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(71) Applicant: **TALLERES TILTEX, S.A.**
E-08205 Sabadell (Barcelona) (ES)

(72) Inventor: **Gonzalez Hernandez, Manuel**
E-08205 Sabadell (Barcelona) (ES)

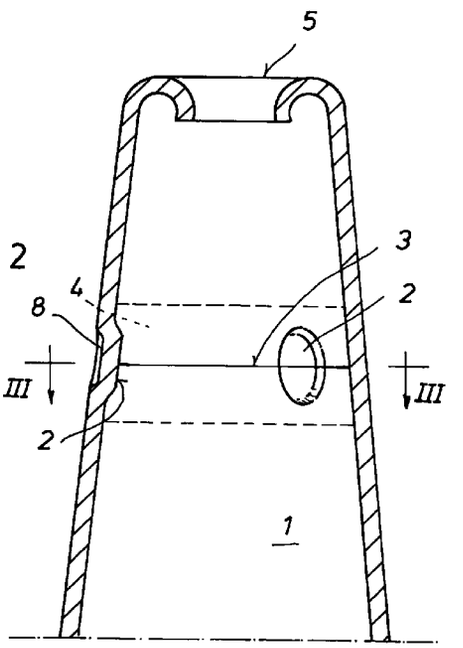
(74) Representative: **Curell Sunol, Jorge et al**
c/o Dr. Ing. M. Curell Sunol I.I. S.L.
Passeig de Gràcia 65 bis
08008 Barcelona (ES)

(54) A spinning cone and a process and device for the manufacture thereof

(57) The cone is made from cardboard or the like and is adapted to be supplied in stacked form with one cone (1) partially nested in an immediately adjacent cone. It is provided with a plurality of embossments (2, 2a, 2b) extending from the inner surface of the cone, being equidistant and close to the apex or smaller base (5) of the cone (1), and the respective most outstanding zones or peaks are at like distances from the inner surface of the cone (1).

In the manufacture thereof, a conventional cone (1) is subjected to an inwardly directed stamping operation, deforming it and forming external dimples (13) which form embossments (2, 2a, 2b) projecting out from the inner surface. This stamping operation is performed with a first rotating tool (12), provided with dimples (13), and a second rotating tool (14) provided with protuberances (15) complementary to the dimples (13).

FIG. 2



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Description

The present invention relates, as stated in the title thereof, to a spinning cone and a process and device for the manufacture thereof, particularly a cone of the type made from cardboard or other permanently formable sheetlike material, which is suitable for supply in nested stacked form, for handling by automatic means in spinning and yarn preparation machines, such that the individual removal of cones from a stack of mutually identical cones is not hindered by jamming caused by cones wedging inside each other.

To avoid the above drawback, various solutions have been adopted, the purpose of which is to provide abutment means within the cone preventing any degree of wedging, thus there have been arranged tubular portions of cardboard, coaxial with the cone and fixedly attached inside the smaller end thereof, forming abutment members for the successively nested stacked cones completely preventing them from becoming wedged together. In other cases, rivets have been provided on the outside to extend to the inside and form internal abutment members. Likewise, internal abutment members have been formed by way of die cut tabs formed in the end of the cone and open on the inside towards the larger end.

All the arrangements considered consist of abutment means preventing a major portion of the inner surface of a cone contacting the corresponding portion of the outer surface of the immediately inner cone, when nestedly stacked together, whereby mutual wedging together is avoided and the cones of a stack become completely independent from one another.

Nevertheless, these arrangements have, in all cases, the serious drawback that, in all cases, they have to be applied after the cone has been formed, in a subsequent operation independent from the conventional cone manufacturing process, whereby they are time consuming and increase the manufacturing costs.

An arrangement would, therefore, be desirable which prevented the cones from wedging together to a sufficient extent to cause undesired sticking and which could be implemented during the conventional cone manufacturing as a final operative step, particularly by means of a device applicable to the machinery available on the market for the manufacture of cardboard cones.

With a view to fulfilling such premises, the spinning cone of the present invention has been developed, according to which the cone is provided with a number of embossments aligned along a circumference belonging to a tapered end region of the inner surface thereof and close to the apex or smaller end, each projecting out in the same distance.

In one case, these embossments define, by the peaks thereof, low friction fitting arrangements on the outer surface of the end close to the apex or smaller end of another like cone housed inside the previous one by nested stacking.

In another case, depending on the distance over which they project, the said embossments of one cone may form abutment arrangements on the edge of the smaller base of another like cone inserted therein.

One feature of the invention is that a preferred embodiment of the cone is provided on the outer surface thereof at a tapered portion adjacent the apex or smaller base thereof with a plurality of stamped depressions which, located on one same ideal perimetral circumferential line, protrude convexly on the inside of the cone, forming a like number of rounded embossments, the most outstanding points of which define an ideal internal circumference of a smaller diameter than that of the ideal circumference of the said tapered region, with the diameter of said internal circumference coinciding with that of an ideal external circumference located on a second external tapered region, comprised between the first tapered region and the apex or smaller base of a second like cone inserted immediately inside the first cone in nested stacked form, such that the second cone is in slight frictional contact at said second external tapered region with the said embossments formed by the stamped depressions of the first tapered region of the outer cone.

A further feature of the invention consists of the contact surface of the embossments of one cone, formed by the stamped depressions therein, tending to have point contact with the cone inserted therein, either on the surface or on the edge of the smaller base thereof.

Further to producing the embossments by stamping, the invention also contemplates a solution in which the embossments are formed by added pieces, fixedly attached to the corresponding internal surface of the cone at the time of production thereof. Obviously, these added pieces may be individual or may be comprised in a ring to be assembled to the cone.

In all cases, it is contemplated that the peak of the embossments in contact with the immediate internal surface of the cone is preferably flattened, semi spherical or has a tapered curve, without excluding other possibilities.

A further feature of the invention is that the number of embossments is the minimum required to provide by abutment or by low friction fitting, the stably aligned engagement of one cone inside the other. There are preferably three equidistant embossments, although there may be only two, four or any other number.

In accordance with the invention, a process has been developed for the manufacture of the spinning cone in question, according to which the cone, at the end of the conventional manufacturing process, is subjected to an inwardly directed stamping operation sufficient permanently to deform the sheet material of the cone, forming dimples in the outer surface thereof which become embossments on the inner surface.

The invention contemplates that the stamping operation be carried out without any additional preparation of the cone material, or with an "ad hoc" preparation of

the cone material of the group formed by wetting, impregnation and application of heat, either alone or in combination.

According to the process of the invention, the stamping operation is carried out using a mould and countermould arrangement.

The invention also comprises a device for the manufacture of the spinning cone of the invention, which is formed by a countermould, formed by a first rotating tool on which the cone is formed by winding glued paper and which is provided at the cantilever end thereof with dimples aligned along a perimetral circumference thereof, in conformity with the design of the embossments it is desired to obtain, and by a mould, formed by a second rotating tool, which may be pressed against the outer surface of the cone and formed by a roller or the like having a like number of protuberances corresponding to those of the dimples of the countermould. These tools rotate in opposite directions, have synchronized angular speeds and the dimples of the countermould operatively mate with the protuberances of the mould.

According to the invention, the second rotating tool may move from a rest position to an operative position, in which the roller with its protuberances is pressed against the cardboard of the cone, synchronized in position and speed with the dimples of the first rotating tool on which the cone is fitted at the end of its manufacture.

The invention contemplates that the second rotating tool be mounted hingedly on a scissors-like extensible support actuated by a rod and cam system.

Finally, it is contemplated that the dimples and mating protuberances of the rotating tools be arranged on replaceable parts, so as to be able to change the form and distribution thereof or to replace them in the case of wear and tear.

One embodiment of the invention is described hereafter with reference to the illustrative drawing for an understanding of the above ideas. In the drawings:

Figure 1 is a schematic view of one embodiment of a spinning cone according to the invention;

Figure 2 is a diametral sectional view of the spinning cone of the previous drawing;

Figure 3 is a cross section view of the spinning cone of the previous Figures, on the line III-III of Figure 2;

Figure 4 is a fragmentary view of a plurality of spinning cones, according to the embodiment of Figure 1, nestedly stacked together and in diametral section, showing one of the low friction engagement regions;

Figure 5 is a diametral section of a plurality of nestedly stacked spinning cones provided with embossments forming abutment arrangements which may be rested on the edge of the smaller base of the immediately inner cone;

Figure 6 is a diametral section of a spinning cone provided with added embossments, either independent (lefthand side) or mounted on an assembly ring (righthand side);

Figures 7a, 7b and 7c are schematic views of three embodiments of its stamped depressions with regard to a generating line and the ideal perimetral circumference of the spinning cone on which they are aligned;

Figure 8 is a plan view of a device for the manufacture of the spinning cone of the invention in the inoperative position;

Figure 9 is an elevation view of the device of the previous Figure, in an operative position, for forming the stamped depressions in the spinning cone of the invention.

According to one preferred embodiment of the invention, the spinning cone 1 is made conventionally by winding a sheet of glued paper. Said cone 1, as best seen in Figures 1, 2, 3 and 4, has a plurality of embossments 2, aligned on an ideal circumference 3 of a tapered end region 4 of the inner surface thereof, close to the apex or smaller base 5, of equal height and defining with their peaks low friction fitting arrangements on the outer tapered surface 6 of the end close to the apex or smaller base 5 of another like cone 1, nestedly stacked in the previous one, as may be seen in Figure 4.

In one embodiment of the embossments 2, the cone 1 is provided on the outer surface at a tapered region 7 close to the apex or smaller base 5 thereof with a plurality of stamped dimples 8 which, located on an ideal perimetral circumference 9, project convexly on the inside of the cone, forming the said embossments 2, the most outstanding tips of which define the ideal internal circumference 3 of a smaller diameter than that of said ideal circumference 9. The diameter of the said internal circumference 3 is that of an external circumference (not shown) located on the second external tapered region 6, comprised between the first external tapered region 7 and the smaller base 5 of a second cone 1, identical to the previous one, nestedly stacked immediately inside the first cone 1, such that the second cone engages with low friction at said second external tapered region 6 with said embossments 2 formed by the stamped depressions of the first external tapered region 7.

In a like manner, Figure 5 shows the case in which an outer cone is provided with stamped embossments 2a, which act as abutment members against the edge of the smaller base of the inner cone.

According to a further embodiment of the embossments 2, they may be formed by attached members 2b adhered to the internal surface of the cone, either as independent members or disposed on a mounting ring 10. These arrangements have been shown in Figure 6, where the lefthand half of the cone shows the independent case and the righthand side shows the mounting ring 10.

In any case, the shape of the stamped depressions 8 defining such embossments 2 with relation to a gener-

ating line 11 and to the ideal perimetral circumference 9, may be circular (Figure 7a), transversally elongate (Figure 7b) and longitudinally elongate (Figure 7c). Nevertheless, this does not preclude other forms, provided that the purpose of the invention is attained thereby. The peak of the embossments 2 and 2b may be flattened, semispherical , conically curved or have other forms, provided that they engage the external tapered region 6 of the cones 1 with a low friction. Furthermore, the number of embossments 2, 2a y 2b is the minimum necessary to provide, by abutment or with low friction fit, the stable aligned engagement of one cone nested inside another, three equidistantly spaced apart being the preferred number, without excluding therefore other possibilities.

A preferred process for the preparation of the spinning cone of the invention consists of subjecting a cardboard cone, at the end of the conventional manufacturing process, to an inwardly directed stamping operation, of sufficient degree permanently to deform the sheet material (paper) of the cone, forming stamped depressions on the outside which become embossments on the inside. The stamping operation may be performed without any preparation of the cone material, i.e. just as it is at the end of its shaping operation, or it may previously be wetted, impregnated or heated.

The stamping operation is performed in a mould and countermould arrangement, preferably with a device comprising a countermould formed by a first rotating tool 12 on which the cone 1 is manufactured by winding of glued paper, which is provided in the proximity of the cantilever end thereof with dimples 13 aligned on a perimetral circumference and which conform to the design of the embossments 2 and 2a it is desired to produce, and by a mould formed by a second rotating tool 14, which may be pressed against the outer surface of the cone 1, in the form of a roller or like member having protuberances 15 corresponding to the said dimples 13 of the countermould and being of a number in accordance therewith. Both tools 12 and 14 rotate in opposite directions, are provided with synchronized angular speeds and the relative spacing between the protuberances corresponds to that of the dimples.

The second rotating tool 14 is mounted such that it may move from a rest position to a working position and back again, for example on a scissors-like extensible mechanism.

This scissors-like extensible mechanism has a support base 16 on which there is journalled a crank 17 having an arm 18 and a fork 19 mutually fixedly attached together, of which the arm 18 is hingedly attached, by way of a tie bar 20 with as rocker arm 21 attracted by a spring 22 and driven by a cam 23, at the same time as the fork 19 is attached to the end of a connecting rod 2 which is rotatably attached at the other end to a fork 25 of a rocker arm 26 forming a bushing for the shaft 27 of the roller provided with protuberances 15 of the mould forming the second rotating tool 14.

Both the dimples 13 and the protuberances 15 are disposed on interchangeable mechanical members, both for modifying the design of the embossments 2 and for replacing them in case of wear and tear.

Claims

1. A spinning cone of the type made from cardboard or other permanently formable sheetlike material, which is suitable for being supplied in stacked form by partial insertion of one cone (1) in an immediately adjacent cone, for the purpose of handling thereof by automatic means in spinning and yarn preparation machines, characterized in that it is provided with a plurality of embossments (2, 2a, 2b): (a) which project out from the inner surface of the cone (1); (b) are equidistant and close to the apex or smaller base (5) of the cone; and (c) whose respective most outstanding regions or peaks are at substantially equal distances from said inner surface of the cone.

2. The spinning cone of claim 1, characterized in that said peaks are adapted to exert a low friction fitting on the outer surface of another partially inserted like cone.

3. The spinning cone of claim 1, characterized in that said embossments (2a) define abutment arrangements on the edge of the smaller base (5) of another partially inserted like cone.

4. The spinning cone of any one of claims 1 to 3, characterized in that said embossments are constituted by added members (2b) fixed to the inner surface of the cone (1).

5. The spinning cone of claim 4, characterized in that each of the added members (2b) individually constitutes an embossment (2).

6. The spinning cone of claim 4, characterized in that a group of added members (2b) is disposed on a ring (10) adapted to be mounted in the cone (1).

7. The spinning cone of any one of claims 2 or 4 to 6, characterized in that the most outstanding region or peak of said embossments (2) is flattened.

8. The spinning cone of any one of claims 2 or 4 to 6, characterized in that said embossments (2, 2a, 2b) are substantially shaped as spherical caps.

9. The spinning cone of any one of claims 2 or 4 to 6, characterized in that said embossments (2, 2a, 2b) have a substantially conical surface.

10. The spinning cone of any one of claims 1 to 9, characterized in that said embossments (2, 2a, 2b) are three in number and are equidistantly spaced apart.

11. A process for the manufacture of a spinning cone characterized in that the cone (1), at the end of the conventional manufacturing process thereof, is subjected to an inwardly directed stamping operation sufficient permanently to deform the sheetlike material of the cone (1), forming dimples (13) in the outer surface thereof which cause embossments (2, 2a, 2b) projecting out from the inner surface of the cone.

12. The process of claim 11, characterized in that the stamping operation is carried out after an additional preparation of the cone material, said preparation comprising at least one of the operations of wetting, impregnation or application of heat.

13. The process of claim 11, characterized in that the stamping operation is carried out by means of a die and countedied arrangement.

14. A device for the manufacture of a spinning cone, specifically a cardboard cone (1) having embossments (2, 2a, 2b) standing out from the inner surface thereof, characterized in that it is constituted by a counterdie, formed by a first rotating tool (12) on which the cone (1) is formed by winding glued paper and which is provided at the end thereof with dimples (13) of a configuration complementary to that of said embossments (2, 2a, 2b), and by a die, formed by a second rotating tool (14), which may be pressed against the outer surface of the cone (1) and formed by a roller of the like having protuberances (15) complementary to said dimples (13); said tools (12, 14) rotating in opposite directions.

15. The device of claim 14, characterized in that said second rotating tool (14) may move from a rest position to an operative position, in which each of said protuberances (15) is pressed against the cardboard of the cone (1), synchronized in position and speed with said dimples (13) of the first rotating tool (12) on which said cone (1) is fitted.

16. The device of claim 15, characterized in that the second rotating tool (14) is mounted hingedly on a scissors-like extensible support (16) and is driven by a rod (20) and cam (23) system.

17. The device of claim 14, characterized in that said dimples (13) and said protuberances (15) are mounted on replaceable parts.

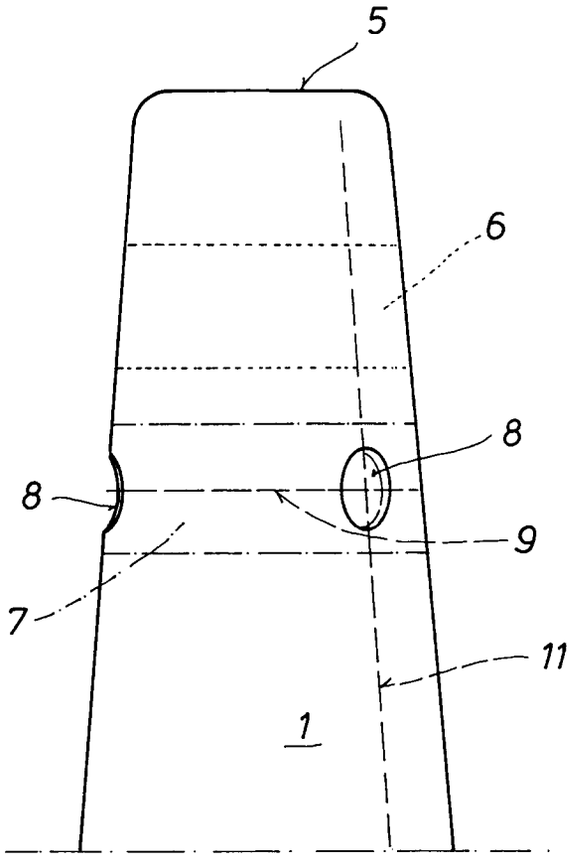


FIG. 1

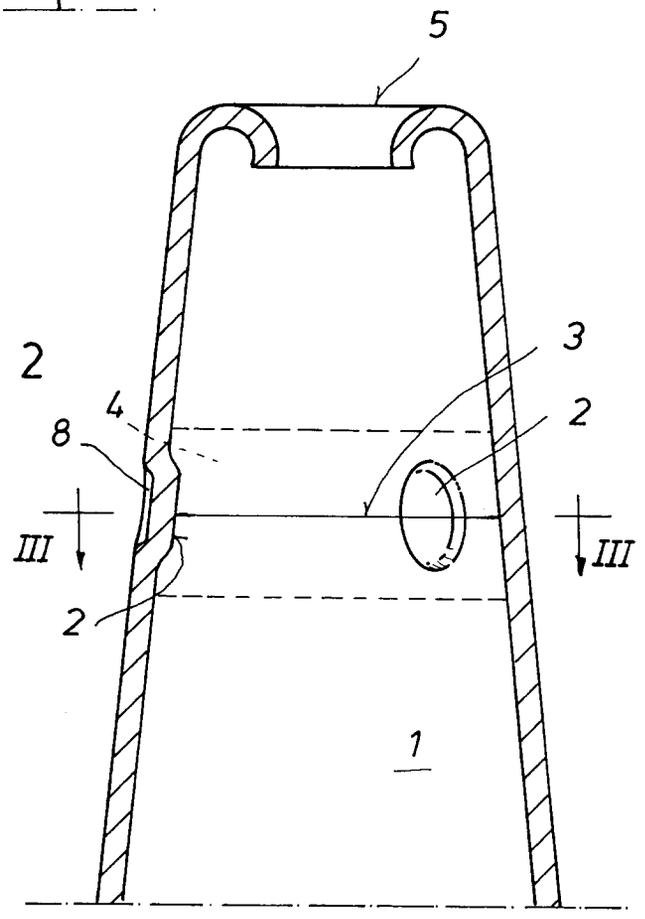
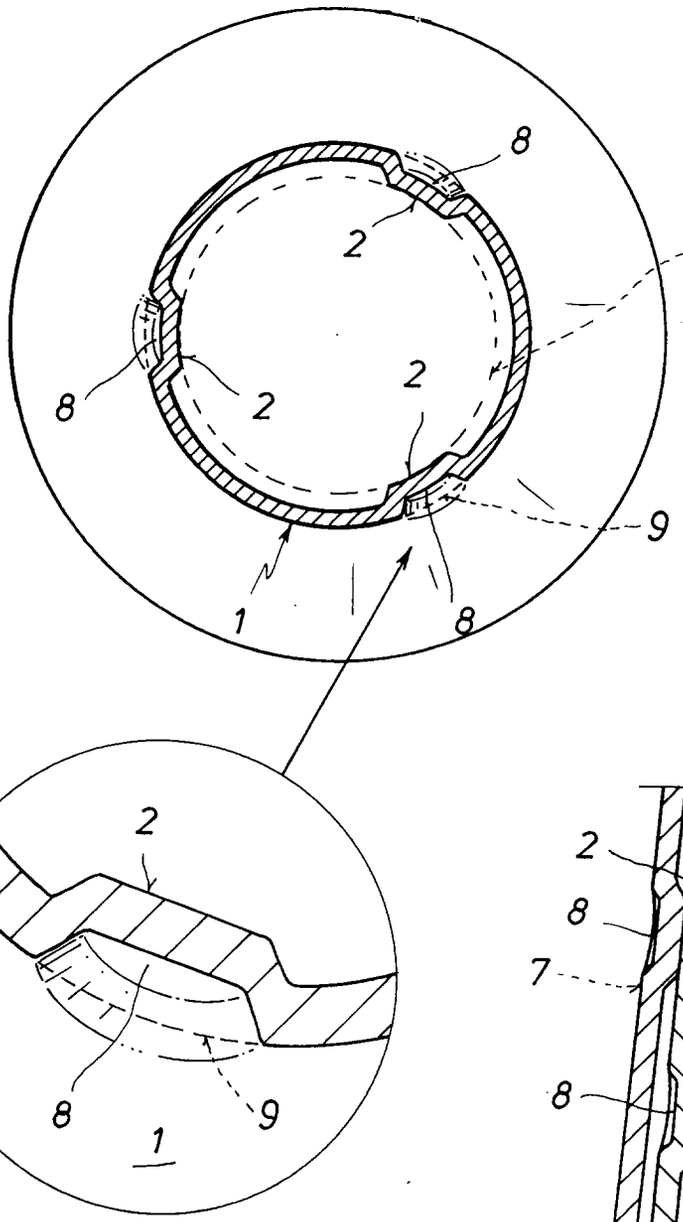


FIG. 2

FIG. 3



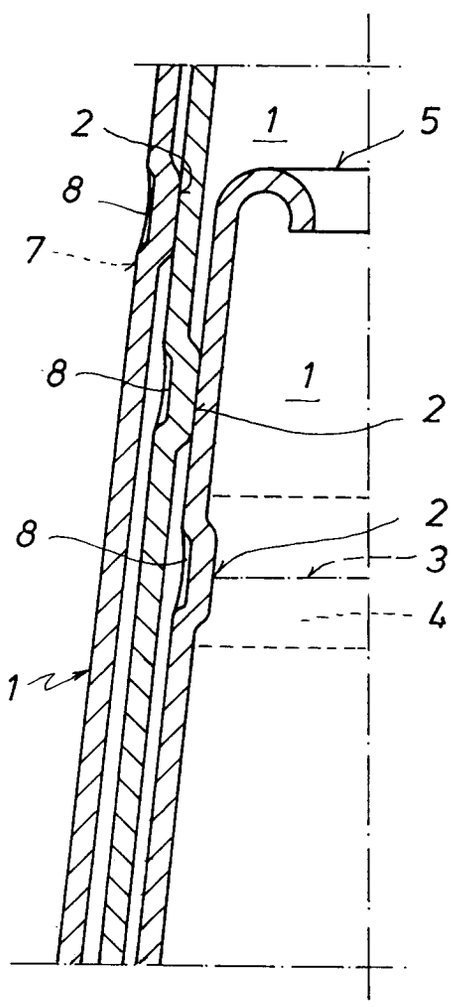


FIG. 4

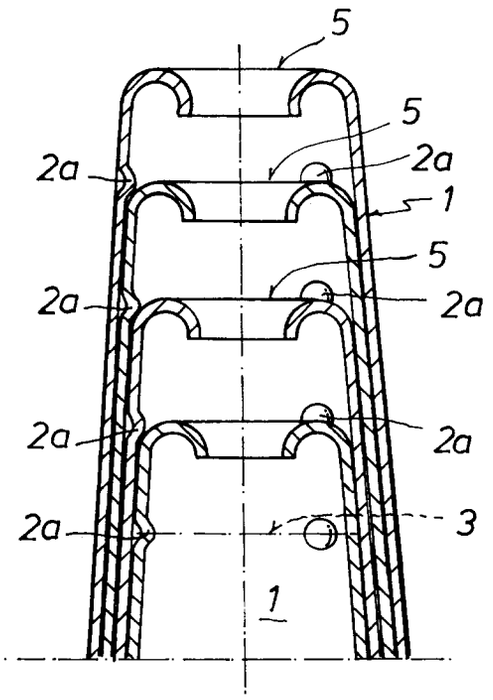


FIG. 5

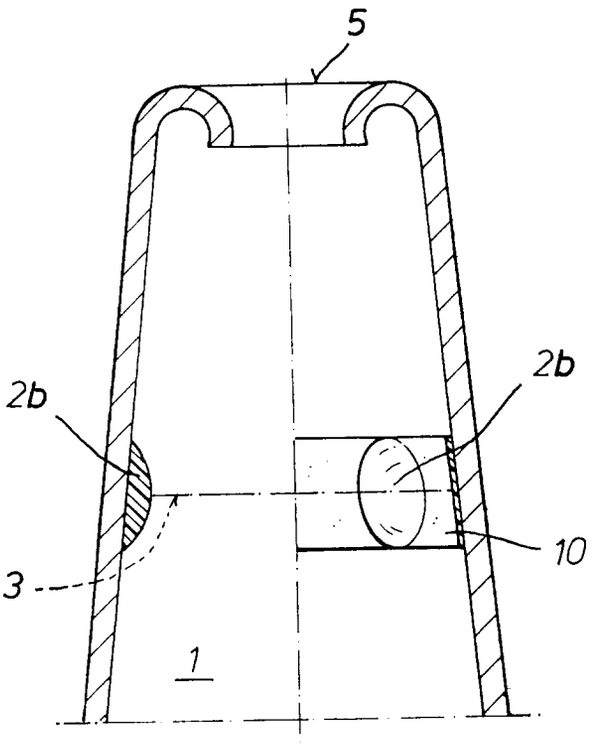


FIG. 6

FIG. 7

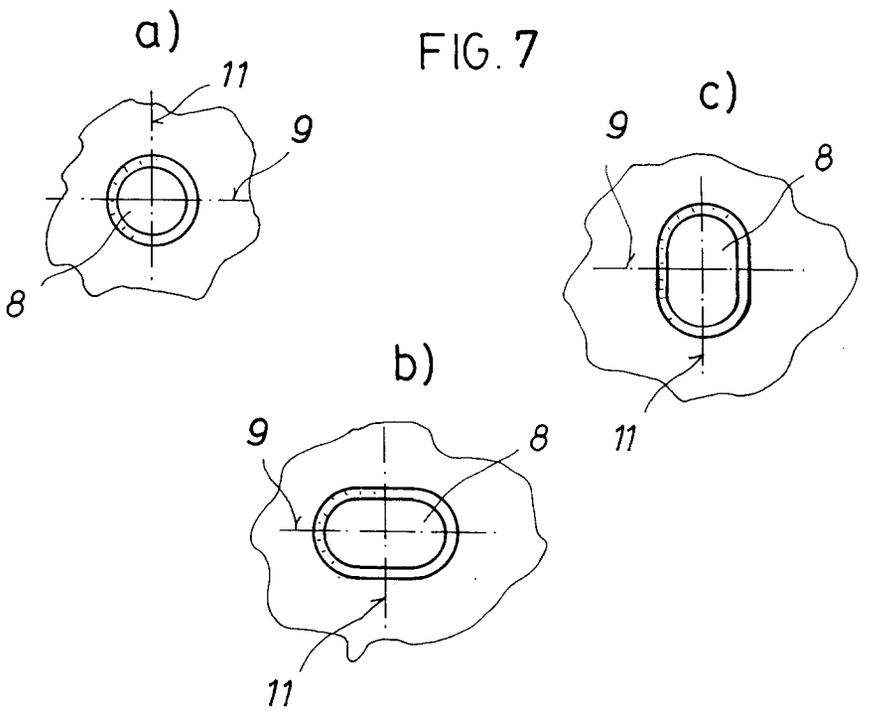
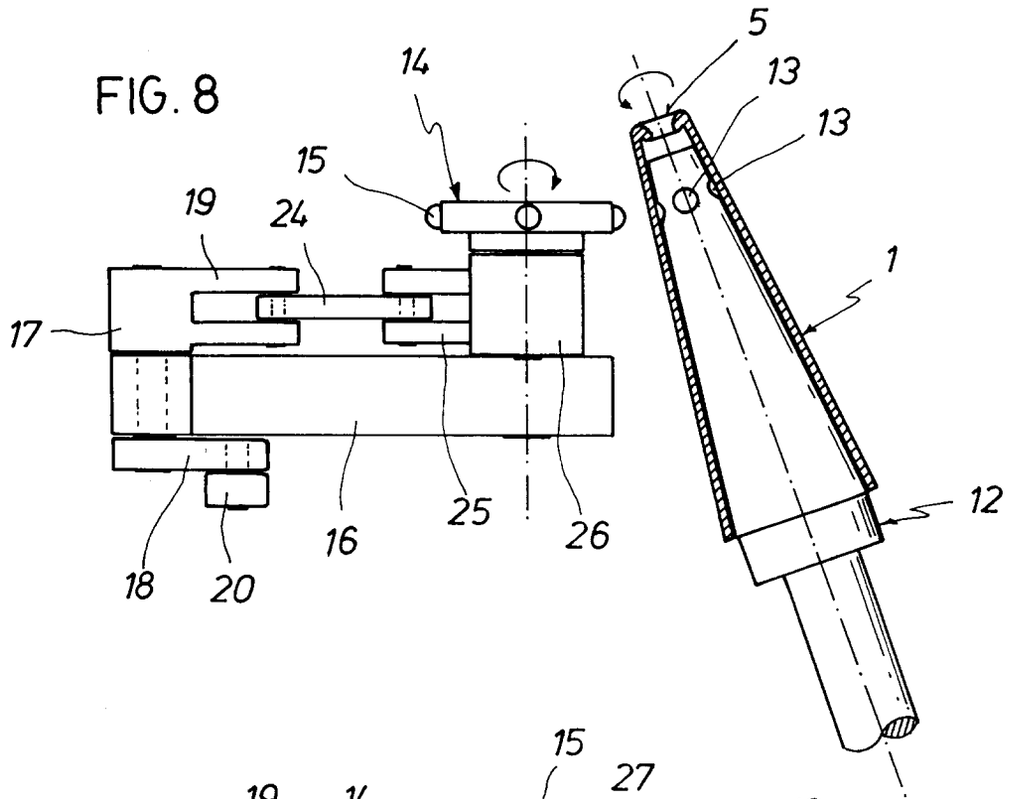


FIG. 8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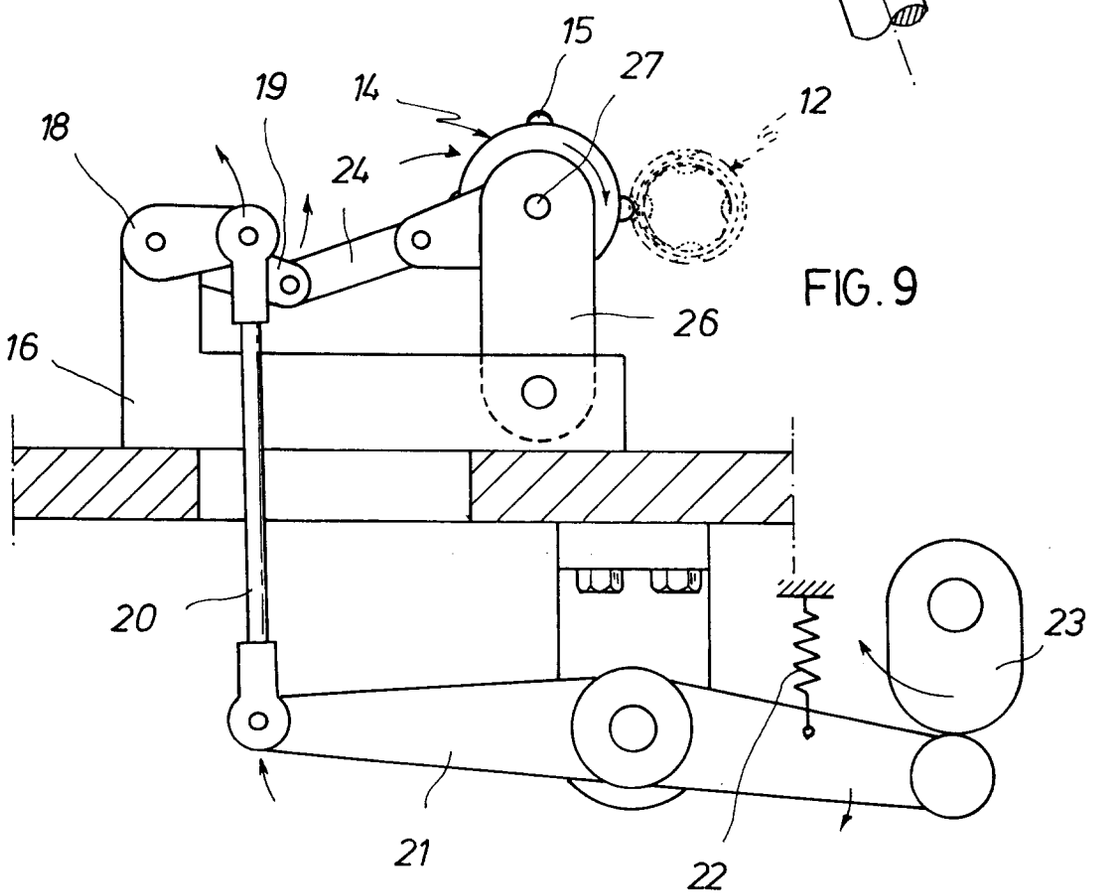
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FIG. 9