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(54) Quick fastener

(57) A fastener which is characterized in that the fastener consists of a locknut (6), a pin (2) and a spring (5); the shape of said locknut appears as a barrel with bore surface being a flight of one step, on the portion of smaller bore diameter there are at least one slot (63) extending outwards in the radial direction and axially passing through the whole portion of smaller bore diameter, and at least one positioning groove extending axially and occupying only a part length of the portion of smaller bore diameter; the width and the number of said positioning grooves (61) are equal to those of said slots (63); the said pin is a cylinder (22) at whose end there is at least one convex segment (21) extending outwards in the radial direction, the number, the position relative to each other, the width and the height of the convex segment just match the number, the position relative to each other, the width and the depth of the locknut correspondingly; said locknut (6) is coupled to said pin (2) by way of rotary and sliding housed joint, and said spring (5) is located between said lock nut and said pin.

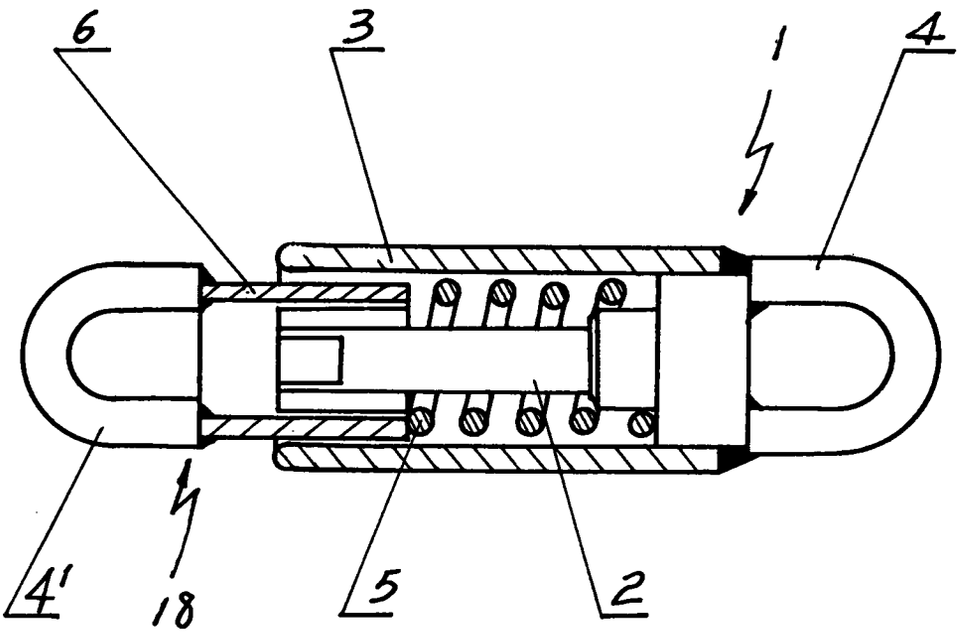

Fig 1

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Description

Background of the Invention

This invention relates to a quick fastener, particularly to a fastener suitable for joining necklace quickly.

In general, there are two types of usual fastener for necklace, e.g. the threaded fastener and the fastener using a spring button. In these prior-art fasteners, the joining strength is low, their separating and joining are inconvenient, the manufacturing technology is complicated and the cost is rather high, hence, it is unsatisfied for application.

Summary of the Invention

Accordingly, it is an object of the present invention to provide a new quick fastener for quickly separating and joining things like necklace, cord, belt and so on, which has the advantages of high joining strength, convenient and quick separation and joining, simple manufacturing technology and lower cost.

With the above-mentioned aim, the present invention provides a fastener which is characterized in that the fastener consists of a locknut, a pin and a spring; the shape of said locknut appears as a barrel with bore surface being a flight of one-step, on the portion of smaller bore diameter there are at least one slot extending outwards in the radial direction and axially passing through the whole portion of smaller bore diameter, said slot has such a depth that the radius of the bottom portion of the slot must be less than or equal to the radius of the larger bore, and at least one positioning groove extending axially and occupying only a part length of the portion of smaller bore diameter, said positioning groove has the width approximate to that of the slots, while the number of said positioning grooves is equal to that of the slots; said pin is a cylinder at whose end there is at least one convex segment extending outwards in the radial direction, the number, the position relative to each other, the width and the height of the convex segments just match the number, the position relative to each other, the width and the depth of the slots and the positioning grooves of the locknut correspondingly; said locknut is coupled to said pin by way of rotary and sliding housed joint, and said spring is located between said locknut and said pin.

The said spring can be mounted on the spring base of the locknut, and is propped with its free end against the butt end of the pin; the said spring can also be mounted on the spring base of the pin, and is propped with its free end against the butt end of the locknut.

For fastening it, aim the convex segments of the pin against the slots of the locknut at first, then insert the pin into the locknut while the spring located on the spring base is being pressed, finally, after the convex segments have passed through the slots, rotate the pin and the locknut relatively to each other until the convex segments are aimed at the positioning grooves. Under the action of recovery force of spring, the convex segments are inserted into the positioning grooves and pressed onto their bottom, hence a joining is performed. Just performing the above mentioned operations in opposite sequence, the joining can be separated.

Therefore, the fastener in accordance with the present invention can be either joined or separated conveniently, its joining strength is high, its manufacturing technology is simple and its cost is low. The fastener can be made from metal or polymeric material by one of the following processing methods, such as injection molding, die casting, machining and impact forming.

Brief description of the Drawings

The invention on the fastener will now be described in detail by means of embodiments with reference to the accompanying diagrammatical drawings, where

Fig. 1 is an assembly view of the first embodiment of the fastener in accordance with the invention;

Fig. 2 is a front view of the pin of the fastener illustrated in Fig. 1;

Fig. 3 is a side view of Fig. 2;

Fig. 4 is a half sectional view of the pin sleeve of the fastener illustrated in Fig. 1;

Fig. 5 is a side view of Fig. 4;

Fig. 6 and Fig. 7 show correspondingly a front and a side views of an auxiliary part of the fastener illustrated in Fig. 1;

Fig. 8 and Fig. 9 show correspondingly a front and a side views of another auxiliary part of the fastener illustrated in Fig.1 and are similar to Fig. 6 and fig. 7;

Fig. 10 is a front view of the locknut of the fastener illustrated in Fig. 1;

Fig.11 is a side view of Fig. 10;

Fig. 12 is an assembly view of the second embodiment of the fastener in accordance with the invention;

Fig. 13 shows an assembly view similar to Fig. 12, where the shoelaces have been fixed, and is in a reduced scale;

Fig. 14 and Fig. 15 are respectively a front view and a side view of the pin of the fastener illustrated in Fig. 12;

Fig. 16 and Fig. 17 are respectively a front view and a side view of the locknut of the fastener illustrated in Fig. 12;

Fig. 18 and Fig. 19 are respectively a front view and a side view of the auxiliary part of the fastener illustrated in Fig. 12;

Fig. 20 is an assembly view of the third embodiment of the fastener in accordance with the invention;

Fig. 21 is an assembly view of the fourth embodiment of the fastener in accordance with the invention;

Fig. 22 is a sectional view of Fig. 21 along the line A-A, where the pin 16 has been dismounted;

Fig. 23 is an assembly view of the fifth embodiment of the fastener in the joined state according to the invention, the fastener is used to join two matters such as two plates propped against each other;

Figs. 24 and 25 are respectively a right side view and a left side view of Fig. 23;

Figs. 26 and 27 are respectively a sectional view and a side view of the locknut of the fastener illustrated in Fig. 23;

Figs. 28 and 29 are respectively a front view and a side view of the pin of the fastener illustrated in Fig. 23;

Figs. 30 and 31 are respectively a sectional view and a side view of the ring gasket of the fastener illustrated in Fig. 23.

Description of the Preferred Embodiments

The first embodiment of the fastener in accordance with the invention is shown from Fig. 1 to Fig. 11, where Fig. 1 shows an assembly view of the fastener and indicates the fastener in a joined state. The fastener includes a locknut set 18, a pin set 1 and a spring 5. Said locknut set 18 consists of a locknut 6 (Figs. 10 and 11) and an auxiliary part 4' (Figs. 6 and 7) secured to the end of the locknut 6. The shape of said locknut 6 appears as a barrel with its bore surface being a flight of one step. On the bore surface of the portion of smaller bore diameter there are at least two slots 63 oppositely positioned in the radial direction. The depths of these two said slots 63 are radially extending outwards and their longitudinal lengths axially pass through the portion of smaller bore diameter. Besides, on the bore surface of the portion of smaller bore diameter, there are two positioning grooves 61 too, making an angle of 90° with said slots 63 along the periphery. The longitudinal lengths of these positioning grooves 61 occupy only a part length of the portion of smaller bore diameter and their widths are preferably equal to those of the slots 63. The auxiliary part 4' is welded on the end with larger bore diameter of the locknut 6. The said pin set 1 includes a pin 2 (Figs. 2 and 3), a pin sleeve 3 (Fig. 4 and 5) and an auxiliary part 4 (Figs. 8 and 9). The shape of said pin 2 is just a cylinder with a flight of two steps, in which the maximum diameter, i.e. the outer diameter of the auxiliary base 24 matches the inner diameter of the pin sleeve 3, the medium diameter, i.e. the outer diameter of the spring base 23 matches the inner diameter of the spring 5, and the minimum diameter of the portion 22 matches the inner diameter of the smaller bore 62 on the locknut 6. At the end of the portion 22 of minimum diameter there are two convex segments 21 oppositely positioned in the radial direction and radially extended outwards. Both the widths and the heights of these convex segments 21 match the corresponding ones of the positioning grooves 61 of the locknut 6. Inside the pin sleeve 3 is located the pin 2, whose auxiliary base 24 is welded onto the end of the pin sleeve 3. The spring 5 is mounted on the spring base 23 of the pin 2, pressing onto the butt end 66 of the locknut 6 with its free end. The auxiliary part 4 is welded onto the butt end of the auxiliary base 24.

During application, insert the locknut set 18 into the pin set 1 through the opening end of the pin sleeve 3. In this course, the convex segments 21 of the pin 2 are sliding along the slots 63 of the locknut 6 while the spring is being pressed. After the convex segments 21 have passed through the slots 63, rotate locknut set 18 to aim the grooves 61 of the locknut 6 at the convex segments 21. Under the action of the recovery force of the spring 5, the butt end 25 of the convex segment 21 presses on the bottom 65 of the positioning groove 61, the joining is then performed. Just performing the above mentioned operations in opposite sequence, the joining can be separated easily.

All parts of the present embodiment can be produced without any difficulties from metal or polymeric material by one of the following processing methods, such as injection molding, die casting, machining and impact forming.

The second embodiment of the fastener in accordance with the invention is illustrated in the Figs. from 12 to 19. The locknut and the pin in the present embodiment are the same as in the first embodiment, the main differences lie in that the spring 5 is located inside the portion of larger bore diameter of the locknut 8, and is pressed onto the butt end of the pin 7 with its free end, meanwhile, the pin 7 possesses an integral structure having a rod-shaped auxiliary part 72 with a flange71 (Figs. 14 and 15), and the auxiliary part 9 also possesses a spring base 91 with an auxiliary base 94, a rod-shaped part 92 and a flange 93 (Figs. 18 and 19). The auxiliary base 94 of the auxiliary part 9 is welded to the locknut 8 at the end of the portion of larger bore diameter. This embodiment can be used, such as for shoelaces, in this case, the only thing needed is to join the shoelaces 11 to auxiliary parts by coverings 10.

The third embodiment of the fastener in accordance with the invention is illustrated in Fig. 20. This embodiment is basically the same as the first embodiment, the only difference lies in that the pin 12 is an integral struc-

ture having a pin sleeve and a auxiliary part, moreover, the auxiliary part 14 is a ring hooked to the lock nut 13.

The fourth embodiment of the fastener in accordance with the invention is illustrated in Figs. 21 and 22. This embodiment is basically the same as the second embodiment, the only difference lies in that the locknut 19 possessing the slots and the positioning grooves is at first fabricated independently, and then fixed to the core of the barrel 20 with larger bore diameter by using the screws 17.

The fifth embodiment of the fastener in accordance with the invention is illustrated in Fig. 23, its difference lies in that said fastener can be used to join two parts 102, 102' propped against each other. Said joined parts 102,102' possess the through hole 103. One end of the pin 2 is shaped like a head of an usual bolt (Figs. 28 and 29); the locknut 6 (Figs. 26 and 27) has only one smaller bore diameter; there are two concave notches 104 positioned oppositely in the radial direction of the inner hole of the ring gasket 101, these concave notches allow the convex segments of the pin 2 to be passed through. During joining, at first mount the spring 5 on the pin between the ring gasket 101 and the end of the pin 2, which is shaped like a head of an usual bolt, then pass the pin 2 through the through hole 103 of the joined parts 102, 102', fix the locknut 6 on the end possessing the convex segments of the pin 2.

Obviously, in the present embodiment, if the inner diameter of the spring 5 is larger than that of the through hole 103, the ring gasket 101 can be omitted; or alternatively, if in the inner surface of the through hole 103 the axial slots are shaped to position oppositely in the radial direction, and to extend axially through the through hole 103 and outwards radially, the ring gasket can also be omitted.

Claims

1. a fastener which is characterized in that the fastener consists of a locknut, a pin and a spring; the shape of said locknut appears as a barrel with bore surface being a flight of one step, on the portion of smaller bore diameter there are at least one slot extending outwards in the radial direction and axially passing through the whole portion of smaller bore diameter, said slot has such a depth that the radius of the bottom position of the slot must be less than or equal to the radius of the larger bore, and at least one positioning groove extending axially and occupying only a part length of th portion of smaller bore diameter, the positioning grooves have the width approximate to that of the slots, while the number of said positioning grooves is equal to that of the slots; said pin is a cylinder at whose end there is at least one convex segment extending outwards in the radial direction, the number, the position relative to each other, the width and the height of the convex segment just match the number, the position relative to each other, the width and the depth of the slots and the positioning grooves on the locknut correspondingly; said locknut is coupled to said pin by way of a rotary and sliding housed joint and said spring is located between said locknut and said pin.

2. A fastener as claimed in claim 1, which is characterized in that said spring can be mounted on the spring base of the pin and is propped with its free end against the butt and of the locknut;

3. A fastener as claimed in claim 1, which is characterized in that said spring can be mounted on the spring base of the locknut and is propped with its free end against the butt end of the pin.

4. A fastener as claimed in claim 1, which is characterized in that said locknut can have only one portion of said smaller bore diameter, said pin is a cylinder at whose end there are the convex segments extending outwards in the radial direction, said spring is jacketed on the pin, the joined matters are clamped between the locknut through which the pin is passed and the other end of the pin.

5. A fastener as claimed in claim 4, which is characterized in that said locknut can be integrated with one from the joined matters.

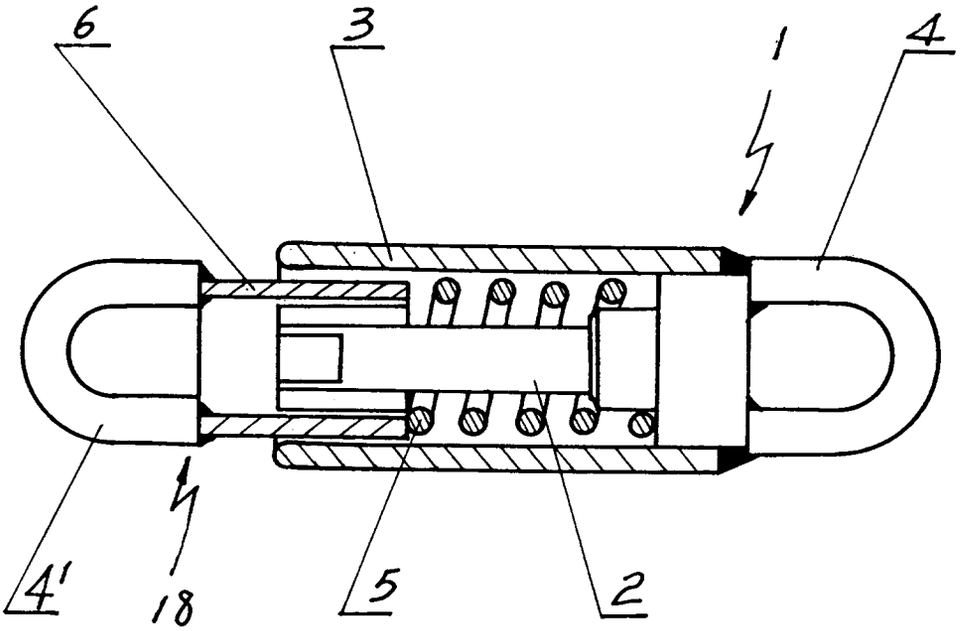


Fig 1

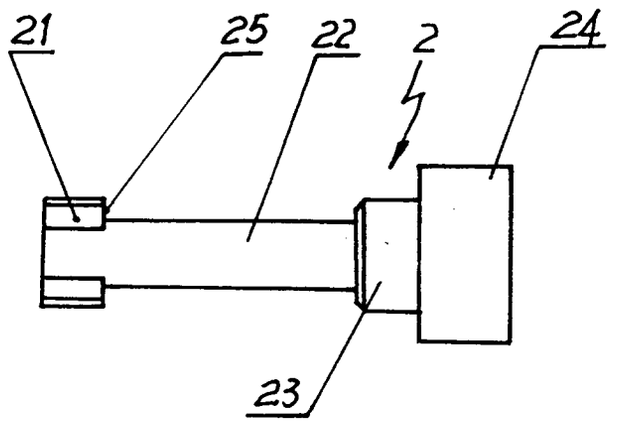


Fig 2

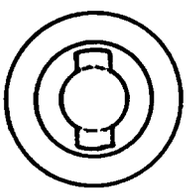


Fig 3

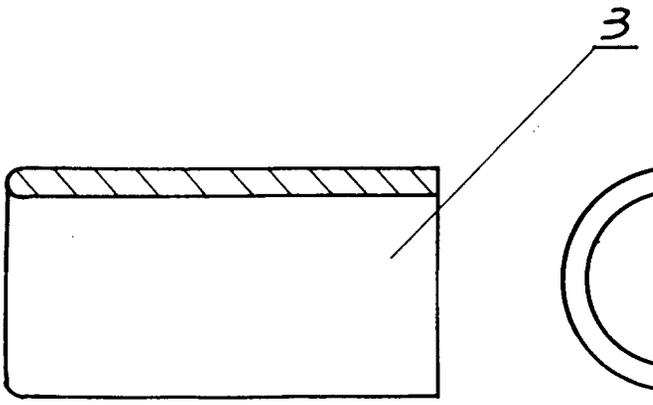


Fig 4

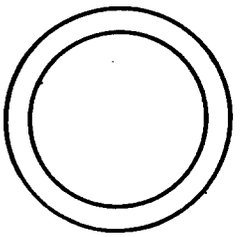


Fig 5

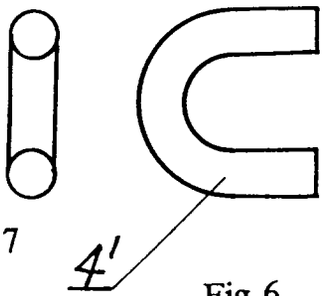


Fig 6

Fig 7

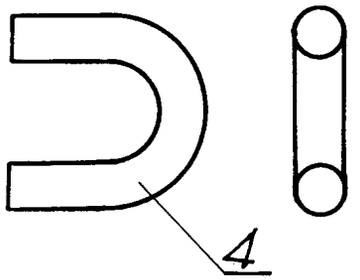


Fig 8

Fig 9

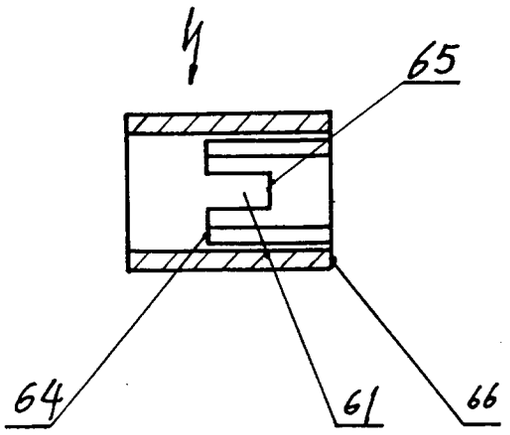


Fig 10

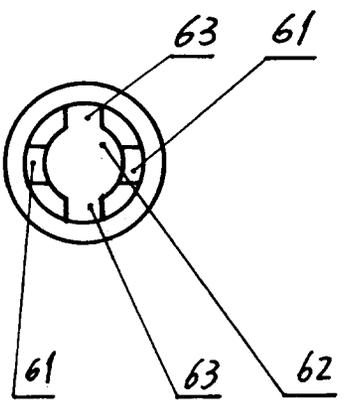


Fig 11

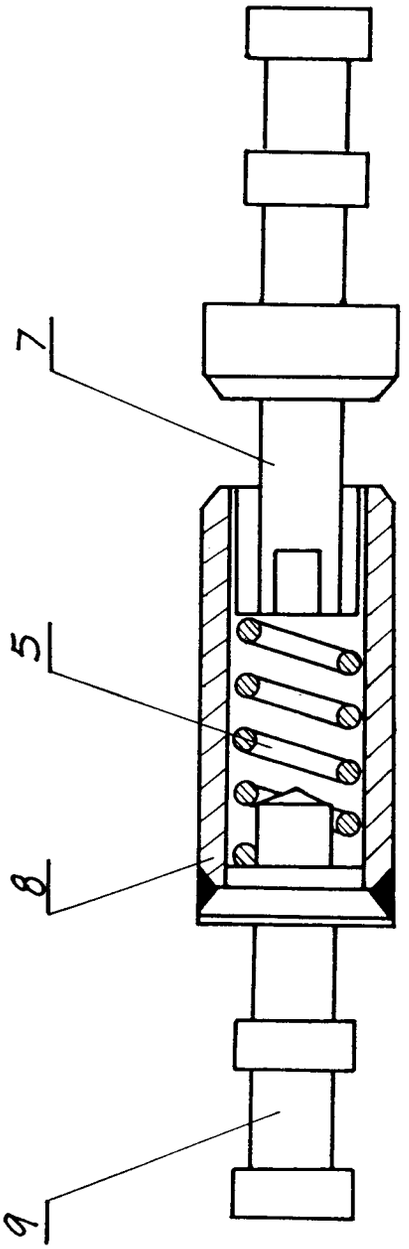


Fig 12

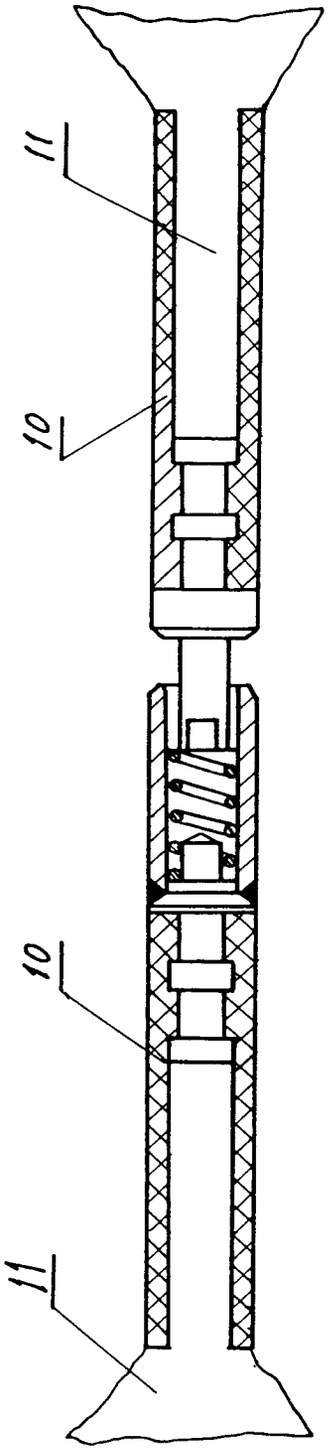


Fig 13

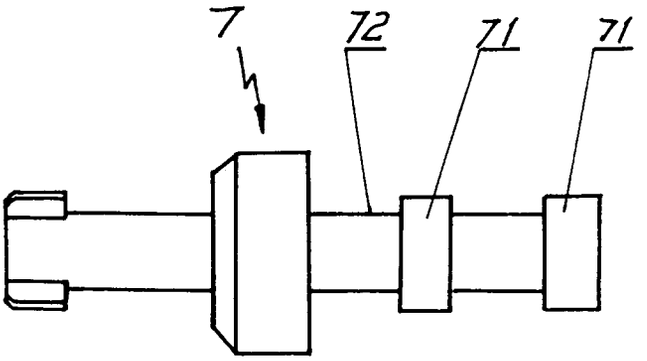


Fig 14

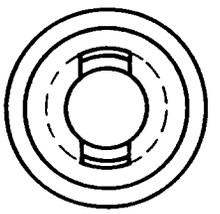


Fig 15

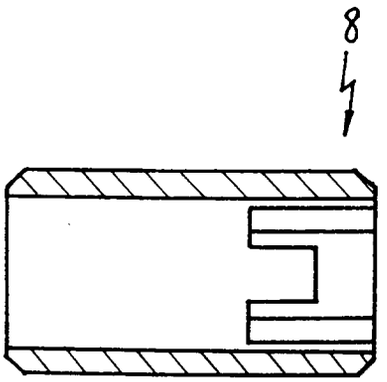


Fig 16

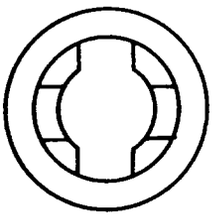


Fig 17

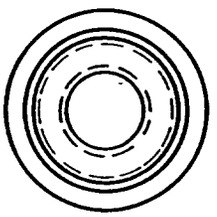


Fig 19

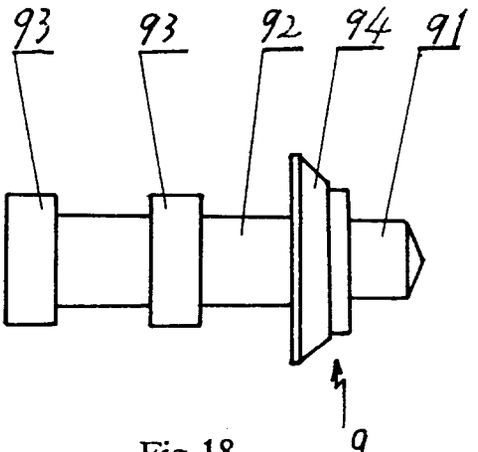


Fig 18

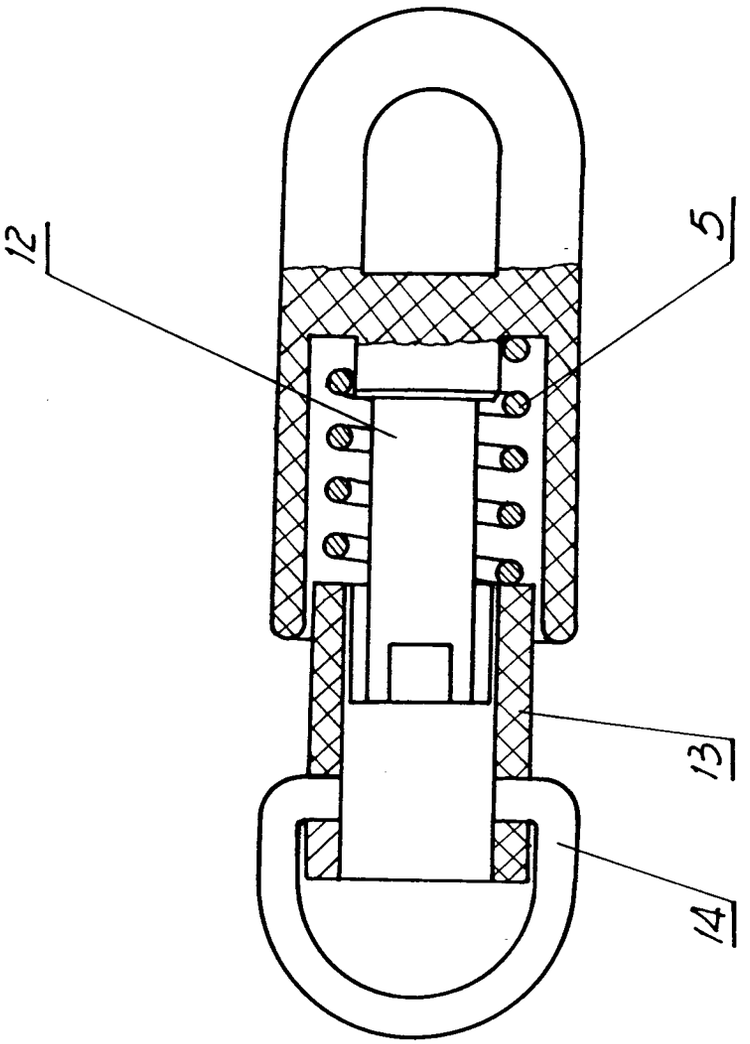


Fig 20

Fig 21

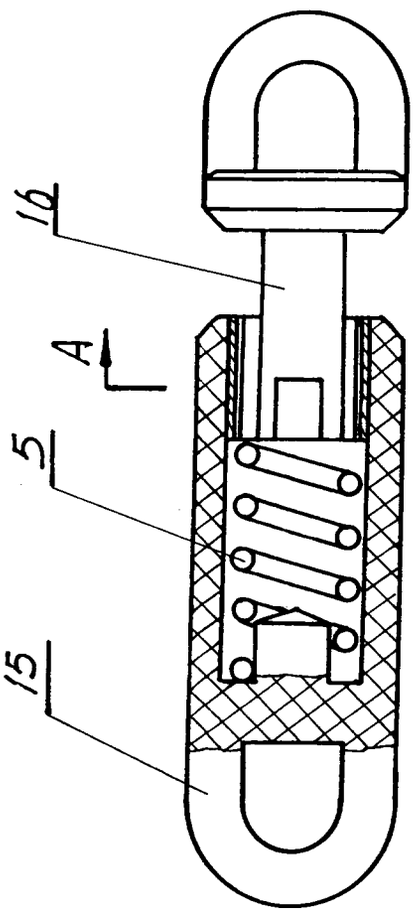
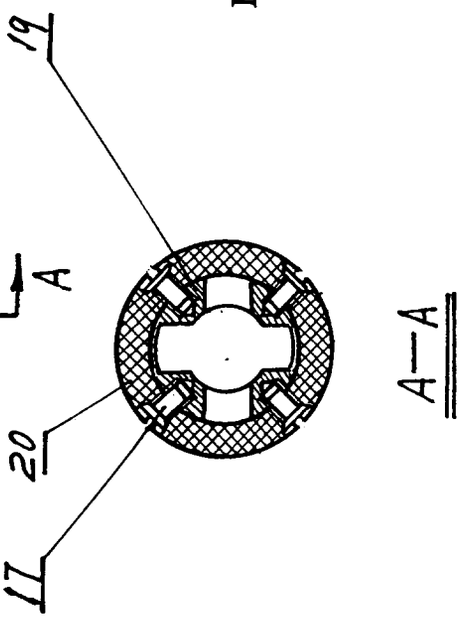


Fig 22



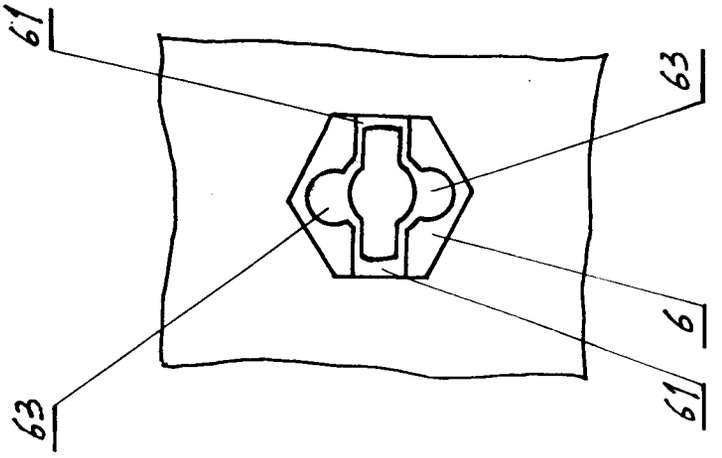


Fig 25

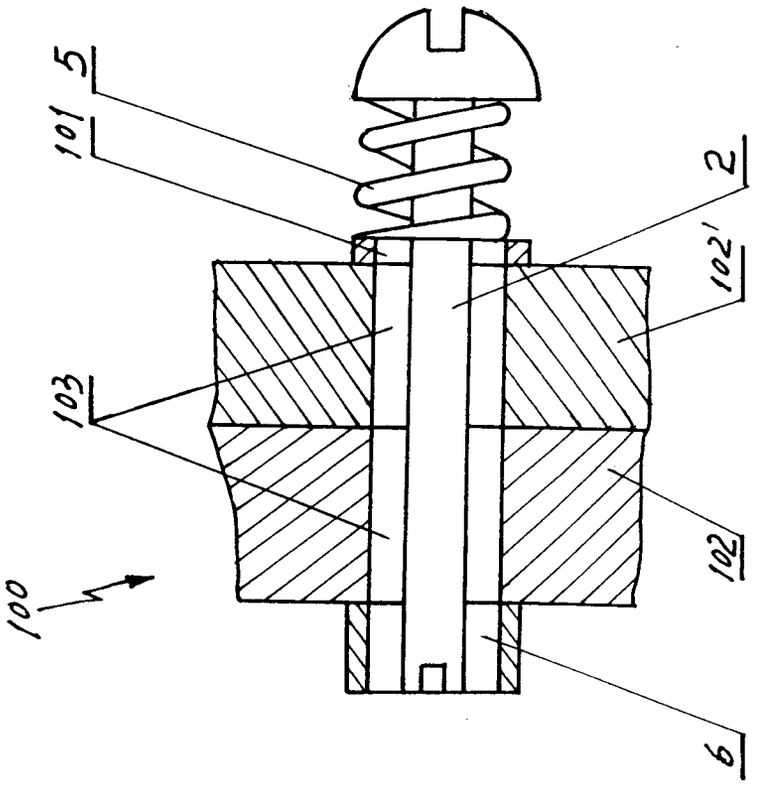


Fig 23

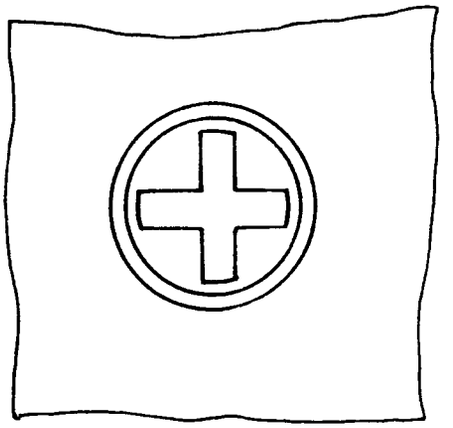


Fig 24

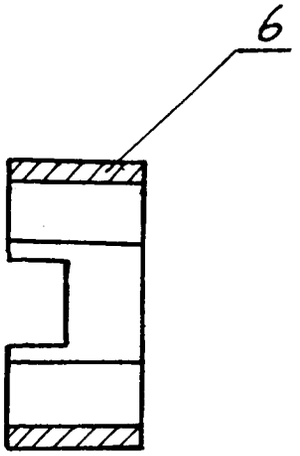


Fig 26

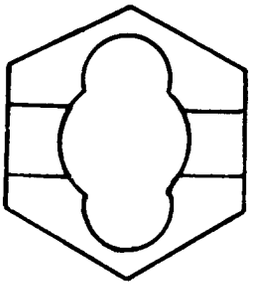


Fig 27

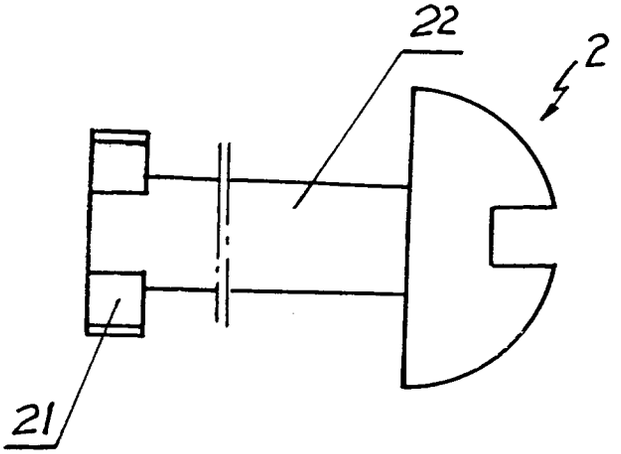


Fig 28

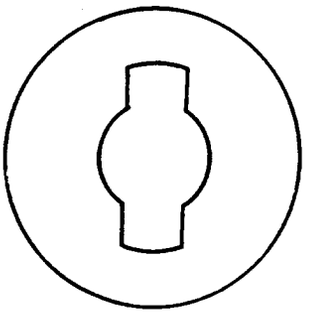


Fig 29

Fig 30

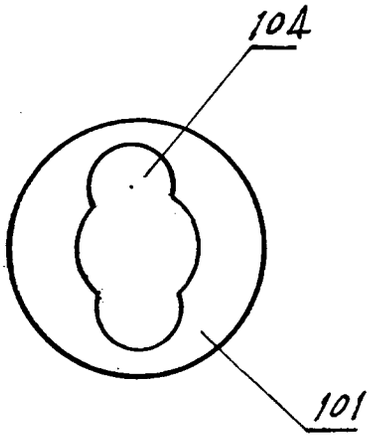


Fig 31

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 11 3248

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.6)
A	US-A-3 286 316 (A. MAROSY) * column 2, line 31 - column 4, line 49; figures 1-9 *	1,3	A44C5/20
A	FR-A-505 837 (F. ZURBUCHEN) * the whole document *	1,3	
A	FR-A-696 020 (J. H. LENFANT) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A44C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 December 1995	Garnier, F

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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P : intermediate document

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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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