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(54) **A steam iron**

(57) A notably reliable steam iron (1) comprises a vaporization chamber (5) associated with a heating plate (2), a tank (4) holding water to be vaporized, a device (6) associated with the tank (4) for supplying water drop by drop and having, in the region of the vaporization chamber (5), a supply valve (7) operated by means of a movable rod (10) which is partially immersed in the tank (4) and is associated with operat-

ing means (11) on the iron (1), the tank (4) having a hole (17) in which the movable rod (10) is engaged, and a resiliently deformable diaphragm (20) fixed to the tank (4) in the region of the hole (17) and to the movable rod (10), the diaphragm (20) being intended to form a hydraulic seal in the region of the hole (17).

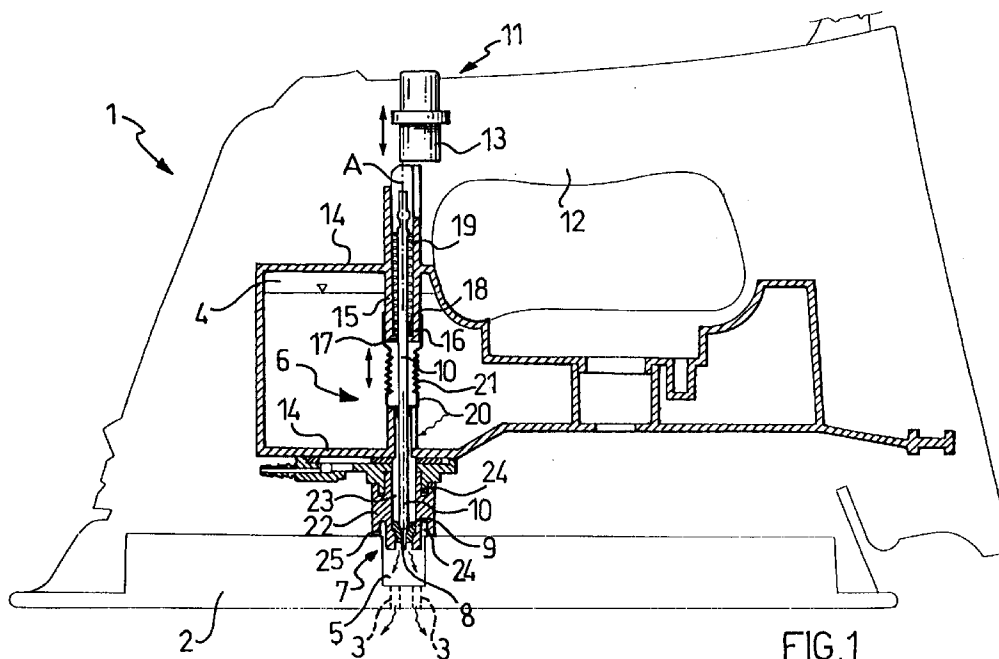


FIG.1

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Description

The present invention relates to a steam iron of the type comprising at least one vaporization chamber associated with heating means, a tank located above the vaporization chamber for holding water to be vaporized, and a water-supply device associated with the tank and having, in the region of the vaporization chamber, a supply valve operated by means of a movable rod which is partially immersed in the tank and is associated with operating means on the iron, the tank having a hole in which the movable rod is engaged.

Irons as specified above are known. They are heated electrically and can supply steam upon demand by the user.

An iron of this type has a seal in the above-mentioned hole for preventing water leakage because of the imperfect seal between the surface of the movable rod and the edge of the hole.

The rod moves in opposite directions in order to open and close the supply valve. There is therefore frequent friction between the outer surface of the rod and the seal which, however, is fixed to the tank.

The friction leads to wear of the seal which, for this reason, has to be replaced periodically.

The immersed portion of the rod which controls the supply of steam is subject to an unpredictable amount of calcareous furring which increases gradually with time.

This furring takes part in the aforementioned friction and increases the rate of wear so that water leakages may occur inside the iron because the seal is not watertight.

As well as being annoying, water leakages may have more serious consequences if they interfere with the electrical circuit of the iron.

The technical problem upon which the present invention is based is to devise an iron which overcomes the problems mentioned with reference to the prior art.

This problem is solved by an iron of the type specified which is characterized in that it comprises a resiliently deformable diaphragm fixed to the tank in the region of the hole and fixed to the movable rod, the diaphragm being intended to form a hydraulic seal in the region of the hole.

The main advantage of the iron according to the invention is that friction is eliminated between the rod and other components of the iron which are subject to wear, ensuring that the water tank is watertight over time.

Further characteristics and advantages of the iron according to the invention will become clear from the description of a preferred embodiment thereof, given by way of non-limiting example with reference to the appended drawings, in which:

Figure 1 is a longitudinally-sectioned elevational view of an iron according to the invention,

Figure 2 is a partially-sectioned and exploded perspective view of a detail of the iron of Figure 1,

Figure 3 is a partially-sectioned perspective view of a detail of the iron of Figure 1.

In Figure 1, a steam iron is generally indicated 1. It comprises a plate 2 heated electrically by means of resistors, not shown, and having a plurality of holes 3 for supplying steam directly onto the fabric articles to be ironed.

The iron 1 incorporates a tank 4 located above the plate 2 for holding the water to be vaporized.

The iron 1 comprises a vaporization chamber 5 formed in the plate 2 facing the holes 3. The chamber 5 is associated with heating means which, in the embodiment shown, are constituted by the plate 2.

Since the vaporisation chamber 5 is disposed in the plate 2, the tank 4 is disposed above the vaporization chamber.

The iron 1 also comprises a device, generally indicated 6, for supplying the water to be vaporized, the device 6 being associated with the tank 4. In the embodiment shown, the device is of the type for supplying water drop by drop and has, in the vaporization chamber 5, a needle supply-valve 7 defining an actuation axis A of the valve 7 and having a needle-like closure element 8 and a metal valve seat 9.

The valve seat 9, which faces the vaporization chamber 5, is disposed a short distance from the heating means, that is, the plate 2.

The supply valve 7 is operated by a movable rod 10 associated with operating means 11 disposed on a grip 12 of the iron 1. In the embodiment shown, the operating means are manual and have a push-button 13.

The rod 10 is moved in opposite directions along the actuation axis A by means of the push-button 13 in order to open and close the valve 7, the rod 10 having the closure element 8 on its opposite end to the push-button 13.

The tank 4 has walls 14 which define a cylindrical duct 15 of axis A, inset in the tank in the region of the valve 7. The duct 15 has an inner end 16 where the tank 4 has a hole 17 with a diameter smaller than that of the cylindrical duct 15 so that the tank 4 also has an abutment surface 18 in the region of the edge of the hole 17.

The rod 10 extends from the valve 7 into the cylindrical duct 15 and is engaged in the hole 17. The rod 10 is therefore partially immersed in the tank 4 at least for a portion thereof which will be defined further below.

The iron 1 also comprises resilient means 19 which act in opposition to the operating means 11 and are associated with the movable rod 10. The user therefore acts against the force exerted by the resilient means 19 in order to open the valve 7.

The resilient means 19 are housed in the cylindrical duct 15 and are constituted by a helical spring disposed around the rod 10, the spring being fixed to the rod 10

and bearing on the abutment surface 18.

The iron 1 according to the invention comprises a resilient diaphragm 20 fixed to the tank 4 in the region of the hole 17 and fixed to the movable rod 10. The diaphragm 20 is intended to form a hydraulic seal for the tank 4 in the region of the hole 17 since it is arranged so as to close the entire opening of the hole 17 around the rod 10.

The diaphragm 20 extends from the hole 17 towards the valve 7, inside the tank 4, that is, it is disposed between the inner end 16 of the cylindrical duct 15 and the supply valve 7.

For this purpose, the resilient diaphragm 20 has a cylindrical structure housing at least a portion of the rod 10. As a result, the immersed portion of the rod 10 is disposed between the valve 7 and the point at which the diaphragm 20 is closed against the rod 10, that is, between the obturator 8 and the portion of the rod 10 housed in the diaphragm 20.

The diaphragm 20 has a bellows-shaped portion 21 and is made of resilient and flexible material, for example, of rubber.

Moreover, the diaphragm 20 is fitted in a resiliently leaktight manner over the outer walls of the cylindrical duct 15 but inside the tank 4.

The iron 1 according to the invention also comprises a covering 22 of insulating and non-stick material, in which the valve seat 9 of the supply valve 7 is enveloped.

By non-stick material is intended a so-called abherent material (Kirk-Othmer, Encyclopedia of Chemical Technology, 3rd Ed., Vol 1, John Wiley & Sons), that is, a material which prevents or reduces the adhesion of another material thereto.

There are many so-called abherent materials, for example, materials based on silicones, stearates, cellulose derivatives, polyolefins, vinyl compounds, polyterephthalates and polyethylene terephthalates, fluorocarbon polymers such as tetrafluoroethylene (Teflon®), etc.

The covering material 22 is preferably elastomeric.

In the embodiment shown, the covering 22 is made of silicone rubber.

The covering 22 is shaped substantially like a bush 4 of axis A, the upper end of which is fixed to the tank 4 in a leaktight manner and which has a first duct 23 full of water from the tank 4.

Moreover, it has lower grooves 24 for fitting in a leaktight manner on corresponding projections 25 on the top of the vaporization chamber 5, which is thus insulated at the top. A second, water-supply duct 26 is also formed in the covering 22 and extends from the valve seat 9 into the vaporization chamber 5.

With regard to the operation of the iron 1 described above, it is clear that, by extending and contracting without friction of any type between movable parts and fixed parts of the iron, the diaphragm 20 ensures watertightness of the tank 4 in the region of the hole 17, irrespec-

tive of the position and the state of movement of the rod 10 relative to the hole 17.

In addition to the above-mentioned advantage, in the iron described, the helical spring associated with the movable rod is not in contact with the water in the tank and is therefore subject to less chemical/physical deterioration.

Moreover, the particular arrangement of the diaphragm enables most of the rod to be kept out of contact with the water, thus minimizing furring.

Furthermore, the presence of the covering in the region of the valve seat of the water-supply device enables the hot region, that is, the vaporization chamber, to be physically, particularly thermally, separated from all of the other components, including the diaphragm, which thus have greater protection.

In order to satisfy further and contingent requirements, an expert in the art may apply to the above-described steam iron many further modifications and variations, all of which, however are included within the scope of protection of the present invention as defined by the appended claims.

Claims

1. A steam iron (1) comprising at least one vaporization chamber (5) associated with heating means (2), a tank (4) located above the vaporization chamber (5) for holding water to be vaporized, and a water-supply device (6) associated with the tank (4) and having, in the region of the vaporization chamber (5), a supply valve (7) operated by means of a movable rod (10) which is partially immersed in the tank (4) and is associated with operating means (11) on the iron (1), the tank (4) having a hole (17) in which the movable rod (10) is engaged, characterized in that it comprises a resiliently deformable diaphragm (20) fixed to the tank (4) in the region of the hole (17) and fixed to the movable rod (10), the diaphragm (20) being intended to form a hydraulic seal in the region of the hole (17).
2. An iron (1) according to Claim 1, in which the supply device (6) is of the type comprising a needle valve (7) defining an actuation axis (A) along which the movable rod (10) is moved in order to open and close the needle valve (7).
3. An iron (1) according to either of the preceding claims, in which the tank (4) has walls which define a cylindrical duct (15) inset in the tank (4), having an end (16) inside the tank (4) where the hole (17) is formed, and housing the movable rod (10), the diaphragm (20) being disposed inside the tank (4) between the inner end (16) of the cylindrical duct (15) and the supply valve (7).
4. An iron (1) according to Claim 3, which comprises

resilient means (19) acting in opposition to the operating means (11), associated with the movable rod (10), and housed inside the cylindrical duct (15).

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5. An iron (1) according to Claim 4, in which the resilient means comprise at least one helical spring (19) disposed around the movable rod (10).

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6. An iron (1) according to any one of the preceding claims, in which the diaphragm (20) has a cylindrical structure housing a portion of the movable rod (10) and comprising at least one bellows-like portion (21).

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7. An iron (1) according to Claim 6, when dependent on Claims 3, 4, 5 in which the diaphragm (20) is fitted in a leaktight manner on the cylindrical duct (15) inside the tank (4).

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8. An iron (1) according to any one of the preceding claims, in which the supply valve (7) has a metal valve seat (9) disposed at a short distance from the heating means (2) and enveloped in a covering (22) made of insulating and non-stick material, in which a water-supply duct (26) is formed.

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9. An iron (1) according to Claim 8, in which the insulating and non-stick material is elastomeric.

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10. An iron (1) according to Claim 9, in which the insulating and non-stick material is a silicone rubber.

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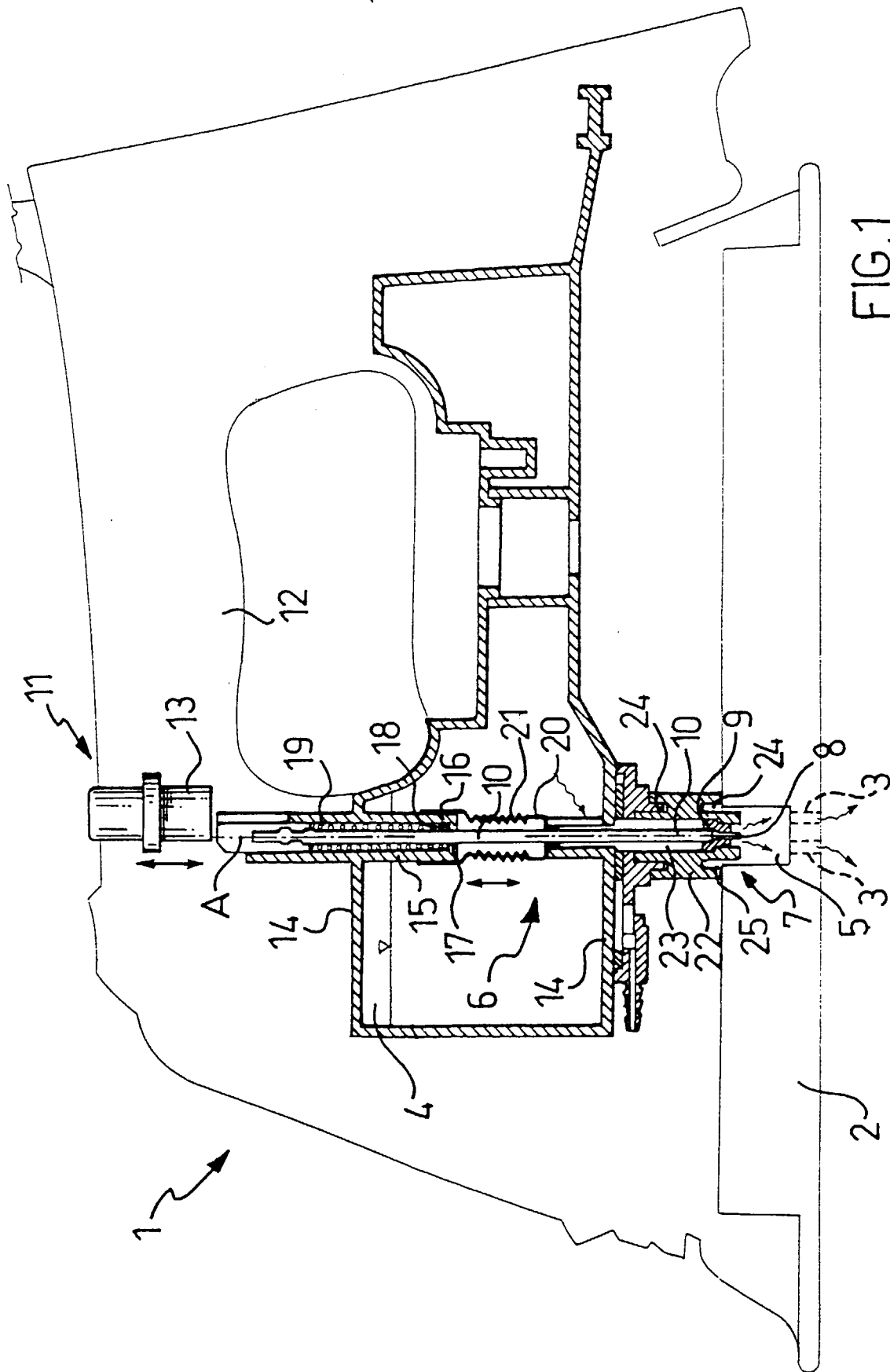


FIG.1

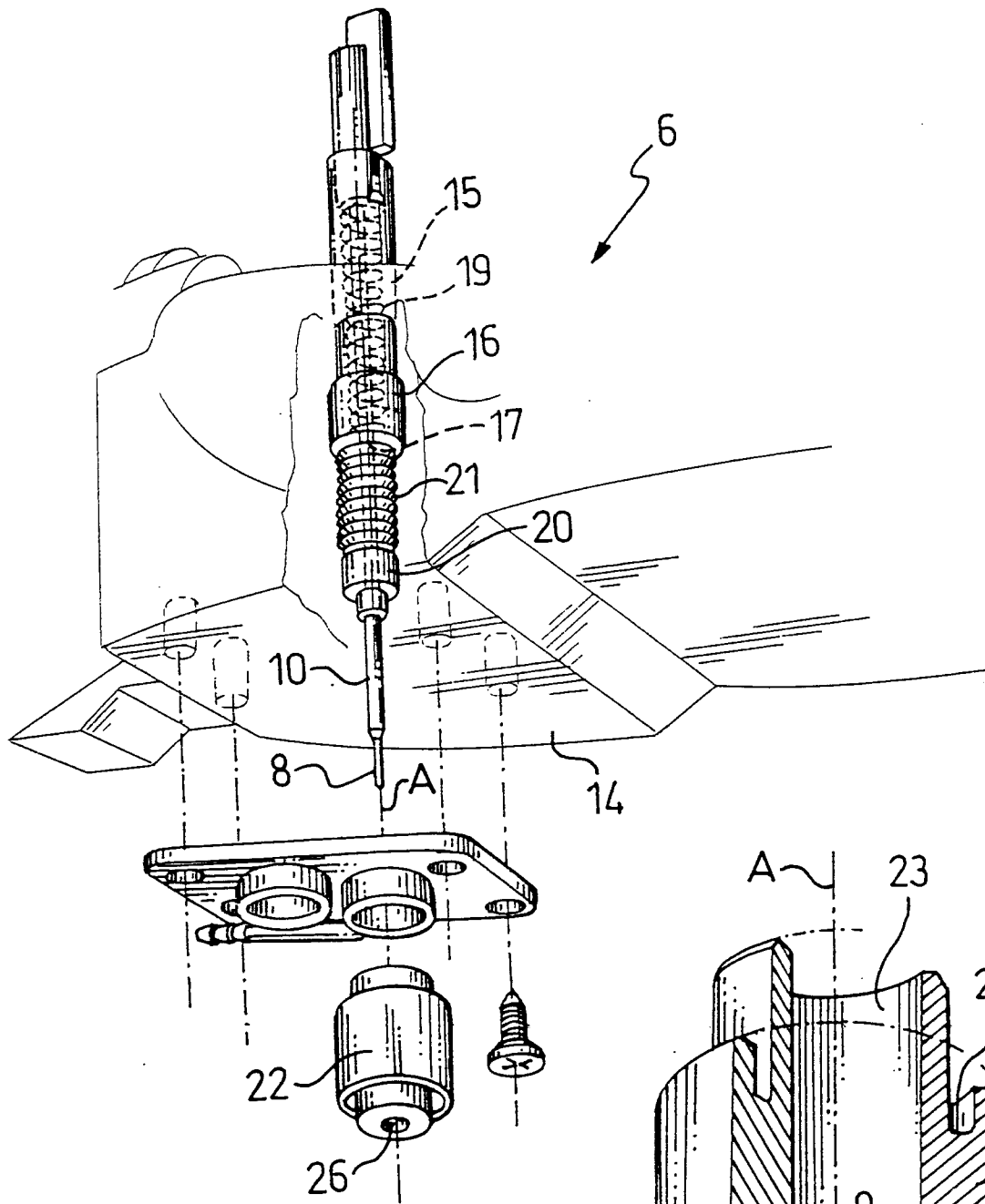


FIG. 2

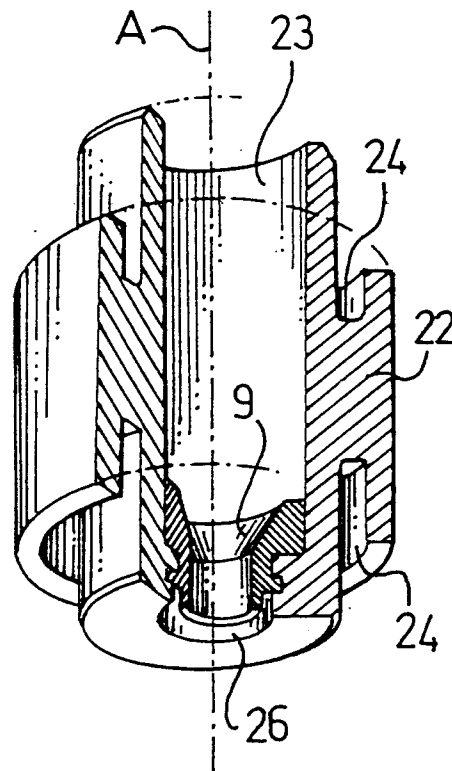


FIG. 3