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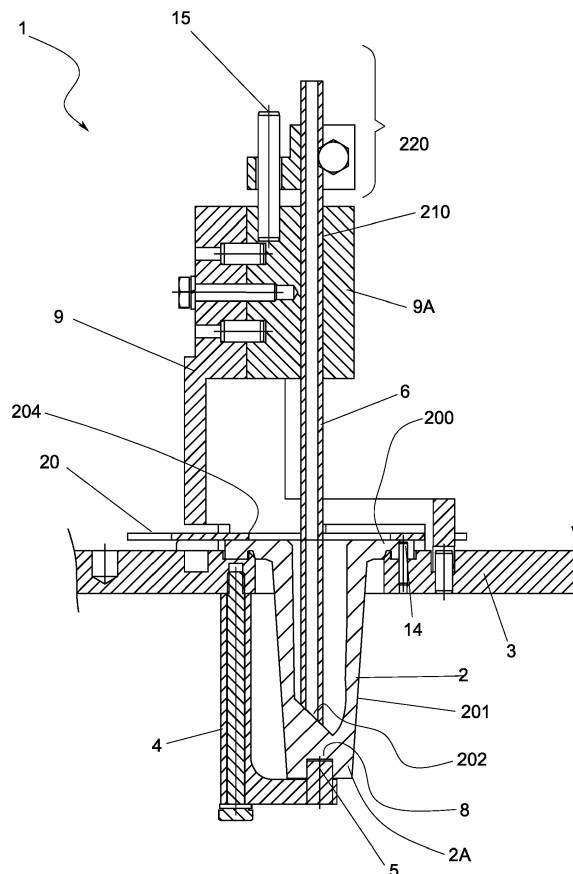
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(54) **DEVICE, MACHINE AND METHOD FOR CASTING A LIP STICK**

(57) A device for casting a lip stick, comprising a deformable mold (2) supported by a plate (3), the plate (3) being integral to an appendix (4) for centering the bottom

(2A) of the deformable mold (2), the appendix comprising a portion (5) configured to perform a form-based coupling with the said bottom (2A) of the mold (2).



**FIG.6**

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**Description**

## FIELD OF THE INVENTION

**[0001]** The present invention relates to a device for casting lip stick.

**[0002]** The invention is also related to a machine which incorporates the device, and to a method for casting a lip stick.

## BACKGROUND ART

**[0003]** The known machines for forming lip sticks (such as for example cosmetic lipsticks or lip balm sticks) hot-cast a product in a deformable mold. Once cooled, the product solidifies, forming the stick.

**[0004]** Given that the mold is deformable (since normally made of silicone), it is possible that before solidification, the mold also deforms slightly, thereby producing a stick which must be discarded.

**[0005]** Furthermore, with the known machines, it is not possible to produce lip sticks which are produced with two different cast products, and therefore, for example, two-coloured lip sticks.

## SUMMARY OF THE INVENTION

**[0006]** Object of the present invention is to provide a device, a machine and a method for producing lip sticks, which make it possible to produce sticks which correspond perfectly with the mold in which they are cast, thereby minimising production waste.

**[0007]** This and other objects are reached by means of a device, a machine and a method for producing lip sticks according to the technical teachings of the appended claims.

**[0008]** Advantageously, the invention makes it possible to produce lip sticks formed from more than one cast product, for example two-coloured sticks.

## BRIEF DESCRIPTION OF THE FIGURES

**[0009]** Further characteristics and advantages of the innovation will become clearer in the description of a preferred but not exclusive embodiment of the invention, illustrated - by way of a non-limiting example - in the drawings annexed hereto, in which:

Figure 1 is a top-down perspective view of a plate of a machine for the production of lip sticks according to the invention;

Figure 2 is a bottom-up perspective view of the plate in Figure 1;

Figure 3 is an enlarged detail of the zone circled in Figure 1;

Figure 4 is an enlarged detail of the zone circled in Figure 2;

Figure 5 is a section view of a part of the machine in Figure 1, in a possible operating configuration;

Figure 6 is a section view of a part of the machine in Figure 1, in a further possible operating configuration;

Figures from 7 to 10 show various steps of the method for casting a stick produced according to the present invention;

Figure 11 shows a different embodiment of the part of the machine of Figure 5;

Figure 12 is a schematic section taken on the line XII-XII of Figure 11; and

Figure 13 is a schematic section taken on the line XII-XII, just before removal of a lipstick produced with the embodiment of Figure 11.

## 25 DETAILED DESCRIPTION OF THE INVENTION

**[0010]** With reference to the said figures a device for casting lip stick, overall, is denoted 1.

**[0011]** Initially, with reference to Figure 6, where it can be seen that the device 1 for casting a lip stick, comprises primarily a deformable mold 2 supported by a plate 3.

**[0012]** More specifically, the mold 2 can envisage a flange 200 from which an elongated portion may extend, for example a frusto-conical portion 201. Inside the frusto-conical portion a cavity 7 is defined, which can assume the external form of a lip stick which one wishes to produce.

**[0013]** In fact, the form of the cavity 7 defines the final outline which the lip stick one intends to produce will have. It can be noted that the bottom 7A of the cavity can be not flat, and more specifically can feature an inclined surface 202, which creates a corresponding inclined portion on the tip of the lip stick, making it thereby assure the characteristic configuration specific of cosmetic lipsticks.

**[0014]** To house the stick, the plate 3 can envisage a hole 21 whose diameter is smaller than that of the flange 200. Thus, when the mold is resting on the plate, the stick is suspended from the plate, with the portion frusto-conical protruding beneath the plate 3 (see Figure 4, for example).

**[0015]** The mold 2 can be secured to the plate 3, by means of a plate 20, which can envisage magnets which removably fix the plate 20 to the plate 3. As can be seen, also the plate can feature a hole 204, which renders the cavity 7 of the mold accessible from the top.

**[0016]** When the plate 20 is positioned on the plate 3, the flange of the mold is sandwiched between the plate

and the mold 2.

**[0017]** It should be noted that the plate 3 can comprise first alignment means 14 for the mold 2, so that the mold can be inserted into the hole solely when correctly positioned (and therefore in one way only).

**[0018]** Regarding this aspect, the flange 200 of the mold can envisage a small alignment hole 205, which engages with a pin 14 protruding from the plate 3.

**[0019]** Beneath the plate, in position with the hole 21, an appendix 4 can be envisaged which is integral to the plate 3 (for example screwed to the plate).

**[0020]** The appendix can comprise a portion 5 (which extends from beneath the mold 2) configured to perform a form-based coupling with a bottom 2A of the mold 2, so as to keep the bottom 2A of the mold centred with respect to the hole 21, or more generally with respect to the plate 3, and so as to stabilise the mold when exposed to stresses.

**[0021]** In Figure 6, it can be seen that the appendix 4 features a centering element 5 (essentially an protrusion with a cylindrical or frusto-conical shape) which fits into a seat 8 envisaged on the bottom 2A of the mold.

**[0022]** Obviously, the form-based coupling between the appendix 4 and the mold can envisage other solutions. For example, the protrusion can envisage a cup-shaped element which copies the external form of the bottom 2A of the mold, and inside which the latter fits.

**[0023]** In fact, the form-based coupling can be configured to maintain of the mold 2 in an axial alignment, also when the latter is exposed to stress.

**[0024]** In this way, following casting, the mold remains aligned even when the plate 3 is handled (to be conveyed to the other processing stations, which will be examined later on). Indeed, the protrusion 4 is integral to the plate 3.

**[0025]** The presence of the system disclosed above, which keeps the mold aligned, also offers another important advantage, which will emerge more clearly later.

**[0026]** As can be seen, still in Figures 5 and 6, the plate 3 can support a core 6 which is movable between at least a first position, in which the core 6 is spaced apart from the mold 2 (Fig. 5), and a second position in which the core 6 has been lowered into a casting cavity 7 of the mold 2, so that the said core is touching a bottom 7A of the cavity of the mold 2 (Fig. 6).

**[0027]** The core 6, which - in this case - is simply a hollow tubular element (but may also be a simple plate do divide the moulding cavity in two parts, as represented in fig. 11), can be secured - in such a way that it can travel - to a frame 9, equipped with centering means 11A, 11B, 11C cooperating with counter-means 12A, 12B, 12C of centering the plate 3. These are essentially shaped teeth protruding from the frame, which can fit into specific seats envisaged in the plate. For example, at least one of the centering means 11A and one of the centering counter-means 12A, can envisage outlines designed to prevent incorrect assembly of the frame 9 on the plate.

**[0028]** In fact, the centering means and the centering counter-means can be configured to center and remov-

ably fasten the frame 9 to the plate 3, and - consequently - the core 6 to the mold 2 (which, remember, is centered by means of the appendix 4).

**[0029]** In this specific case, it can be seen that the plate 20 features the through-windows or cutouts in position with the counter-means 12A, 12B and 12C.

**[0030]** Advantageously, the frame 9 supports a block 9A, endowed with a gauged through-hole 201, inside which the core is inserted in a sliding manner. In this way, the core can slide from the position in Figure 5 to that in Figure 6, in a perfectly vertical and guided fashion.

**[0031]** Advantageously, frame 9 comprises second means 15 of aligning the core 6 with the frame, in a torsional manner.

**[0032]** In this way, as can be seen clearly in Figure 6, a bottom 6A of the core 6 (which preferably has the same form as the bottom 7A of the cavity), may fit together with this.

**[0033]** In the example, one can see that the bottom 6A of the core 6, is inclined in exactly the same way as the inclination of the surface 202, with which it fits together perfectly.

**[0034]** In this configuration, also in presence of the core 6 resting on the bottom 7A of the cavity 7, the appendix 4 (and the centering portion 5 thereof) keep the deformable mold perfectly aligned. Note that without the appendix 4, obviously, the mold would move towards the left in Figure 5, because of the pressure exerted on the bottom by the core 6. However, thanks to the presence of the appendix 4, this does not occur.

**[0035]** The presence of the core 6 makes it possible to produce lip sticks composed of two different cast materials, which can be contemporaneously facing a surface on which the stick is used.

**[0036]** Indeed, as can be seen in Figure 7, there may be a first dosing device 22 present, endowed with a nozzle 23 configured to deliver a first (hot-) cast product into a gap 24 between the mold 2 and the core 6 (once the core has been lowered into the cavity of the mold).

**[0037]** Once dosing is complete, the plate 3 is moved to a cooling station, which cools the mold with the core still inserted in the cavity.

**[0038]** Once sufficiently cooled, the core 6 is extracted (Fig. 8) from the cavity 7 of the mold. Advantageously, the operation can be carried out automatically, but also by hand.

**[0039]** During the extraction of the core, the block 9A guides the core extraction movement to perfection, preventing the latter from oscillating. Furthermore, also the systems 220 for the torsional coupling of the core with the frame 9 (which can comprise the pin 15 over which a bored element 239 integral to the core 6 slides) prevent the core rotating around its own axis, at least during a first extraction step in which the bored element and the pin 15 are coupled.

**[0040]** Once the core 6 (Fig. 8) has been extracted, the frame 9 supporting the core 6 can be removed, and the plate 3 (and, consequently, also the mold 2) move

into position with a second casting station (Fig. 9).

**[0041]** Here, there is a second dosing device 25 present, which is configured to deliver a second (hot-) cast product into a compartment 27 which forms in the first cast and solidified product through the removal of the core 6. If the core is plate like, the device 25 doses the second cast product in the still empty part of the mould.

**[0042]** Once dosing is complete (Fig. 10 or Fig. 13), the plate accesses a second cooling station, so as to bring the stick to complete solidification, the latter being therefore extracted from the mold, for example upon the said mold deforming through a vacuum in a known way.

**[0043]** After the extraction of the stick from the mold, the plate 3 can be moved so as to bring the mold into a station in which the frame 9 is once again positioned on the plate and the core is repositioned inside the mold (so that the said mold can receive a casting again).

**[0044]** It should be noted that the first and the second products cast, may be specific cosmetic products for cosmetic lipsticks/lip glosses/lip balms etc., and may differ in terms of the intrinsic properties thereof (for example, whether or not they are endowed with active ingredients), but also for example (and advantageously) in terms of the colour, finish, appearance etc.

**[0045]** In this case, the final stick features a part (occupied by the core) consisting of the second cosmetic product, and a part (corresponding to that which was surrounding the core) formed of the second product, and therefore may be two-coloured, or formed of products with different proprieties.

**[0046]** It must be said that the section of the core 6, as shown in this example, is circular. Obviously the section of the core can be any conformation, for example square, rectangular, oval, heart- or star-shaped, or any other shape deemed aesthetically pleasing or eye-catching.

**[0047]** As already discussed, the core 6 can also be a plate (as in fig. 11), a cross etc. If the core 6 is a plate, the final lipstick will be formed as represented in the section of fig. 13. One half of the lipstick is made by a first cast product 22 and the other half of the lipstick is made by a second cast product 25.

**[0048]** The presence of the appendix 4 for centering the mold 2 makes it possible to keep the latter aligned also in the event of intense pressure exerted by the core 6 against the bottom 7A of the cavity 7. Given that the system withstands a high level of pressure (preventing the deformation, including elongation, of the mold), the core may be pressed hard against the bottom of the cavity. In this way, the visible edges which separate the first and second product (for example on the inclined surface of the stick) are perfectly clean, without burrs, or commingling of the first and second product.

**[0049]** To complete the description, it should be highlighted that the plate can assume the conformation of a circular turntable, endowed with a plurality of holes inside which it is possible to house the molds.

**[0050]** As can be seen from Figure 1, for each hole in

the plate there is a mold present and consequently a frame with the respective core. In Figure 1, some of the frames 9 have been removed, for example because the corresponding holes are located in work stations in which the frames 9 not are necessary.

**[0051]** In Figure 2 meanwhile, it can be seen that all the holes 21 in the plate are associated with a centering appendix 4, which remains stably secured to the plate during use.

**[0052]** Obviously, the rotation of the plate 3 makes it possible to move the molds around a closed circuit, which features different work stations shared by the machines for forming lip sticks, some of which have been described already.

**[0053]** Various embodiments of the innovation have been described, but others may be conceived by exploiting the same innovative concept.

**[0054]** For example, the invention may relate to a machine for forming lip sticks, which comprises, in addition to the device described, a second station for cooling the stick located downstream of the second casting station, a demolding station for the removing the solidified sticks, and optionally, a station for preheating the molds 2 located between the demoulding station and the first casting station,.

**[0055]** The invention also relates to a method for casting a lip stick, comprising the step consisting of at least axially blocking the bottom 2A of the deformable mold, and (while keeping the bottom 2A of the mold axially blocked):

- inserting a core 6 inside the cavity 7 of the mold until the core is in contact with a bottom 7A of the cavity 7,
- pouring a first cast product into the cavity 7, into a gap between the mold 2 and the core 6,
- cooling down the first cast product 2 until partially solidified,
- extracting the core 6 from the mold cavity,
- pouring a second cast product into the space 27 formed in the first product cast by the core 6.

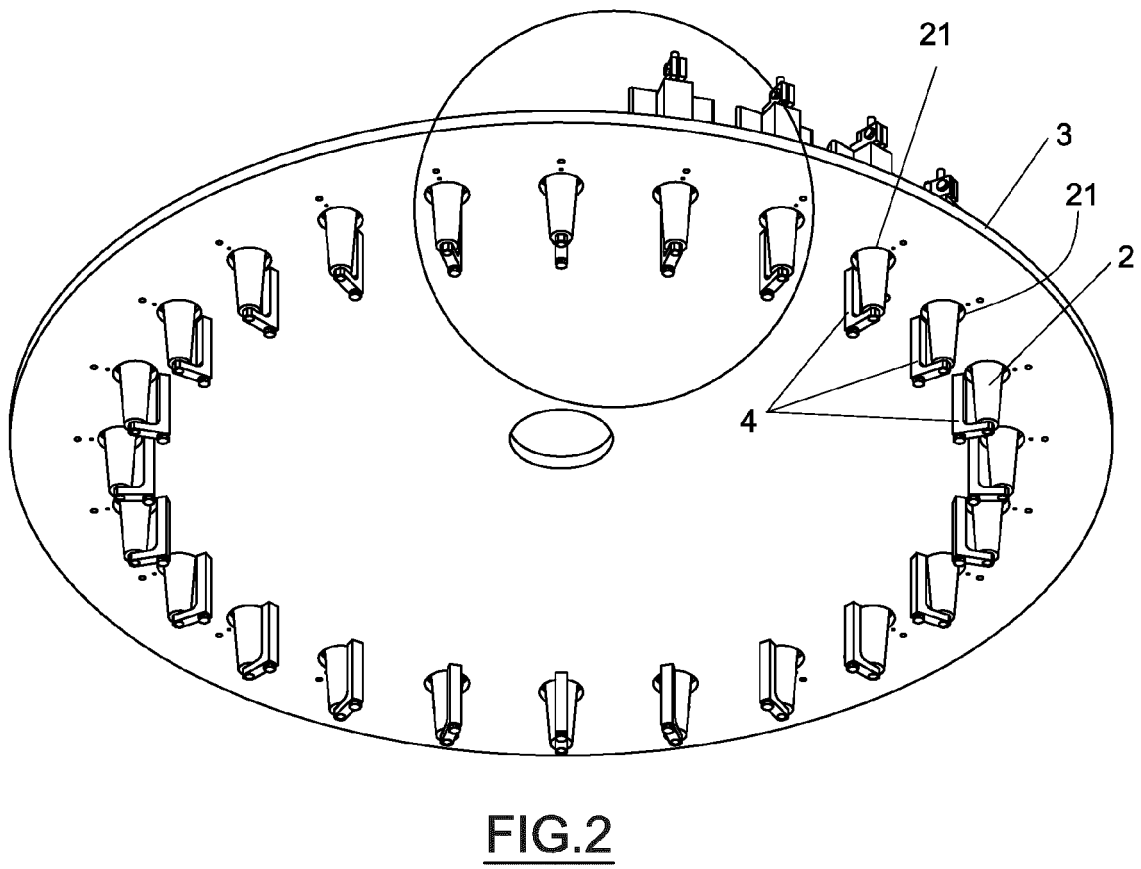
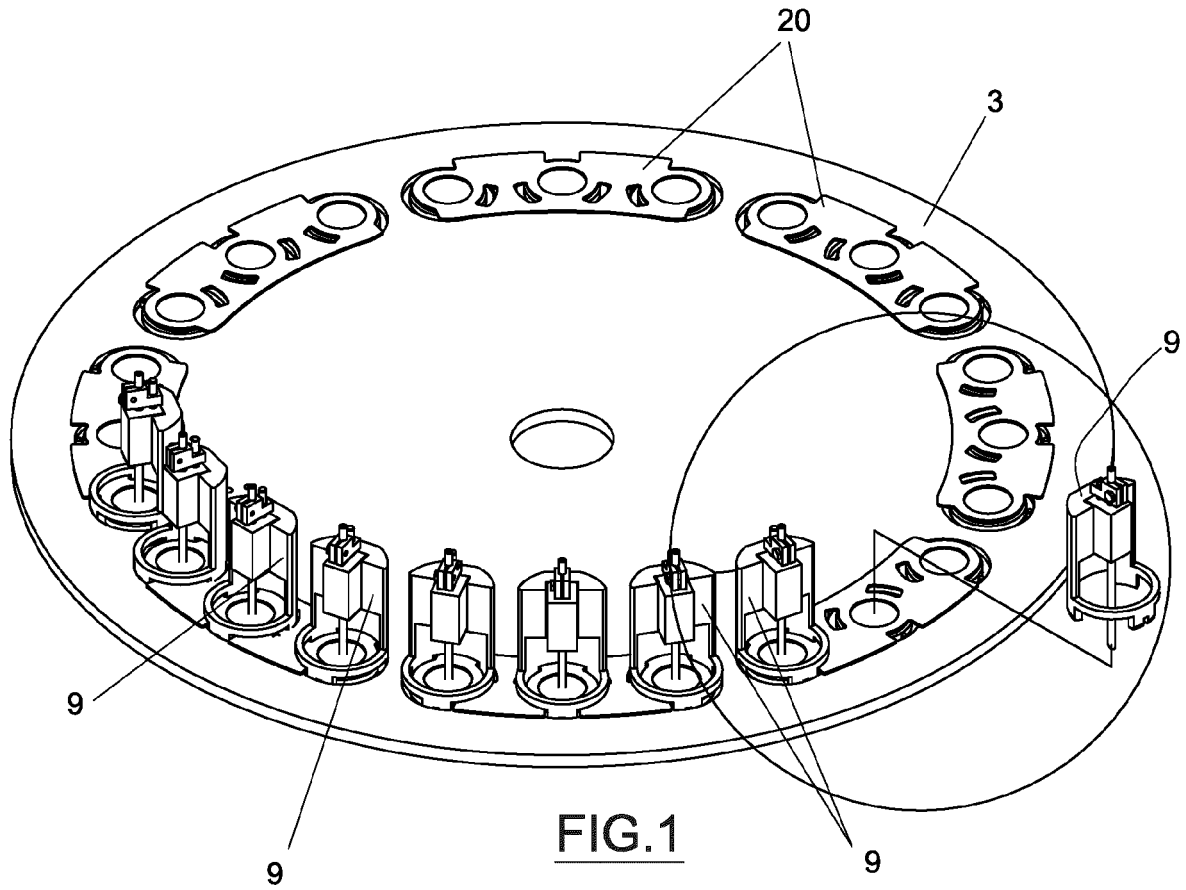
#### Claims

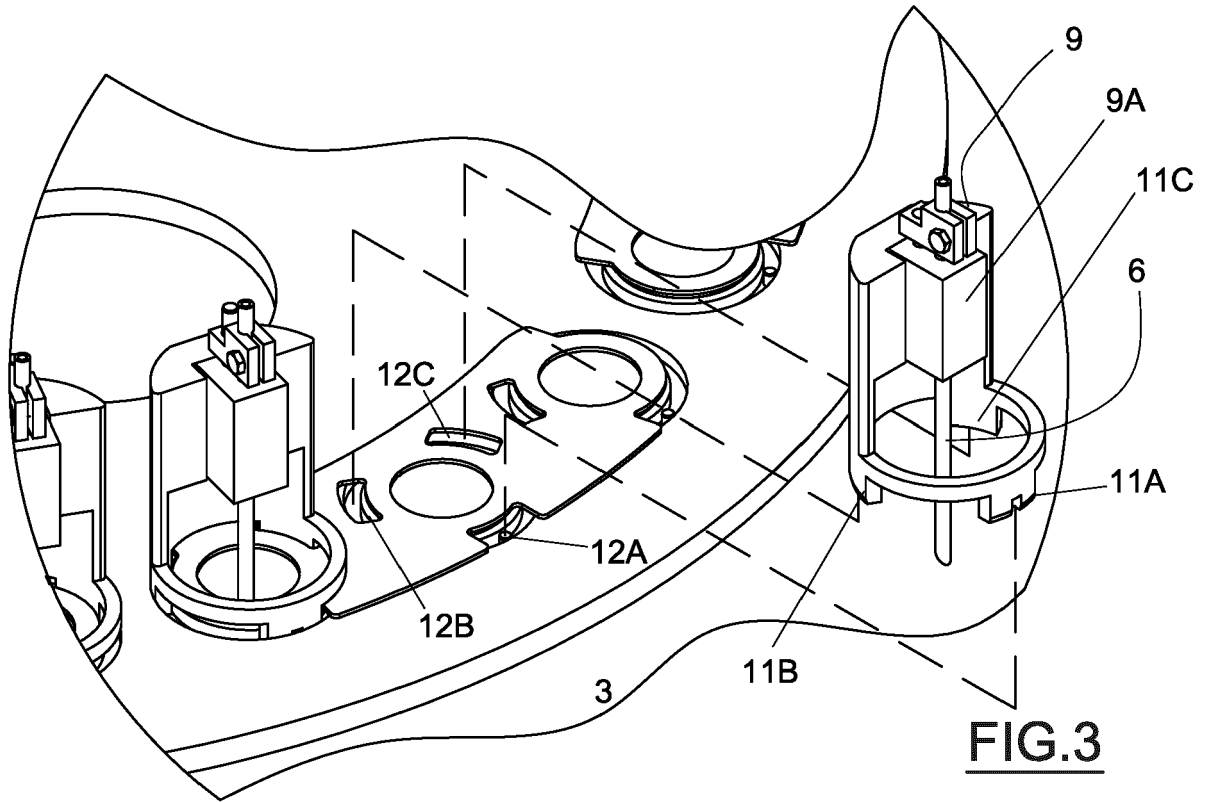
1. A lip stick pouring device, comprising a deformable mold (2) supported by a plate (3), the plate (3) comprising an appendix (4) for centering the bottom (2A) of the deformable mold (2), the appendix comprising a portion (5) configured to perform a shape coupling with said bottom (2A) of the mold (2).
2. Device according to claim 1, wherein the plate (3) supports a core (6) movable between at least a first position in which the core (6) is spaced from the mold (2) and a second position in which the core (6) is lowered inside a mold cavity (7) of the mold (2), so as to touch a bottom (7A) of the mold cavity (2).

3. Device according to claim 1, wherein the mold comprises, at its bottom (2A), a seat (8) configured to couple with said portion (5) of the appendix (4), to stabilize the bottom of the mold (2).
4. Device according to claim 2, wherein the core (6) is movably connected to a frame (9), provided with centering means (11A, 11B, 11C) cooperating with centering counter-means (12A, 12B, 12C) of the plate (3), the centering means and the centering counter-means being configured to reciprocally center and removably fixing the frame (9) to the plate (3).
5. Device according to claim 2, wherein the plate (3) comprises first alignment means (14) of the mold (2), and the frame (9) comprises second alignment means (15) of the core (6), so that a bottom of the core (6A) can match the bottom (7A) of the cavity (7).
6. Device according to claim 1, wherein the plate (3) has a hole (21) in which the mold (2) is housed, and the mold is fixed to the plate (3) by means of a plate (20) which presses it onto the plate (3).
7. Device according to claim 1, in which there is a first dosing device (22), provided with a nozzle (23) configured to deliver a first cast product into a gap (24) between the mold (2) and the core (6), and a second dosing device (25) configured to deliver a second cast product into a space (7) formed in the first cast and solidified product, after removal of the core (6).
8. Device according to claim 7, wherein the plate (3) is provided with moving means configured to move the mold (2) along a closed circuit which comprises at least a first casting station (30) in which the first dosing device is present (25) and a second casting station (31) where the second dosing device (25) is present, between the first and the second casting station being provided a first cooling station, the device further comprising a core extraction station (6) and a station for removing the frame (9) from the plate (3), and wherein, upstream of the first casting station, a positioning station of the frame (9) on the plate (3) is provided.
9. Machine for forming a lip stick, comprising a device according to claim 8, the machine further comprising a second cooling station for the sticks located downstream of the second casting station, a solidified stick demoulding station, and optionally, between the demoulding station and the first casting station, a mold (2) preheating station.
10. Method for casting a lipstick, comprising the step of at least axially blocking the bottom (2A) of the deformable mold, and while keeping the bottom (2A)

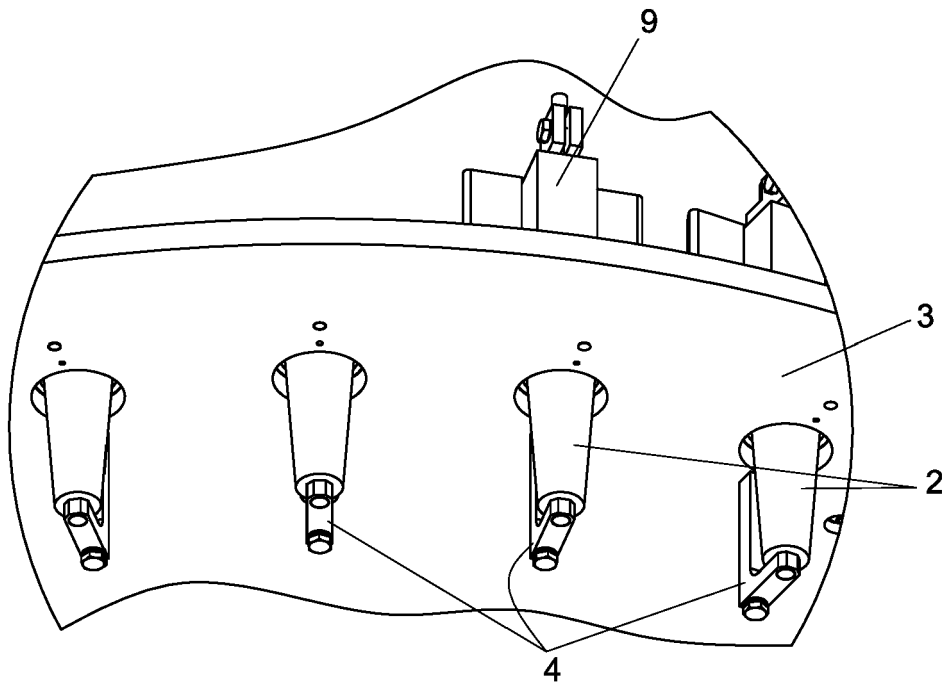
of the mold axially blocked:

- inserting a core (6) inside the cavity (7) of the mold until the core is in contact with a bottom (7A) of the cavity (7),
- pouring a first cast product into the cavity (7), into a gap between the mold (2) and the core (6),
- cooling down the first cast product until it is partially solidified,
- extracting the core (6) from the mold cavity,
- pouring a second cast product into the space (27) formed in the first product cast by the core (6).

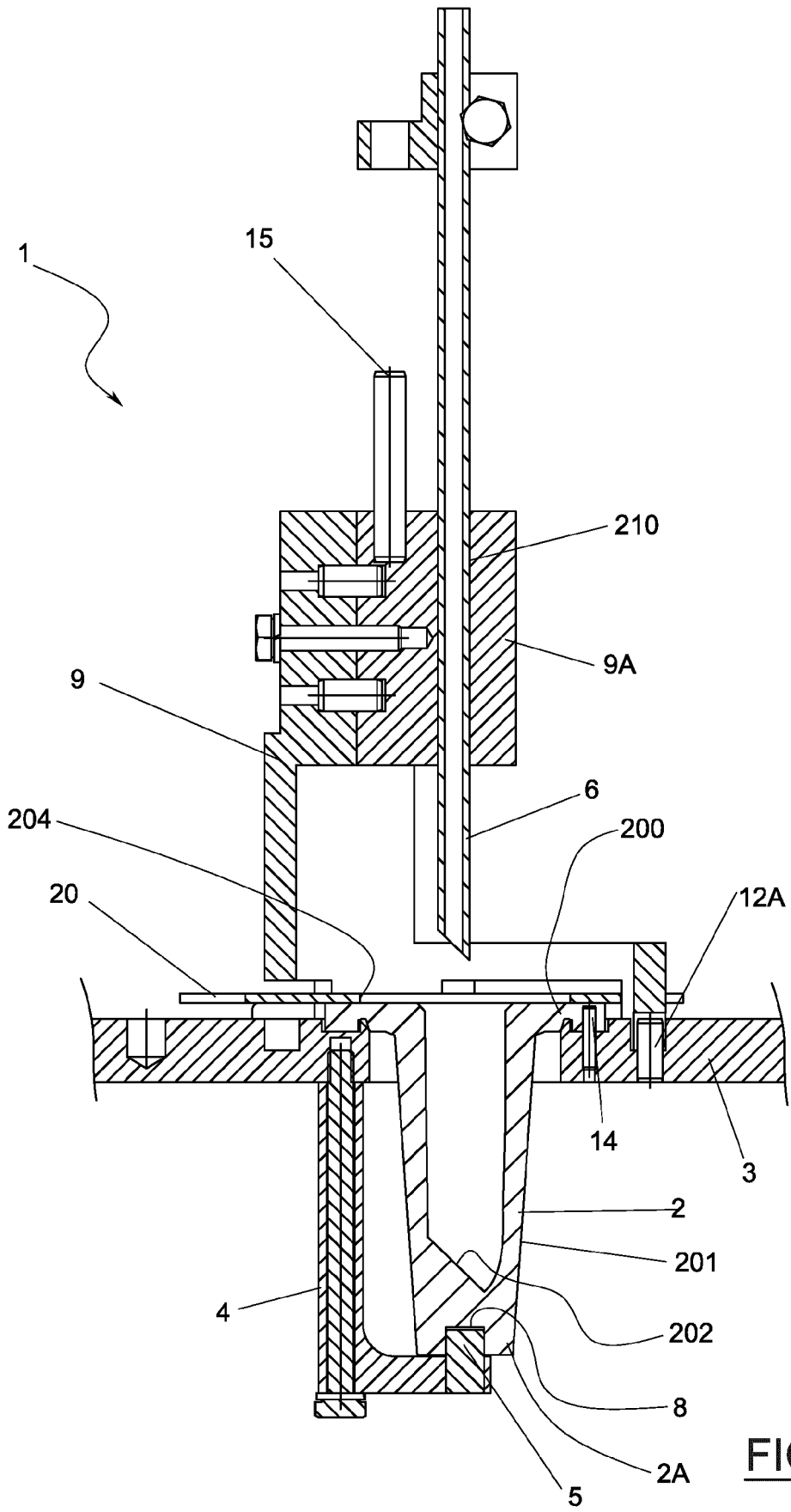




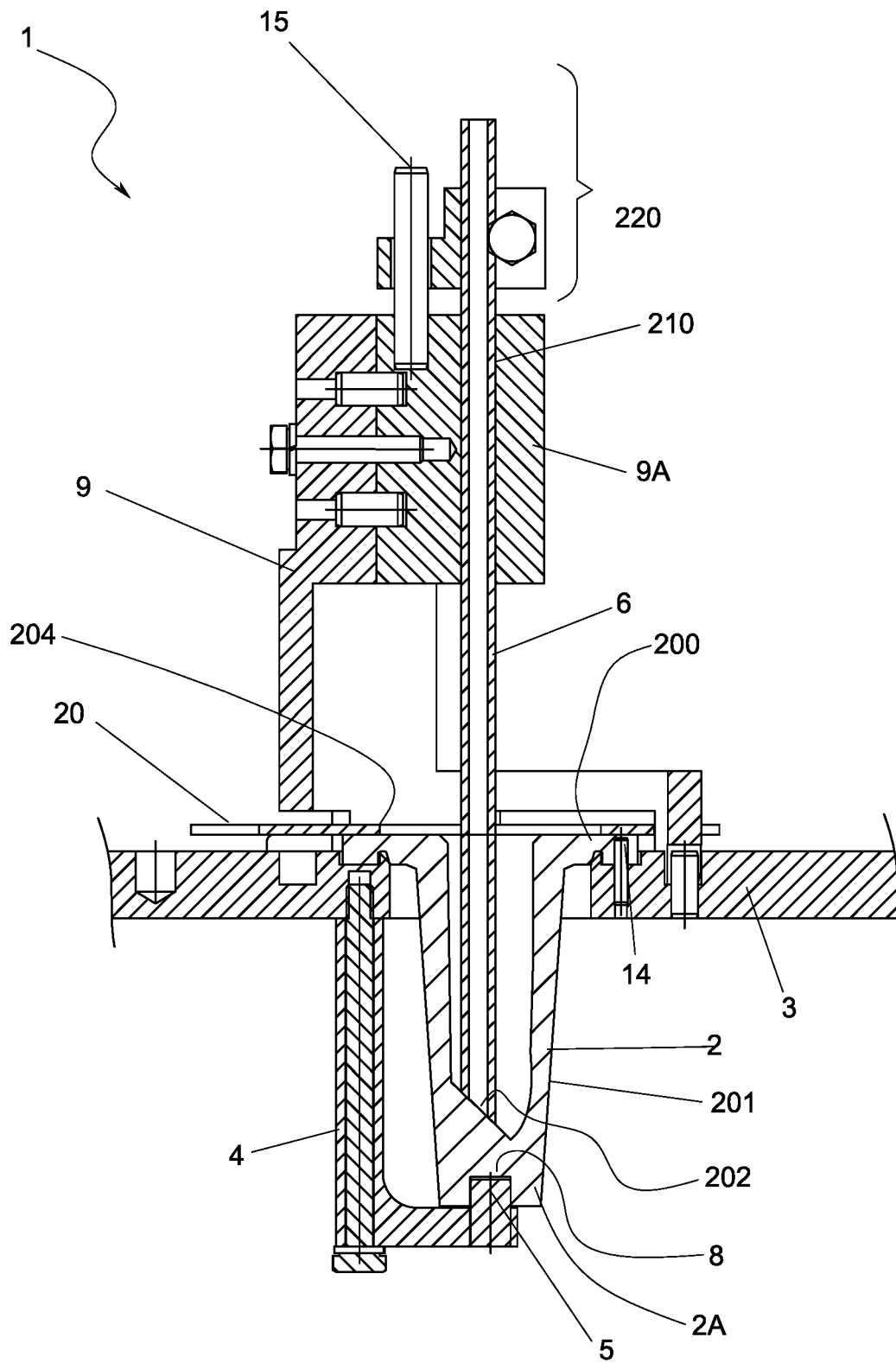
**FIG. 3**



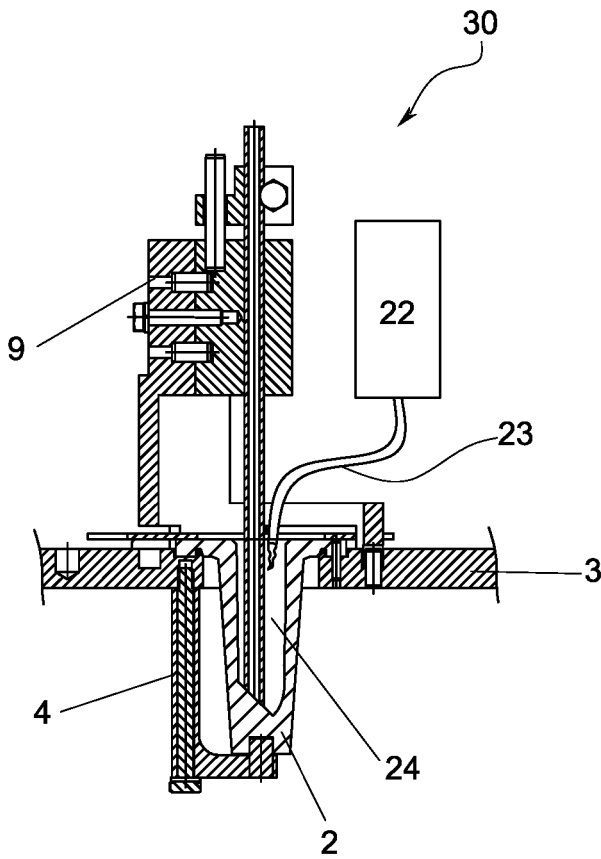
**FIG. 4**



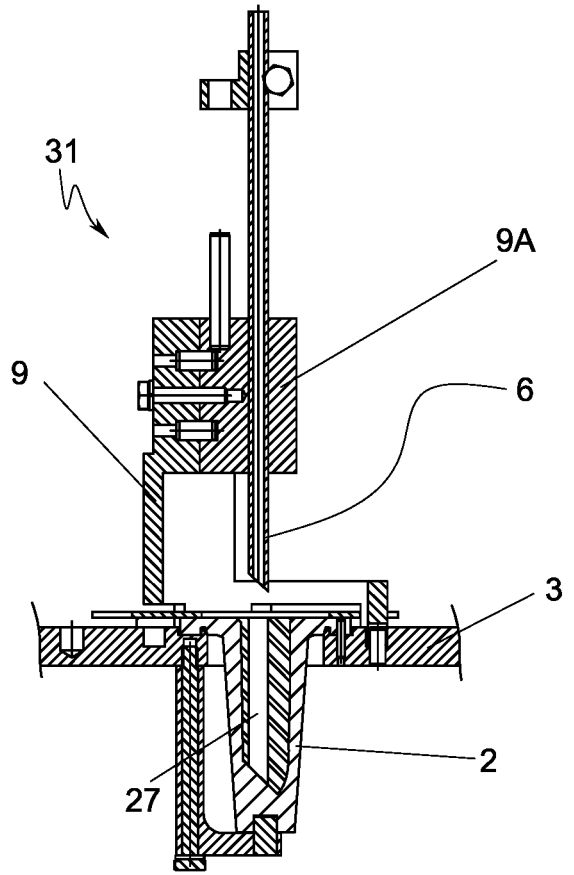
**FIG. 5**



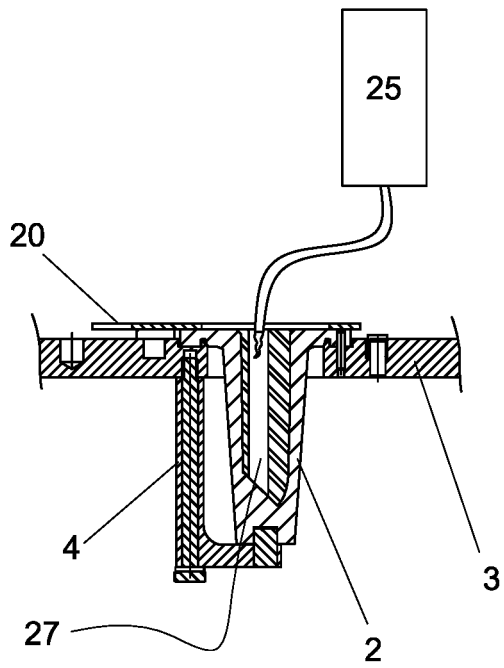
**FIG. 6**



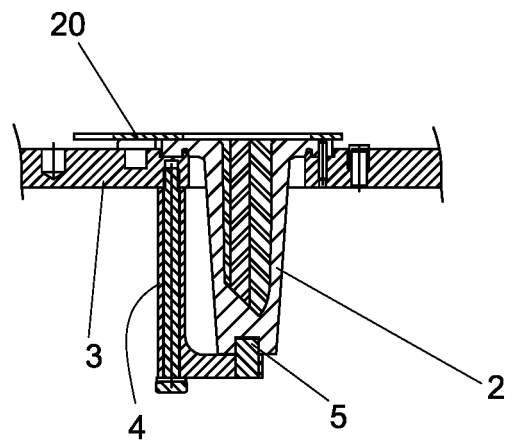
**FIG. 7**



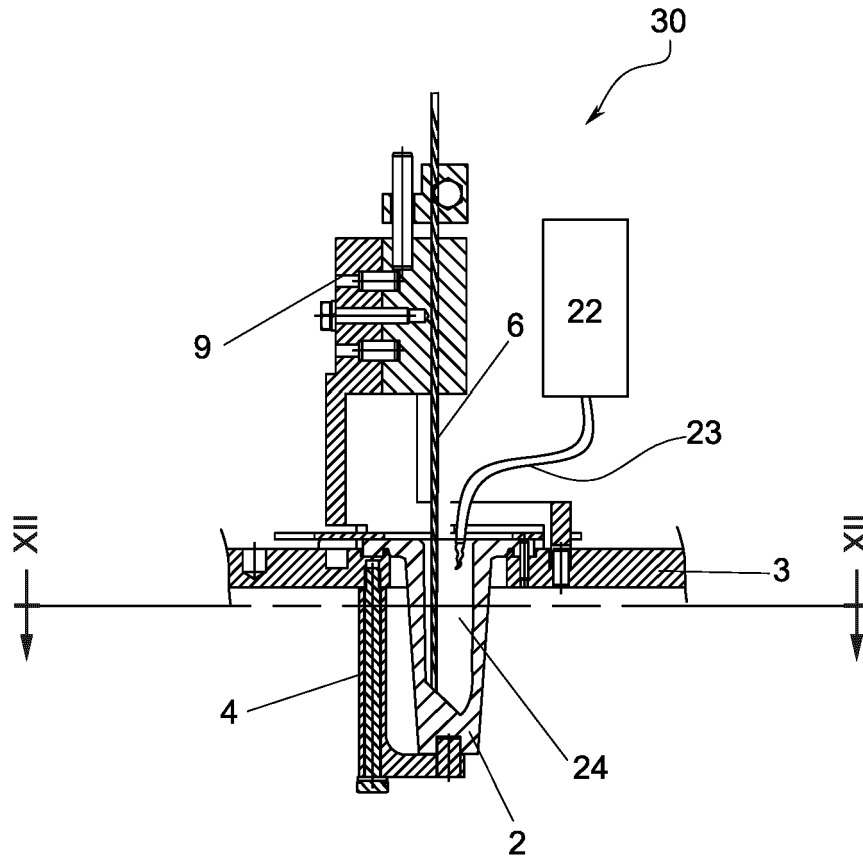
**FIG. 8**



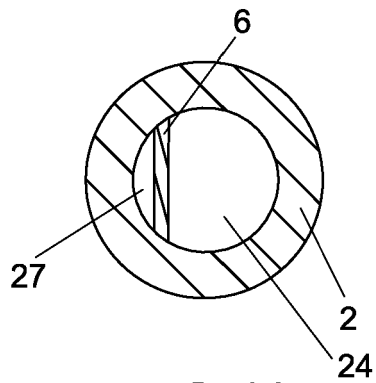
**FIG. 9**



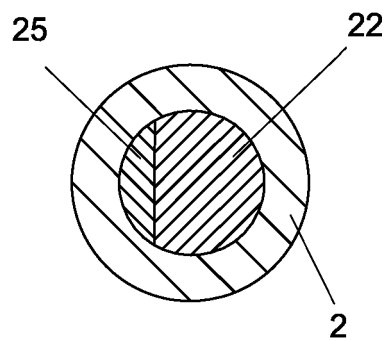
**FIG. 10**



**FIG. 11**



**FIG. 12**



**FIG. 13**



EUROPEAN SEARCH REPORT

Application Number  
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Place of search		Date of completion of the search	Examiner
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