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⑤④ **Brush for applying material in liquid or emulsion form.**

⑤⑦ A brush for applying liquid or emulsion material such as toothpaste, hair-dye, cleaning material, etc., has a handle (2), a rod (3) having bristles, sponge, etc. at its head and a pumping mechanism (4) accommodated in the handle (2). The rod (3) is slidably held, at its rear end, by the main body (5) of the handle (2). The pumping mechanism (4) has an operational pipe (12), two forward and rear valve bodies (19, 20) and an operational bar (22) to control the open and close movements of the two valve bodies (19, 20). When the rod (3) is pushed rearward and thereafter released, the pumping mechanism (4) is operated so as to suck the material from a containr (6) forming a part of the handle (2) and feed the sucked material to the head of the rod.

BRUSH FOR APPLYING
MATERIAL IN LIQUID OR EMULSION FORM

This invention relates to a brush for applying
5 liquid or emulsion material, having a container for
containing material such as tooth-brushing material,
hair-dye, hair-growth material, hair-dressing material,
paints, cleaning material, lubricating oil, etc. in
liquid or emulsion form.

10 There have been proposed various brushes for
applying liquid or emulsion material. For example, there
have appeared toothbrushes which contain therein tooth-
brushing material in paste or emulsion form and feed the
material onto their bristle-planted portions when they
15 are used for tooth-brushing operations. In those
toothbrushes disclosed in Japanese Utility Model
Publication Nos. 138966/1977 and 102374/1979, the
material contained in their handles is extruded by
extrusion members, such as a piston, or others. However,
20 the operation for extruding the material is troublesome,
and it is difficult to adjust the piston or others so as
to extrude a necessary amount of the material. In a
toothbrush of the type which contains a tooth-brushing
material extrusion mechanism in its handle, much space is
25 not allowed for the material. If the toothbrush is made
disposable, the material runs out before its bristle-
planted portion becomes unusable, and it is inevitable to
make the material refillable. Additionally the sealing
is not carried out perfectly between the interior of its
30 handle and the bristle-planted portion. Accordingly
there has been a case wherein the material flows back
into the interior of the handle from its user's mouth
during the tooth-brushing operation. As described above,
the conventional toothbrushes containing tooth-brushing
35 material have these various drawbacks.

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Further, as a brush for dyeing hair, there have appeared brushes of a type having a handle on the fore part of which a great number of bristles are held so as to be extended in the radial direction from the fore part thereof. When a user uses the brush to dye his hair, he
5 pours hair-dye on the bristles from a bottle containing the hair-dye to apply the hair-dye on his hair while rubbing his hair with the brush.

In this dyeing operation, it is troublesome for the
10 user to pour a predetermined amount of hair-dye on the bristles of the brush. Sometimes he pours hair-dye more or less than a necessary amount on its bristles thereby causing an uneven dyeing.

Moreover, when a user applies hair-growth medical
15 liquid or hair-dressing medical liquid on his hair or his head skin, he pours an amount of the medical liquid onto his palm from a bottle containing it to rub it on his hair with his palm or he pours an amount of the medical liquid on his hair directly from the bottle to rub it on
20 his hair with his hand. In this applying operation, the user's hand becomes dirty.

It is an object of this invention to provide a brush for applying liquid or emulsion material such as toothpaste, hair-dye, etc., containing therein the
25 material in liquid or emulsion form, which is simple in structure and can be operated by one hand to feed a necessary quantity of the material onto its bristle-planted or sponge-applied surface.

According to this invention, there is provided a
30 brush for applying liquid or emulsion material comprising a handle having a container for containing material in liquid or emulsion form and a main body, rod provided, at its head, with a great number of bristles, a piece of sponge, a piece of rubber or likewise members and a
35 pumping mechanism provided in the handle for sucking the material from the container and feeding the sucked

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material to the head of the rod, characterized in: that a rear end of the main body of the handle is connected detachably to a mouth of the container; that the root portion of the rod is inserted axially slidably into a forward bearing portion of the main body in such a manner that rotation of the rod can be avoided by a rotation-preventing-means and the rod has a material feeding passage extending from the root portion to the head thereof; and that the pumping mechanism is operated in accordance with axial movements of the rod at the time when the rod is pushed rearward and thereafter returned forward and the pumping mechanism comprises (i) an operational pipe received slidably at a connecting region between the main body and the root portion of the rod so as to be moved in accordance with axial movements of the rod, (ii) a forward valve body for closing and opening the front opening of a conduit formed in the pipe, (iii) a rear valve body accommodated in a valve seat member located in the rear portion of the main body in order to open and close a suction hole formed in the valve seat member and opened to the inside of the container, (iv) a suction chamber formed between the two valve bodies, and (v) an operational bar provided between the two valve bodies so as to pass through the conduit formed in the operation pipe in order to feed the material from the suction chamber to the head of the rod so as to control open and close movements of the two valve bodies.

The nature, utility, and further features of this invention will be more clearly apparent from the following detailed description with respect to preferred embodiments of the invention when read in conjunction with the accompanying drawings briefly described below.

In the accompanying drawings:

Fig. 1 is a front view of a brush of this invention;

Fig. 2 is a plan view of the brush of this invention;

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Fig. 3 is a vertical sectional view of the brush of this invention;

Fig. 4 is a vertical sectional view of the brush in the condition where a bristle-planted rod is pushed into a handle main body;

Fig. 5 is a vertical sectional view of the brush in the condition where the bristle-planted rod is returned after being pushed thereinto initially;

Fig. 6 is a vertical sectional view of the brush in the condition where the bristle-planted rod is again pushed into to feed a liquid or emulsion material onto a bristle-planting surface after being once returned;

Fig. 7 is a vertical sectional view of the brush in the condition following the condition of Fig. 5, where the material is sucked into a suction chamber;

Fig. 8 is a plan view of a forward valve body; and

Figs. 9(A) and (B) are elevational views of two valve plates provided at the opposite ends of the valve body, respectively.

In Figs. 1 to 3, a brush 1 of this invention comprises a handle 2 and a bristle-planted rod 3 inserted in the forward end of the handle 2 slidably axially thereof, the handle 2 housing a pumping mechanism 4 for feeding material such as tooth-brushing material, hair-dye, hair-growth material, hair-dressing material, cleaning material, paints, lubricating oil, etc. in liquid or emulsion form.

The handle 2 comprises a combination of a main body 5 and a material container 6 for housing a liquid or emulsion material 24, connected to the handle body 5. The container 6 has a male thread 6A provided in the projected peripheral surface of the forward end thereof, and the main body 5 has a female thread 5A provided in the inside peripheral surface of the rear portion thereof. The body 5 and the container 6 are connected

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detachably to each other by the screw-engagement of the male thread 6A with the female thread 5A.

The bristle-planted rod 3 is formed at its head, in a flat shape of rectangular section like a common brush. 5 The bristles 7 are planted in a bristle-planted surface 3A of the head of the rod 3. The rod 3 has a material passage 8 provided in the interior thereof from the rear end 3B to the bristle-planting surface 3A thereof. The passage 8 opens directly on the bristle-planting surface 10 3A or is in communication with the planting holes of the respective bristles 7 planted in the bristle-planted surface 3A so that the material 24 can be exuded at the roots of the bristles 7.

The rod 3 is slidably inserted at the root portion 15 3B thereof into the bearing portion 9 of the body 5 so as to keep a sealing function between the root portion 3B and the inside peripheral surface of the bearing portion 9. The bearing portion 9 has a slit 10 extending axially in the peripheral surface of the bearing portion 9. An operational projection 11 is protruded from the outside 20 peripheral surface of the root portion 3B of the rod 3. The projection 11 is engaged slidably with the slit 10 to prevent the rod 3 from rotating about its axis. On an operational projection 11 is provided a slip prevention 25 surface 11A which is rugged in order to prevent a thumb of a user's hand from slipping thereon. The projection 11 and the slit 10 form rotation-preventing means. The pumping mechanism 4 has an operational pipe 12 which is integrally provided with a valve portion 15 at the outer 30 peripheral surface of the pipe 12. The valve portion 15 has front and rear lip portions 15A and 15B, respectively. The front lip portion 15A functions to prevent air and dirty water from entering and permeating into the main body 5 through the sliding portions of the 35 bearing portion 9 while the rear lip portion 15B functions to prevent the material from leaking out. The front surface of the valve portion 15 is adapted to abut

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against a projection 30 provided on the inner surface of the main body 5 of the handle 2 when the pipe 12 is in a normal position.

5 The front part of the pipe 12 is inserted into a hole 31 formed in the root portion 3B of the rod 3. In front of the pipe 12 is accommodated a forward valve body 19 which has a shape shown in Figs. 8 and 9. The valve body 19 is made of elastic material such as synthetic resin. Further, the valve body 19 has two valve plates 10 19A and 19B at its front and rear ends, respectively. The valve plate 19A has, in general, a circular shape whose peripheral is partially cut to form four paths 19D for passing the material. Another valve plate 19B of the same shape as the plate 19A has four paths 19D. The two 15 valve plates 19A and 19B are connected to each other by a loop portion 19C mainly functioning as an elastic member.

The valve body 19 is accommodated in the hole 31 in a state wherein the peripheral portion of the front valve plate 19A abuts against a step 3C formed on the inner 20 surface of the hole 31.

The front face of the operational pipe 12 is provided with an annular projection 12A which engages with the rear valve plate 19B. The pipe 12 is provided in a connecting region of the root portion 3B of the rod 3 and the main body 5 and has a conduit 32 extending in 25 its longitudinal direction in order to feed the material 24 from an airtight suction chamber 21 to the rod 3. The suction chamber 21 is formed between the valve portion 15 of the pipe 12 and a valve seat member 16 fixed to the rear end of the body 5. A ball-shaped rear valve body 30 is accommodated in the valve seat member 16. The rear valve body 20 is made of steel. In the conduit 32 is freely accommodated an operational bar 22 for controlling the movement of the forward valve body 19 and the rear 35 valve body 20. The valve seat member 16 is cup-shaped and its bottom has a suction hole 18. On the inner wall of the valve seat member 16 are provided a plurality of

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libs 16B. The libs 16B are disposed at a predetermined distance in the circumferential direction of the valve seat member 16. The libs 16B form a space 33 for accommodating the rear valve body 20 and each lib 16B has
5 a projection 16C, at its front end, for preventing the valve body 20 from coming out of the space 33.

The rear half portion of the operational pipe 12 is extended into the suction chamber 21. A compression coil spring 17 for urging the pipe 12 forward is provided
10 between the front faces of the libs 16B and the inner side of the bell-shaped valve portion 15 in a state wherein the rear half portion of the pipe 12 is inserted into the coil spring 17.

The above operational bar 22 is slender enough not
15 to prevent the material 24 from passing through the conduit 32 of the pipe 12 and is slightly shorter than the distance between the two valve bodies 19 and 20 in a state where the valve body 19 closes the conduit 32 and the valve body 20 closes the suction hole 18 as shown in
20 FIG. 3.

The container 6 is provided, at its bottom, with a piston-like movable bottom body 23 which is slidable axially in close contact with the inner peripheral surface of the container 6. The movable bottom body 23
25 is made of soft synthetic resin or others and has slide edges 23B and 23C which are expanded in a bell-shape respectively at the forward end and the rear end of a cylindrical portion 23A. The tight contact of the slide edges 23B and 23C with the inside peripheral wall of the
30 container 6 ensures the airtightness so that the emulsified material or liquid material 24 filled in the container 6 may not leak therefrom.

At the forward end of the cylindrical portion 23A, there is provided a smaller-diameter cylindrical portion
35 23D which can be inserted in the projected smaller-diameter portion 6B of the mouth of the container 6 so that all material 24 can be completely consumed. In

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drawings a reference numeral 25 indicates a bottom plate for preventing the movable bottom body 23 from dropping off from the rear end of the container 6. The bottom plate 25 is inserted into the peripheral surface of the
5 opened rear end of the container 6. At the same time, the bottom plate 25 functions as a reinforcement member for preventing the deformation of the container by outside forces in order to keep the close contact of the slide edges 23B and 23C with the inside of the container
10 6. The bottom plate 25 has, at its center, a projected bar 25A which is projected into the cylindrical portion 23D of the bottom body 23 to restrict the rearward movement of the bottom body 23. The bottom plate 25 is provided with a plurality of air passages 25B for
15 preventing air pressure in a rear space 34 defined by the bottom body 23 and the bottom plate 25 from becoming negative when the bottom plate 25 is moved forward during the use of the brush 1.

The operation of the brush 1 will be explained with
20 reference to FIGS. 3 to 7.

The handle 2 is held in one hand in the state shown in Fig. 3. When the brush 1 is used, the bristle-planted rod 3 is pushed rearward or toward the container 6 by putting a thumb on the operational projection 11, by
25 pushing the tip of the rod 3 with the other hand, or by pressing the tip of the rod 3 against something. The rear portion of the rod 3 is pushed into the handle 2 along the bearing portion 9 as shown in Fig. 4 with the operational pipe 12 being pushed to advance in the handle
30 main body 5.

When the rod 3 is pushed into the handle 2 as shown in FIG. 4, the operational pipe 12 is moved rearward and the front end of the operational bar 22 abuts against the valve plate 19B to cause the valve body 19 to be shrunk
35 or crushed so that the front opening of the conduit 32 is opened while its rear end abuts against the rear valve body 20 thereby to close tightly the suction hole 18.

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Then the rod 3 is freed from the push so as to cause the repulsive force of the compressed spring 17 to push back the rod 3 and the pipe 12 to their respective forward positions. At this time the pressure in the suction chamber 21 of the body 5 becomes negative, as a result, the material 24 in the container 6 is sucked into the suction chamber 21 of the body 5 through the suction hole 18 of the valve seat member 16 (Fig. 5).

When the valve portion 15 is slid forward, the front lip portion 15A is forced to expand radially thereby obtaining a close contact with the inner peripheral wall of the body 5. Further, the forward valve body 19 closes the conduit 32. Accordingly, air or dirty water does not enter or permeate into the inside of the suction chamber 21 in a negative pressure condition through gaps of sliding portions of the bearing portion 9. The suction results in a negative pressure in the container 6 to cause the movable bottom body 23 to advance for a short distance in close contact with the inside peripheral wall of the container 6.

The rod 3 is again pushed rearward as described above. This time the forward valve body 19 opens the conduit 32 of the pipe 12 and the rear valve body 20 closes the suction hole 18 of the valve seat member 16. The material sucked in the suction chamber 21 is fed into the hole 31 and the material passage 8 of the rod 3 (Fig. 6). Thereafter, the rod 3 is freed from the push, and the material 24 in the suction chamber 21 stops flowing forward and the material 24 in the container 6 is sucked from the container 6 into the suction chamber 21 of the body 5 (Fig. 7). Similarly as described above this suction causes the movable bottom body 23 in the container 6 to move forward in response to the sucked amount of the material 24.

When the brush 1 is initially used, this operation is repeated two or three times to fill the body 5, the conduit 32 and the material passage 8 with the material

24. After this, one push of the rod 3 feeds an amount of the material 24 suitable for one operation onto the bristle-planted surface 3A. Thus, the brush 1 is ready for use. Individually if the amount of the material 24 fed onto the surface 3A is not enough, twice- or more than twice-pushes will be given.

When the material 24 in the container 6 has run out, the container 6 is unscrewed from the rear end of the body 5, a cap (not shown) screwed on a fresh container 6 at the male thread 6A thereof is disengaged, and the male thread 6A of the fresh container is engaged with the female thread 5A of the body 5. Then immediately the brush 1 can be again used continuously. When the opening of the material passage 8 opening on the bristle-planting surface 3A of the rod 3 may become dry during a continuous use, the whole bristles 7 may be covered with a cap 26 as shown by a phantom line in Fig. 1.

In this invention, the operational bar 22 is provided between the forward and rear valve bodies 19 and 21 to control the open-close movements of the two valve bodies 19 and 20. The bar 22 can ensure a reliable alternative movement of the two valve bodies as shown in FIGS. 4 to 7. Further, if the length of the bar 22 is properly adjusted, the necessary supply of the material 24 to the surface 3A can be ensured.

Furthermore, as the forward valve body 19 is an elastic valve member which can shrink and expand by itself, a special coil spring for urging a valve body toward the front opening of the pipe 12 is not necessary thereby to make the construction of a valve mechanism simple.

As described above, the brush 1 of this invention comprises the bristle-planted rod 3 having the operational projection 11, and by the rod being pushed toward the main body 5, it can feed a certain amount of the material 24 onto the bristle-planted surface 3A. Advantageously this makes it possible to use the brush

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with one touch of operation. Besides, since one push of the rod 3 feeds a predetermined amount of the material, its users do not need to pay attention to how much the material should be squeezed for one operation as they do
5 with the conventional operation and wasteful use of excessive material can be avoided. Furthermore, the material 24 is fed by simply pushing the rod 3. Accordingly, when the brush is used as a toothbrush, even infants and children can use the brush 1 easily.
10 Additionally the material container 6 is easily detached from the main body 5 and disposable, and economically the main body 5 of the brush can be used for a long time.

Especially in the brush 1 of this invention, the movable bottom body 23 moves forward in response to a
15 decrease of the material 24 in the container 6 when the rod 3 is pushed rearward to feed the material 24 toward the rod 3. This perfectly prevents air from being sucked from the outside into the material 24 in the container 6. It is desirable in terms of hygiene that the material can
20 be fed in a perfectly sealed condition. Among others, the brush 1 of this invention comprises a small number of components and can be easily fabricated.

In the above embodiments, on the head of the rod 3 are planted a great number of fine or thick bristles for
25 applying the material 24. However, instead of the bristles, a piece of sponge, a piece of rubber or a member having a convex-concave surface for applying the material 24 thereon may be attached to the head of the rod 3.

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CLAIMS:

1. A brush for applying liquid or emulsion material comprising a handle having a container for containing material in liquid or emulsion form and a main body, rod provided, at its head, with a great number of bristles, a piece of sponge, a piece of rubber or likewise members and a pumping mechanism provided in the handle for sucking the material from the container and feeding the sucked material to the head of the rod, characterized in: that a rear end of the main body (5) of the handle (2) is connected detachably to a mouth of the container (6); that the root portion (3B) of the rod (3) is inserted axially slidably into a forward bearing portion (9) of the main body (5) in such a manner that rotation of the rod (3) can be avoided by a rotation-preventing-means and the rod (3) has a material feeding passage extending from the root portion (3B) to the head thereof; and that the pumping mechanism is operated in accordance with axial movements of the rod (3) at the time when the rod (3) is pushed rearward and thereafter returned forward and the pumping mechanism comprises (i) an operational pipe (12) received slidably at a connecting region between the main body (5) and the root portion (3B) of the rod (3) so as to be moved in accordance with axial movements of the rod (3), (ii) a forward valve body for closing and opening the front opening of a conduit (32) formed in the pipe (12), (iii) a rear valve body accommodated in a valve seat member located in the rear portion of the main body (5) in order to open and close a suction hole formed in the valve seat member and opened to the inside of the container, (iv) a suction chamber (21) formed between the two valve bodies (19, 20), and (v) an operational bar (22) provided between the two valve bodies (19, 20) so as to pass through the conduit formed in the operational pipe (12) in order to feed the material from the suction chamber (21) to the head of the rod (3) while controlling

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open and close movements of the two valve bodies (19, 20).

2. A brush according to claim 1, wherein the rod (3) has a great number of bristle (7) at its head and the container (6) contains toothbrushing material in liquid or emulsion form.

3. A brush according to claim 1, wherein the rod (3) has a great number of bristles (7) at its head and the container (6) contains hair-dye or hair growth material.

4. A brush according to claim 1, wherein the rotation-preventing-means comprises: an operational projection formed on a peripheral surface of the root portion of the rod and functioning as a pushing member on which a finger is put when the rod is pushed rearward; and a slit axially provided in a bearing portion of the main body for slidably receiving the operational projection.

5. A brush according to claim 1, wherein the forward valve body (19) has an elasticity itself so that the forward valve body (19) is expanded and contracted in accordance with the movement of the rod (3).

6. A brush according to claim 4, wherein the forward valve body (19) has: two valve plates (19A, 19B) of a circular shape whose peripheral is partially cut to form paths for passing the material; and a loop portion (19c) for connecting the two valve plates (19A, 19B) with each other, the loop portion (19C) functioning as an elastic portion.

7. A brush according to claim 1, wherein the operational bar (22) is slightly shorter than a distance between the two valve bodies (19, 20).

8. A brush according to claim 1, wherein the operational pipe (12) has a valve portion (15) integrally formed at the outer circumferential surface thereof so as to be in airtight contact with the inner surface of the main body (5).

9. A brush according to claim 7, wherein the valve portion (15) has front and rear lip portions (15A, 15B).

10. A brush according to claim 7, wherein at the rear position of the container (6) is provided a movable bottom body (23) which is axially slidable in close contact with the inner peripheral surface of the container (6), the bottom body (23) being moved forward in response to the decrease of the material in the container (6).

11. A brush according to claim 9, wherein the bottom body (23) has a smaller-diameter cylindrical portion (23D) which can be inserted into a mouth (6B) of the container so that all material in the container (6) can be completely consumed.

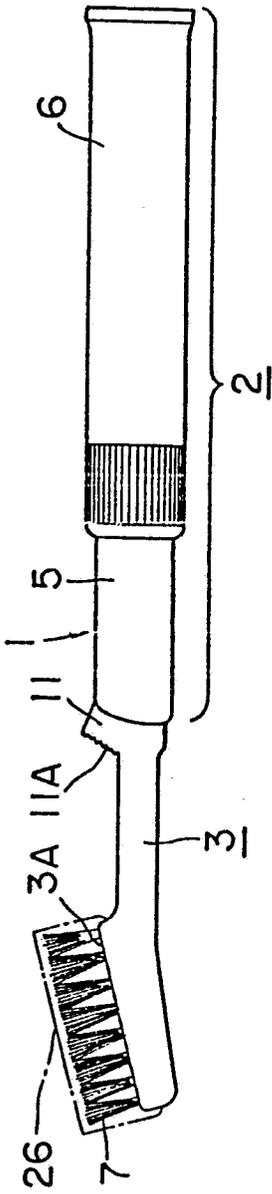


FIG. 1

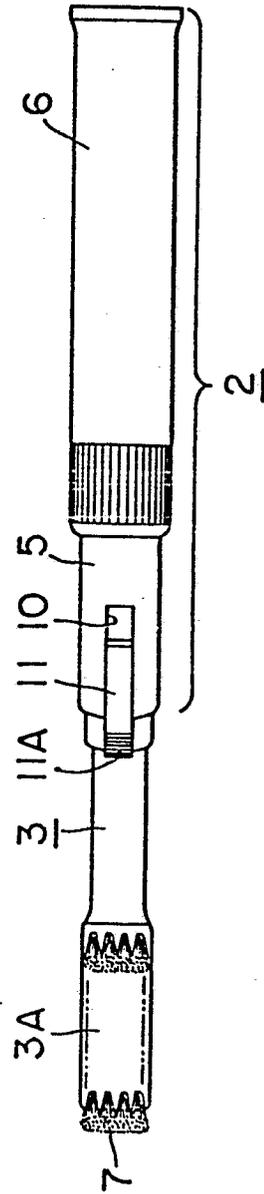


FIG. 2

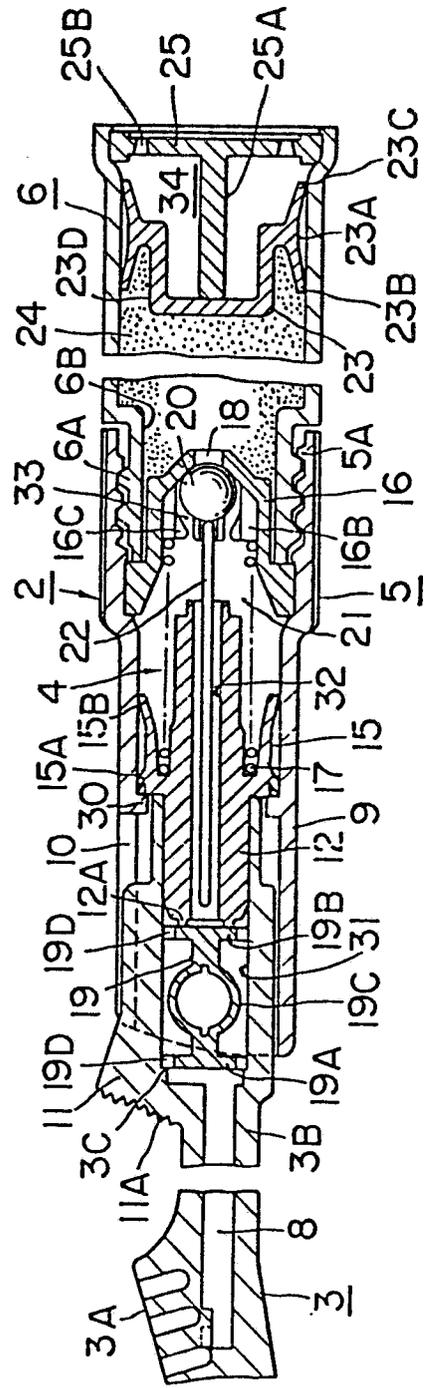


FIG. 3

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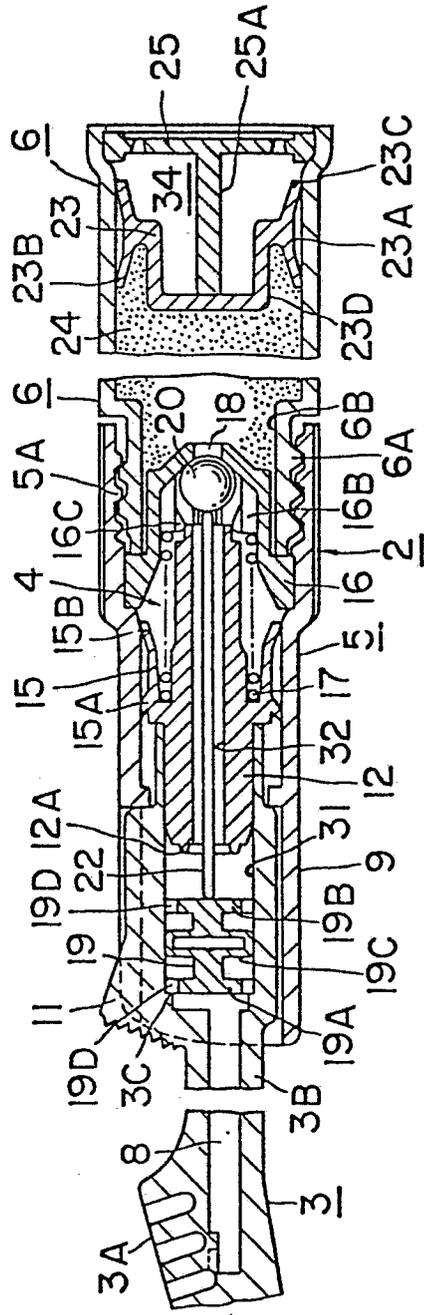


FIG. 4

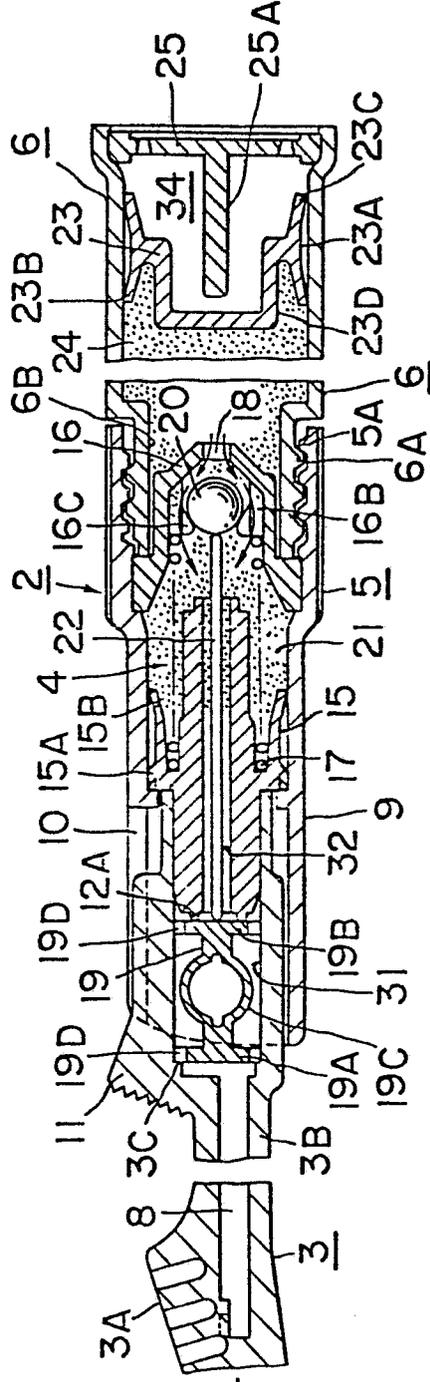


FIG. 5

FIG. 6

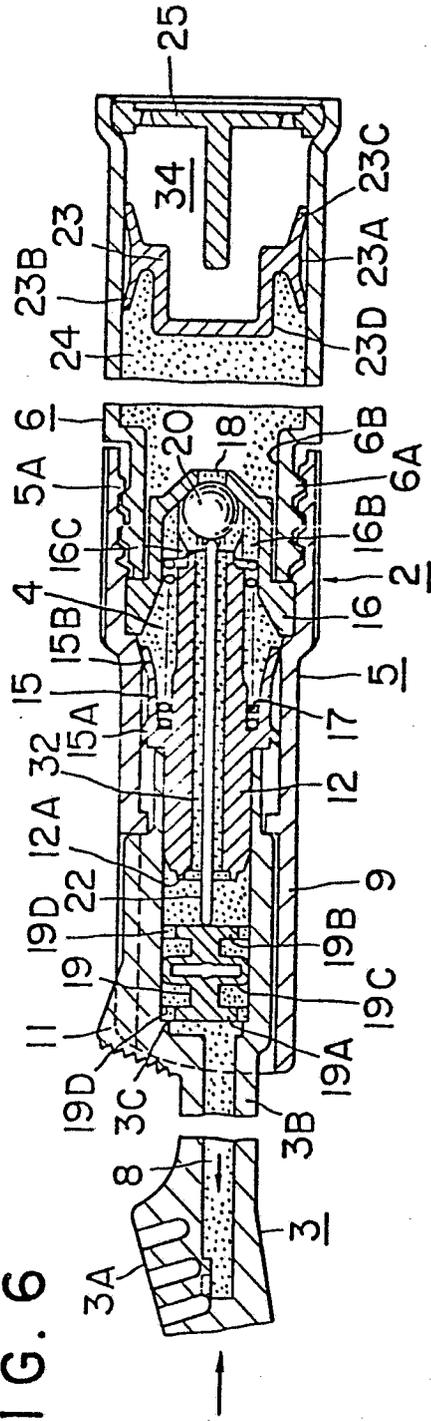


FIG. 7

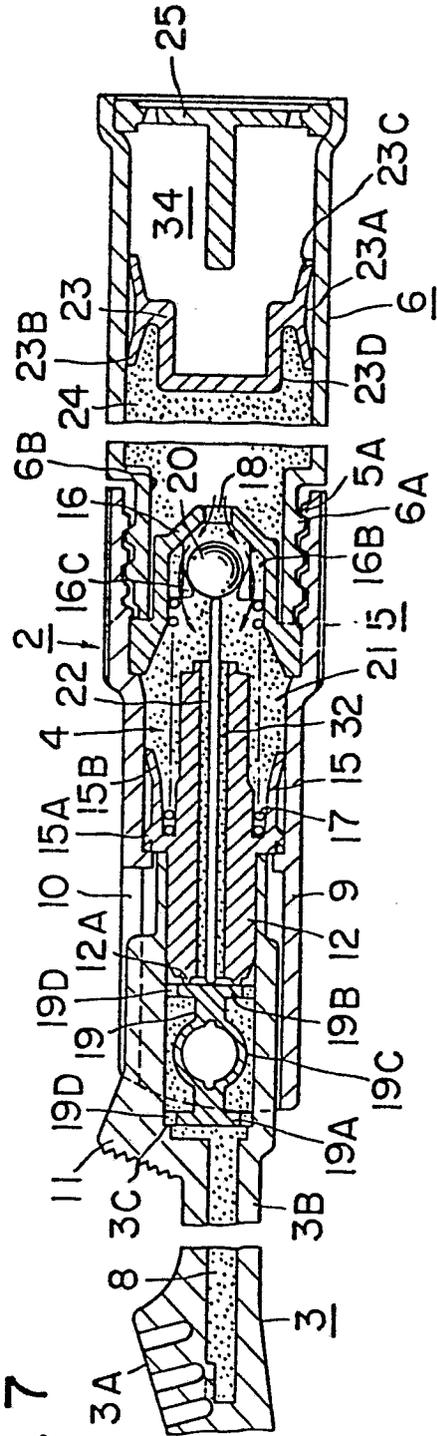


FIG. 8

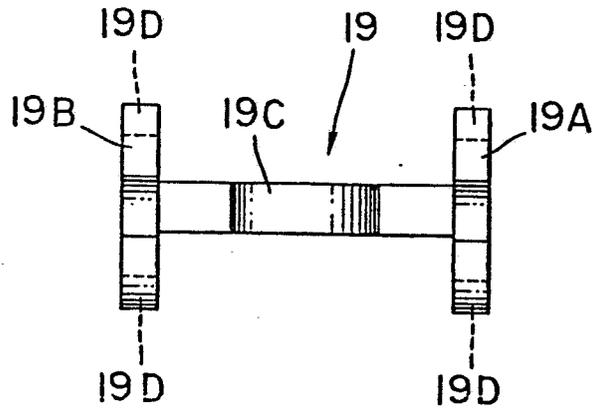
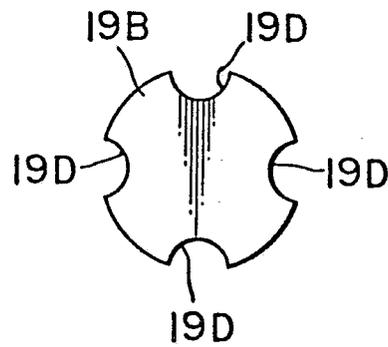
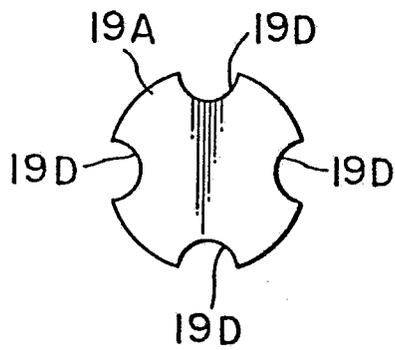


FIG. 9 (A)

FIG. 9 (B)





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
Y	EP-A-0 123 518 (ENDO) * Page 3, line 32 - page 9, line 16; page 10, lines 21-25; page 12, lines 1-8; claims; figures 1-6, 8-10 *	1,5-7	A 46 B 11/02
X		2-4,8-11	
Y	--- US-A-3 248 022 (SCHULMAN et al.) * Column 2, lines 12-61; column 3, lines 12-30; claim 3; figures 2,4 *	1,7	
Y	--- GB-A-1 562 817 (YOSHINO) * Page 3, lines 71-52; figures 1,4 *	5,6	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			A 46 B B 05 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20-05-1986	Examiner BOURSEAU A.M.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			