



- (51) **International Patent Classification:**
B65B 7/16 (2006.01)
- (21) **International Application Number:**
PCT/IB2009/055514
- (22) **International Filing Date:**
4 December 2009 (04.12.2009)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
3062/CHE/2008 4 December 2008 (04.12.2008) IN
- (71) **Applicant (for all designated States except US):** **ITW India Limited** [IN/IN]; 3rd Floor, Merchant Towers, #5, Road #4, Banjara Hills, Hyderabad 500034 (IN).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **CHANDA, Rana** [IN/IN]; Gaurang 501, Prasun Dham Apartments, Opposite Aditya Birla Hospital, Chinchwad, Pune 411033 (IN). **SHENDE, Mahesh** [IN/IN]; B-702 Ganga Osian Park, Sr. No. 25 Near Rajas Society, Katraj, Pune 411046 (IN).
- (74) **Common Representative:** **ITW India Limited**; c/o HAUPTMAN, Benjamin J., Lowe Hauptman Ham & Berner, Llp, 1700 Diagonal Road, Suite 300, Alexandria, Virginia 22314 (US).
- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) **Designated States (unless otherwise indicated, for every kind of regional protection available):** ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM,

[Continued on next page]

(54) **Title:** A UNIVERSAL TAPE MACHINE (UTM) HEAD ASSEMBLY FOR A CARTON SEALING MACHINE

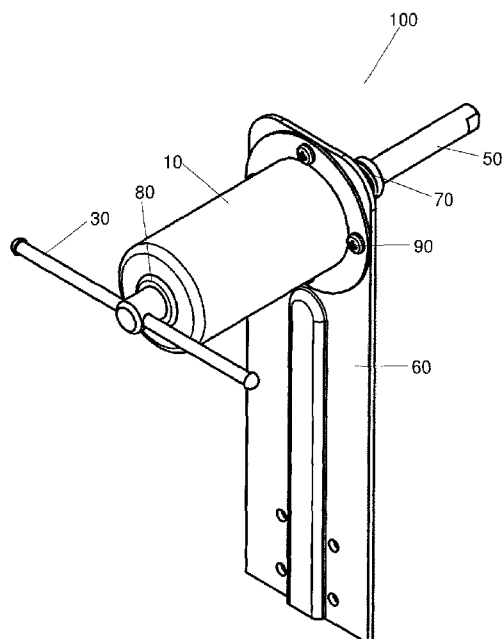


FIG. 9

(57) **Abstract:** A self- locking type UTM head assembly 100 for a carton sealing machine comprises a mounting bracket 60 on which the entire tape head assembly 100 is mounted, and a central shaft 50 for supporting a tape reel holder with adhesive tapes. A lock pin 40 can locate an axial position of the central shaft 50 using the force exerted by resilient means 70. A positioner cam 20 can be designed with several depths to lock the axial position of the central shaft 50 by using the lock pin 40, and a cover 10 is provided for covering the central shaft 50, the lock pin 40, the resilient means 70 and the positioner cam 20. A handle rod 30 can be associated with the central shaft in order to enable a user to pull the central shaft 50 for guiding the lock pin 40 on the depths of the positioner cam 20. Therefore, it is possible to provide the adhesive tapes at various sizes without removing the tape reel holder assembly.



TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

— of inventorship (Rule 4.17(iv))

Declarations under Rule 4.17:

Published:

— as to applicant's entitlement to apply for and be granted
a patent (Rule 4.17(ii))

— without international search report and to be republished
upon receipt of that report (Rule 48.2(g))

— as to the applicant's entitlement to claim the priority of
the earlier application (Rule 4.17(iii))

Description

Title of Invention: A UNIVERSAL TAPE MACHINE (UTM) HEAD ASSEMBLY FOR A CARTON SEALING MACHINE

FIELD OF THE INVENTION

- [1] The present invention relates to the fields of carton sealing machines. The present invention specifically relates to a tape head assembly for the carton sealing machines.

BACKGROUND OF THE INVENTION

- [2] In the packaging industry, corrugated and fiberboard cartons have been used for many years. Various carton sealing machines have been developed which are capable of sealing such cartons by applying a strip of self-adhesive tape material along the edges of the foldable flaps to maintain the flaps in a closed position. In particular, such carton sealing machines are widely used in industries like, but not limited to home appliance, textile, food, general merchandise, medicine and chemical, etc. Many of these carton sealing machines are designed to accept cartons of random width and height by providing various types of means to control the transverse movement of the side arm assemblies associated therewith and the vertical movement of the top sealing means.
- [3] Generally, the carton sealing machines are equipped with a tape head assembly and tape applying assembly units that frequently exhibit two tape applicator rollers pivotally mounted for swing. The tape head assemblies are arranged with a tape reel holder for holding the adhesive tape. This adhesive tape in the tape reel holder can be conveyed to the tape applying assembly units such that the foldable flaps of cartons are sealed by applying the strip of self-adhesive tape material along the edges of the flaps. The tape head assembly is designed in such a manner that the tape reel holder can facilitate easy removal of the adhesive tape to gain access to the interior of the carton. The carton sealing machines also includes a mechanism for controlling the tracking of the adhesive tape in the tape head assembly.
- [4] In addition, these carton sealing machines can universally utilize four ranges of adhesive tapes based on its width, namely 1.5 inch, 2 inch, 2.5 inch, and 3 inch. In the conventional carton sealing machines, several tape reel holders defined by the tape width are utilized for each size of adhesive tapes. These tape reel holders can manually be changed for different variant of the tape width while demand for a particular size of the adhesive tape. For example, if the required tape width should be 2 inch, then, the tape reel holder for the 2 inch adhesive tape can be fixed to the tape head assembly. Similarly, for all the tape widths, we need to fix the appropriate tape reel holder on the tape head assembly by removing the previous tape reel holder.

- [5] However, in this case, there are the problems that manual removal and fixing of the tape reel holder may be tedious and time-consuming, also it is not predictable which type of tape reel holder will be in demand and what inventory need to be maintained, there are instances while there is a demand of a particular size tape reel holder but the inventory is exhausted for the same which leads to late dispatches. Furthermore, this is lacking in practicality because the operation is not very reliable due to misalignment of the adhesive tape while manually fixing the tape reel holder in to the tape head assembly. Also, some of the customers may need different attachments of the tape reel holder for different product, which leads to partially change some components of the tape head assembly and longer changeover time. With respect to the conventional tape head assembly, it is very difficult to assemble the tape reel holder at every time. Therefore, it is desirable to provide a universal tape machine (UTM) head assembly for carton sealing machines, which provides the adhesive tapes at various sizes without removing a tape reel holder assembly.

OBJECT OF THE INVENTION

- [6] An object of the present invention is to provide a UTM head assembly for a carton sealing machine, which provides the adhesive tapes at various sizes without removing a tape reel holder assembly.
- [7] Another object of the present invention is to provide a self-locking type UTM head assembly for the carton sealing machine.
- [8] A further object of the present invention is to provide a UTM head assembly, which is adaptable to existing mandrel of the carton sealing machine.
- [9] Another object of the present invention is to provide a UTM head assembly, which reduces the number of variants that enables lesser inventory carrying cost.

SUMMARY OF THE INVENTION

- [10] According to one aspect, the present invention, which achieves the objectives, relates to a self-locking type UTM head assembly for a carton sealing machine comprising a mounting bracket on which the entire tape head assembly is mounted, and a central shaft for supporting a tape reel holder with adhesive tapes. A lock pin can locate an axial position of the central shaft using the force exerted by resilient means. A positioner cam can be designed with several depths to lock the axial position of the central shaft by using the lock pin, and a cover can be provided for covering the central shaft, the lock pin, the spring and the positioner cam. A handle rod can enable a user to pull the central shaft for guiding the lock pin on the depths of the positioner cam. Therefore, it is possible to provide the adhesive tapes at various sizes without removing the tape reel holder assembly.
- [11] In addition, a rubber grommet can be used to seal the clearance of the central shaft to

the cover for ingress prevention. Tape inch-locating means, i.e. scale, can be placed on top of the cover to visually guide the user about the operation and positioning with respect to the size of the adhesive tapes. A set of ring nuts can be utilized for securing the central shaft and the positioner cam to the mounting bracket. The cover can be fastened to the mounting bracket by using several fasteners, in particular mounting screws. The cover can be designed to safeguard the head assembly from dirt, dust and moisture.

- [12] Furthermore, the mounting bracket can be designed to be retrofitted on an existing carton sealing machine, where the central shaft is also compatible for retrofit. The resilient means is preferably a spring that is positioned on the central shaft. The spring can be designed to allow easy single hand operation and to retain positional accuracy of the tape reel holder. The positioner cam can lock the position of the central shaft without axial rocking and ease of positioning by providing adequate entry relief for the lock pin. The handle rod provides easy two-finger operation.

BRIEF DESCRIPTION OF THE DRAWINGS

- [13] The invention will be discussed in greater detail with reference to the accompanying Figures.
- [14] FIG. 1 shows an isometric view of a cover of a UTM head assembly, in accordance with an exemplary embodiment of the present invention.
- [15] FIG. 2A and 2B illustrate 2-dimensional and 3-dimensional views of a positioner cam of the UTM head assembly, in accordance with an exemplary embodiment of the present invention.
- [16] FIG. 3 illustrates a schematic front view of a handle rod of the UTM head assembly, in accordance with an exemplary embodiment of the present invention.
- [17] FIG. 4 illustrates a schematic front view of a lock pin of the UTM head assembly, in accordance with an exemplary embodiment of the present invention.
- [18] FIG. 5 illustrates an isometric view of a central shaft of the UTM head assembly, in accordance with an exemplary embodiment of the present invention.
- [19] FIG. 6 illustrates an isometric view of a mounting bracket of the UTM head assembly, in accordance with an exemplary embodiment of the present invention.
- [20] FIG. 7 illustrates a schematic front view of a spring of the UTM head assembly, in accordance with an exemplary embodiment of the present invention.
- [21] FIG. 8 illustrates an exploded view of the UTM head assembly, in accordance with an exemplary embodiment of the present invention.
- [22] FIG. 9 illustrates an assembled view of the UTM head assembly, in accordance with an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

- [23] FIG. 1 shows an isometric view of a cover 10 of a UTM head assembly 100, as shown in FIG. 8, in accordance with an exemplary embodiment of the present invention. The cover 10, which may be of any convenient shape and material, can aesthetically be designed to safeguard the UTM tape head assembly 100 from dirt, dust and moisture. The cover 10 comprises an opening 11 at its top for receiving a central shaft 50, as shown in FIG. 5, and several through holes 12 on it, which are provided to hold fasteners 90, in particular mounting screws.
- [24] Referring to FIG. 2A and 2B, 2-dimensional and 3-dimensional views of a positioner cam 20 of the UTM head assembly 100 are illustrated, in accordance with an exemplary embodiment of the present invention. The positioner cam 20 is a cylindrical type rotating body that is shaped to convert circular motion into linear motion. The positioner cam 20 includes several lock pin-receiving portions 21 on its top, where the lock pin-receiving portions 21 is formed with various depths, in particular 1.5 inch, 2 inch, 2.5 inch, 3 inch, in accordance with widths of adhesive tapes to be held on a tape reel holder (not shown).
- [25] Moreover, each lock pin-receiving portions 21 can be tapered on its top such that a lock pin 40, as shown in FIG. 4, can easily be located and/or positioned on the adjacent lock pin-receiving portions 21 of the positioner cam 20. The several depths of the positioner cam 20 can be designed to lock an axial position of the central shaft 50 by using the lock pin 40. The positioner cam 20 can also include a threaded portion 22 at its bottom for attaching the positioner cam 20 to a mounting bracket 60, as shown in FIG. 6.
- [26] Referring to FIG. 3, a schematic front view of a handle rod 30 of the UTM head assembly 100 is illustrated, in accordance with an exemplary embodiment of the present invention. The handle rod 30 can be located in the central shaft 50 in such a manner it can provide easy two-finger operation, i.e. index and middle fingers, for locking the lock pin 40 in various depths of the positioner cam 20. According to FIG. 5, an isometric view of the central shaft 50 of the UTM head assembly 100 is illustrated, which comprises a set of through holes 51 and 52 for receiving the handle rod 30 and the lock pin 40, respectively. The central shaft 50 can also includes a stopper 53 in it for stopping a resilient means, i.e. spring, as shown in FIG. 7, and a tape roll securing portion 54 that is configured for supports the tape reel holder, where the central shaft 50 can be compatible for retrofit.
- [27] Referring to FIG. 6, an isometric view of a mounting bracket 60 of the UTM head assembly 100 is illustrated, in accordance with an exemplary embodiment of the present invention. The mounting bracket 60 can be designed to be retrofitable on the existing carton sealing machine in such a manner that the entire tape head assembly 100 can be mounted on it. The mounting bracket 60 comprises a shaft-receiving hole

61 for receiving the central shaft 50 and the spring 70, as shown in FIG. 7. The mounting plate 60 can also include several holes 62 on it for securing the mounting screws 90. The spring 70 can be flatted at its both ends. The spring 70, which may be of any convenient shape and material, can be designed to allow easy single hand operation and to retain positional accuracy of the tape reel holder.

[28] Referring to FIGS. 8 and 9, exploded and assembled views of the UTM head assembly 100 is illustrated, in accordance with an exemplary embodiment of the present invention. Note that the same reference numbers are assigned to identical components in FIGS. 1-9. The UTM tape head assembly 100 can specifically be designed for the carton sealing machine. The tape head assembly 100 can be mounted on the mounting bracket 60. The central shaft 50 of the tape head assembly 100 can be configured to support the tape reel holder with the adhesive tapes of various sizes.

[29] Furthermore, the tape head assembly 100 includes the cover 10 that is provided for completely covering the lock pin 40 and the positioner cam 20, and partially covering the central shaft 50 and the spring 70. The lock pin 40 can locate an axial position of the central shaft 50 using the force exerted by the spring 70, which is positioned on the central shaft 50. The positioner cam 20 can be designed with several depths in order to lock the axial position of the central shaft 50 with the help of lock pin 40. The positioner cam 20 locks the position of the central shaft 50 without axial rocking and ease of positioning by providing adequate entry relief for the lock pin 40. A rubber grommet 80, which may be of any convenient shape and material, is configured to seal the clearance of the central shaft 50 to the cover 10 for ingress prevention.

[30] Additionally, tape inch-locating means 120, i.e. scale, can be placed on top of the cover 10 to visually guide the user about the operation and positioning with respect to the size and/or width of the adhesive tapes. A set of ring nuts 110 can be utilized for securing and attaching the central shaft 50 and the positioner cam 20 to the mounting bracket 60. Finally, the cover 10 can be placed over the positioner cam 20 by fastening the cover 10 to the mounting bracket 60 using the mounting screws 90 in order to achieve fully covered design and aesthetically appealing of the UTM tape head assembly 100. The handle rod 30 is inserted into the through holes 51 of the central shaft 50, which enables the user to pull the central shaft 50 for guiding the lock pin 40 on the positioner cam 20 in accordance with the size and/or width of the adhesive tapes. Such arrangement facilitates the UTM tape head assembly 100 to provide the adhesive tapes at various sizes without removing the tape reel holder assembly.

Claims

[Claim 1]

WE CLAIM:

A universal tape machine (UTM) head assembly for a carton sealing machine, comprising:

a mounting bracket including a plurality of mounting apertures, and a central shaft configured for supporting a tape reel holder assembly;
a lock pin configured for locating an axial position of said central shaft using force exerted by resilient means;
a positioner cam designed with a plurality of depths to lock said axial position of said central shaft by using said lock pin;
a cover fastened to said mounting bracket for covering said central shaft, said lock pin, said resilient means and said positioner cam; and
a handle rod integrally provided with said central shaft and operable to pull said central shaft for guiding said lock pin on said plurality of depths of said positioner cam, and thereby facilitating said UTM head assembly to provide an adhesive tape with required sizes without removing said tape reel holder assembly.

[Claim 2]

The assembly of claim 1, further comprising:

tape inch-locating means placed on top of said cover to visually guide the user about operation and positioning with respect to the sizes of said adhesive tape;

a grommet arranged between said cover and said handle rod to seal the clearance of said central shaft to said cover for ingress prevention; and
a plurality of fastener elements configured for fastening said central shaft and said positioner cam to said mounting bracket.

[Claim 3]

The assembly of claim 1, wherein said UTM head assembly is mounted on said mounting bracket.

[Claim 4]

The assembly of claim 1, wherein said plurality of depths of said positioner cam is tapered on its top to provide entry relief for said lock pin so as to lock said axial position of said central shaft without axial rocking and with ease of positioning.

[Claim 5]

The assembly of claim 1, wherein said plurality of depths of said positioner cam is configured in accordance with the sizes of said adhesive tape.

[Claim 6]

The assembly of claim 1, wherein said mounting bracket and said central shaft are configured to be retrofitted on existing universal tape machines.

- [Claim 7] The assembly of claim 2, wherein said tape inch-locating means includes a scale.
- [Claim 8] The assembly of claim 1, wherein said resilient means includes a spring.
- [Claim 9] The assembly of claim 1, wherein said resilient means are positioned between said positioner cam and said central shaft.
- [Claim 10] The assembly of claim 1, wherein said resilient means are configured to allow easy single hand operation and to retain positional accuracy of said tape reel holder assembly.
- [Claim 11] The assembly of claim 2, wherein said grommet is made of rubber.

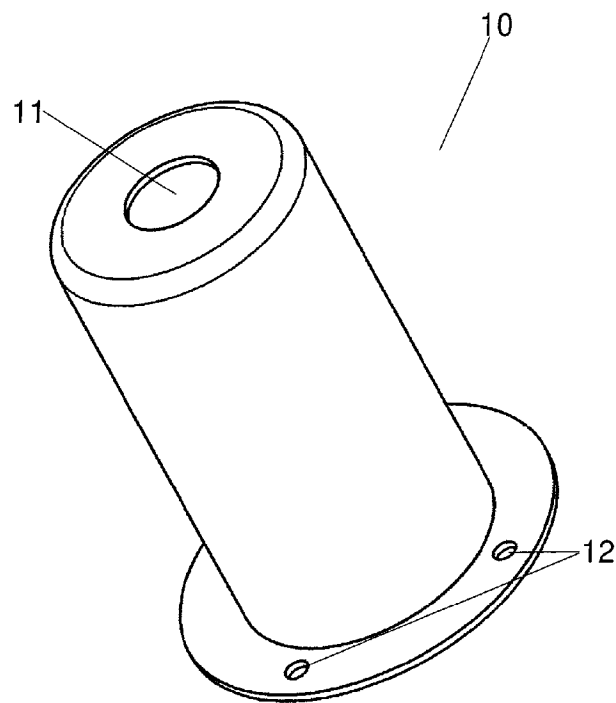


FIG. 1

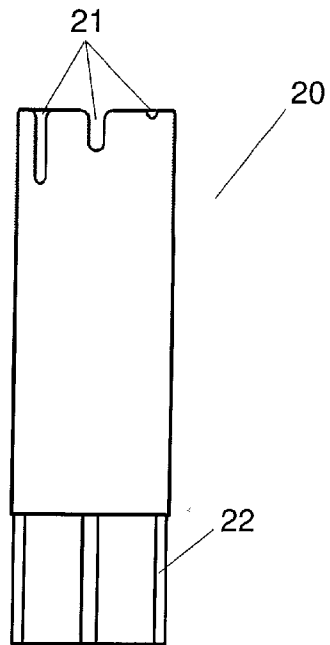


FIG. 2A

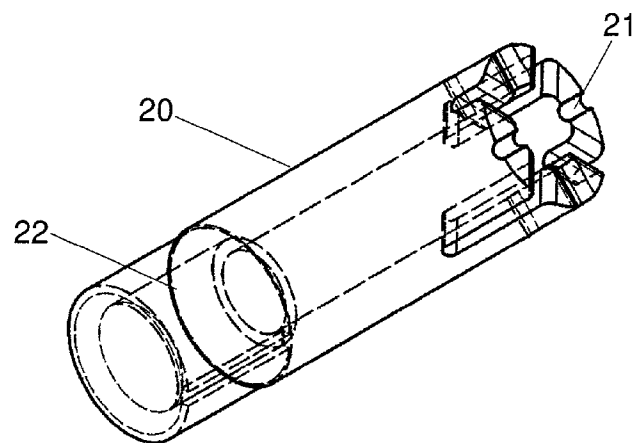


FIG. 2B

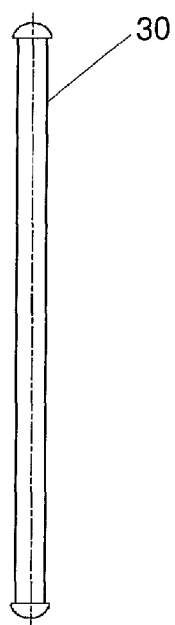


FIG. 3

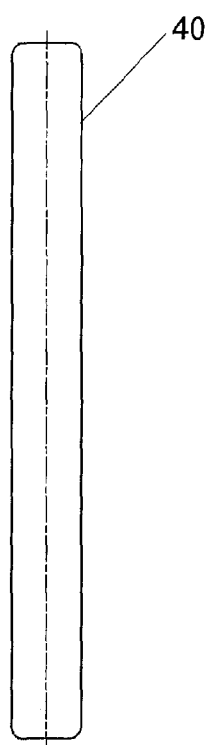


FIG. 4

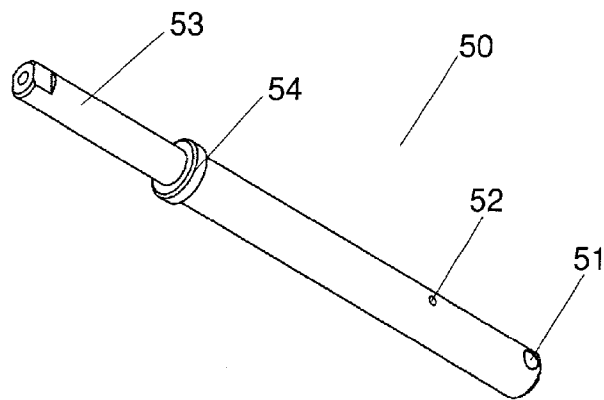


FIG. 5

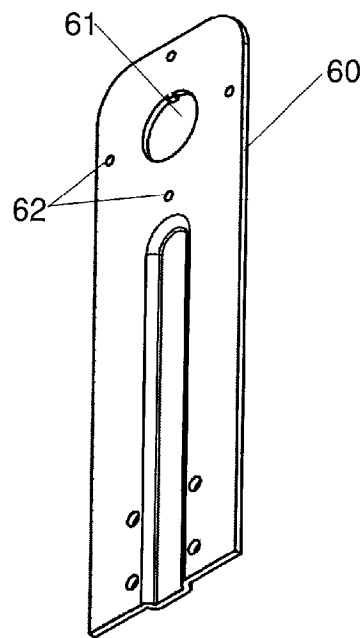


FIG. 6

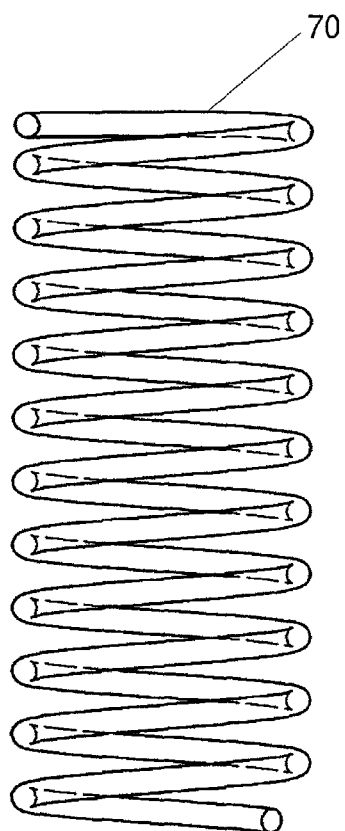


FIG. 7

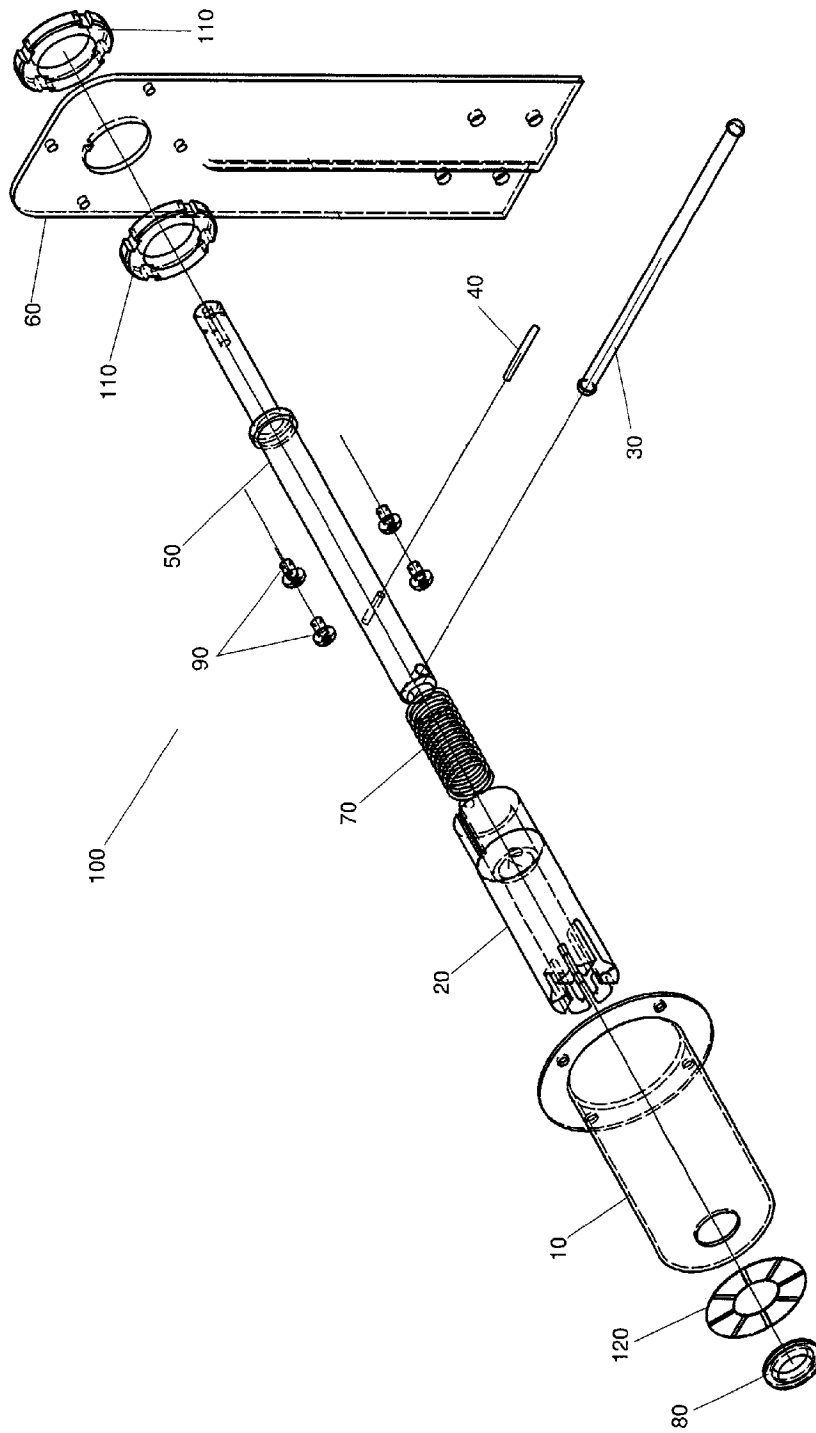


FIG. 8

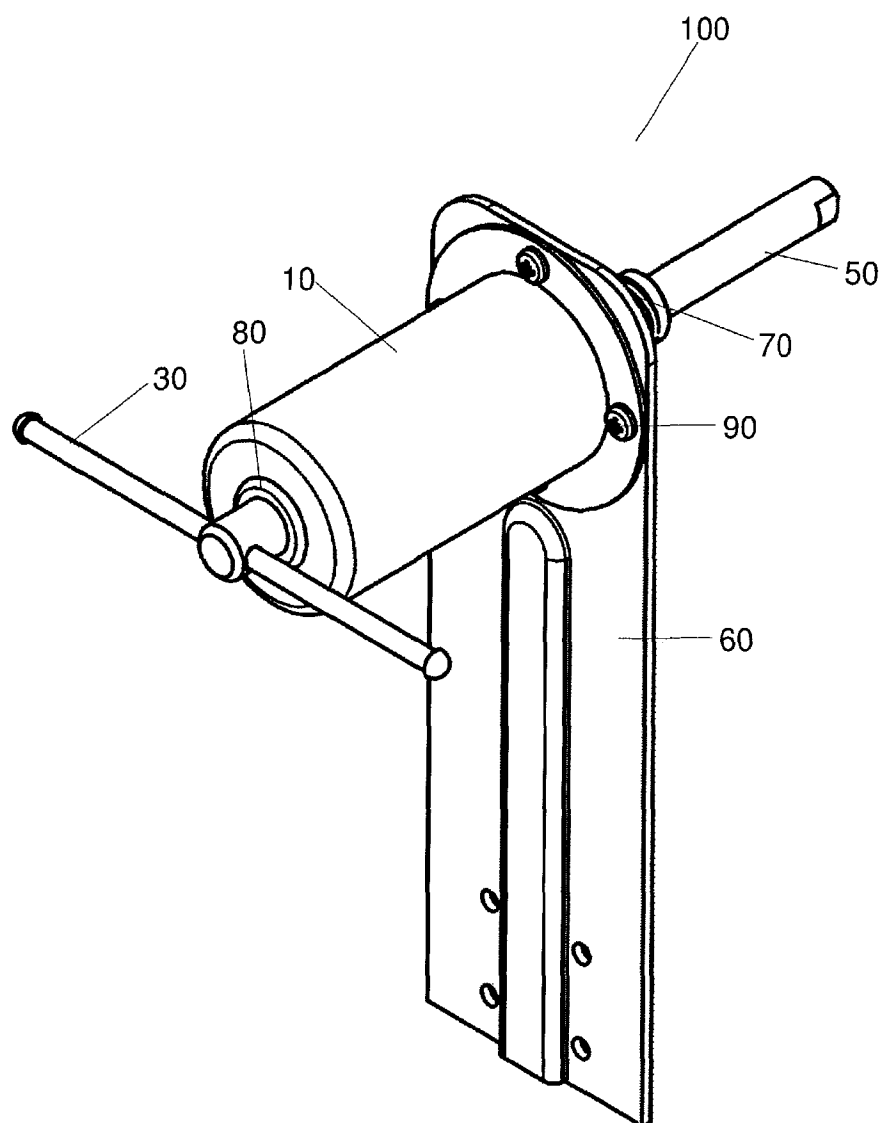


FIG. 9