R. N. SARGENT.

APPARATUS FOR MOLDING.

APPLICATION FILED JUNE 1, 1915.

1,289,275.

Patented Dec. 31, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

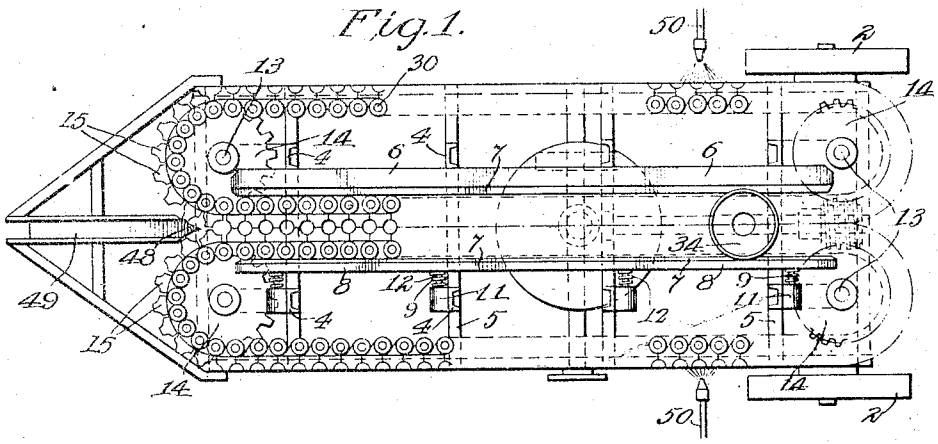
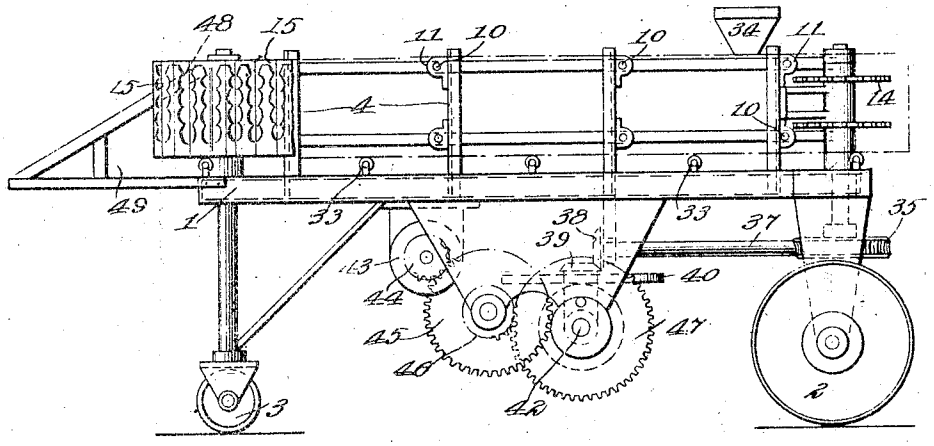


Fig. 2.



Inventor:
Ralph N. Sargent
by Mustick & Lucke
his attorneys.

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2 SHEETS—SHEET 2.

Fig. 3.

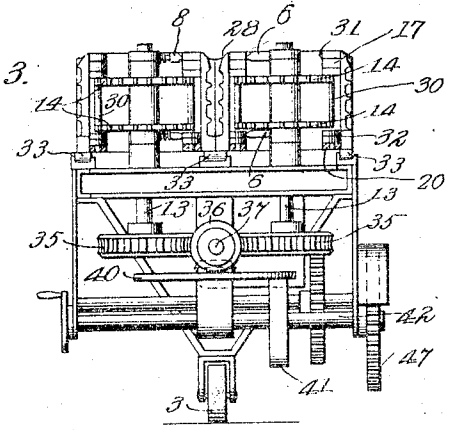


Fig. 7.

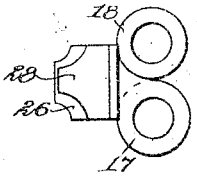


Fig. 4.

Fig. 5.

Fig. 6.

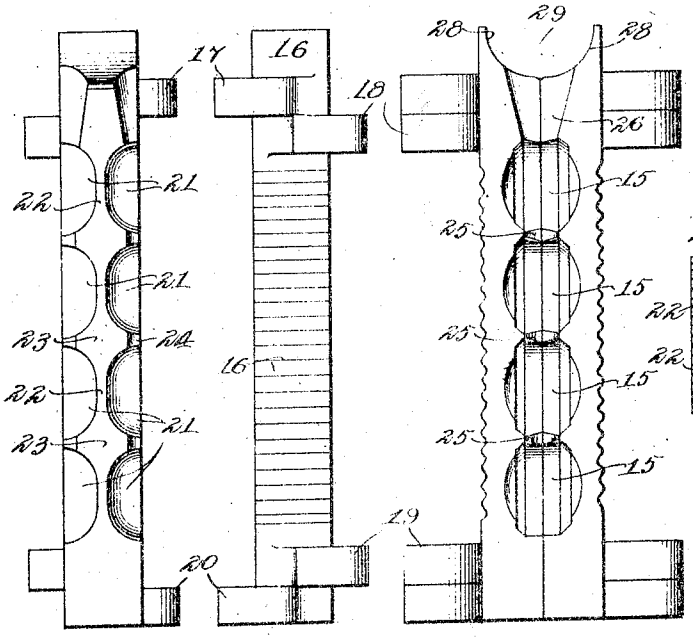
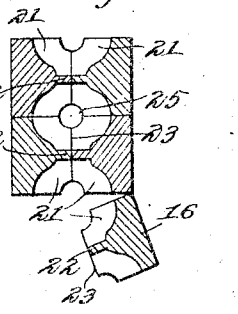


Fig. 8.



Inventor:

Ralph N. Sargent

by Mustrich & Locke,

his attorneys.

UNITED STATES PATENT OFFICE.

RALPH NELSON SARGENT, OF PERTH AMBOY, NEW JERSEY, ASSIGNOR TO THE ROESSLER & HASSLACHER CHEMICAL CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

APPARATUS FOR MOLDING.

1,289,275. Specification of Letters Patent. **Patented Dec. 31, 1918.**

Original application filed January 6, 1914, Serial No. 810,544. Divided and this application filed June 1, 1915. Serial No. 31,367.

To all whom it may concern:

Be it known that I, RALPH NELSON SARGENT, a citizen of the United States of America, residing at Perth Amboy, county of Middlesex, and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Molding, of which the following is a specification.

My invention relates to apparatus for molding and has particular relation to an apparatus for molding or forming substances which are first caused to assume a liquid, semi-liquid or plastic condition, are run or forced into the molds in such condition, are solidified during the course of operation and then discharged in solidified, molded form. I have illustrated the invention in connection with the molding of chemical substances into solid form, the particular object illustrated being the molding of such chemicals into cakes or other shape of predetermined form, size and weight, so that they may be handled without breaking as soon as they leave the molding apparatus and may be readily utilized in the arts, especially wherever either form or weight is a desideratum. For example, if any given weight of chemical is to be used for a particular reaction, a certain number of cakes of the chemical, each cake having a weight preferably bearing some multiple or unit relationship to the desired weight, may be counted out without weighing, and so utilized. Such method will greatly lessen the time of operation and hence cheapen the process, as the present elaborate weighing step at the time of use would be done away with.

In connection with the application of my invention to chemical substances, the chemical must first be fused or otherwise put into a liquid or sufficiently liquid condition, then fed into the molding apparatus, and solidified at or before the time of discharge, the distance of travel between the feeding point and the point of discharge being preferably sufficiently great to permit the cooling or solidifying of the chemical or a shorter line of travel in connection with specific cooling means may be adopted.

In the following I have described, in connection with the accompanying drawings, one form of apparatus in connection with which my invention may be practised.

In said drawings, Figure 1 is a top plan view of the apparatus, parts being removed for clearness of illustration;

Fig. 2 is a side elevation of the same, parts also being removed in this view;

Fig. 3 is a rear end elevation, parts being removed;

Fig. 4 is a front view; and

Fig. 5 is a rear view of one form of mold section;

Fig. 6 is an edge view of two mold sections, face to face;

Fig. 7 is a top plan view of the device shown in Figs. 4 and 5; and

Fig. 8 is a cross sectional view of a plurality of mold sections similar to those shown in Figs. 4 and 5 but shown adjacent each other so as to form a complete mold.

Similar numerals of reference indicate similar parts throughout the several views.

In the drawings 1 indicates the frame or table on which the other parts are supported. Said table may be fixed in position or may be provided with truck wheels 2, 2, and a guide wheel 3 for example, by means of which the apparatus may be shifted from place to place as desired. Vertically arranged supports 4, 4, may be mounted on cross-bars 5, 5, in turn carried by frame 1. Supports 4, 4, are shown as arranged in two parallel series (Fig. 1) one on each side of the central line of the apparatus. 6, 6 indicate horizontally arranged guide bars fixed to one series of supports 4, 4, one of said bars being arranged near the tops of the supports 4, 4, and the other near the bottom thereof (Fig. 3), each of said guide bars being shown as provided with a bearing way or track 7, on its inner edge.

8, 8 indicate horizontally arranged guide bars adjustably mounted on the other series of supports 4, 4, so as to have motion toward and away from said supports in a horizontal direction, each of said bars 8 being alined with the corresponding fixed horizontal bar 6 and similarly provided with a bearing way

or track 7. The bars 8, 8 are mounted on pins 9 sliding in holes 10 in bearings 11 on supports 4, 4. 12, 12 indicate spring coils around pins 9 bearing at one end against bars 8 and at the other end against bearings 11 and having a tendency to force bars 8 away from their supports 4, 4 and toward fixed bars 6, 6.

13, 13, 13, 13 indicate vertically arranged rotatable shafts mounted in any convenient manner (not shown) at each end of frame 1, each shaft carrying a pair of sprocket wheels 14, 14 mounted on said shafts near the top and bottom thereof, each pair of sprocket wheels being the same distance from each other and from the frame 1 and each set of sprocket wheels being equidistant from the corresponding set at the opposite end of the frame.

The respective pairs of sprocket wheels at the opposite ends of the frame are connected together by a pair of chains, each chain comprising a plurality of vertically arranged mold sections 15, 15, linked together and arranged longitudinally parallel to each other to come into contact during the rotation so as to form a complete mold, as hereinafter described. As illustrated (Figs. 4–8) each of the mold sections comprises a back plate 16 carrying two pairs of oppositely extending lugs 17, 18 and 19, 20 one set at each end of the back plate. The front of each mold section is provided with recesses or cavities 21, 21, each recess or cavity forming a quarter of the completed molded form, the recesses being separated from each other by a continuous vertical rib 22 and by horizontal ribs 23, 23, the horizontal ribs being cut away at their outer ends, as at 24, to provide a bore 25 connecting the completed mold forms vertically from the sink hole 26 at the top to the lowermost mold form of the series. The sink hole 26 is formed by means of recesses or cavities 27, 27, at the tops of each section, each recess forming a quarter of the sink hole. The tops of the mold sections may be cut away as at 28 to form a continuous trough 29 when the oppositely disposed sections are brought into position face to face. The adjacent mold sections are linked together by pins or rods 30 passing through lugs 17 and 20 of one section and lugs 18 and 19 of the adjacent section, pins 30 also carrying rollers 31, 32, rollers 31 resting on lugs 17 and rollers 32 resting on lugs 20. The teeth of the sprocket wheels 14 are of such dimensions as to receive rods 30, and thus by the rotation of the driving sprocket wheels cause the endless chain of mold forms to be moved or pushed forward. The parts are preferably so arranged that the sprocket wheels engage the rods 30 at a point beneath lugs 18 and above rollers 32 resting on lugs 20. The chain of molds in its rotation is partially carried or supported by rollers 33 in turn carried by frame 1.

In the manner shown in the drawings it requires four mold sections to make a complete form (Fig. 8), the oppositely arranged pairs of sections on the respective chains registering with and fitting closely against each other. The adjustably mounted guide bars 8, 8, are arranged so that their trackways 7, 7, contact with rollers 31, 32, on rods 30 thus serving to press the one chain of mold sections against the faces of the other chain of mold sections which are held in position by fixed guide bars 6, 6, the trackways 7, 7, of said fixed guide bars contacting with rollers 31, 32, on rods 30 of its chain of mold sections. 34 indicates a hopper or funnel through which the substance to be molded may be discharged into trough 29 or into sink holes 26.

The sprocket wheels may be driven by any suitable means, preferably so as to provide for variable speeds. I have shown such a driving mechanism (Figs. 1–3) whereby the sprocket wheels at the right hand of the drawings (Figs. 1 and 2) are utilized as the driving means. The shafts 13, 13 of said sprocket wheels are extended downward and provided with worm gear wheels 35, 35, in mesh with worm 36 on shaft 37. Shaft 37 carries a bevel gear 38 at the end opposite worm 36, said bevel gear 38 being in mesh with bevel gear 39 on friction plate 40. Friction plate 40 is driven by friction wheel 41 on shaft 42 along which it is movable so as to cause friction plate 40 to travel at a greater or less rate of speed as may be desirable. Shaft 42 may be driven by any convenient means. I have shown such a means in Fig. 2 wherein 43 indicates an electric motor having a gear 44 on its armature in mesh with gear 45 carrying pinion 46 in mesh with gear 47 on shaft 42.

The molded material drops into a suitable container (not shown) at the forward (left) end of the machine as the mold sections open, the pointed end 48 at the bottom of trough 49, detaching the sinkheads by contact therewith as the mold sections open, the sink heads passing down trough 49 to a suitable receptacle (not shown).

As stated above, one of the objects of my invention is to bring into certain form such chemicals as are sold at the usual temperature but melt when heated to a higher temperature. The chemicals which may come into consideration extend over a wide range and as examples I may cite caustic soda, caustic potash, sodium cyanid, etc. In forming sodium cyanid for example, the chemical is heated in a suitable vessel, until the whole mass is melted and in proper liquid state. The fused sodium cyanid is then poured into funnel 34 and the machine

set in motion at the desired speed. The fused material flows into trough 29 through sink holes 36 into the molds so as to fill up the same, enough surplus of the material remaining in the sink holes to completely fill the molds as the mass shrinks in cooling. The continuous motion of the chains of mold sections between the respective guide bars and the pressure exerted by the movable or spring adjustable guide bars against said chains, causes the molds to come together in proper registry and very closely and tightly against each other just before the funnel is reached and to continue in such condition for a distance of travel sufficient to permit the molten material to solidify before the point of discharge or point of opening of the molds is reached. The apparatus is preferably of such length and the speed of travel is usually so adjusted that the fused chemical will have time to cool off and solidify before the point of discharge is reached but I may accelerate the cooling and solidifying in any desirable manner consistent with the nature of the chemical worked with. For example I may blow cold air over the accessible surfaces of the molds or, if the chemical is not hygroscopic or not too hygroscopic, I may sprinkle water over the backs of the molds. Cooling means 50 may of course be utilized to cool off the hot molds after giving up their contents, so that the molds will be of a sufficiently low temperature to solidify another charge of material which otherwise, owing to retained heat, might be prevented from radiating enough heat to assume the solid state before leaving the molds.

In practical operation of the apparatus certain important points have become evident in order to insure successful use of the same and successful practice of the process. For example, it is of importance that the chains of mold sections be rather pushed than pulled through the apparatus, each section in turn being engaged and immediately released again by the driving means which in turn engages and releases the adjacent section, the sections being thus lined up one after the other, each section pushing against the one ahead of it. As the sections are of precise workmanship, each section being as the mirror image of its opposite section, and they fit tightly against each other face to face as well as edge to edge in the respective chains, a perfect and complete mold is formed so that the form cast will not be distorted.

Another important point relates to the form the chemical is intended to be brought into. It is a significant fact that, up to the present, chemicals, such as those named above, have been manufactured only in the form of short sticks made manually in small tilting molds. In research work on manufacturing chemicals on a large scale in or having special forms, I have observed that the form itself into which said chemicals must be brought is of considerable importance.

For example, it might appear desirable to form the chemicals into a prismatic body having six or eight sharp "corners" formed by the intersection of three or more planes, the lines of intersection convening at a point common to any of said planes. By many experiments I have found that a prismatic body having as many corners as stated above is not a suitable form for the purposes of my invention, but that a sphere, ellipsoid, cylinder or a body formed by the intersection of the bounding lines of either of them with one of the others or a body formed by the intersection of the bounding lines of either of said forms with prismatic bodies and variations obtained by the combinations of such intersecting lines will all give suitable forms. There are some forms with sharp corners which may be easily produced by the practice of my method and use of my apparatus, such as those obtained by laying planes through the ends of the axes of a sphere, ellipsoid, etc., but these are unsuitable for commercial purposes as far as chemicals are concerned, although they may be well suited for the manufacture of metallic bodies, for example.

The reason why molds for forming prismatic bodies, especially those having unequal axes, having six or eight sharp corners, are not suitable, is that, when opening, a mold for making such forms, in the act of discharging the molded body, scratches the product and breaks off the corners so as to make the same unsuitable for the market.

There are moreover considerable advantages which make my apparatus, as well as the product formed, a great improvement over the present state of the art of finishing solid chemicals for the market. The present method involves too much manual labor to permit the supplying of low priced chemicals in special forms; by my invention however, I can supply chemicals in any desired form or weight in commercial quantities and at slight expense. The same remarks apply to those bodies of metal which lend themselves to treatment by my invention. The practice of my invention also permits of forming products which may be easily identified by one not otherwise familiar with the characteristics of the chemical; that is, he is enabled to identify the same by form alone. It also saves considerable labor and expense in weighing the material as the bodies formed may be of certain standard unit weights, so that the weight may be quickly estimated by count.

I am aware that many changes may be

made in the form and proportion of parts and in the details of construction as herein shown and described, without departing from the spirit or sacrificing any of the advantages of the invention and I therefore reserve the right to make such changes as fall within the scope of the appended claims. As instances of possible changes I cite as examples the making of the apparatus as a whole either portable or fixed; the substituting of molds of other form and type; the use of various means for actuating the apparatus, and for varying the speed thereof; substituting other means for breaking off the sink heads, etc.

This application is a division of my application Serial No. 810,544, filed January 6, 1914.

What I claim and desire to secure by Letters Patent is:—

1. In a molding machine an element having pairs of horizontally arranged quarter mold cavities adapted to be alined in each of two movable, longitudinally parallel endless chains having the cavities of the inner elements register with each other, one quarter of a mold cavity forming with the horizontally adjacent cavity of the adjoining element of either chain one half of a mold, two of such correspondingly formed but opposite halves of a mold forming a complete mold.

2. In a molding machine an element having a plurality of pairs of horizontally arranged quarter mold sections communicating with each other in vertical series adapted to be alined in each of two movable, longitudinally parallel endless chains having the cavities of the inner elements register with each other one quarter of a mold cavity forming with the horizontally adjacent cavity of the adjoining element of either chain one half of a mold, two of such correspondingly formed but opposite halves of a mold forming a complete mold having a single sink-hole at its top.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

RALPH NELSON SARGENT.

Witnesses:
OTTO K. ZWINGENBERGER,
ARTHUR L. GARDNER.