June 13, 1961 R. E. MILLER ET AL 2,987,819

PRINT FORMING MACHINE

Filed July 21, 1959 2 Sheets-Sheet 1

Fig. 1

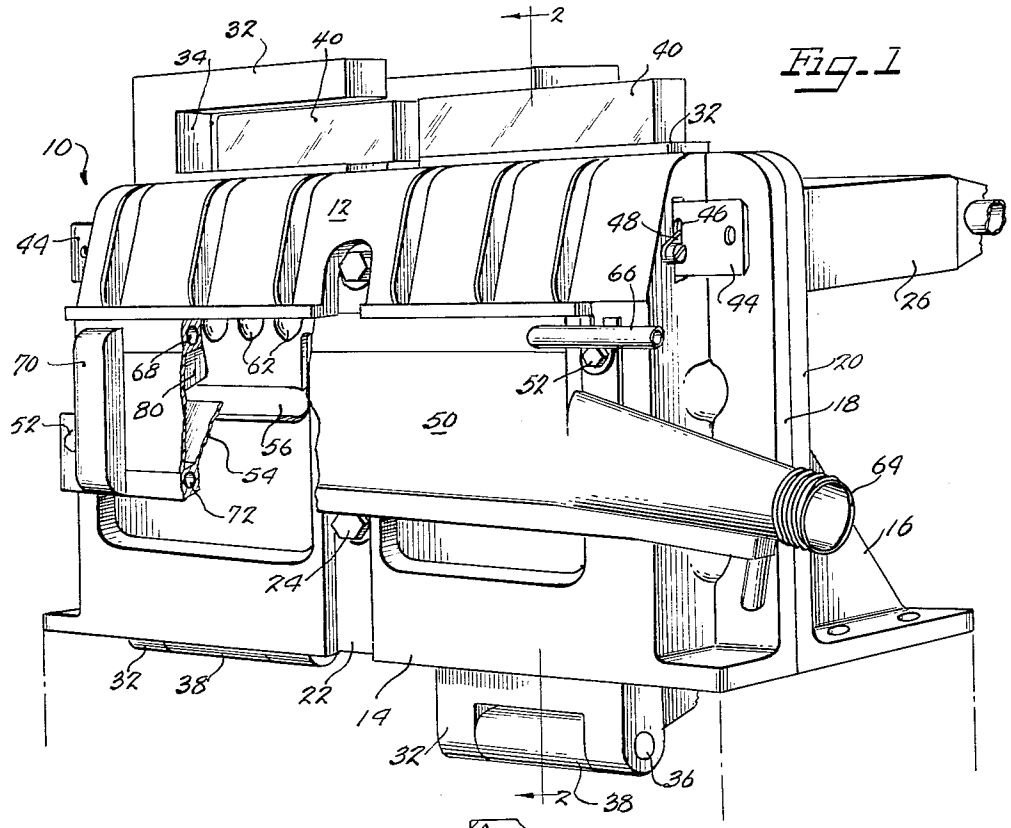
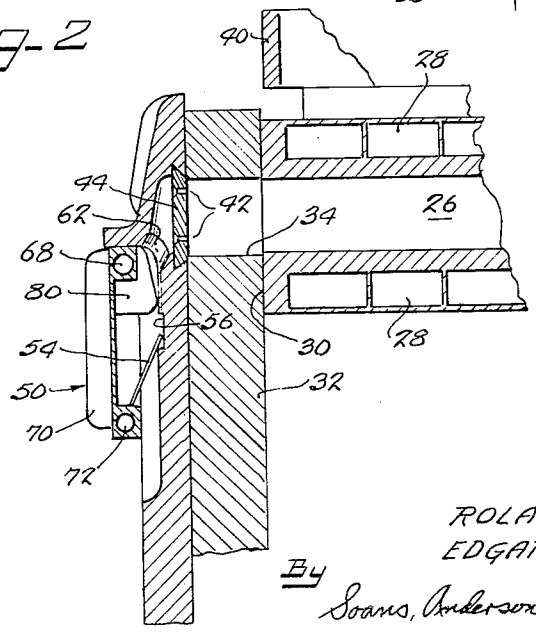


Fig. 2



Inventors
ROLAND E. MILLER
EDGAR C. OLSON

By Soans, Anderson, Luedeka & Ditch
Atty's

June 13, 1961 R. E. MILLER ET AL 2,987,819

PRINT FORMING MACHINE

Filed July 21, 1959 2 Sheets-Sheet 2

Fig. 3

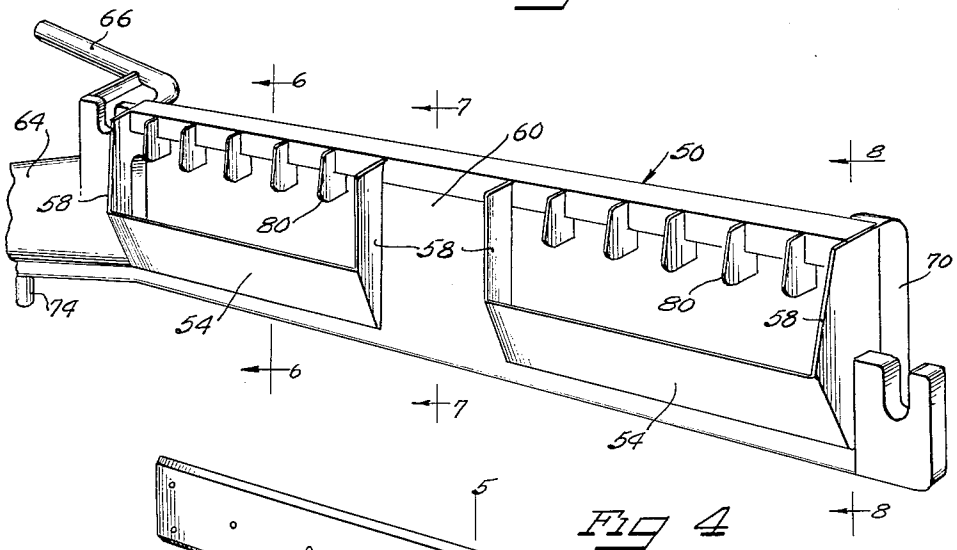


Fig 4

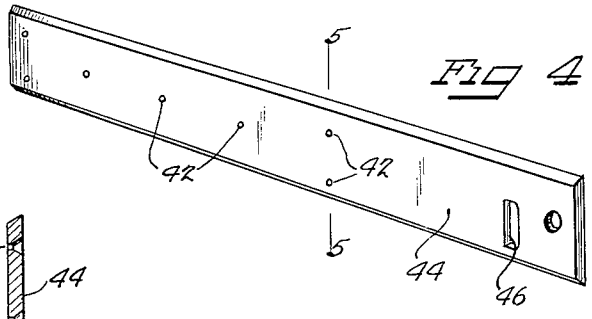


Fig. 5

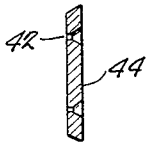


Fig. 6

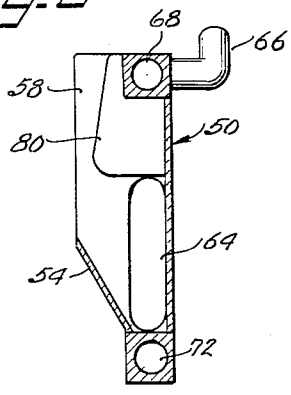


Fig. 7

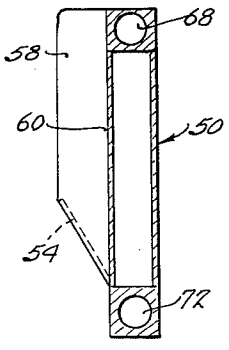
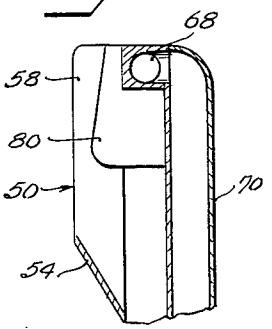


Fig. 8



Inventors
ROLAND E. MILLER
EDGAR C. OLSON

By Soans, Anderson, Luedeka & Fitch
Atty's

United States Patent Office 2,987,819 Patented June 13, 1961

2,987,819

PRINT FORMING MACHINE

Roland E. Miller, Orangeville, and Edgar C. Olson, Waukegan, Ill., assignors to National Dairy Products Corporation, Chicago, Ill., a corporation of Delaware

Filed July 21, 1959, Ser. No. 828,667
5 Claims. (Cl. 31—8)

The present invention relates generally to print forming machines, such as is used in connection with the packaging of margarine, and is particularly directed to improved means for removing excess material from such machines.

The high speed production of prints of semi-fluid material, such as margarine which is usually formed into one-quarter pound blocks of rectangular shape, generally involves pressure formation in a die or the like in a manner resulting in excess material which must be removed. Due to the viscous nature of such material, the handling of the excess material from the die or forming chamber presents some quite difficult problems, both with respect to the effective salvaging and removal of the excess semi-fluid material and with respect to maintaining sanitary conditions around the machine.

It is a primary object of the present invention to provide improved means for bleeding air during the formation of the print and for effecting the removal of excess semi-fluid material from a print forming machine. More specifically, it is an object of this invention to provide a novel form of discharge means for air and excess material resulting from the pressure forming of prints of semi-fluid substances, such as margarine. Other objects and advantages will become apparent from the following description of the selected embodiment of the invention.

In the drawings:

FIGURE 1 is a perspective view of a print forming machine embodying the features of this invention;

FIGURE 2 is an enlraged sectional view taken along the line 2—2 in FIGURE 1;

FIGURE 3 is an enlarged perspective view of the discharge shield which forms part of the machine seen in FIGURE 1;

FIGURE 4 is a perspective view of another element of the machine in FIGURE 1;

FIGURE 5 is a sectional view along the line 5—5 in FIGURE 4;

FIGURE 6 is an enlarged sectional view along line 6—6 in FIGURE 3;

FIGURE 7 is an enlarged sectional view along line 7—7 in FIGURE 3; and

FIGURE 8 is an enlarged sectional view along line 8—8 in FIGURE 3.

With reference particularly to FIGURE 1 of the drawings, it will be seen that the machine chosen to illustrate the present invention is a print forming machine 10 which is particularly adapted for the making of rectangular prints of semi-fluid material, such as margarine or the like. The margarine is pumped under pressure or otherwise suitably fed into the machine, where it is pressed into rectangular-shape bars and then ejected from the machine for wrapping and packaging. The margarine is subjected to sufficiently elevated temperatures to make it flowable and moldable during the described operation.

Generally, the print forming machine comprises a main housing portion 12, which is preferably made of a plurality of sections suitably secured together, in order to thereby facilitate dismantling of the machine for cleaning and servicing. In the illustrated embodiment, the main housing portion 12 includes a front section 14 and a rear section 16, each having flanged edge portions 18 and 20, respectively, at opposite ends thereof which are bolted or otherwise detachably joined, as well as internally ribbed center sections 22 which are also joined together by bolts 24 or the like. In this latter connection, it will be noted that the machine in the drawings embodies a pair of print forming means enclosed within one housing, with each print former being substantially identical to the other.

The rear section 16 of the main housing 12 includes a pair of inlet passage means 26 for introducing the semi-fluid substance into the print forming chambers, and each inlet passage 26 (FIGURE 2) is preferably provided with surrounding water passages 28 for circulation of heated water therethrough in order to maintain the temperature in the passage sufficiently high to facilitate flow of the semi-fluid material under operating pressure of the feed means. At the inner end of each inlet passage 26 there is provided a transverse vertical passage 30 (FIGURE 2) in which is slidably mounted a generally rectangular metal block 32 which comprises the die for forming the prints of predetermined shape and volume. This die block 32 is vertically movable in the housing 12 and includes an opening 34 therethrough of the shape and size of the print to be formed, and this opening provides a print forming chamber which is alignable with the inlet pasage 26 to receive the semi-fluid substance as it is pressure fed through such inlet. The lower end of each slidable block 32 is suitably connected, as by a pin 36 (FIGURE 1), with an actuating lever 38 which is in turn suitably connected with a powered drive means (not shown) to afford vertical reciprocal movement of the block in passage 30.

As the opening or forming chamber portion 34 of each die 32 is filled with margarine or the like, the die block is moved upwardly to position the forming chamber above the main housing portion 12. Mounted on the top of the main housing is a pair of power driven ejector arms 40, one for each print former, and each of these arms is movable to engage the rear face of the formed print in the associated die and move it forwardly onto a conveyor, or the like, which is not shown. The die 32 is then withdrawn into the housing 12 to again place the print forming chamber 34 opposite the inlet passage 26 in readiness for formation of the next print.

For purposes of illustration, the pair of print forming dies 32 in FIGURE 1 are shown in different positions. It will also be understood that the ejector arms 40 associated therewith are also power operated, in any suitable manner, for synchronization with the operation of the slidable die blocks 32. Since these features of operation of the machine are not essential to a proper understanding of the present invention, it is believed that a more detailed description of such features is unnecessary.

On the forward face of the main housing 12, as seen in FIGURE 1, there is provided novel and improved means for handling the excess material resulting from the formation of the prints. Since the material being handled is quite viscous and the print is necessarily formed under pressure, it is desirable that some means be provided for insuring the complete filling of the die chamber 34, and this is accomplished generally by providing for the escape or bleeding-off of air from the die chamber, to thereby provide for the flow of an excess amount of material into the chamber. In order to do this, there is provided a plurality of openings 42 (FIGURE 2) in the wall opposite each of the material inlet passages. The size and number of these openings are calibrated with the viscosity of the substance being handled, so as to provide for proper bleeding-off of air from the chamber, with a minimum of excess material being discharged from the chamber through such openings, to afford complete filling of the chamber.

As seen particularly in FIGURES 2, 4 and 5 of the drawings, the openings 42 are formed in a pair of re-

movable wall sections or plates 44 which are slidably mounted in the inner face of the front wall 14 of the main housing adjacent and opposite each of the inlet passages 26. Each removable plate 44 is suitably held in place, as by means of a slot 46 in the exposed end of the plate and a rotatable arm 48 mounted on the housing for movement into locking engagement with the slot (FIGURE 1). In addition to facilitating the cleaning of the air bleed-off and excess discharge openings 42, the provision of these openings in a removable plate is also advantageous in that a plurality of such plates, each having different size bleeder openings, may be provided in order to handle materials of different viscosities. For example, whipped margarine will require somewhat larger openings than ordinary margarine and, consequently, in the described arrangement the same machine can be used in the forming of both margarines by simply changing the plates.

In order to effectively reclaim the excess margarine and to provide for its continuous flow from the print forming machine without spilling over the machine, there is provided a cover or shield 50 which is seen in detail in FIGURES 3 and 6–8. This cover is removably mounted on the forward face 14 of the main housing, as by the pair of bolts 52, and is generally channel-shaped in cross-section. Extending rearwardly and upwardly from the lower flange or edge of the cover 50 (FIGURES 2 and 3) is a pair of inclined ledge portions 54 which extend, respectively, into a pair of grooves 56 (FIGURE 1) formed lengthwise of the forward face of the main housing. The opposite ends of these ledges 54 are provided with transverse wall sections 58 (FIGURE 3) having their inner edges abutting the housing face so as to further provide for retention of the excess material within the shield or cover 50. The intermediate pair of wall sections 58 are spaced-apart and there is provided therebetween a flat section 60 for abutting the outer face of the center section 22 along the forward housing wall. It will be noted that the forward face of the housing 12 also includes a plurality of downwardly inclined grooves 62 (FIGURE 1) communicating with each of the transverse openings in the forward housing portion 14 which receive the slidable plates 44. Consequently, the material passing through the excess discharge openings 42 flows downwardly in the grooves 62 and onto the ledge 54, so as to be retained within the cover portion 50.

In order to provide for easy flow of the excess material within the cover 50 and out the discharge outlet 64 (FIGURE 1) which is provided at one end thereof, there is provided a series of continuous passages in the peripheral portions of the cover through which a heated fluid, such as water, may be passed. More particularly, as seen in FIGURE 1, a conduit 66 is in fluid communication with the passage 68 at the upper end of the cover and this conduit 66 is suitably connected with a source of heated fluid. The passage 68 at the upper end is continuous along the length of the cover 50 and then passes downwardly through the passage 70 (FIGURE 8) into another longitudinally extending passage 72 at the bottom of the cover. An outlet fluid conduit 74 is connected to the opposite end of this passage (FIGURE 1) and this outlet is preferably in communication with the source, to thereby provide for circulation of the heated fluid through the cover 50. In this way, the temperature within the cover is controlled so as to maintain the excess material in a sufficiently fluid state to afford continuous flow of such material through the openings 42 and out of the cover 50 through the discharge outlet 64.

As a further means for facilitating the flow of the excess material from the chamber 34 and into the cover 50, there is provided a series of relatively thin, heat transfer or radiator plates 80 which are integral with the cover 50 and disposed to extend between each pair of the downwardly inclined grooves 62 in the forward face of housing 12. The heat provided by the heated fluid in the conduit 68 is transferred to the plates 80 and radiated therefrom in the vicinity of the grooves 62 to aid in the flow of the excess material into and through the cover 50.

It is seen, therefore, that there is provided herein a print forming machine which is particularly adapted to handle semi-fluid substances, such as margarine or the like, of different viscosities and consistencies. Moreover, the described mechanism is simple and economical in form and is readily dismantled for cleaning, servicing and adjustment. The illustrated structure enables high speed production of prints of margarine or the like, while avoiding any waste of material in the formation of such prints.

Although shown and described with respect to particular apparatus and material, it will be apparent that various modifications might be made without departing from the principles of this invention.

We claim:

1. In a machine for forming prints of a semi-fluid material, said machine including means defining a forming chamber, means adjacent said chamber for introducing material into said chamber, and means also adjacent said chamber for discharging the formed material from said chamber, an improved means for bleeding air and effecting removal of excess material from said forming chamber comprising means defining one wall of said forming chamber having openings therethrough affording the passage of air and excess material outwardly from said chamber during the forming of the material, means defining a cover disposed along said one wall, said cover defining an interior portion which is in communication with the openings through said one wall, an outlet on said cover whereby said excess material may be discharged, and means defining enclosed passages in said cover affording the flow of heated fluid therethrough so as to maintain the temperature in said cover at a predetermined level to thereby facilitate the flow of excess material from said openings in said one wall, through said cover, and out said material discharge outlet.

2. In a machine for forming prints of a semi-fluid material, said machine including means defining a forming chamber, inlet passage means in said chamber-defining means for introducing material into said chamber, and means in said chamber-defining means for discharging the formed material from said chamber, an improved means for effecting removal of air and excess semi-fluid material from said forming chamber comprising a removable wall along the side of said forming chamber opposite said inlet passage, said wall having openings therethrough affording the bleeding-off of air and the passage of excess material outwardly from said chamber during the forming of the material, means defining a cover detachably mounted along said wall, said cover defining an interior portion which is in communication with the openings through said one wall to thereby receive excess material being discharged from said chamber through said openings, said cover including an excess material discharge outlet, and means difining an enclosed continuous passageway adjacent the periphery of said cover affording the circulation of heated fluid therethrough so as to maintain the temperature in said cover at a predetermined level to thereby facilitate the flow of excess material from said openings in said wall into said cover and thence to said material discharge outlet.

3. A print forming machine for use with semi-fluid material comprising a frame structure defining a main housing, means defining an inlet passage in said housing affording the introduction of semi-fluid material into the housing, a second passage in said housing disposed transversely of said inlet passage at the inner end thereof, a print forming die in said second passage comprising a member disposed therein for slidable movement relative thereto, said member including an opening therethrough having the dimensions of the print to be formed and positionable in fluid communication with said inlet passage, a plurality of air bleeding and excess material

discharge openings in said main housing at positions opposite the opening in said die when such opening is disposed to receive material from said inlet passage, a cover detachably mounted on said main housing in covering relation to said air and excess material discharge openings and adapted to collect the excess material resulting from operation of said die in the forming of a print, means defining a discharge outlet for said cover, and enclosed fluid passage means in said cover affording circulation of heated fluid therethrough, in order to maintain the temperature in said cover at a level which facilitates the flow of excess material from said excess discharge openings through the interior of said cover and out said discharge outlet.

4. A machine for forming prints of semi-fluid material comprising a frame structure defining a main housing, means defining an inlet passage in said housing affording the introduction of semi-fluid material into the housing, a second passage in said housing disposed transversely of said inlet passage and at the inner end thereof, a print forming die in said second passage comprising a member disposed therein for reciprocal movement transversely of said inlet passage, said member including an opening therethrough defining with the walls of said housing a print forming chamber which is positionable in fluid communication with said inlet passage, an air bleeding and excess material discharge opening formed in a wall of said housing at a position opposite said inlet passage so that, when said die member opening is disposed to receive material from said inlet passage, air and excess material may pass through said discharge opening during the formation of a print, a cover detachably mounted on said main housing in covering relation to said excess discharge opening so as to collect the excess material resulting from the forming of a print, means defining a discharge outlet for said cover, and enclosed fluid passage means in said cover affording circulation of heated fluid therethrough, in order to maintain the temperature in said cover at a level which facilitates the flow of excess material from said excess discharge opening through the interior of said cover and out said discharge outlet.

5. A machine for forming prints of semi-fluid material comprising a frame structure defining a main housing, means defining an inlet passage in said housing affording the introduction of semi-fluid material into the housing, a generally vertical second passage in said housing disposed transversely of said inlet passage and at the inner end thereof, a print forming die in said second passage comprising a close fitting member slidably disposed therein for vertical reciprocal movement from a position within said housing to partially projecting relation thereto, said member including an opening therethrough defining a print forming chamber having the dimensions of the print to be formed, said vertical reciprocal movement of said die member alternately placing said chamber in fluid communication with said inlet passage and at a position externally of said housing, a removable plate mounted in said housing and including a plurality of bleeder openings therethrough, said plate being disposed opposite the chamber in said die member when said chamber is disposed to receive material from said inlet passage, to thereby place the die forming chamber in communication with the exterior of said housing through said plurality of openings for the bleeding off of air and excess material from said chamber, a cover detachably mounted on said main housing in covering relation to the bleeder openings in said plate so as to collect the excess material resulting from the forming of a print in said chamber, means defining a discharge outlet for said cover, and enclosed fluid passage means in said cover affording circulation of heated fluid therethrough in order to maintain the temperature in said cover at a level which facilitates the flow of excess material from said print forming chamber to said outlet.

References Cited in the file of this patent

UNITED STATES PATENTS

2,481,690	Schaub	Sept. 13, 1949
2,484,005	Alberti	Oct. 11, 1949
2,683,283	Anderson	July 13, 1954
2,917,776	Dormal et al.	Dec. 22, 1959
2,923,967	Smith	Feb. 9, 1960