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A DUAL ROLLER SHADE
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US 4372432
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- (57) Claim

1. A dual roller shade comprising an outer roller, a first shade panel secured at one end to the outer roller, an inner roller mounted within the outer roller, and a second shade panel coupled to the inner roller, the outer roller being provided with a longitudinal slot and capable of accommodating the first shade panel in an up-rolled position, wherein the second shade panel is secured at one end to the inner roller, extending through the longitudinal slot of the outer roller, the inner roller being adapted to accommodate the second shade panel in the up-rolled position.

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COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

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Invention Title: "A DUAL ROLLER SHADE"

The following statement is a full description of this invention,
including the best method of performing it known to us:-

(File: 18827.00)

A DUAL ROLLER SHADE

The present invention relates to a dual roller shade comprising an outer roller, a first shade panel secured at one end to the outer roller, an inner roller mounted within the outer roller, and a second shade panel coupled to the inner roller, the outer roller being provided with a longitudinal slot and capable to accommodate the first shade panel in up-rolled position.

Such a dual roller shade is known inter alia from the FR 1,557,062 patent, whereby the first and second shade panels are lowered and raised from the outer roller. When the first shade panel is fully unrolled, the inner roller, which is coupled to the second shade panel, arranges for a restricted and independent movement of the second shade panel.

It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

In accordance with the present invention there is provided a dual roller shade comprising an outer roller, a first shade panel secured at one end to the outer roller, an inner roller mounted within the outer roller, and a second shade panel coupled to the inner roller, the outer roller being provided with a longitudinal slot and capable of accommodating the first shade panel in an up-rolled position, characterised in that the second shade panel is secured at one end to the inner roller, extending through the longitudinal slot of the outer roller, the inner roller being adapted to accommodate the second shade panel in the up-rolled position.

The shade assembly embodying the invention provides a roll-up and roll-down curtain. The first shade panel, which will usually be on the room side, is preferably a sheer curtain, and advantageously the second sheet panel is a light control and privacy shade.

In a preferred construction the inner and outer rollers are rotatable about the same axis and the central axis of the outer tube may be offset from the central axis of the inner roller, the axis of rotation of the inner and outer rollers being the central axis of the inner roller.

Desirably a pull cord is provided to raise and lower said shade by rotation of the rollers and this pull cord may be operatively connected to one of the rollers for raising and lowering the first and second shade panels by rotation of said inner roller.



In such a construction it is preferred that the pull cord be operatively connected to the inner roller by a dual acting spring clutch for raising and lowering the first and second shade panels by rotation of the inner roller. Advantageously mounting brackets are provided at each end of the rollers, the dual acting spring clutch on one end of the inner roller operatively connecting the inner roller to a bracket, a bearing rotatably mounting the other end of the inner roller on the bracket and bearings said each end of the outer roller journaling the outer roller on the inner roller.

For ease of operation, the first shade panel and the second shade panel may be provided at their other ends with first and second bottom rails respectively, and engagement of the second bottom rail on the outer roller provides a driving connection between the pull cord, the clutch and the inner roller, the second shade panel and the outer roller for rolling the first shade panel on the outer roller.

In a preferred embodiment of the present invention there is provided an improved dual shade assembly which is compact, easily operated and provides an attractive light and privacy control window covering.

Unless the context clearly requires otherwise, throughout the description and the claims, the words 'comprise', 'comprising', and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

In order that the present invention may more readily be understood, the following description is given, merely by way of example, reference being made to the accompanying drawings in which:-

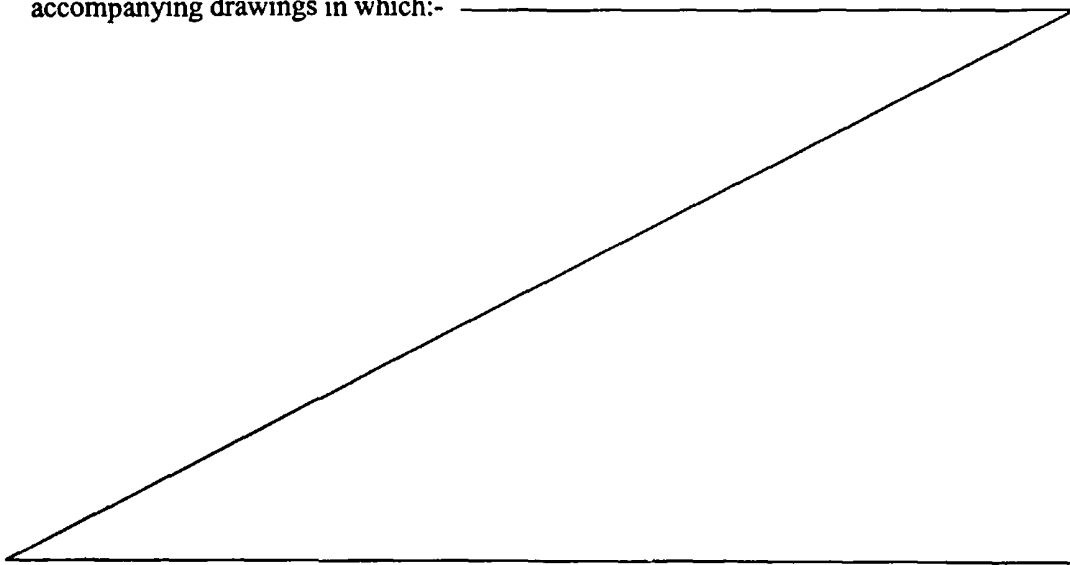


Fig. 1 is a perspective view of a dual shade assembly embodying the present invention mounted on a window frame.

5 Fig. 2 is a perspective view of the roller assembly shown in Fig. 1 but with the shades fully rolled and wound on the rollers.

Fig. 3 is an exploded view of the roller shade assembly.

10 Fig. 4 is a section view taken substantially in the horizontal plane of line 4-4 on Fig. 2.

Fig. 5 is an enlarged section view taken substantially in the transverse vertical plane of line 5-5 on Fig. 2.

15 Fig. 6 is an enlarged section view taken substantially in the transverse vertical plane of line 6-6 on Fig. 2.

Fig. 7 is an enlarged section view of the left hand end of the roller assembly shown in Fig. 4.

20 Fig. 8 is an enlarged partial section view of the right hand portion of the roller assembly shown in Fig. 4.

Fig. 9 is an enlarged transverse vertical section view taken substantially in the plane of line 9-9 on Fig. 1.

25 Fig. 10 is a section view similar to Fig. 9 but showing the inner shade fully wound and the outer shade partially extended.

Fig. 11 is a transverse cross-sectional schematic view showing the axial relationship of the outer tube and inner tube.

30 Fig. 12 is a longitudinal cross-sectional view showing the axial relationships of the outer tube and inner tube.

The present invention is embodied in a dual roller double acting friction clutch driven shade assembly 20 actuated by a single pull cord 21 to raise or lower an
5 outer or front decorative or sheer shade 22 and an inner or rear light control and privacy shade 24 (Figs. 1 and 2). Each shade 22, 24 is provided with a bottom rail 25, 26 respectively which is of sufficient weight to hold its respective shade in a downwardly extended
10 unrolled position and maintain a tension on the shade during rolling and unrolling. The shades and rollers are mounted between end plates 28, 29 mounted at each end of a housing or valance 30 supported by mounting brackets 31 secured to an architectural opening such as a window
15 frame or adjoining wall 32.

The inner or rear shade 24 is wound on an inner roller 34 journaled between the end plates 28, 29 (Figs. 3 and 4). The inner roller 34 is formed by a
20 roller tube 38 having a journal assembly 39 mounted at one end and a dual acting clutch and pull cord assembly 40 mounted at the other end. The inner or rear shade is secured along one transverse edge 41 in any suitable manner to the roller tube 38, and when unrolled, depends from the roller 38 terminating in an opposite transverse
25 bottom edge 42 to which is secured in any appropriate manner a bottom rail 25. The length and width of the shade 24 is determined by the length and width of the window opening to be covered. The shade is formed of any appropriate light and privacy control material, whether
30 opaque or translucent, and whether fabric, plastic or any other suitable material. The shade panel may be attached to the inner roller 38 in any appropriate manner, such as by an adhesive, groove and insert strip or the like. Likewise, the shade panel may be attached at its bottom
35 edge to the bottom rail by adhesive, or by a groove and insert attachment construction. A weight rod 37 inserted in the bottom rail adds mass to the rail and can be

adjustably positioned to eliminate skew in the shade panel.

For rotatably mounting one end of the inner roller tube 38 to an adjacent mounting plate 28, the journal assembly 39, as shown in Figures 3, 4 and 7, includes a cylindrical bearing sleeve 44 defining an outer cylindrical bearing surface 45 with an integral insert plug portion 46 adapted to be inserted into the end of the inner roller tube 38 and held tightly therein by frictional engagement between external ribs 48 on the plug and the inner wall surface of the tube 38. A stub shaft 49 extends outwardly from the inner surface of the end plate 28 and is journaled in a sleeve bearing 50 defined and integrally formed in the end of the insert plug 46 for rotatably supporting the inner roller tube on the adjoining end plate 28. The journal body 39 may be rotatably held on the stub shaft 49 by a screw or like fastener 51 extending through the cylindrical journal body 39 into threaded engagement with the end of the stub shaft 49.

At its opposite end the inner roller tube 38 is engaged with the dual acting spring clutch and pull cord assembly 40 which supports the roller tube on the adjoining end plate 29, as shown in Figures 3, 4, and 7. The clutch assembly 40 is formed by a clutch housing 52 defining an outer cylindrical bearing surface 54 and having an inset sleeve plug 55 integrally formed thereon for insertion into the end of the roller tube 38. The sleeve plug 55 is held tightly in the roller tube by engagement between friction ribs 56 thereon and the inner surface of the tube 38.

The clutch assembly 40 includes a clutch cylinder sleeve 58 adapted to receive a stub shaft 59 on the adjacent end plate 29 for mounting the clutch assembly and tube thereon. For keying the clutch assembly to the end plate 29, a clutch assembly end plate 60 integrally formed with the clutch cylinder sleeve 58 defines an aperture or slot 61 which engages a pin or key 62 on the end plate 29.

On the clutch cylinder sleeve 58 is journaled a clutch sleeve 64 having a pull cord wheel 65 thereon. The sleeve 64 defines an axially extending slot 66 for receiving and engaging the tangs 68,69 of a helical clutch spring 70
5 mounted on the clutch sleeve 64. The clutch housing sleeve 52 receives and houses the clutch cylinder sleeve 58, clutch sleeve 64 and dual clutch spring 70. The clutch assembly is secured to the end plate 29 by a screw fastener 57 extending through the clutch into threaded engagement with the
10 mounting shaft 59.

For receiving and frictionally engaging the pull cord 21, the pull cord wheel 65 defines a plurality of slotted teeth 71. By pulling on the pull cord 21 in one direction, the cord wheel 65 is rotated and the inner or
15 rear shade is unwound and lowered. Pulling on the cord 21 in the opposite direction raises the inner shade by winding it on the roller tube 38. The friction clutch prevents the shade from being wound or unwound without using the cord. The inner shade and clutch assembly is described in further
20 detail in US Patent 4,372,432.

The outer or front shade 22 is wound on an outer roller 72 which surrounds and encloses the inner roller tube 38. The outer roller assembly 72 is formed by a roller tube 74 surrounding the inner roller tube 38 and is provided with
25 end plates 75,76 defining cylindrical bearings 78,79 defining internal bearing surfaces 80,81 respectively journaled on the outer bearing surfaces 45,54 of the inner roller tube journal assembly 39 and clutch assembly 40. The end plates 75,76 further define external flanges 82 with
30 supporting ribs 84, the outer edges of which frictionally engage the inner surface of the outer tube 74 to secure the end plates 75,76 tightly thereto.

The outer or front shade 22 is secured along one transverse edge to the outer roller tube 74 by insertion of the edge into a slot or channel 85 extending longitudinally along the outer tube and secured thereon by an insert strip 86. At its opposite edge the shade is secured to the bottom rail 26 again by insertion of the bottom edge of the shade into a slot 88 in the bottom rail and held therein by an insert strip 89. Appropriate decorative end covers 90 may be provided for enclosing the ends of the bottom rail.

In order to raise and lower the inner or rear shade 24 when the same is surrounded by the outer tube 74, the outer roller tube 74 defines a slot 92 through which the shade 24 extends. To reduce friction on the rear shade, the edges 94 of the slot 92 are coated with an anti-friction coating 95.

For receiving and nesting the bottom rail 25 of the inner shade 24 when the inner shade is wound on the inner tube 38 thereby to couple the inner and outer tubes together, the outer tube defines a longitudinal channel 96 adjacent the slot 92 and shaped to receive the bottom rail 25 of the inner or rear shade with one edge surface thereof forming a continuation of the surface of the outer tube 74.

As the inner tube 38 is rotated to wind the inner shade thereon, the bottom rail 25 engages and nests within the outer tube channel 96. Continued rotation of the inner roller assembly 34 by the pull cord 21 then rotates the outer roller assembly to wind the outer or front shade 22 on the outer roller tube 74. The outer or front shade rolls on the outer tube 74 thereby locking the inner shade bottom rail 25 in the channel 96.

To lower the shades the direction of pull on the pull cord 21 is reversed, the tubes rotate together, being locked together, thereby unwinding and lowering the front or sheer panel 22 until it is fully extended and hanging freely from the outer tube under the tension

applied by the bottom rail thereon. The bottom rail is of sufficient weight to ensure that the shade panel is lowered under the force of gravity and remains tightly extended in its lowered position.

5 At its unwound lowermost point the front or outer shade hangs from the outer roller thereby releasing the inner shade rail 25 and inner shade panel for lowering or raising. To ensure that the outer roller tube is held relatively stationary by the depending shade panel and
10 bottom rail, thereby allowing for manipulation of the inner or rear panel, the centre axis 99 of the outer tube may be offset from the axis of rotation 98 of the outer roller tube 7 (Fig. 11). Both the inner and outer roller tubes 38,74 have the same axis of rotation 98, while the centre axis 99
15 of the outer roller is offset therefrom. The axis of rotation 98 of the outer tube is on a diametrically opposite side of its centre axis 99 from the point or line of attachment of the outer or front shade panel 22. This orientation creates a moment arm X which provides a
20 resistance to winding of the outer shade until the inner shade 24 has been fully retracted and the bottom rail 25 thereof is nested in the channel 96 defined in the outer tube 74. The slightly eccentric rotation produced by the off-centre axis of rotation of the outer roller tube 74 has
25 a further advantage. When the outer roller supports a sheer, lightweight fabric panel or panel of other lightweight material, rotation of the roller slightly shakes the panel as it is rolled or unrolled to even the wrapping action and reduce wrinkles and buckles in the material.
30 The mounting brackets 31 for securing the shade assembly to the window frame 32 may be of any appropriate configuration. As shown in Figs. 2 and 3, the brackets are L-shaped with one leg 100 adapted to be fastened to the window frame by appropriate mounting fasteners 101 such as
35 screws. The other leg 102 is secured to the valance by an appropriate snap insert connection. To

this end the legs extend horizontally and define an outer edge or lip 104 adapted to engage in an upper and rearwardly extending channel 105 formed on the valance 30 with the valance thereby suspended from the leg in cantilever fashion. The upper leg may likewise be
5 screwed to the window frame by appropriate screw fasteners 101. Alternatively, any appropriate fastening and mounting structure may be utilized such as the structures conventionally used for hanging draperies,
10 vertical blinds and the like.

In use, the shades are unwound and lowered by first completely lowering the outer or sheer panel (Fig. 10) following which the light and privacy control panel can be raised and lowered to a desired position (Fig. 9).
15 The shades are retracted by first completely retracting the inner or rear light and privacy control shade following which the decorative sheer shade panel is wound on the outer roller (Fig. 6). The only control utilized is the single pull cord 21 which actuates both shade
20 panels 22, 24 to raise and lower the same.

Although a friction clutch operated inner roller has been described, it will be apparent that other clutch and spring mechanisms may be utilized. Likewise, the panels are not limited to light control or window coverings, and
25 may be of any desired configuration and composition. One panel may, for example, be a movie or video projection screen and the other a scrim.

While a certain illustrative embodiment of the present invention has been shown in the drawings and described above in considerable detail, it should be
30 understood that there is no intention to limit the invention to the specific form and construction disclosed. On the contrary, the intention is to cover all modifications, alternative constructions, equivalents
35 and uses falling within the spirit and scope of the invention as expressed in the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A dual roller shade comprising an outer roller, a first shade panel secured at one end to the outer roller, an inner roller mounted within the outer roller, and a second shade panel coupled to the inner roller, the outer roller being provided with a longitudinal slot and capable of accommodating the first shade panel in an up-rolled position, wherein the second shade panel is secured at one end to the inner roller, extending through the longitudinal slot of the outer roller, the inner roller being adapted to accommodate the second shade panel in the up-rolled position.
2. A shade according to claim 1, wherein the inner and outer rollers are rotatable about the same axis.
3. A shade according to claim 2, wherein the central axis of the outer roller is offset from the central axis of the inner roller and wherein the axis of rotation of said inner and outer rollers is the central axis of the inner roller.
4. A shade according to claim 2 or 3, wherein a pull cord is provided to raise and lower said first and second shade panels by rotation of said rollers.
5. A shade according to claim 4, wherein said pull cord is operatively connected to one of said rollers for raising and lowering said first and second shade panels by rotating said roller.
6. A shade according to claim 5, wherein said pull cord is operatively connected to the inner roller by a dual acting spring clutch for raising and lowering said first and second shade panels by rotating said inner roller.
7. A shade according to claim 6, further comprising mounting brackets at each end of said rollers, said dual acting spring clutch on one end of said inner roller operatively connecting said inner roller to a bracket, a bearing rotatably mounting the other end of said inner roller on said bracket, and bearings at each end of said outer roller journaling said outer roller on said inner roller.
8. A shade according to claim 6 or 7, wherein said first shade panel and said second shade panel are provided at their other ends with first and second bottom rails, respectively, wherein engagement of said second bottom rail with said outer roller



provides a driving connection between said pull cord, said clutch, said inner roller, said second shade panel and said outer roller for rolling said first shade panel on said outer roller.

9. A shade according to claim 8, wherein said inner roller is capable of being rotated
5 independently of said outer roller.

10. A shade according to any preceding claim, wherein the first shade panel is a sheer curtain.

11. A shade according to any preceding claim, wherein said second shade panel is a light control and privacy shade.

10 12. A dual roller shade substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

DATED this 17th day of NOVEMBER, 1998

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ABSTRACT

A double panel window shade (20) is formed by shade panels (24, 22) wound on inner and outer coaxial rollers (34, 72). The inner roller (34) includes a shaft (49, 59) secured at each end and journaled in mounting brackets (28, 29) at each end of the inner
5 roller (34). The outer roller (72) includes end plates (75, 76) journaled on the inner roller shafts (49, 59). The outer roller (72) defines a slot (92) for receiving and passing the inner shade (24) when said outer shade (22) is fully unrolled from the outer roller (72). Each shade panel includes a bottom rail (25, 26). A pull cord (21) is provided for raising and lowering the shades by rotating the rollers (34, 72). The pull cord (21) is
10 operatively connected to the inner roller (34) by a dual direction spring clutch (40). The rollers (34, 72) are formed by a pair of roller tubes (38, 74) aligned one inside the other and each having a central axis (98), the axis of rotation (98) of each tube being the central axis of the inner tube (38), and the central axis (99) of the outer tube (74) being spaced from its axis of rotation (98).

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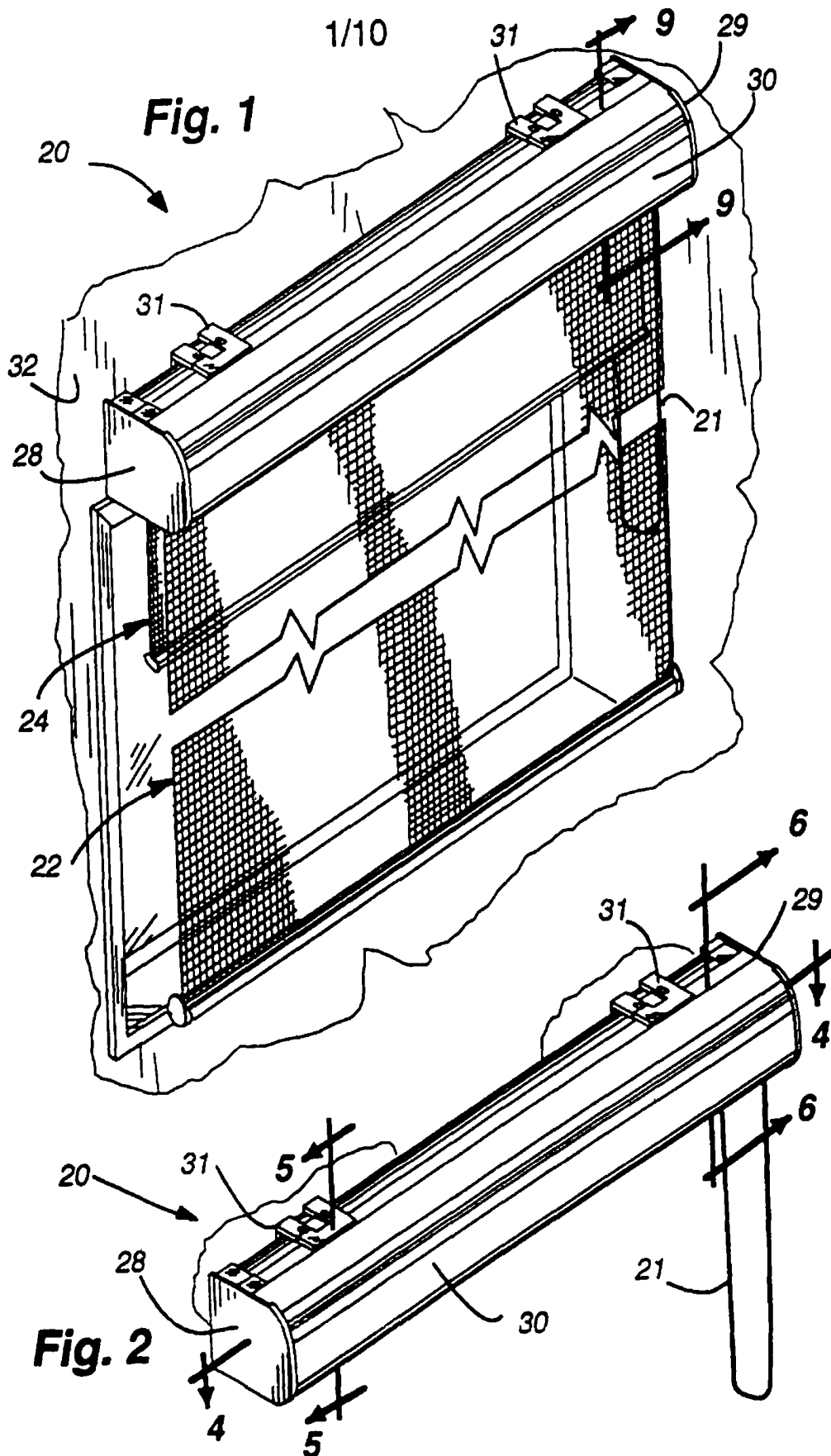
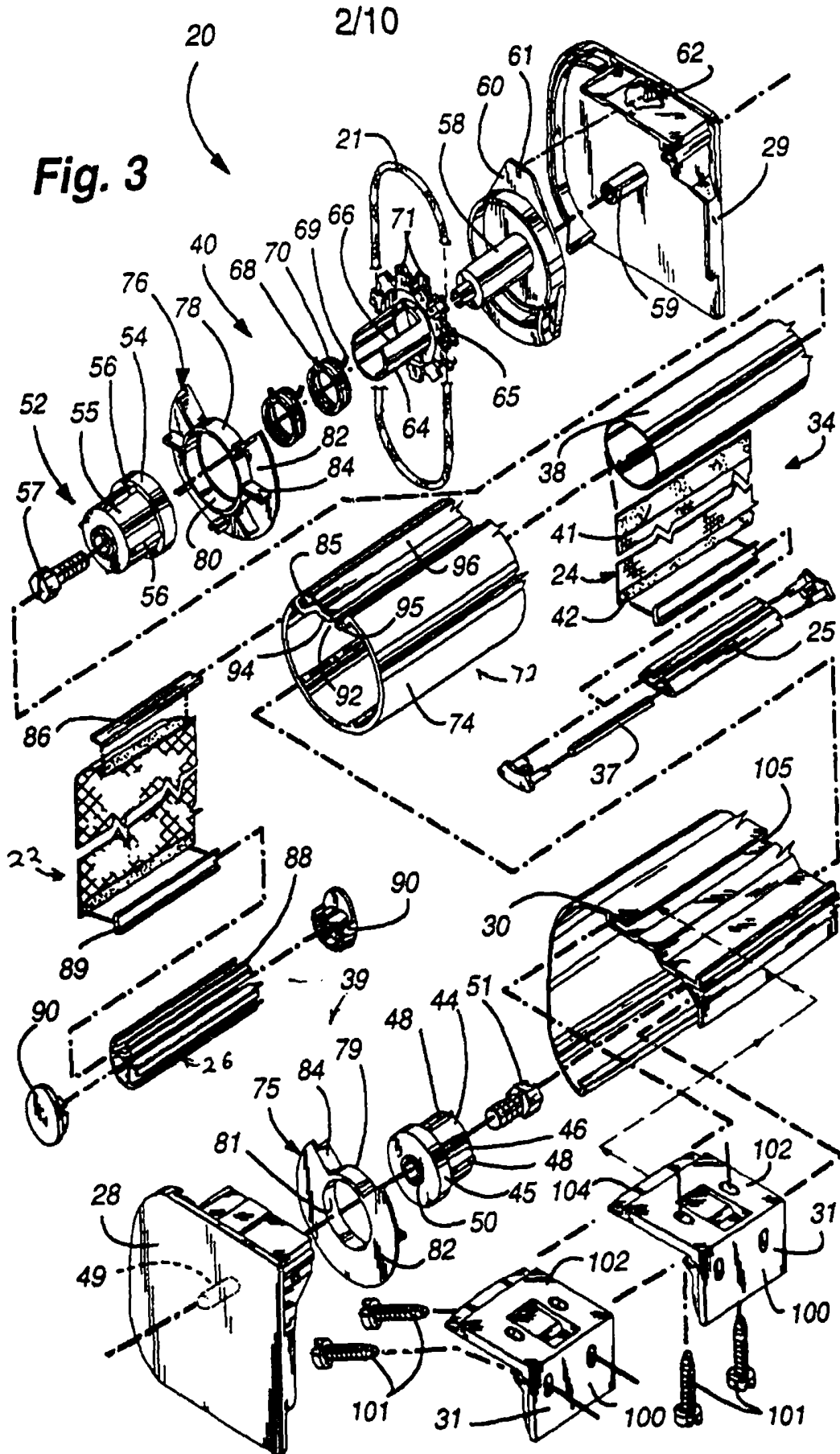


Fig. 3



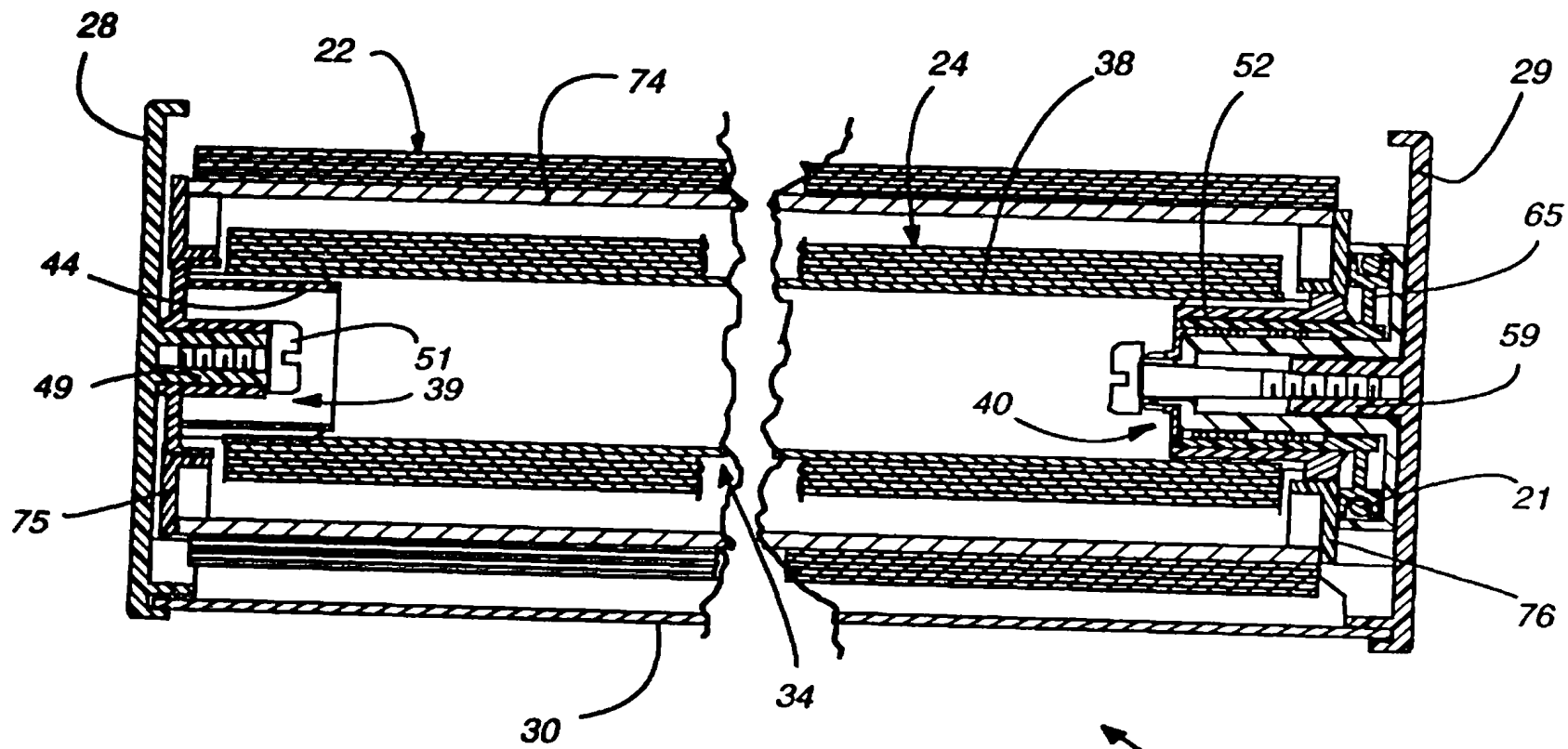


Fig. 4

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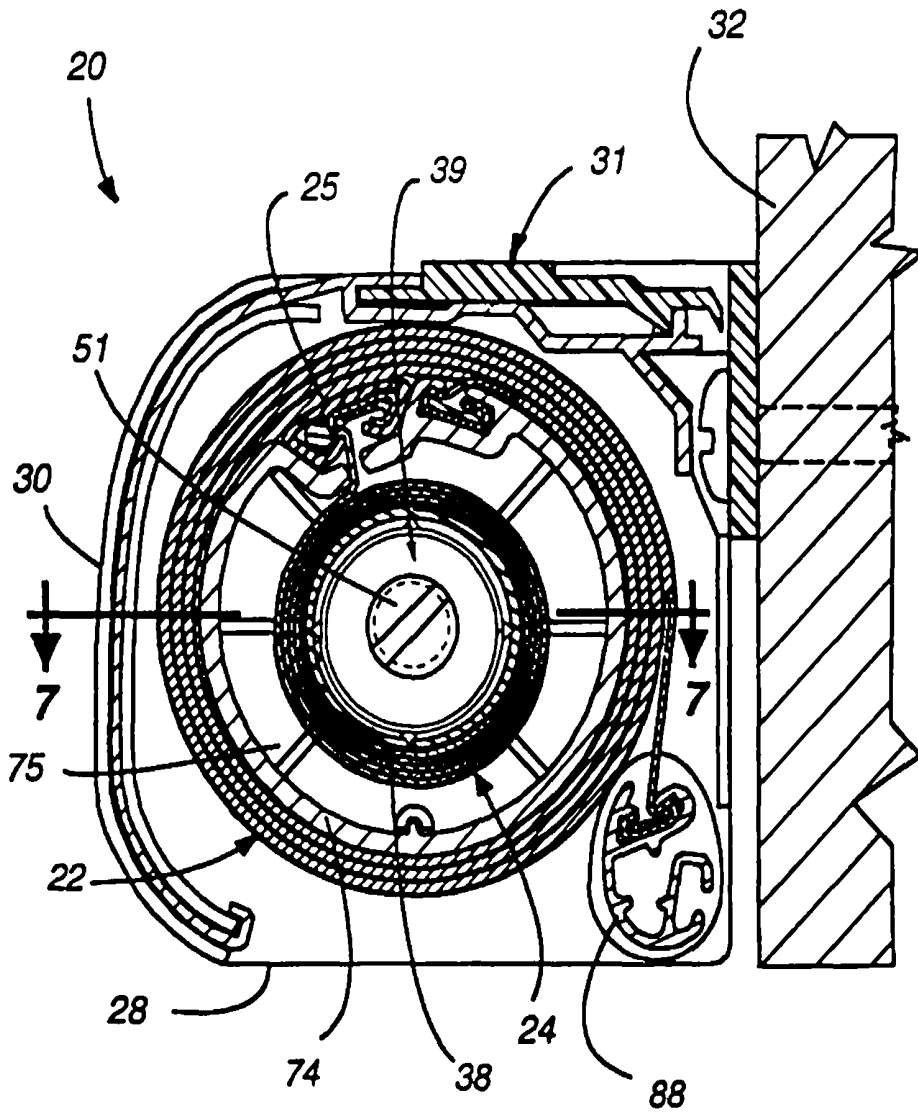


Fig. 5

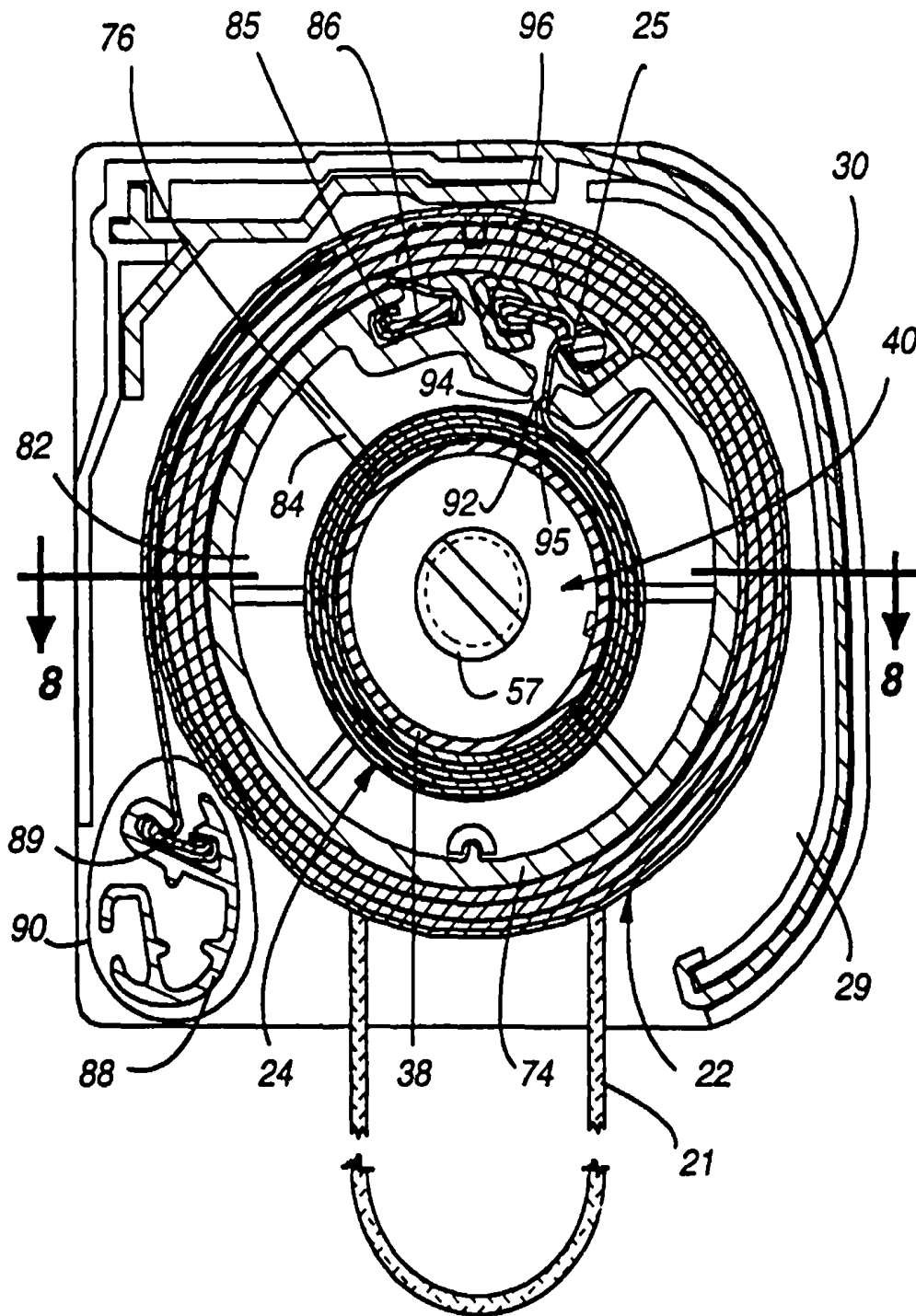


Fig. 6



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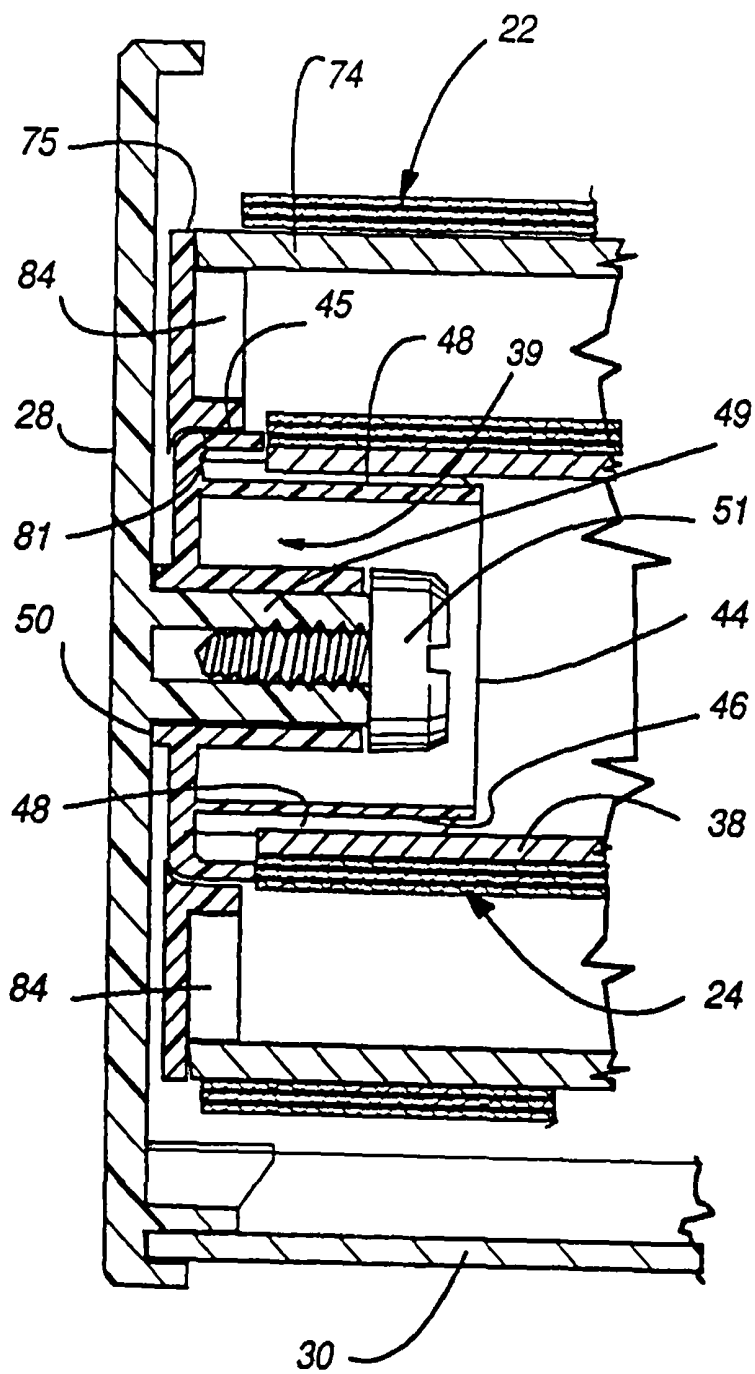


Fig. 7

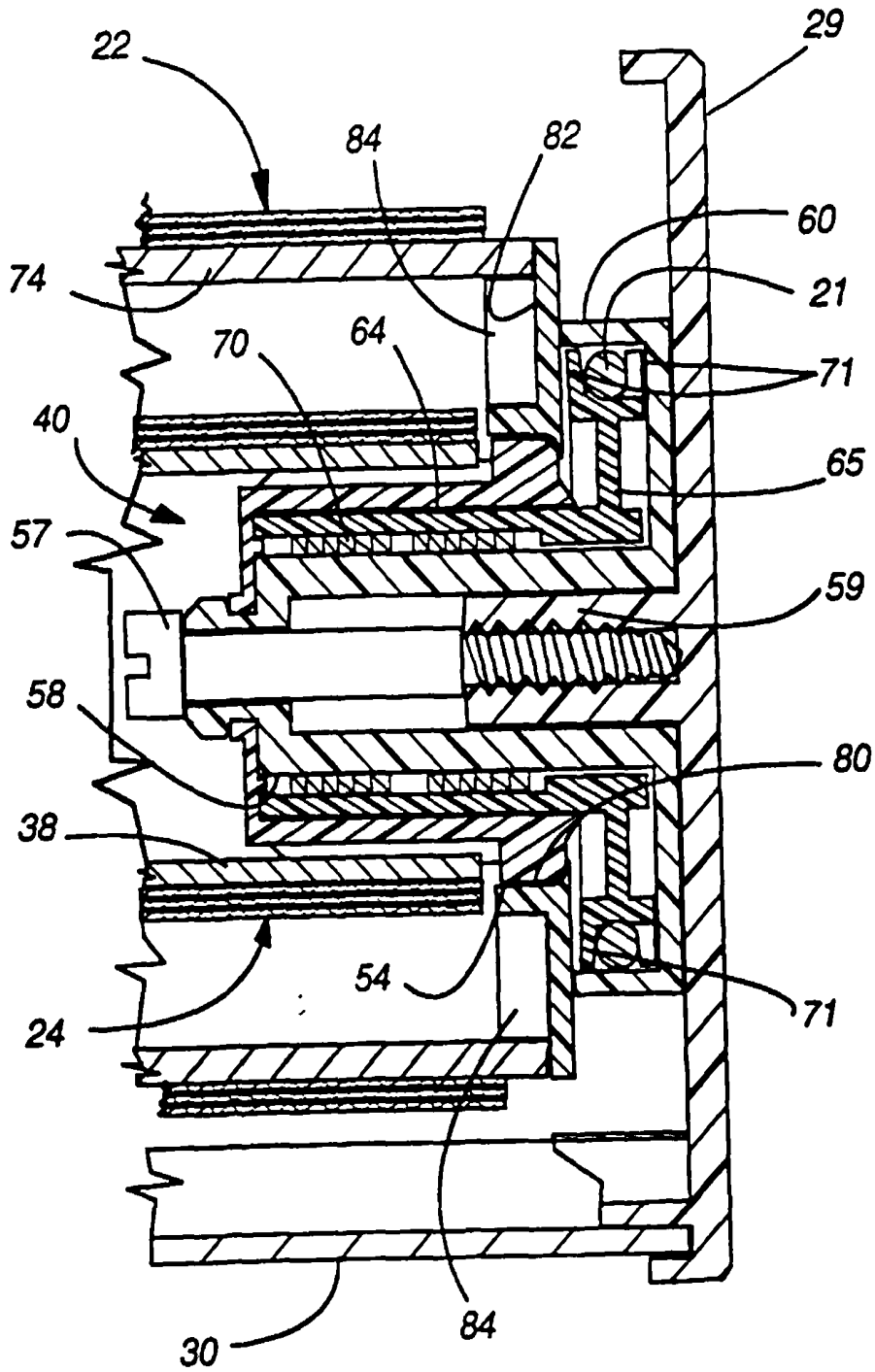


Fig. 8

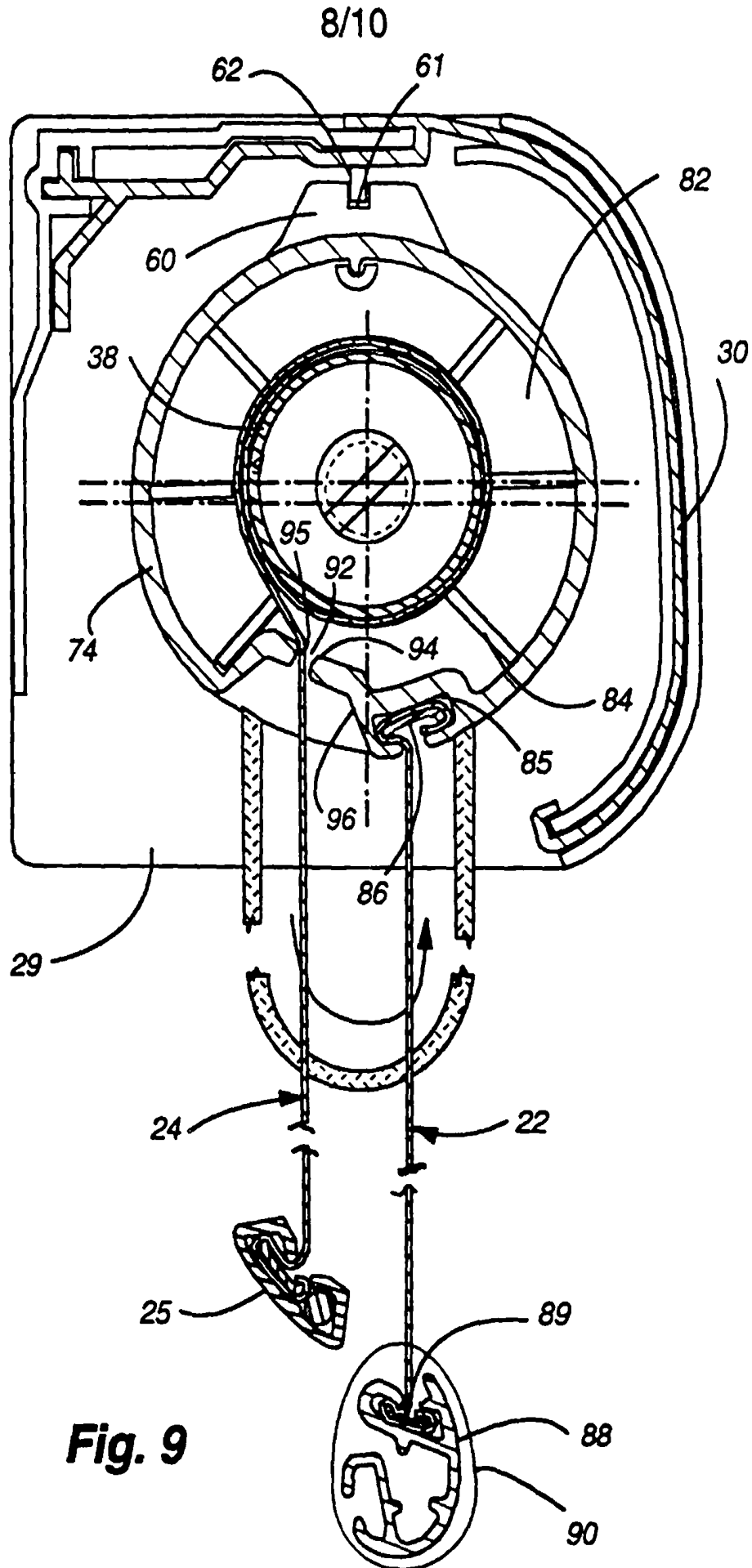


Fig. 9

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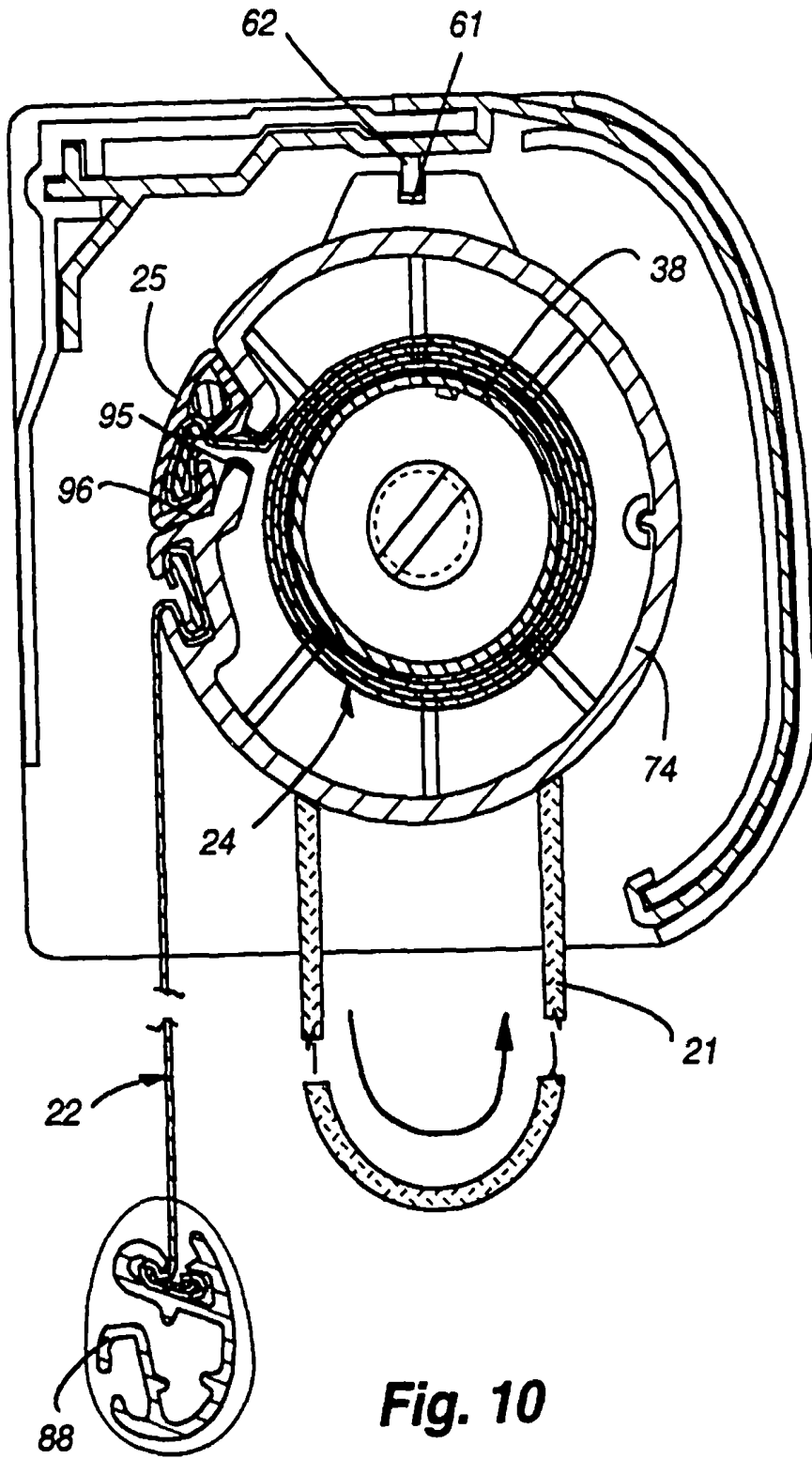
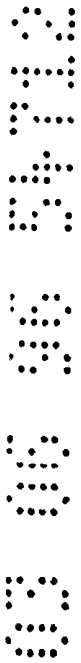


Fig. 10



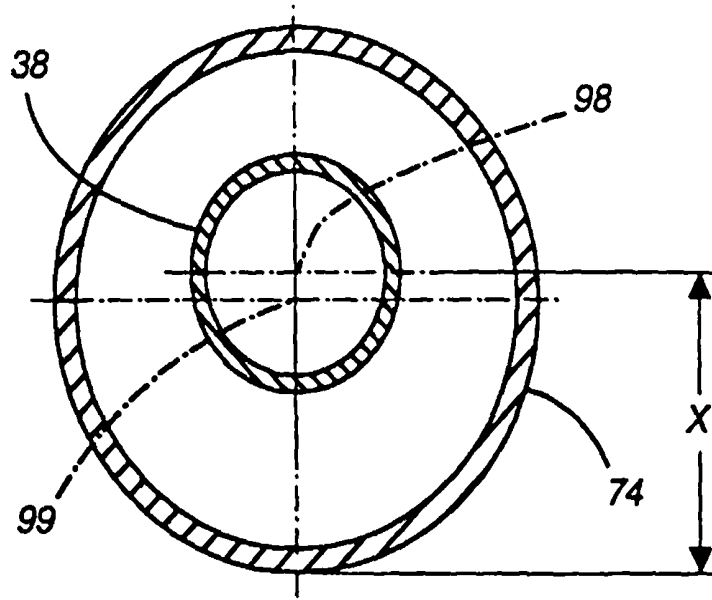


Fig. 11

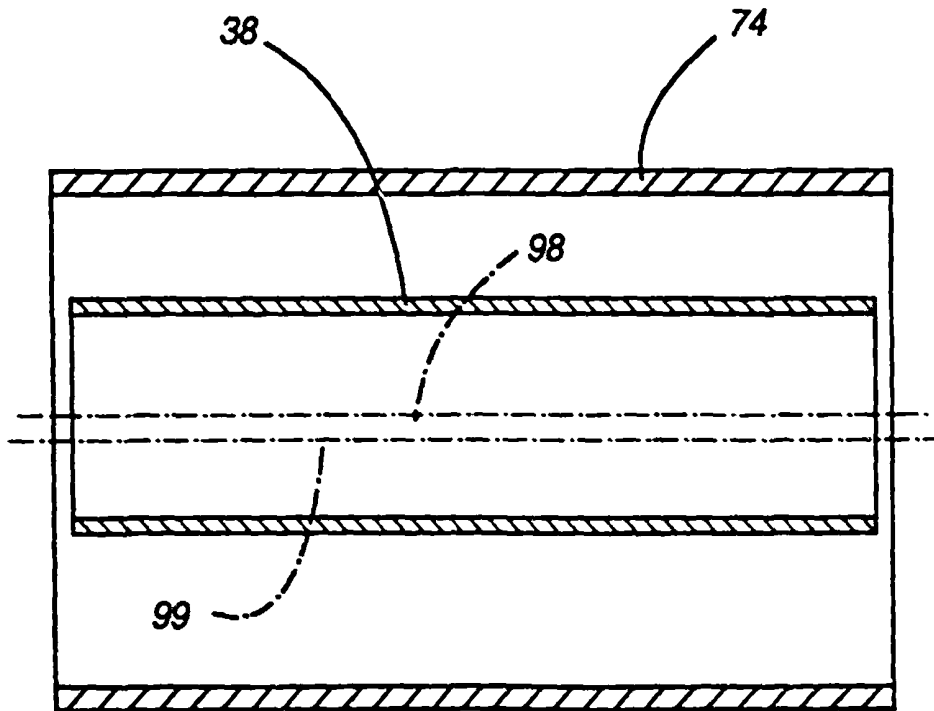


Fig. 12

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