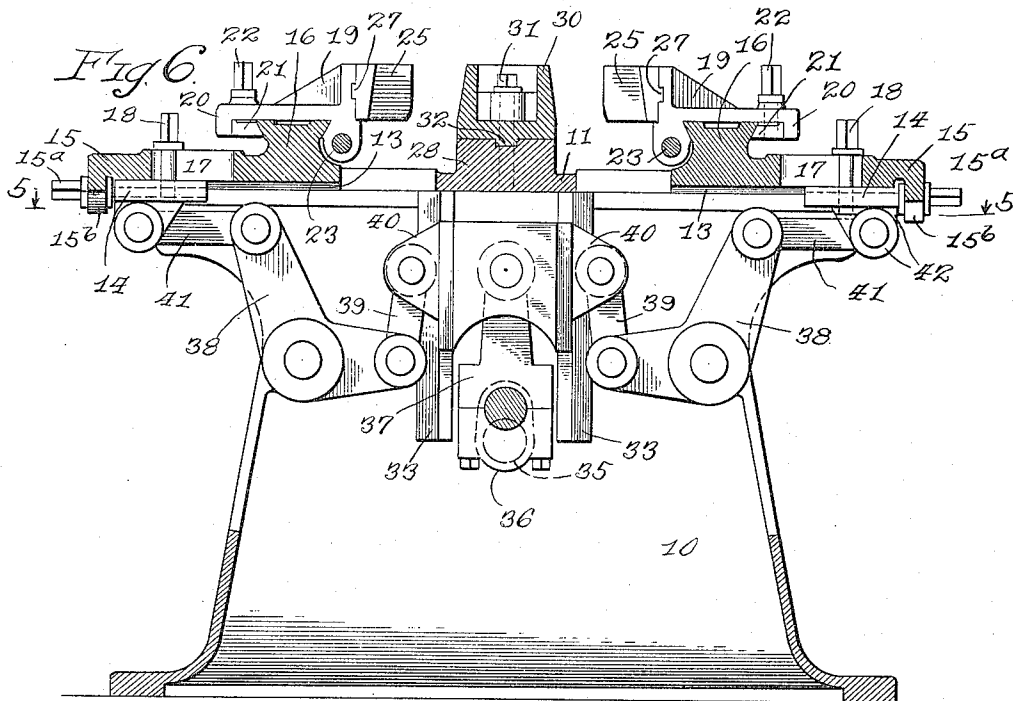
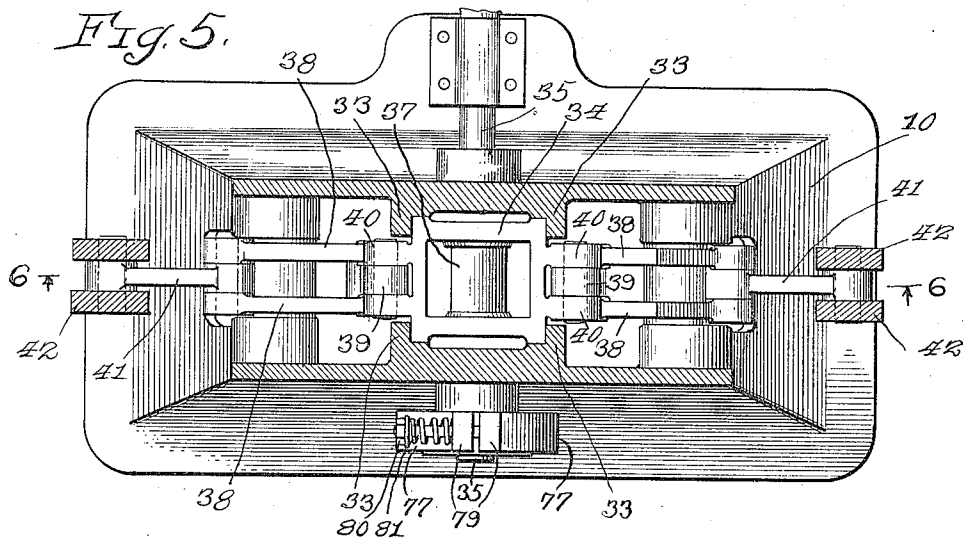
Attys.

E. KATZINGER.
MACHINE FOR FOLDING THE CORNERS OF PANS AND THE LIKE.
APPLICATION FILED JUNE 27, 1914.

1,153,313.

Patented Sept. 14, 1915.

5 SHEETS—SHEET 5.



WITNESSES:
L. B. Graham
C. N. Seem

Inventor:
Edward Katzinger
By Brown, Nissen & Sprinkle
ATTORNS.

UNITED STATES PATENT OFFICE.

EDWARD KATZINGER, OF CHICAGO, ILLINOIS, ASSIGNOR TO EDWARD KATZINGER COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

MACHINE FOR FOLDING THE CORNERS OF PANS AND THE LIKE.

1,153,313.

Specification of Letters Patent.

Patented Sept. 14, 1915.

Application filed June 27, 1914. Serial No. 847,612.

To all whom it may concern:

Be it known that I, EDWARD KATZINGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Folding the Corners of Pans and the like, of which the following is a specification.

The invention relates to folding machines adapted to fold the corners of pans, boxes, and other receptacles, and the primary object is to provide a machine of this character which will fold the corners of pans and similar receptacles efficiently and economically, requiring only the services of a single attendant.

In forming pans and similar receptacles of sheet metal or sheets of other material, when the side walls of the material are folded to an angular position with relation to the bottom there is generated a certain amount of fullness of the material at the corners that is commonly taken care of by folding flat on the sides of the resulting receptacle, vessel or pan, and it is the object of the present invention to take care of this fullness at the corners by folding it in the manner described quickly and efficiently and leaving the folding devices in position for the succeeding operation.

Other objects of the invention will appear from the following description of the preferred embodiment of the invention which is shown in the drawings and set forth more particularly in the appended claims.

In said drawings, Figure 1 is a front elevation view of my improved corner folding machine, and Fig. 2 is a view in side elevation of the same. Figs. 3 and 4 are top plan views of the machine taken on line $x-x$, Fig. 2, with certain of the upper portions of the machine in section and illustrating the two positions of the corner folding elements. Fig. 5 is a plan section of the machine taken on line 5-5 of Fig. 6, showing the mechanism for operating the folding devices; and Fig. 6 is a vertical section on line 6-6 of Fig. 5. Figs. 7 and 8 are detail views of the cam structure and intermediate connections for operating the holding clamp, showing the elements in different operated positions. Fig. 9 is a view of a blank from which a pan is to be formed. Figs. 10 and 11 are relative inverted views showing the blank with the sides formed in

the angular position with the corner flaps extending diagonally outward ready to be operated on by my machine to have the corners folded on the end walls of the pan as illustrated in Figs. 12 and 13, the former being a bottom plan view of the pan and the latter an end elevation. Fig. 14 is a sectional view through the clutch which controls the operation of the machine. Fig. 15 is an edge view of the clutch controlling rod. Fig. 16 is a side elevation thereof.

The machine forming the subject-matter of the present invention is designed primarily to fold the corners of a bread or baking pan or similar receptacle against the ends of the pan after the pan has been formed. That is to say, the sides and bottom of the pan are stamped or folded out of a blank, producing projecting or protruding corners. The present machine operates upon these corners to fold the same flush against the ends of the pan.

In Fig. 9 is illustrated the blank from which a pan upon which the present machine operates is formed; and in Fig. 10 is illustrated the pan after it has been operated upon by a die to fold the sides S and ends E to the proper positions with respect to the bottom B . This folding of the sides S and ends E produces the projecting corners C , which extend from the pan at an angle to the sides and ends. The present machine is designed to receive the pan or receptacle in the form shown in Figs. 10 and 11 and bend or fold the corners so that they rest flush against the ends E , said corners assuming the positions illustrated in Figs. 12 and 13, being bent in the direction of the arrows in Fig. 11. After the corners have been so positioned by the present machine, the pan or receptacle is removed therefrom.

The machine for carrying out the folding process hereinbefore referred to comprises a base 10, which carries a base plate 11 and the goose-neck 12, said goose-neck being designed to carry a clamping mechanism for the pans as will hereinafter be apparent. At each end of the base plate 11 is formed or secured a pair of longitudinal tracks or guides 13, which are dove-tailed in cross-section, as illustrated in Fig. 2. A block 14 is mounted for reciprocation between each pair of guides or tracks 13 and is designed primarily to carry the folding dies to be hereinafter described. A carrier 15 for the

folding dies is adjustably secured to each block 14, (see Fig. 6) and under normal conditions is rigidly secured to this block. This carrier comprises a transverse dove-tailed track 16 at its inner end, upon which is adjustably mounted the folding dies and a body portion which is pierced by the slots 17. Bolts 18 extend through the slots 17 and are threaded into the cooperating block 14, thereby rigidly securing each carrier adjustably to its cooperating block. As will be noted from the drawings, there are two of these carriers, and each carrier is arranged to have mounted thereon a pair of folding dies, which operate upon two corners of the pan or receptacle in the machine.

Mounted upon each dove-tailed track 16 of the carriers 15 are a pair of die blocks 19. These die blocks are dove-tailed upon one side of their under face for engagement with one side of the cooperating track 16, and are provided with the downwardly extending lips 20 upon the opposite sides thereof. A wedge block 21 is interposed between each lip 20 and the adjacent side of the corresponding cooperating track 16, and is secured or threaded to a bolt or set-screw 22. By this construction the die block 19 can be adjusted to its proper position upon the cooperating track 16, and by tightening the set-screw or bolt 22 the wedge block 21 clamps the same in its adjusted position. A shaft 23 provided with right and left hand threads cooperates (as illustrated in Figs. 6, 3 and 4) with each pair of die blocks 19, thereby providing means whereby each pair of die blocks 19 may be adjusted to and from one another when wedge blocks 21 thereof are loosened. The inner face of each die block is provided with a projection 24, to which is secured the die 25 by means of bolts 26, which pierce both the projection and the die. A tongue 27 is formed on the die which enters a groove in the inner face of the die block. These dies are angular in formation so that they engage the projecting corners C of the pan and will bend them to rest flush against the ends E of the pan.

A projection or ridge 28 is formed transversely and centrally upon the base plate 11 and is provided on its upper face with a longitudinal groove 29, (Fig. 4). A mandrel 30 is secured to this projection 28 by means of the bolts 31, and a tongue 32, which latter are received in the groove in said projection. In vertical cross-section this mandrel 30 conforms to the formation of the pan or receptacle and said pan or receptacle is adapted to be inverted and placed upon said mandrel so that the projecting corners C thereof will be located at the corners of this rectangular mandrel 30. Various sized horns may be placed upon the projection 28 by removing the bolts 31 and changing the mandrel accordingly.

When the pan or receptacle is placed upon the mandrel the projecting corners C thereof will align with the four dies and die blocks 25 and 19 respectively, there being one die block and die corresponding to each corner of the mandrel, so that when the carriers 15 move toward the mandrel 30 the dies will engage the corners and bend them so that they will rest loosely against the ends E of the pan. When the size of the mandrel is changed to operate on varied sizes of pans it is necessary of course to loosen the bolts 22 and adjust the die blocks 19 toward or from one another through the instrumentality of the shafts 23, so that the positions of the dies and die blocks will correspond to the size of the mandrel.

In order to impart the necessary reciprocation of the carriers 15 to and from one another, a plurality of vertical tracks 33 are formed within the base 10, between which reciprocates a hollow rectangular cross-head 34. A drive shaft 35 is mounted transversely in the base 10 and is provided with a crank 36 aligned with the cross-head 34, so that as the shaft 35 rotates a vertical reciprocation will be imparted to the cross-head 34 between the tracks 33.

Disposed on each side of the cross-head 34 is a pair of bell-cranks 38, the inner arms of which are connected by links 39 to the ears 40 formed on the cross-head. The outer arms of each pair of bell-cranks have a link 41 pivoted thereto, which link stands approximately horizontally and has its outer terminal pivoted to ears 42 formed on the under surface of the adjacent block 14.

From the foregoing it will readily be seen that as the shaft 35 rotates the cross-head 34 will be reciprocated vertically between the tracks 33, thereby imparting an oscillatory movement to the two sets of bell-cranks 38. As these bell-cranks oscillate, they will reciprocate the blocks 14 between the tracks 13. This movement of the blocks 13 reciprocates the carriers 15 to and from the mandrel 30, so that the dies 25 adjustably mounted upon said carriers will cooperate with the corners of the mandrel 30, thereby forcing the protruding or projecting corners C of the pan or receptacle mounted upon the mandrel against the ends E of the pan. The two positions assumed by the dies and die blocks are illustrated in Figs. 3 and 4. In Fig. 4 the dies are shown drawn away from the mandrel 30, and when in this position the cross-head is in the position shown in Fig. 6, while in Fig. 3 the dies are shown embracing the corners of the mandrel, illustrating their positions when the cross-head is lowered between the tracks 33 to the opposite position to that illustrated in Fig. 6.

In order to aid in positioning the pan or receptacle upon the mandrel 30 a guide is provided which comprises a pair of rods 43 adjustably mounted in the goose-neck 12, said rods carrying a vertical guiding plate 44 at their outer ends. This vertical guide plate is located (as illustrated in Figs. 3 and 4) so that the same is alined slightly to the rear of the rear terminal of the mandrel 30 and thus insures the quick and positive placing of the pan or receptacle upon the mandrel.

During the folding operation, that is to say when the dies are operating upon the corners of the pan, it is desirable to clamp the pan upon the mandrel 30, and in order to accomplish this a clamp 45 is mounted on a rod 46, which reciprocates in the goose-neck 12. An oscillatory lever 47 is pivoted in the goose-neck and has one end bifurcated and engaging grooves 47' in a head 46', the latter being on rod 46 between two spaced enlargements 46'' on said rod. A spring 45' is interposed between the head 46' and the lowermost of the enlargements 46'' for providing a cushioning means for the clamp 45 upon the latter engaging a pan on the mandrel 30 to prevent marring the pan. The other end of lever 47 is connected to a rod 48, to which is imparted a reciprocatory movement from the shaft 35. It will be seen that as the rod 48 moves upwardly the terminal of the lever 47 connected to the rod 46 will force the same downwardly, bringing the clamp 45 into contact with the pan mounted upon the mandrel 30. When the rod 48 moves in the opposite direction the terminal lever 47 connected to the rod 46 will be elevated, thus elevating said rod 46 and clamp 45. In order to impart this reciprocatory movement to the rod 48, the lower terminal of the rod is connected to one arm of a bell-crank 49 and is provided with a roller bearing 50, which rests upon a clamping cam 51, mounted upon and keyed to the shaft 35. As this cam 51 rotates it contacts with the roller bearing 50 and elevates the rod 48, thereby lowering the rod 46 and clamp 45. In order to retract or elevate the clamp 45 an elevating cam 52 is provided, which contacts with the roller bearing 53 on the opposite arm of the bell-crank 49 to that connected to the rod 48. When the roller bearing 50 is about to contact with the depressed surface of the clamping cam 51, the elevating cam 52 contacts with the roller bearing 50, thus oscillating the bell-crank 49 and positively drawing the rod 48 downwardly, bringing the roller bearing 50 into positive engagement with the lower surface of the cam 51. This elevates the clamp 45 by lowering the rod 48.

The entire machine receives its power from the shaft 35, and at each revolution of

the shaft the carriers 15 are moved inwardly to and outwardly from the mandrel 30 and the clamp 45 is lowered and elevated. Therefore, after each revolution of the shaft 35 it is necessary for the shaft to remain stationary while the pan or receptacle is removed from the mandrel 30 and a new one substituted therefor. In accomplishing this a constantly running pulley 54 is loosely mounted upon the shaft 35 and is provided with a groove 55 on its inner face, said groove having a depression 56 in the base thereof. The cams 51 and 52 are formed from a single piece of metal and have a passage or keyway 57 therein, in which is mounted a reciprocatory key 58, said key extending into a keyway 59 in the shaft 35. A spring 60 is mounted in the keyway 57 and bears against the inner end of the key 58. The opposite terminal of the key 58 rests in the groove 55 of the pulley 54, and the spring 60 normally tends to force this key into the depression 56 of the pulley. When the key is forced into this depression 56 in the base of the groove 55 of the pulley 54, the pulley will be keyed to the shaft and consequently said shaft will rotate, imparting the heretofore described movements to the elements of the machine. As it is desired to impart only a single cycle of movement the shaft 35 bearing 61 is provided, in which is mounted a clutch controlling rod 62, which is acted upon by a coiled spring 63 to force the same into the space between the pulley 54 and the cam 52. The upper end of this clutch controlling rod 62 is provided with a cam arm 64, which rests in the space between the pulley 54 and cam 52 and coöperates with a notch 65 formed in the key 58. When the cam arm 64 is withdrawn from the notch 65 in the key 58, the key under the influence of the spring 60 will be forced into the notch 56 of the pulley 54, locking the pulley to the shaft. After the shaft has taken one revolution and the arm 64 returns to its normal position, the notch 65 in the key 58 will ride upon the cam surface of the arm 64, withdrawing the key from the depression 56, and releasing the shaft 35 from engagement with the pulley 54.

In order to operate the machine, a pedal 66 is provided which is provided with the tongue 67 at its inner terminal. This tongue 67 fits into a depression formed in a link or arm 68, which is pivoted to one end of a lever 69. The opposite end of this lever 69 spans and engages the lower end of the clutch controlling rod 62. When pressure is placed upon the pedal 66 it will raise the link or arm 68 and lower the free terminal of the lever 69, withdrawing the arm 64 from the notch 65 of the key 58, permitting the key to spring into the depression 56 of the pulley. A spring 70 is provided to ele-

vate the pedal 66, so that when pressure is removed therefrom the clutch controlling rod 62 may be elevated by the spring 63 to remove the key from the depression 56.

Should the operator continue to retain pressure upon pedal 66, the machine will continue to operate unless some safety device is provided to permit the elevation of the controlling rod 62. This is accomplished by providing a cam projection 71 upon the cam 51, which projection is arranged to contact with a roller bearing 72, mounted upon the upper terminal of a vertical lever 73. The lower terminal of this lever 73 is connected by knee joint 74 to a link or arm 68 pivoted to the lever 69. A spring 75 operates upon this knee joint to retain the notch in the arm or link 68 in engagement with the tongue 67 on the pedal 66. After the machine has been operated, and if the operator continues to retain pressure upon the pedal 66, the cam projection 71 will contact with the roller 72, oscillating the lever 73, breaking the knee joint 74 against the tension of the spring 75. This removes the tongue 67 from the notch in the link or arm 68 and permits the spring 63 to act upon the rod 62 to throw the cam arm 64 into the path of movement of the key 58, thereby withdrawing the key from the depression 56 and the pulley 54 and stopping the machine. The machine cannot be operated again until the operator removes the pressure from the pedal 66, permitting the spring 70 to elevate the pedal, at which time the spring will straighten the knee joint 74, causing the tongue 67 of the pedal 66 to enter the notch in the link or arm 68. Thus it will be seen that under no condition can the machine operate more than once, and that a positive safety device is provided which will eliminate danger to both the operator and the article.

In order to overcome the momentum which the shaft 35 will have and to cause the same to stop its rotation at the completion of one cycle so that the elements of the machine will be in their proper positions for the removal of one pan and the reception of another pan, a drum 76 is mounted on the opposite terminal of the shaft 35 to the pulley 54. This drum is embraced by a pair of friction brakes 77, which are pivoted upon a pin 78 secured to the base 10. The upper terminals of these friction brakes are provided with the ears 79, which are pierced by bolts 80. This bolt is surrounded by a coiled spring 81, which bears against one of the friction brakes 77 and the nut of the bolt 80. This causes a friction of any desired strength to be exercised upon the drum 76 and the shaft 35, which causes the immediate cessation of rotation on the part of the shaft 35 when the pulley 54 is disengaged therefrom. To facilitate the setting

of the carriers 15 upon the blocks 14, a square-headed shaft 15^a is mounted in an ear 15^b formed on each carrier and is threaded to the cooperating block, thereby providing for the adjustment of the carrier 70 with respect to its block.

What I claim is:

1. In combination with a mandrel, of substantially alining guides on opposite sides of said mandrel, die carriers slidably mounted on said guides and having transversely extending tracks thereon, a shaft journaled in each of the carriers adjacent the track thereon and provided with right and left hand threads, a pair of die blocks movably mounted on each track and having threaded portions engaging the right and left hand threads on the shaft adjacent said track, and bolts passing through the die blocks and threaded in the carriers locking the blocks against movement on the carriers.

2. In combination with a frame having substantially alining guides therein, a mandrel between the guides, a block slidably mounted in each guide, a die carrier on each block and having slots therein, bolts passing through said slots and threaded in the blocks locking the carriers to the blocks, a shaft mounted in each of the carriers and threaded in the block supporting such carrier, and means for moving the blocks in the guides toward and away from the mandrel.

3. The combination with a mandrel, of a carrier mounted for reciprocation upon each side of said mandrel, die blocks and dies mounted upon each carrier and arranged to cooperate with said mandrel, a drive shank, a crank cooperating with said drive shaft, a connection between said crank and said carriers including a reciprocable cross-head, a connecting rod between said crank and said cross-head, and a connection between said cross-head and said carriers.

4. The combination with a mandrel, of a carrier mounted for reciprocation upon each side of said mandrel, die blocks and dies mounted upon each carrier and arranged to cooperate with said mandrel, a drive shaft, a crank cooperating with said drive shaft, a connection between said crank and said carriers including a reciprocable cross-head, a connecting rod between said crank and said cross-head, bell cranks, and link connections between said bell cranks and said carriers and between said bell cranks and said cross-head.

5. The combination with a mandrel, of tracks on each side of said mandrel, blocks mounted for reciprocation on said tracks, carriers mounted on said blocks, die blocks and dies secured to said carriers, a drive shaft, a crank cooperating with said drive shaft, a connection between said crank and said blocks, including a reciprocable cross-head, a connecting rod between said cross-

head and said crank, and a connection between said cross-head and said blocks.

6. The combination with a mandrel, of tracks on each side of said mandrel, blocks mounted for reciprocation on said tracks, carriers mounted on said blocks, die blocks and dies secured to said carriers, a drive shaft, a crank cooperating with said drive shaft, a connection between said crank and said blocks, including a reciprocable cross-head, a connecting rod between said cross-head and said crank, bell cranks, and pivotal connections between said cross-heads and said cranks and between said bell cranks and said blocks.

7. The combination with a base having vertical guides therein, a mandrel above said guides and horizontal guides at each side of the mandrel, of dies slidably mounted on said horizontal guides, a shaft journaled in said base and having a crank thereon, a cross head mounted in said vertical guides, a connecting link connecting said crank and said cross head, and connections between said cross head and said dies.

8. The combination with a base having vertical guides therein, a mandrel above said guides and horizontal guides at each side of the mandrel, of carriers mounted in said horizontal guides, dies carried on said carriers, a shaft journaled in said base and having a crank thereon, a cross head mounted in said vertical guides, a connecting link connecting said crank and said cross head, a bell crank mounted in said base at each side of the cross head, and connecting links con-

necting each bell crank with one of the carriers and the cross head.

9. The combination with a mandrel and reciprocable dies adapted to cooperate with said mandrel, of a shaft, an operative connection between said dies and said shaft, a reciprocable clamp adapted to cooperate with said mandrel and dies, and an operative connection between said clamp and said shaft, said last mentioned connection including a resilient means permitting said clamp to yield under the influence of the connection upon engaging the mandrel.

10. The combination with a base, a mandrel on said base, dies reciprocably mounted on the base and adapted to cooperate with the mandrel, and a shaft operatively connected with said dies, of a support on said base having vertical guides therein, a rod slidably mounted in said guides and having an enlargement thereon, a clamping head at the lower end of the rod and adapted to cooperate with the mandrel, a member slidably mounted on said rod above said enlargement, a spring between said enlargement and said member on said rod, and an operative connection between said member and said shaft.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 25th day of June, A. D. 1914.

EDWARD KATZINGER.

Witnesses:

CHARLES H. SEEM,
KENT W. WONNELL.