

METHOD OF AND APPARATUS FOR FORMING WAX CAKES.

Patented Dec. 7, 1920.

2 SHEETS--SHEET 1.

Fig. 1.

Fig. 2.

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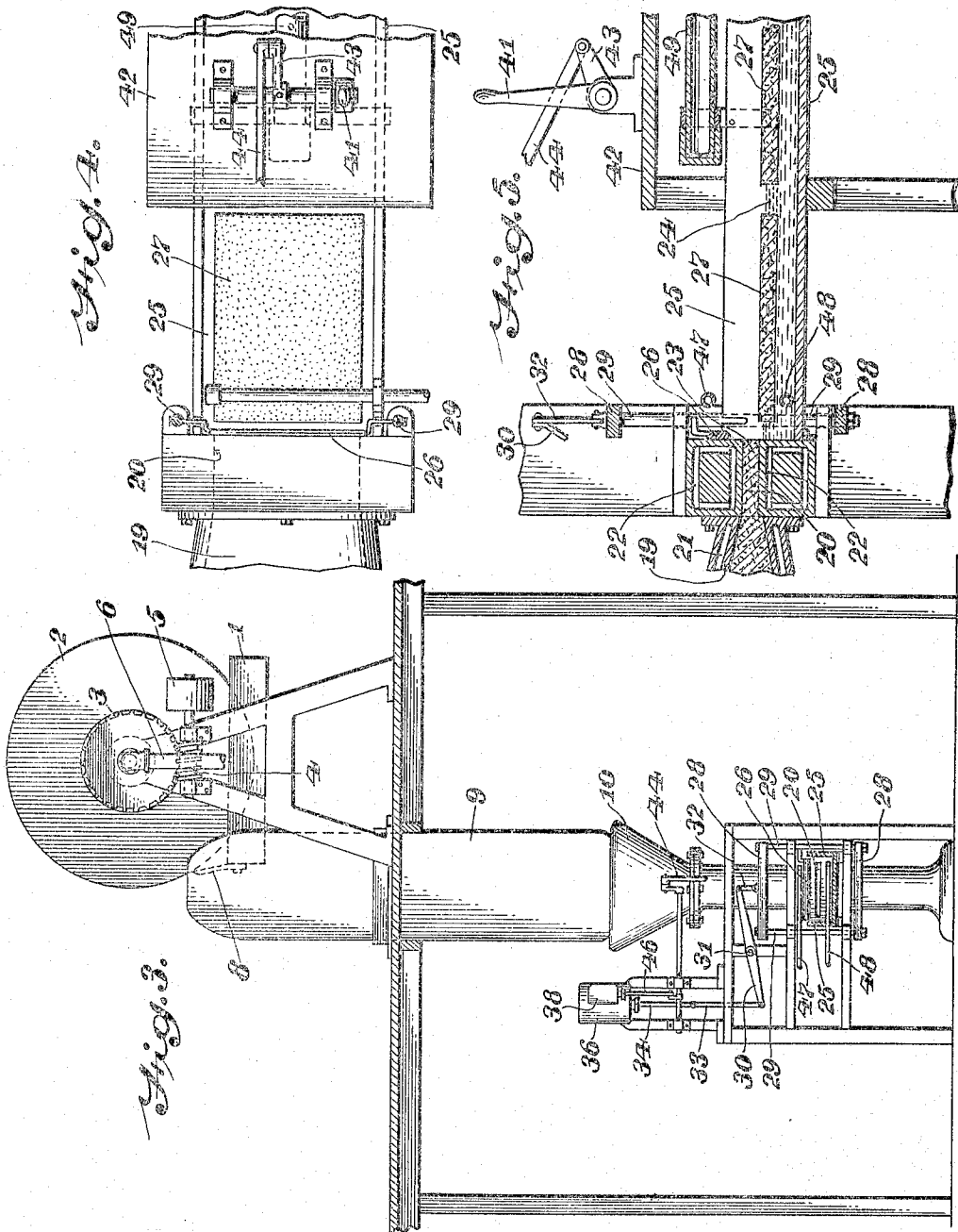
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1,361,346.

APPLICATION FILED FEB. 4, 1920.

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2 SHEETS—SHEET 2.



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METHOD OF AND APPARATUS FOR FORMING WAX CAKES.

1,361,346.

Specification of Letters Patent.

Patented Dec. 7, 1920.

Application filed February 4, 1920. Serial No. 356,336.

To all whom it may concern:

Be it known that I, HOWARD M. NICHOLS, a citizen of the United States, residing at Swarthmore, county of Delaware, State of Pennsylvania, have invented new and useful Methods of and Apparatus for Forming Wax Cakes, of which the following is a specification.

My invention relates to a method of and apparatus for forming into cakes, blocks or other units, wax or the like, and particularly paraffin wax derived from petroleum.

In accordance with my invention wax is suitable subdivision or other suitable state is forced, preferably through a die or equivalent, to form the wax into a ribbon or length of suitable cross section, as circular, rectangular or other suitable form, and delivered, preferably while still in more or less pliant condition, preferably on to a liquid, as water, or on to other suitable means, and severed by knife or the like into cakes or blocks of suitable length, and floated or conveyed away, while cooling, and preferably subjected to additional cooling as by spray of cooling liquid, as water.

For an illustration of one of the forms my apparatus may take, and for an understanding of a mode of practising my method, reference is to be had to the accompanying drawings, in which:

Figure 1 is a vertical sectional view, partly in elevation, of apparatus embodying my invention.

Fig. 2 is a fragmentary cross sectional view through part of the structure illustrated in Fig. 1.

Fig. 3 is an end elevational view of structure shown in Fig. 1.

Fig. 4 is a fragmentary top plan view, on larger scale, of structure shown in Fig. 1.

Fig. 5 is a fragmentary sectional view, on enlarged scale, of structure shown in Fig. 1.

Referring to the drawings, 1 is a pan to which is delivered from any suitable source, not shown, molten wax, as paraffin wax derived from petroleum, in any suitable stage of manufacture, for example, so-called slack wax, crude paraffin wax or refined wax, etc. Within the pan 1 rotates the cylinder 2 of steel or other suitable material, rotated by

the worm gear 3 rotated by the worm 4 rotated by pulley 5, which may be driven by belt or any other suitable means.

Extending through the trunnion bearings of the cylinder 2 are the pipes 6 and 7, respectively conducting into and withdrawing from the interior of the cylinder 2 cooling medium, such as cold water, without interruption of rotation of the cylinder, whose walls are accordingly maintained at low temperature and in passing through the molten wax in the pan 1 chills the immediately adjacent wax which adheres to the cylinder and rotates therewith until it comes into engagement with the stationary knives or scrapers 8, which scrape from the cylinder 2, films or thin sheets or flakes of wax in substantially semi-solid or other suitable condition. The wax so removed from the cylinder 2 falls into the hopper 9, which delivers into the receiver 10 and is then fed by the screw 11, rotated by gear 12 driven by gear 13 secured upon shaft 14 rotated by any suitable source of power. The screw 11 delivers the wax to the feed screw 15, driven by gear 16, pinion 17 and pulley or motor 18, which forces it through the converging chamber to and through the die or equivalent structure 20.

The feed screw structure described may be provided with the water jackets 21 through which is circulated water at suitable temperature, for example, 120 to 125 degrees F., in the case of paraffin wax, though it will be understood that any other suitable temperature may be employed.

Surrounding the walls of the die structure 20 may be provided a water jacket structure 22 through which may be circulated water of any suitable temperature, for example, the temperature above mentioned.

The wax 23 issues from the die in strip or ribbon form and of cross section conforming to the cross section of the die, which in the example illustrated is rectangular. As the wax issues from the die 20 it rests upon and advances along the surface of the water 24 contained in the flume 25.

When the wax issuing from the die has attained suitable or desired length, the knife member 26 whose upper and lower edges are both cutting edges, is quickly moved

across the face of the die, shearing the wax into a severed cake 27.

The knife may be held by any suitable structure, for example, the vertically reciprocating frame 28 having the vertically extending side bars 29 to which the knife member 26 is secured.

The frame 28 may be actuated by any suitable means, for example, by the lever 30, pivoted at 31 and connected at its one end to the frame 28 by the pivoted lever 32 and pivoted at its other end to the connecting rod 33 pivoted to the piston rod 34 actuated by the piston 35 within the cylinder 36 into opposite ends of which fluid under pressure, as compressed air, is alternately admitted by slide valve 37 in the chest 38, with which communicates the pipe 39 delivering the fluid under pressure and controlled by the hand valve 40. The valve 37 is controlled by the hand lever 41 supported on member 42 and actuated by the operator through a suitable system of levers 43, 44 and 45 connected with the valve stem 46. Accordingly the piston 35 moves the knife 26 downwardly and upwardly, in alternation, each stroke of the knife severing a cake 27.

The knife 26 is kept at suitable temperature by steam or other fluid delivered against the same from the pipe 47. For example, steam or hot water may be delivered against the knife 26, the condensed steam or water falling into the flume 25 and commingling with the water 24 therein.

Similarly a pipe 48 may be disposed within the water in the flume 25 adjacent the die and knife structure and deliver steam or hot water for maintaining the water 24 adjacent the die at suitable temperature, and assisting in maintaining the temperature of the knife 26, which in some cases may plunge into the water 24 in its downward stroke.

Extending longitudinally of the flume 25 and above the same may be provided a pipe 49 into which is delivered cooling fluid, as cold water, delivered, preferably downwardly and in a direction away from the die and knife structure, as indicated by arrows in Fig. 1, through perforations in the lower side of the pipe 49. The cooling fluid strikes the cakes 27, cooling or chilling the same at suitable rate, and at the same time imparting thereto a force having a component assisting in moving the cakes 27 from left toward the right, as viewed in Fig. 1.

The flume 25 may be of any desired or suitable length. In general, it should be of length sufficient to permit the cakes 27 to cool to atmospheric or substantially atmospheric temperature, or to any other suitable temperature. The cakes 27 are then removed from the flume 25 in succession as they come to the delivery point either due

to the water 24 flowing longitudinally of the flume from left to right, as viewed in Fig. 1, which is the preferred mode of action, or by pushing the cakes longitudinally by external means or manually.

By way of example merely, it may be stated that I have practised my invention in producing cakes of paraffin wax $1\frac{1}{2}$ inches thick, 12 inches wide and of various lengths, as 24 inches, the water 24 in the flume 25 having a temperature of about 55 to 60 degrees F. and the flume having a length of several hundred feet.

What I claim is:

1. The method of producing wax cakes, which consists in forcing the wax through a die on to a flowing stream of liquid, and severing the wax into a detached cake.

2. The method of producing wax cakes, which consists in forcing the wax in semi-solid state through a die to form the same into a semi-solid ribbon, receiving the ribbon upon a flowing stream of liquid, and severing the ribbon to form detached cakes.

3. The method of producing wax cakes, which consists in forcing subdivided wax at elevated temperature below its melting point through a die to form a ribbon, receiving the ribbon upon liquid, and shearing the ribbon into cakes.

4. The method of producing wax cakes, which consists in melting the wax, distributing it upon a chilled surface, scraping the wax from said surface, forcing it through a die to form a ribbon, and severing the ribbon into cakes.

5. The method of producing wax cakes, which consists in melting the wax, distributing it upon a chilled surface, scraping the wax from said surface, forcing it through a die to form a ribbon, receiving the ribbon upon a liquid, and severing the ribbon as it issues from the die into cakes.

6. The method of producing wax cakes, which consists in forcing the wax through a die on to a flowing stream of liquid, severing the wax into detached cakes, and floating said cakes away on said liquid.

7. The method of producing wax cakes, which consists in forcing the wax in semi-solid state through a die to form the same into a semi-solid ribbon, receiving the ribbon upon a liquid, severing the ribbon to form detached cakes, and floating said cakes away on said liquid.

8. The method of producing wax cakes, which consists in forcing subdivided semi-solid wax through a die to form a ribbon, receiving the ribbon upon liquid, shearing the ribbon into cakes, and floating said cakes away on said liquid.

9. The method of producing wax cakes, which consists in melting the wax, distributing it upon a chilled surface, scraping the wax from said surface, forcing it through a

die to form a ribbon, receiving the ribbon upon a liquid, severing the ribbon as it issues from the die into cakes, and floating said cakes away on said liquid.

5 10. The method of producing wax cakes, which consists in forcing the wax in semi-solid condition through a die, receiving the wax ribbon upon cooler liquid, severing the ribbon into cakes, and subjecting the cakes to additional cooling medium.

10 11. The method of producing wax cakes, which consists in forcing the wax in semi-solid condition through a die, receiving the wax ribbon upon cooler liquid, severing the ribbon into cakes, and forcing cooling liquid against said cakes in a direction causing the same to float away on said first named liquid.

20 12. The method of producing wax cakes, which consists in forcing wax at a temperature below its melting point through a die from which it issues in semi-solid state, severing the same while in semi-solid state as it issues from the die, and floating the severed cakes away upon a liquid chilling the wax into solid state.

30 13. The method of producing wax cakes, which consists in melting the wax, distributing it upon a chilled surface, scraping the wax from said surface, heating said wax below its melting point and simultaneously compressing the same through a die to form a ribbon, and shearing said ribbon into cakes.

35 14. The method of producing wax cakes, which consists in melting the wax, distributing it in a thin layer upon a chilled surface, scraping the wax from said surface, compressing said wax while heating the same to near its melting point, forcing said wax through a die on to a flowing stream of wax bearing liquid, and severing said wax as it issues from said die into detached cakes.

45 15. Apparatus for producing wax cakes comprising a die, means for forcing wax through said die, means for maintaining adjacent the die a flowing stream of wax floating liquid, and means for shearing the wax into separate cakes.

50 16. The method of producing wax cakes, which consists in melting said wax, distributing said melted wax in a thin layer upon a chilled surface, scraping said wax from said surface, compressing said wax and heating the same to below its melting point, forcing said wax through a die to form a ribbon, shearing said ribbon into cakes, and

delivering said cakes on to a cooling and conveying stream of liquid.

17. Apparatus for producing wax cakes comprising a die, a flume terminating at said die and containing wax floating liquid, a knife for severing the wax into cakes, and means for heating said knife. 60

18. Apparatus for producing wax cakes comprising a die, a flume terminating at said die and containing wax floating liquid, a knife for severing the wax into cakes, and means within the liquid in said flume adjacent said die for imparting heat thereto. 65

19. Apparatus for producing wax cakes comprising a die, a flume terminating at said die and containing wax floating liquid, a knife for severing the wax into cakes, and means disposed above said flume for projecting cooling water on to the wax cakes. 70

20. Apparatus for producing wax cakes comprising a die, a flume terminating at said die and containing wax floating liquid, a knife for severing the wax into cakes, and means disposed above said flume for delivering cooling liquid on to said wax cakes and in a direction to cause movement of said wax cakes longitudinally of said flume. 75

21. Apparatus for making wax cakes comprising a wax pan, a cylinder rotating therein and accumulating wax, means for scraping wax from said cylinder, a die, means for forcing the wax films through said die, and means for severing the resultant wax ribbon into cakes. 80

22. Apparatus for making wax cakes comprising a die, a feed screw for forcing the wax through said die, jackets for said feed screw and die for imparting suitable temperature to the wax, and a knife movable across said die at the orifice thereof for shearing the wax issuing from said die into cakes. 85

23. Apparatus for producing wax cakes comprising a die, means for forcing the wax therethrough to form a ribbon, a flume terminating at said die and containing wax floating liquid, a knife movable transversely of said die to shear the ribbon into cakes, a frame supporting said knife, a motive device for actuating said frame, and means for controlling said motive device to determine the length of the wax cakes. 90

In testimony whereof I have hereunto affixed my signature this 31 day of January, 1920. 105

HOWARD M. NICHOLS.