Feb. 15, 1927. 1,617,577

E. CARLSON

ASSEMBLING MECHANISM FOR CASTING MACHINES

Filed April 14, 1926 4 Sheets-Sheet 1

Fig. 12.

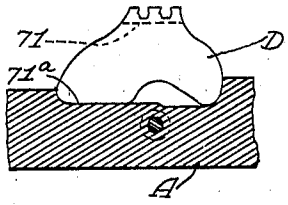


Fig. 10.

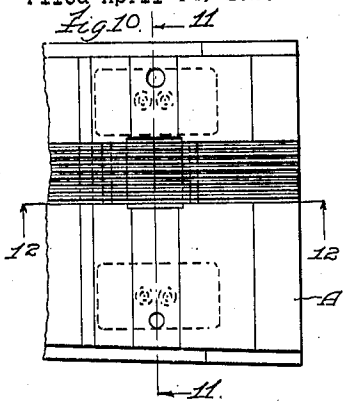


Fig. 11.

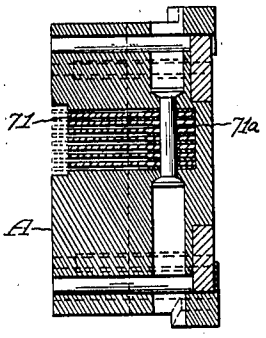
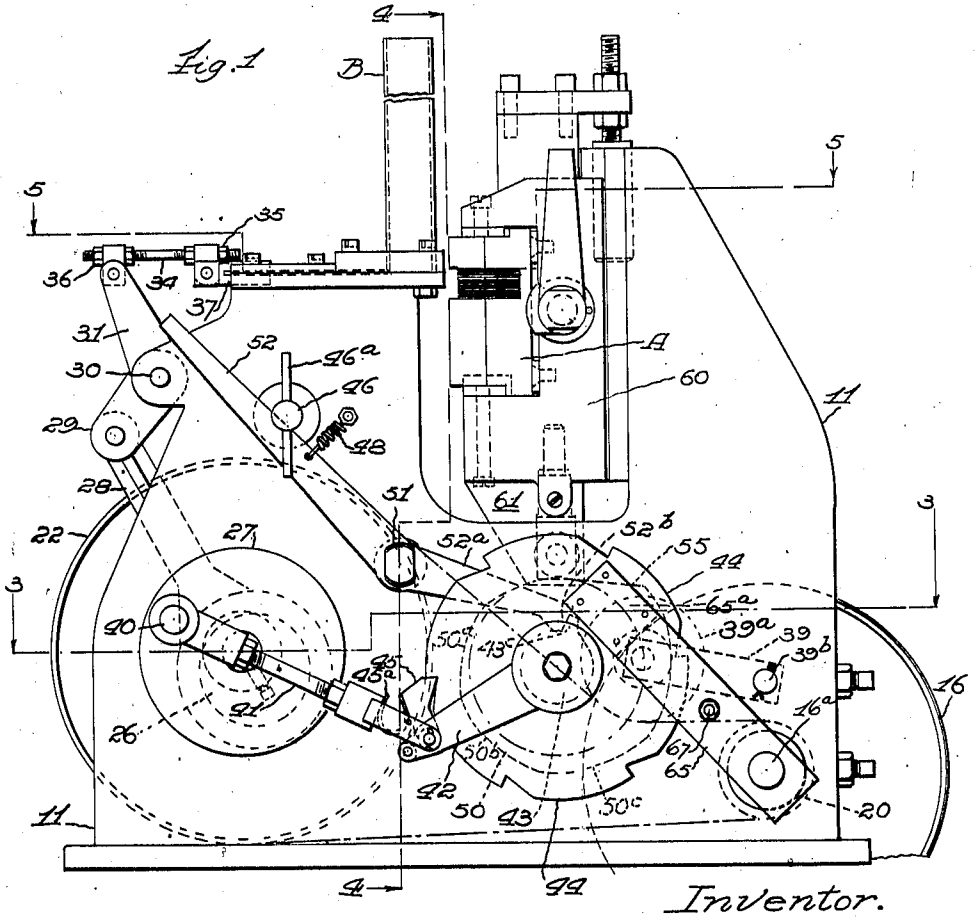


Fig. 1



Witness.
L. O. McKnight.

Inventor.
Eric Carlson.
by Burton & Burton
his Attorneys.

Feb. 15, 1927. 1,617,577

E. CARLSON

ASSEMBLING MECHANISM FOR CASTING MACHINES

Filed April 14, 1926 4 Sheets-Sheet 2

Fig. 2.

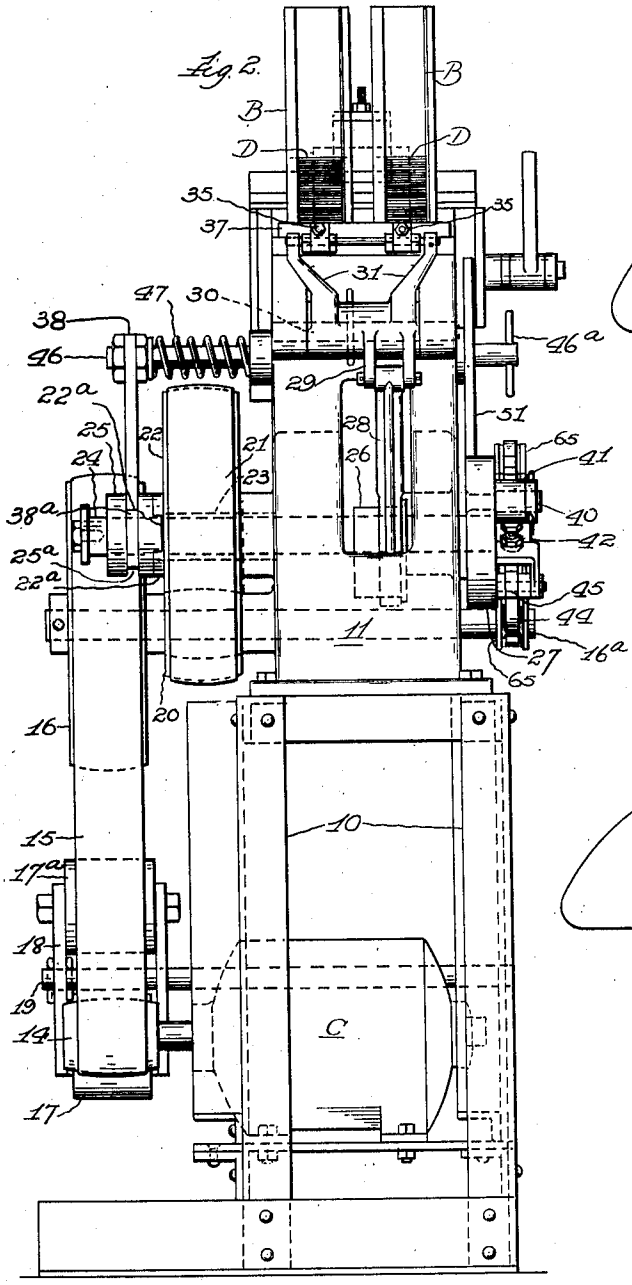


Fig. 6

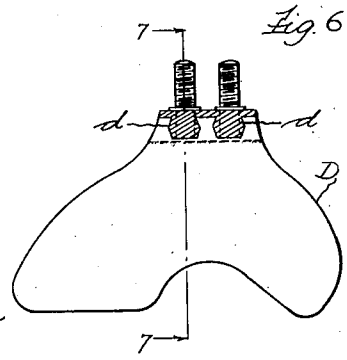


Fig. 7.

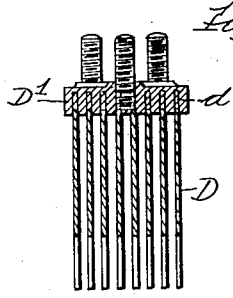


Fig 8

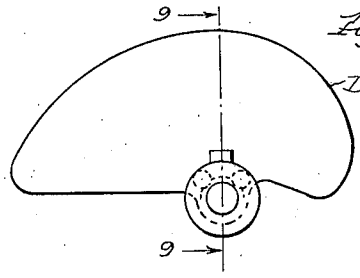
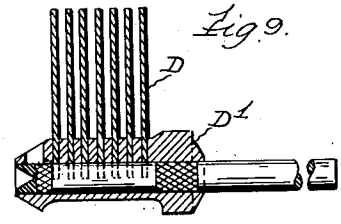


Fig. 9.



Witness.
H. O. McKnight.

Inventor.
Eric Carlson.
by Burton & Burton
his Attorneys.

Feb. 15, 1927. 1,617,577

E. CARLSON

ASSEMBLING MECHANISM FOR CASTING MACHINES

Filed April 14, 1926 4 Sheets-Sheet 3

Fig. 3.

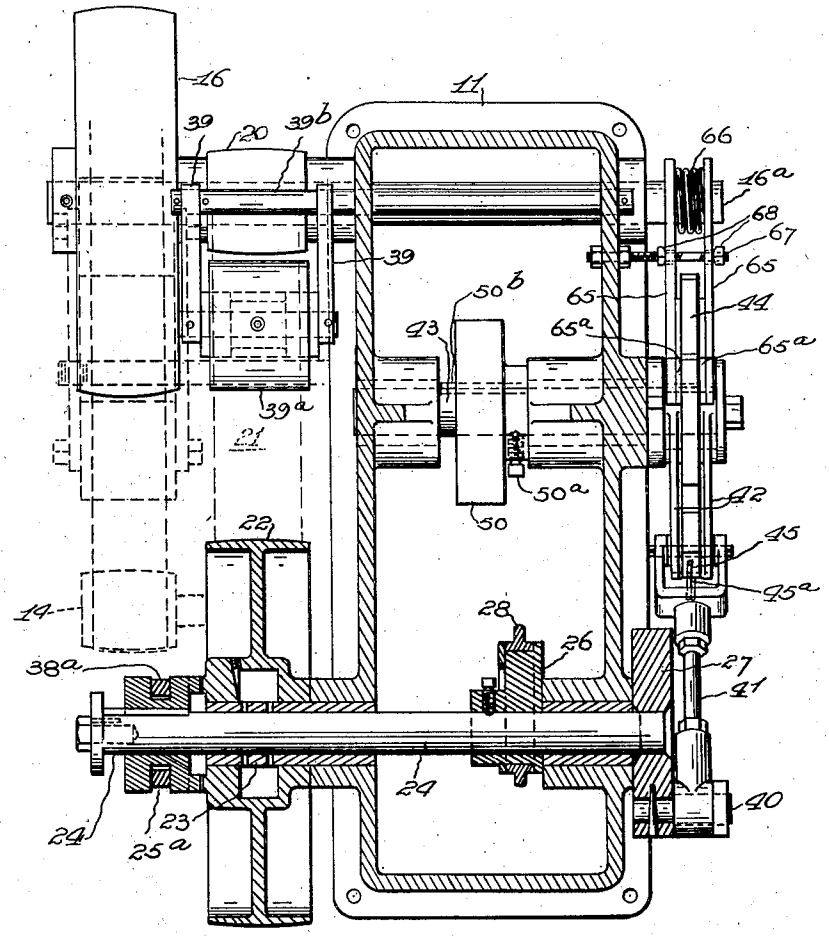


Fig 13.

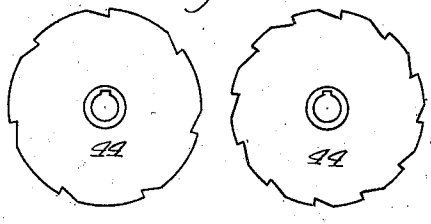
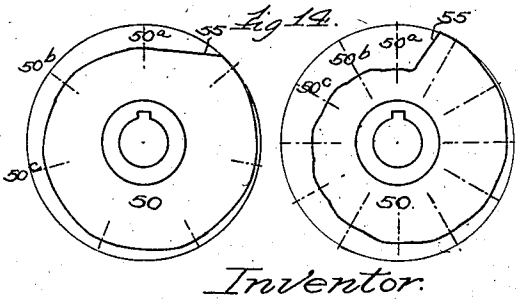


Fig 14.



Witness.
H. C. McKnight.

Inventor.
Eric Carlson.
by Burton & Burton
his Attorneys.

Feb. 15, 1927. 1,617,577

E. CARLSON

ASSEMBLING MECHANISM FOR CASTING MACHINES

Filed April 14, 1926 4 Sheets-Sheet 4

Fig. 4.

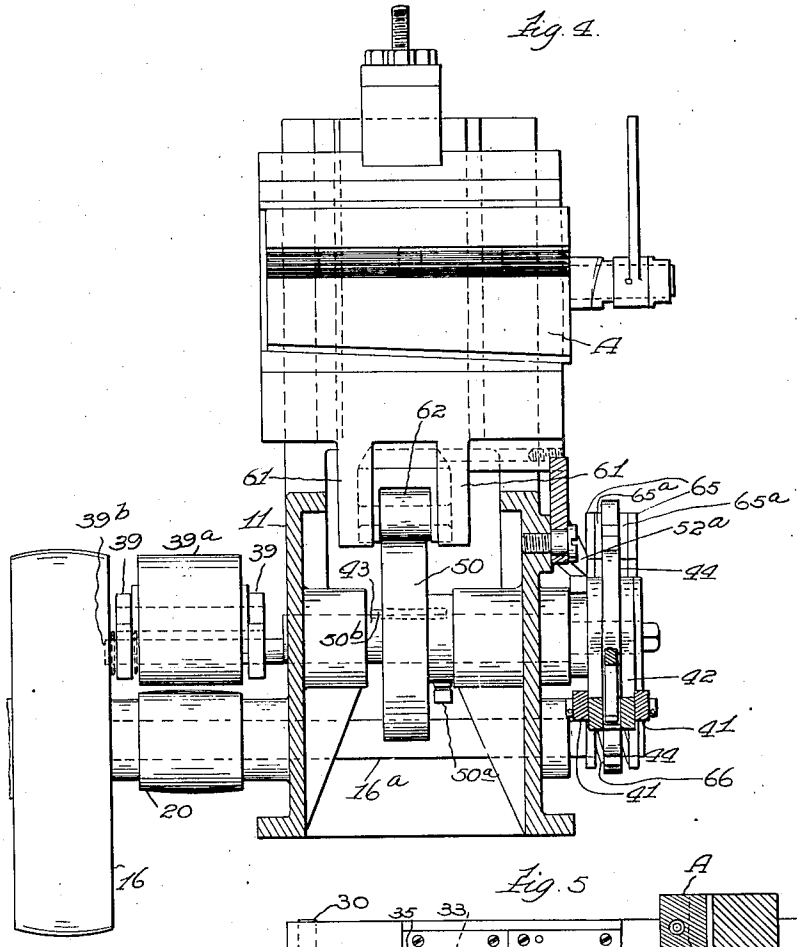
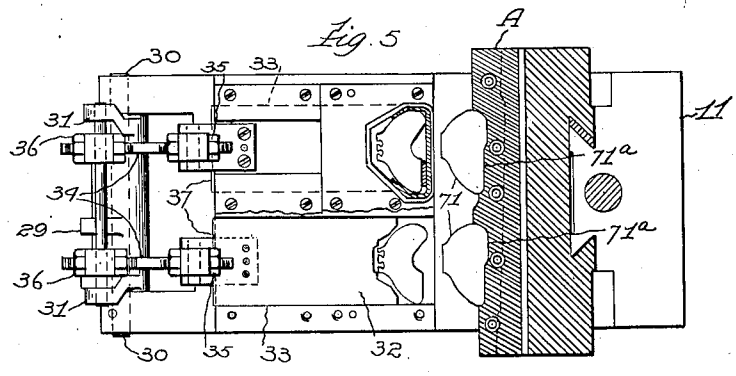


Fig. 5



Witness.
H. C. McKnight.

Inventor.
Eric Carlson.
by Burton & Burton
his Attorneys.

Patented Feb. 15, 1927. 1,617,577

UNITED STATES PATENT OFFICE.

ERIC CARLSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO STEWART MANUFACTURING CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

ASSEMBLING MECHANISM FOR CASTING MACHINES.

Application filed April 14, 1926. Serial No. 101,854.

The purpose of this invention is to provide a means for assembling a desired number of plates which are to be eventually held permanently in parallel relation by securement or partial imbedment in a die casting, particularly designed for assembling the plates of an electric condenser and the like which is to be completed by casting the plate-retaining metal about a corresponding portion of all plates. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

Figure 1 is a side elevation of the upper part of a machine embodying this invention.

Figure 2 is a front end elevation of the machine.

Figure 3 is a horizontal section at the line 3—3 on Figure 1.

Figure 4 is a vertical section at the line 4—4 on Figure 1.

Figure 5 is a horizontal section at the line 5—5 on Figure 1.

Figure 6 is a plan view of a condenser element comprising plates of one form which the machine is adapted to assemble in a die member in which the devcie is to be completed by casting.

Figure 7 is a section at the line 7—7 on Figure 6.

Figure 8 is a view similar to Figure 6 showing a condenser element co-operative with the condenser element shown in Figure 6.

Figure 9 is a section at the line 9—9 on Figure 8.

Figure 10 is a front elevation of a die member to be carried in the machine for being loaded with the plates and masking the portion of them which is not to be enclosed in the casting when said die member with the plates assembled in it is associated with the remainder of the die for the casting process.

Figure 11 is a section at the line 11—11 on Figure 10, showing in dotted lines the plates as they are to be inserted by the machine.

Figure 12 is a section at the line 12—12 on Figure 10, cutting through one of the plate-receiving slots of the die member, and showing a plate in the position in which it will be inserted in the slot by the machine.

Figure 13 shows in side elevation several interchangeable cams, and Figure 14 shows similarly several corresponding interchangeable ratchet disks, said cams and disks to be interchanged in the machines according to the number of plates to be assembled in the die member according to the number of slots with which the die member is provided for receiving the plates.

The machine shown in the drawings comprises a carrier for a die member indicated at A in Figure 1 and seen in Figures 10 and 11, which is adapted to be mounted in the machine for being loaded with the plates to be carried with said die member in the die in the casting process by which the condenser element is completed, and a magazine shown at B in Figure 1 for containing a pile of the plates D which it is the function of the machine to assemble in the die member, which latter is formed for enclosing and masking all of the area of said plates except the small portion thereof which is to be imbedded in the metal to be cast around that portion in the die. The function and operation of the machine consists in thrusting the plates, one by one, into the apertures with which the die member is provided, dimensioned for drive fit of the plates therein. And the machine for that purpose comprises means for carrying the die member, step by step, past the plane of the support of the pile of plates in the magazine, halting it after each step with one of the plate-receiving slots registered with the bottom plate of the pile, and, during the halt, thrusting the bottom plate by means of a thrust bar into the slot, the thrust bar withdrawing after the thrust while the die member is advanced to bring the next slot in registration with the next plate of the pile which descends by gravity to the plane of the thrust bar ready for the next thrusting movement. The machine is constructed for automatically giving the die member and the thrust bar the movements described in the proper alternation, and for returning the die member to original position when it is fully loaded and automatically halting the mechanism for removal of the die member in substitution of another die member to be similarly loaded with plates.

The structure in detail may be described as follows:

It comprises a frame structure consisting of the base frame, 10, and an upper frame, 11, mounted upon the base frame, both

frames being shown as metal castings. C represents conventionally an electric motor mounted in the base frame having its shaft extending out to the left hand side of the frame and carrying a pulley, 14, which drives a belt, 15, passing around a pulley, 16, journaled toward the rear end of the base frame, a slack take-up pulley, 17, being provided carried by a lever frame, 18, on the pivotal shaft, 19, mounted in the base frame, the take-up being effected by a counterweight indicated at 17^a on the longer arm of the lever frame. Rigid with the pulley, 16, is a small pulley, 20, about which a belt, 21, extends to and about a pulley, 22, which is journaled on a tubular bushing, 23, mounted in the left hand side web of the upper frame, 11, and constituting a journal bearing of a shaft, 24, which extends across the frame protruding at the left hand side for carrying a clutch collar, 25, co-operates with a clutch member, 22^a, formed on the hub of the pulley, 22, for deriving from the pulley, 22, rotary driving for the shaft, 24, the two clutch members being engaged and disengaged as hereinafter described.

On the shaft, 24, there is made fast inside the upper frame, 11, an eccentric, 26, and outside said frame a crank wheel, 27. With the eccentric, 26, there is associated an eccentric link connection, 28 the link extending upwardly and being connected at its upper end with a bell crank lever, 29, fulcrumed on the frame as seen at 30, and having its upwardly extending arm, 31, connected to a slide, 37, for reciprocating a thrust bar, 32, which is mounted for sliding on a slideway, 33, provided at the upper end of the forward part of the frame, 11. The connection from the bell crank for operating the thrust bar consists of the link, 34, adjustable as to its operative length by screwing through unts, 35 and 36, at its opposite ends, the nut, 35, being pivoted to the lever arm, 31, of the bell crank lever, and the nut 36, being mounted also pivotally on the end of the thrust bar carrying slide, 37.

The crank wheel, 27, has a crank wrist, 40, connected by a forked pitman, 41, with a pair of lever arms, 42, 42, which are mounted for oscillation upon a shaft, 43, journaled in the frame and carrying between said lever arms, a ratchet disk, 44, said lever arms, 42, carrying on the pivot of the forked lever to said lever arms, a pawl, 45, which is pressed in a spring, 46, toward the periphery of the ratchet disk for engaging with the ratchet teeth thereof to rotate the ratchet wheel and thereby the shaft, 43, one step upon each reciprocation of the pitman at each revolution of the shaft, 24. Fast on the shaft, 43, inside the frame there is secured a cam wheel, 50, having its cam edge eccentric in successive steps, 50^a, 50^b, 50^c, etc., progressively increasing in eccentricity in the reverse of the direction of rotation of the cam wheel with the shaft, 43, the angular extent of the eccentric steps of the cam corresponding to the angular interval between the ratchet teeth of the ratchet wheel, 44, but dropping off at the last step from the maximum to the initial eccentricity as indicated at 55.

In the upper frame member there is mounted for vertical reciprocation a carrier, 60, for the die member, A, said carrier having journaled between downwardly projecting lugs, 61, 61, a cam roll, 62, which rides upon the periphery of the cam disk, 50, whereby the rotation of the cam lifts the carrier, step by step, throughout the increasing eccentricity of the cam steps to the maximum, the roll, 62, dropping off from the cam at its maximum eccentricity back to the point of least eccentricity as the carrier descends by gravity after having been lifted, step by step, to the highest point for which the cam is constructed.

From Figures 6 and 8 it will be seen that the plates, D, are formed with dove-tail notches, *d*, into which the metal flows in the casting process, effecting a secure engagement of each plate with the hub or stem, D^1, by which they are retained in proper assembled relation for the purpose of an electric condenser element.

In Figures 13 and 14 are shown interchangeable cams, 50, and corresponding interchangeable ratchet disks, 44, which will be substituted in the machine by selection according to the number of plates to be assembled in the die member, and for which the latter has a corresponding number of slots. The interchange of ratchet cams and ratchet disks is facilitated by the detail construction shown, consisting in that the shaft, 43, is withdrawable upon slacking the set screw, 50^a, which secures the cam, 50, as to its position longitudinally of the shaft, 43, a key, 50^b, serving to secure it for rotation with the shaft.

For the function of the clutch, 22^a, 25, the clutch collar, 25, is feathered for sliding on the shaft, 24, the necessary distance for engaging and disengaging the clutch teeth; and it is peripherally grooved at 25^a for engagement of a fork, 38^a, which terminates an arm, 38, which is carried on the left hand end of a shaft, 46, which extends through the frame, 11, having at its right hand end a cross handle, 46^a, for operating it, and to co-operate in locking it as hereinafter described. A spring, 47, coiled on the shaft, 46, between its bearing in the left hand side of the frame and the hub of the arm, 38, reacts for holding the clutch member, 25, out of engagement with the member, 22^a. On the right hand side of the

frame, 11, there is fulcrumed at 51 a lever, 52, whose longer arm extends in the direction to be engaged behind the cross handle, 46ª, of the clutch operating shaft, 46, when the shaft is at withdrawn position for engaging the clutch; and a spring, 48, is provided attached to the frame and to the lever, 52, for holding the lever in the position shown in Figure 1 behind said cross arm at the withdrawn position of the shaft, 46. The shorter arm, 52ª, of the lever, 52, terminates in an abutment, 52ᵇ, which is positioned in the plane of rotation of a disk-like flange, 43ᵇ, formed integrally on the shaft, 43, and having a cam projection, 43ᶜ, which encounters the abutment, 52ᵇ, in the last step of the rotation of the ratchet disk and cam, and by said encounter rocks the lever, 52, out of engagement with the cross handle, 46ª, thereby releasing the shaft, 46, and causing the spring, 47, to operate for thrusting the shaft in the direction for disengaging the clutch, which disengagement, it will be understood, occurs upon the completion of the last upward step movement of the carrier, 60, and while the carrier is descending as the cam roll, 62, moves down along the slope, 55, of the cam to the initial position at the start of the first or lowest eccentricity of the cam.

The operation of the machine may be understood from the foregoing description, but may be further indicated as follows:

The die member to be loaded with plates having been selected and mounted in the carrier, 60, and a cam, 50, and a ratchet disk, 44, being selected, having the number of cam steps and ratchet teeth corresponding to the number of slots in the die member, and being placed in position on the shaft, 43, the necessary number of plates being placed in the magazine, B, the machine is started by the operator pulling the clutch shifting lever shaft 46 outwardly and thereby moving the clutch member, 25, into position for engaging the co-operating clutch member 22ª on the hub of the pulley, 22, which is in revolution, being driven by the motor; and thereupon the clutch members becoming engaged, and the machine is operated in all its parts, causing the thrust bar, 32, to eject from the pile of plates contained in the magazine, the bottom plate which lies immediately in advance of the thrust bar and in registration with the uppermost slot of the die member, into which, accordingly, the plate is thrust to the limit of the stroke of the thrust bar, which is also the limit of the slot in the die member. During the retraction of the thrust bar which immediately follows its operating stroke, the first cam eccentricity comes into operation for uplifting the carrier, 60, carrying the die member up one step, and bringing the next slot into registration with the next plate of the pile which, upon the complete retraction of the thrust bar, has fallen with the descent of the entire pile, into the place vacated by the ejected plate, and thereupon, the operation is repeated; and upon each succeeding revolution of the shaft, 24, giving a step movement to the ratchet disk and to the cam, an additional plate is thrust from the pile into the die member until the last or lowest slot of the die member is filled in the final step of rotation of the cam disk by which it arrives at the original starting position, the cam projection, 43ᶜ, on the flange, 43ᵇ, encounters the abutment, 52ᵇ, of the short arm of the lever, 62, causing the lever to be rocked, and its longer arm to be withdrawn from behind the cross handle, 46ª, of the clutch operating shaft, 46; whereupon the spring, 47, reacts for disengaging the clutch, and the machine slows down while the cam roll, 62, on the carrier, 60, which co-operates with the cam, is descending along the edge, 55, of the cam to initial position at the commencement of the lowest cam eccentricity, 50ª, and the machine comes to rest with the parts at initial position, ready for repetition of the cycle of movements upon the substitution of another die member for the one which is now fully loaded with plates and ready to be removed.

The belt, 21, is provided with a slack-take-up pulley, 39ª, carried by a frame, 39, on a pivot shaft, 39ᵇ, and operating on the belt by gravity.

For the purpose of preventing over-actuation of the ratchet disk, 44, and shaft, 43, at each pawl stroke, and especially to insure that the parts coming to rest at the completion of the cycle of the cam, 50, there is provided a friction brake device comprising a pair of arms, 65, 65, mounted loosely on the right-hand end of the shaft, 16ª, of the pulley, 16, which shaft protrudes slightly for that purpose, said arms extending alongside the ratchet disk, 44, and having friction pads, 65ª, which are pressed against the opposite sides of the disk by a spring, 66, coiled around the shaft, 16ª, between the ends of the arms, 65, 65, and reacting to spread said ends of the arms apart, a die bolt, 67, mounted in the frame being extended through said arm, 65, and having outside the arms respectively, adjusting nuts, 68, which, being screwed toward each other, form fulcrums for the arms respectively, over which they pivot for pressing the pads toward each other against the ratchet disk under the reaction of the springs spreading apart the opposite ends of the arms.

Although the formation of the die member, in which the plates are assembled by this machine, constitute no part of the present invention, it may be noted that this die member is preferably built of laminæ and

spacer strips for forming between the laminæ the slots whose width is the thickness of the spacer strips, and that the laminæ thus spaced for forming the intervening slots, are each spaced substantially in conformity with the face of the plates to be entered between them, as may be seen at 71 in Figure 5, wherein the lower laminæ at the slot at which the section is made, is seen and indicated at 71a.

I claim:—

1. In a machine for the purpose indicated in combination with a frame structure, a reciprocable carrier for a die member and the like, a magazine for plates to be mounted in the die member, a reciprocable thrust bar for ejecting the plates, one by one, from the magazine into the die member; operating means for advancing the die member carrier transversely with respect to the position of the plates in the magazine, operating means for reciprocating the thrust bar, a power shaft and connections therefrom for actuating the carrier-operating means and the thrust bar operating means adapted to time said movements in alternation with each other for first positioning the die member with its plate-receiving openings in alignment with the thrust bar, and next operating the thrust bar.

2. In the construction defined in claim 1, the carrier actuating means being a cam progressively stepped, and means for moving the same step by step, the cam steps being dimensioned correspondingly to the spacing of the plate-receiving openings of the die member.

3. In the construction defined in claim 1, the carrier actuating means being a rotatable cam having circumferentially seccessive steps increasing in eccentricity progressively in the reverse of the direction of rotation; a ratchet wheel mounted for rotation with the cam and a reciprocating pawl for actuating the ratchet wheel to rotate the cam step by step.

4. In the construction defined in claim 1, the plate magazine being adapted for holding the plates piled therein, whereby they are held in close succession by gravity, the means for operating the carrier being adapted for giving it step-by-step movement upward, and permitting downward movement in a single step at the end of a predetermined number of upward steps, the die member carrier being adapted for holding the die member in directly transverse relation to the direction of delivery of the plates from the magazine.

5. In the construction defined in claim 1, the plate magazine being adapted for holding the plates piled therein for descending by gravity, the thrust bar being positioned for encountering and ejecting from the pile the bottom plate of the pile, the die member carrier being adapted for holding the die member in directly transverse relation to the direction of delivery of the plates from the magazine.

6. In the construction defined in claim 1, foregoing, the die member carrier being arranged with respect to its actuating means for making the step movement upwardly, and adapted to be returned by gravity to its starting position, a dash pot on the frame structure and a plunger piston carried by the die member carrier cooperating with the dash pot in the descending movement of the carrier for damping said descending movement.

7. In the construction defined in claim 1, the power shaft having an eccentric operating connection with the thrust bar for reciprocating the latter, and having also an eccentric operating connection with the pawl for giving step by step movement to the cam, said eccentric operating connections being relatively positioned about the casting of said shaft for actuating the cam during the retraction of the thrust bar.

8. In a machine for the purpose indicated in combination with a frame structure, a carrier for a plate-receiving die member, a plate magazine, a thrust bar for ejecting plates from the magazine into the die member on said carrier, operating means for the carrier for moving it transversely to the plate-receiving openings of the die member carrier therein, in steps corresponding to the spacing of said openings, and operating means for the thrust bar for giving it its thrust movement in alteration with the step movements of the carrier.

9. In the construction defined in claim 8, a power shaft mounted in the frame structure, a rotatable shaft parallel thereto, a cam on the latter shaft rotated thereby having circumferentially successive graduated cam steps of uniformly increasing eccentricity in the reverse of the direction of rotation of the shaft, and dropping off from the step of greatest eccentricity to that of least eccentricity; a ratchet wheel on said second shaft, a pawl co-operating with said ratchet wheel; crank and pitman connection from the power shaft to said pawl for giving the pawl a feeding stroke in each complete rotation of the power shaft, the graduated steps of the cam corresponding in angular extent to the angular interval between the ratchet teeth and between the pawl strokes; whereby the carrier is actuated one step for each complete rotation of the power shaft.

10. In a construction as defined in claim 1, means for advancing the carrier, step by step, to position the die member for receiving a plate at each position reached by the successive steps, a disengageable clutch in the driving connection, means for locking

the clutch at engaged position, yielding means for disengaging the clutch when released from the locking means, and means carried by the carrier-advancing means for releasing the locking means after a predetermined number of steps of advance.

11. In a construction as defined in claim 1, means for advancing the carrier comprising a rotating shaft, and operating connections by which the advance is made step by step with intervening haltings, to position the die member for receiving a plate at each position at which it is halted; a disengageable clutch in the driving connections; means for locking it at engaged position for driving, yielding means for disengaging it when released from the locking means, and means carried by the rotating carrier operating shaft for releasing the locking means after a predetermined number of steps.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 9th day of April, 1926.

ERIC CARLSON.