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(54) **Mold for the manufacture of leads of cosmetic pencils**

(57) A mold for the manufacture of leads of cosmetic make-up pencils, comprising a main body (2) provided with centering means (5) for its positioning onto a base (4, 4A, 4B), and a plurality of runners (6) internally to which a fluid is cast which, once solidified, will make up the leads; a cursor (7) is housed, whose overall height is lower that the depth of the runner and which presents a cavity (7A) at one of its ends suitable for receiving said fluid to form a point for the lead, said cursor being slidable in said runner to assist the extraction of the lead once this is solidified, the cursor comprising constraint means (12) to constrain it to said main body suitable for holding it inside the runners even when the main body is separated from the base.

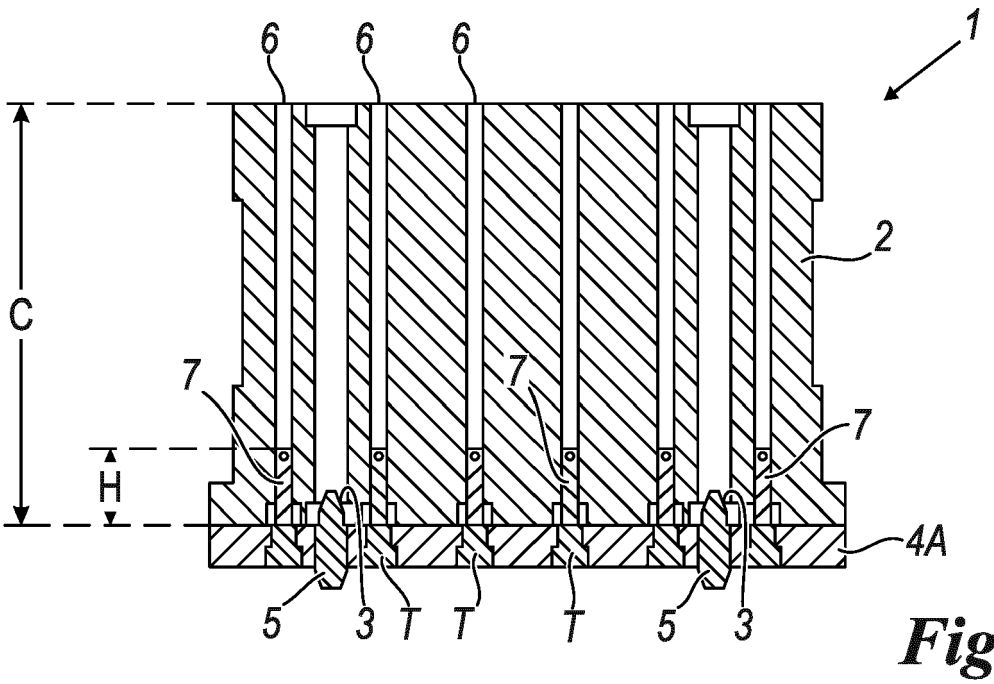

Fig. 2

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Description

[0001] The present invention refers to a mold for the manufacture of leads for cosmetic pencils, and specifically for make-up.

[0002] It is known that the leads for cosmetic pencils, especially those housed in propelling pencils, are molded in specially designed molds. Propelling pencils can be, for instance, of automatic or screwable types.

[0003] The molds known so far are usually made of aluminium or steel and feature a plurality of runners having a diameter substantially equal to that of the lead to be molded.

[0004] The make-up product is prepared by hot mixing its various components (waxes, oils, pigments, pearlescent substances, excipients, actives, perfumes/flavorings, and additives/antioxidants). The fluid mix is subsequently cast into the runner properly closed at one of its ends by a plug or stop external to the mold which forms the point of the lead. Casting takes place while the product is still hot hence fluid. Then it is waited until the product solidifies by properly cooling the mold and then, having removed the closing of the hole, the various leads are extracted.

[0005] For this extraction use is made of pushers which, upon penetrating the hole of the mold, push the lead outwards. This operation is carried out in a station different from the casting one.

[0006] Automation requirements lead to the construction of automatic or semi-automatic machines which carry-out the extraction activity and advantageously insert the just drawn leads into their respective propelling pencils in one and the same operating step.

[0007] The pushers according to the known art are substantially very long lifting irons, much longer than the depth of the runners, provided with a tip that features a conical hollow. When the mold is positioned above the extraction station the pusher couples with the point of the lead and penetrates the runner in the direction opposite to that of the casting itself.

[0008] The pusher penetrates the runner all along its extension, thus pushing the lead out on the opposite side.

[0009] The conical hollow tip of the pusher coupling with the point of the lead decreases its possibility of getting broken; however in many cases is the alignment between the point of the lead and the cavity of the pusher not perfect and consequently the lead or its point snaps.

[0010] Also, it might occur that residues remain between the point of the lead and the pusher. Consequently, when pushing against the point, the pusher irreparably damages it.

[0011] Patent document US1312189 describes a mold for the manufacture of candles and similar products, soaps or other articles that can be obtained through a molding process with different cross sections. In this previous patent, there is provided a mold consisting of a hollow water-box, closed by a top plate on the upper side and by a bottom on the lower side. The top plate has a plurality of through openings of equal diameters and the bottom has a plurality of threaded holes also of equal diameters. The holes are axially aligned with the openings, i.e. their axes are coaxial to those of the openings of the top plate.

[0012] In every couple of such openings and holes a tubular mold, i.e. a cylindrical body, is located. It is provided that the water-box is capable of housing molds or cylindrical bodies of different cross sections; such bodies are provided with terminal flanges whose overall diameter equals that of the openings of the top plate and with lower ends externally threaded suitable for being inserted and screwed in the threaded holes of the bottom of the water-box.

[0013] Therefore, said molds are detachable from the water-box and molds are used having the desired transversal section as a function of the product to be manufactured.

[0014] Inside every mold a piston is movable whose rod goes through its corresponding lower end of said mold. So, it is presumed that the piston is inserted into the mold from the top with such rod. The piston (integral with its own rod) makes it possible to form the point of the candle and is drilled to receive the wick thereof.

[0015] Moreover, when the mold or cylindrical body is too short and does not reach the bottom of the water-box after being inserted therein from the aperture of the top plate, there is provided a hollow adapter where the lower end of the mold or cylindrical body is screwed in and in turn screws in the hole of the bottom of the water-box. The piston rod moves inside the adapter.

[0016] The pistons operate as expellers of the candle from its respective mold after being manufactured.

[0017] So, such previous patent document describes a water-box to obtain candles or similar products, which are made of malleable materials and, after being molded, make up a compact and homogeneous body such that the product thus obtained can be handled without any risk for it of snapping as a simple consequence of being picked-up from the water-box.

[0018] Therefore, the known solution is not suitable for being used to manufacture leads of cosmetic pencils for make-up, which, as everybody knows, consist of friable, even though compact, and difficult to handle products. Therefore, the technical field that document US1312189 refers to is a field not similar to that of the cosmetic products and one skilled in the sector addressed by the present invention could never take cue from said previous patent document to obtain a mold for cosmetic pencils.

[0019] Also, the previous patent document describes the use of a device to obtain candles and the like which presents a plurality of parts to assemble, which makes the device complex, with possible non negligible problems of reliability and cost.

[0020] Finally, the known solution does not describe any air bleed present in every mold through every piston (integral with its rod) because the one hole present there-

in is used to accommodate the wick of the candle. Such hole is anyway closed by the piston rod and could never allow the air possibly formed in the mold to escape.

[0021] Furthermore, the previous patent document does not mention any lubricants possibly used in every mold, also because the realization of a candle or similar fat products does not require lubrication in any case. This problem is neither dealt with nor suggested by the U.S. patent.

[0022] A purpose of the present invention is therefore to provide an enhanced mold for casting leads for make-up that overcomes the drawbacks of the known art.

[0023] In particular a purpose of the present invention is to provide a mold that is easily transportable from a working station to another one also when the leads have already been cast into the mold and that allows to draw the leads effectively, without damaging them.

[0024] The present invention also allows to optimally lubricate the runners between any two consecutive castings by means of appropriate oils.

[0025] These purposes and others are achieved by implementing a mold for leads of make-up pencils according to the technical teachings of the attached claims.

[0026] Further features and advantages of the invention will be apparent from the description of a preferred but not exhaustive embodiment of the device which is illustrated in an explanatory hence not limitative way in the attached drawings, in which:

figure 1 is a top view of a mold according to the present invention;
figure 2 is a cross-sectional view taken along line 2-2 in figure 1, the mold being ready to receive a casting;
figure 3 is a cross-sectional view taken along line 2-2 in figure 1, the mold being in the operating step whereby cast and already solid leads are being extracted;
figure 4 is an extremely simplified plan view of a lead casting plant using the mold depicted in figure 1; and
figure 5 is a simplified cross-sectional view of a cursor being part of the mold according to the present innovation.

[0027] With reference to the mentioned figures, a mold is shown for the manufacture of leads of make-up pencils, indicated by the reference numeral 1 as a whole.

[0028] The mold comprises a single-block main body 2 provided with centering means 3 for its positioning on a base 4 (or 4A and 4B as shown in figures 2 and 3).

[0029] In the embodiment here represented, the single-block main body comprises a number of seats 3 suitable for housing centering pins 5 which project from the base 4 (or 4A and 4B). By looking at the figure, the centering pin is apparently not perfectly in contact with the seats 3 of the main body 2, wherein it is housed, but this is solely due to a simplification of the drawing where the clearances present between the base and the main body are exaggerated. In practice, on the contrary, the centering pins 5 projecting from the base make it possible an accurate coupling between the base 4 and the body 2. Centering means different from the pins 5 can be used indeed between the base and the body 2, as it is evident to those skilled in this sector.

[0030] The single-block main body 2 features a plurality of runners 6, directly machined in such body crossing the main body from one side to the other. So, the mold consists of one body where there are provided holes suitable for operating as runners.

[0031] All in all the various components of the material that is destined to form the lead are hot mixed, so as to assume a fluid consistency and are cast inside the runners 6 of the single-block body 2 supported by a first base 4A which closes such runners 6 on the lower side (as better described below).

[0032] The fluid, once cooled, will make up the lead. Notwithstanding its solidification, the lead remains a fragile product the same, as well known to those skilled in this sector.

[0033] The mold comprises a cursor 7 inserted in every runner. In figure 2 all cursors 7 are located on the bottom of the runner (close to the base) in a configuration ready to receive the fluid destined to form the lead.

[0034] Every cursor is an independent element inserted in its corresponding runner and is not connected to anything outside said runner 6. It features an overall height H shorter than the depth C of the runner, otherwise there would not be a space available in the runner for the fluid to cast; however it is possible to obtain leads of different lengths by positioning the cursor at different heights.

[0035] Advantageously has the cursor 7 a height in the range from 5 to 30% of the height of the runner.

[0036] As clearly shown in figure 5, the cursor has a cavity 7A at one of its ends suitable for receiving said fluid to form a point for the lead. Every cursor 7 is slidable in its respective runner to contribute to or facilitate the extraction of the lead once this is solidified.

[0037] All in all, once the leads M are cast, it is possible to immediately displace the mold into a refrigerator and subsequently to an extraction station, where it is housed in a specially provided, second base 4B. This specially provided, second base 4B features a number of holes F or non-intercepted openings in correspondence with the bottom of every runner. In the embodiment here described, corresponding holes are also present in the first base 4A, but they are closed by appropriate inserts T, which make the contact surface between the main body and the base substantially devoid of openings at least in correspondence with the bottom of the runners. It is worth saying that applying inserts T to close the holes F is advantageous in that it makes it possible to implement one and the same base structure only which can be used as a first base 4A as well as a second base 4B, provided that inserts T are used.

[0038] Under the second base 4B, as shown in figure 3, in correspondence with the holes F a number of ex-

tractors are present, which are in fact simple rods 8 connected by a properly operated crosspiece 9, which lean on the cursors 7 and push them, thus penetrating the runners (from the direction opposite to the casting one). Let us confirm and highlight that the cursors 7 are not permanently constrained to the rods 8.

[0039] The leads M are thus extracted from the individual runners 6 thanks to the push exerted by the rods 8 leaning on the cursors 7.

[0040] Note that every cursor 7 comprises constraint means 10 which constrain them to said single-block body 2, suitable for holding the cursor itself inside its respective runner 6 also when the main body is separated from the base. In the embodiment here shown such constraint means 10 comprise at least one O-ring 12 housed in a groove 11 specifically provided for this purpose perimetrically on the cursor. Advantageously are three grooves and three O-rings present for every cursor.

[0041] The O-ring 12 enables the cursor 7 to hermetically slide, with a slight friction, on the surface that defines the runner 6. Whenever the cursor is not pressed by the extractor 8, it remains in its own position, even if loaded by the weight of the fluid just cast in its respective runner. This takes place thanks to the action exerted by every O-ring 12 onto the wall of its corresponding runner 6.

[0042] This way the mold can be lifted in any moment and transported to other working or transportation stations without jeopardizing the quality of the cast and without being obliged to wait until the fluid solidifies.

[0043] Figure 5 shows that the cavity 7A present in the cursor has the shape of a cone with a radiused or rounded vertex. An axial air vent 7B is also present which allows the air trapped between the fluid and the cursor to escape toward the outside of the mold while casting is made. Air outlet takes place through a space anyway present between every plug T and its corresponding hole F because every plug is not hermetically associated with the latter.

[0044] In the embodiment here described, the constraint means 10 perform a sealing action only on the wall of said runner 6.

[0045] It is worth saying that it is not absolutely necessary that the constraint means perform a sealing action on the surface of the runner, but it is possible that the O-rings operate just as constraint means between the cursor and the runner.

[0046] Alternatively, it is possible to envisage an end-stroke in every runner which operates as a constraint means for its respective cursor, so as to prevent the latter from leaving the runner, or at least from a bottom thereof, which corresponds to that part of the runner which is close to the base.

[0047] The mold according to the present invention is particularly useful in a machine 30 like that illustrated in figure 4.

[0048] This machine comprises a first rotary board 20 and a second rotary board 21, the former equipped with four first bases 4A and the second on which four second bases 4B are mounted.

[0049] Also, for every board a loading station C is present to load the molds of it respective board as well as an unloading station S.

[0050] To complete the description of the machine 30 let's emphasize that it comprises a refrigerator 23 internally to which a first conveyor belt 24 runs, and externally to the refrigerator there is a second conveyor belt 25 which connects the unloading station S2 of the second board to the loading station C1 of the first board.

[0051] A lubrication station 26 is present in the path of the second conveyor belt to lubricate the runner (which is important to extract the leads which are made of a material that, once coagulated, features a high friction coefficient), whereas at least one casting station 27 is present in correspondence with the first board. Conversely, in correspondence with the second board 21 there is provided an extraction station 28 assisted by a pencil loading/unloading robot 29 to extract the leads.

[0052] The operation of the machine 30 is the following.

[0053] As a preliminary operation, the loading station C1 picks up a mold 2 from the second conveyor belt 25, which is set to the conditions depicted in figure 2, and deposits it onto the first base 4A which is opposite to the loading station C1. The board rotates clockwise and brings the first base 4A along with its mold under the casting station 27, where the fluid being at the right temperature is injected into the individual runners 6. Once the runners are filled, the board rotates again up to bringing the mold in a position opposite to the unloading system S1, which picks up the mold 2 which is full from the base 4A and deposits it onto the first conveyor belt 24.

[0054] Such first conveyor belt moves at a preset speed in the refrigerator 23, hence the just cast fluid gets properly cool. When cooling is over, the mold 2 is located opposite to the loading system C2 and it is picked up from the latter and is positioned on a second base located on the second rotary board 21. It rotates clockwise up to bringing the mold to the extraction station where the extractors 8 expel the leads as shown in figure 3. Advantageously are the leads expelled from the mold and simultaneously (with the same movement) inserted in propelling pencils properly located just above the individual runners of the mold.

[0055] The extractors push the cursors up to making them project as much as necessary from the runners. Anyway, in this position too the O-rings constrain the cursors to the main body, so as to prevent the latter from going out of the runners even during successive handlings of the mold 1.

[0056] Thanks to the cavity 7A, every cursor holds the point of the pencil fixed and protects it until the lead is completely extracted from the body 2.

[0057] Having completed the pencils, the robot 29 picks up and sends them to the next working stations.

[0058] The rotary board 21 rotates again so as to bring the mold opposite to the unloading system S2, which picks up the latter from the board and positions it on a

further base (similar to the second base) provided on the second conveyor belt.

[0059] Here, in harmony with the operating sequence of the machine, the mold 2 is brought to a lubrication station 26 where the runners are lubricated from bottom up in advance (via small probes penetrating the runners from bottom up and spraying a lubricant, e.g. a silicone spray, which operates as a substance used to detach the cosmetic product remained in the individual runners 6), and subsequently a number of pushers (fully similar to those of the extraction station, but acting from top down of the mold in the direction of the cast), push the cursors against the bottom of the mold, in the position shown in figure 2.

[0060] It is worth noting that while the cursor is sliding, the O-rings clean the inner surface of the runner properly lubricated in the previous passage. This way any residues of product are removed from their respective runners.

[0061] The lubricant is perfectly removed from the surface of the runner, so as not to generate defects in the next cast.

[0062] The advantages of the present embodiment are simplicity, compactness, and reduced weight, as a matter of fact the single-block mold is preferably not made of a metal, but above all the cursors are short and anyway constrained to the mold and independent of the pushers (which facilitates mold handling). The true extractors used to insert the lead into the pencil are only there where they are necessary (and are separate from the cursors 7) and are present at the end of the manufacturing process, in the rotary board 4B.

[0063] The basic difference with respect to the molds known so far is in that there are no extractors constrained to each individual mold, which would entail the construction of heavy and cumbersome molds, because of the extractors must be longer than the lead itself. Consequently, in the present state of the art the mold-extractors assembly shall be rather rigid (hence made of a metal) to prevent harmful bendings and be provided with columns and sliding bushes for a movable table which the extractors are fixed to; all of this is true for every mold.

[0064] Furthermore, the method according to the invention prevents the point of the lead (the most fragile part of a cosmetic pencil) from getting broken while the lead itself is inserted into the body of the pencil. According to the methodologies known in the cosmetic field, the lead is cast into the "body of the pencil" which is supported by a metal mold; thereafter the point is made. Consequently, a force must be generated between the latter and the mold to detach it, which leads to breakages.

[0065] Conversely, thanks to the invention, this problem is avoided because the cursor 7 goes with its corresponding lead into the body of the pencil without any risk for the point of getting broken.

[0066] Different embodiments have been illustrated, but others can be conceived by taking advantage of the same innovative concept. For instance, molds can be envisaged with more or less holes, and consequently more or less cursors, pushers, etc..

Claims

1. A mold for the manufacture of leads of make-up pencils comprising a main body (2) provided with centering means (5) for its positioning on a base (4; 4A, 4B), and a plurality of runners (6) internally to which a fluid is cast which once solidified will make up the leads, **characterized in that** said main body (2) is a single-block one, the runners (6) are realized directly in such body in the form of holes provided in the latter, each of said runners (6) houses a cursor (7) whose overall height is lower than the depth of the runner (6) and which features a cavity (7A) at one of its ends suitable for receiving said fluid to form a point for the pencil, said cursor (7) being freely slidable in said runner (6) to assist the extraction of the lead, once this is solidified, when subjected to separate extractor means (8), the cursor (7) comprising constraint means (12) for constraining it to said main body suitable for holding it inside its respective runner (6) even when the main body (2) is separated from the base.

2. A device according to the previous claim, wherein the cavity (7A) present in the cursor has the shape of a cone with a radiused vertex.

3. A device according to one or several of the previous claims, wherein said constraint means (12) exert a sealing action onto the walls of said runner.

4. A device according to either claim 1 or 3, wherein said constraint means (12) comprise at least one groove where an O-ring is housed.

5. A device according to claim 3, wherein the cursor (7) comprises an air vent (7B) to make the air trapped between the cursor (7) and the fluid during the casting process, escape.

6. A lead manufacturing method comprising the following operating steps:

   a. bringing every cursor (7) onto the bottom of its respective runner (6) in a mold comprising a single-block body (2) in which such runner is directly obtained as a hole drilled in said single-block body (2);
   b. positioning the mold on a first base (4A), and
   c. in a casting station (27), casting into every runner (6) of the single-block body (2) of the mold, a fluid destined to form, once cooled down, the lead;
   d. picking-up the mold from the first base (4A)

and cooling it down so as to enable the fluid to solidify and, after the fluid is solidified,
e. positioning the mold on a second base (4B), and
f. in an extraction station, pushing every cursor in the lead extraction direction by means of extractor means (8) separate from said mold and from every cursor (7) freely movable in its corresponding runner (6).

7. A method according to the previous claim, wherein the gate is lubricated before bringing every cursor again onto the bottom of the mold.

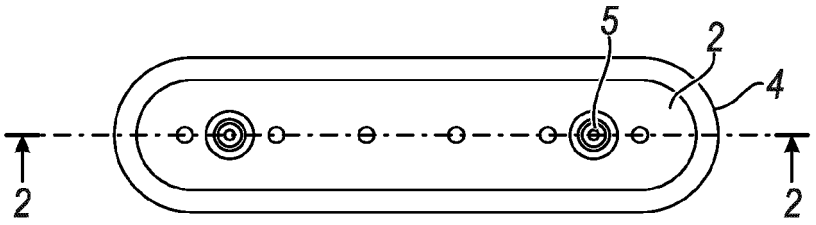


Fig. 1

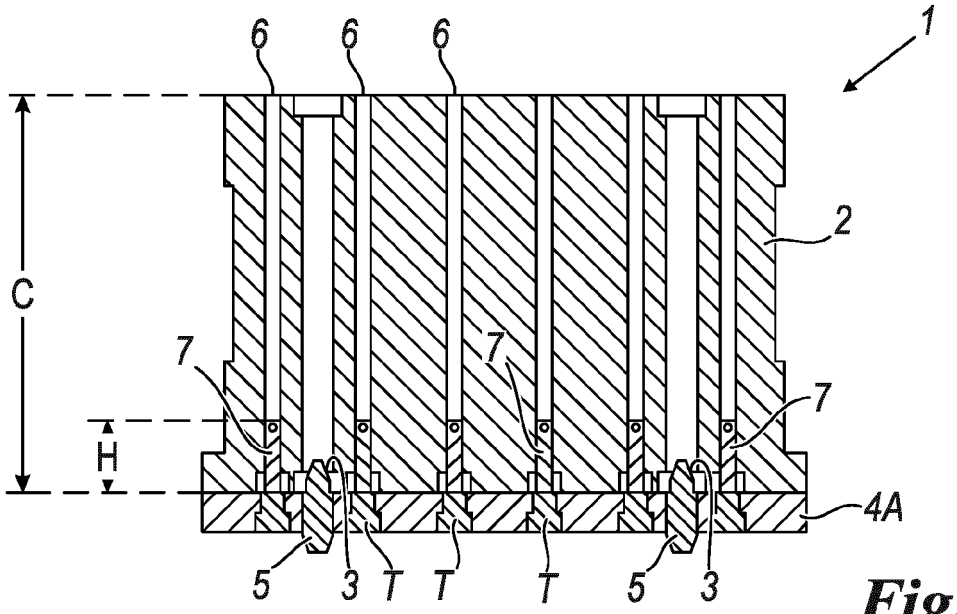


Fig. 2

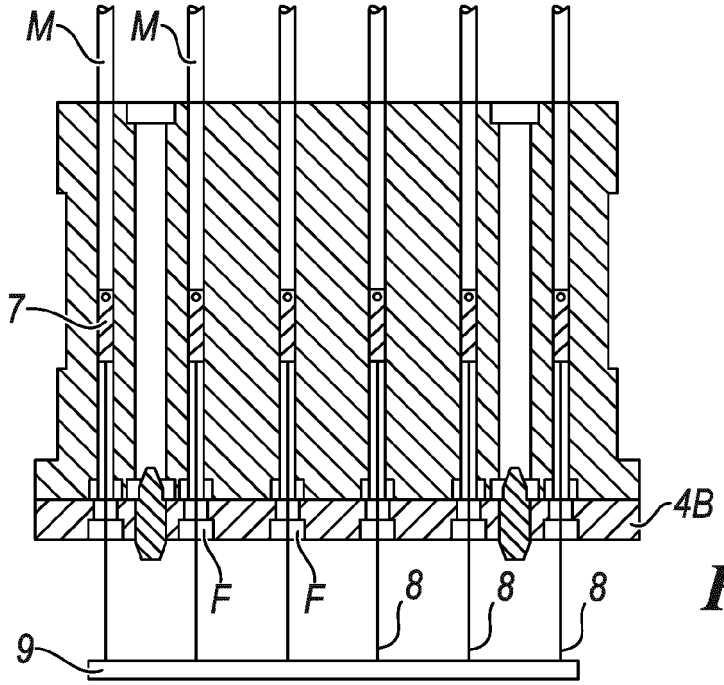
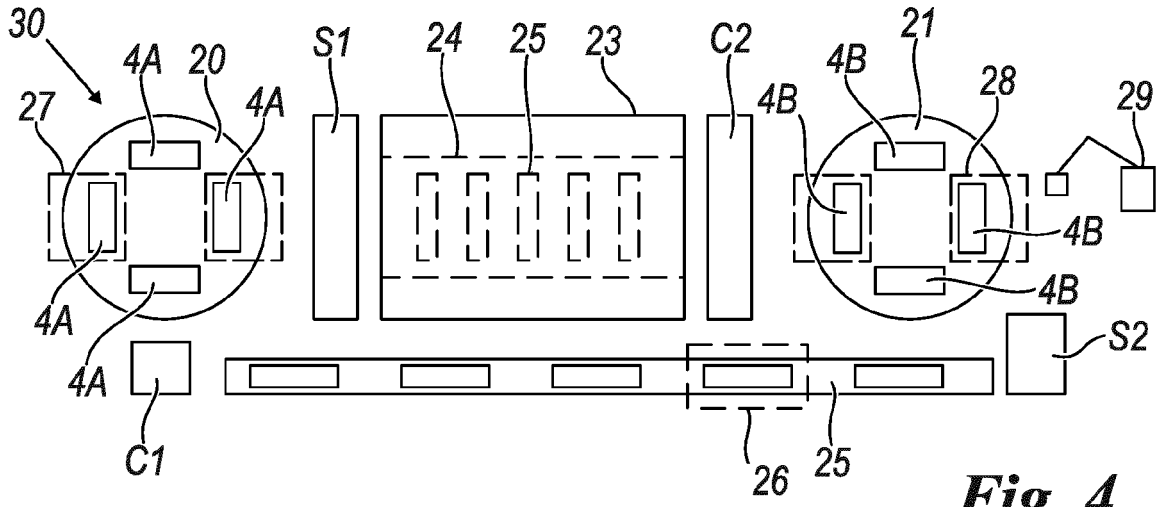


Fig. 3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4A
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S1
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23
C2
21
4B
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C1
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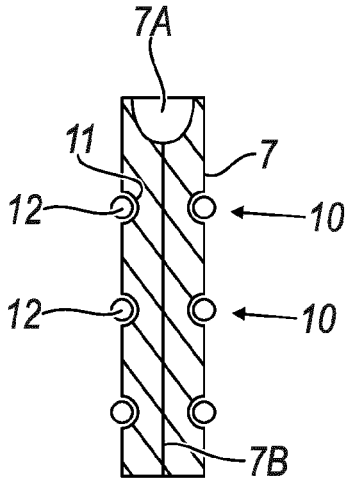
Fig. 4


7A
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7B

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 15 15 7790

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TECHNICAL FIELDS SEARCHED (IPC)

A47C
A45D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	15 July 2015	Sainz Martínez, M

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