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(54) First heater for a draw texturing machine

(57) A first heater (H1) for a draw texturing machine which guides a plurality of running yarns (3) by a single guide (27) and which is able to process a plurality of yarns (3) in a single heating space (26) of the first heater (H1). On conventional systems where only one yarn can be processed by one heater as the number of heaters and the number of winders are the same, by doubling the yarn processed by separate heaters for example, half the winders become free. According to the present invention, as a plurality of yarns (3) can be processed in a single heating space (26) without contact between the yarns (3), no winders become free.

EP 0 784 110 A2

Description

TECHNICAL FIELD

The present invention relates to a first heater for a draw texturing machine that applies heat by a first heater to a draw textured/false twisted yarn pulled from the supply package and winds the yarn on a package via an oiling member after cooling by a cooling plate (which also restricts ballooning of the yarn and is thus sometimes known as a "Balloon Plate") and reduction in torque by heating the yarn by a second heater.

BACKGROUND ART

Conventionally, a first heater for a draw texturing machine has been known in which one yarn is inserted into one heating space comprising yarn guides and a slit or the like into which the yarn is inserted.

PROBLEMS TO BE SOLVED BY THE INVENTION

As only one yarn is inserted into one heating space on a conventional first heater for a draw texturing machine, not only is the efficiency of the processing of the yarn in the heater poor but the draw texturing machine also increases in size.

Further, when a plurality of yarns that have been draw textured and false twisted are doubled, as the distance between adjacent heating spaces is great, an excessive tension is applied to the yarn due to it curving and quality of the doubled yarn decreases.

SUMMARY OF THE INVENTION

It is a object of the present invention to propose a first heater for a draw texturing machine that not only solves the aforementioned problems present on the conventional devices but also increases the machine efficiency.

In order to achieve the aforementioned object, a first aspect of the present invention is a draw texture machine which winds the yarn pulled from a supply package onto a winding package after a false twisting process has been completed by the yarn passing through a first heater, a cooling plate and a false twist member, and which is arranged with a yarn guide that guides a plurality of yarns in one heating space of a non-contact type first heater.

A second aspect of the present invention is that the aforementioned heating space is formed as a taper shape narrowing toward the yarn insertion opening.

A third aspect of the present invention is positioning of a yarn guide block having a plurality of guide grooves corresponding to the aforementioned yarn guides in the entrance and exit sides of the first heater.

A fourth aspect of the present invention is that the plurality of yarns guided by a single yarn guide are doubled.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a summarised side view of the draw texturing machine showing one example of the application of the first heater of the present invention.

Figure 2 is a vertical section along the center line of the slit of the first heater of the present invention.

Figure 3 is a vertical section along the line III-III of Figure 1 of the first heater of the present invention.

Figure 4 is a front view of the yarn entrance side of the first heater of the present invention.

Figure 5 is a vertical section along the line III-III of Figure 1 of another embodiment of the first heater of the present invention.

Figure 6 is section of the main parts along the line III-III of Figure 1 of yet another embodiment of the first heater of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Hereafter, the present invention will be described using the drawings but the present invention is not limited to the present embodiment provided the limitations of the aims of the present invention are not surpassed.

Firstly, using Figure 1, the running of the yarn in the draw texturing machine applied with one example of a first heater of the present invention will be described.

(1) is a creel stand. A yarn (3) pulled from a number of supply packages (2) supported on the creel stand (1) is guided to a first feed roller (5) via a suitable guide (4). Then the yarn (3) is inserted in a first heater (H1) while being guided by suitable guides (6,7) positioned on the yarn entrance side of the first heater (H1). The yarn (3) that exits from the first heater (H1) enters a cooling plate (8), is then imparted with a twist by a false twist member (9) and afterwards is guided to a second feed roller (11) via a suitable guide (10). The yarn (3) that exits from the second feed roller (11) is wound onto a winding package (16) via a second heater (H2), a guide (12), a third feed roller (13), an oiling roller (not shown in the drawing) and guides (14,15).

Next, using mainly Figures 2 and 3, the first heater (H1) will be described.

(17) is a sheath heater made of a metal such as brass or the like with good heat conductance and positioned inside a roughly prism shaped heater block (18) . The vertical cross section of the heater block (18) is rectangular long. In the present embodiment, two sheath heaters (17) are arranged parallel to each other along the longitudinal direction inside the heater block (18).

(19) is a horizontal insulating part formed from a plate shaped insulating member positioned on the lower surface of the heater block (18). (20) are side insulating parts comprising plate shaped insulating members extending upwards and positioned along both sides of the heater block (18) in the longitudinal direction. (21) is a center insulating part comprising a plate shaped insulating member facing upwards from the center of the

upper surface of the heater block (18) and positioned approximately parallel to the side insulating parts (20). The height of both the upper surface (20a) of the side insulating parts (20) and the upper surface (21a) of the center insulating part (21) is approximately equal. The heater block (18) incorporated in the sheath heater (17), and the horizontal insulating part (19), the side insulating parts (20) and the center insulating part (21) positioned around the heater block (18) together are assembled in an inner case (22) of which the cross section is U-shaped.

(23) is a peripheral insulating part positioned so that it surrounds the horizontal insulating part (19) and the side insulating parts (20). The peripheral insulating part (23) is contained within a suitable outer case (24). The outer case (24) covers not only the upper surface (20a) of the side insulating parts (20) but also the upside of the side insulating parts (20) of the center insulating part (21) side. (25) is a cover that covers the upper part of the center insulating part (21).

(26) is a slit shaped heating space arranged between the side insulating parts (20) and the center insulating part (21). In the present embodiment as shown in Figure 3, two slit shaped heating spaces are formed by the side insulating part (20) positioned on the left and the center insulating part (21), and the side insulating part (20) position on the right and the center insulating part (21).

As shown in Figure 3, both side walls (21b) of the longitudinal direction of the center insulating part (21) slant towards the side insulating parts (20) from around the middle to the upper surface (21a). Furthermore, the side wall (20b) in the longitudinal direction of the side insulating parts (20) positioned on the center insulating part (21) side also slants towards the center insulating part (21) from around the middle to the upper surface (20a). Accordingly, the vertical cross section of the heating space (26) formed between the side insulating parts (20) and the center insulating parts (21) forms a roughly trapezoid shape which tapers narrowing towards the yarn insertion opening (26a) of the heating space (26).

As previously described, as the vertical cross section of the heating space (26) forms a roughly trapezoid shape which tapers narrowing towards the yarn insertion opening (26a) of the heating space (26), the yarn insertion opening (26a) is small and as a consequence, radiation of heat from the heating space (26) heated by the heater block (18) incorporated in the sheath heater (17) through the yarn insertion opening (26a) can be effectively suppressed.

(27) are guides positioned above the heater block (18) inside the heating space (26) with a suitable number being positioned at predetermined intervals along the longitudinal direction of the heating space (26). As shown in Figure 2, the yarn guides (27) are positioned above the heater block (18) along a curve and the further towards both ends of the heater block (18) from the central area of the heater block (18), the closer the positioning to the heater block (18).

The yarn guide (27) is composed of a approximate column shape of ceramic or the like with high anti-abrasion properties and is formed with two guide grooves (27a) at a predetermined spacing in the periphery on which two yarns (3) are guided respectively. (27b) is a horizontal shaft formed on the side surface of the the yarn guide (27) and as that horizontal shaft (27b) is fitted into a hole bored into the side wall (20b) of the side insulating parts (20), a suitable number of guides (27) are positioned at predetermined spacing in the side insulating parts (20) as described above.

Next, using Figure 4, the plate shaped yarn introduction member (28) positioned on a yarn exit side and a yarn entrance side of the first heater device (H1) will be described.

(28a) are a pair of slits corresponding to the heating spaces (26). An approximately round window part (28b) having a width greater than the spacing of the two guide grooves (27a) of the yarn guide (27) is formed on the lower part of the slit (28a). An expanded opening (28c) which is v-shaped and increases in size towards the upper end is formed at the top part of the slit (28a) for easy insertion of the yarn (3).

(28d) is a plate shaped yarn guide support member arranged on which is a pair of approximately square cup parts (28e) in a position corresponding to a pair of the window parts (28b) and moreover at outer side of the yarn introduction member (28). A yarn guide block (28f) is arranged in the cup part (28e) and has two v-shaped guide grooves (28f') having a spacing aproximately the same as the spacing of the two guide grooves (27a) of the yarn guide (27) positioned in the heating space (26). A peaked projection (28f") is arranged in the middle part of the connected two v-shaped guide grooves (28f'). The yarn guide support member (28d) is attached to the yarn introduction member (28) by a suitable attachment tool (29) such as a bolt or the like. Also, the yarn introduction member (28) to which the yarn guide support member (28d) is affixed is attached to the yarn entrance side and the yarn exit side of the first heater (H1) by a suitable attachment tool (30) such as a bolt or the like. It should be noted that the spacing of the two guide grooves (27a) arranged on the yarn guide (27) positioned in the heating space (26) and the spacing of the two guide grooves (28f') arranged on the guide block (28f) are formed so as to be wider than the width of the slit (28a).

Next, the means for introducing a yarn (3) into the first heater (H1) having the aforementioned construction will be described.

Two yarns (3a,3b) are caught on a yarn threading member (not shown in the drawings) having a pair of guide grooves or yarn holes positioned apart by the same amount as the pair of the guide grooves (27a) arranged on the yarn guide (27) positioned in the aforementioned heating space (26), and the pair of the guide grooves (28f') arranged in the yarn guide block (28f) fitted onto the yarn guide support member (28d). The yarns (3a,3b) caught on the yarn threading member are

positioned inside the expanded opening (28c) of the yarn introduction member (28) as shown in Figure 4. When the yarn threading member drops along the slit (28a), the yarns (3a,3b) proceed downwards while contacting each side of the slit (28a) and respectively enter into the two connected guide grooves (28f') situated either side of the projection (28f''). The spacing of the pair of guide grooves (28f') formed in the yarn guide block (28f) is approximately the same as the spacing of the pair of guide grooves (27a) formed in the yarn guide (27) arranged inside the heating space (26). Consequently, the yarns (3a,3b) in the guide grooves (28f') of the yarn guide block (28f) are able to enter the guide grooves (27a) formed in the yarn guide (27) without any alteration.

Another embodiment of the first heater device (H1) of the present invention shown in Figure 5 has the heater block (18) formed as a horizontal rectangle shown in Figure 3 as a vertical rectangle and the pair of sheath heaters (17) are positioned vertically. As all other structures are the same as the embodiment shown in Figure 3, the details have been omitted. By positioning the heater block (18) vertically, the lateral width of the first heater (H1) can be reduced and the draw texturing machine can be made more compact.

Figure 6 shows yet another embodiment of the present invention. The first heater (H1) of this embodiment positions the yarn guides (27) at a predetermined spacing along the longitudinal direction of the heating space (26) by the fitting of horizontal shafts (27b) formed in side surface of yarn guide (27) in holes bored in the side surface (21b) of the center insulating part (21) . As all other structures are the same as the embodiment shown in Figure 3, the details have been omitted.

As described above, as the present invention inserts two yarns (3) into one heating space (26), the yarn processing efficiency in the heating space (26) is increased.

Also, as the vertical cross section of the heating space (26) forms a roughly trapezoid shape which tapers narrowing towards the yarn insertion opening (26a) of the heating space (26), the yarn insertion opening (26a) is small and as a consequence, radiation of heat from the heating space (26) heated by the heater block (18) incorporated in the sheath heater (17) through the yarn insertion opening (26a) can be effectively suppressed.

Further, as two yarns (3) are inserted into one heating space (26), the draw texturing machine can be made more compact and the operatability of the yarn threading operations are improved.

Yet further, when two yarns (3) which have been draw textured and false twisted are doubled, as two yarn (3) guided to the pair of guide grooves (27a) of the yarn guide (27) positioned in the single heating space (26) can be doubled, there is no excessive flexing of the yarn and accordingly the quality of the doubled yarn improves.

In the aforementioned embodiment, an example where one pair, in short, two guide grooves (27a) are formed on the yarn guide (27) positioned in the heating space (26) is shown, but a structure comprising of over three guide grooves (27a) and the insertion of over three yarns (3) in a single heating space (26) can be arranged. In this case, there are over three guide grooves (28f') arranged in the yarn guide block (28f) corresponding to the aforementioned guide grooves (27a).

Due to the aforementioned construction, the present invention demonstrates the following advantages.

As a plurality of yarns can he inserted in a single heating space, the yarn processing efficiency in the heating space is improved.

As the vertical cross section of the heating space forms a shape which tapers narrowing towards the yarn insertion opening of the heating space, the yarn insertion opening is small and as a consequence, radiation of heat from the heating space can be effectively suppressed.

As a plurality of yarns are inserted in a single heating space, the draw texturing machine can be made more compact and accordingly, operations such as yarn threading becomes simpler.

When a plurality of yarns which have been draw textured and false twisted are doubled, as a plurality of yarns guided to the plurality of guide grooves of the yarn guide positioned in the single heating space can be doubled, there is no excessive flexing of the yarn and accordingly the quality of the doubled yarn improves.

As a yarn guide member attached to which is the yarn guide block having a plurality of yarn guides is positioned on the yarn introduction side corresponding to the yarn guide having a plurality of guide grooves positioned in the heating space, yarn threading onto the yarn guide positioned in the heating space is simplified.

Claims

1. A first heater for a draw texturing machine which winds the yarn pulled from a supply package onto a winding package after a false twisting process has been completed by the yarn passing through a first heater, a cooling plate and a false twist member,

   arranged with a yarn guide that guides a plurality of yarns in one heating space of a non-contact type first heater.

2. A first heater for a draw texturing machine as in claim 1, wherein the heating space is formed as a taper shape narrowing towards a yarn insertion opening.

3. A first heater for a draw texturing machine as in claims 1 or 2, wherein a guide block having a plurality of guide grooves corresponding to the yarn guides are arranged on the yarn entrance and exit side of the first heater.

4. A first heater for a draw texturing machine as in claim 1, wherein the plurality of yarns guided by one yarn guide are doubled yarns.

FIG. 1

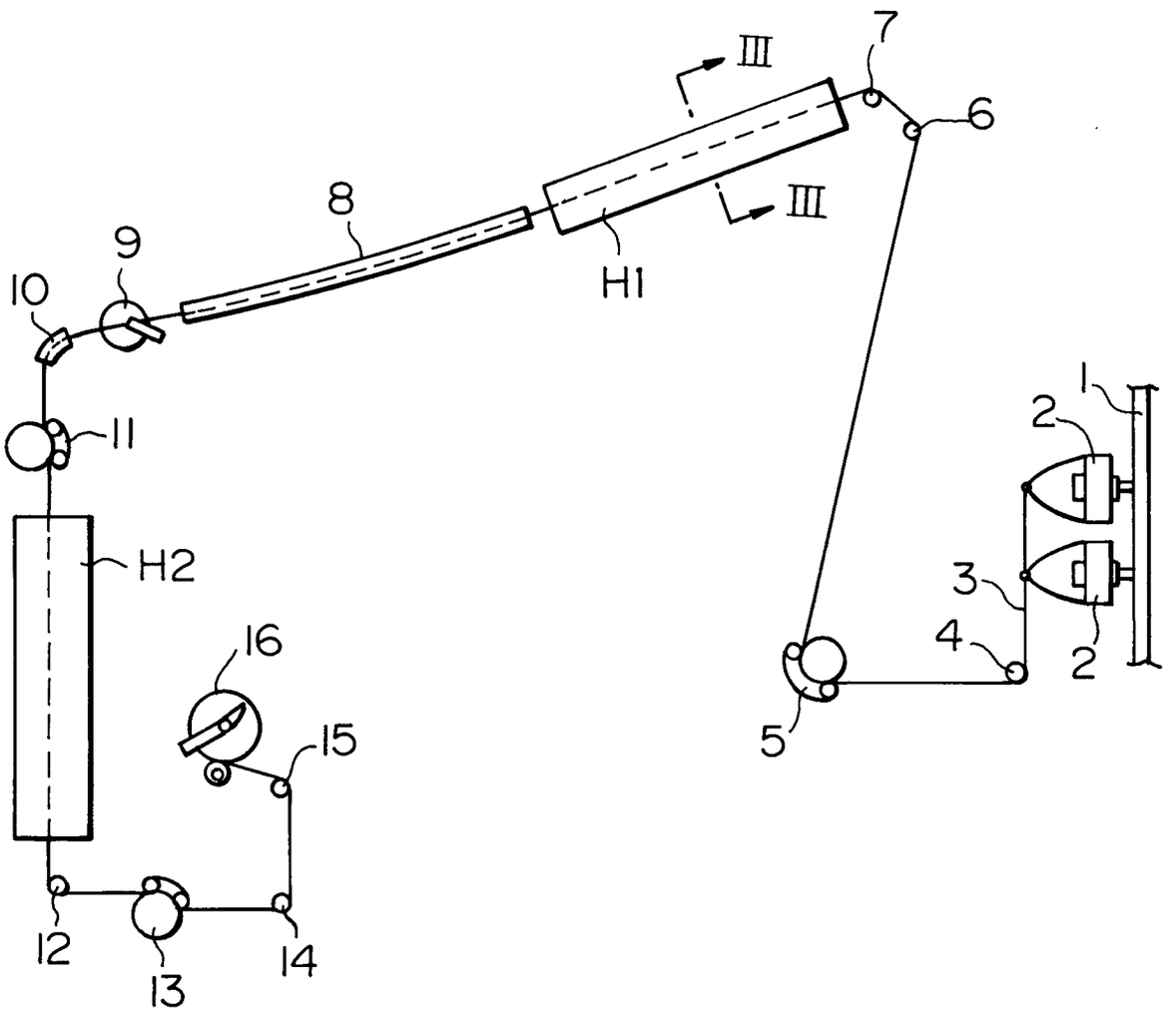

FIG. 2

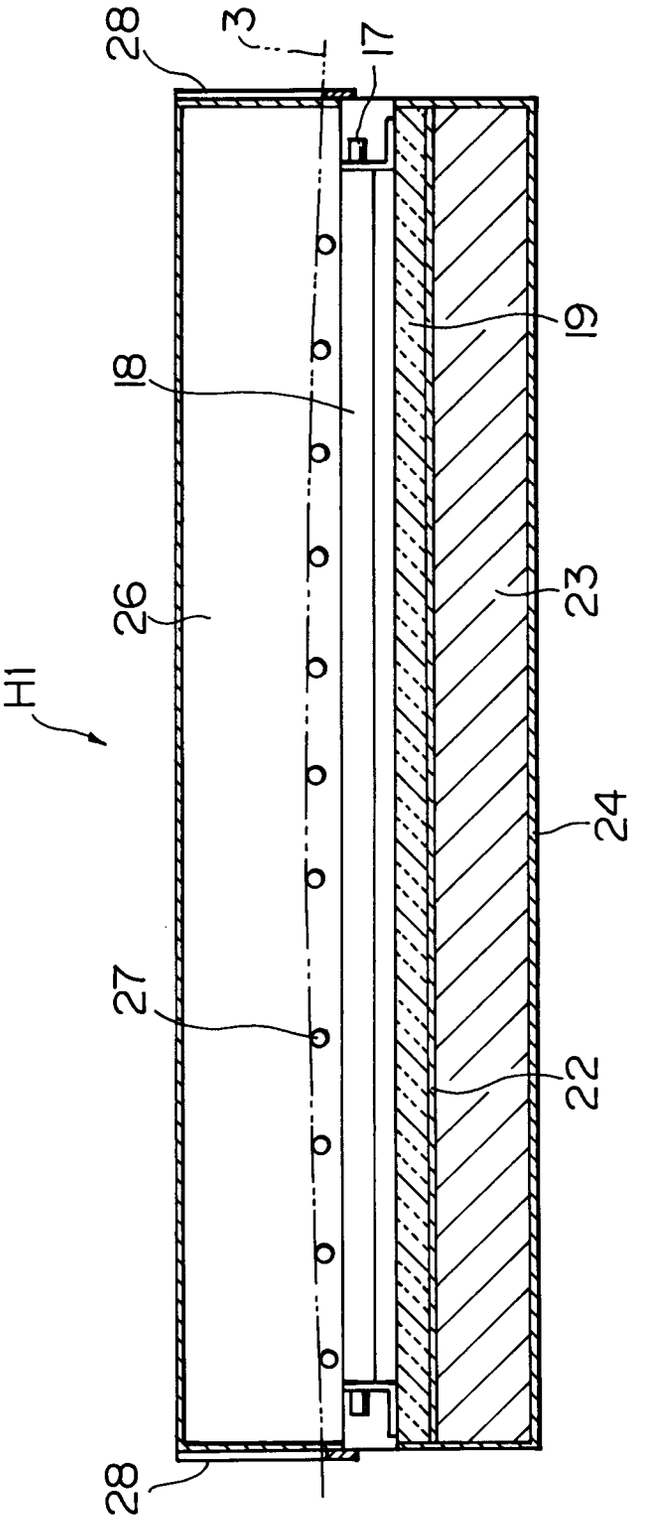

FIG. 3

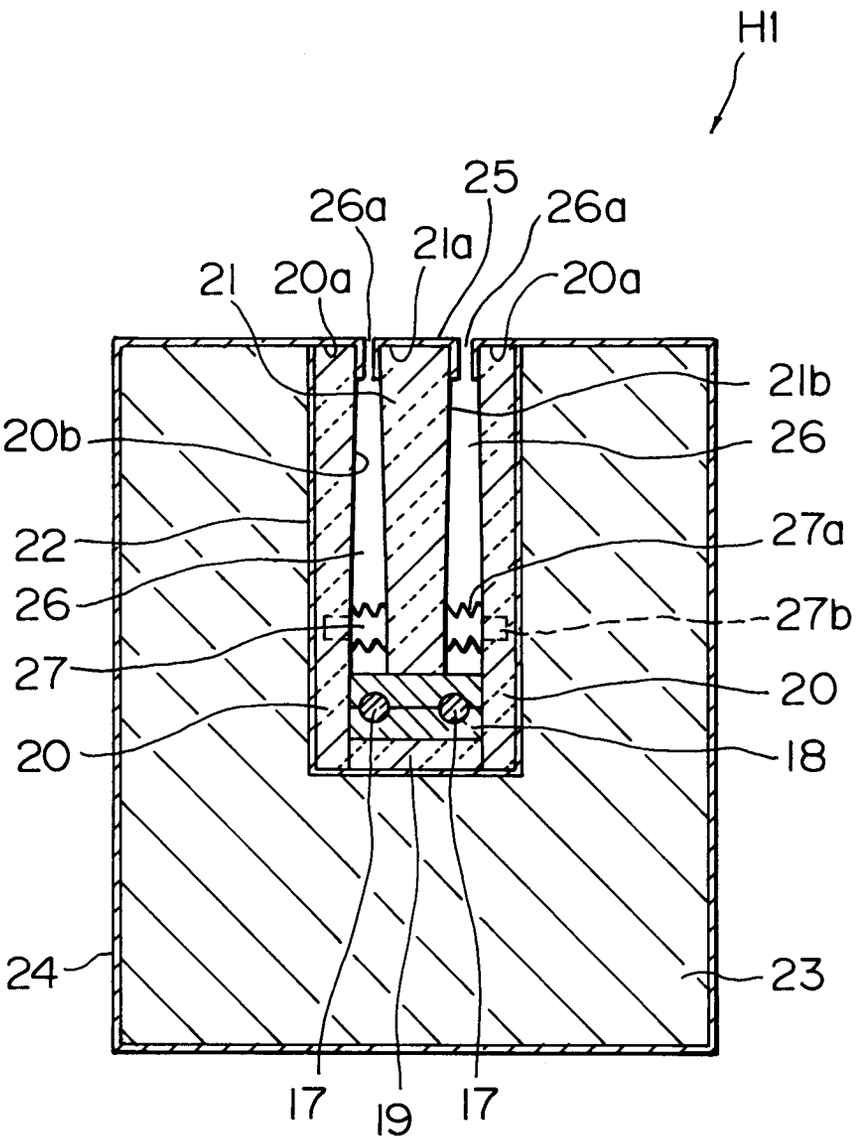
H1
25
26a
26a
21a
21
20a
20a
21b
20b
26
22
27a
26
27b
27
20
20
18
24
23
17
19
17

FIG. 4

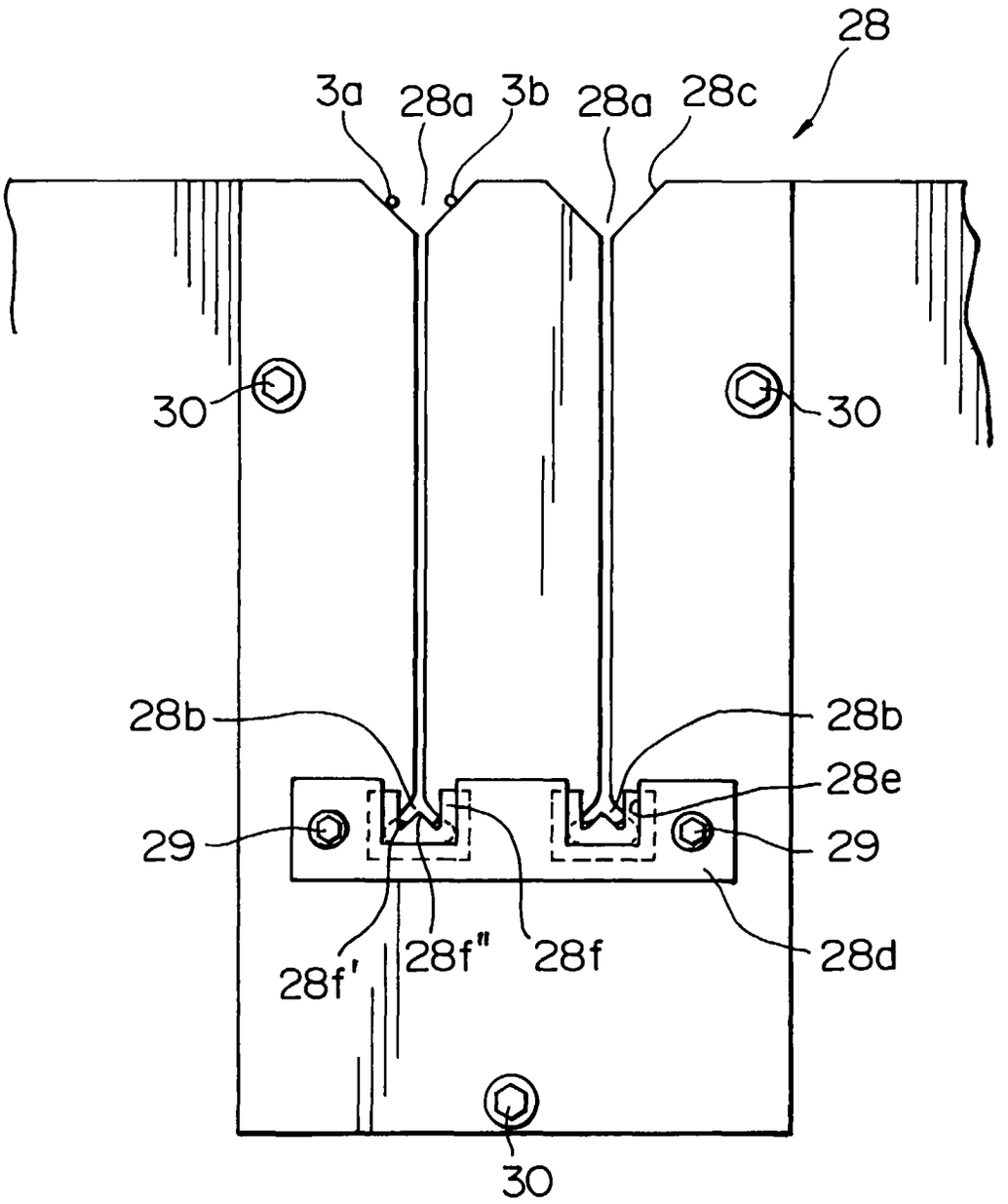

FIG. 5

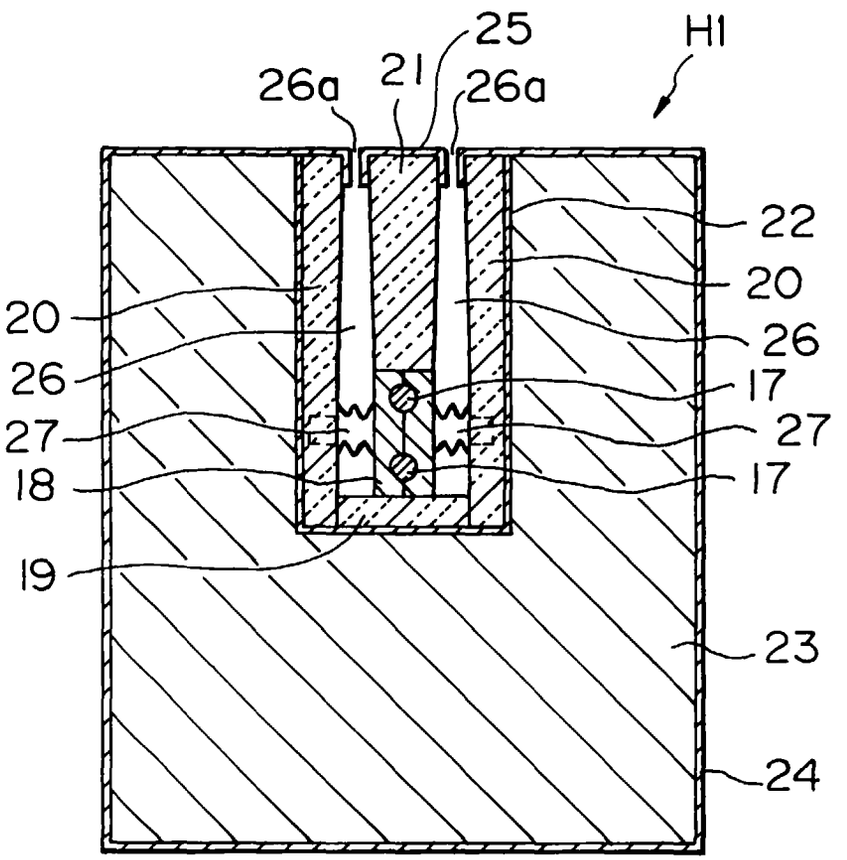

FIG.6