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Berman et al.

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[54] **WINDOW SHADE ROLLER ASSEMBLY**

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[73] Assignee: **Joel Berman**, Hewlett, N.Y.

[21] Appl. No.: **479,948**

[22] Filed: **Mar. 29, 1983**

Related U.S. Patent Documents

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Issued: **Apr. 6, 1982**
Appl. No.: **18,763**
Filed: **Mar. 8, 1979**

U.S. Applications:

[63] Continuation-in-part of Ser. No. 716,153, Aug. 20, 1976, Pat. No. 4,223,714.

[51] **Int. Cl.**[3] **E06B 9/20**

[52] **U.S. Cl.** **160/309;** 160/298; 160/319

[58] **Field of Search** 160/309, 298, 307, 325, 160/319, 263, 249

[56] **References Cited**

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Primary Examiner—Kenneth Downey
Attorney, Agent, or Firm—Philip H. Gottfried

[57] **ABSTRACT**

A shade roller having a chain operated mechanism at one end thereof for controlling the position of the shade on the window, and means for maintaining the chain operated mechanism against a bracket to help insure proper positioning and operation of the said mechanism.

11 Claims, 19 Drawing Figures

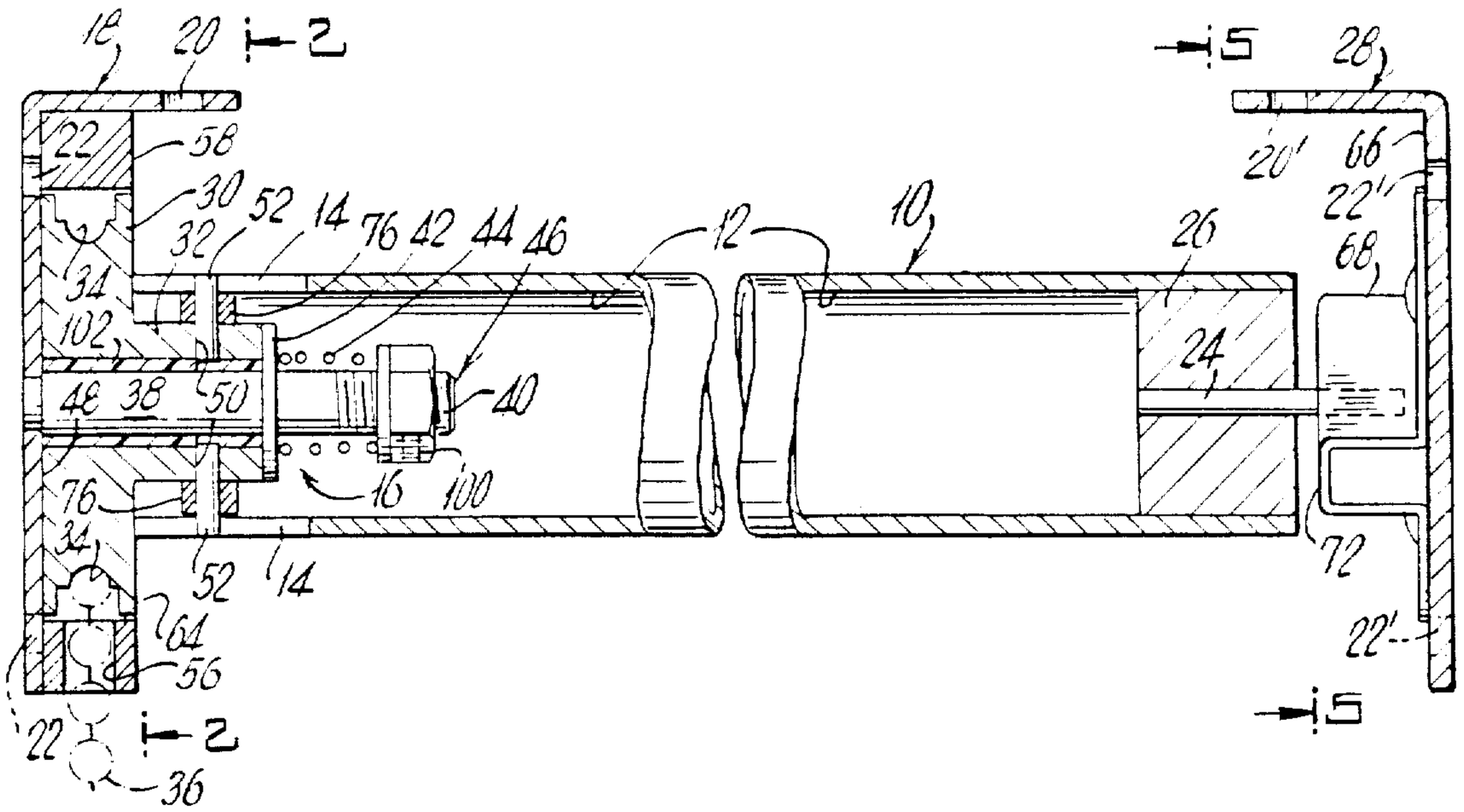


Fig. 1.

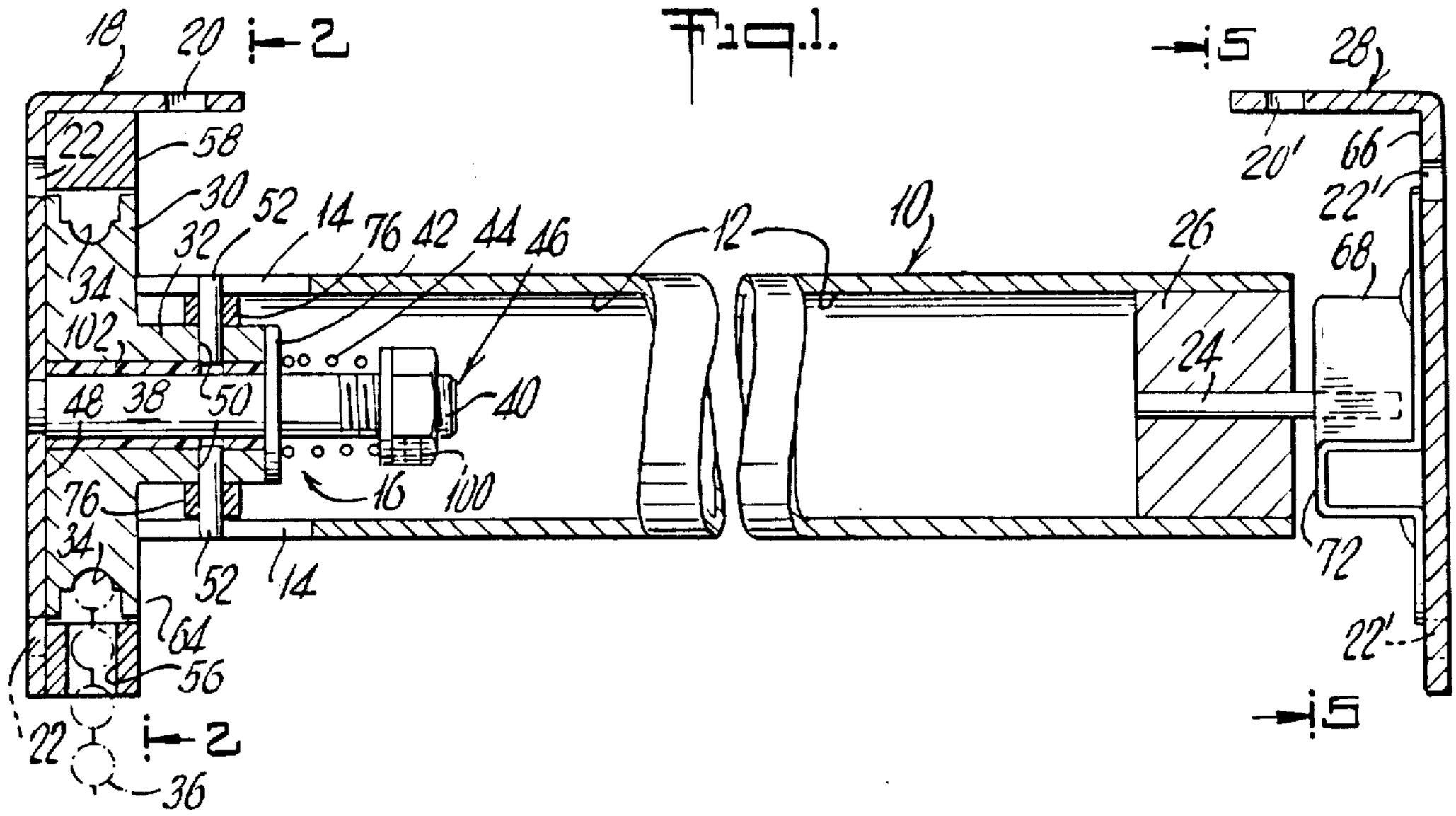


Fig. 2.

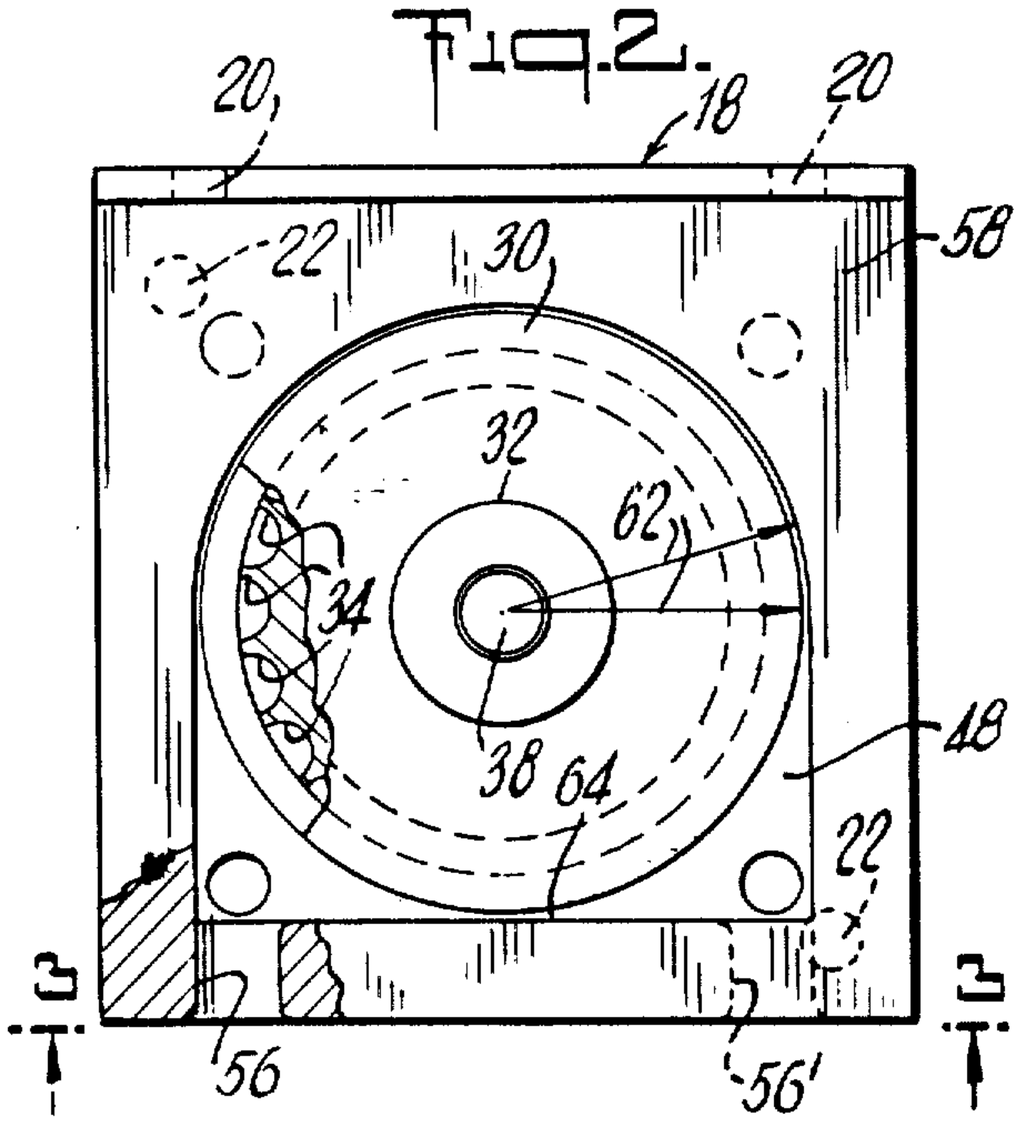


Fig. 5.

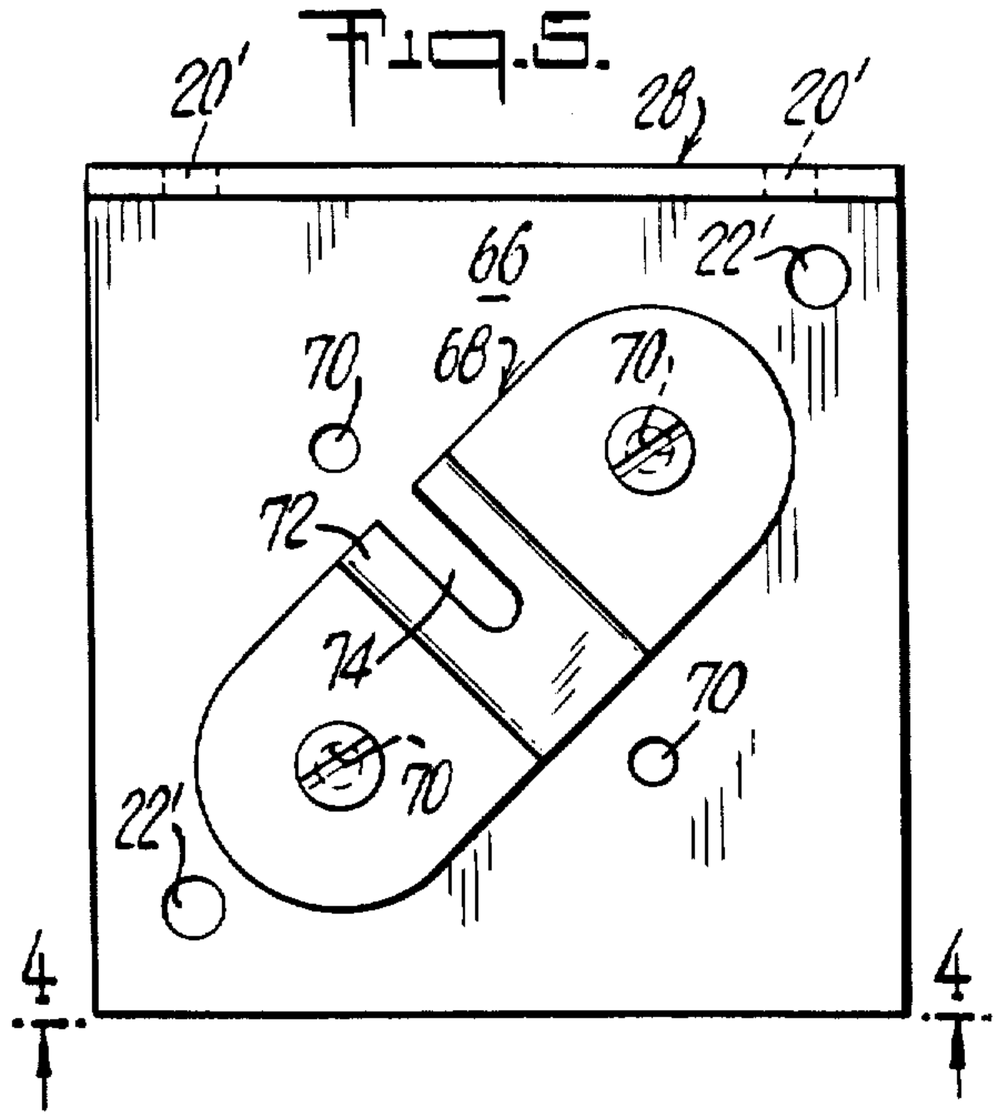
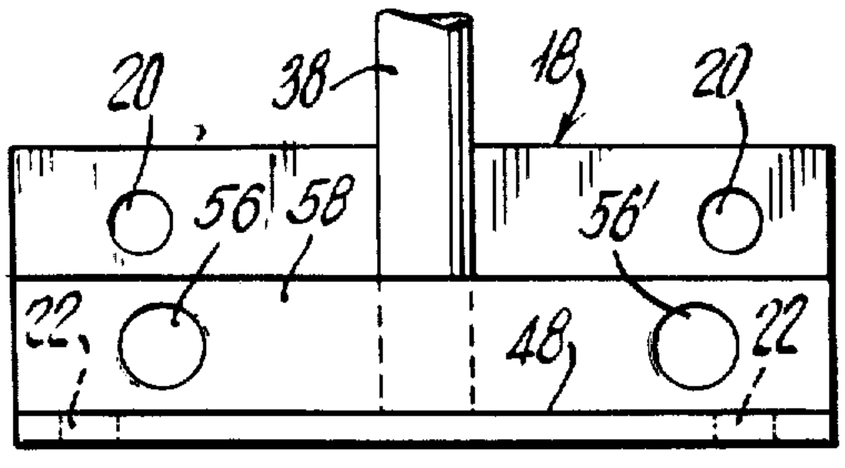


Fig. 3.



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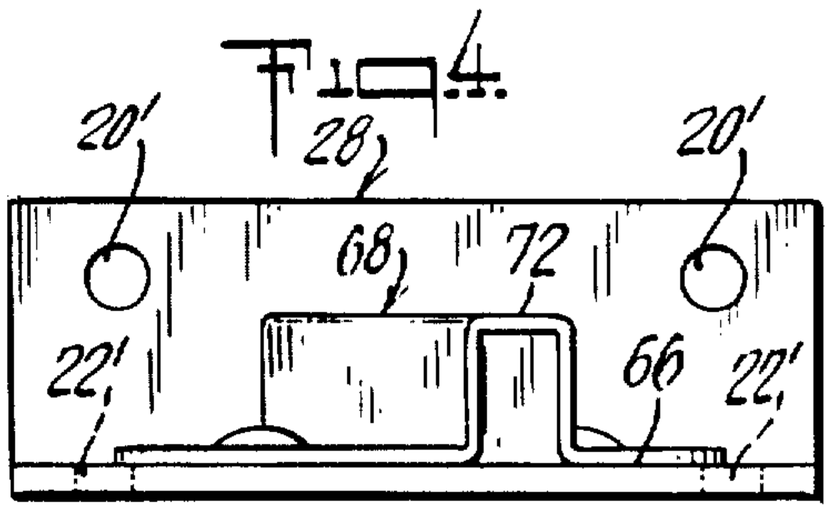


Fig.6.

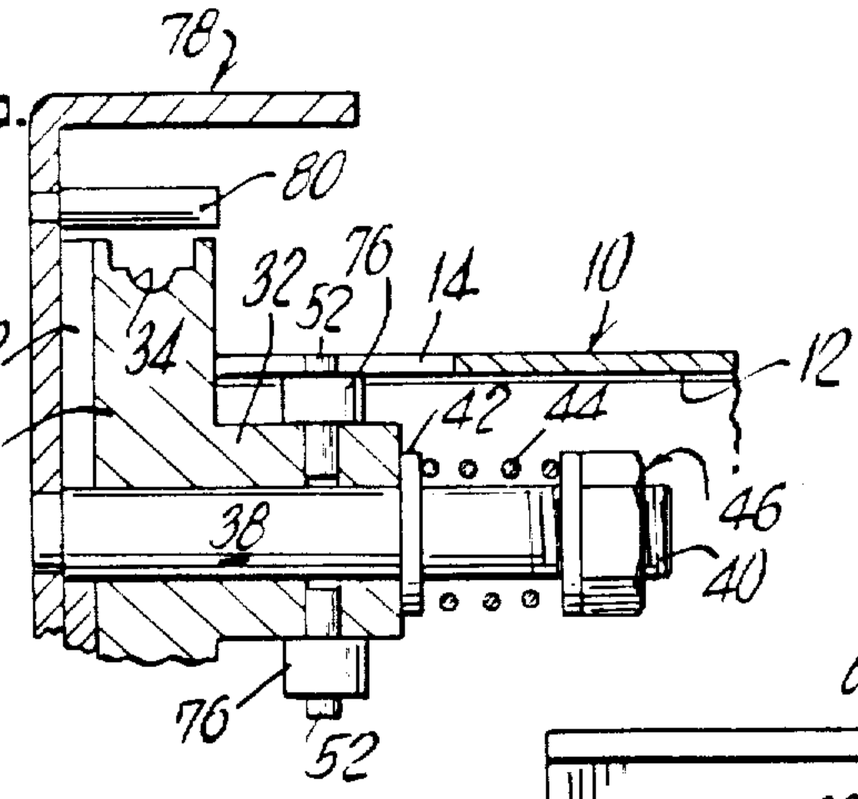


Fig.7.

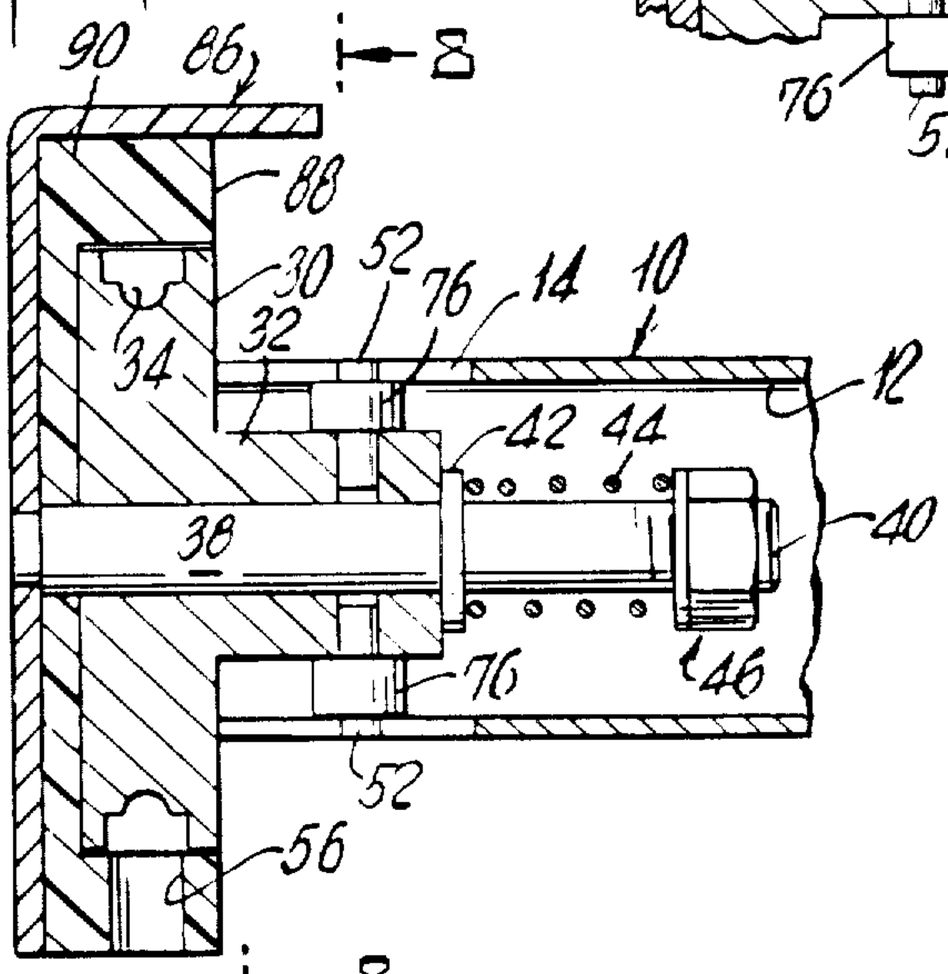


Fig.8.

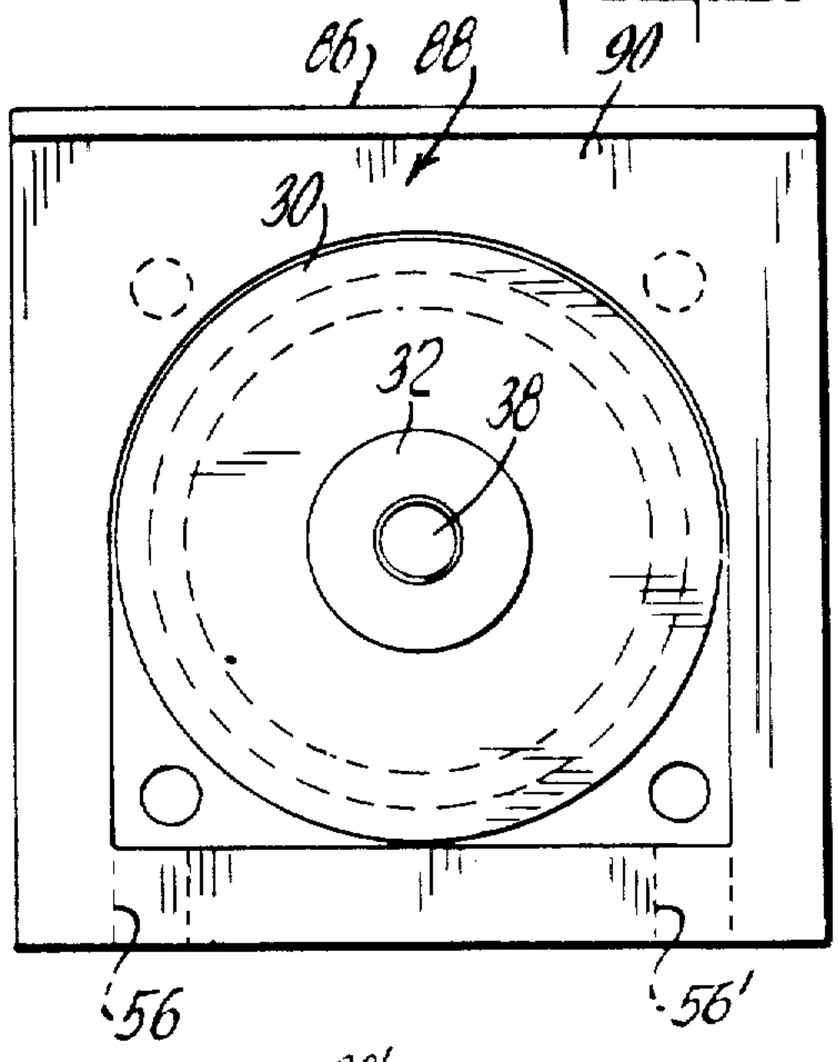


Fig.9.

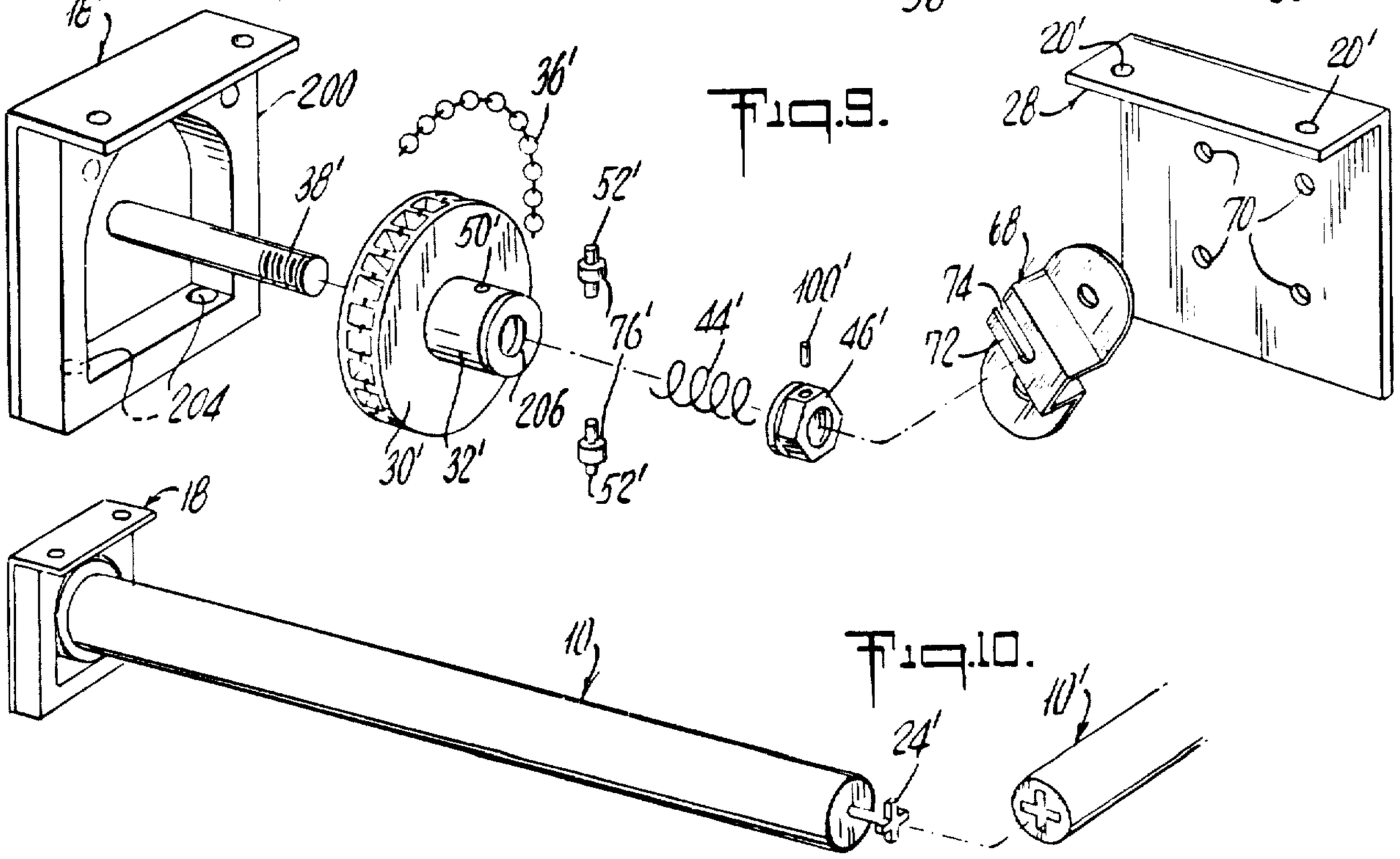


Fig.10.

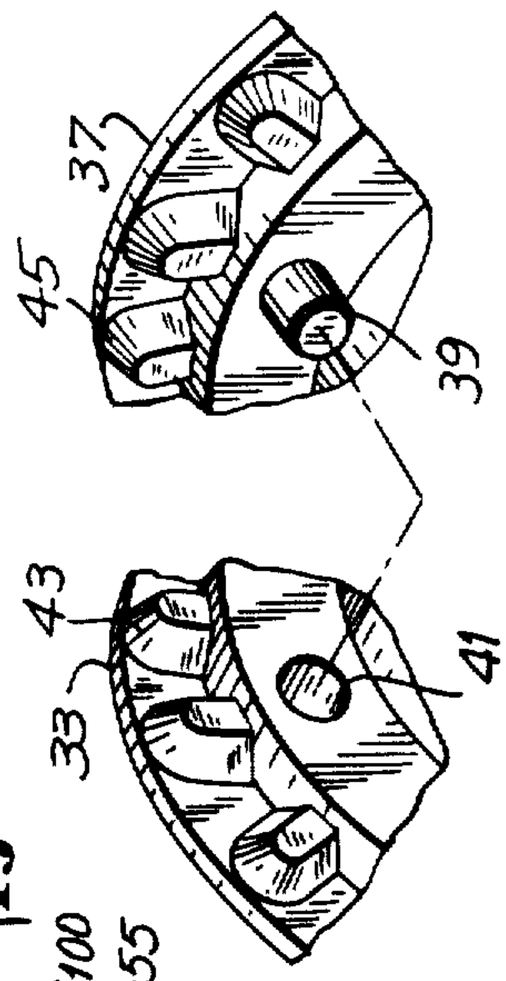


FIG. 12

FIG. 11

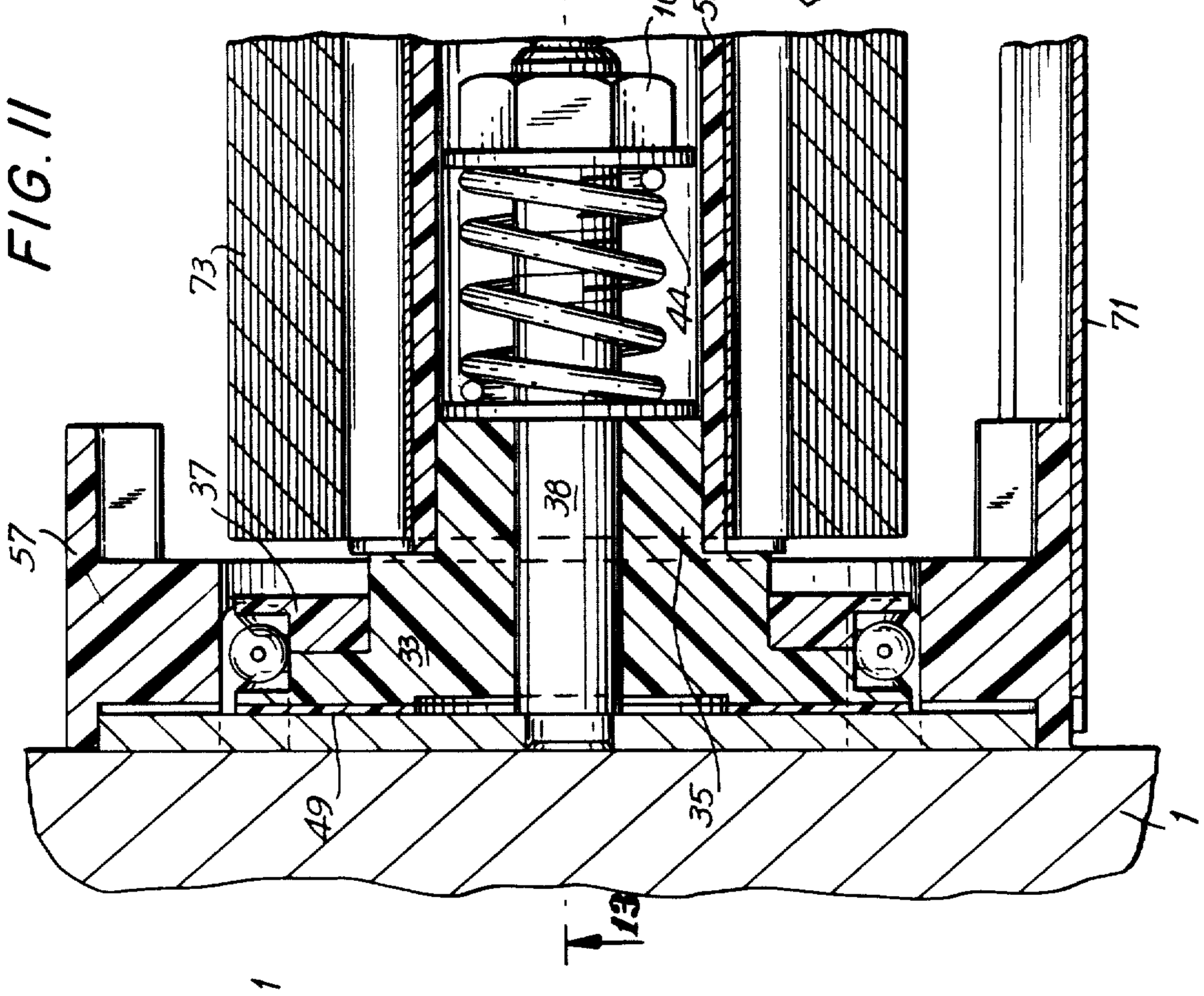


FIG. 1a

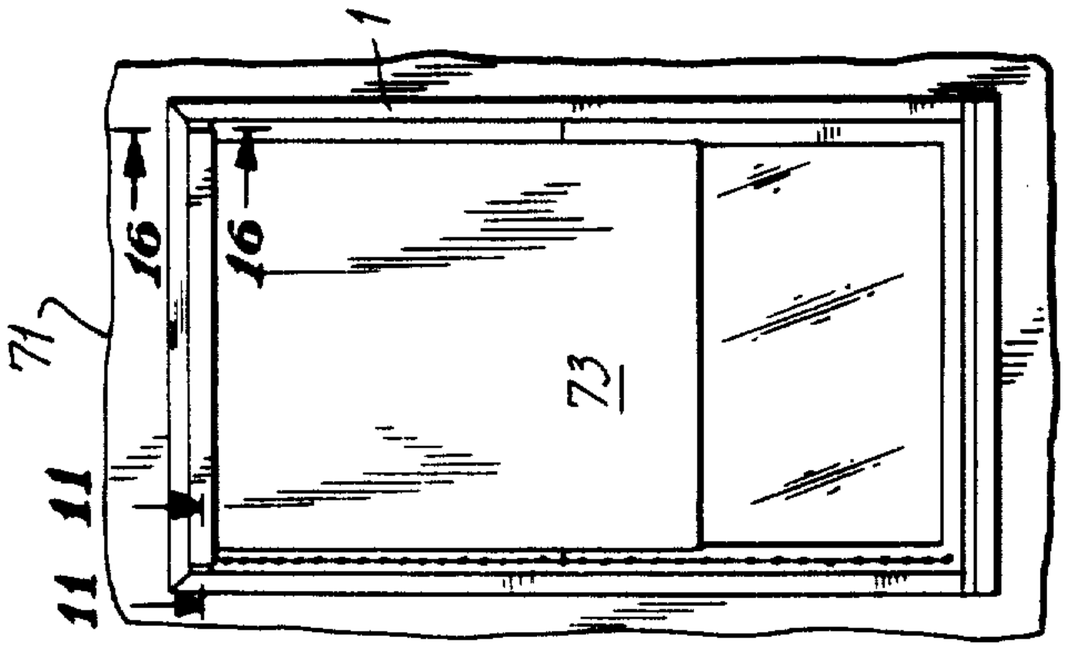
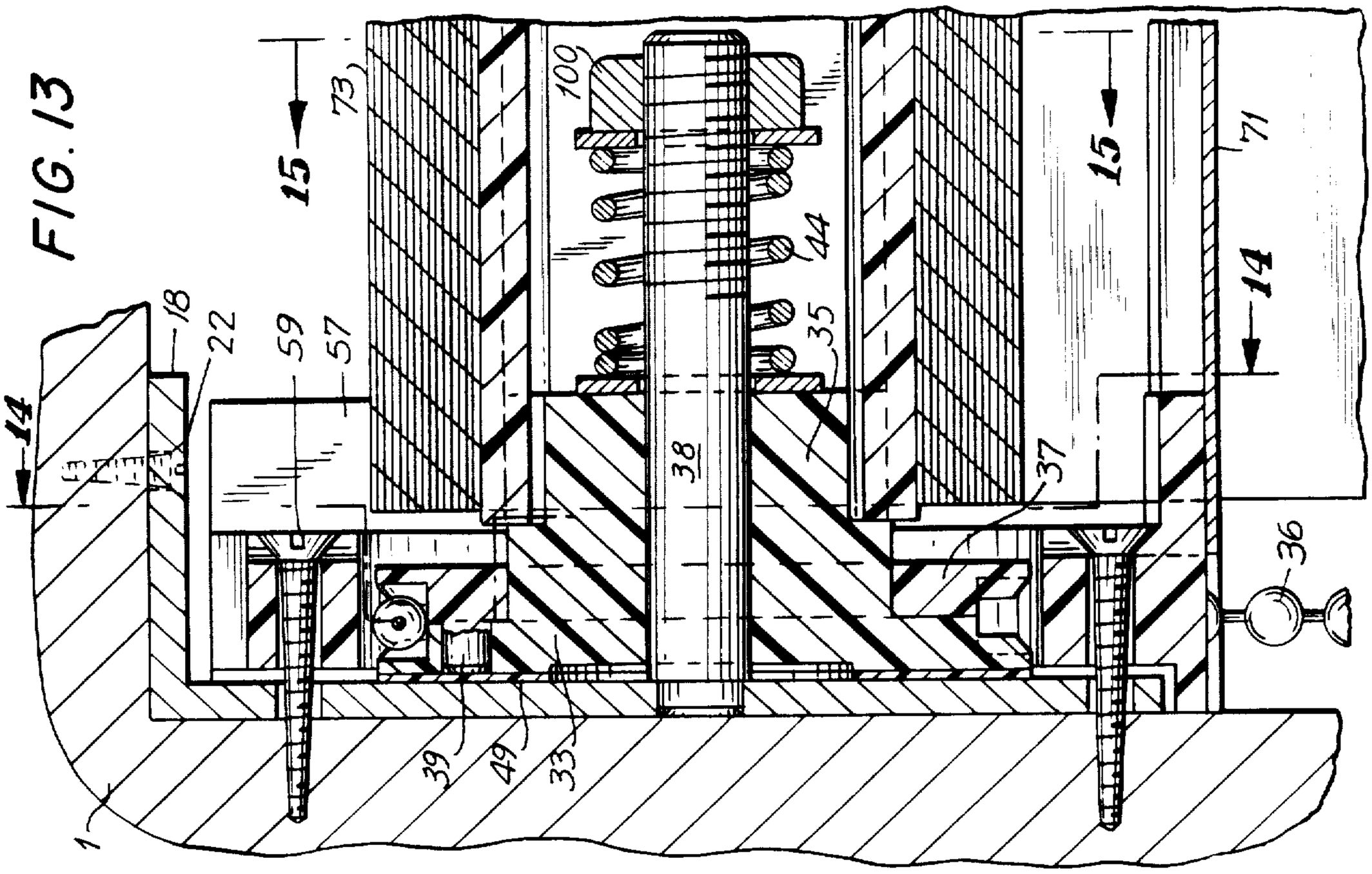


FIG. 13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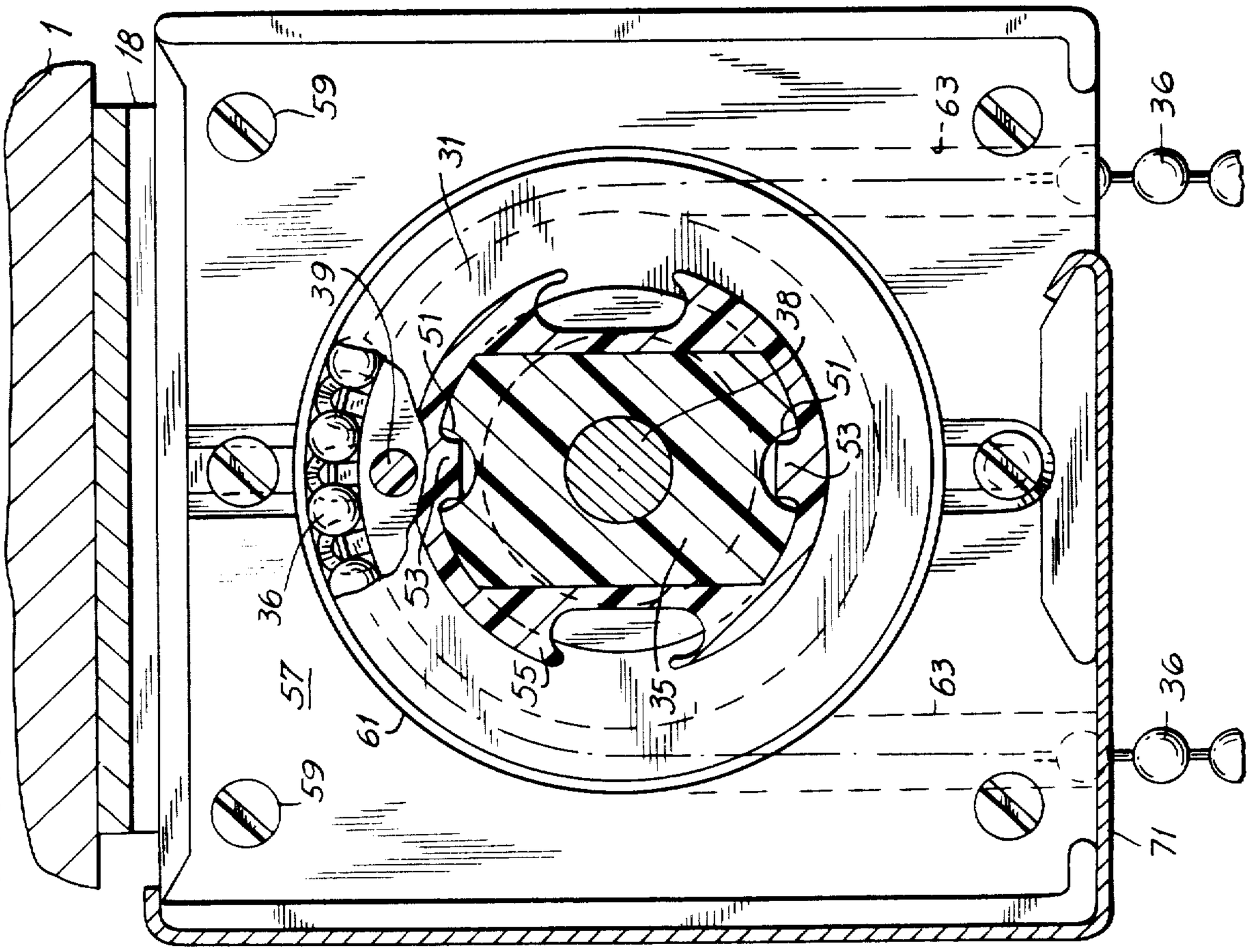
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FIG. 14

FIG. 15

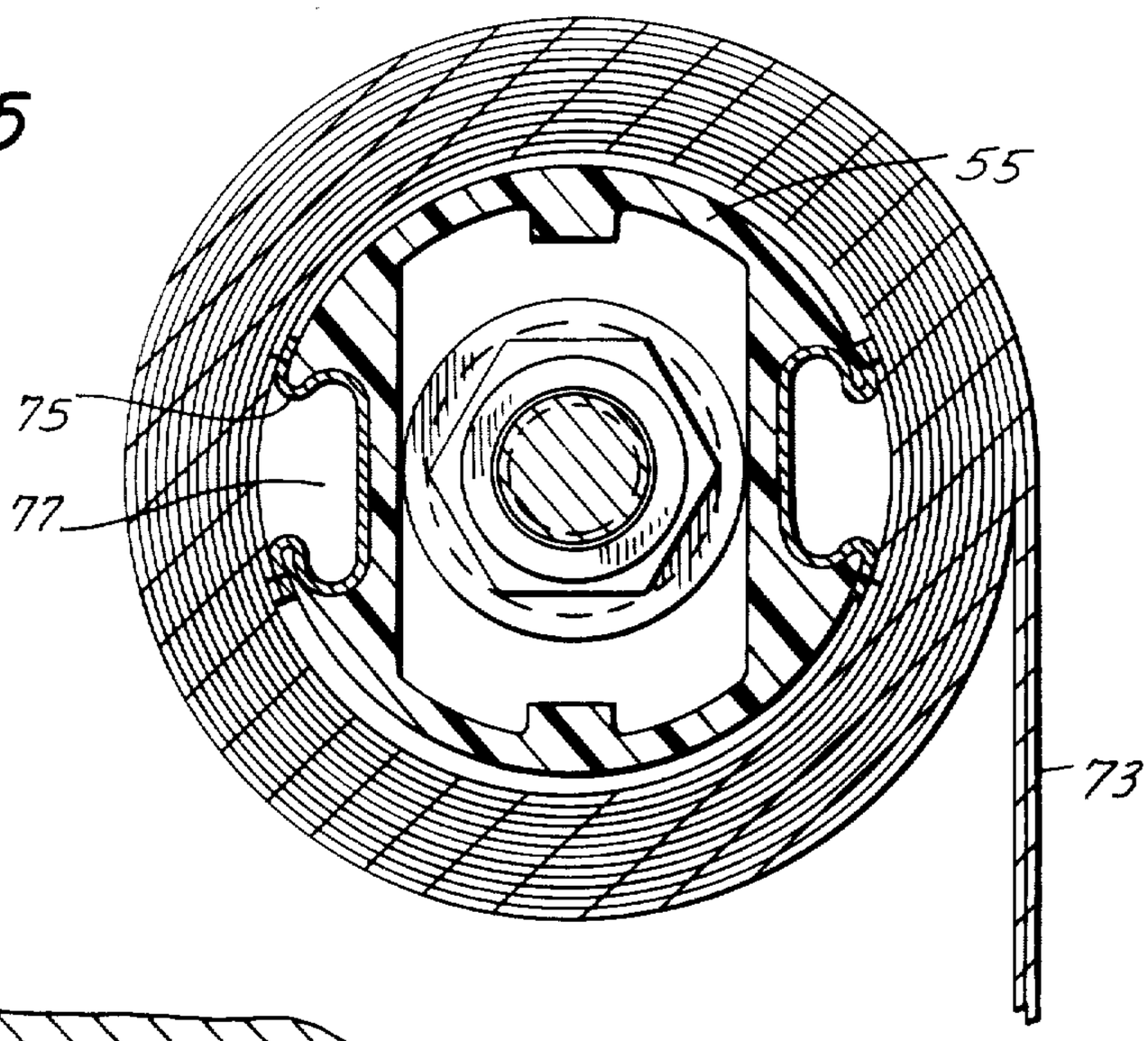
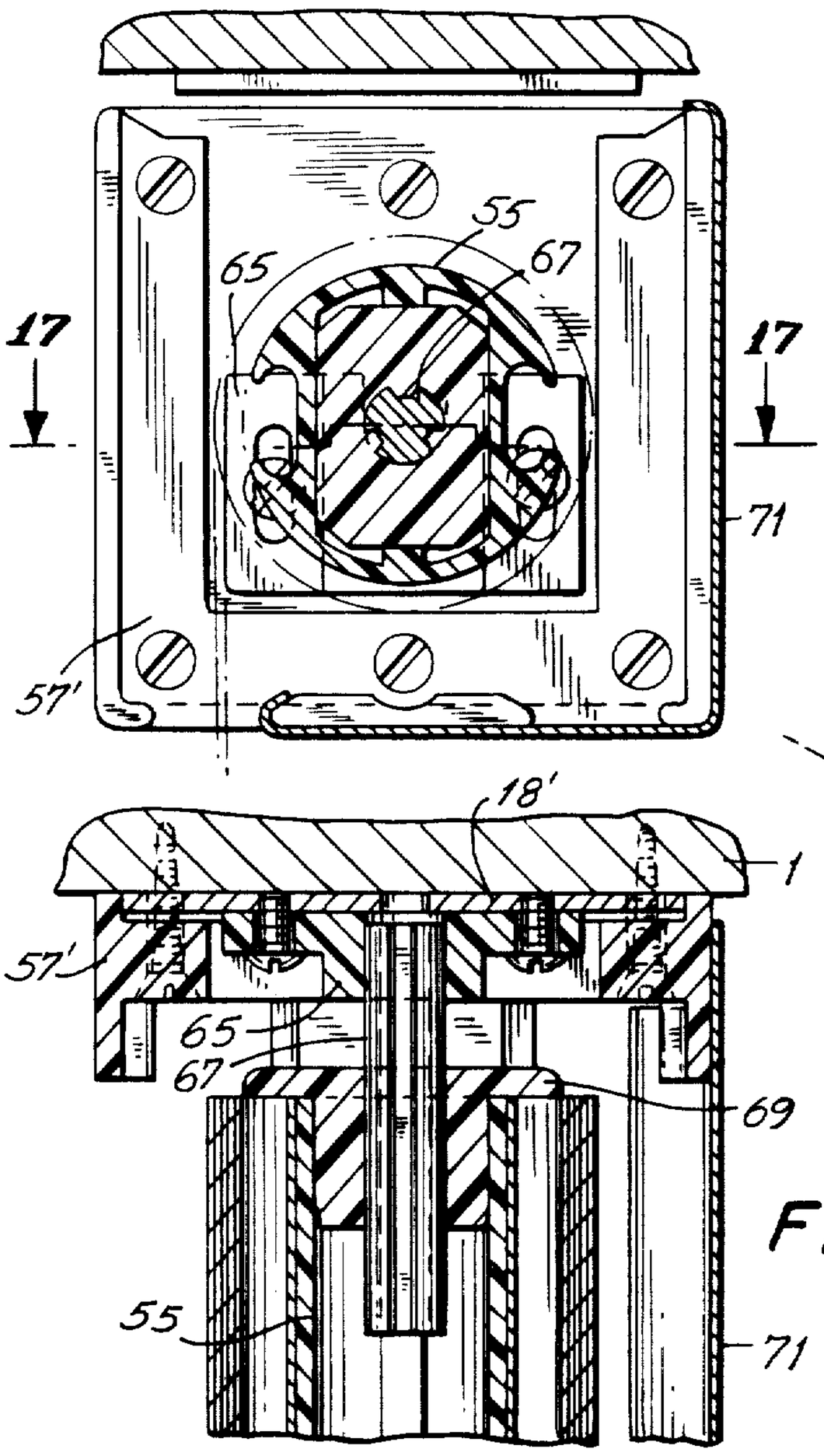


FIG. 16



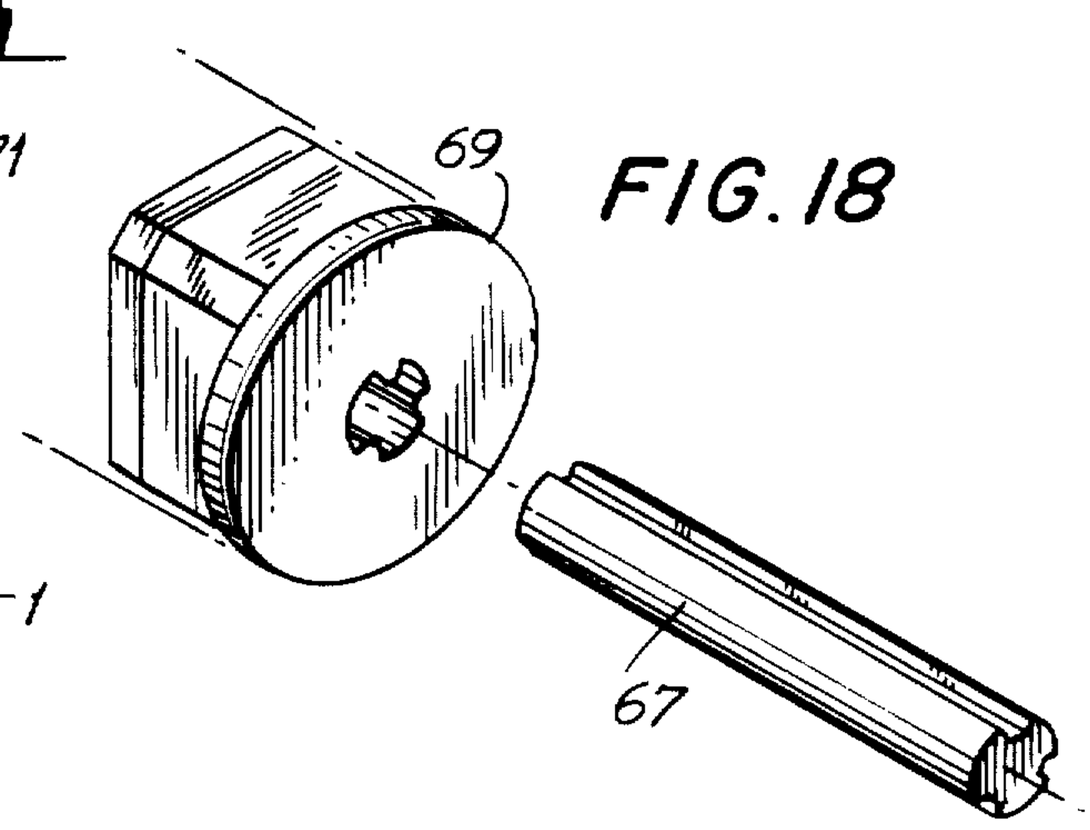


FIG. 18

FIG. 17

WINDOW SHADE ROLLER ASSEMBLY

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This application is a continuation-in-part of Application Ser. No. 716,153, filed Aug. 20, 1976, now U.S. Pat. No. 4,223,714.

The present invention relates to shade rollers, preferably for windows, and employs a roll having an opening at one end thereof for accepting a roll operating device. In its preferred form, the roll operating device comprises a chain operated sprocket wheel having an extension which projects into and is disengageably mounted in the roll. In another form, projections on the roll engage openings in the sprocket wheel. In either case, the hub is adapted to engage the roll to cause the roll to rotate in response to movement of the chain.

For best results, a pair of brackets is provided for attachment to the wall, ceiling surfaces or frame surrounding the window. The roll operating device is mounted to one of the brackets. The other end of the roll may be provided with a pin extending therefrom, and the other bracket with means for rotatably receiving the pin. The mounting of the roll to both brackets is preferably non-permanent to allow for removal and replacement of the roll, as well as easy access to operating parts for service and tension adjustment should this ever be needed.

The roller drive mechanism is completely hidden by the shade mounting which is provided with a snap-in facia covering the entire roller shade assembly. The roller drive mechanism itself includes a novel form of sprocket wheel of paddle-shape design which prevents the bead chain from riding up and hitting the surrounding retainer. An adjustable novel disc brake is provided, whose readily accessible tension is adjustable from 0 to 100% of the shade weight.

These and other features of the invention are described in more detail below with reference to the drawings in which like numerals refer to like parts and in which various preferred embodiments of the invention are depicted:

FIG. **1** is a detail view of a preferred embodiment of a window shade roller assembly in accordance with the present invention;

FIG. **1a** is a general front elevation of a shade as installed;

FIG. **2** is a detail view of the bracket which accepts the roll operating device, taken along line **2—2** in FIG. **1** and with the roll operating device removed;

FIG. **3** is a detail view of the bracket of FIG. **2** taken along line **3—3** in FIG. **2**;

FIG. **4** is a detail view of the bracket of FIG. **5** taken along line **4—4** in FIG. **5**;

FIG. **5** is a detail view of the other bracket taken along line **5—5** in FIG. **1** (and omitting the roll pin);

FIG. **6** is a partial detail view showing the upper half of another embodiment of a roller assembly in accordance with the invention and including the bracket which accepts the roll operating device;

FIG. **7** is a detail view of still another embodiment of a window shade roller assembly in accordance with the present invention;

FIG. **8** is a detail view of the bracket in the embodiment of FIG. **7**, the said detail taken along line **8—8** in FIG. **7**;

FIG. **9** is an isometric view of still another preferred embodiment of the present invention;

FIG. **10** is an isometric view of an embodiment in accordance with the invention in which the window shade rollers are ganged;

FIG. **11** is a partial horizontal cross-sectional view of a further embodiment of the present invention, taken along the line **11—11** of FIG. **1a**;

FIG. **12** is a partial exploded perspective view showing construction of a modified form of sprocket wheel;

FIG. **13** is a partial vertical cross-sectional view along the line **13—13** of FIG. **11**;

FIG. **14** is a cross-sectional view along the line **14—14** of FIG. **13**;

FIG. **15** is a cross-sectional view along the line **15—15** of FIG. **13**;

FIG. **16** is a partial cross-sectional view along the line **16—16** of FIG. **1a**;

FIG. **17** is a horizontal cross-sectional view along the line **17—17** of FIG. **16**, and

FIG. **18** is a perspective view of the idle end of the roller.

FIG. **1** generally illustrates a window shade roller with mounting brackets, while FIG. **1a** illustrates installation in a window frame **1**.

With specific reference to FIG. **1**, the numeral **10** denotes a roll for receiving a conventional shade (not shown). The roll **10** has an opening **12** and two slots **14** at one end into which is inserted a roll operating mechanism denoted generally by the numeral **16**. More slots can be used if desired.

The roll operating mechanism **16** is mounted on a bracket **18**. The bracket **18** is provided with a plurality of holes **20**, **22** for mounting to the window frame, to the ceiling, or to the wall, depending on which holes are used. Preferably, holes **20** should be used for ceiling or window frame mounting while holes **22** should be used for wall mounting.

The other end of the roll contains a pin or equivalent extension **24**, the extension being fixedly mounted in plug **26** which in turn is fixedly mounted in roll **10**. Thus, the pin and plug assembly rotate with the roll.

The pin **24** rotatably engages a second mounting bracket **28** which may also be mounted to the ceiling, wall or window frame in the same manner as bracket **18**. The mounting holes in second bracket **18** are denoted by the numerals **20'** and **22'**.

The roll operating device **16** comprises a sprocket wheel **30** having an extension **32** thereon. The hub **30** is larger in diameter than the roll **10** and is provided with a plurality of indentations or depressions **34** for receiving a conventional bead chain (denoted by the numeral **36**) or other operating device, such as a sprocket chain. As illustrated, the extension **32** is an integral part of the hub **30**, although it should be understood that the extension may be provided as a separate piece which is then affixed to the hub **30**.

Bracket **18** has a projecting non-rotatable extension or pin **38** on which the hub **30** and extension **32** are journalled via a nylon or other low friction material bushing **102**. The extension **38** extends a selected distance past the end of hub extension **32** and is preferably provided with screw threads **40** as illustrated. A washer **42** is mounted on the extension **38** adjacent the hub extension, along with a spring **44** and a washer and nut

assembly **46**. Preferably, the nut is of the self-locking variety. Alternatively, a pair of nuts can be used, or a nut with a set screw, such as that denoted by the numeral **100**, can be used. As is readily appreciated, the spring **44**, braced by the washer and nut assembly **46**, urges the entire roll operating device to the left as viewed in FIG. **1**. This tends to insure continuing frictional contact of the hub **30** with the inner surface **48** of the bracket **18** both before and after installation of the bracket on the ceiling or wall. This frictional force between hub and bracket tends to prevent the roll from rotating and unwinding the shade which may occur due to the weight of a partially lowered shade.

The hub extension **32** is provided with two or more bores **50** which accept an equal number of operating pins **52**. Operating pins **52** project from the hub and ride in the roll slots **14**. Upon rotation of the roll operating device **16**, operating pins **52** will engage the sides of the slots to rotate the roll to raise or lower the shade.

Although two bores **50** are shown, it is to be understood that three or more, and preferably four, bores may be used. If four bores are used, the roller, when mounted in a window, can be adjusted to horizontally level the shade by simply separating the roll from the hub, rotating the roll one-quarter turn, and replacing it on the hub. Of course, the number of operating pins **52** may be made equal in number to the bores **50**.

The bracket **18** may be made of metal, plastic or wood and may be molded or machined or otherwise fabricated to obtain the illustrated configuration. The bracket **18** is formed with a plurality of bead chain receiving channels **56**, **56'** which are recessed in the face **58** of the bracket.

As can be readily appreciated, hub **30** is approximately the same in diameter as the diameter of the recess indicated by the arrows **62** in FIG. **2**. When the hub is installed on the bracket, the bead chain is entrained in the recesses **56** or **56'**, as the case may be, between the hub **30** and the overhanging portions **64** of the bracket.

The channels **56** and **56'** will permit the bead chain to exit and hang down from the bracket regardless of whether the bracket is mounted to the wall, ceiling or window frame.

Referring now to the other end of the roll **10**, bracket **28** is seen to be similar in external appearance to bracket **18**. This permits it to be mounted in the same manner as bracket **18** to provide an aesthetically balanced effect for the window roller assembly. However, the face **66** of this bracket is different than the face of bracket **18**. Bracket **28** is provided with a mounting panel **68** which in turn is mounted on the bracket face via a pair of screw receiving openings **70**.

The mounting panel **68** is provided with a raised section **72** which has an elongated slot **74** therein for rotatably receiving the pin **24**.

In its preferred form, the brackets **18** and **28** have their respective roll operating mechanism **16** and mounting panel **68** pre-assembled thereon. The brackets are then affixed to the ceiling wall or frame surrounding the window. Roll **10** is then brought into position by first placing opening **12** over the roll operating mechanism.

With two or even four operating pins **52**, it will be appreciated that the roll **10** may pivot on the pins in all directions, the extent of pivoting motion being limited only by contact of the steel bumpers **76** or contact of the washer and nut assembly **46** with the inside wall of the roll. This then permits the roll to be moved into position

and pin **24** dropped into the slot **74** in mounting panel **68** to complete the installation. Adjustments in horizontal tilt of the roll may then be made by simply moving mounting panel **68** to correct for alignment error.

The bumpers preferably fill the space between the hub extension **32** and roll **10** so that play in the roll diameter is eliminated, and the roll can turn silently and not deviate from level.

FIG. **6** depicts another embodiment in which the mounting bracket **18** is replaced by a bracket **78** which, instead of the type of overhangs **64** shown in FIG. **2**, is provided with a plurality of overhangs consisting of plates **80** spaced around the circumference of the hub **30** to retain the bead chain in place. In addition, a face of leather or other friction material **82**, as shown in dotted lines in FIG. **6**, may be used in both embodiments described above if it is desired to help insure consistent friction loading on the hub **30**.

The embodiment shown in FIGS. **7** and **8** utilizes a bracket **86** which is somewhat different from the bracket **18**. In this embodiment, a separate insert **88** having an arched overhang **90** is fixedly mounted to the bracket **86**, the overhang **90** retaining the bead chain (not shown) in the link depressions **34** after the hub has been placed on the bracket. The insert **88** may be made of any material, such as plastic, to give consistent friction loading on the hub for the reasons set forth above. In addition, the insert **88** and its corresponding recess may be other than round to prevent rotation without the use of mounting screws.

FIG. **9** discloses still another preferred embodiment of the present invention. The bracket **18'** is simpler in construction as compared to the bracket **18** shown in FIG. **1**. A face plate **200**, which can be an injection molded plastic part, is secured to bracket **18'** by conventional screws (not shown). Face plate **200** is further provided with elongated bores **204** into which the bead chain **36'** is fed. Hub **30'** is in the form of a paddle wheel and is designed to accept one bead, or more if desired, between adjacent paddles. The bead chain **36'** exits the face plate **200** through bores **204**.

Paddle **30'** has a bore **206** to permit mounting of the paddle and the hub extension **38'**, which is in turn mounted on bracket **18'**. Extension or plug **32'** accepts operating pins **52'** and in turn mounts on extension **38'**. The assembly is completed by spring **44'** and nut and washer assembly **46'**, in the same manner as in the other embodiments described in this specification.

The face plate **200** can be oriented in any of three different positions on the bracket **18'**. For instance, the face plate can be mounted so that bores **204** have their axes oriented parallel to the top portion **54'**, instead of perpendicular thereto as shown in the drawing. This will permit the bracket **18'** to be mounted to the frame of the window, or to the ceiling, as desired. The face plate is simply repositioned to orient the bead chain vertically.

The shade rollers may be ganged to cover multiple windows, the drive being taken from one bracket and hub assembly of the type denoted by the numerals **18**, **18'** in the foregoing embodiments. To achieve this, pin **24'** (FIG. **1**) is fitted into the leading end of the other roll (See FIG. **10**). Pin **24'** is preferably provided with a cross-shape as shown, which fits into a corresponding cross-shaped opening in the second roll. Alternatively, the bracket **18'** can be placed in the center, between the two rolls. Any number of ganged rolls can be used. However, it has been found desirable to use a conven-

tional detent (not shown) in connection with the bead chain to prevent gravity forces from unwinding the shades due to the weight loading of the multiple shade system.

Turning now to the form of roller shade mounting and drive shown in FIGS. **11**, **13** and **14**, the bracket **18** is again provided with mounting holes and a nonrotatable projecting pin **38** welded thereto on which is journaled a modified form of sprocket wheel **31**.

As shown more clearly in FIGS. **11**, **12** and **13**, the internal drive is in the form of a modified sprocket wheel and is preferably formed of two sections molded together, i.e., a principal section **33** having a hub **35**, rotatably mounted on pin **38**, and a complementary section **37** mounted on hub **35** and joined to section **33** through pin extensions **39** fitting into appropriate receiving holes **41**. There are preferably a plurality of such pins equally spaced about the meeting surface of section **37** and molded into section **33** to form the unitary sprocket wheel **31**.

As is more clearly shown in FIG. **12**, the peripheries of the two sections **33** and **37** are formed with cut-out portions containing complementary teeth **43** and **45** which when the two sections are joined form individual spaced pockets into which the individual beads of bead chain **36** fall to permit movement and control of the sprocket wheel and the movement of the shade roll as a whole, these pockets preventing the bead chain from riding up and hitting the top of the retainer. There are preferably 24 of these teeth spaced at 15°. The sprocket wheel is preferably formed of a mouldable plastic such as "Delrin".

About the inner face of sprocket wheel **31**, i.e., the face opposing the bracket **18**, and more particularly the face of section **33**, there is mounted a flat annulus of frictional material **49**.

It will thus be apparent that as in the form of invention shown for example in FIG. **1**, through the use of spring **44** and nut **100** in the threaded end of pin **38**, the face of sprocket wheel **31** is urged against the vertical face of bracket **18**, except that in this case the interposed frictional material **49** controls the drag on the roller shade instead of direct friction per se between these two parts. It differs in this respect from the form of invention above described in reference to FIG. **6** in which frictional material is interposed between the entire opposed surfaces of the sprocket wheel and bracket. The type of construction illustrated in FIGS. **11** and **13** permits better frictional control when, for example, the opposed surfaces are not exactly in parallel and thus better takes care of tolerances in manufacture. Adjustment of the friction for supporting the weight of the extended shade is accomplished through spring **44** and nut **100**, as previously described. This adjustment is readily available upon removal of the shade roller.

Attachment of the sprocket wheel to the shade roll is effected in this embodiment by providing the hub **35** with a pair of opposed recesses **51** engageable by a pair of inward extensions **53** on hollow shade roll **55**.

Surrounding the sprocket wheel **31** and the interconnection between it and the shade roll is an end cover **57** which may be attached to the vertical face of the bracket **18** or directly to the window frame as by screws **59**. The end cover has an opening **61** of such diameter that it forms a retainer surrounding sprocket wheel **31** being spaced therefrom only such distance as to aid in preventing the bead chain from leaving the pockets in the periphery of the wheel. Appropriate openings **63** in the lower end of the cover permit passage of the bead chain.

For supporting the idle end of the shade roll a bracket **18'** (FIG. **17**) is provided, identical in all substantial respects to bracket **18**, and this is surrounded by end cover **57'** which again is substantially the same as end cover **57** except that no openings are provided for a bead chain. An adjustable support **65** receives idle end pin **67** which in turn fits in plug **69** of the shade roll.

The entire front of the roller shade assembly is preferably covered by a facia **71** (see FIG. **1a**) extending across the upper portion of the window frame and snapped on the end covers as shown in FIGS. **14** and **16**. This facia may be made of metal or suitable springable plastic material. This construction avoids the use of screws and provides a tight fit against the ceiling or window frame.

A preferred manner of attaching the shade to the roller is illustrated in FIG. **15** in which one end of shade **73** is attached to a spring clip **75** and fits into a slot **77** extending longitudinally the length of the roll **55**. This arrangement facilitates a change in shades without removing the roller. By providing the roller with opposed slots, the use of a double shade is made possible, as illustrated.

Many modifications in and to the above-described embodiments will be apparent to those of ordinary skill in the art. It is intended to cover all such modifications which fall within the spirit and scope of the invention as defined in the claims appended hereto.

What we claim is:

1. A window shade roll assembly comprising in combination:

a shade roll;

a first support apparatus organized at a first end of the shade roll, a second support apparatus for supporting rotatably a second end of the shade roll;

an operator system on said first support apparatus including:

a mounting plate on said first support apparatus having a pin extending therefrom axially of the shade roll and into the shade roll,

a wheel mounted rotatably about the pin on said first support apparatus and having a face arranged in juxtaposition to the mounting plate.

the wheel having a hub of a diameter smaller than the shade roll and projecting therefrom opposite the face,

means for connecting detachably the hub that is on said first support apparatus to the shade roll.

biasing means connected to the hub for causing frictional contact of the face of the wheel against the mounting plate,

and a wheel turner mechanism;

the window shade roll assembly characterized in that all of the elements of said operator system are mounted on the first support apparatus.

2. The window shade roll assembly according to claim **1** characterized further in that the biasing means includes:

a spring mounted on the pin inwardly relative to the shade roll and beyond the hub for said biasing of said entire face of the wheel against the mounting plate,

tensioning means mounted on a free end of the pin and organized for controlling tension of the spring.

3. The window shade roll assembly according to claim 1 characterized further in that the wheel turner mechanism includes:

the wheel provided with a plurality of circumferentially spaced indentations,

a bead chain having a plurality of beads for seriatim engagement of the indentations as the wheel is rotated.

4. The window shade roll assembly according to claim 1 characterized further in that the means for connecting detachably the hub to the shade roll includes a plurality of projections extending radially from the hub in detachable engagement with the shade roll.

5. A window shade roll assembly comprising in combination:

a shade roll;

a first support apparatus organized at a first end of the shade roll, a second support apparatus for supporting rotatably a second end of the shade roll;

an operator system including:

a mounting plate having a pin extending therefrom axially of the shade roll,

a wheel mounted rotatably about the pin and having a face arranged in juxtaposition to the mounting plate,

the wheel having a hub of a diameter smaller than the shade roll and projecting therefrom opposite the face,

means for connecting detachably the hub to the shade roll,

biasing means connected to the hub for causing frictional contact of the face of the wheel against the mounting plate,

and a wheel turner mechanism;

the window shade roll assembly characterized in that all of the elements of said operator system are mounted on the first support apparatus, the window shade roll assembly characterized further in that

end covers enclose respectively the first and second ends of the shade roll,

each of the end covers provided with a mounting means,

a flexible fascia engagable with both of the mounting means and spanning between the end covers and adapted to cover entirely the window shade roll assembly from one side.

6. A window shade roll assembly for use with a shade roll having a first and a second end, comprising:

a first support apparatus constructed and arranged to be mounted adjacent to the first end of the shade roll;

a second support apparatus constructed and arranged to be mounted adjacent to the second end of the shade roll for rotatably supporting the second end of the shade roll; and,

an operator system mounted on said first support apparatus, said operator system including securing means for removably securing the shade roll to the operator system, said securing means including a mounting plate having a pin extending therefrom axially of and into the shade roll for operatively and detachably engaging the shade roll and the mounting plate, said operator system further including operating means for rotating the shade roll to adjust the height of a shade affixed to the shade roll; said securing means further including a wheel rotatably mounted with respect to the first support apparatus, and in operative engagement with the operating means so that the wheel rotates as the height of the shade is adjusted, said operating means further including a brake in operative engagement with said wheel and which prevents the shade roll from rotating and unwinding the shade which may occur due to the weight of a partially lowered shade;

wherein the assembly is characterized in that all of the elements of said operator system are mounted on said first support apparatus.

7. The window shade roll assembly of claim 6, wherein the brake is an adjustable frictional brake.

8. A window shade roll assembly for use with a shade roll having a first and a second end, comprising:

a first support apparatus constructed and arranged to be mounted adjacent to the first end of the shade roll;

a second support apparatus constructed and arranged to be mounted adjacent to the second end of the shade roll for rotatably supporting the second end of the shade roll; and,

an operator system the elements of which are mounted on one or the other of said support apparatuses, said operator system including securing means for removably securing the shade roll to the operator system, said securing means including a mounting plate having a pin extending therefrom axially of and into the shade roll for operatively and detachably engaging the shade roll and the mounting plate, said operator system further including operating means for rotating the shade roll to adjust the height of a shade affixed to the shade roll; said securing means further including a wheel rotatably mounted with respect to one of said support apparatuses, and in operative engagement with the operating means so that the wheel rotates as the height of the shade is adjusted, said operating means further including a brake in operative engagement with said wheel and which prevents the shade roll from rotating and unwinding the shade which may occur due to the weight of a partially lowered shade;

wherein the assembly is characterized in that all of the elements of said operator system are mounted on one or the other of said support apparatuses.

9. The window shade roll assembly of claim 8, wherein the brake is an adjustable friction brake.

10. A window shade roller assembly for use in a shade roll having a first and a second end, comprising:

a first support apparatus constructed and arranged to be mounted adjacent to the first end of the shade roll;

a second support apparatus constructed and arranged to be mounted adjacent to the second end of the shade roll for rotatably supporting the second end of the shade roll; and,

an operator system, mounted on one or the other of said support apparatuses and including securing means having a mounting plate with a pin extending axially therefrom and into the shade roll for removably and operatively securing the shade roll to the operator system; said operator system including operating means for rotating the shade roll to adjust the height of a shade affixed to the shade roll; said operator system further including a hub rotatably mounted with respect to one of said support apparatuses and in operative engagement with the shade so that the hub rotates as the height of the shade is adjusted; said operator system still further including a brake in operative engagement with said hub and which prevents the shade roll from rotating and unwinding the shade which may occur due to the weight of a partially lowered shade;

wherein the assembly is characterized in that each of the elements of said operator system are mounted on one or the other of said support apparatuses.

11. The window shade roll assembly of claim 10, wherein the brake is an adjustable friction brake.

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