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(11) **EP 1 447 175 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.08.2004 Bulletin 2004/34

(51) Int Cl.7: **B25B 11/00**

(21) Application number: **03002995.3**

(22) Date of filing: **11.02.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT SE SI SK TR**
Designated Extension States:
AL LT LV MK RO

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(54) **Portable suction device**

(57) A suction device includes a handle (11) and an operation lever (30) which has a cam end (32) pivotally connected to the handle. A suction disk (20) has a shaft (21) which movably extends through the underside of the handle and is pivotally connected to the cam end.

A release device (40) is connected to a side of the handle and removably engaged with a hole in a side of the operation lever and the handle. The release device can be easily operated by the thumb of the user to disengage the shaft from the operation lever, and the suction disk is pushed back by a spring (22) mounted to the shaft.

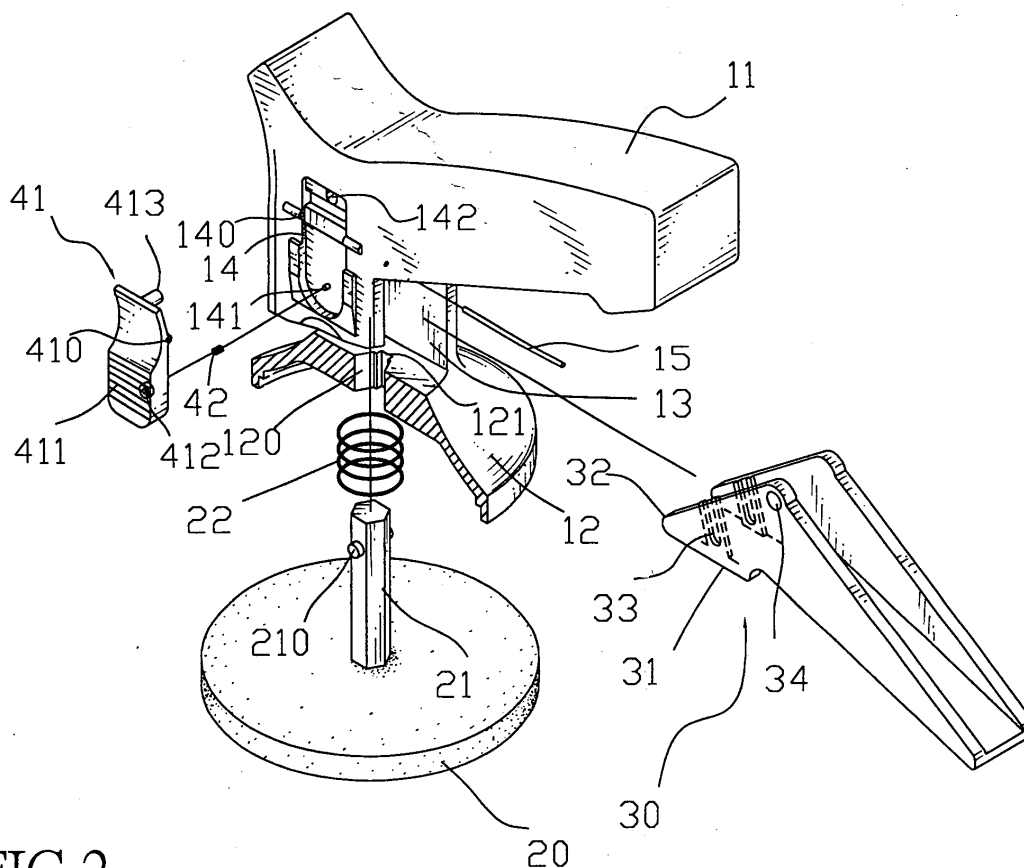


FIG.2

EP 1 447 175 A1

Description

[0001] The present utility model relates to a portable suction device wherein the user releases the suction disk by only a thumb.

[0002] A conventional suction device for sucking a piece of object such as a tile generally includes a suction disk and a handle connected to the suction disk. The user holds the handle and operates the suction disk to suck a piece of tile. The shortcoming of the conventional suction device is that the user has to use the other hand to release the suction disk from the tile after the tile is positioned, and usually, the user holds a tool by said the other hand.

[0003] The present utility model relates to a suction device which comprises a handle having a neck portion and an operation lever having a cam end is pivotably engaged with an opening of the neck portion. A suction disk has a shaft which is movably engaged with a passage of the neck portion and a spring is mounted to the shaft and biased between the top surface of the suction disk and an underside of the neck portion. The shaft is pivotably connected to the cam end of the operation lever and a hole is defined in a side of the operation lever. A release device is engaged with neck portion and has an insertion which extends through the neck portion and the lever. The insertion is removably engaged with the hole of the operation lever.

[0004] The present utility model will become more obvious from the following description when taken in connection with the accompanying drawings.

IN THE DRAWINGS

[0005]

Fig. 1 is a perspective view to show the suction device of the present utility model;

Fig. 2 is an exploded view to show the suction device of the present utility model;

Fig. 3 is a cross sectional view to show the suction device of the present utility model;

Fig. 4 shows that the operation lever of the suction device of the present utility model is pulled to suck the tile;

Fig. 5 shows the insertion of the release device is engaged with the hole of the operation lever;

Fig. 6 shows the insertion of the release device is disengaged from the hole of the operation lever, and

Fig. 7 shows another embodiment of the release device.

[0006] Referring to Figs. 1 to 3, the suction device of the present utility model comprises a handle 10 having a neck portion extending from an underside thereof and the neck portion has an opening 13. A passage 120 is defined through an underside of the neck portion and communicates with the opening 13. A skirt 12 is con-

nected to the neck portion. A recess 14 is defined in an outside wall of the handle 10 and an aperture 142 is defined through an inside of the recess 14. The aperture 142 communicates with the opening 13.

[0007] A suction disk 20 has a shaft 21 extending from a top surface thereof and the shaft 21 is movably engaged with the passage 120. A spring 22 is mounted to the shaft 21 and biased between the top surface of the suction disk 20 and an underside of the neck portion. Two bosses 210 extend from the shaft 21. The skirt portion 12 contacts the top surface of the suction disk 20.

[0008] An operation lever 30 has a cam end 32 which is pivotably received in the opening 13 and includes two walls and a groove 33 is defined in an inside of each of the two walls of the cam end 32. A hole 34 is defined in a side of the operation lever 30. The two bosses 210 of the shaft 21 are movably received in the two grooves 33. The cam end 32 has an open top and the two grooves 33 communicate with the open top so that the operation lever 30 is easily to be connected with the two bosses 210 by inserting the bosses 210 in the grooves 33 via the open top. The spring 22 ensures the bosses 210 are located at the end of the two grooves 33. The cam end 32 of the operation lever 30 has a flat underside 31 which is matched with a top surface of the skirt 12.

[0009] A release device 41 is pivotably engaged with the recess 14 by a pin 15 extending through the holes 140 defined in the side of the handle 10 and a hole 410 defined in the release device 41. A spring 42 has one end received in a recess 412 in the release device 41 and the other end of the spring 42 is received in the recess 141 in the inside of the recess 14. Therefore, the spring 42 is biased between the release device 41 and the inside of the recess 14. A knurl portion 411 is defined in an outside of the release device 41 for convenience of pressing by a thumb of the user. Further referring to Fig. 5, an insertion 413 extends from the release device 41 and extends through the aperture 142. The insertion 413 is removably engaged with the hole 34 of the operation lever 30. The insertion 413 has a rounded tip.

[0010] Referring to Fig. 4, the suction disk 20 is placed on a tile and the operation lever 30 is then pulled, the operation lever 30 is pivoted about the front edge of the cam end 32 and the shaft 21 is lifted and the suction disk 20 sucks on the tile as shown. The periphery of the hole 34 in the operation lever 30 moves over the rounded tip of the insertion 413 which is then engaged with the hole 34 as shown in Fig. 5. After the tile is positioned, the release device 41 is pressed by the thumb of the user as shown in Fig. 6, and the insertion 413 is removed from the hole 34, the operation lever 30 is released by the user and the suction disk 20 is pushed back by the spring 22.

[0011] Referring to Fig. 7, the release device 41 may also be made to be a simple button 43 which is movably inserted through the hole 34 in the lever 30 and a hole 15 defined through the neck portion of the handle 10. The button 43 has a recess defined in an inside thereof

and a spring 44 is biased in the recess and the inside of the lever 30. The button 43 can be pushed inward to disengage from the hole 15 so as to allow the lever 30 to be pivoted.

Claims

1. A suction device comprising:

a handle having a neck portion extending from an underside thereof and the neck portion having an opening, a passage defined through an underside of the neck portion and communicating with the opening;

a suction disk having a shaft extending from a top surface thereof and the shaft movably engaged with the passage, a spring mounted to the shaft and biased between the top surface of the suction disk and an underside of the neck portion;

an operation lever having a cam end pivotably received in the opening and the shaft pivotably connected to the cam end of the operation lever, a hole defined in a side of the operation lever, and

a release device movably engaged with the neck portion and the operation lever, a spring biased between the release device and the inside of the recess.

2. The device as claimed in claim 1, wherein a recess is defined in a wall of the neck portion of the handle and an aperture is defined through an inside of the recess, the aperture communicating with the opening, the release device pivotably engaged with the recess and an insertion extending from the release device and extending through the aperture, the insertion removably engaged with the hole of the operation lever.

3. The device as claimed in claim 1, wherein the cam end of the operation lever includes two walls and a groove is defined in an inside of each of the two walls of the cam end, the shaft having two bosses which are movably received in the two grooves.

4. The device as claimed in claim 3, wherein the cam end has an open top and the two grooves communicate with the open top.

5. The device as claimed in claim 2, wherein the insertion has a rounded tip.

6. The device as claimed in claim 1, wherein a skirt portion connected to the neck portion and contacts the top surface of the suction disk.

7. The device as claimed in claim 6, wherein the cam end of the operation lever has a flat underside which is matched with a top surface of a skirt portion of the suction disk.

8. The device as claimed in claim 2, wherein a hole is defined through a wall of the neck portion of the handle and communicates with the opening, a release device movably received in the hole in the handle and the hole defined in the side of the operation lever, a spring biased between the release device and the inside of the lever.

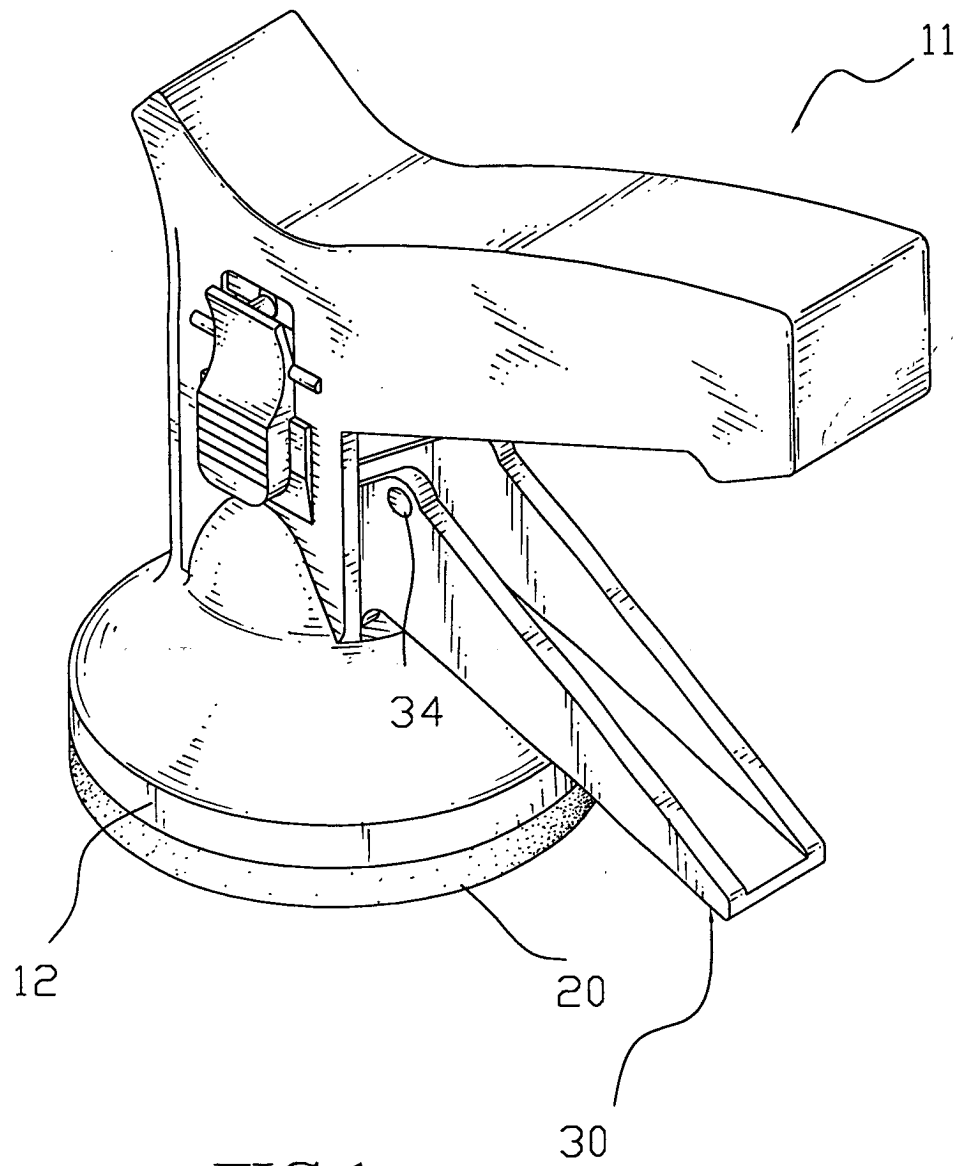
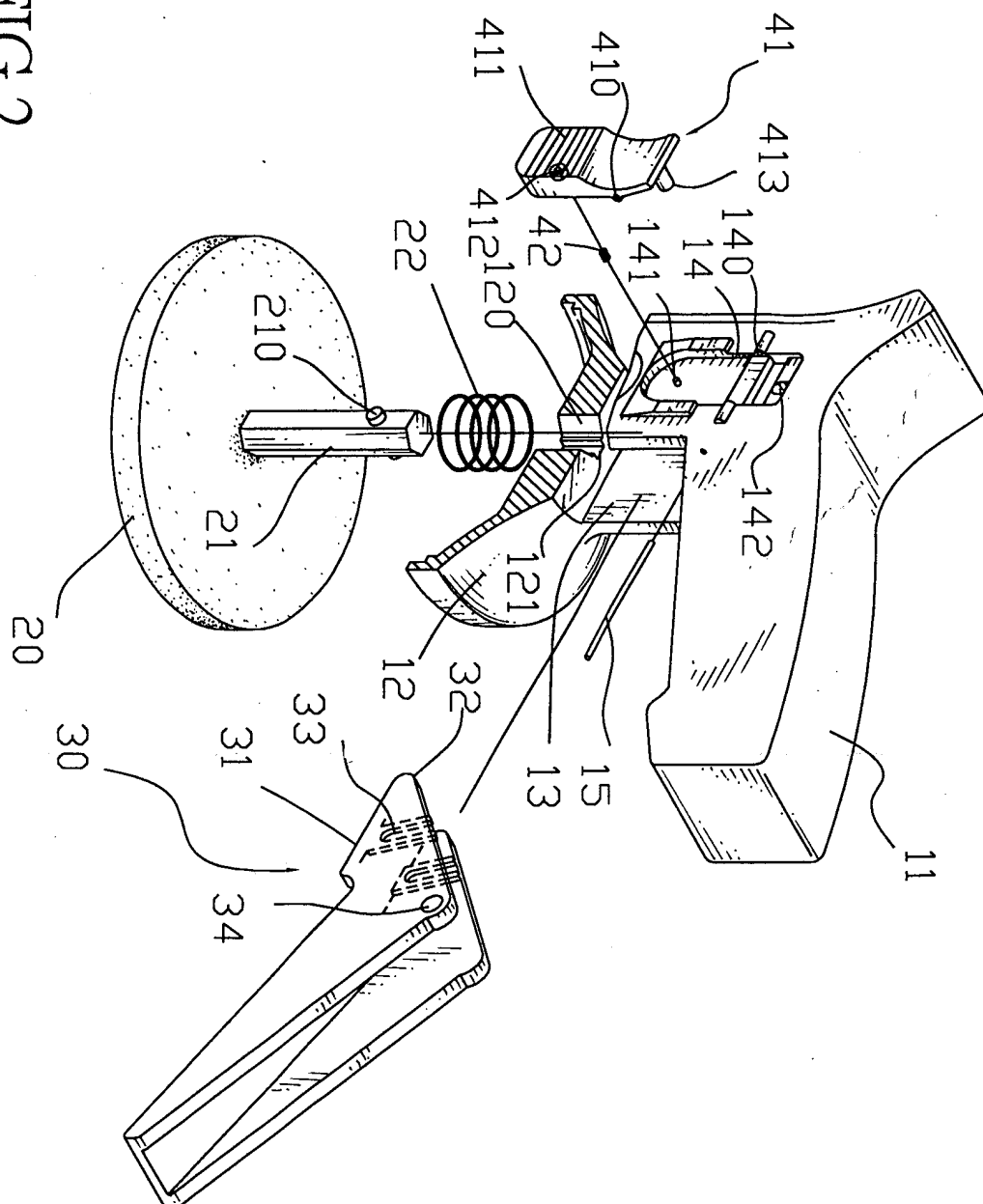


FIG.1

FIG.2



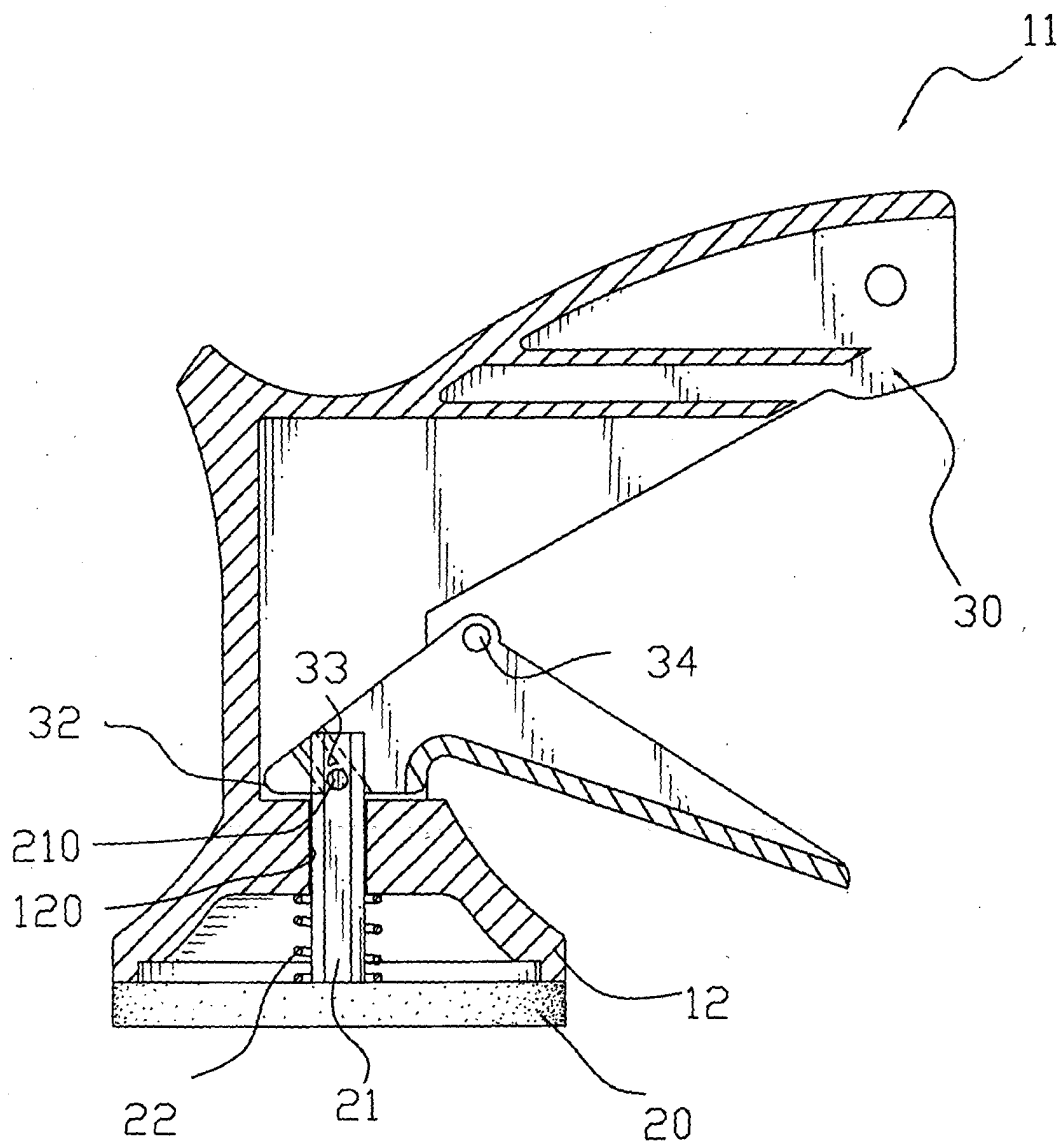


FIG.3

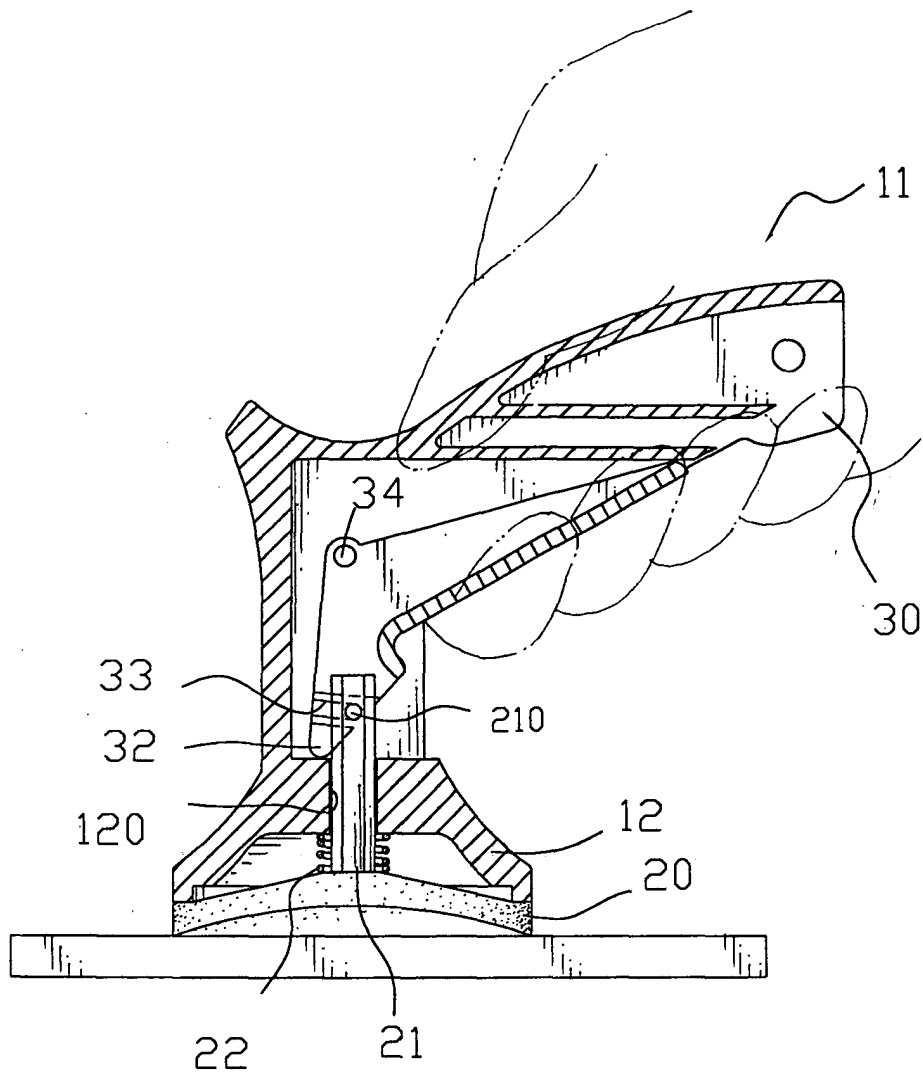


FIG.4

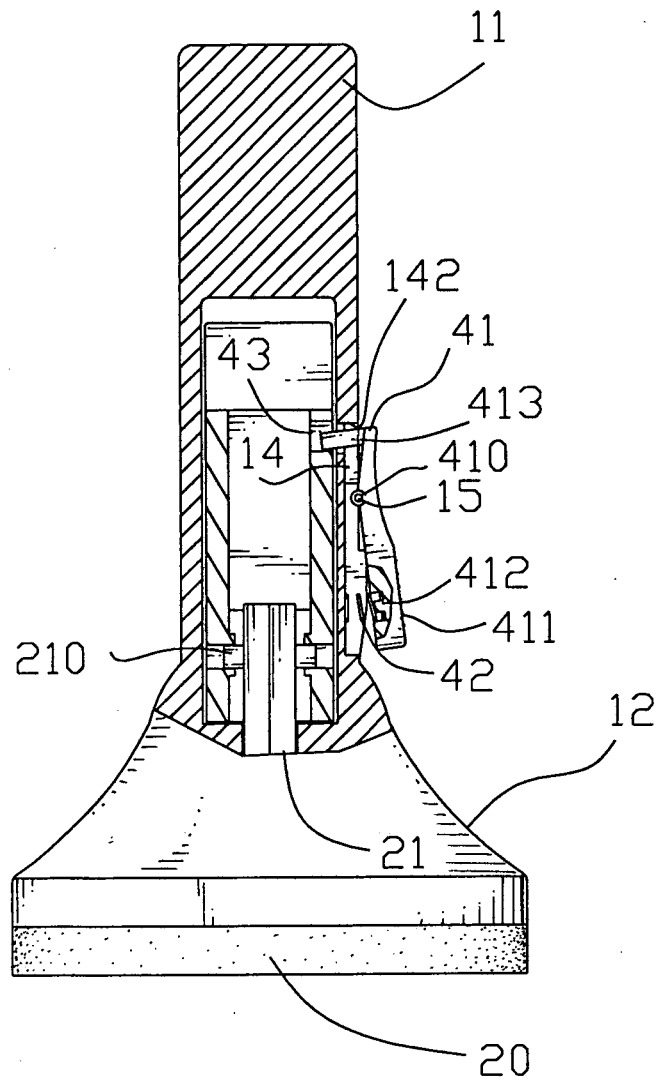


FIG.5

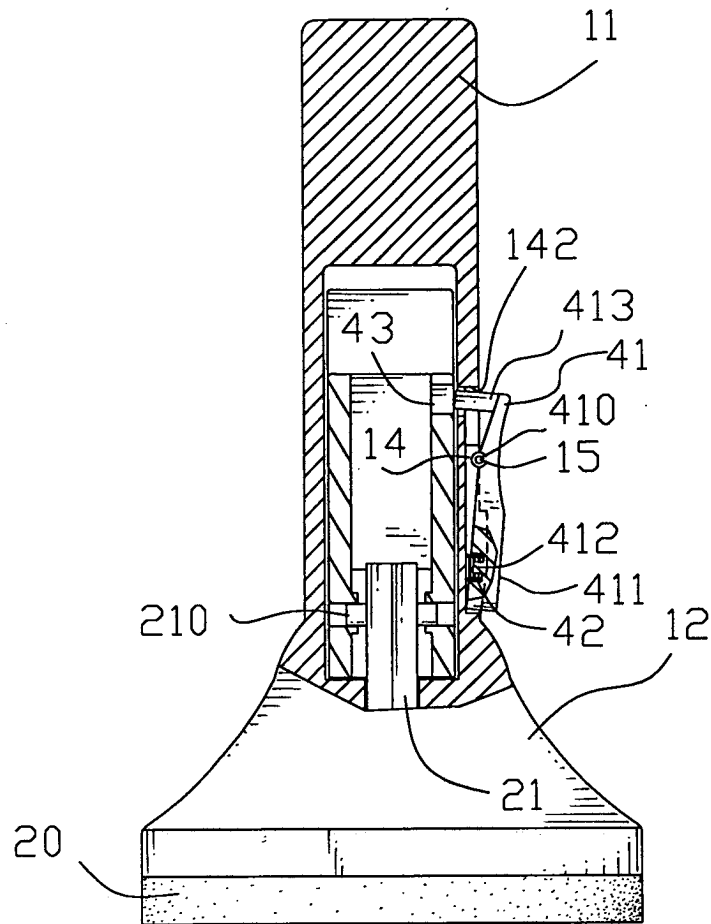


FIG.6

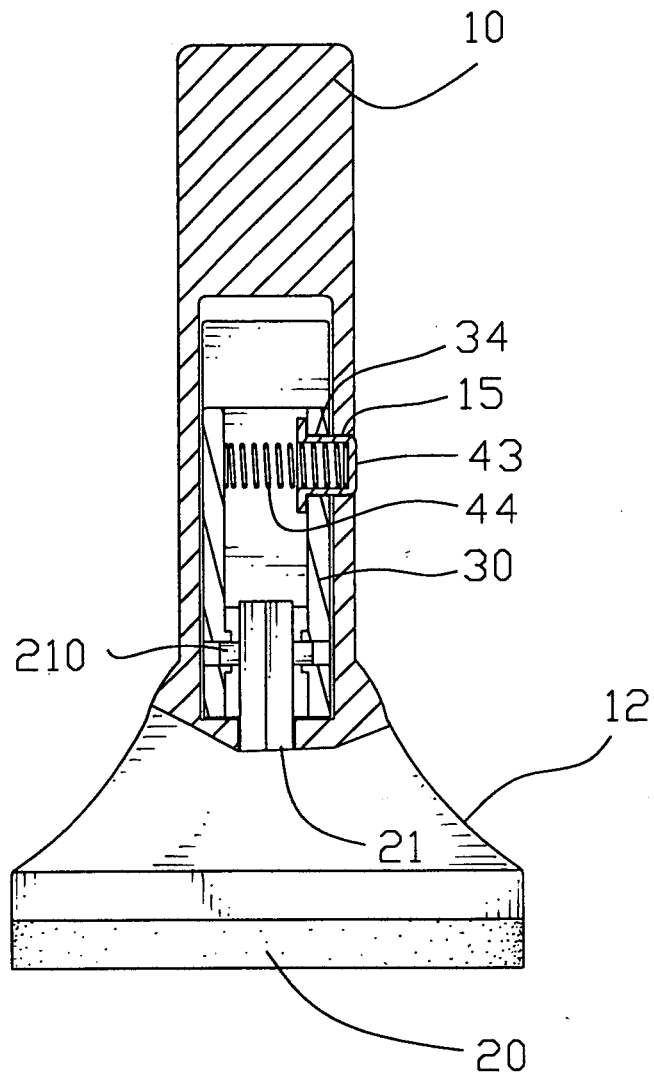


FIG.7



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EUROPEAN SEARCH REPORT

Application Number
EP 03 00 2995

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	DE 10 51 198 B (BOHLE FA JOSEF) 19 February 1959 (1959-02-19) * column 3, line 17 - line 33; figure 3 *	1,6	B25B11/00
A	US 2 303 393 A (EUGENE SCHMIDT) 1 December 1942 (1942-12-01) * page 2, left-hand column, line 5 - line 38; figures 1,3 *	1	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) B25B B60J E04F B25J F16B B65G H01L B66C G11B
Place of search		Date of completion of the search	Examiner
THE HAGUE		14 July 2003	Carmichael, Guy
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 O : non-written disclosure P : intermediate document 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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 03 00 2995

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14-07-2003

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82