

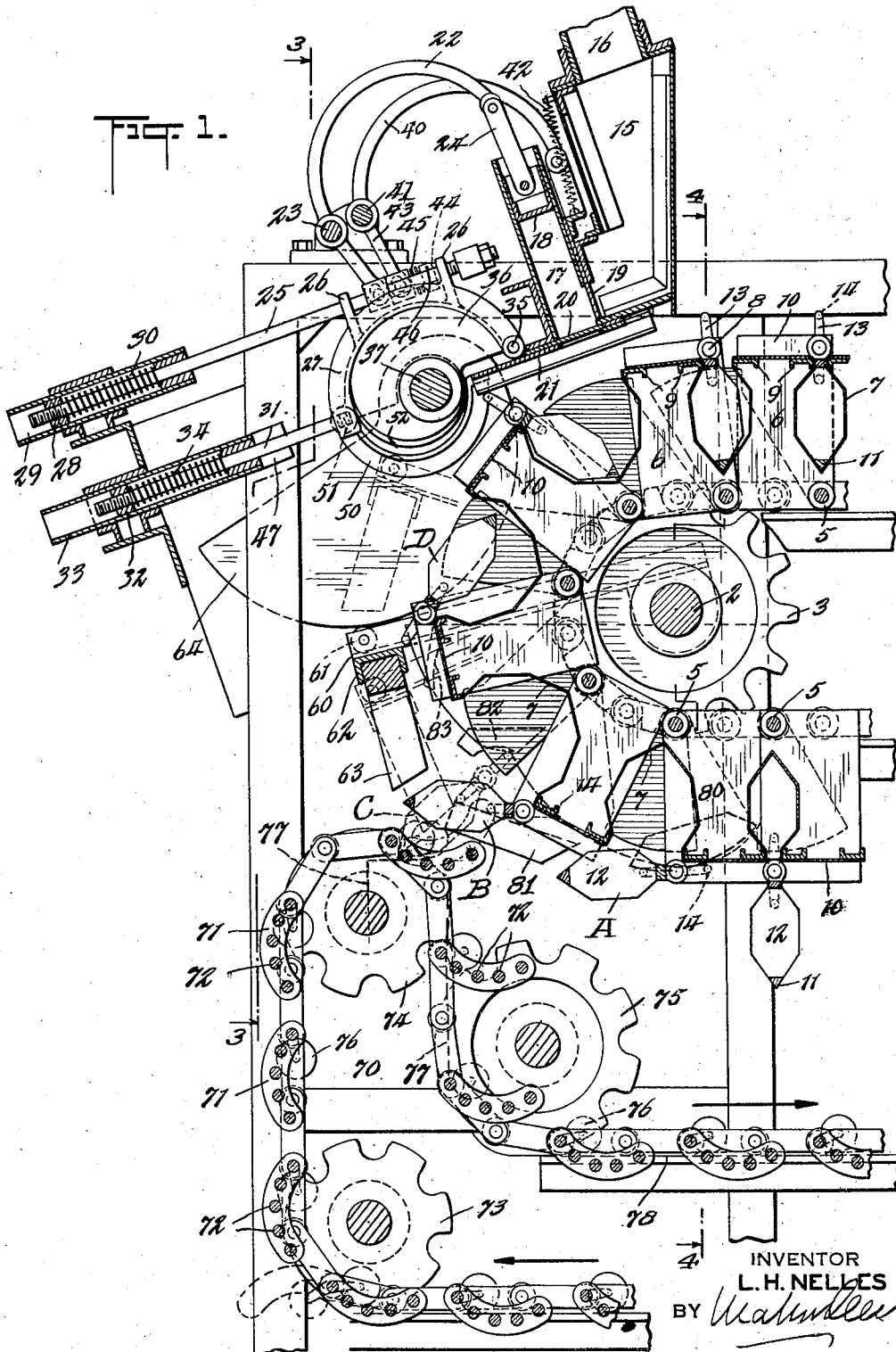
April 18, 1933.

L. H. NELLES
SOAP MOLDING MACHINE

1,904,071

Filed May 2, 1930

4 Sheets-Sheet 1



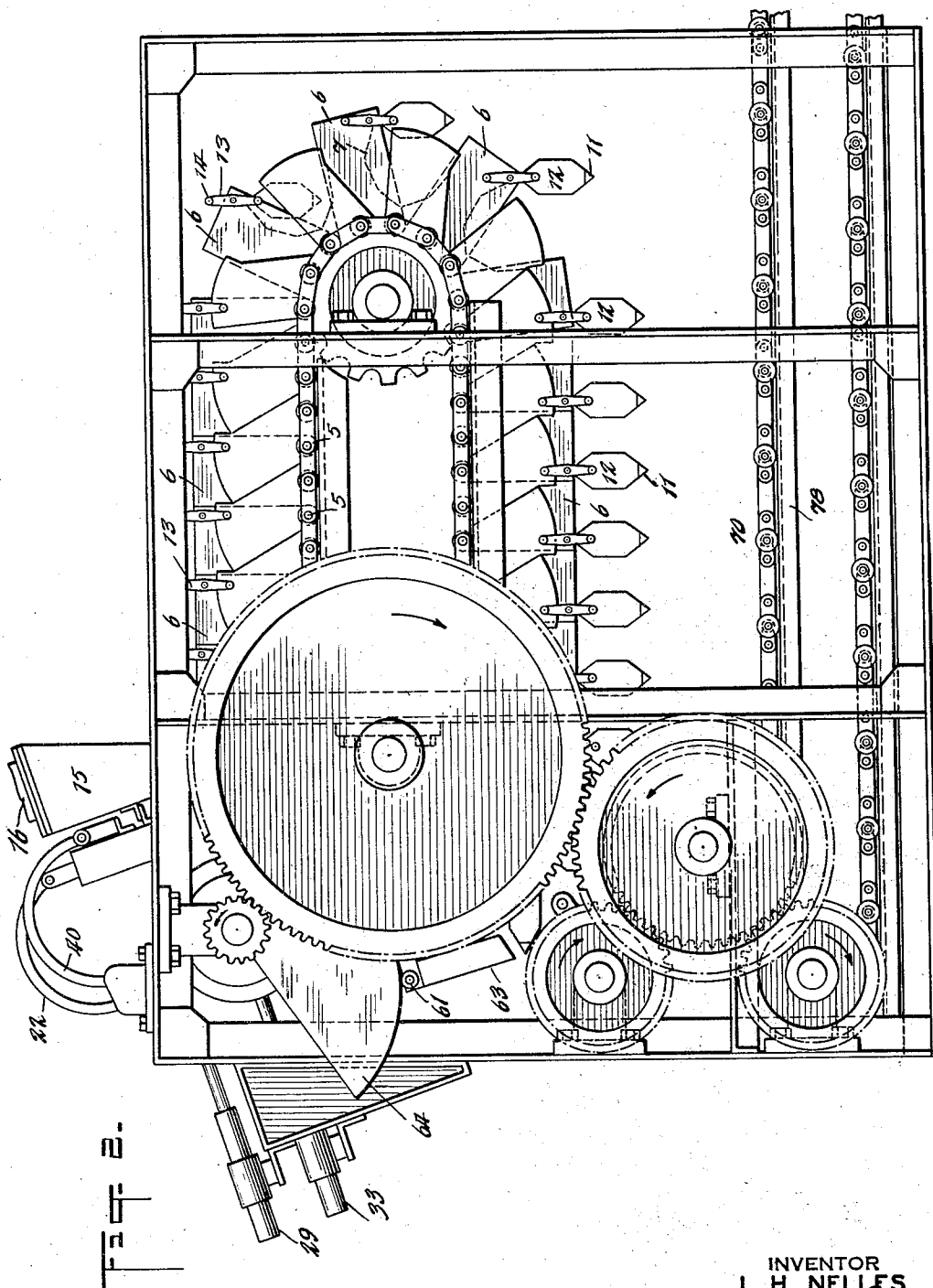
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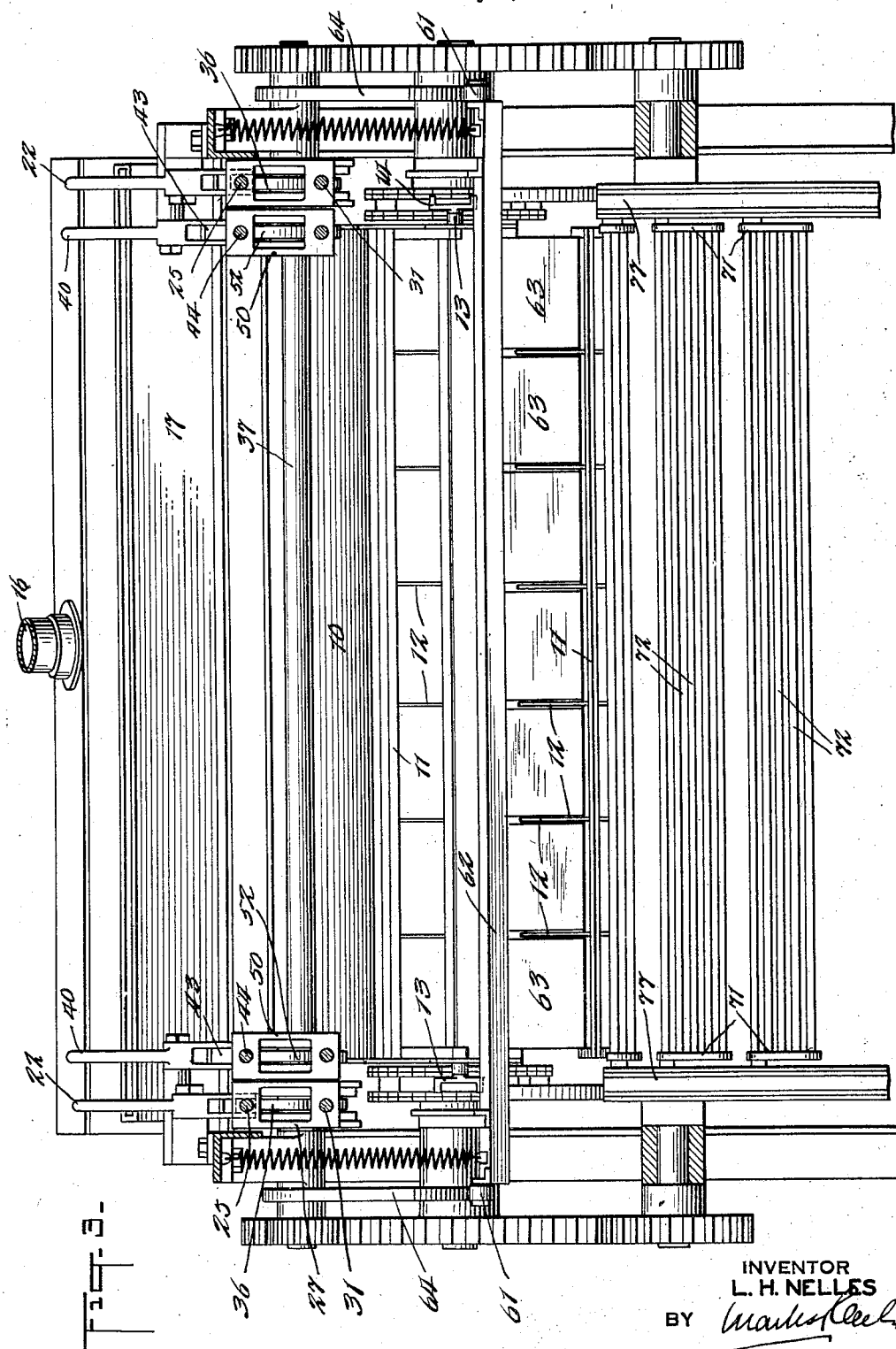
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4 Sheets-Sheet 3



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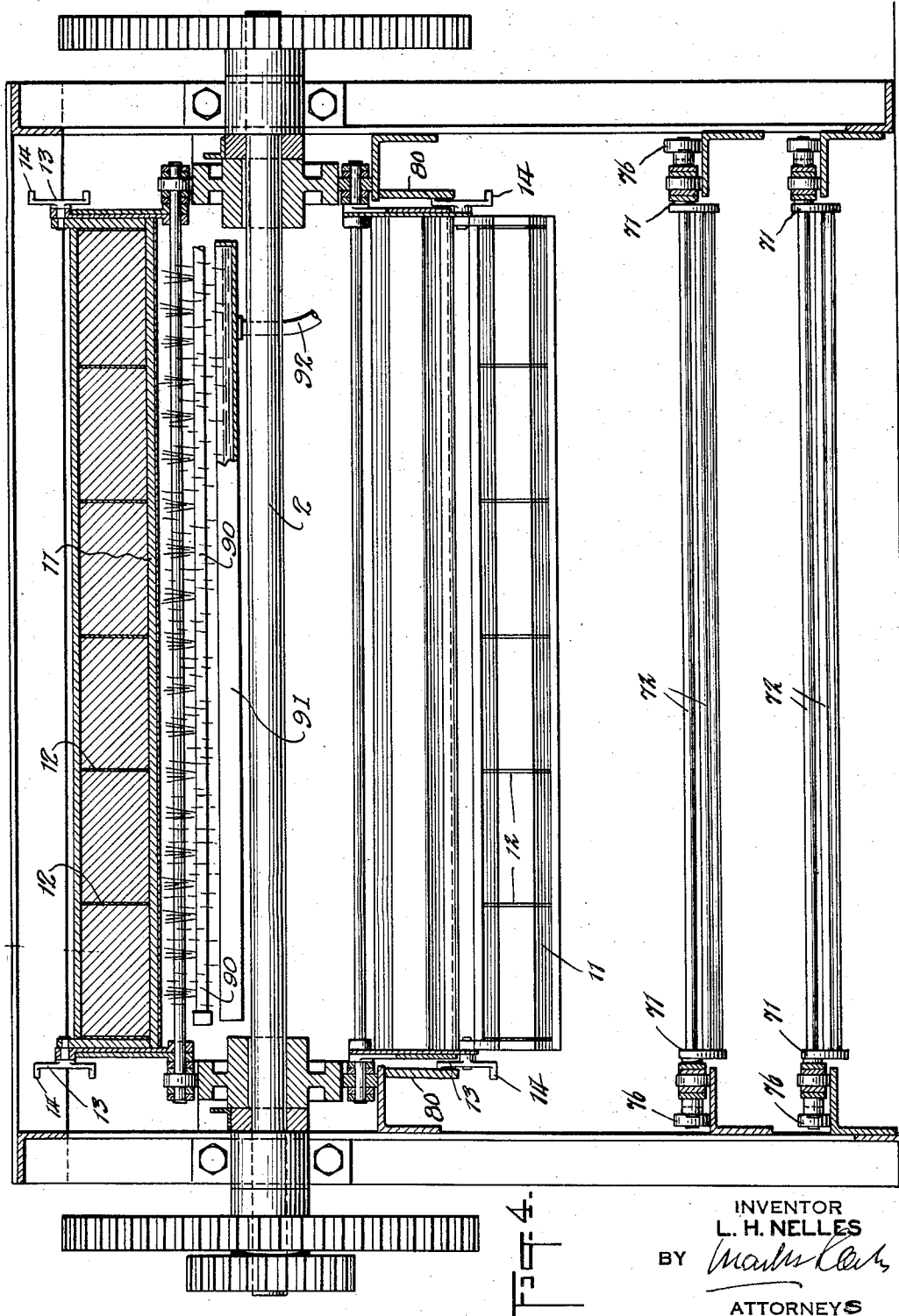
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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SOAP MOLDING MACHINE

Application filed May 2, 1930, Serial No. 449,283, and in Great Britain May 2, 1929.

The invention is concerned with machines and apparatus for the making of soap and particularly with such as are adapted or arranged for the molding and forming of the already made soap into blocks, tablets, bars or any other desired configuration.

The main object of the invention is to provide improved apparatus of the above character which will be more efficient than those hitherto utilized, will save waste and will result in the elimination of unnecessary operations and manipulations.

The invention consists in soap making apparatus comprising an endless conveyor having a plurality of molds extending transversely thereon into which the soap is to be poured and cooled during movement of the conveyor.

Preferably the front and back walls of each mold are of flexible sheet material and are relatively movable in a manner as will be apparent hereinafter; the molds also may be arranged so that each is of correct size for the forming of one or more blocks or tablets of soap and may be embossed with a design or name. It will be seen that the separate cutting and stamping operations hitherto made may be eliminated.

Further features of the invention will be apparent from the following description of one convenient embodiment of the invention given by way of example in order to indicate more clearly the nature thereof and how the same may be carried into effect.

The specific embodiment is illustrated in the accompanying drawings in which:—

Fig. 1 is a side sectional elevation of the filling end of a soap molding machine according to my invention;

Fig. 2 is a side elevation of the conveyor mechanism showing the various positions of the molds and soap retaining frames; and

Fig. 3 is an end sectional elevation of the upper part of Fig. 1.

Figure 4 is another view of the upper part. Referring to the drawings there is shown mounted on the filling end of the main frame 1 a main shaft 2 carrying a sprocket 3 around which one side conveyor chain 4 passes. The

two chains of the conveyor, one on each side of the machine are connected by transverse rods 5 to which are attached by means of bushings side plates 6 for the molds 7. Each side plate 6 has a wing piece which, no matter what the relative positions of the molds, always overlaps the adjacent side plate so that there will be no egress of soap from the container or mold 7. In the same manner that rods 5 connect or carry the lower parts of the plates 6, so further transverse channel bars 9 join the tops of the plates 6 across which a top closing plate 10 is fastened and to which the edges of the molds or containers 7 are attached. The molds or containers 7 comprise sheet material having a certain amount of flexibility, for example thin copper sheet, and extend across the whole width of the machine and they may be of any suitable form according to the shape of the bar or tablet required. In this present embodiment the molds are of elongated hexagonal form and by virtue of the attachment of the front and back edges of the sheet metal to channel bars on successive side plates the molds open, upon relative angular movement of the plates, as the conveyor passes round the end sprockets, and close as the conveyor keeps on a straight path. Swivelled on pins 8 are soap holders or retainers in the form of frames comprising a bar 11, which is shaped to fit the bottom of the mold, and a plurality of plates 12 attached thereto and spaced transversely therealong according to the length of bar or tablet required. The plates 12 are shaped to fit to the sides of the mold as it is closed, and so they divide the mold into a plurality of compartments.

Formed integrally with each holder or frame, or attached thereto is a cross arm 13 carrying at each end an outstanding lug 14. It will be seen that by virtue of the swivel support of the frames they will, at one end (the right hand end of Fig. 2) swing out of the containers or molds and along the lower straight path of the conveyor they hang clear of the same. As the molds move to the filling (left hand Fig. 1) end of the machine they open, in passing round the end sprocket 3 and during this opening the retainers or

holders are replaced therein in a manner to be indicated later. Before the molds close, to pass along the upper path of the conveyor, they are filled with soap and preferably in the manner and by the mechanism now to be described.

Mounted on the upper part of the main frame 1 is a hopper or container 15 which is arranged to be kept filled with soap by the supply pipe 16. The hopper 15 extends across the whole width of the machine and communicates by means of a transverse slot with a charging chamber 17 in which a charging plunger 18 is movable and which communicates at its base with the molds as they pass beneath in open position as will be clear from Fig. 1. Communication between hopper 15 and chamber 17, and between chamber 17 and the molds, is controlled by sliding door plates 19, and 20 and 21 respectively, which also extend across substantially the whole width of the machine.

Plunger 18 is actuated by means of curved levers 22 one at each side of the machine and pivoted on a shaft 23, and connecting links 24; the bottom end of each lever 22 is connected to a rod 25 slidable in lugs 26 carried on a semicircular frame 27. The rod 25 carries a piston 28 working in a cylinder 29 which contains a spring 30 constrained to move the rod 25 and press the plunger 18 down. The frame 27 also has a similar rod 31, piston 32, cylinder 33 and spring 34 and also carries a roller 35 which bears on a cam 36 on the secondary driving shaft 37. The frame 27 is open to allow sliding thereof relative to cam 36 and it carries at its forward end the upper sliding plate 20. The cam 36 in rotating therefore stresses springs 30 and 34 and as the roller 35 overrides the top point of the cam the plunger 18 is forced down and plate 20 opened. A catch (not shown) is preferably provided to withhold plunger 18 until full communication between chamber 17 and the mold is effected.

The sliding door plate 19 is actuated by a similar arrangement on each side of the machine. A curved lever 40 is mounted on a shaft 41 and is constrained by a spring 42 in its top position. The lower end of the lever comprises a plate 43 passing through which is a rod 44 carrying a spring 45 and a nut 46 which comprises a buffer connection between the rod and lever. Rod 44 is fixed to and actuated by means of a second frame 50 similar to 27 and having its own spring plunger arrangement 47 and carrying a roller 51 riding on a cam 52 on shaft 37 of similar but opposite contour to cam 36. The frame 50 carries the lower sliding door 21 which by virtue of cam 52 is arranged to open prior to the plunger descending but is also arranged to close before door 20 closes and scrape the face of the plunger clean of soap before the plunger is moved up on its suction stroke.

The whole arrangement of the cams is such that door 19 is open as the plunger ascends to draw soap into the charging chamber from the hopper but closes prior to the discharge stroke of the plunger; door 20 commences to close as the plunger starts its intake stroke when door 21 is already closed; but both doors 20 and 21 open prior to the discharge stroke of the plunger.

Mounted on each end of the main shaft 2 or on any other convenient part of the side frames of the machine is an arm 60 and the two arms each carry a roller 61 and are connected by a cross piece 62 which carries a number of ejector members 63 extending across the machine and adapted to eject the tablets or bars of soap from the retainers or holders as they are brought to an ejecting position. The ejectors are actuated by a cam 64 on each end of and rotatable with the shaft 37 and contacting with the roller 61. A suitable spring (not shown) is preferably provided to bring the ejectors to the top position after each ejection.

Beneath the mold conveyor is preferably provided a carrier conveyor 70 carrying a plurality of spaced cradles comprising curved end members 71 and transverse slats or rods 72. The conveyor is carried at the filling end around three sprockets 73, 74, 75 arranged (Fig. 1) so that each cradle will in turn be brought close to a retaining member at the moment the ejectors 63 descend. In order to hold the cradle horizontally each carries a roller 76 which rides over a fixed cam 77, shaped as shown so that for the ejecting action each cradle is slightly lifted upwardly into the position shown by the dotted lines. After passing down between and past the sprockets 74 and 75 the roller 76 moves along a horizontal guide rail 78.

In order to lift the carriers or retainers clear of the horizontally held cradle and to lift the same into a suitable ejecting position there are provided on each side of the machine a set of suitably shaped abutment members 80, 81, 82, 83 adapted to coact with the projecting lugs 14 on the arms 13. As the conveyor moves the upper lug on an arm contacts with the lower curved surface of abutment 80 and is moved accordingly into position A. Further movement causes the lower and now the foremost lug to contact and ride along the upper surface of abutment 81 into position B. The conveyor chains are now passing over sprockets 3 in a curved path and the rearmost lug 14 contacts with the lower curved surface of abutment 82 and is moved into dotted position C which is the ejecting position at which the ejector is moved by cams 64 to knock the tablets or bars from the retainers on to the cradle awaiting and positioned for the same. Further movement of the conveyor carries the lower and upper lugs clear of abutments

81 and 82, and subsequently the upper lug contacts with the rear surface of the last abutment 83. This last abutment swings the frame container upwards until it finally
5 tilts over by gravity (position D) into its container or mold.

The whole operation will now be clear. The charging chamber is automatically and continuously filled and discharged by plunger 18, and as each mold or container 7 is
10 brought into the charging position the charge is ejected therein. It will be understood that by varying the stroke of plunger 18 the exact amount required for each set of molds
15 can be adjusted correctly. As each mold closes the soap is compressed and the closed molds pass down to the other end of the machine and during passage may be cooled as by water sprays from one or more pipes,
20 90. The water may be caught in a pan 91 and removed through a pipe 92 under the same. The rate of movement of the conveyor and the length thereof should be such that the soap is substantially set by the time
25 the other end is reached. For instance a conveyor length of 80 feet and a speed of 160 feet an hour is satisfactory. At the other end each retainer or frame falls from its mold and carries with it the soap from
30 which the mold walls have been peeled as it were by relative angular motion of the two channel members carrying it and on the return journey the soap is carried clear of the molds and can be further dried by being
35 subjected to a hot air stream. On again reaching the filling end the retainers are lifted clear of the carrier conveyor, and into the ejecting position, the ejector pushes the tablets or bars on to the cradle and the retainer
40 is then tipped again into its mold ready for a further charging. The cradles carry the bars to the other end of the machine and again through a drying atmosphere if desired.

45 The operation is thus continuous throughout and the soap is molded and dried in bars of desired form or size. By virtue of the flexibly walled mold there is a peeling action and no clearing of the molds is required. Suitable embossments may be made
50 on the walls if desired and obviously the shape and size of the molds may be varied as may also the method of and mechanism for charging the same. Such and similar
55 modifications are to be deemed within the scope of the invention.

I claim:

1. Soap molding machine comprising an endless conveyor, a plurality of molds
60 whose walls will flex as said molds open and close and extending transversely thereon into which the soap is to be poured, and means for cooling the soap during movement of the conveyor.

65 2. Soap molding machine comprising a

conveyor, a plurality of molds carried thereon, said molds being formed of flexible material and being adapted to be flexed as they are opened and closed during movement thereof on the conveyor.

3. Soap molding machine comprising a conveyor, a plurality of molds carried thereby and formed of flexible sheet material, and a plurality of soap retaining members adapted to be enclosed within the
75 molds along one part of the conveyor path and to hold the solidified soap clear of said molds along another part of the path.

4. Soap molding machine comprising a conveyor, a plurality of soap retaining members, and a plurality of flexibly walled molds carried by said conveyor and adapted to be filled at one end of the conveyor and to open at the other end to allow said members to carry the solidified soap clear of
85 said molds back to the filling end.

5. Soap molding machine according to claim 4 having supports on said conveyor and in which the molds are made of thin sheet metal, the front and back edges being
90 attached to said supports, relative angular movement between which causes opening or closing of the molds.

6. Soap molding machine comprising a conveyor, flexible molds carried by said conveyor, and a soap retaining member pivotally associated with each mold.

7. Soap molding machine comprising a conveyor, flexible molds carried by said conveyor, and a soap retaining member pivotally associated with each mold, and ejecting means for ejecting soap from said members.

8. Soap molding machine comprising a conveyor, a plurality of flexible sheet metal molds on said conveyor and a frame retaining member pivotally associated with each
105 mold.

9. Soap molding machine comprising a conveyor, a plurality of flexible sheet metal molds on said conveyor and a frame retaining member pivotally associated with each mold, and lugs on each member adapted to control the pivotation thereof.

10. Soap molding machine comprising a conveyor, flexible molds on said conveyor, soap retaining frame members pivoted on said molds, lugs on said members, and fixed abutment members arranged to coact with said lugs for the control of the movement
120 of said frame members.

11. Soap molding machine comprising a frame, a conveyor in said frame, flexible molds on said conveyor, soap retaining members pivoted to said molds, lugs on said members, abutments on said frame adapted
125 to contact with said lugs for returning said members to their respective molds.

12. Soap molding machine comprising a frame, a conveyor in said frame, flexible molds on said conveyor, soap retaining
130

- members pivoted to said molds, lugs on said members, abutments on said frame adapted to contact with said lugs for returning said members to their respective molds, and
 5 ejecting means for ejecting soap from said members. at predetermined part of the conveyor path, and a soap retaining frame member pivoted to each mold for movement into and out of the same at said predetermined parts of the conveyor path. 70
13. Soap molding machine comprising a frame, an endless conveyor in said frame, flexible sheet metal molds on said conveyor,
 10 a soap retaining framework pivoted to each mold, lugs on said framework and abutments on said frame adapted to contact with said lugs to hold said framework in an ejecting position. 75
14. Soap molding machine comprising a frame, an endless conveyor in said frame, flexible sheet metal molds on said conveyor,
 15 a soap retaining framework pivoted to each mold, lugs on said framework and abutments on said frame adapted to contact with
 20 said lugs to hold said frameworks in an ejecting position, and a second conveyor adjacent said ejecting position. 80
15. Soap molding machine according to claim 3 having a plunger for charging said
 25 molds situated at a curved portion of the conveyor path. 85
16. Said molding machine according to claim 3 having a soap holding chamber, a
 30 plunger chamber communicating therewith and a plunger in said latter chamber adapted alternately to draw fluid soap from said holding chamber and to discharge soap into
 35 said molds. 90
17. An endless conveyor soap molding machine comprising a plurality of molds and a charging mechanism adjacent a curved
 40 curved path, said mechanism comprising a plunger chamber, a plunger in said chamber and a door mechanism controlling communication between said chamber and said
 45 molds. 95
18. A machine according to claim 17 in which said mechanism comprises a pair of
 50 slidable doors and a cam for each door. 100
19. A soap molding machine, comprising a conveyor, a plurality of flexible molds on
 55 said conveyor and a frame member pivoted to each mold, said molds and members being movable over closed paths which are in part coincident. 105
20. Soap molding machine comprising a conveyor, a plurality of molds on said conveyor and a plurality of soap carrying members pivoted to said molds. 110
21. Soap molding machine comprising a conveyor, a plurality of molds thereon and
 60 a soap retaining frame pivoted to each mold and adapted to carry the soap free of said molds over a part of the conveyor path. 115
22. Soap molding machine comprising a conveyor, a plurality of molds thereon
 65 adapted for opening and closing movements 120
- 125
- 130

In testimony whereof I affix my signature.
 LAFAYETTE HENRY NELLES.