

A. L. BAUSMAN.
CHOCOLATE TEMPERING MACHINE.
APPLICATION FILED MAY 16, 1913.

1,141,683.

Patented June 1, 1915.
4 SHEETS—SHEET 1.

Fig. 1.

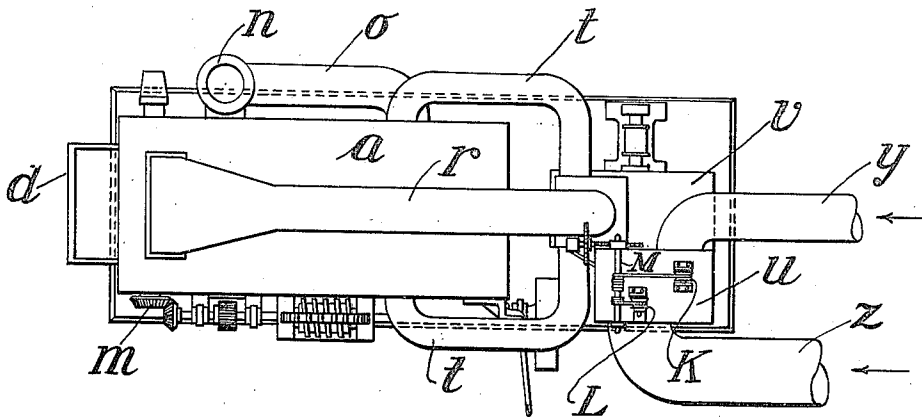
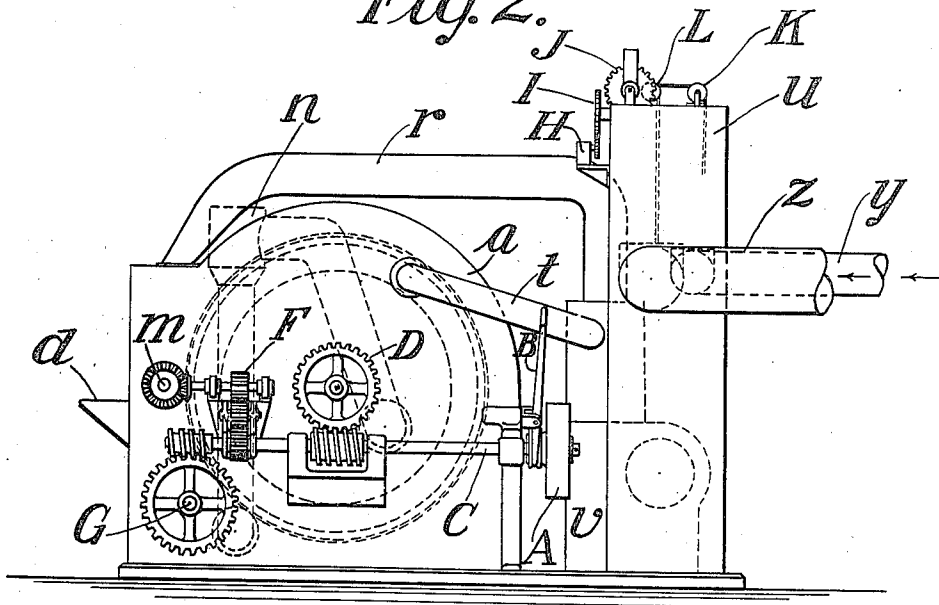


Fig. 2.



WITNESSES:

H. E. Hartwell.
M. Q. Hunter

INVENTOR.

Alonzo L. Bausman.

BY

Chapin & Co.
ATTORNEYS

A. L. BAUSMAN.
CHOCOLATE TEMPERING MACHINE.
APPLICATION FILED MAY 16, 1913.

1,141,683.

Patented June 1, 1915.
4 SHEETS—SHEET 2.

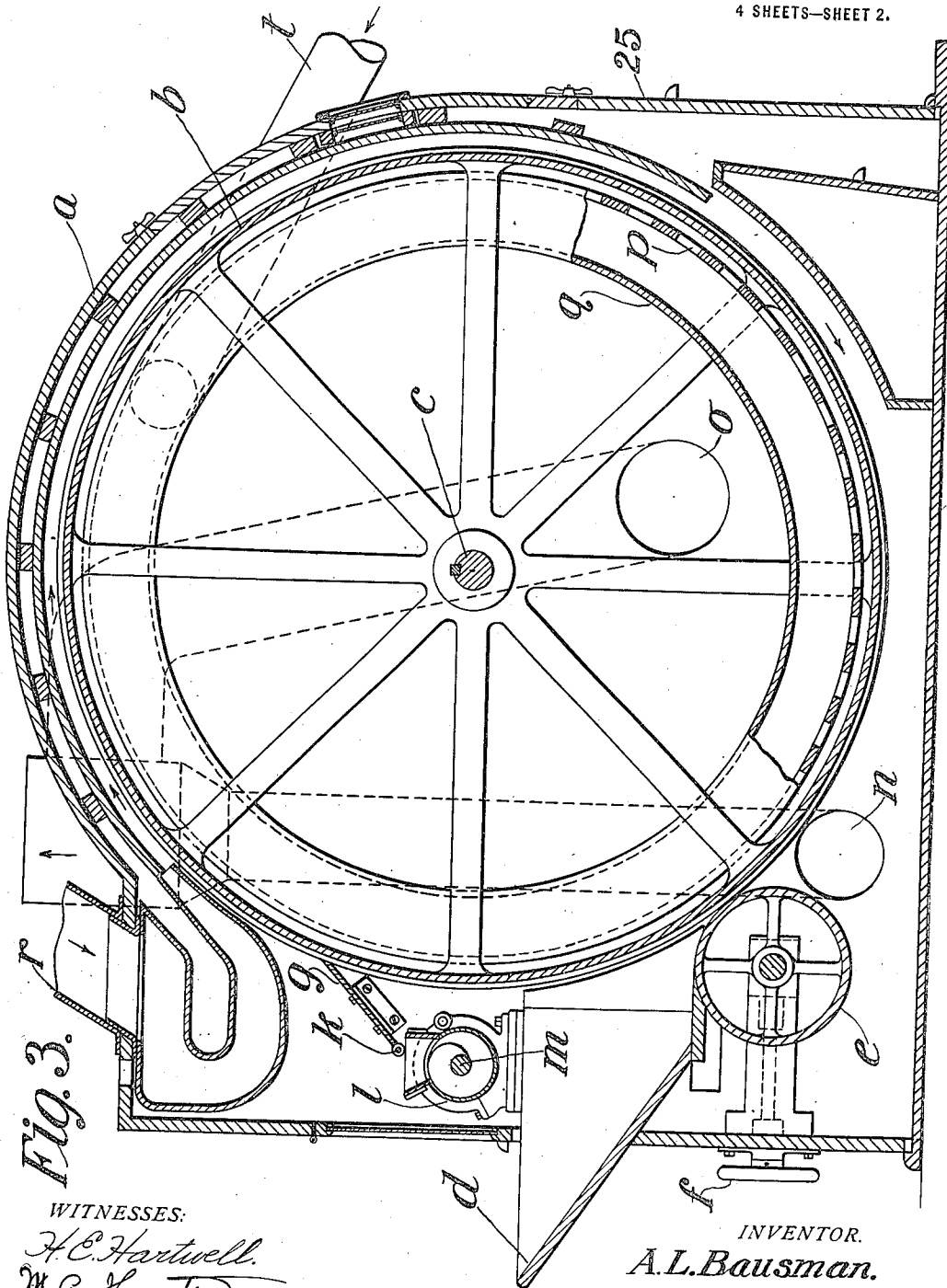


Fig. 3.

WITNESSES:

H. C. Hartwell.
W. R. Hunter

INVENTOR.
A. L. Bausman.
BY

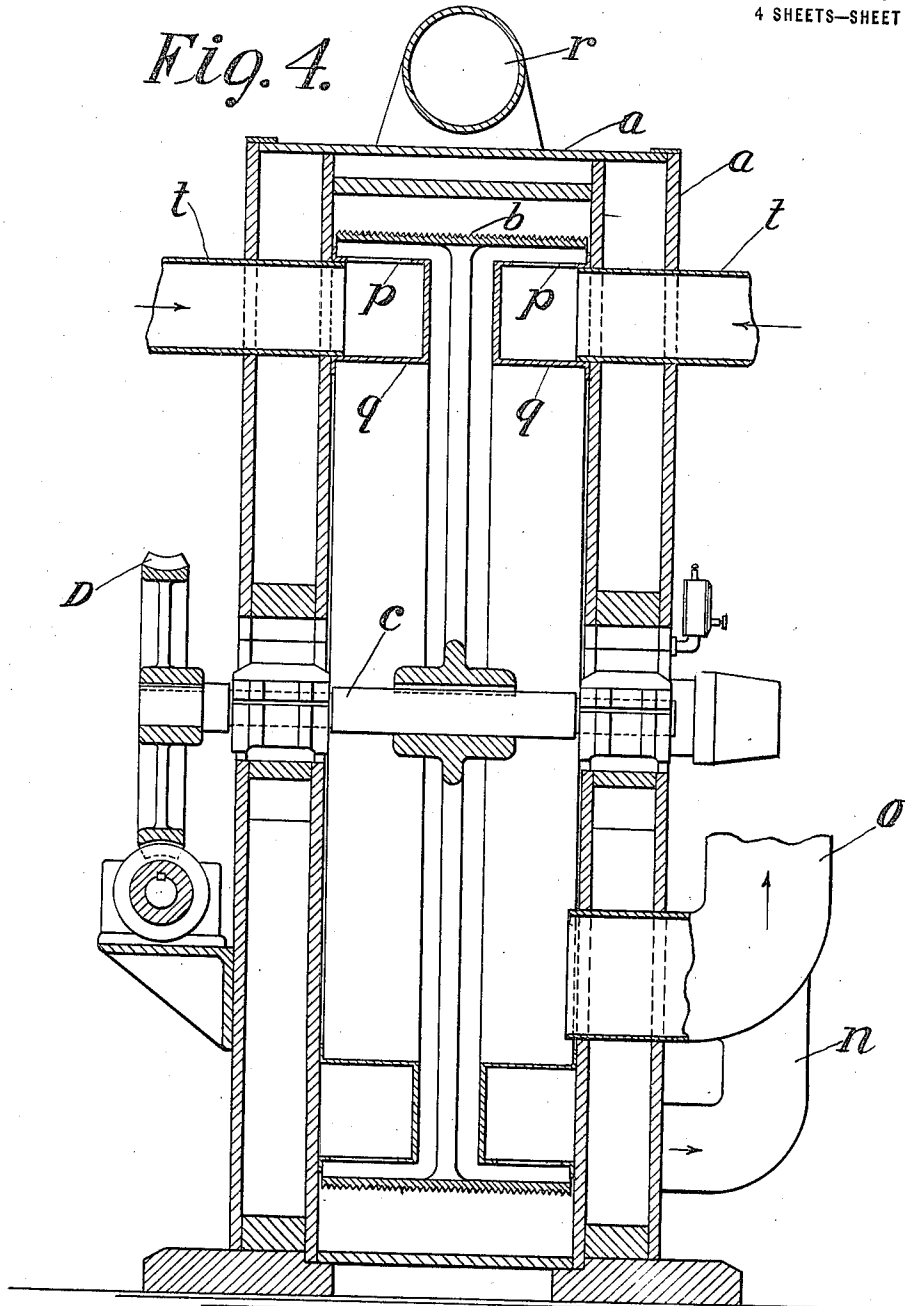
Chapin & Co.
ATTORNEYS

A. L. BAUSMAN.
CHOCOLATE TEMPERING MACHINE.
APPLICATION FILED MAY 16, 1913.

1,141,683.

Patented June 1, 1915.
4 SHEETS—SHEET 3.

Fig. 4.



WITNESSES:

H. E. Hartwell.
M. R. Hunter

INVENTOR.

Alonzo L. Bausman

BY

Chapman & Co.
ATTORNEYS

A. L. BAUSMAN.
CHOCOLATE TEMPERING MACHINE.
APPLICATION FILED MAY 16, 1913.

1,141,683.

Patented June 1, 1915.

4 SHEETS—SHEET 4.

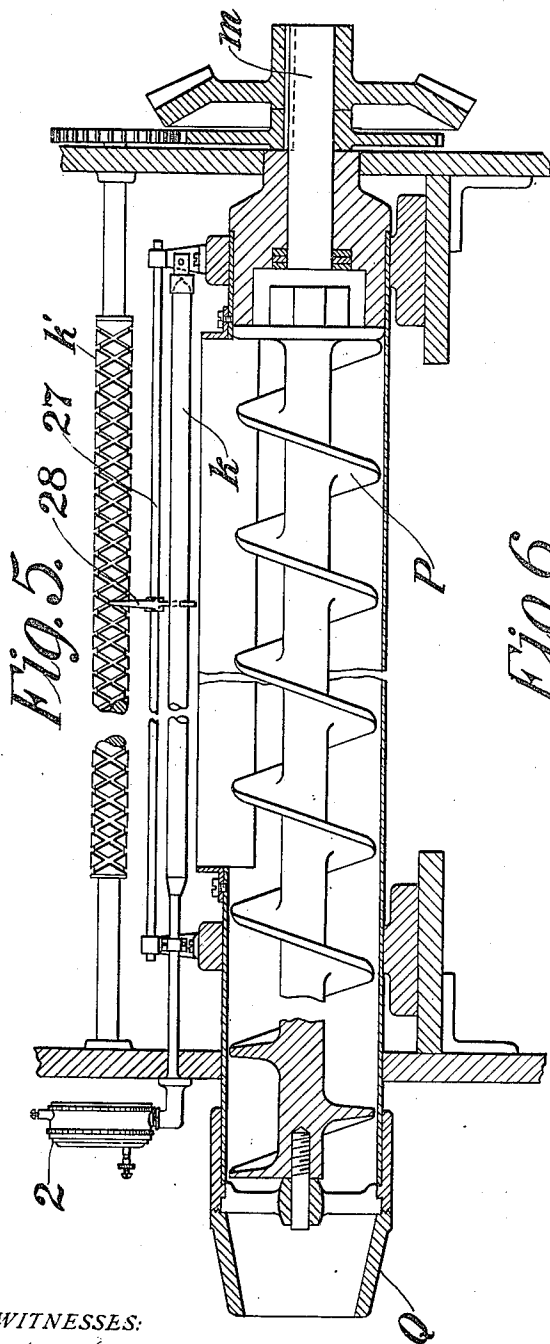


Fig. 5.

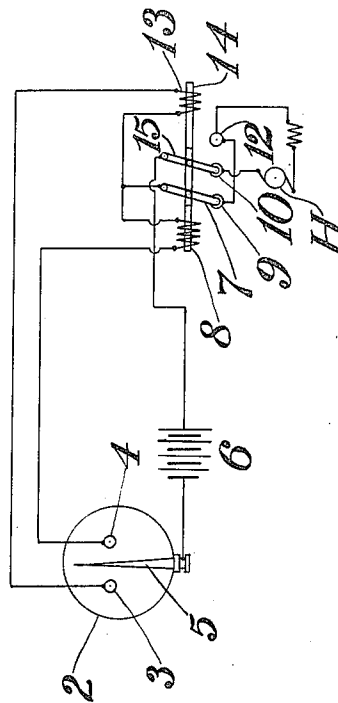


Fig. 6.

WITNESSES:

H. C. Hartwell.
M. C. Hunter

INVENTOR.

Alonzo L. Bausman.

BY

Chapin & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE.

ALONZO L. BAUSMAN, OF CHICOPEE, MASSACHUSETTS, ASSIGNOR TO NATIONAL EQUIPMENT COMPANY, OF SPRINGFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

CHOCOLATE-TEMPERING MACHINE.

1,141,683.

Specification of Letters-Patent.

Patented June 1, 1915.

Application filed May 16, 1913. Serial No. 768,140.

To all whom it may concern:

Be it known that I, ALONZO LINTON BAUSMAN, a citizen of the United States of America, residing at Chicopee, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Chocolate-Tempering Machines, of which the following is a specification.

This invention relates to an apparatus for obtaining a constant temperature of a fluid and particularly of a viscous mass such as chocolate which it is desired to use in large quantities and which it is especially necessary to obtain at an approximately constant temperature within small limits for use in continuous chocolate molding machines. The invention, however, is not limited to this particular use since it can be called broadly a tempering machine and can be used in many different ways.

The object of the invention is to so construct an apparatus of the nature described that an extremely small change in temperature of the mass being treated or brought to a desired temperature will correspondingly regulate the temperature controlling means whereby the temperature of said mass can only change within extremely small limits.

With this object in view, the invention will be clearly understood from a description of the preferred form used for the purpose of illustrating the invention.

In the drawings:—Figure 1 is a plan view of the assembled apparatus. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal cross sectional view of the apparatus showing the revolving drum, the means for subjecting said drum to a constant flowing temperature controlling medium, means for feeding the material to be treated to the drum, and means for taking said material from the drum and a thermostatic element which is used for controlling said constant flowing temperature controlling medium. Fig. 4 is a cross-sectional view showing parts of the same. Fig. 5 is a cross-sectional view of the expelling means in its relation to the sensitive thermostatic element. Fig. 6 is a diagrammatic view of the thermostatic control circuits and motor which is used to control the inlet valves of the reservoir for the temperature controlling medium.

Referring to Fig. 3, the apparatus has parts inclosed in a double walled casing *a*, provided with a door 25 for access thereto. A large drum *b* is keyed on the shaft *c* to rotate therewith. Chocolate or other material is fed into the hopper *d* and works between the feed-wheel *e* (the position of which is controlled by the hand-wheel *f* in an obvious manner) and the drum *b*. The chocolate is thus forced into a thin stream which sticks to the drum *b* and passes around with said drum to be scraped off by the plate *g*, after which it flows over the sensitive thermostatic element *h* and into the expelling casing *l* to be expelled by the expelling screw *p* on shaft *m*. The periphery of the drum *b* is provided with many little circumferential grooves as shown in Fig. 4. These grooves are used where the material handled is chocolate or material of a similar nature which will pack in the grooves and be carried around with the drum to the point of discharge. Between the drum and the double casing *a*, there is an annular space as shown in Fig. 3 connecting with the inlet pipe *r* which conducts the temperature controlling medium from a source to be hereinafter described. A convenient medium for the temperature controlling fluid is air which is let in through the pipe *r* and has the temperature desired for the material being treated. The air led in through the pipe *r* is forced around the annular space between the drum and the casing *a* and out through the pipe *n*, during which time it travels in the opposite direction to the drum. This constant flowing air at a certain temperature will give approximately the same temperature to the chocolate or other material passing from the feed hopper *d* around with the drum *b* to the discharge-plate *g*. Another stream of air with the same temperature as that leading in through the pipe *r* is led through the pipes *t* to the annular casings *q* seen best in Figs. 3 and 4. These annular casings have on their outer periphery a series of openings *p*. The air forced into the casings *q* is forced out through the openings *p* directly against the inner side of the drum *b*. This drum being of metal transmits the heat therethrough to the chocolate being carried on its outer surface as hereinbefore described. The thin stream of chocolate or other material which

is carried around by the drum is thus subjected to the constant temperature desired both on its inner and outer surface, and, since the cross-section of the stream is very small, the material will quickly take the temperature of the air passing through the casing and, when it leaves over the discharge-plate *g*, the desired temperature of the material is insured by a thermostat controlling means to be described.

In the use of an apparatus of this same general kind heretofore, it has been the practice to maintain the air entering the casing by the temperature of the air leaving the casing acting on the sensitive element of a thermostat arrangement. It has been found, however, that this practice is not satisfactory for the reason that the temperature of the air will change necessarily before the temperature of the chocolate or other material being treated. The result of this is that a temperature change of the chocolate will always lag behind any temperature change of the air and no thermostat has been found which is sensitive enough to control the necessary air inlet passages for hot and cold air and thus maintain the temperature change of the chocolate within limits of two degrees Fah. Applicant's apparatus in its temperature controlling means and arrangement is essentially different from any heretofore used. This means will now be described.

Referring to Figs. 3 and 4, the sensitive element *k* of applicant's thermostat (which is of a form in which an expansion of the material, such as alcohol, contained in the tube *k* will operate to expand a hollow-coiled spring in the thermostat box 2 which in turn controls the position of the contact member 5 in a manner similar to an ordinary steam gage,—see Fig. 6,) is placed directly at the end of the discharge-plate *g* as clearly shown in Figs. 3 and 5. The tube *k* where the chocolate flows thereover is made of very thin metal, such as copper, to afford a ready transmission of heat while the rest of the tube from the enlarged thin portion to the thermostat casing is made of a material to resist the transmission of heat therethrough. In this position of the element *k*, the material being discharged flows directly over the sensitive element *k* and floods it so that said element will immediately take the same temperature as the material being discharged. It is seen from this arrangement that the slightest change in temperature of the material at the point of discharge will be transmitted directly to the sensitive element *k*, and the expansion of the alcohol therein will quickly move the hand 5 in the thermostatic casing. When the element *k* is flooded continuously, there is a tendency for the chocolate to cake thereon. To avoid this, a right and left-handed screw *k*¹, driven

from shaft *m* operates to move a scraper 28 back and forth on the element *k*. The movement of the contact member 5 is used to control the temperature of the air flowing through the casing in a manner now to be described.

Referring to Figs. 1 and 2, warm air from any source is led through the pipe *z* to the reservoir *u*. Cold air is led through the pipe *y* to the same reservoir. The difference in temperature between these two streams of air is considerable so that by controlling the amount of air entering from each pipe the result in temperature of the air in reservoir *u* can be controlled within wide limits. The air from the reservoir *u* is led to a pump *v* which forces it through the pipes *r* and *t* to the casing *a* to be used as described. The valve controlling the passage of the air through the pipe *y* is controlled by a rope passing over pulley K, mounted on top of reservoir *u* and connected with the winding-shaft M. The valve of the pipe *z* is similarly controlled by a rope passing over pulley L and connected with the same shaft M. This shaft M is turned by the motor H operating through the gearing I and J as indicated in Figs. 1 and 2. An inspection of Fig. 1 shows that the two ropes leading over the pulleys L and K are wound on the shaft M in different directions so that when the motor H turns the shaft in one direction the valve in one pipe *y* or *z* will be closed while the valve in the other pipe *y* or *z* will be opened. The temperature of the air in the reservoir *u* is thus controlled by the operation of the motor H. This motor is started in one or the other direction by the movement of the contact member 5 as heretofore mentioned.

Referring now to Fig. 6, the circuits from the hand 5 to the motor and the controlling means of the latter will be described. One pole of the battery 6 is connected with the indicator 5 while the other pole thereof is connected to a switch lever 15 of a double throw switch. Two adjustable terminals 2 and 4 contained in the thermostat casing 2 are arranged to be contacted by indicator 5 in its movement in one or the other direction respectively. A wire leads from the terminal 4 to a magnet 8. The other end of the magnet is connected to the lever 7 of the double throw switch. Another wire leads from the terminal 3 to the magnet 13, the other end of which is connected with the same lever 7 of said switch. An armature 14 is controlled by both magnets 13 and 8 in the manner indicated in Fig. 6. The motor H has one pole connected to terminals 12 and 9 and the other pole connected to terminal 10.

From the arrangement described and illustrated in Fig. 6, it is clear that, when the hand 5 makes contact with the terminal

4, the magnet 8 will be energized and the double throw switch will take the position shown in said Fig. 6. The motor will then operate in one direction. When the contact member 5 makes contact with terminal 3, the magnet 13 will be energized and the double throw switch will by its connection with armature 14 be pulled over so that lever 15 contacts with contact 12 and lever 7 with contact 10. The current from the battery 6 is thus sent to the motor in the opposite direction than that first described, and said motor will thus turn in the direction opposite to the one first described. When the contact member 5 does not contact either terminal 3 or 4, the motor remains stationary, and the temperature of the air in the reservoir *u* is at the desired point. If the temperature of the material leaving drum *b* over the sensitive element *a* changes within extremely small limits, the contact member 5 will immediately contact one of the terminals 3 or 4 to operate the motor *H* in the proper direction to control the inlet of either hot or cold air through the pipes *z* and *y*. Thus, the temperature or degree of the temperature controlling medium is changed immediately that the temperature of the chocolate changes. The temperature of the chocolate is thus obtained continuously at the desired degree.

The gearing operating the drum *b*, the feeding-wheel *e*, and the expelling shaft *n* is best seen in Figs. 1 and 2. The main pulley *A* is connected with any suitable driving-shaft whereby the shaft *C* is turned. The worm-gearing *D* is thus turned to rotate shaft *c* of the drum *b*. The gearing *f* in a manner obvious from inspection of Fig. 2 turns the shaft *m* of the expelling means, and another worm-gear turns the shaft *G* of the feeding means, all of which is obvious from an inspection of Figs. 1 and 2.

The outlet of the apparatus *Q* (see Fig. 5) discharges into a suitable receptacle as the feeding-trough of a chocolate molding machine.

The apparatus described can handle very large quantities of material in a continuous manner, and, because of the particular arrangement of the thermostatic device, the temperature of the material being delivered can be arranged within the smallest limits. By moving terminals 3 and 4 toward or away from each other, these limits can be changed as desired.

A preferred form of the invention having been described for purposes of illustration, I claim:

1. In a chocolate tempering machine, a casing, a rotatable drum therein, a feeding device arranged to feed a viscous or fluid material to the periphery of the drum in a thin stream, passages in said casing for the

flow of a temperature-controlling medium, means for enabling the material to leave the drum in a stream together with mechanism for controlling the flow of the temperature-controlling medium comprising an inlet for a hot and an inlet for a cold stream of said medium to said passages, valves for said inlets, a thermostat with its sensitive element located directly in the stream of material leaving said drum, a contact member for said thermostat, and circuits including means to open and close said inlet valves arranged to be controlled by the movement of the thermostat contact member, all for the purpose described.

2. Apparatus for bringing pasty materials or a semi-liquid to a predetermined temperature, comprising conveying means, means to direct a fluid at approximately the same temperature as that required for the said material over the surface of said conveying means, means to feed material to said conveying means, means to take the material from said conveying means together with mechanism for controlling the flow of said fluid over the conveying means, including a passage, a valve therein, means to operate the valve, and a thermostat having a part located directly in the flow of the material being treated and controlling the valve-operating means, all for the purpose described.

3. Apparatus for bringing pasty material or a semi-liquid to a predetermined temperature, comprising conveying means, means to feed material to said conveying means, means to direct a fluid at approximately the same temperature as that required for the said material against the conveying means together with mechanism for controlling the means to direct said fluid comprising a thermostat having a part located directly in said material, said thermostat being connected to said directing means to operate the latter, all for the purpose described.

4. Apparatus for bringing pasty material or semi-liquids to a predetermined temperature, comprising conveying means, means to feed material to said conveying means, together with means to direct a fluid of approximately the same temperature as that required for said material against the conveying means including a conductor for hot and a conductor for cold air, a pipe into which both said conductors lead, valves in said conductors, and a thermostat having a part placed directly in the flow of the material from said conveying means and connection from said thermostat to said valves.

5. In a chocolate tempering machine, a conveying means, means to feed material to said conveying means, means to cause the material to leave said conveying means after it has traveled a certain distance therewith, a casing for said conveying means, together

with means to direct a fluid of approximately the same temperature as that required for said material into said casing and against the conveying means including an inlet to said casing with connections to two sources of fluid at different temperatures, valves in said connections, and a thermostat-control-device with its sensitive part placed directly in the stream of material leaving said conveying means arranged to control said valves whereby the proper temperature of the fluid may be maintained.

6. In a chocolate tempering machine, a conveying means, means to feed material to said conveying means, means to cause the material to leave said conveying means after it has traveled a certain distance therewith, a casing for said conveying means having an inlet and outlet for a fluid of approximately the same temperature as that required for said material, a reservoir for said fluid connected to said inlet having a con-

nection with a source of hot and a connection with a source of cold air, valves in each of said connections, a thermostat-control-mechanism for said valves having the temperature controlling element thereof directly in the stream of material leaving said conveying means.

7. In a chocolate tempering machine, means to carry the chocolate in a thin film, means to direct a flow of a temperature controlling medium against said film and controlling devices for said medium, including valves and a thermostat having a sensitive part directly in the chocolate and adapted to control said valves, together with means for supplying the temperature controlling medium at different temperatures to said valves.

ALONZO L. BAUSMAN.

Witnesses:

HENRY A. BOOTH,
HARRY W. BOWEN.