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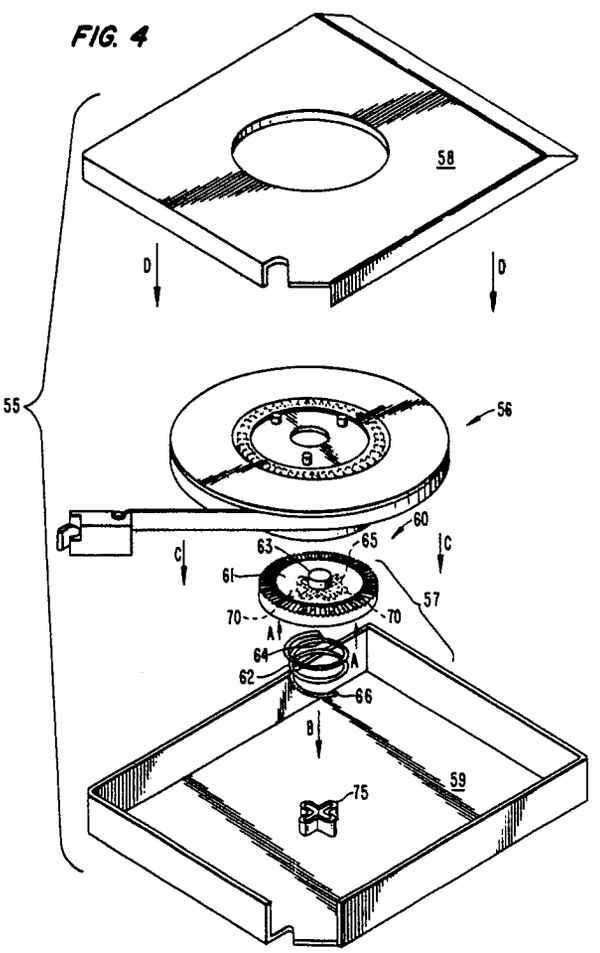
(54) Brake button/spring assembly and related method.

(57) A tape cartridge brake button/spring assembly and related method are described. The brake button includes a set of tabs radially opposed on the underside thereof. These tabs direct, center and maintain the spring relative to the brake button to facilitate automated assembly and prevent the spring from becoming misaligned in the cartridge during assembly or use. In addition, the brake button includes a cross-shaped recess for receiving a correspondingly shaped projection formed on the lower half of the cartridge to facilitate assembly and prevent binding of the brake button.

FIG. 4



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BACKGROUND OF THE INVENTION

This invention relates to a tape or ribbon cartridge and, more particularly, to a preassembled brake button/spring assembly for such a cartridge which facilitates overall assembly of the cartridge and promotes proper alignment of the spring therein.

Ribbon cartridges, known in the art as "Segoma" cartridges, include a single, circular ribbon spool biasly oriented within a square catridge. The cartridge has an opening in the periphery to allow the ribbon on the spool to be withdrawn from the cartridge. There is also an opening in a first half of the cartridge, which allows the spool to be coupled to an external drive means to turn the spool and dispense the ribbon.

The spool includes a hub which, in the assembled cartridge, surrounds a circular brake button biasly mount ed in the cartridge by a coil spring. The brake button is intended to "brake" or prevent rotation of the spool, except when desired. That is, the coil spring normally biases the brake button against the hub to interlock corresponding, respective teeth and "brake" the spool. Only when the brake button is pushed back into the cartridge against the force of the spring via, e.g., the external drive means, can the hub be rotated and the ribbon dispensed.

During assembly of the cartridge, the spring is loosely mounted on a projection formed on the second half of the cartridge. Then, the brake button is loosely mounted on the coil spring, the hub is loosely mounted on the brake button and the first half of the cartridge is mated to the second half.

Unfortunately, accurate automated assembly of the brake button and spring as described above is difficult. Further, the spring sometimes falls out of the cartridge during assembly. In addition, the spring can become misaligned during assembly and be caught in an improper position between the two cartridge halves. As a result, the brake button might also become misaligned, resulting in undesirable dispensing of the ribbon and a failure of the external drive means to properly operate the brake button.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a brake button/spring assembly which can be preassembled as a single unit.

It is another object of the present invention to provide a brake button/spring assembly which prevents misalign ment of the spring in the assembled cartridge and ensures positive, concentric alignment of the spring relative to the brake button.

Other objects of the present invention are to provide a cartridge and method for assembling same characterized by relatively easy manufacture, a lack of interference with conventional assembly or operation steps, and trouble-free mounting and movement of the brake button relative to the cartridge.

To achieve the foregoing and other objects of the present invention and in accordance with the purposes of the invention, there is provided a cartridge having a preassembled brake button spring assembly including a brake button with a set of tabs formed radially on the underside thereof. These tabs direct, center and contain one end of the spring relative to the brake button during assembly, thus preventing the spring from falling off or becoming misaligned in the cartridge during assembly and use, and ensuring proper operation of the brake button by the external drive means. In addition, the brake button includes a cross-shaped recess for receiving a correspondingly shaped projection formed on the second half of the cartridge. This configuration facilitates automated mounting of the brake button and prevents binding of the brake button during mounting or use.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

FIG. 1 is an exploded perspective view of a conventional Segoma-type cartridge.

FIG. 2 is a bottom plan view of the present invention illustrating particularly location of a pair of tabs thereon.

FIG. 3 is a side, sectional view of the brake button/spring assembly of the present invention shown in FIG. 2, taken along lines 3-3 and illustrating particularly placement of a tab on the underside of the brake button receiving the spring.

FIG. 4 is an exploded perspective view illustrating the method of assembly according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 illustrates a conventional "Segoma" type cartridge indicated generally by reference nu-

meral 10. Such a cartridge is also shown and described in U.S. Patent No. 4,383,660, issued to RICHARD et al.

The cartridge 10 includes a first half 11 and a second half 13. Each half 11, 13 has an opening 12 in the periphery thereof to allow the ribbon or tape 14 wound on a spool 16 to be withdrawn from the cartridge 10 via a leader 18, as known in the art. The spool 16 includes both a hub 17 and a planar flange 19 formed integrally thereof. There is also an opening 20 in the first cartridge half 11 which allows an external drive means (not shown) access to the hub 17 to rotate the hub 17 during operation and supply the tape 14.

The brake button 24 includes a circular disk 27, a first upper projection 29 and a second, substantially rectan gular lower projection 31. The second, lower projection 31 includes a corresponding rectangular recess 33 which, during assembly of the cartridge 10, is mounted on a similarly sized rectangular projeotion 26 formed on the second half 13 of the cartridge 10.

The brake button 24 is biasly mounted within the cartridge 10 via a coil spring 28. A first end 30 of the spring 28 abuts the underside 25 of the brake button 24 and the second end of the spring 32 abuts the second half 13 of the cartridge 10 to normally bias both the brake button 24 and the spool 16 resting thereon in the direction of the first half 11 of the cartridge 10.

As suggested above, the conventional brake button/spring assembly does not prevent the spring from falling out of the cartridge during assembly. It is also very possible for the spring 28 to become oriented off-center of the brake button 24 during assembly or use. Further, due to the misalignment of the spring, the brake button 24 might be improperly installed and effectively disengaged, which disadvantageously allows dispensing of the ribbon when the cartridge 10 is not coupled to the external drive means. In addition, the misaligned spring 28 may interfere with proper coupling of the external drive means with the brake button 24.

It has also been observed in the industry that the rectangular recess 233 formed in the second, lower projection 31 has a tendency to bind relative to the projection 26 during mounting and operation of the brake button 24. Further, these brake buttons 24 are mounted on the projections 26 by machines. It has also been observed that a rectangular recess 33 and corresponding rectangular projection 26 do not provide the most time and cost efficient automation during assembly. Finally, this confi guration undesirably allows the mounted brake button to wobble.

The present invention overcomes these drawbacks, as will now be described in relation to the preferred embodiments of the present invention shown in FIGS 2-4, by providing means for ensuring positive, concentric mounting of the spring relative to the brake button.

More particularly, the cartridge 55 of the present invention generally includes a spool 56 and a brake button/spring assembly 57 located between first and second halves 58 and 59, respectively, of the cartridge 55.

The brake button 60 is substantially circular and generally includes a substantially flat disk 61, an upper projection 63 and a lower projection 65.

The brake button 60 also includes a means 70 for fixedly retaining a spring 62 thereon during assembly of the cartridge 55. By fixedly it is meant that the spring 62 is attached to the brake button 60 and will not fall off thereof, even though the spring 62 may be able to partially rotate about its axis while mounted in the retaining means 70. Retaining means 70 is formed to extend from the underside 71 of the brake button 60. The retaining means 70 preferably includes an abutting surface 67 which is angled relative to the disk 61 and a retaining surface 68 thereunder parallel to the disc 61.

As best seen in FIGS. 2 and 3, preferably, the retaining means 70 is two opposing bosses or tabs 70' integrally molded to be equally, radially, spaced about the underside 71 of the brake button 60.

The brake button/spring assembly 57 also includes a coil spring 62 having a first end 64 and a second end 66. The first end 64 can be fixed to the underside 71 of the brake button 60 by screwing or snapping, whereas the second end 66 of the spring 62 is a free end.

More particularly, as the spring 62 is being assembled on the brake button 60, the retaining means 70 receives the first end 64 of the spring 62 to maintain the spring 62 in the desired position, i.e., on center with the brake button 60, as illustrated by the coincident axes "X" of the brake button 60 and the spring 62, shown in FIG. 3.

The lower projection 65 of the brake button 60 is preferably a cross-shape and includes a corresponding cross-shaped recess 73 formed therein, which receives in sliding relation a cross-shaped projection 75 formed on the second half 59 of the cartridge 55. Of course, a cross-shape is the equivalent of four, substantially columnar projections extending from the second half 59 of the cartridge 55. The combination of the cross-shaped recess 73 and projection 75 leads to less binding therebetween during assembly and operation of the brake button 60. In addition, this configuration facilitates assembly by making the machine's task of mounting the brake button 60 on the second half 59 of the cartridge 55 easier.

Alternatively, the conventional rectangular lower projection and corresponding rectangular recess

described above can still be used.

The methods for assembling the brake button spring assembly 57 and overall cartridge 55 according to the present invention are also illustrated by FIGS. 3 and 4. As seen, the first end 64 of the spring 62 can be pushed down against the abutting surface 67 of the retaining means 70 as indicated by arrows "A" in FIG. 4. The first end 64 necessarily expands an extent great enough to pass over the edge 69 of the retaining means 70 and returns to its original shape under the retaining means 70, i.e., within an annular channel 72, and against the retaining surface 68. Alternatively, the spring 62 can be placed against the underside 71 of the brake button 60 and screwed on, i.e., turned until the first end 64 is caught under the retaining means 70. Either of these actions produces the brake button/spring assembly 57 shown in FIG. 3. Then, this brake button/spring assembly 57 is mounted via automation on the projection 75 via the recess 73 as indicated by arrow "B". The spool 56 is then placed on top of the biased brake button 60 as indicated by arrows "C". Finally, the first and second halves, 58 and 59, respectively, are mated as indicated by arrow "D" and are ultrasonically welded together as known in the art.

As can be seen, incorporation of the retaining means 70 requires only minimal modifications to the structure of the cartridge. 55. In addition, the retaining means 70 does not otherwise interfere with assembly or operation of the cartridge 55. And yet, the retaining means 70 allows positive seating of the spring 62 relative to brake button 60 once assembled. Moreover, the easy snapping or screwing assembly of the spring and brake button can be easily reversed, if desired. In this manner, if either the spring or injection molded brake button is defective, the parts can be separated, the defective part scrapped and the non-defective part reused. Further, the means for mounting the brake button 60 relative to the second half 59 of the cartridge 55 further facilitates assembly and prevents binding and wobbling of the centered brake button 60.

The foregoing is considered illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described. Accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention and the appended claims.

Claims

1. A brake button spring assembly, comprising:

(a) a brake button;

(b) retaining means formed on a surface of the brake button, for retaining a spring; and

(c) a coil spring having first and second ends, wherein the first end of the spring is fixedly received by the retaining means and the second end is a free end.

2. The assembly as recited in claim 1, wherein the retaining means comprises a plurality of tabs radially spaced on the surface of the brake button.

3. The assembly as recited in claim 2, wherein the plurality of tabs is two tabs equally radially, spaced on the surface of the brake button.

4. A cartridge, comprising:

(a) first and second cartridge halves;

(b) a brake button;

(c) means formed on a surface of the brake button for retaining a spring; and

(d) a coil spring having first and second ends for biasing the brake button between the first and second cartridge halves,

wherein the first end of the spring is fixedly received by the retaining means, the second end of the spring abuts the second half of the cartridge. and the first half of the cartridge is mated with the second half of the cartridge.

5. The cartridge as recited in claim 4, wherein the retaining means comprises a plurality of tabs radially spaced on the surface of the brake button.

6. The cartridge as recited in claim 5, wherein the plurality of tabs is two tabs equally, radially spaced on the surface of the brake button.

7. The cartridge as recited in claim 4, wherein the brake button comprises a projection on one surface thereof having a cross-shaped recess formed therein, and the second cartridge half includes a corresponding cross-shaped projection formed thereon, and

wherein, during assembly, the cross-shaped projection is slidingly received by the cross-shaped recess.

8. A method for assembling a brake button/spring as sembly, comprising the steps of:

(a) forming a brake button;

(b) forming means on a surface of the brake button for retaining a spring;

(c) forming a coil spring having first and second ends; and

(d) fixedly mounting the first end of the spring in the retaining means.

9. The method as recited in claim 6, wherein step (b) comprises the substep of forming the retaining means to include a plurality of tabs radially spaced along the surface of the brake button.

10. The method as recited in claim 9, further comprising the substep of forming the plurality of tabs as two tabs equally radially, spaced on the surface of the brake button.

11. A method for assembling a cartridge, comprising the steps of:

(a) forming first and second cartridge halves and a spool:

(b) forming a brake button;

(c) forming means on the brake button for retaining a spring;

(d) forming a coil spring having first and second ends for biasing the brake button between the first and second cartridge halves;

(e) fixedly mounting the first end of the spring in the retaining means to form a pre-assembled brake button/spring assembly;

(f) biasly mounting the brake button/spring assembly on the second cartridge half;

(g) mounting the spool on the brake button; and

(h) mating the first and second cartridge halves.

12. The method as recited in claim 11, wherein step (c) comprises the substep of forming the retaining means as a plurality of tabs radially spaced on the surface of the brake button.

13. The method as recited in claim 12, further comprising the substep of forming the plurality of tabs as two tabs equally, radially spaced on the surface of the brake button.

14. The method as recited in claim 11, wherein the brake bottom comprises a projection on one surface thereof having a cross-shaped recess formed therein, and the second cartridge half includes a corresponding cross-shaped projection formed thereon, and

wherein, during assembly, the cross-shaped projection is slidingly received by the cross-shaped recess.

FIG. 1

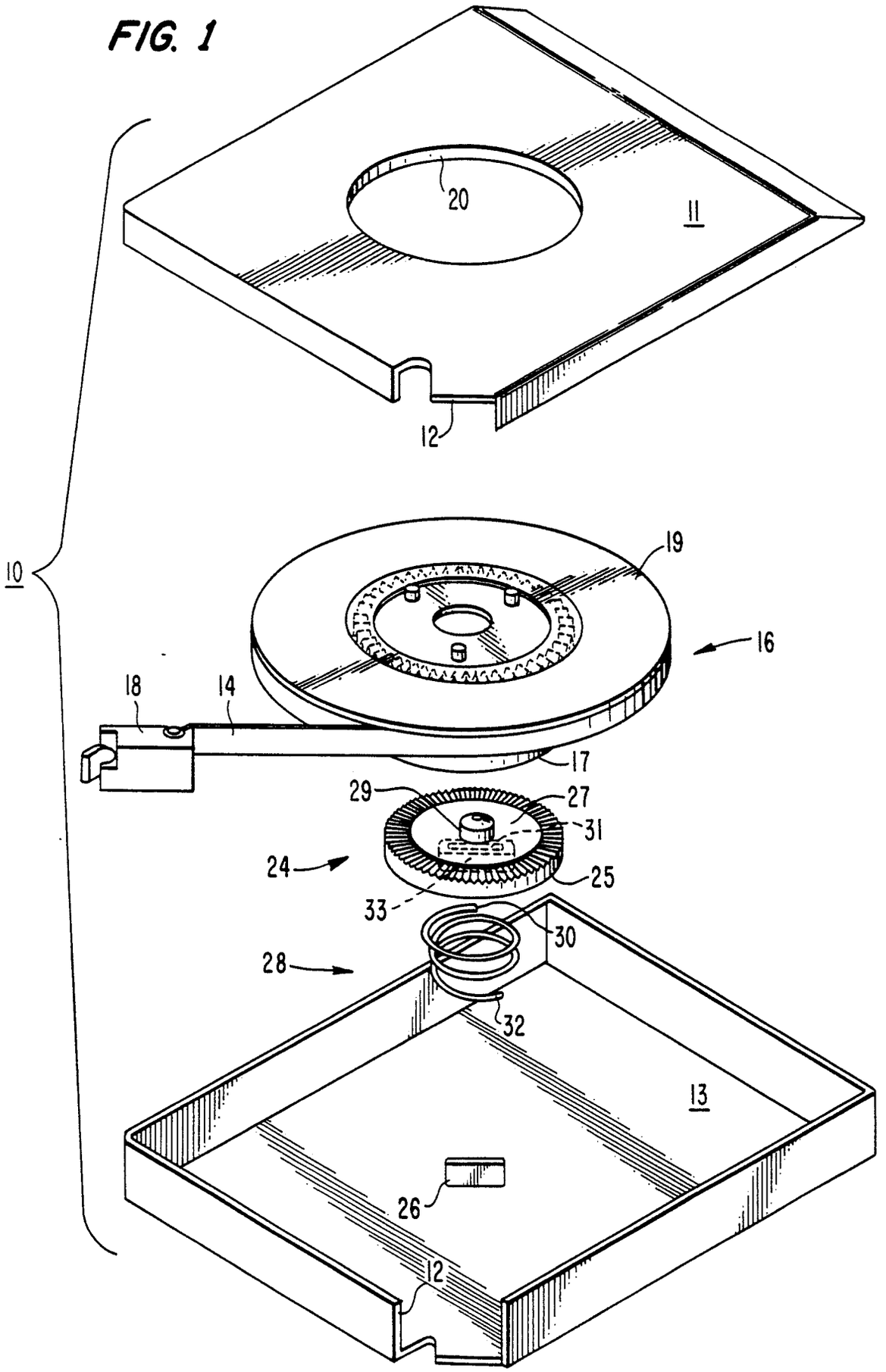

FIG. 2

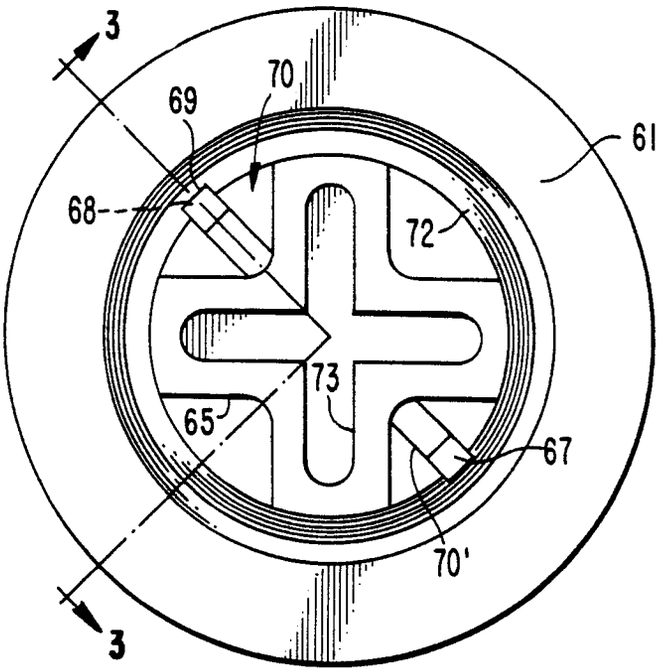
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FIG. 3

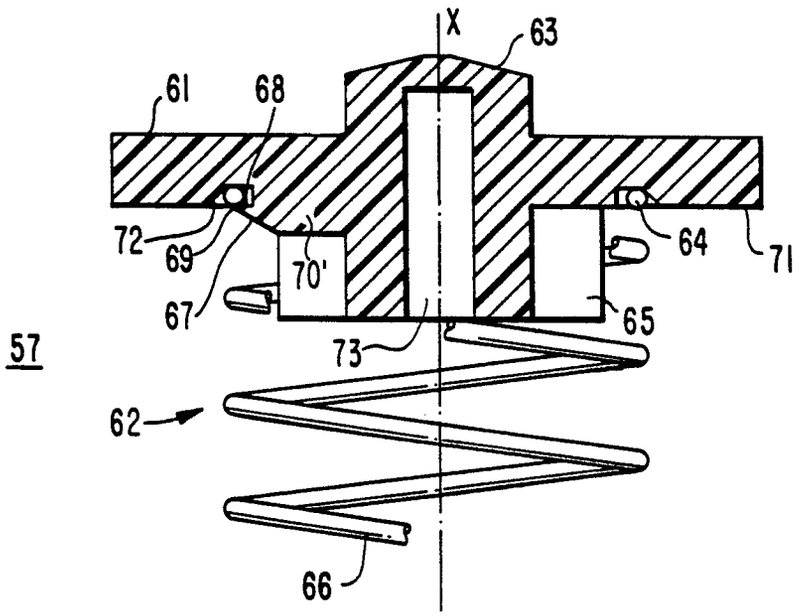
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FIG. 4