

Oct. 7, 1941.

K. G. HEFT ET AL

2,258,288

PRINTING MACHINE FOR MARGARINE OR THE LIKE

Filed Feb. 4, 1939

3 Sheets-Sheet 1

FIG 1

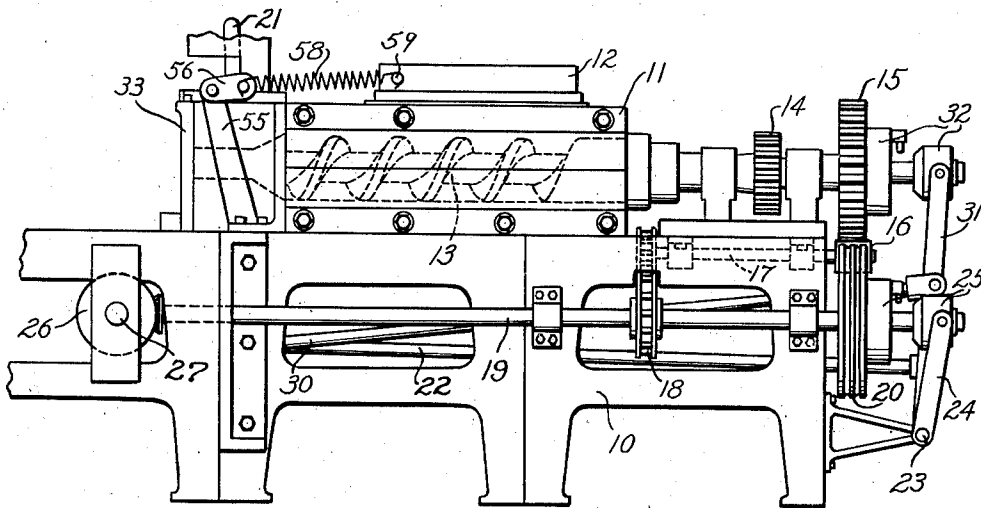
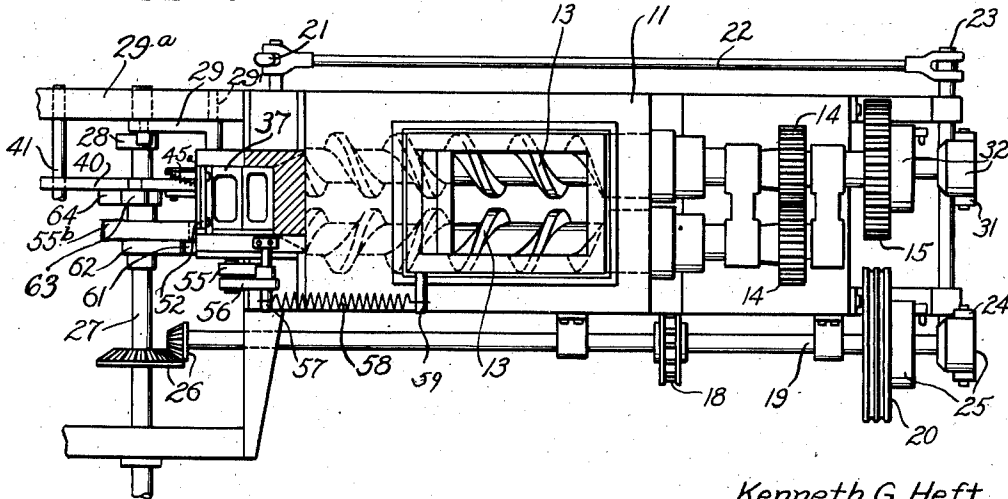


FIG 2



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3 Sheets-Sheet 2

FIG 3

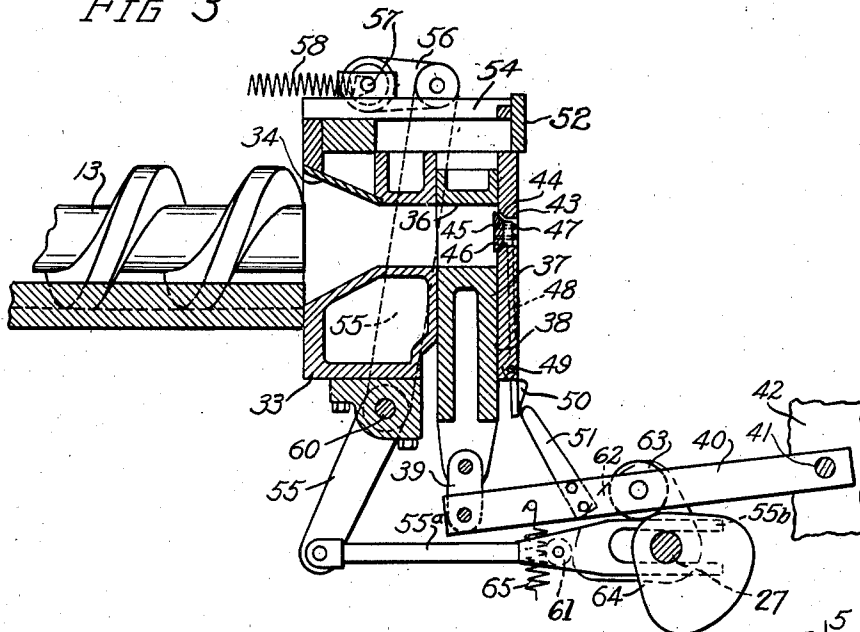


FIG 4

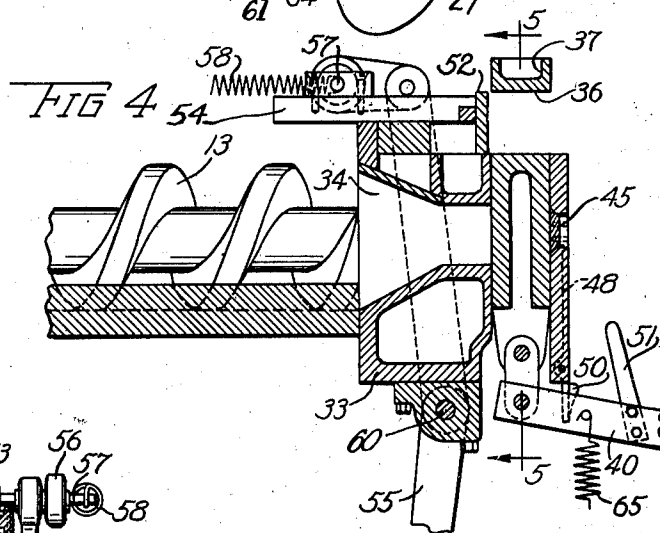
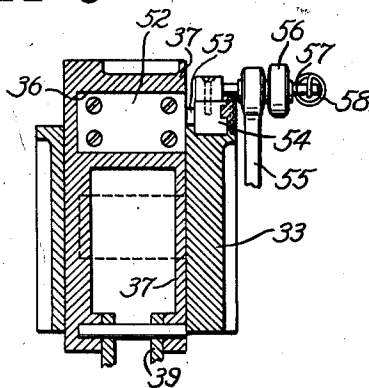


FIG 5



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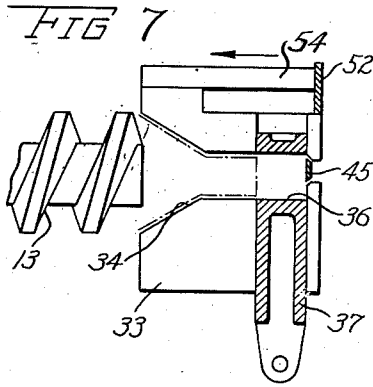
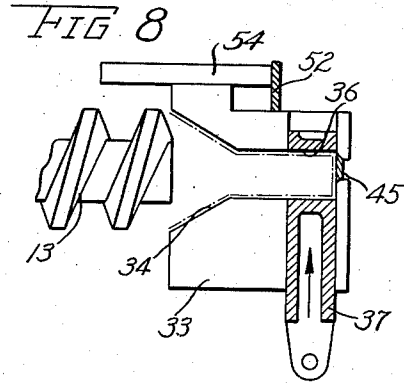
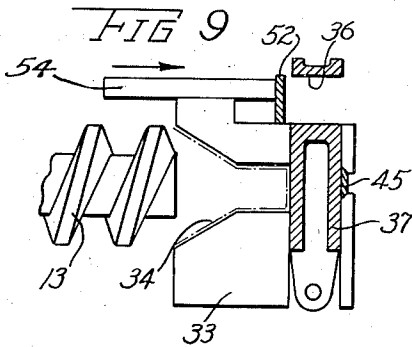
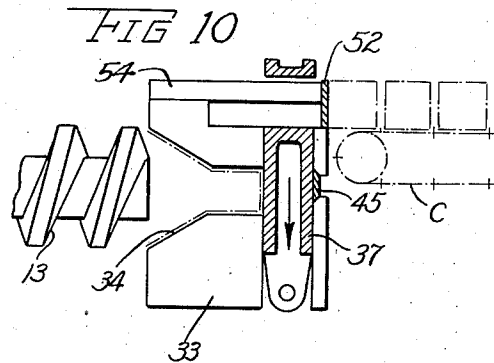
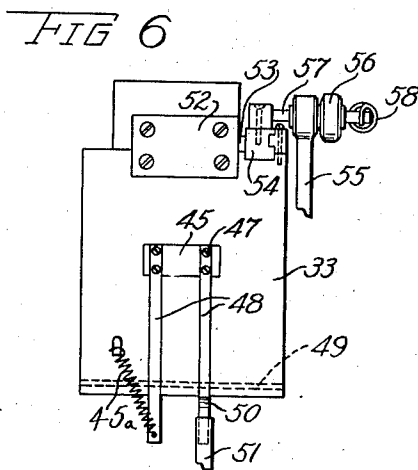
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3 Sheets-Sheet 3



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PRINTING MACHINE FOR MARGARINE OR
THE LIKE

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Application February 4, 1939, Serial No. 254,618

16 Claims. (Cl. 31—42)

This invention relates to machines and methods of handling margarine, butter, cheese, lard and other materials of similar nature, but more particularly to the formation of such materials into prints or bars of substantially the same weight and size, it being a desideratum successively and expeditiously to produce prints of such material, which are of uniform consistency and of the same weight.

An object of the invention is to produce a new and improved machine for producing prints of butter, margarine, cheese, lard and the like, by which air is vented or released from the material so that the prints are uniformly of the same consistency and weight, and by which prints of this character are successively and rapidly produced.

Another object is to produce a machine of the above character in which the material is intermittently packed into a mold, whereupon the mold shifts to a point where the finished print is discharged and then rapidly returns for another charge but before the discharging means has retracted, thereby greatly expediting the operation.

A further object is to produce a simple and efficient method of forming prints of the above character from which the air is released or vented, and which are expeditiously delivered to the wrapping mechanism so that the time element involved is reduced to a minimum.

Other objects and advantages of the invention will hereinafter appear, and, for purposes of illustration but not of limitation, an embodiment of the invention is shown on the accompanying drawings, in which:

Figure 1 is a side elevation of a print forming machine, the sheet feeding mechanism and wrapping mechanism being omitted;

Figure 2 is a top plan view of the machine shown in Figure 1;

Figure 3 is an enlarged vertical sectional elevation of the mold, casing therefor, and associated parts, showing the position of the parts reversed with respect to Figures 1 and 2 and showing particularly the mold in position to receive a charge of margarine, or other material, and the pusher or ram in its advanced position;

Figure 4 is a vertical sectional elevation similar to Figure 3, but in which the mold has received the charge and has been moved to its elevated position, the pusher being in position to discharge the print from the mold;

Figure 5 is a vertical sectional view on the line 5—5 of Figure 4;

Figure 6 is an end elevation of the mold casing showing the valve for venting air from the mold and also showing the means for actuating the print discharging pusher or ram;

5 Figure 7 is a diagrammatic view showing the initial position of the mold preparatory to receiving its charge of margarine, or the like, with the print discharging ram in its advanced position;

10 Figure 8 is a diagrammatic view showing the mold filled and the material closing the air vent valve;

Figure 9 is a diagrammatic view in which the mold has been elevated to the print discharge position, the ram or pusher being ready for its advancing movement; and

Figure 10 is a diagrammatic view similar to Figure 9 in which a ram or pusher is moved forwardly to discharge the print from the mold.

20 The illustrated embodiment of the invention comprises a print forming machine having a supporting frame or standard 10 on which is suitably mounted a box 11, on the top of which is a hopper 12 into which material to be formed into prints is introduced. The machine is particularly adapted for the handling of margarine, butter, cheese, lard and other similar materials of semi-plastic nature. Disposed within the box 11 is a pair of feed screws 13, which are disposed horizontally and are arranged side by side. Preferably, the screws 13 are of wood, and are operatively connected by meshing gears 14 respectively at their rear ends. A gear 15 is connected to drive the gears 14, and meshing with the gear 15 is a pinion 16, which is fixed to a counter shaft 17. The counter shaft 17 has a sprocket and chain connection 18 with a main drive shaft 19. On the drive shaft 19 is a sheave 20, which is operatively connected to a source of power, such as an electric motor (not shown).

40 The operation of the machine is controlled by an operating handle 21, which is suitably connected through a link 22 to a shaft 23 on which an arm 24 is fixed. The arm 24 actuates a suitable internal expanding clutch 25 so that the machine may be connected at will to the source of power by manipulation of the handle 21.

The main drive shaft 19 is connected by beveled gears 26 to a transverse counter shaft 27. On the counter shaft 27 is a cam 28, with which one end of a bell crank 29 engages. The bell crank 29 is fixed to a shaft 29' which turns in a frame member 29a. The opposite end of the bell crank is connected by a rod 30 and an arm 31 to an internal expanding clutch 32, which controls

the operation of the screws 13. The arrangement is such that the screws 13 are recurrently driven, thereby to feed or deliver a charge of material to the mold and thereafter stop until the mold has discharged a print and has returned to its initial position, whereupon the screws are again rotated to deliver another charge.

Mounted on the main frame 10 and disposed at the front end of the box 11 is a mold casing 33 in the form of a casting provided with a throat 34 which tapers inwardly from the feed screws 13, and is adapted to be aligned with a mold or print forming cavity 36 formed in an intermediate part of a mold 37. The mold 37 is rectangular in cross section and elongate in a vertical direction. The mold is mounted for vertical reciprocating sliding movements in an open ended guide 38 within which the mold fits snugly. The lower end of the mold is connected by a link 39 to one end of an arm 40, which is pivoted at its opposite end at 41 to a bar 42 suitably secured to the main frame. The mold cavity 36, into which the material is forced by the screws 13, is open at its front and rear ends.

Formed in the wall of the casing 33 substantially in axial alignment with the throat 34 is a substantially rectangular vent opening 43, which is provided with a tapered valve seat 44. Adapted to close the opening is an elongate plate valve 45, side edges of which are tapered, as indicated at 46, to fit snugly against the tapered seat 44. The valve 45 is secured by screws 47 to a pair of spaced depending arms 48, which are pivoted adjacent their lower ends upon a transverse rod 49. The valve is normally urged inwardly to its open position by a coil spring 45a which engages one of the arms 48. On the lower end of the other of the arms 48 is a cam piece 50, the outer surface of which inclines upwardly and outwardly so that a finger 51 secured to the arm 40 may ride over the cam surface during the upward movement of the mold 37 for urging the valve 45 against its seat and insuring that the valve is entirely closed when the mold slides over it.

An important feature of the invention is to enable release or venting of air from the mold cavity and the material in order to insure that the material packed into the mold cavity is a solid mass free from air pockets which interfere with the weight of the print. It is desired that a print consists of a homogeneous mass entirely free from air pockets so that each print will have the same weight as every other print. In this connection, it will be observed that the vent opening 43 is disposed substantially in alignment with the advancing movement of material into the mold cavity. Consequently, any air which is trapped in the mass will be squeezed out as the material is forced under pressure and packed tightly within the cavity 36. Substantially upon completion of the filling of the mold cavity the material impinges against the inner surface of the valve 45 and forces it tightly against its seat 44, thereby to close the vent opening.

Rotation of the feed screws 13 stops when the mold 37 moves upwardly so that further feeding or packing of the material into the throat and mold cavity ceases upon vertical movement of the mold. Thus, it will be understood that the mold 37 moves from the position shown in Figure 8 to that shown in Figure 9, in which latter position the mold cavity 36 is aligned with a ram

or pusher 52, which, as indicated in Figure 10, moves forwardly to force the bar or print of material carried by the mold upon a suitable conveyor C. If desired, the print may first be folded in any suitable manner with parchment paper by wrapping mechanism well known in the art.

As shown in Figure 5, one side of the mold cavity 36 is open and the pusher or ram 52 is connected by a short bracket 53 with a slide 54, which is reciprocable horizontally in the mold casing 33. It will be understood that the face of the ram 52 has a nice sliding fit in the mold cavity, and the open side of the cavity enables the ram 52 to move forwardly to a position shown in Figure 10 for expelling the print, whereupon the mold 37 retracts or moves downwardly while the ram is in its advanced position. Such downward movement of the mold is made possible by movement of the ram 52 to a point beyond the adjacent side of the mold so that neither the ram nor its associated parts are within the mold cavity 36. After the mold has retracted the ram 52 moves rearwardly, as indicated in Figure 7.

This construction and arrangement is of importance in increasing the speed of the print forming operation because the mold does not have to remain in its uppermost position until the ram 52 has retracted. On the contrary, the mold merely remains in its uppermost position just long enough to allow the print to be expelled and then it retracts, allowing the ram 52 to retract subsequently. In the rearward movement of the ram 52, it slides over the top of the mold which is then receiving another charge of margarine.

The slide 54 carrying the ram 52 is actuated by an arm 55 joined at one end by a link 56 to a post 57 which is fixed at one end to the slide 54. A coil spring 58 has one end anchored to the post 57 and the opposite end to a stationary bracket 59, the spring urging the ram 52 to its normal or retracted position. The arm 55 is pivoted at 60 and the lower end thereof is pivoted to a horizontally disposed arm 55a which has a forked end 55b straddling the counter-shaft 27. On the arm 55a is a roller 61 which is suitably actuated by a cam 62 on the counter shaft 27. A roller 63 on an intermediate portion of the mold actuating arm 40 engages a cam 64 on the shaft 27, a coil spring 65 assisting in the downward movement thereof. It will be understood that the cams on the counter shaft 27 are so arranged and chosen that the above described sequence of operation of the several parts takes place. Detail illustration and description of these parts are not regarded as necessary since they will be readily understood by those skilled in this art.

Upon the return of the mold 37 to its normal position with the cavity 36 in position to receive the next succeeding charge, the cam 28 on the counter shaft 27 will have moved to such position as to actuate the clutch 32 for resuming the rotative movement of the screws 13. The above described operation is then repeated.

When the mold 37 returns to its normal position where it receives another charge of material, the valve 45 automatically opens as soon as the lower edge portion of the cavity 36 passes free, thereby to vent air from the oncoming charge. As shown, the weight of the valve is such as to cause it normally to rock slightly in a counter clockwise direction (Figure 3) or to its open position, and the valve remains in such position until the material presses it closed. The

valve then remains closed, and through the finger 51 and cam surface 50 is held tightly in its closed position when the lower edge portion of the mold cavity 36 encounters it upon the upward movement thereof.

A cardinal feature of this invention resides in the production of a print of margarine, butter, or the like, which is substantially free from air pockets, at least sufficiently free from such air pockets as not to vary the weight of the successive prints, so that the weights of the prints are uniform. Another important feature resides in the rapidity with which the prints can be produced, and such speedy action is made possible to a large extent by the relative operation of the mold and discharge ram because the mold can move quickly to print discharging position, the print quickly expelled, and the mold returned for its next charge without waiting for the retraction of the discharge ram. This greatly enhances the speed of operation of the machine.

It is to be understood that although I have described a machine and method which satisfy the objects primarily enumerated, the description and illustration are not to be regarded as limiting except as defined by the appended claims.

What we claim is:

1. In a print machine for semi-plastic materials, means to advance material under pressure, a box-like open ended mold for containing a predetermined amount of material and disposed in the path thereof, a normally open valve at the front end of said mold for venting air therefrom and arranged to be engaged and closed by the material, means for actuating said mold at substantially right angles to the advancing movement of the material, said material advancing means being rendered ineffective during movement of the mold, and means to insure that the valve remains closed during movement of the mold.

2. In a print machine for semi-plastic materials, a restricted throat, means to force material through said throat, a mold at the opposite end of said throat for the material, said mold having an open outer end, an air vent valve adjacent said open end and arranged to be engaged by the material and thereby closed, means for vertically actuating said mold, and a pusher for discharging the material from the mold.

3. In a print machine for margarine or the like, a restricted throat, means to force margarine through said throat, a mold at the opposite end of said throat for the margarine, said mold having an open outer end, an air vent valve adjacent said open end and arranged to be engaged by the margarine and thereby closed, means for actuating said mold, means conjoined to said actuating means for insuring closing of said valve during actuation of said mold, and a pusher for discharging the margarine from the mold.

4. In a print machine for margarine or the like, a mold having opposite sides open, means for forcing margarine through one open side of the mold, an air vent valve juxtaposed to the other open side of the mold, said valve being open upon introduction of the margarine and adapted to be closed by pressure of the margarine thereagainst, means for reciprocating said mold, a pusher for discharging the margarine

from said mold, and means enabling return of said pusher after retraction of said mold.

5. In a machine for forming prints of margarine or the like, means operable intermittently to feed margarine, a mold having an open end to receive the margarine, margarine responsive means for venting air from said mold, means operable in timed relation to said feeding means for reciprocating said mold from feeding position to discharging position, means to discharge the print from the mold, and means to enable retraction of said mold prior to retraction of said discharge means.

6. In a machine for forming prints of margarine or the like, margarine feeding means, a casing, a mold reciprocable in said casing and having open ends, an air venting device constructed and arranged to be closed by the margarine substantially upon filling of the mold, means to move said mold between margarine filling and print discharging locations, a pusher for discharging the print, means for actuating said pusher, and one side of said mold being open to enable said pusher to discharge the print when the mold is in discharging location, and to retract after the mold has returned to feeding position.

7. In a print machine for semi-plastic materials, an intermittently operable material feeder, a mold to receive material from said feeder, reciprocatory means operable in timed relation to the movement of said feeder for actuating said mold from material-receiving position to print-discharging position, a reciprocatory print discharger operable when said mold is in print-discharging position for discharging the print therefrom, and means to enable retraction of said mold to material-receiving position prior to retraction of said discharger.

8. In a print machine for semi-plastic materials, an intermittently operable material feeder, a mold to receive material from said feeder, reciprocatory means operable in timed relation to the movement of said feeder for actuating said mold from material-receiving position to print-discharging position, a reciprocatory print discharger movable at right angles to the direction of movement of the mold when said mold is in print-discharging position for discharging the print therefrom, and means to enable retraction of said mold to material-receiving position prior to retraction of said discharger.

9. In a print machine for semi-plastic materials, an intermittently operable material feeder, a mold to receive material from said feeder, reciprocatory means operable in timed relation to the movement of said feeder for actuating said mold from material-receiving position to print-discharging position, said mold having an open side, a reciprocatory print discharger operable when said mold is in print-discharging position for discharging the print therefrom, and means for actuating said print discharger including a part movable along the open side of said mold to a point in advance of the mold, whereby said mold is enabled to retract to material-receiving position prior to retraction of said discharger and substantially when the discharger has cleared the mold.

10. In a print machine for semi-plastic materials, an intermittently operable material feeder, a mold to receive material from said feeder, means adapted to be closed by the material for venting air from the mold, said venting means being movable to and from closed po-

sition, reciprocatory means operable in timed relation to the movement of said feeder for actuating said mold from material-receiving position to print-discharging position, said mold having an open side, a reciprocatory print discharger operable when said mold is in print-discharging position for discharging the print therefrom, and means for actuating said print discharger including a part movable along the open side of said mold to a point in advance of the mold, whereby said mold is enabled to retract to material-receiving position prior to retraction of said discharger and substantially when the discharger has cleared the mold.

11. In a print machine for semi-plastic materials, a material feeder, a mold for receiving a predetermined amount of material from the feeder, said mold being movable between material-receiving and material-discharging positions, means movable between open and closed positions responsive to the material for venting the air from said mold, means normally urging said venting means to its open position, and positive means responsive to movement of said mold for holding said venting means in closed position during movement of said mold to material discharging position.

12. In a print machine for margarine or the like, an intermittently operable material feeder, a mold to receive material from said feeder, reciprocatory means for actuating said mold from material-receiving to print-discharging positions, venting means adapted to be closed by the material when said mold is substantially filled, said venting means comprising a pivoted arm, a valve on one end of said arm, and means engaging the opposite end of said arm for holding said valve in closed position upon movement of said mold.

13. In a print machine for semi-plastic material, an intermittently operable material feeder, a mold to receive material from said feeder, said mold being movable between material-receiving position and print-discharging position, and venting means adapted to be closed by the material when said mold is substantially filled, said venting means comprising a valve, an arm pivotally mounted intermediate its ends and connected at one end to said valve, a cam surface on the opposite end of said arm, and positive means cooperating with said cam surface for insuring complete closure of said valve during movement of said mold to print-discharging position.

14. In a print machine for semi-plastic material, a material feeder, a casing, a mold for receiving a predetermined amount of material

from the feeder, said mold having an open side portion and being movable in said casing between material-receiving and material-discharging positions, means adapted to be closed by the material for venting air from the mold, said venting means being disposed substantially in the path of movement of the material and comprising a valve, a valve seat in the casing for said valve, an arm pivoted intermediate its ends and connected at one end to said valve, a cam surface on the opposite end of said arm, positive means cooperating with said cam surface for insuring complete closure of said valve as said mold moves over said valve to print-discharging position, and a print discharger mounted for reciprocating movement at right angles to the movement of said mold, said discharger comprising a ram, and an actuator for said ram movable along the open side portion of said mold to a point in advance of said mold, whereby in its most forward position, no part of said print-discharging mechanism remains in the mold cavity and said mold is enabled to retract to the material-receiving position prior to retraction of said discharger and substantially when said discharger has cleared the mold.

15. In a print machine for semi-plastic materials, an intermittently operable material feeder, a mold to receive material from the feeder, reciprocatory means for actuating said mold between material-receiving and print-discharging positions, means adapted to be closed by the material for venting air from the mold comprising a valve, a pivoted arm connected at one end to said valve, a cam surface on the opposite end of said arm, positive means cooperating with said cam surface for insuring complete closure of said valve, said positive means being responsive to the operation of said reciprocatory means, and means operating in timed relation to the movement of said mold for discharging the print therefrom.

16. In a print machine for semi-plastic material, an intermittently operable material feeder, a mold to receive material from the feeder and operating between material receiving and discharging positions, a valve for venting air from the mold, said valve being disposed in the path of movement of said mold, means normally urging said valve to open position, means for imparting rectilinear reciprocatory movement to said mold, and means for insuring closure of said valve to enable movement of said mold over same.

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