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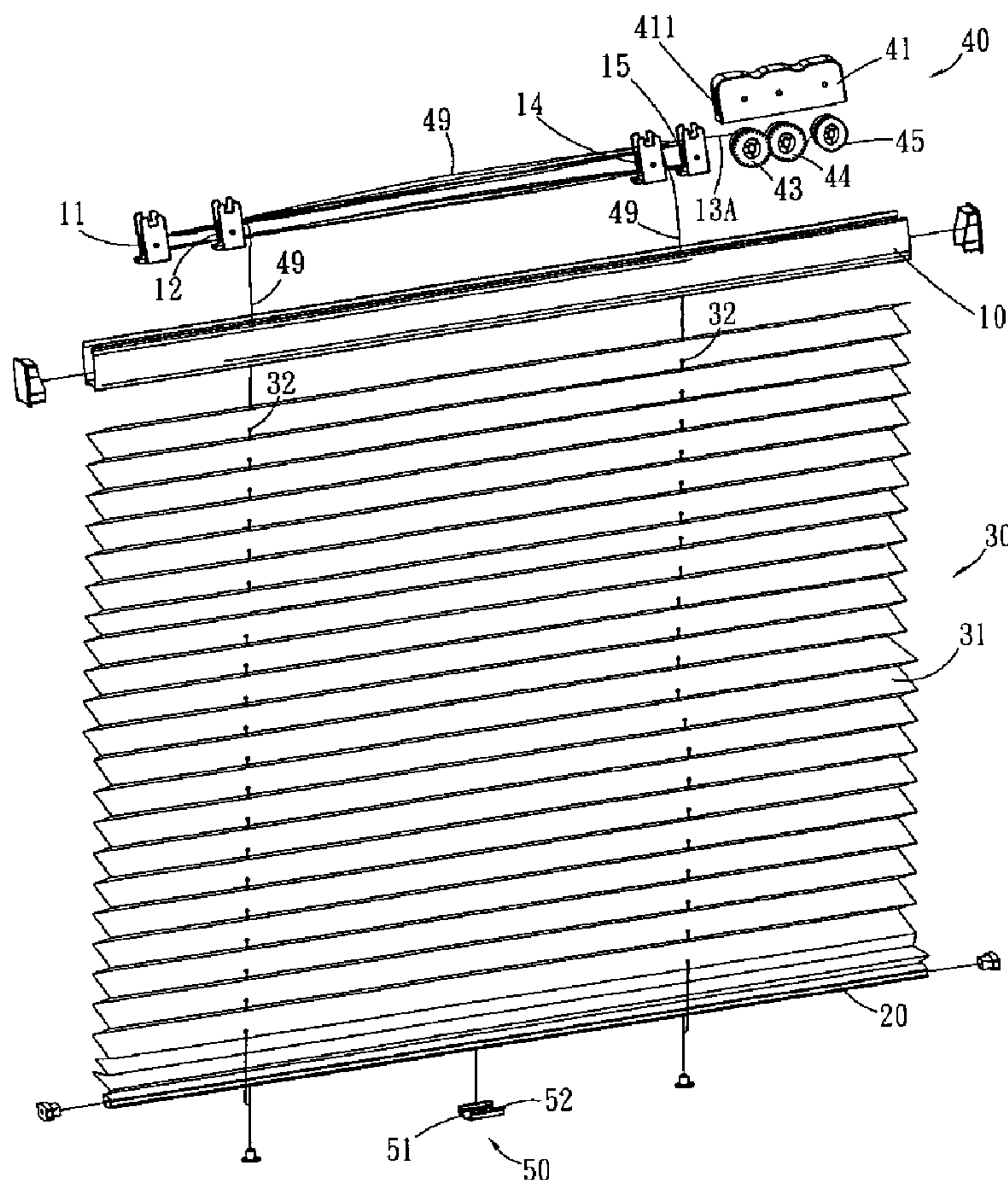
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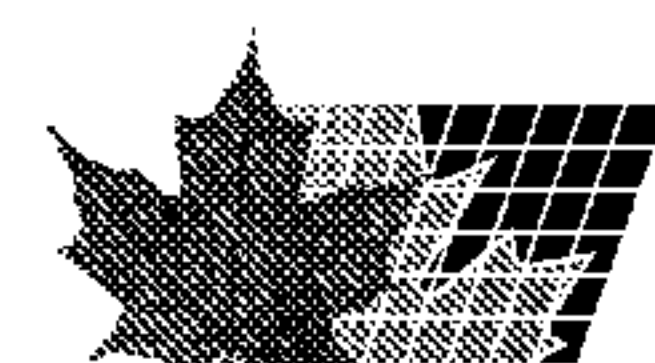
(54) Titre : MECANISME D'ENROULEMENT DE STORE

(54) Title: WINDING MECHANISM OF BLIND



(57) Abrégé/Abstract:

A winding mechanism mounts at head rail of blind and includes lines each wrapped around a bottom stiffener strip and the head rail, a cord wound around cord reel and having at least one loop wrapped around a bight section of the line, a first drum coupled to



(57) **Abrégé(suite)/Abstract(continued):**

the cord reel by gear, a second drum, and an S-shaped tape spring interconnected the first and second drums, the spring adapted to exert a force to support the drapery material. In a downward pulling of the stiffener strip the cord reel rotates to release each line and the cord with one worm section of the spring being further wound and the other worm section thereof being loosened for reaching a balance with the blind. An upward pulling of the same has an opposite effect. The drapery material is able to stay at any position in response to stopping the cord reel.

ABSTRACT OF THE DISCLOSURE

A winding mechanism mounts at head rail of blind and includes lines each wrapped around a bottom stiffener strip and the head rail, a cord wound around cord reel and having at least one loop wrapped around a bight section of the line, a first drum coupled to the cord reel by gear, a second drum, and an S-shaped tape spring interconnected the first and second drums, the spring adapted to exert a force to support the drapery material. In a downward pulling of the stiffener strip the cord reel rotates to release each line and the cord with one worm section of the spring being further wound and the other worm section thereof being loosened for reaching a balance with the blind. An upward pulling of the same has an opposite effect. The drapery material is able to stay at any position in response to stopping the cord reel.

WINDING MECHANISM OF BLIND

BACKGROUND OF THE INVENTION

Field of Invention

The present invention relates to blinds and more particularly to a winding
 5 mechanism of a blind (e.g., roll-up or Venetian blind) which can be releasably locked
 in any one of a plurality of positions relative to a top of window frame.

Related Art

Typically, a blind (e.g., roll-up or Venetian blind) is adapted to raise or lower by
 pulling a lift cord coupled to a winding mechanism. However, it is possible that a child
 10 may tie the exposed cord about the neck to cause danger or even death. Thus, this is
 not safe.

A conventional roll-up blind having a hidden lift cord is shown in FIG. 1 and
 comprises a head rail 1 fixed to a top of window frame, two spaced, opposite springs 2
 in the head rail 1, a bottom stiffener strip 3, a plurality of folds 4 coupled between the
 15 head rail 1 and the stiffener strip 3, each fold 4 having two openings proximate both
 sides, two side rails 5 and 6 of U-section fixed at both sides of the window frame, the
 side rails 5 and 6 adapted to allow both ends of the folds 4 to longitudinally slide
 therein, and two cords 7 and 8 in which the cord 7 has one end passed the left
 openings to couple to one spring 2 and the other end tied off at the left side rail 5, and
 20 the cord 8 has one end passed the right openings to couple to the other spring 2 and
 the other end tied off at the right side rail 6.

However, the previous design suffered from several disadvantages. For example,
 the springs 2 tend to lose its elasticity after a predetermined times of lowering or
 raising operation of the folds 4. And in turn, it may compromise the positioning
 25 capability of folds 4 by operating the cords 7 and 8. Further, there are no guide
 members for the cords 7 and 8 in the head rail 1 and the stiffener strip 3. It may
 increase friction in pulling the cords 7 and 8 during operation. To the worse, the cords

7 and 8 may break after a predetermined times of lowering or raising operation. Furthermore, the stiffener strip 3 is relatively thin, resulting in a poor maneuverability of the blind.

Thus, it is desirable to provide an improved winding mechanism of blind in order to overcome the above drawbacks of prior art.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a winding mechanism mountable at a groove of a head rail of a blind, the blind further including a bottom stiffener strip and a sheet of drapery material coupled between the head rail and the stiffener strip, comprising:

a cord reel provided on the head rail;

lines each having one end tied off at a first position of the stiffener strip, passed one side of the sheet of drapery material, the head rail, and the other side of the sheet of drapery material, and having the other end tied off at a second position of the stiffener strip, the other end of the line formed as a bight section proximate the cord reel;

a cord wound around the cord reel and having at least one loop wrapped around the bight section;

a first drum rotated with the cord reel;

a second drum;

a tape spring interconnected the first drum and the second drum, the spring including two worm sections together formed an S, the spring adapted to exert a force to support the weight of the sheet of drapery material; and

a plurality of spaced guide rollers disposed in the groove and holes formed on a bottom of the groove, the guide rollers being coupled together by winding the cord therearound, two ends of the cord being adapted to pass the holes;

wherein in a downward pulling of the stiffener strip the cord reel rotates to

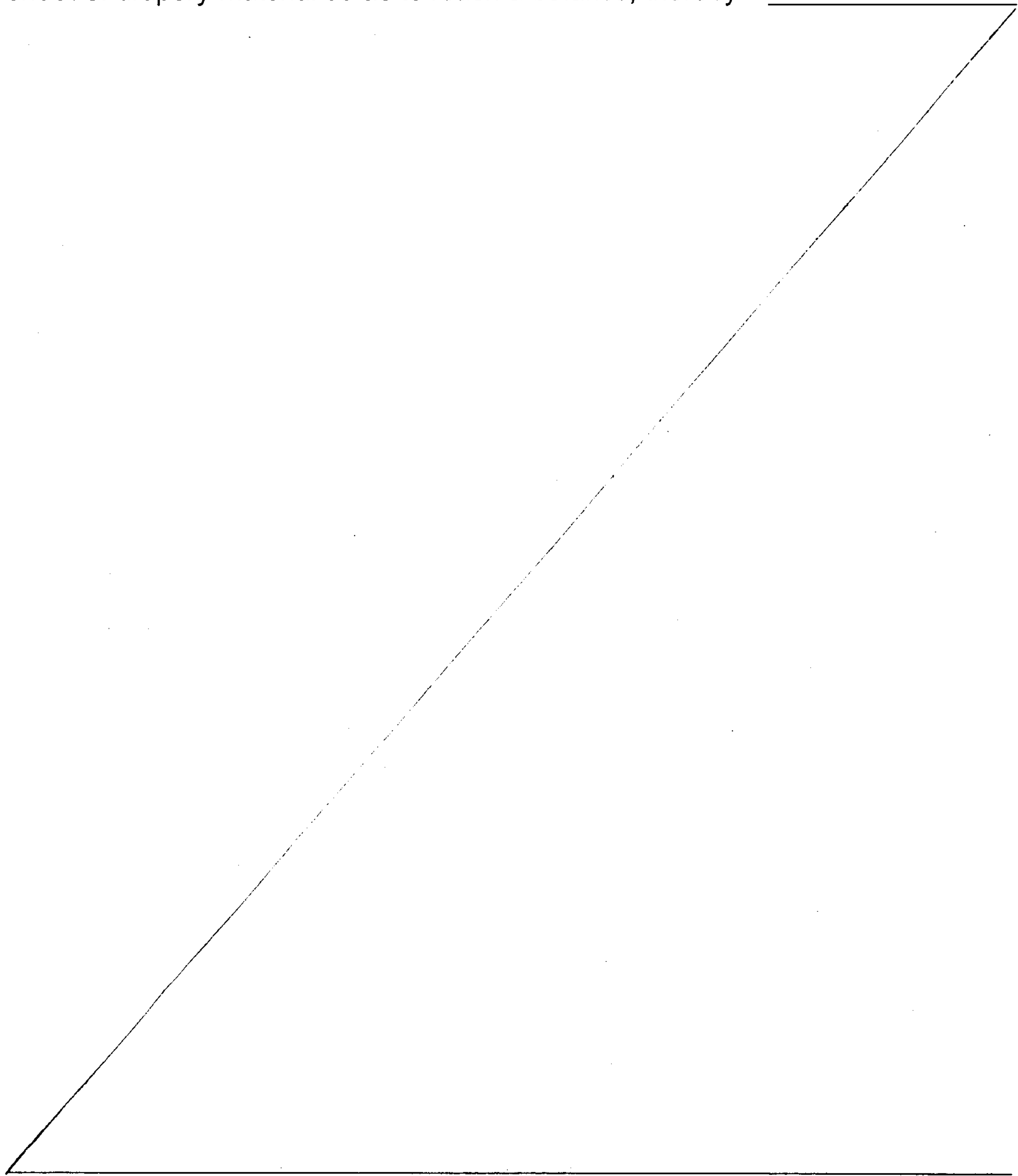
release the lines and the cord for lowering the sheet of drapery material with one worm section being further wound and the other worm section being loosened as a counterweight of the sheet of drapery material so as to reach a balance, thereby maintaining the sheet of drapery material at any one of a plurality of positions from a fully raised position to a fully lowered position in response to stopping the cord reel; and in an upward pulling of the stiffener strip the cord reel rotates in an opposite direction to wind the lines and the cord for lifting the sheet of drapery material with one worm section being loosened and the other worm section being further wound as a counterweight of the sheet of drapery material so as to reach a balance, thereby maintaining the sheet of drapery material at any one of a plurality of positions from the fully raised position to the fully lowered position in response to stopping the cord reel.

Preferably, it is therefore an object of the present invention to provide a winding mechanism mountable at a groove of a head rail of a blind, the blind further including a bottom stiffener strip and a sheet of drapery material coupled between the head rail and the stiffener strip, comprising a cord reel provided on the head rail; a line having one end tied off at a first position of the stiffener strip, passed one side of the sheet of drapery material, the head rail, and the other side of the sheet of drapery material, and having the other end tied off at a second position of the stiffener strip, the other end of the line formed as a bight section proximate the cord reel; a cord wound around the cord reel and coupled to the bight section of the line; a first drum rotated with the cord reel; a second drum; a tape spring interconnected the first drum and the second drum, the spring including two worm sections together formed an S, the spring adapted to exert a force to support the weight of the sheet of drapery material wherein in a downward pulling of the stiffener strip the cord reel rotates to release the line and the cord for lowering the sheet of drapery material with one worm section being further wound and the other worm section being loosened as a counterweight of the sheet of drapery material so as to reach a balance, thereby maintaining the sheet of drapery material at any one of a plurality

of positions from a fully raised position to a fully lowered position in response to stopping the cord reel; and a retaining member including an elongate seat engaged with a bottom surface of the stiffener strip, and two upwardly curved snapping edges along front end rear edges of the seat for clamping the stiffener strip; wherein in an upward pulling of the stiffener strip the cord reel rotates in an opposite direction to wind the line and the cord for lifting the sheet of drapery material with one worm section being loosened and the other worm section being further wound as a counterweight of the sheet of drapery material so as to reach a balance, thereby maintaining the sheet of drapery material at any one of a plurality
10 of positions from the fully raised position to the fully lowered position in response to stopping the cord reel.

Preferably, it is another object of the present invention to provide a winding mechanism mountable at a groove of a head rail of a blind, the blind further including a bottom stiffener strip and a sheet of drapery material coupled between the head rail and the stiffener strip, comprising a cord reel provided on the head rail; lines each having one end tied off at a first position of the stiffener strip, passed one side of the sheet of drapery material, the head rail, and the other side of the sheet of drapery material, and having the other end tied off at a second position of the stiffener strip, the other end of the line formed as a bight section proximate the
20 cord reel; a cord wound around the cord reel and having at least one loop wrapped around the bight section; a first drum rotated with the cord reel; a second drum; and a tape spring interconnected the first drum and the second drum, the spring including two worm sections together formed an S, the spring adapted to exert a force to support the weight of the sheet of drapery material; wherein in a downward pulling of the stiffener strip the cord reel rotates to release the lines and the cord for lowering the sheet of drapery material with one worm section being further wound and the other worm section being loosened as a counterweight of the sheet of drapery material so as to reach a balance, thereby maintaining the sheet of drapery material at any one of a plurality of positions from a fully raised position to a fully

lowered position in response to stopping the cord reel; and in an upward pulling of the stiffener strip the cord reel rotates in an opposite direction to wind the lines and the cord for lifting the sheet of drapery material with one worm section being loosened and the other worm section being further wound as a counterweight of the sheet of drapery material so as to reach a balance, thereby



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maintaining the sheet of drapery material at any one of a plurality of positions from the fully raised position to the fully lowered position in response to stopping the cord reel.

The above and other objects, features and advantages of the present invention will become apparent from the following detailed description taken with the
5 accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view of a conventional roll-up blind;

FIG. 2 is an exploded view of a first preferred embodiment of winding mechanism to be mounted on a roll-up blind according to the invention;

10 FIG. 3 is a perspective view of the assembled winding mechanism and blind of FIG. 2;

FIG. 4 is a top view in part section of the winding mechanism;

FIG. 5 is a greatly enlarged, exploded view of the winding mechanism;

15 FIGS. 6 and 7 are transverse and longitudinal sectional views of the winding mechanism respectively;

FIG. 8 is a perspective view of a second preferred embodiment of winding mechanism for roll-up blind according to the invention;

FIG. 9 is a transverse sectional view of the winding mechanism shown in FIG. 8;

20 FIG. 10 is a longitudinal sectional view of the winding mechanism shown in FIG. 8 where the winding mechanism is activating to lift the blind and a single loop is interconnected the joining point of the line and the cord reel;

FIG. 11 is a view similar to FIG. 10 showing another configuration thereof where loops are interconnected the joining point of the line and the cord reel;

FIG. 12 is a perspective view of the fully lifted blind according to the invention;

25 FIG. 13 is a longitudinal sectional view of a third preferred embodiment of winding mechanism for roll-up blind according to the invention;

FIG. 14 is a transverse sectional view of the winding mechanism shown in FIG.

13;

FIG. 15 is a longitudinal sectional view of a fourth preferred embodiment of winding mechanism for roll-up blind according to the invention; and

FIG. 16 is a transverse sectional view of the winding mechanism shown in FIG.

5 15.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 2, 3 and 4, there is shown a winding mechanism 40 in accordance with a first preferred embodiment of the invention. The winding mechanism 40 is to be mounted on a roll-up blind comprising a head rail 10 of U-section, a bottom stiffener strip 20, and a sheet of drapery material 30 coupled between the head rail 10 and the stiffener strip 20 and comprised of a plurality of folds 31 each having two orifices 32 proximate both sides. A plurality of spaced guide rollers 11, 12, 14, and 15 and the winding mechanism 40 are disposed in a groove of the head rail 10. The guide rollers 11, 12, 14, and 15 are coupled together by a continuous line 49 wound around them. Two ends of the line 49 pass two bottom apertures (not shown) and the orifices 32 to tie off in the stiffener strip 20. The guide rollers 11, 12, 14, and 15 are adapted to guide the line 49 in its pulling operation (i.e., more smooth). Note that the sheet of drapery material 30 and its folds 31 of the roll-up blind in this embodiment can be replaced by slats of a Venetian blind in the other embodiment.

Referring to FIGS. 5 to 7, the winding mechanism 40 comprises a case 41 open to its bottom, the case 41 having an internal space 42 for mounting a cord reel 43, a first drum 44, and a second drum 45 therein. The winding mechanism 40 further comprises at least three shafts 46 each having two ends fixed on two opposite walls of the case 41 with the cord reel 43, the first drum 44, or the second drum 45 rotatably put thereon. A tape spring 47 is interconnected the first drum 44 and the second drum 45. The tape spring 47 comprises two worm sections 471 and 472 together formed an S. The tape spring 47 can exert a force to support the weight of the sheet of drapery

material 30. A free end 48 of the worm section 472 is fixed on the first drum 44. A long
cord 13A is wound around the cord reel 43. A winding direction of the cord 13A is the
same as that of each of the worm sections 471 and 472. One end of the cord 13A
passes one of two slits 411 on one side surface of the case 41 to couple to the line 49
5 at a bight section 491 formed at the other end of the line 49. As such, the line 49 and
the cord 13A can operate as a whole. The cord reel 43 comprises a gear 412 at one
end to be meshed with a gear 413 of the first drum 44 such that the cord reel 43 and
the first drum 44 can rotate in opposite directions.

The S-shaped tape spring 47 is energized due to the same winding direction of
10 the worm sections 471 and 472 and the weight of the sheet of drapery material 30. A
downward pulling of the stiffener strip 20 by the hand together with the weight of the
sheet of drapery material 30 can overcome an upward pulling force of the cord 13A
provided by the tape spring 47. As such, the cord reel 43 rotates to release the cord
13A and thus the line 49 so as to lower the sheet of drapery material 30. The worm
15 section 472 is wound further (i.e., store energy) and the worm section 471 is loosened
to compensate the further winding of the worm section 472 during the release. Such
serves as a counterweight of the sheet of drapery material 30 so as to reach a
balance. As a result, the sheet of drapery material 30 is adapted to stay at any one of
a plurality of positions from the fully raised position to the fully lowered position by
20 stopping the cord reel 43.

Referring to FIGS. 8, 9, and 10, there is shown a winding mechanism 40 in
accordance with a second preferred embodiment of the invention. The winding
mechanism 40 of the second preferred embodiment is identical to that of the first
preferred embodiment of the invention with certain exceptions. Cord 13A is replaced
25 by a loop 13B having one end connected to the cord reel 43 and the other end
wrapped around the bight section 491 of the line 49. Referring to FIG. 11, it shows
another configuration of the second preferred embodiment of the invention. In this

configuration, cord 13A is replaced by loops 13C each having one end connected to the cord reel 43 and the other end wrapped around the bight section 491 of the line 49.

Referring to FIGS. 12 in conjunction with FIG. 2, an upward pulling of the stiffener strip 20 by the hand together with the compression force of the spring 47 can overcome the weight of the sheet of drapery material 30. For reaching a balance, the worm section 472 coupled to the first drum 44 begins to release and the worm section 471 coupled to the second roller 45 begins to wind. A force exerted onto the cord reel 43 by the spring 47 is thus adjusted. Also, a rotation of the first drum 44 will cause the cord reel 43 to rotate the same for winding the line 49. Likewise, the sheet of drapery material 30 is adapted to stay at any one of a plurality of positions from the fully raised position to the fully lowered position by stopping the cord reel 43.

Referring to FIGS. 2 and 3 again, the winding mechanism 40 further comprises a retaining member 50 including an elongate seat 51 engaged with a bottom surface of the stiffener strip 20 and two upwardly curved snapping edges 52 along front end rear edges of the seat 51 for clamping the stiffener strip 20. The provision of the retaining member 50 aims at facilitating the upward or downward pulling the stiffener strip 20 by the hand.

Referring to FIGS. 13 and 14, a third preferred embodiment of winding mechanism 60 of blind according to the invention is shown. The winding mechanism 60 of the third preferred embodiment is identical to that of the first preferred embodiment of the invention with certain exceptions. The winding mechanism 60 comprises a case 61 open to its bottom, the case 61 having an internal space 62 for mounting a third drum 63 and a fourth drum 64 therein. The winding mechanism 60 further comprises two shafts 65 each having two ends fixed on two opposite walls of the case 61 with the third drum 63 and the fourth drum 64 rotatably put thereon. An S-shaped tape spring 66 is interconnected the third drum 63 and the fourth drum 64. A

free end of the worm section 66 is fixed on the third drum 63. A cord reel 67 is coaxially formed at one side of the third drum 63. A long cord 68A is wound around the cord reel 67. One end of the cord 68A passes a slit on one side surface of the case 61 to couple to a line 70. As such, the cord 68A and the line 70 can operate as a whole.

5 Referring to FIGS. 15 and 16, a fourth preferred embodiment of winding mechanism 60 of blind according to the invention is shown. The winding mechanism 60 of the fourth preferred embodiment is identical to that of the third preferred embodiment of the invention with certain exceptions. The winding mechanism 60 comprises a case 61 open to its bottom, the case 61 having an internal space 62 for
10 mounting a third drum 63 and a fourth drum 64 therein. The winding mechanism 60 further comprises two shafts 65 each has two ends fixed on two opposite walls of the case 61 with the third drum 63 and the fourth drum 64 rotatably put thereon. An S-shaped tape spring 66 is interconnected the third drum 63 and the fourth drum 64. A free end of the worm section 66 is fixed on the third drum 63. A cord reel 67 is
15 coaxially formed at one side of the third drum 63. A long cord 68A is wound around the cord reel 67. One end of the cord 68A formed as a loop 68B passes a slit on one side surface of the case 61 to wrap around a bight section 71 of the line 70. As such, the loop 68B and the line 70 can operate as a whole.

In practice, each of the springs 47 and 66 can control one or more cord reels 43
20 and 67 for accommodating different sizes of the blind. In brief, the invention is safe and smooth in its operation.

While the invention herein disclosed has been described by means of specific embodiments, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope and spirit of the invention set forth in
25 the claims.

WHAT IS CLAIMED IS:

1. A winding mechanism mountable at a groove of a head rail of a blind, the blind further including a bottom stiffener strip and a sheet of drapery material coupled between the head rail and the stiffener strip, comprising:

a cord reel provided on the head rail;

10 lines each having one end tied off at a first position of the stiffener strip, passed one side of the sheet of drapery material, the head rail, and the other side of the sheet of drapery material, and having the other end tied off at a second position of the stiffener strip, the other end of the line formed as a bight section proximate the cord reel;

a cord wound around the cord reel and having at least one loop wrapped around the bight section;

a first drum rotated with the cord reel;

a second drum;

a tape spring interconnected the first drum and the second drum, the spring including two worm sections together formed an S, the spring adapted to exert a force to support the weight of the sheet of drapery material; and

20 a plurality of spaced guide rollers disposed in the groove and holes formed on a bottom of the groove, the guide rollers being coupled together by winding the cord therearound, two ends of the cord being adapted to pass the holes;

wherein in a downward pulling of the stiffener strip the cord reel rotates to release the lines and the cord for lowering the sheet of drapery material with one worm section being further wound and the other worm section being loosened as a counterweight of the sheet of drapery material so as to reach a balance, thereby maintaining the sheet of drapery material at any one of a plurality of positions from a fully raised position to a fully lowered position in response to stopping the cord reel; and in an upward pulling of the stiffener strip the cord reel rotates in an

opposite direction to wind the lines and the cord for lifting the sheet of drapery material with one worm section being loosened and the other worm section being further wound as a counterweight of the sheet of drapery material so as to reach a balance, thereby maintaining the sheet of drapery material at any one of a plurality of positions from the fully raised position to the fully lowered position in response to stopping the cord reel.

2. The winding mechanism of claim 1, further comprising a retaining member including an elongate seat engaged with a bottom surface of the stiffener strip, and two upwardly curved snapping edges along front end rear edges of the seat for
10 clamping the stiffener strip.
3. The winding mechanism of claim 1, wherein the cord reel comprises a first gear and the first drum comprises a second gear meshed with the first gear such that the cord reel and the first drum are adapted to rotate in opposite directions.
4. The winding mechanism of claim 1, wherein the spring is adapted to control the cord reel.
5. The winding mechanism of claim 1, further comprising a gear interconnected the first drum and the cord reel.
6. The winding mechanism of claim 1, wherein the cord is wound in a direction same as that of each of the worm sections.
- 20 7. The winding mechanism of claim 1, further comprising a case for receiving the cord reel, the first drum, and the second drum therein.

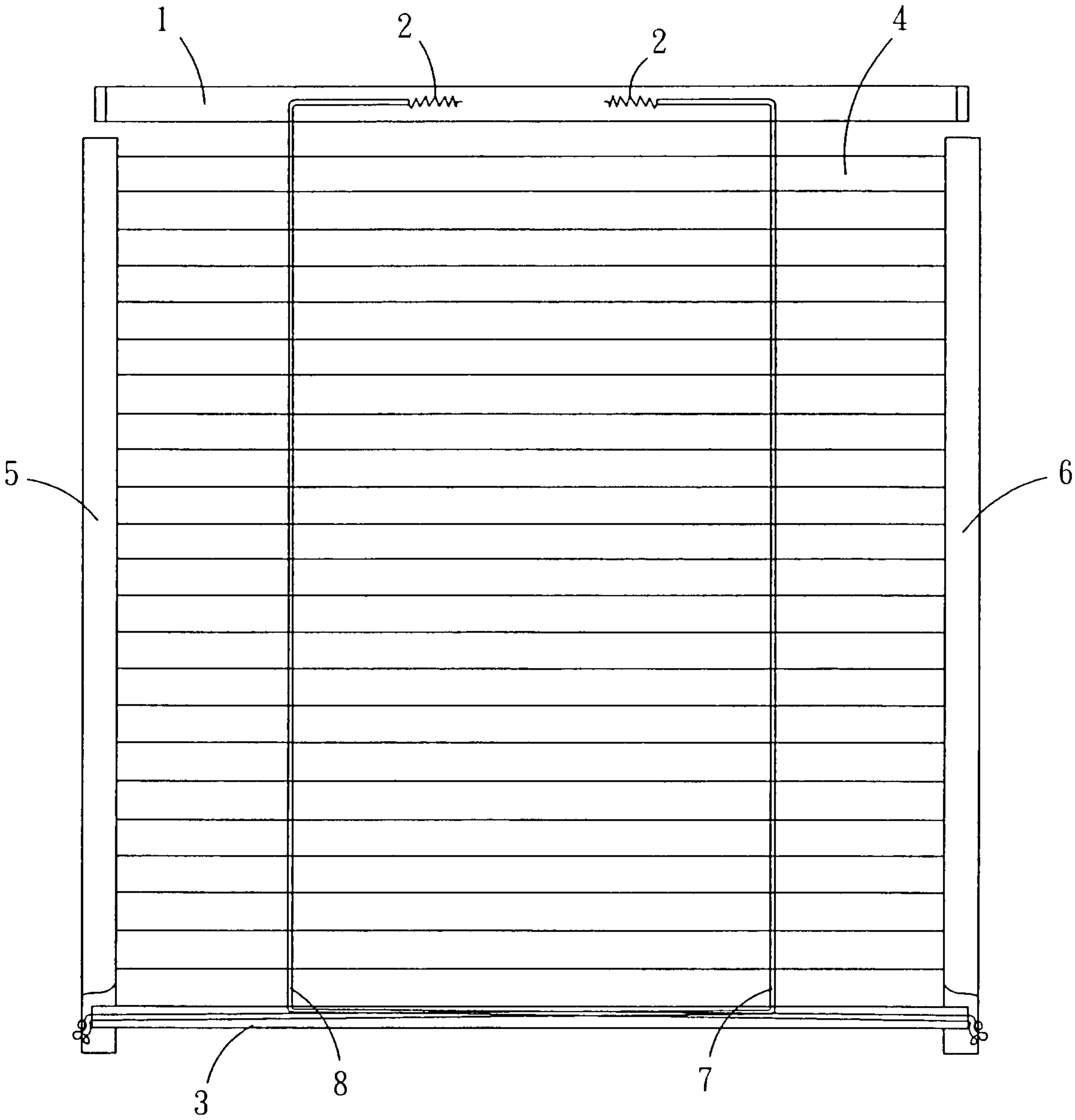


FIG. 1
PRIOR ART

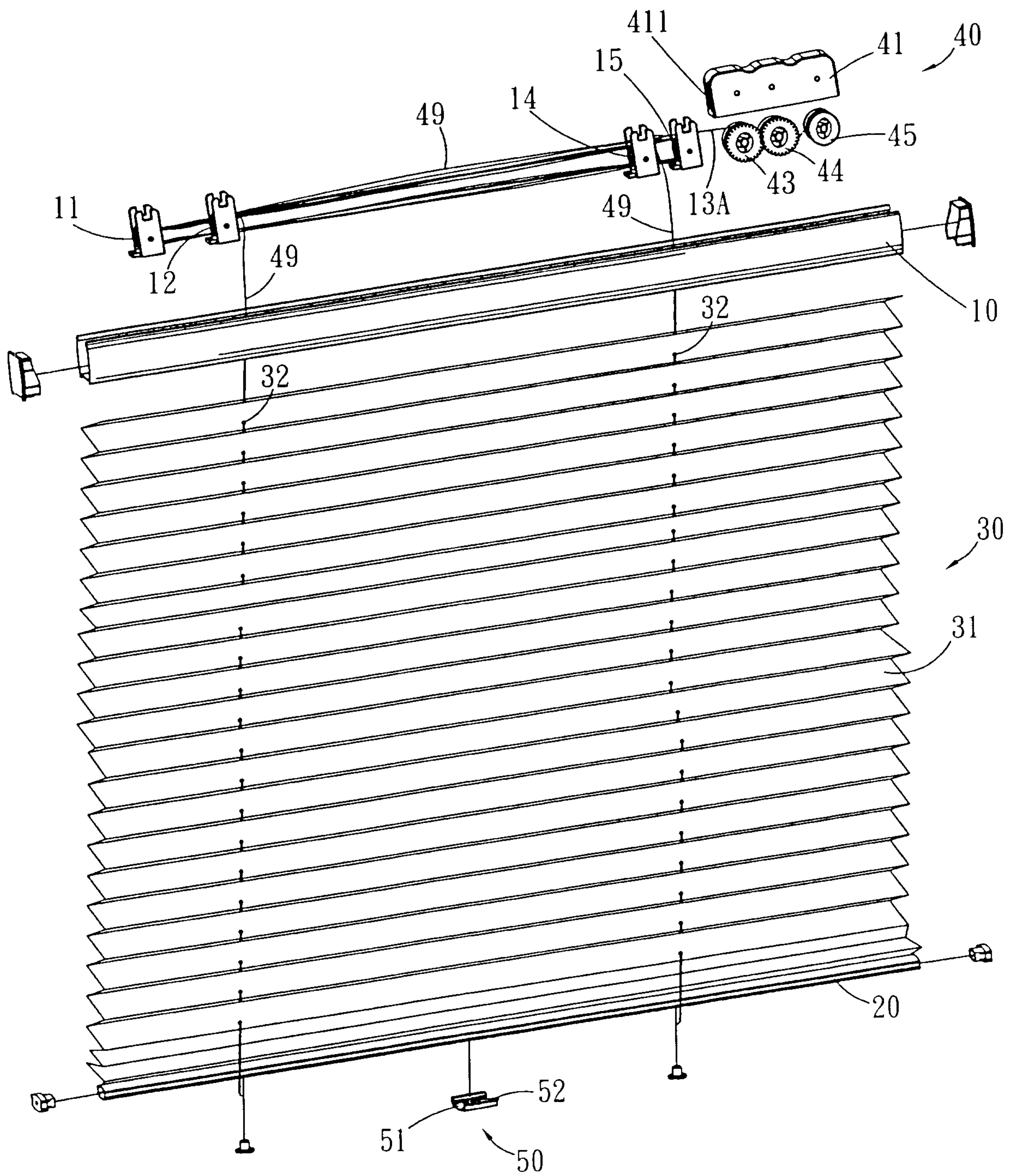


FIG. 2

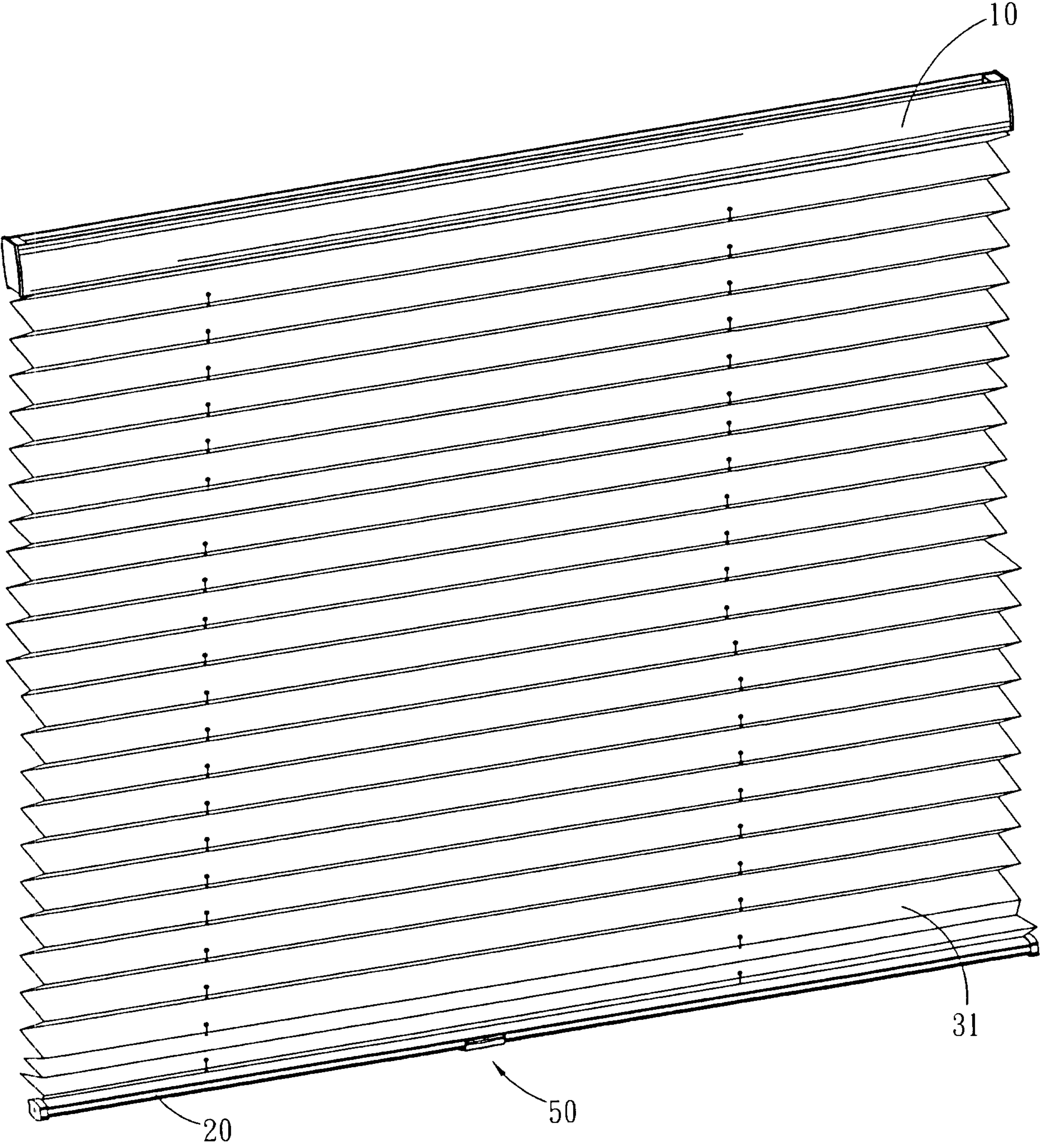


FIG. 3

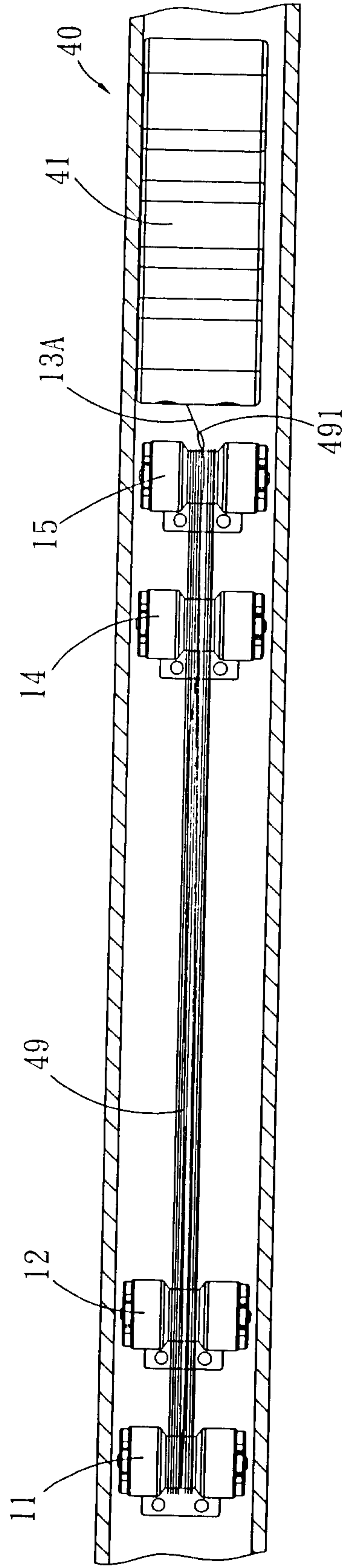


FIG. 4

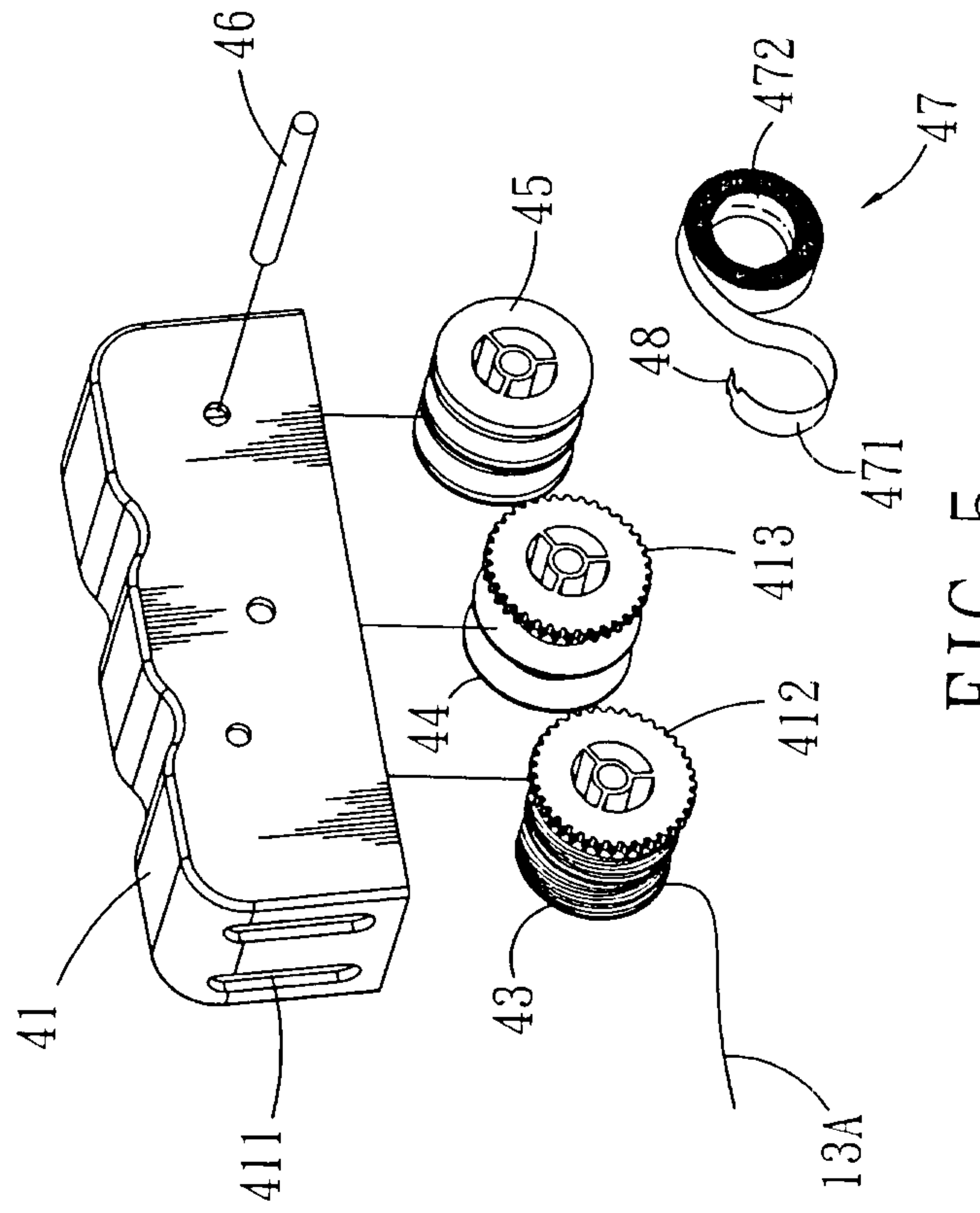


FIG. 5

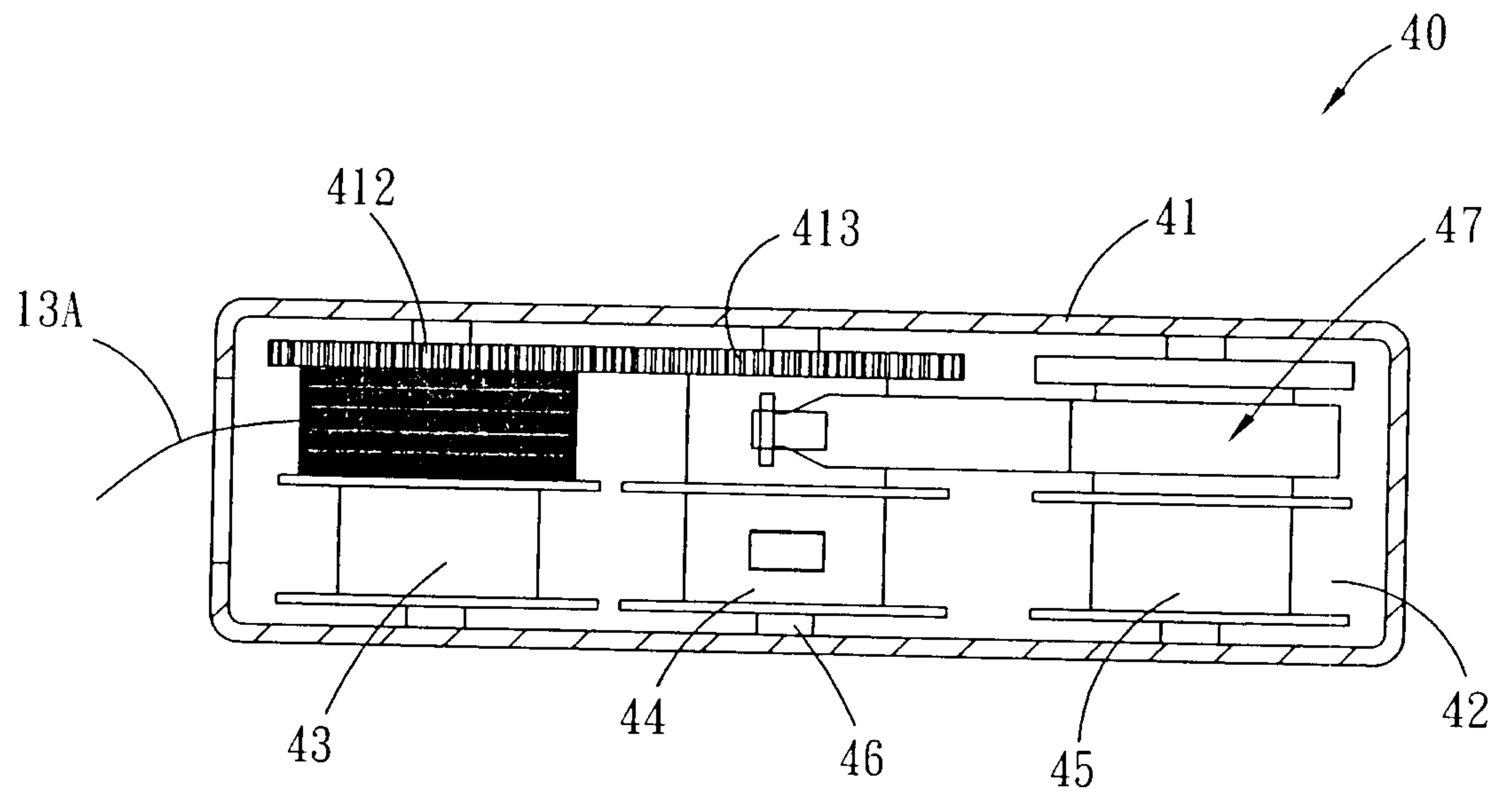


FIG. 6

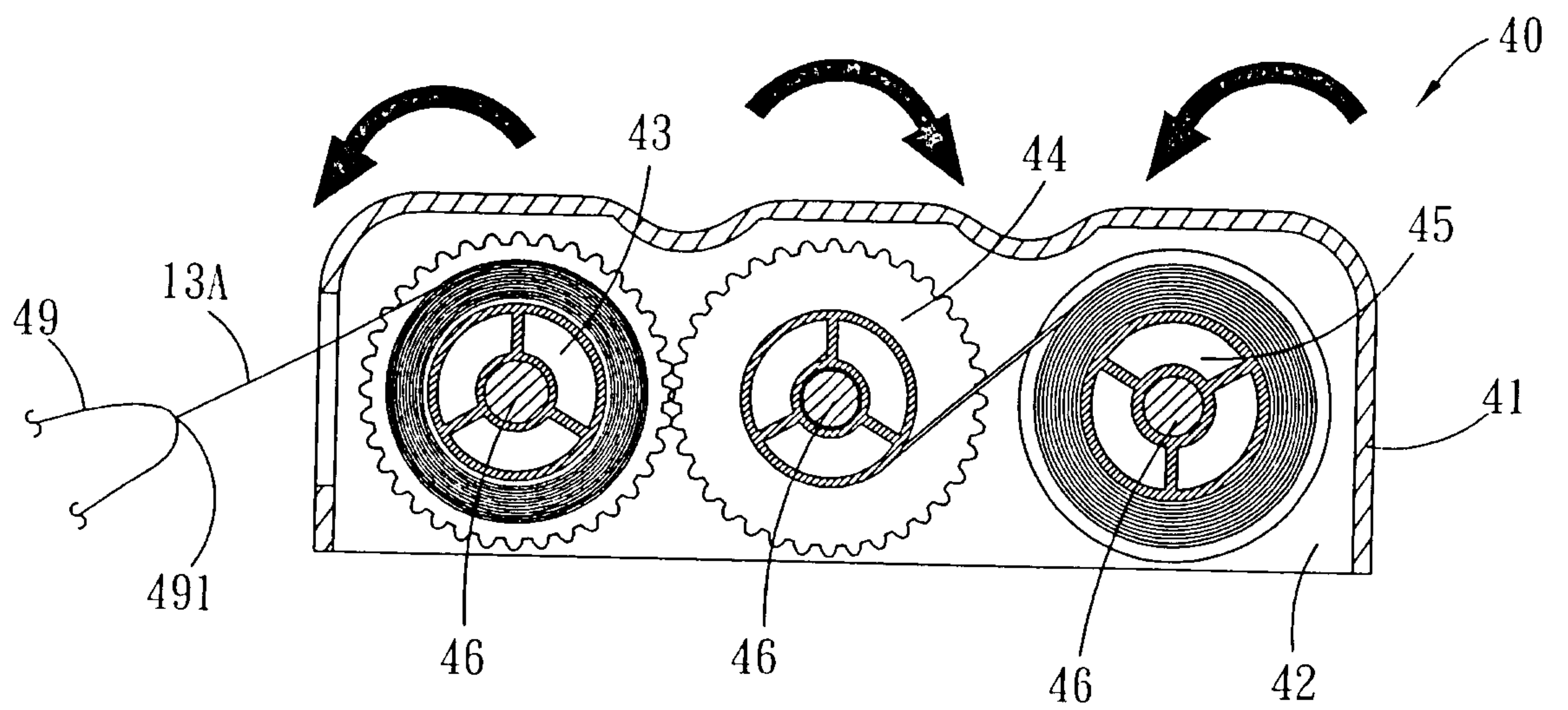


FIG. 7

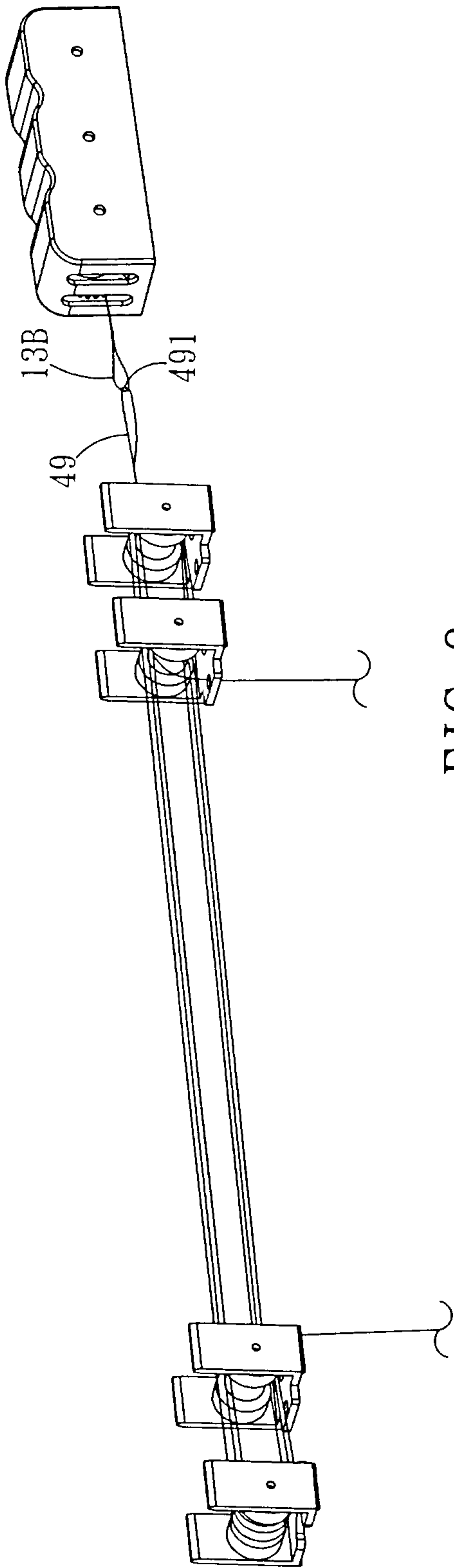


FIG. 8

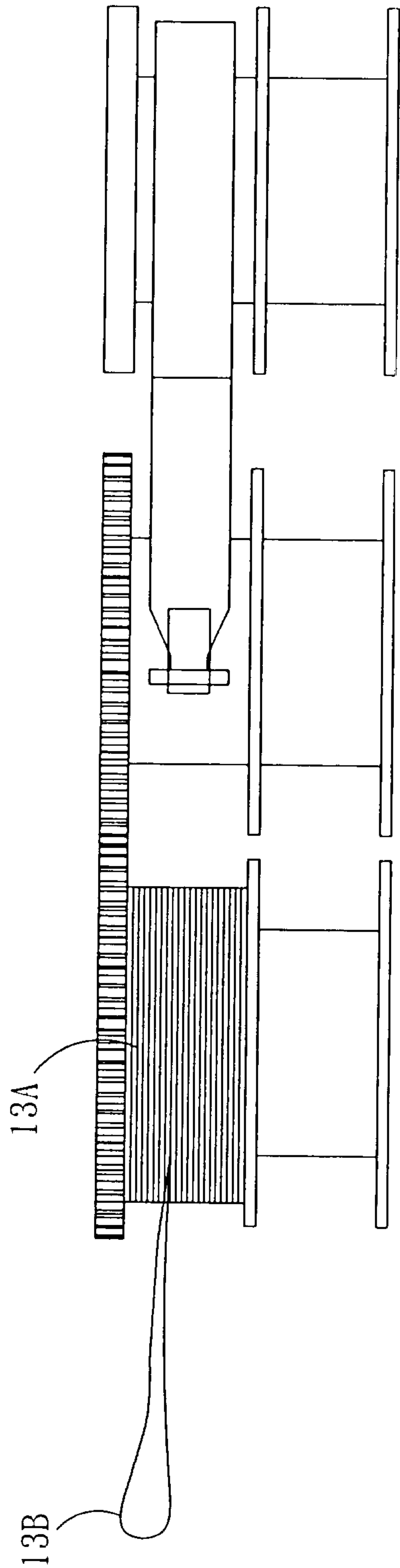


FIG. 9

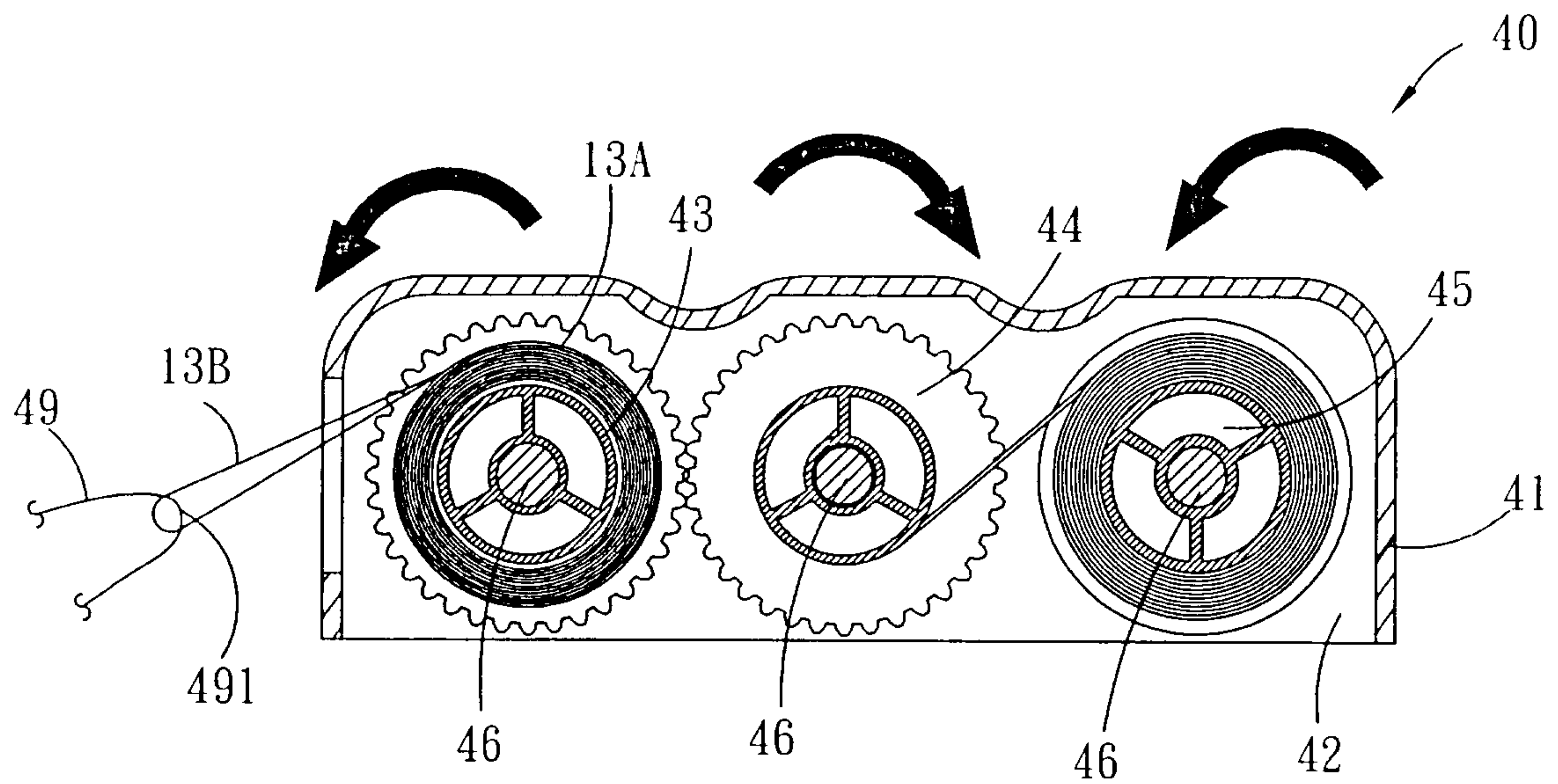


FIG. 10

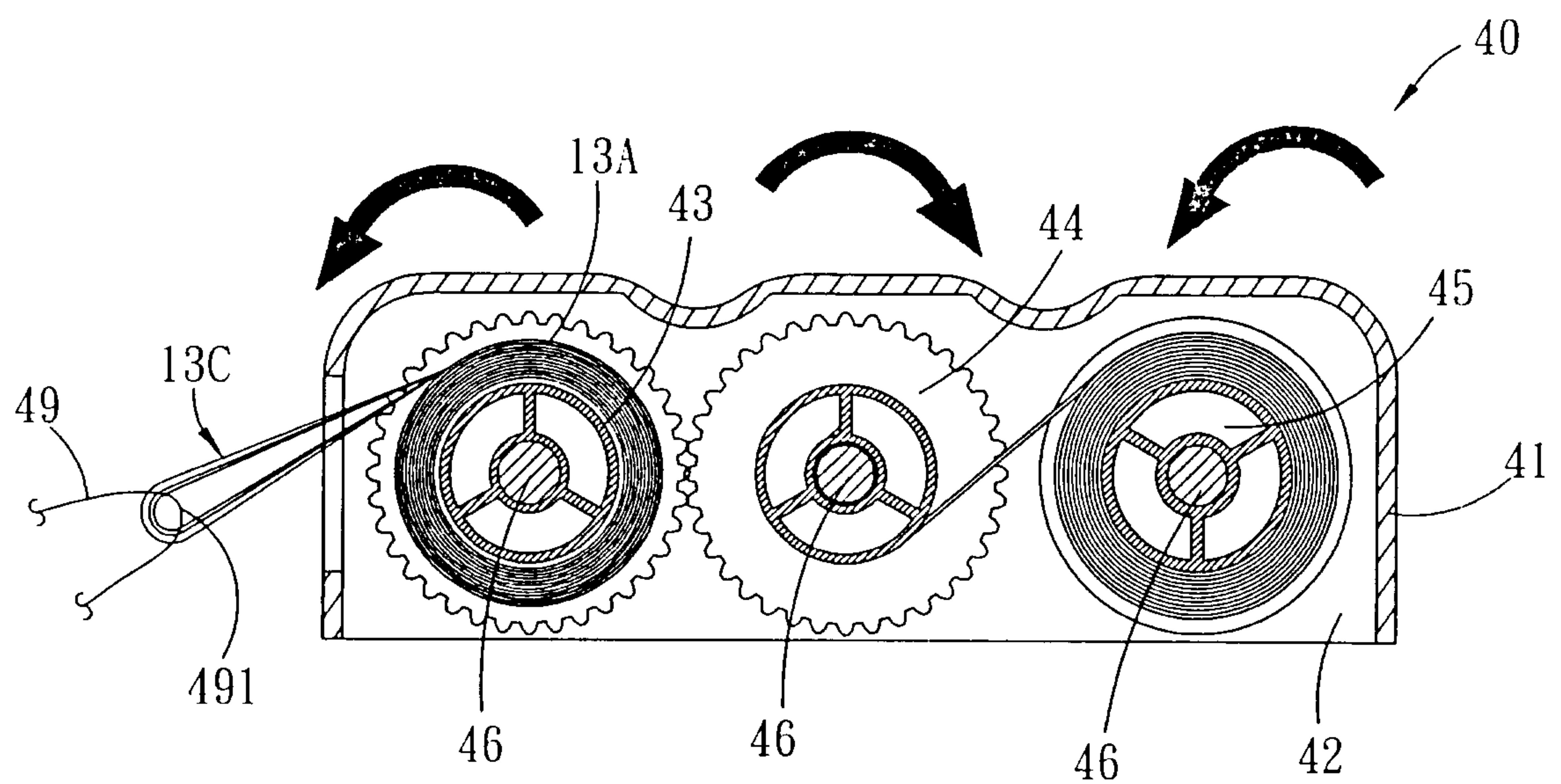


FIG. 11

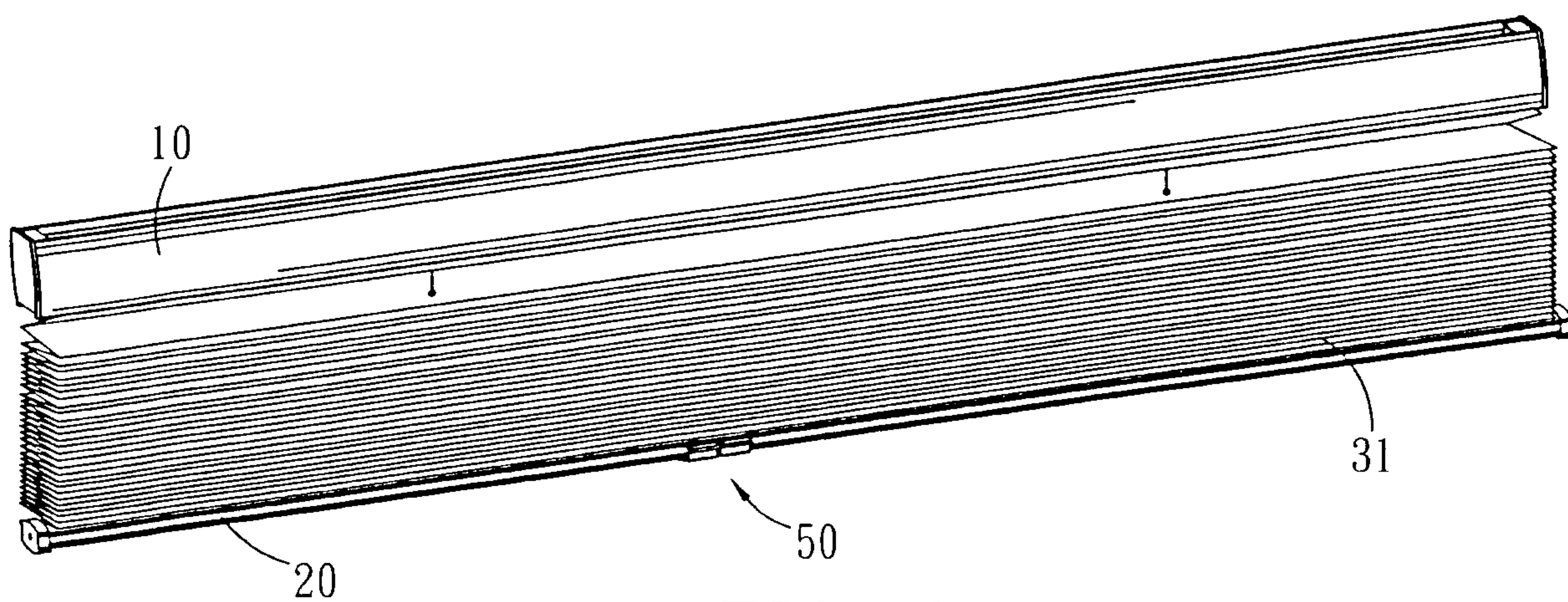


FIG. 12

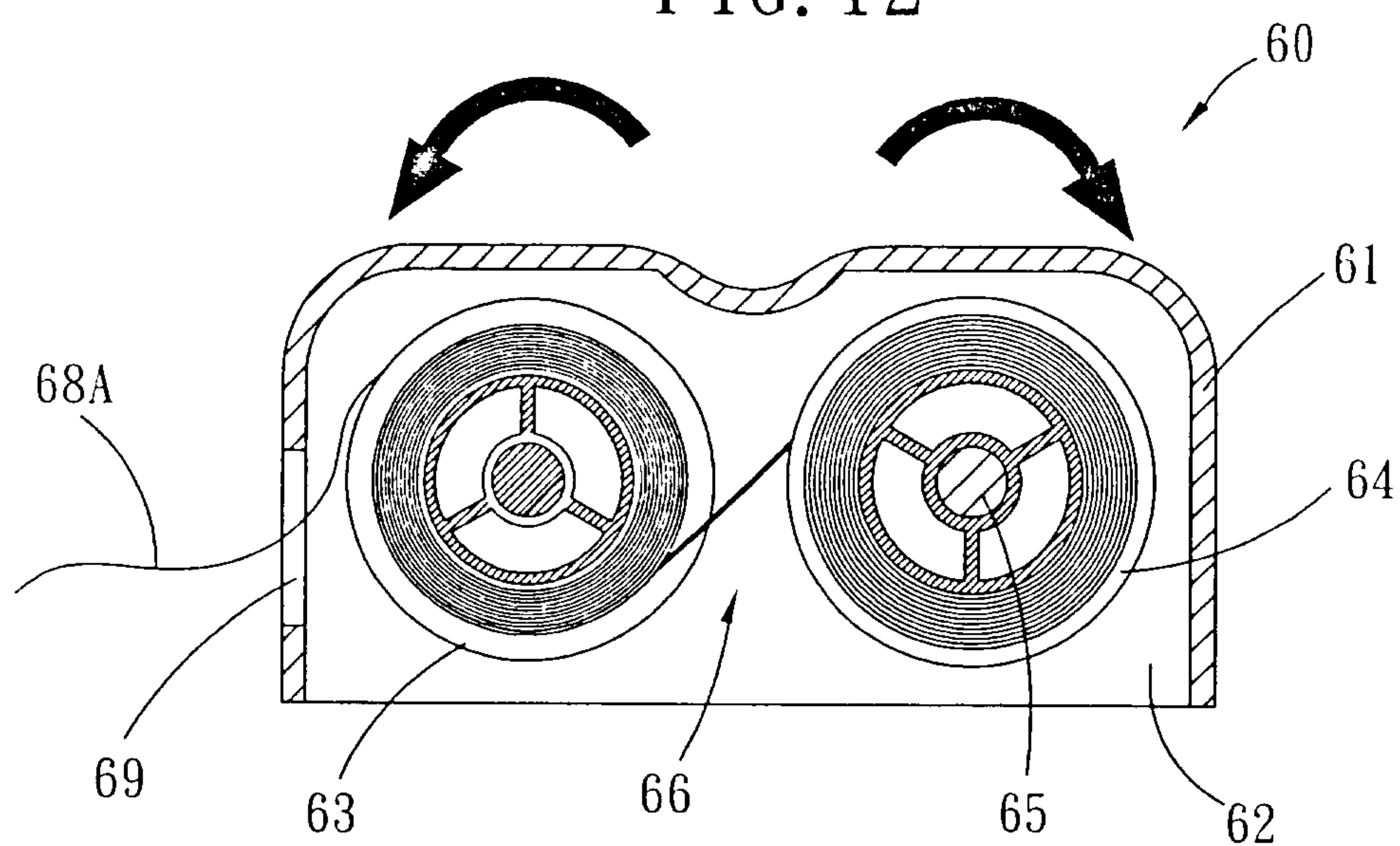


FIG. 13

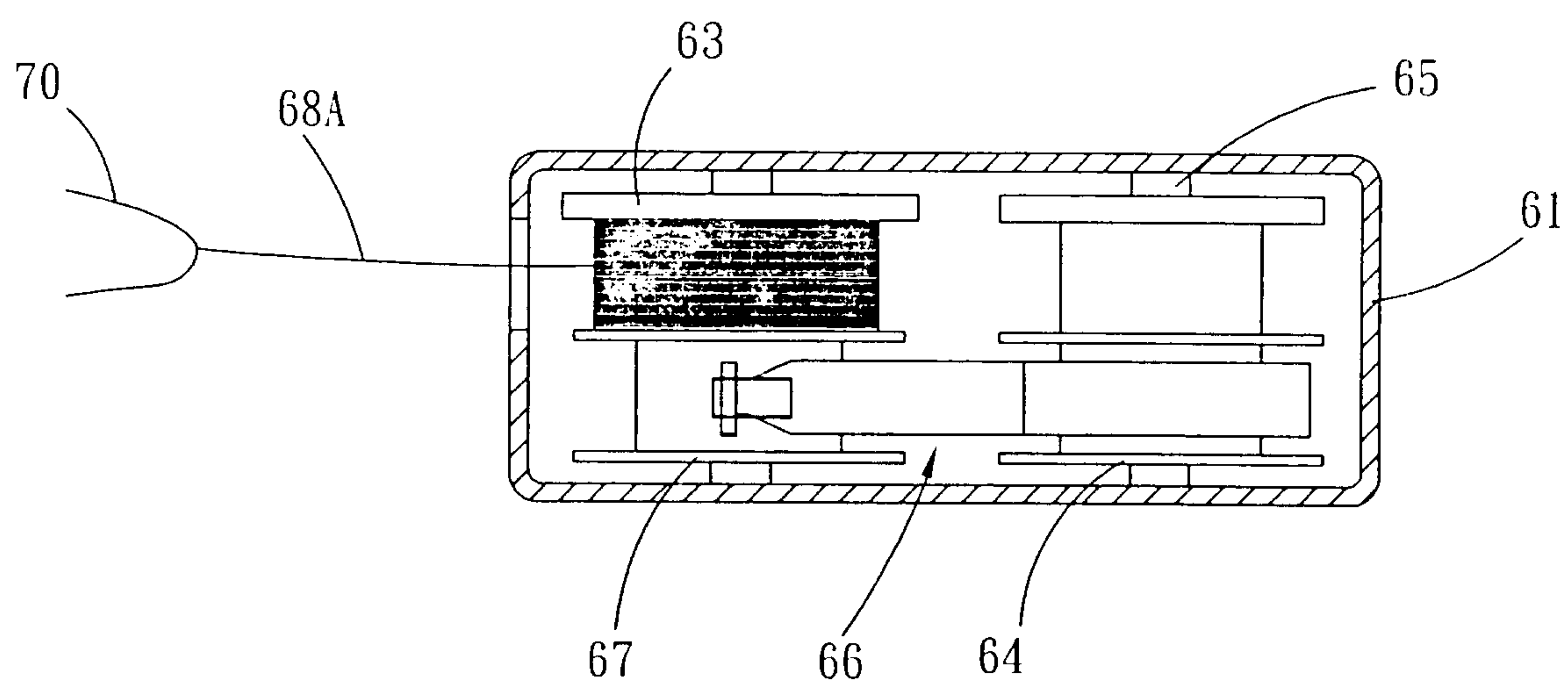


FIG. 14

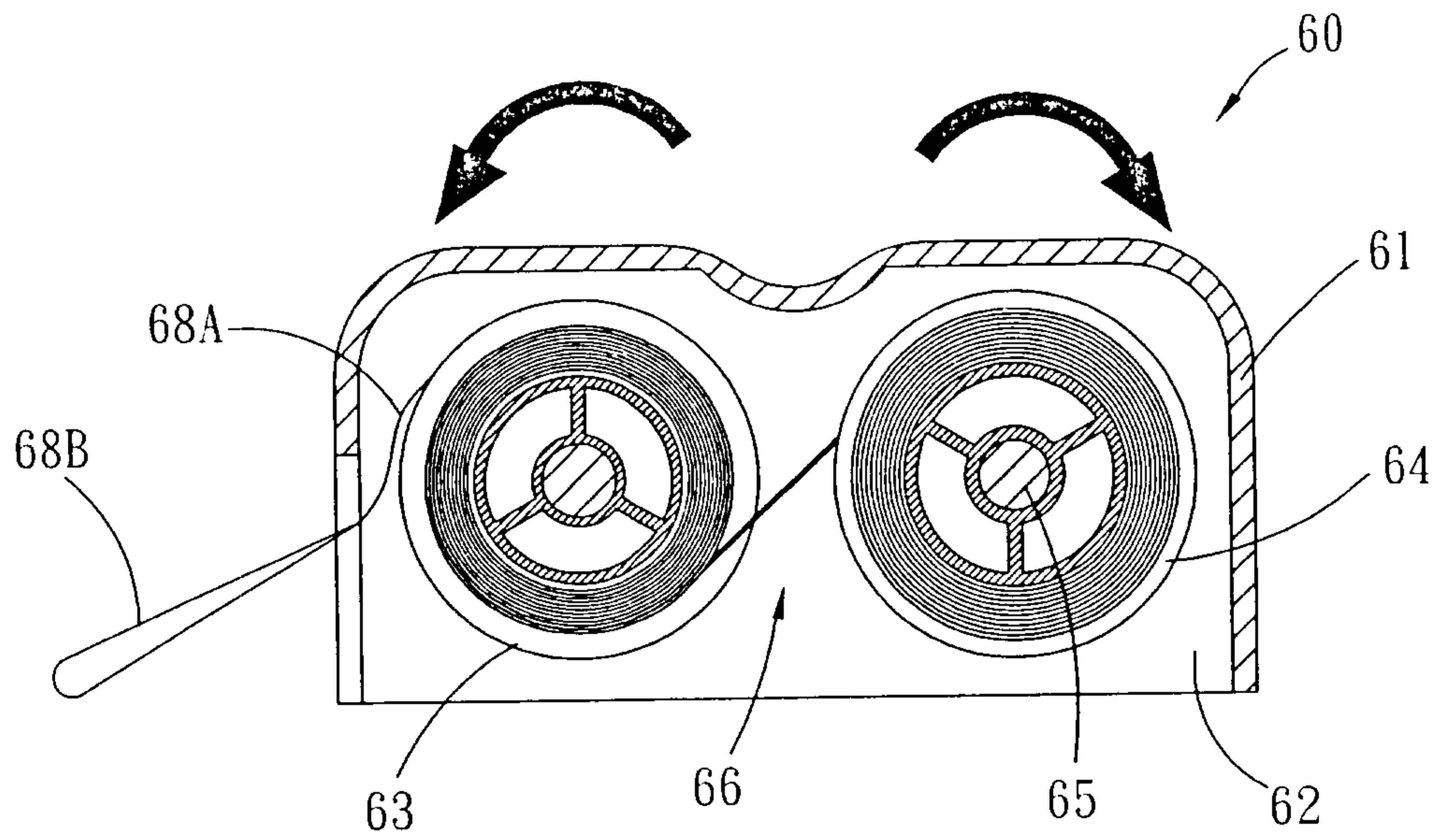


FIG. 15

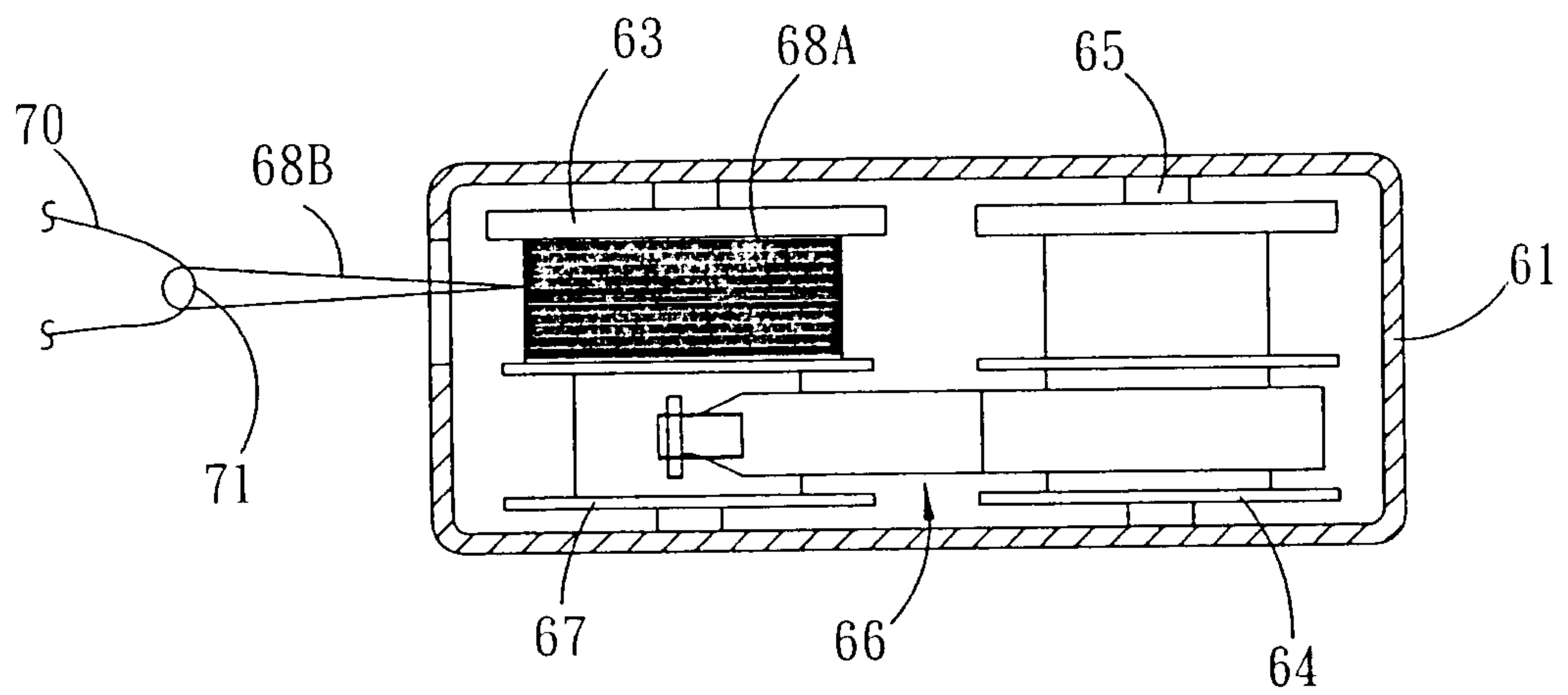


FIG. 16

