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BY HEAT.

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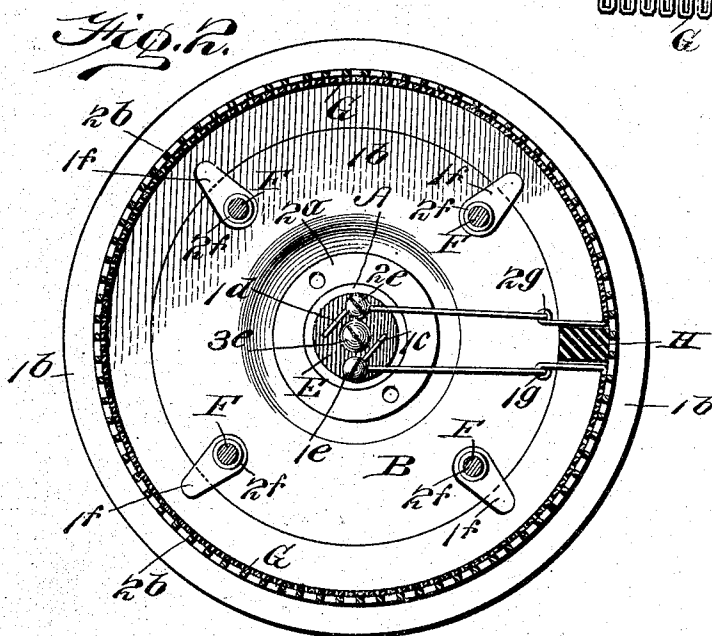
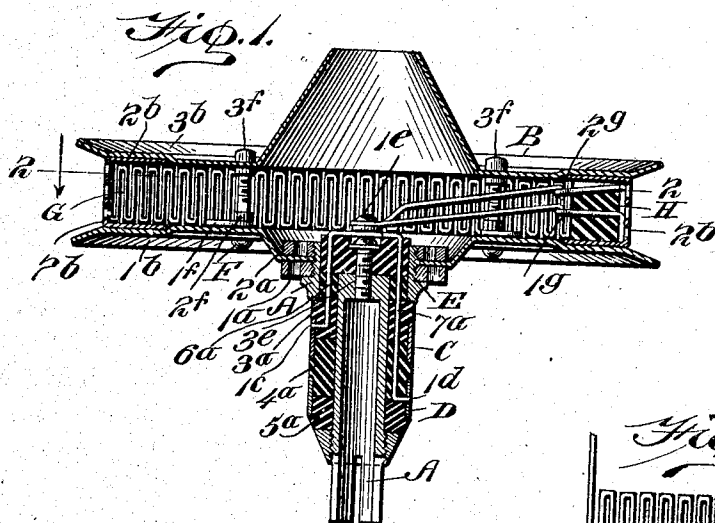
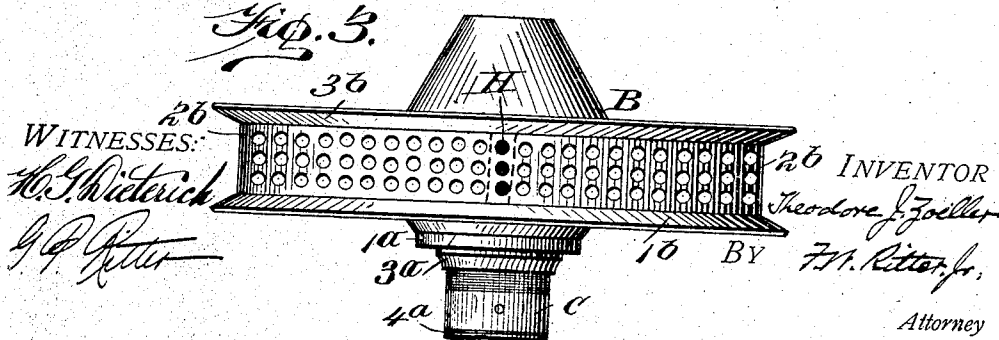


Fig. 3.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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PROCESS OF CONVERTING INTO FILAMENTS SUBSTANCES LIQUEFIABLE BY HEAT.

No. 816,056.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed January 5, 1905. Serial No. 239,766.

To all whom it may concern:

Be it known that I, THEODORE J. ZOELLER, a citizen of the United States, residing at Nashville, in the county of Davidson, State of Tennessee, have invented certain new and useful Improvements in Processes of Converting into Filaments Substances Liquefiable by Heat; and I hereby declare the following to be a full, clear, and exact description of the same, such as will enable any person skilled in the art to which it appertains to practice and use the process.

For the purpose of more readily and clearly explaining my said process, but without any intent to limit myself to the use of any particular mechanism in the practice thereof, I shall refer to the accompanying drawings, in which—

Figure 1 is a vertical central section of a mechanism which may be used in performing the process. Fig. 2 is a horizontal section on the line 2 2, Fig. 1, looking in the direction of the arrow. Fig. 3 is a side elevation of such a device. Fig. 4 is a view showing a fragment of the heater-screen employed in the device illustrated.

Like symbols refer to like parts wherever they occur.

My invention relates to the process of converting into filaments or a filiform mass those substances which liquefy upon the application of heat, and has for its object to render the process economical and the product uniform. Hitherto in the practice of such processes but a small amount of the heat supplied in liquefying the substance to be operated upon has been utilized as necessary heat, the result being that an extravagant amount of heat energy was uselessly expended. Furthermore, the ratio of the amount and intensity of the heat supplied to the material operated upon to the quantity of such material has not been controlled, the result being that those substances which are altered or changed at certain critical temperatures could not be operated upon to surely obtain the desired uniformity of product.

To overcome the objections before noted, I supply substantially equal quantities of heat to successive increments of the material operated upon, thus, in effect, maintaining a constant ratio between the amount of material to which heat is supplied and the amount

and intensity of such heat, thereafter subjecting such heated material to centrifugal force. For this purpose I prefer to centrifugally project the material operated upon through a heat zone or belt in such manner as to withdraw the material operated upon from the presence of the heat simultaneously with its liquefaction.

I will now proceed to describe my process with reference to the particular mechanism shown in the drawings, so that others skilled in the art to which it appertains may perform the same.

In the drawings illustrating a form of device suitable for practicing my invention in the conversion of sugar to a filamentous form A is a split-sleeve shaft or shaft-coupling adapted to engage the shaft of a suitable motor (not shown) of any well-known construction; but, if desired, any other means of attachment to the motor may be employed or any other means of revolving the device may be utilized.

Mounted upon the upper end of the coupling A, and preferably secured thereto between the collars or nuts 1^a 2^a, which engage said coupling, is the lower member 1^b of the retaining-receptacle B, and said shaft or shaft-coupling A is also provided with collector or transmitting rings C D, which are insulated therefrom and from each other by the insulating-rings 3^a 4^a 5^a and insulating spools, tubes, or cylinders 6^a 7^a or in other suitable manner. The transmitting or collector ring C is preferably electrically connected to the binding-post 1^c by means of the wire 1^d, which is embedded in the ring of insulating material 3^a and in the insulating-tube 6^a, and the transmitting-ring D is connected by the wire 1^d, which passes through insulating-rings 3^a 4^a and insulating-tube 7^a with the binding-post 2^c, said binding-posts 1^c and 2^c being mounted on the plug or cap E, which is of insulating material and is or may be secured to the upper end of the shaft-coupling A by a screw 3^e or in other suitable manner.

The receptacle B, which is a containing means for the material operated upon, is preferably constructed of a lower member 1^b, an upper member 3^b, having a centrally-disposed orifice therein for the introduction of the material to be operated upon, and an in-

intermediate or interposed section 2^b, the latter being preferably of an insulating material or having an insulating-coating, such as enamel, and having a perforated vertical face and upper and lower lateral flanges within which the ribbon-screen heater is housed; but, if desired, the intermediate section 2^b may be omitted, and other means of maintaining the proper spaced or separated relation of the upper and lower sections of the receptacle B may be employed, the heater-screen G peripherally closing the opening between them and retaining the material to be acted upon. When, however, an intermediate member 2^b is employed, the lower lateral flange thereof rests upon the lower member 1^b of the receptacle B and is secured thereto by the elongated washers 1^f 1^f, which engage such lateral flange and which are held in position by nuts 2^f 2^f upon the screws F F, which pass upwardly through the said lower member 1^b, by which means the intermediate perforated member 2^b may be readily disengaged from the lower member 1^b by a partial rotation of said elongated washers should such disengagement be necessary or desirable for cleaning the device or for any other purpose. The screws F F also pass through the upper member 3^b of the receptacle B and serve, through the nuts 3^f 3^f to retain said upper member in engagement with the upper flange of the intermediate member 2^b; but, if desired, any other suitable means of connecting the several sections may be employed.

Housed within the intermediate sections and protected by the lateral flanges of the intermediate member 2^b of the receptacle B is the heater ribbon-screen G, which is preferably constructed of square wire alternately folded in opposite directions to form a ribbon occupying the space between the lateral flanges of such intermediate member, the openings in such screen being of such size or fineness as to prevent the escape of any of the material to be operated upon in its raw state or without having been first reduced to a molten or liquid condition; but in lieu of forming the heater ribbon-screen of square wire the same may be formed in other manner—as, for example, by folding a flat band of broad wire in a zigzag manner. The opposite ends 1^s 2^s of the heater-screen G are insulated from each other by the block of insulating material H, in which they are secured, and such ends 1^s 2^s are electrically connected to the binding-posts 1^e and 2^e, respectively, preferably by short lengths of wire soldered to the ends of said heater-screen. The electrical energy supplied to the heater-screen G for the purpose of heat-

ing the same may be led in through brushes (not shown) contacting the collector or transmitting rings.

As a matter of information, and not as limitation, I would state that I revolve the containing-receptacle at about two thousand revolutions per minute and form the heater-screen G of a wire which is square or nearly so in cross-section.

The receptacle B being charged with the material to be operated upon and being revolved rapidly, the material is centrifugally forced into contact with the retaining heater-screen G, which is simultaneously heated to the proper degree by passing a current of electricity therethrough. Such material as at any instant is contiguous to the retaining heater-screen G is thus reduced to a molten state, in which condition it may escape through the interstices of said screen and be then thrown off in filiform fragments from the periphery of the revolving device.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The process of converting into filaments substances liquefiable by heat, which consists in supplying a substantially equal amount of heat to all increments of the material operated upon and subjecting such heated material to centrifugal force.

2. The process of converting into filaments substances liquefiable by heat, which consists in centrifugally projecting the material operated upon through a heat zone in such manner as to withdraw the material operated upon from the presence of the heat simultaneously with its liquefaction.

3. A step in the process of converting into filaments substances liquefiable by heat, which consists in supplying a substantially equal amount of heat to all increments of the material operated upon.

4. The improvement in the art of making candy, which consists of confining a mass of candy-making material, in rotating said mass and simultaneously heating the outer or peripheral portion thereof to melt the outer parts of the mass of candy-making material, and in permitting the melted portion of the candy-making material to be extruded by centrifugal force.

In testimony whereof I affix my signature, in presence of two witnesses, this 31st day of December, 1904.

THEODORE J. ZOELLER.

Witnesses:

SAML. S. BRIGGS,
A. R. SPILLERS.