No. 651,829. Patented June 19, 1900.

A. W. COPLAND.

NOZZLE FOR DEPOSITING MACHINES.

(Application filed Nov. 6, 1899.)

(No Model.)

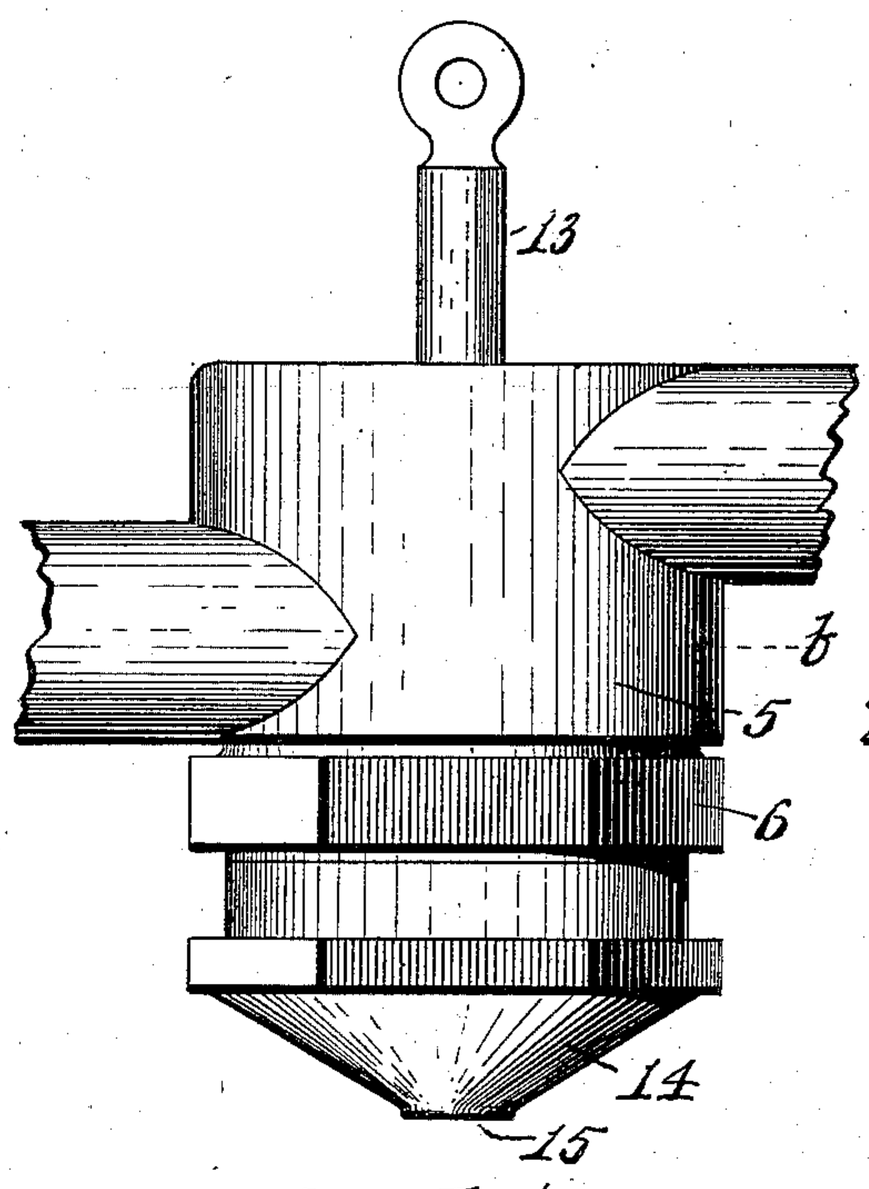

FIG. 1.

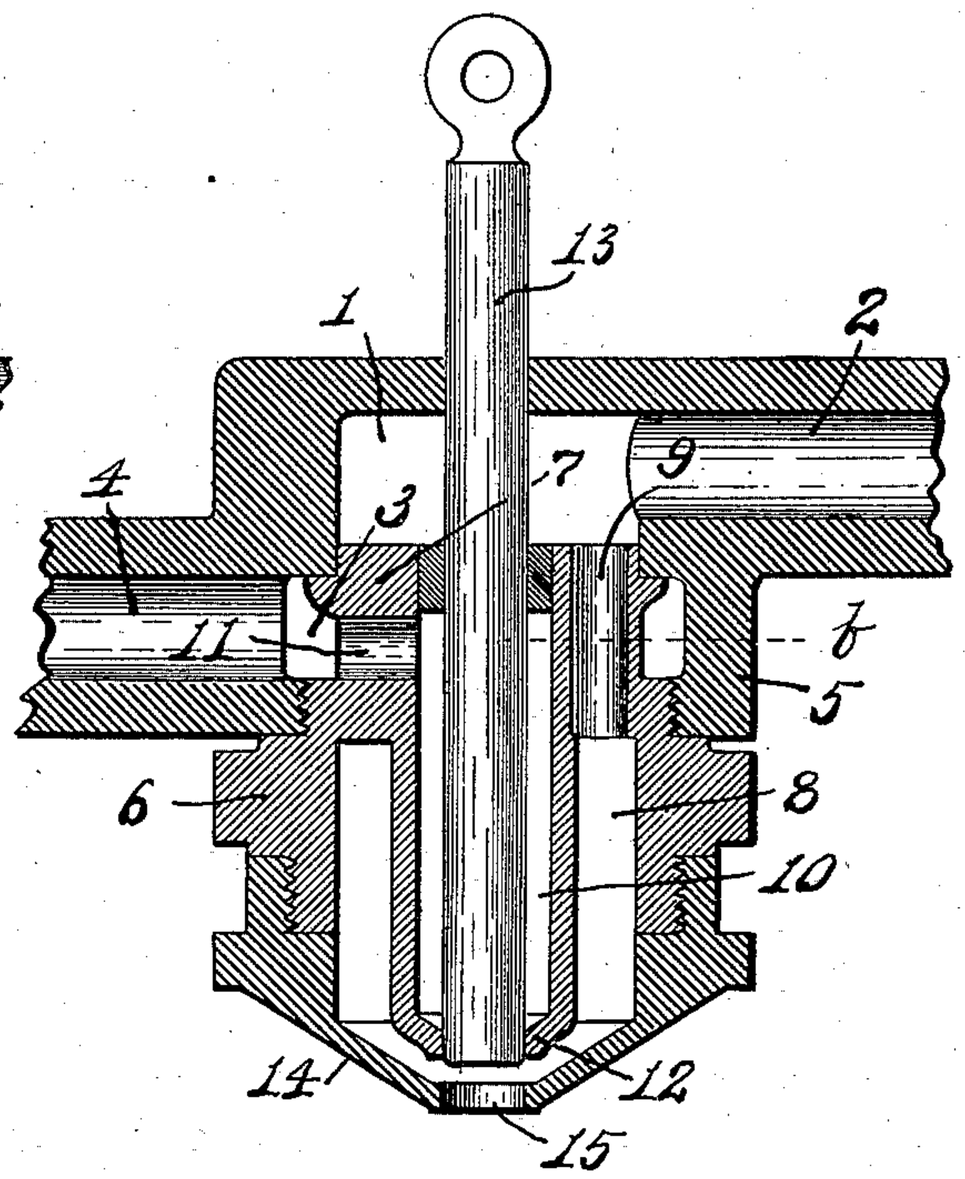

FIG. 2.

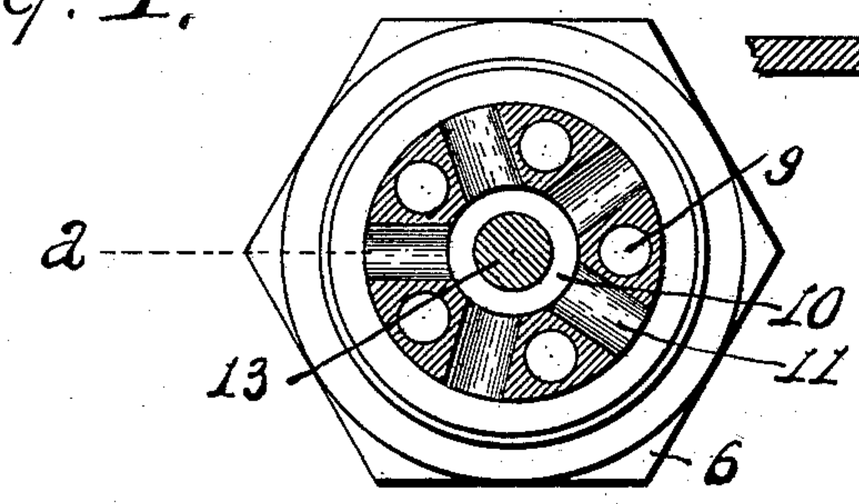

FIG. 3.

FIG. 4.

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NOZZLE FOR DEPOSITING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 651,829, dated June 19, 1900.

Application filed November 6, 1899. Serial No. 735,897. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER W. COPLAND, a citizen of the United States, residing at Boston, Suffolk county, Massachusetts, (post-office address, 252 Massachusetts avenue, Boston, Massachusetts,) have invented certain new and useful Improvements in Nozzles for Depositing-Machines, of which the following is a specification.

In certain of the arts there are employed machines designed to deal at one time with two different kinds of plastic material and deposit one of the materials in certain relationship to the other. An example is found in the depositing-machines employed in making cakes and confectionery. (See, for instance, my Patent No. 544,962, of August 20, 1895.)

My present invention relates to improvements in the depositing-nozzles for such machines regardless of the material with which they are intended to deal or the product which they are designed to produce; but for purposes of description I will assume the improved nozzle to be employed in the production of cakes or the like formed of dough in combination with jam, it being understood that in this description I employ the terms "dough" and "jam" as merely illustrative of dissimilar plastic materials to be dealt with by the nozzle.

My invention will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a depositing-nozzle exemplifying my invention; Fig. 2, a vertical longitudinal section thereof in the plane of line *a* of Fig. 3, this view also comprehending a typifying surface or plate to receive the deposit from the nozzle; and Fig. 3, a horizontal section of the nozzle in the plane of line *b* of Figs. 1 and 2.

In the drawings, 1 indicates a chamber into which dough may be forced under controlled pressure; 2, the supply-conduit leading thereto; 3, a chamber into which jam may be forced under controlled pressure; 4, the supply-conduit leading thereto; 5, a fixed casing containing the chambers 1 and 3 and having the conduits 2 and 4 communicating with it; 6, a plug screwed upwardly into the casing 5; 7, the upper end of plug 6, the same fitting tightly into the base of chamber 1, chamber 1 being thus above the top of the plug, while chamber 3 is around the upper neck of the plug; 8, an annular groove cut upwardly in the base of plug 6, the roof of this groove separating the groove from chambers 1 and 3; 9, a series of vertical ports in plug 6, leading through the roof thereof and placing groove 8 in free communication with dough-chamber 1 and its conduit 2, the illustration showing five of these ports; 10, a vertical central bore in plug 6, the same extending up to near the top of the plug; 11, a series of radial ports extending through the neck of the plug and placing counterbore 10 in free communication with jam-chamber 3 and its conduit 4, the illustration showing five of these radial ports; 12, a contracted nozzle at the base of counterbore 10; 13, a cylindrical valve-rod projecting down through the roof of chamber 1 and through the roof of counterbore 10, in both of which roofs it fits nicely and is adapted to project into and fill the contracted nozzle 12 of counterbore 10, this valve-rod being adapted for vertical motion, so as to bring its lower end up into counterbore 10 free of nozzle 12; 14, a cap screwed on the lower outer portion of plug 6 and forming a floor for groove 8; 15, a nozzle in the floor of cap 14, concentrically under and near to nozzle 12, sufficient space being formed between the two nozzles to permit a proper flow of the dough from groove 8 to nozzle 15, and 16 an exemplifying pan, plate, or surface on which the nozzles may deliver their deposits.

Referring to Fig. 2, let it be assumed that conduit 2 is arranged to convey dough under controlled pressure and that conduit 4 is arranged to convey jam under controlled pressure, as is common in depositing-machines, as illustrated, for instance, in my earlier patent above referred to. Assume valve-rod 13 to be in the position shown in the drawings. The dough from conduit 2 will fill chamber 1 and pass through ports 9 and into annular groove 8 and will become expelled through nozzle 15 in the form of a rope of dough. Assume plate 16 to be absent. Then this rope of dough will continue to pass from nozzle 15 and may be dealt with as desired, being cut off in short pieces or being cut off in long pieces and

coiled up, as desired. Under such conditions the product of the nozzles may be described as a continuous rope of dough. Again, assume the conditions as before, but with plate 16 present. The rope of dough will start down from nozzle 15, and upon striking plate 16 it will become flattened or swelled out into cake form. If now the supply-pressure on the dough be arrested and the plate 16 be lowered, the cake upon the plate will move downwardly with the plate, leaving the cake united to the nozzle by a neck formed by the rope of dough; but as the descent of the cake continues the neck will become stretched and attenuated and finally assume a thread-like thinness and break, the "stalagmite," so to speak, of dough collapsing into the cake, while the stalactite of dough depends from the nozzle. The plate being presented upwardly anew to the nozzle condenses the stalactite of dough, and then when the pressure of dough is reinstalled the formation of another cake begins, and so on, as before. Under these conditions the product of the nozzle may be described as cakes of dough upon a receiving-surface. Again, assume valve-rod 13 to be lifted free of nozzle 12 and assume the dough and jam as being supplied under pressure. The jam coming through conduit 4 will enter chamber 3 and pass through radial ports 11 into counterbore 10 and out of nozzle 12 at the same time the dough is passing out of nozzle 15. The jam passes centrally down from nozzle 12 through nozzle 15, while the dough passes annularly down through nozzle 15 around the rope of jam. Under such conditions, assuming plate 16 to be absent, there will pass continuously from nozzle 15 a rope of dough having a core of jam, and this compound product thus passing continuously from the nozzles may be cut off and dealt with as desired. The product of the nozzles in such case may be described as a continuous rope of dough having a continuous jam core. Again, assume valve-rod 13 in closed position, as seen in Fig. 2, and assume pressure upon the supply of dough, under which conditions the rope of dough starts out of nozzle 15. The rope of dough having thus started, let valve-rod 13 be raised, thus opening nozzle 12. The two materials will thus flow together, the rope of dough having a jam core, the lower end of the compound rope being sealed by dough. If the pressure be arrested and the compound rope cut off, there will result a piece of rope having its lower end and periphery formed of dough, its core being formed of jam—in other words, a deep cup formed of dough and filled to the top with jam. If under conditions similar to the above the compound rope be permitted to come against the plate 16, it will become swelled out and enlarged, and when the rope is cut off there will obviously result a cup of dough having a contracted form and filled with jam exposed at the top. Again, assume that the rope of dough is started and then the core of jam is started and that then valve-rod 13 is lowered, thus arresting the flow of jam, while the flow of dough continues for a period, the flow of jam being later and at intervals repeated as the flow of dough continues. The product will be a rope of dough containing within it at intervals completely-inclosed bodies of jam. If during each cessation of the flow of jam the rope of dough be cut off, there will result a series of short sections of dough rope each containing a completely-inclosed body of jam. Again, assume the rope of dough to be started and to come against plate 16, whereupon the dough begins to swell outward into cake form. At the same time let the flow of jam be started by raising valve-rod 13, thus depositing jam within the cake. Then let the flow of jam be arrested, and let the flow of dough continue for an interval. The result will be that the rope of dough will re-form solidly over the deposited jam. If now the flow of dough is stopped and the plate be lowered, the neck uniting the cake with the nozzle will be thinned and finally severed, thus leaving upon the plate a cake of dough containing a completely-inclosed body of jam, the inclosing wall of dough being without seam or joint of any character. Again, assume the rope of dough to be started against plate 16 and that the plate is carried horizontally as the rope is delivered upon it. The result will be that the rope will lie upon the plate in flattened form. While this is taking place the flow of dough may be arrested at intervals, thus delivering upon the plate a series of flattened long cakes of dough. At the same time while each cake of dough is thus being formed upon the plate there may be injected into it a body of jam, thus producing long flat cakes of dough containing completely-inclosed bodies of jam.

The above examples are simply illustrative of the variety of products obtainable from the nozzle. Heretofore attempts have been made to produce similar results by central jam-nozzles whose cessation of action depended upon cessation of pressure upon the jam supplemented in cases by a sucking action upon the jam; but these attempts have not been successful, owing to the fact that the flow of jam was not satisfactorily cut off, the result being that the closure of the dough above the jam necessarily partook of the nature of a welding or contact action, resulting in incomplete closure and in an unsightly product. In the present case when valve-rod 13 is down the dough flowing from nozzle 15 forms a solid homogeneous body to compose the floor and walls of the inclosure for the jam, and when rod 13 is lifted to admit the jam and then closed to stop the flow of jam the continued flow of dough under nozzle 12 and across the end of the valve-rod at once cleans off all jam and then proceeds at once to form a homogeneous roof over the deposited jam.

I claim as my invention—

In a nozzle for a depositing-machine, the combination, substantially as set forth, of a fixed body containing two outlet-nozzles in line with each other and one above the other, separate conduits adapted to convey material to said nozzles respectively, and a movable valve-rod disposed within said body and adapted to engage within the upper one of said nozzles and close the same and form a roof over the lower one of said nozzles.

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