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Todd et al.

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[54] **CORDLESS SHADE**

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[73] Assignee: **Comfortex Corporation**, Watervliet, N.Y.

[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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[22] Filed: **May 1, 1997**

[51] **Int. Cl.**[7] **A47H 5/00**

[52] **U.S. Cl.** **160/84.05**; 160/84.01; 160/84.04; 242/422.5

[58] **Field of Search** ..... 160/84.01, 84.04, 160/84.05, 170 R, 171 R, 193; 242/422.5, 615

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,444,242	4/1984	Amsler et al.	160/172
4,606,157	8/1986	Esposito	52/173 R
4,687,041	8/1987	Anderson	160/84.01 X
4,832,271	5/1989	Geleziunas	242/55.53
4,838,333	6/1989	Mottura	160/305
5,105,867	4/1992	Coslett	160/84.1
5,184,660	2/1993	Jelic	160/84.01 X
5,279,472	1/1994	Hongo et al.	242/422.5
5,307,855	5/1994	Martensson, IV	160/66
5,311,729	5/1994	Viaud	56/341
5,482,100	1/1996	Kuhar	160/170 R
5,519,562	5/1996	Argumedo et al.	360/130.21
5,531,257	7/1996	Kuhar	160/168.1
5,706,876	1/1998	Lysyj	160/84.05
5,791,393	8/1998	Judkins	160/84.05 X
5,799,715	9/1998	Biro et al.	160/84.04 X
5,868,893	2/1999	Kipper et al.	156/277

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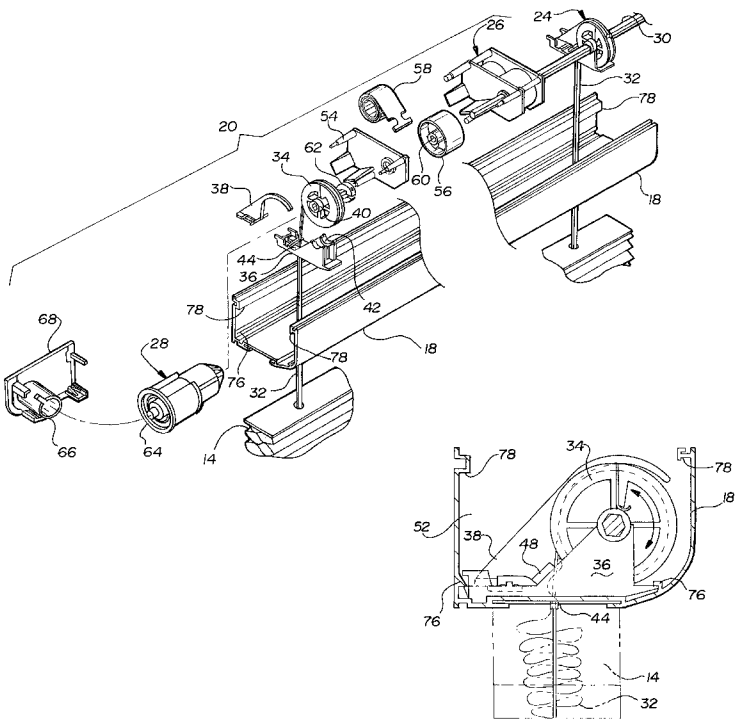
[57] **ABSTRACT**

A cordless drive mechanism for use in a top rail of a shade having inherent spring characteristics. The drive mechanism includes a constant torque spring assembly, at least two tape spool assemblies, and a brake/clutch mechanism, all interconnected via a shaft. The shaft is driven by at least one spring assembly to drive the tape spool assembly, which retracts a bottom rail of the shade by acting as a reel upon which tape is wound. The brake/clutch assembly locks the shade into a position desired by the user, and applies a braking force to the shaft when the shade is retracting, forcing a virtually constant retraction speed. The constant torque spring assembly is modular, constructed of identical housing pieces, a spring take-up spool and a rolled constant torque spring. More spring assemblies may be added to the drive mechanism for larger and heavier shades. The tape spool assembly includes a tape guide retainer fitted with an angled tape retention wall which prevents slack tape from accumulating with the top rail.

3 Claims, 3 Drawing Sheets



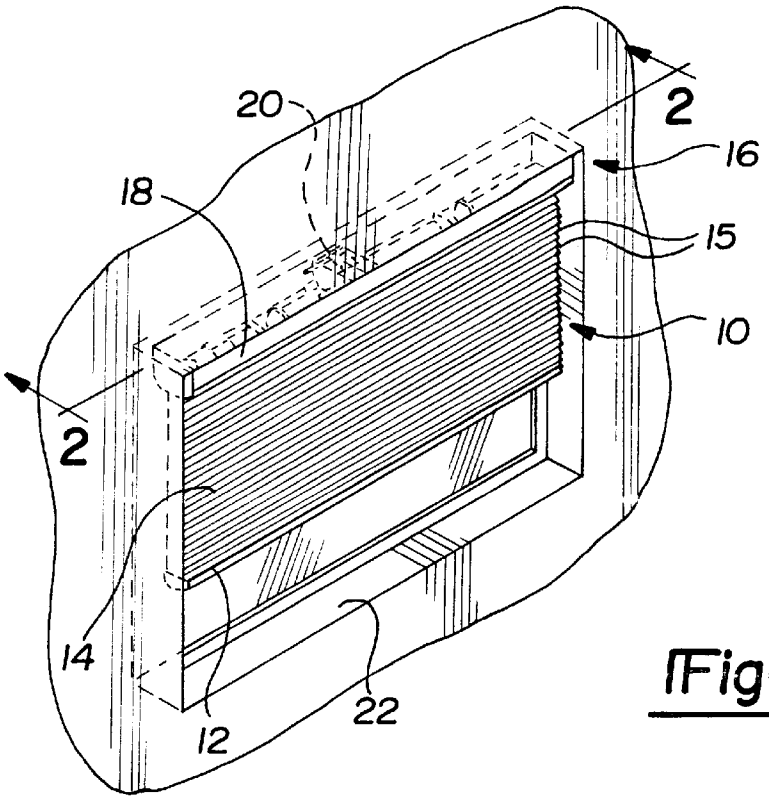


Fig-1

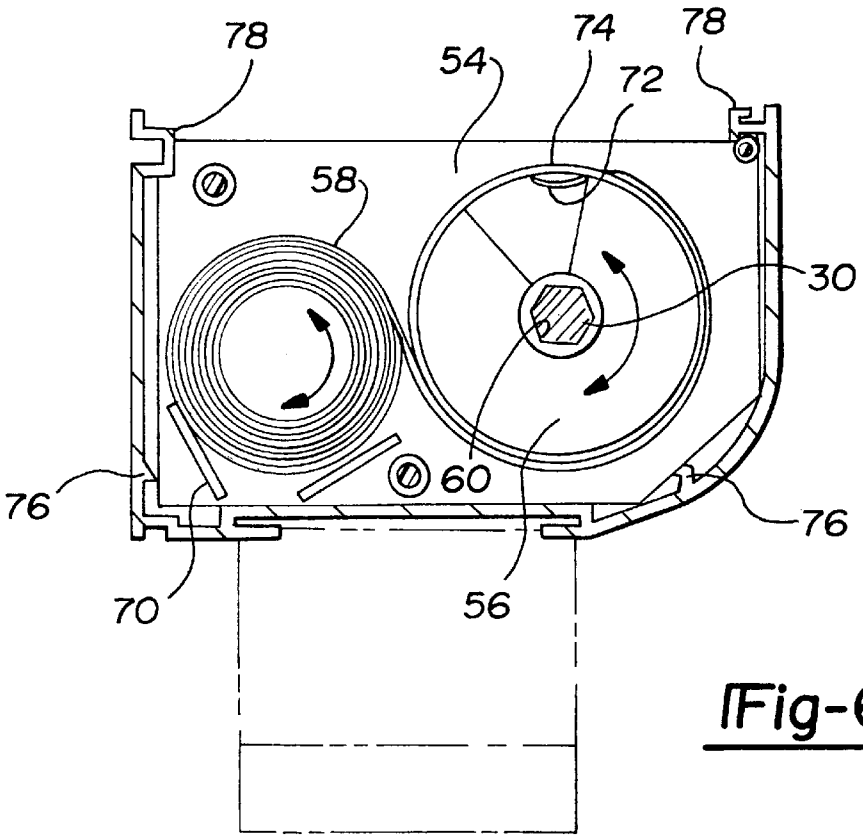


Fig-6

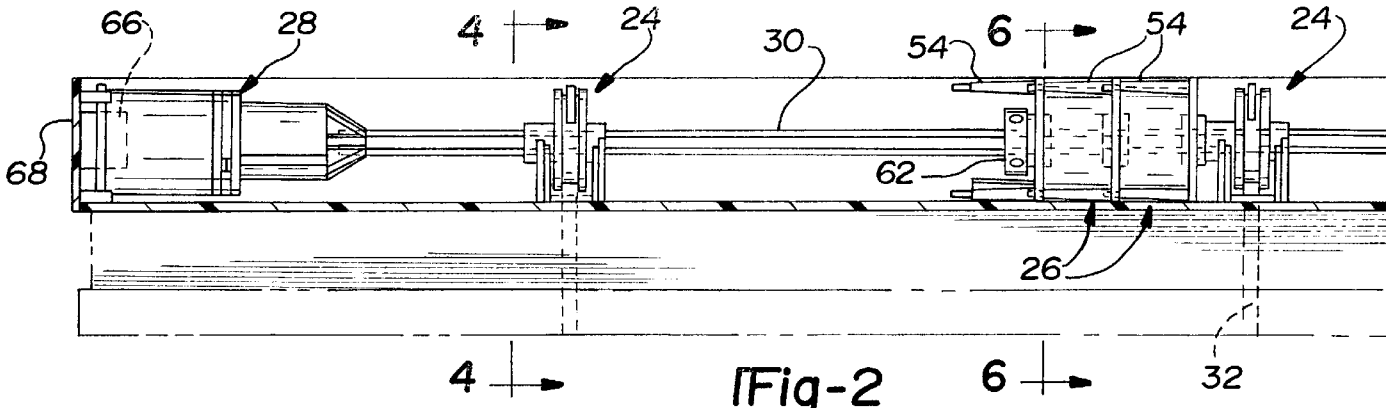


Fig-2

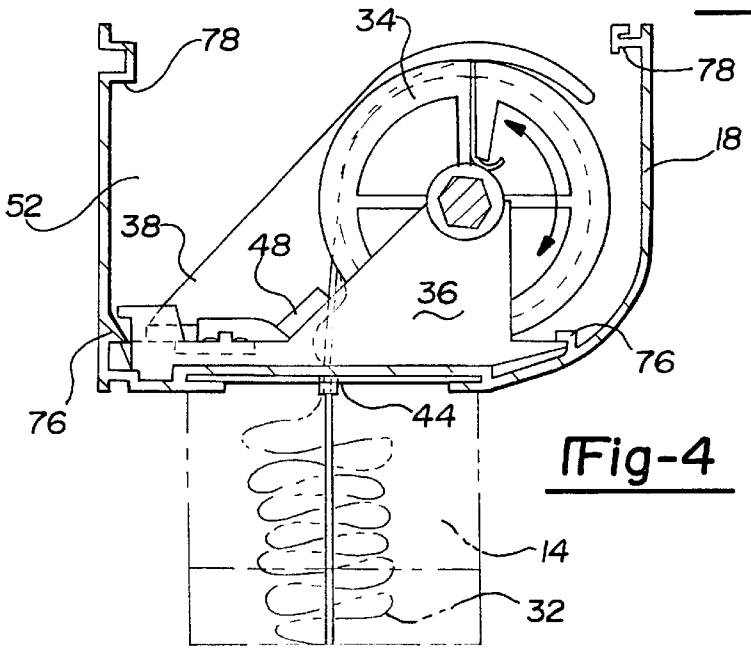


Fig-4

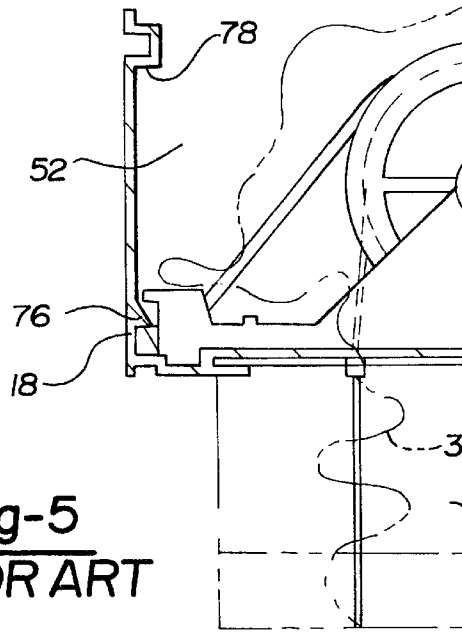


Fig-5
PRIOR ART

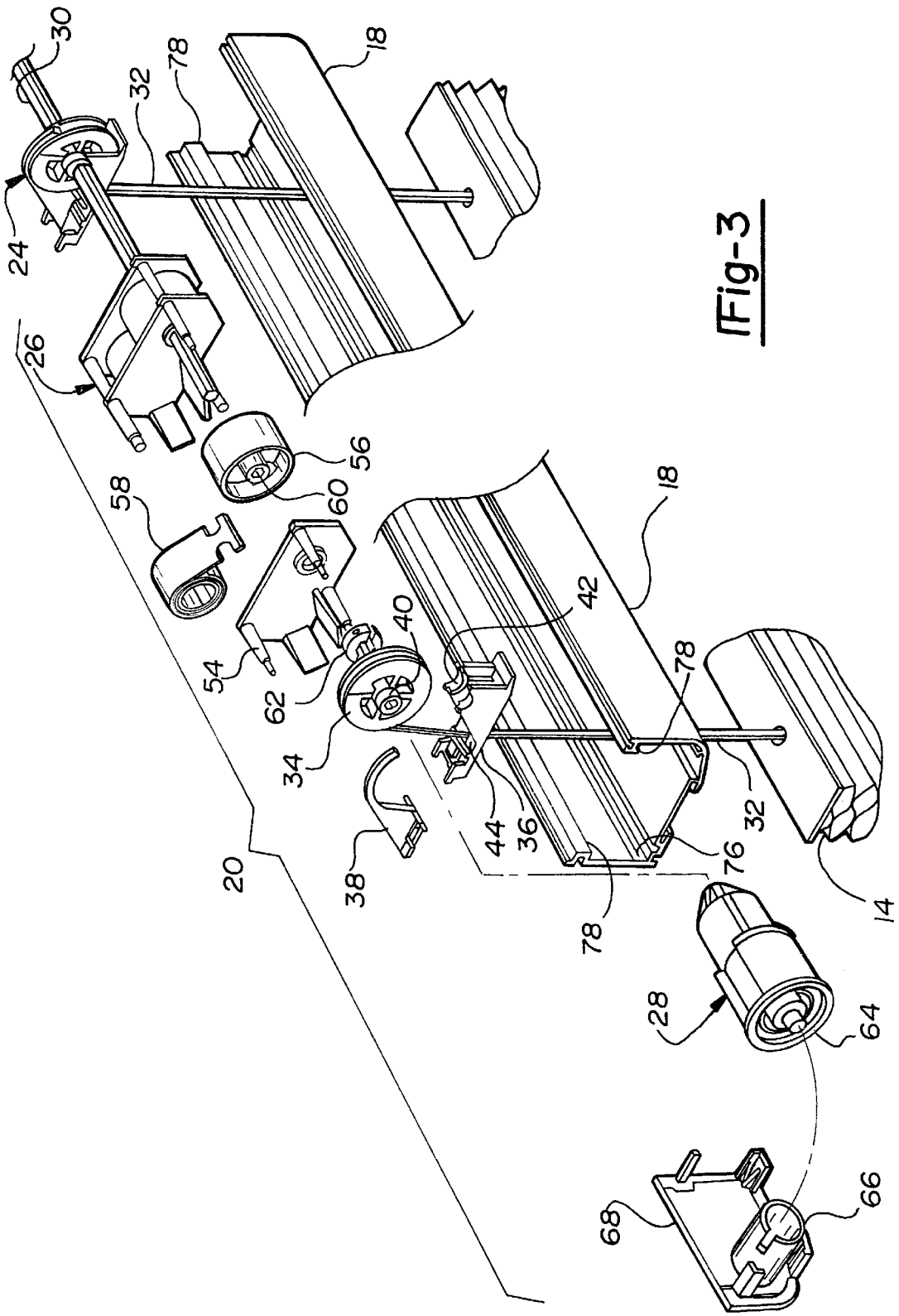


Fig-3

CORDLESS SHADE

FIELD OF THE INVENTION

The present invention is directed to a window shade adjustment apparatus. More particularly, the present invention is directed to a cordless window shade.

BACKGROUND OF THE INVENTION

Shades are used in a wide variety of applications to regulate the amount of light entering a given location and to enhance the overall appearance of the location in which the shades are placed. Shades normally employ several strings which are vertically placed through the shade and are bundled into a single shade cord. The shade cord is used to raise or lower the shade in conjunction with a shade positioning apparatus.

Conventional cellular or pleated shades utilize cord locks or a clutch system to raise, lower and position a shade. With the cord lock mechanism, cords run up through the folded fabric, across the inside of a head rail and exit through a cord lock mechanism. Based on the width of a given shade, there can be no fewer than two and up to six or more cords coming out of the lock mechanism. In systems which utilize a clutch system, a continuous loop cord, not unlike the system use in raising and lowering a flag on a flagpole, is used. While shade positioning apparatuses allow for the desired positioning of the shades, they suffer from many drawbacks.

First, the mere presence of a cord increases the danger of a child getting caught in or strangled by the exposed control cord. Second, excess cord usually is arranged around a wall-mounted cup hook or a cord cleat after the shade is adjusted. Wrapping the cord keeps it from hanging down to the floor but takes extra time and effort on the part of the person adjusting the shade. If left alone, the cords puddle on the floor, looking unsightly and leaving the window area unsafe to children and adults alike. Third, cords hanging from the lock or clutch mechanism are often perceived as aesthetically displeasing and detract from the decorative function of the shade. Fourth, ordinary shades with lock mechanisms regularly go out of alignment, making the bottom rail uneven. Finally, many of the shade positioning apparatuses utilizing cords frequently tangle or otherwise twist the shade cord after continued use of the apparatus.

Common roller shades are known which operate in the absence of a cord. These roller shades include a wound torsion-spring retraction mechanism in combination with a catch mechanism mounted along a take-up roller onto which the shade rolls. In operation, a roller shade is pulled down manually to a desired location, where it locks and stays until the shade is released. To release the shade, an operator tugs along a bottom rail of the shade, extending the shade sufficiently to disengage an internal clutch within the catch mechanism of the shade. When the clutch is disengaged, the shade then retracts under its power, using the torsion-spring driven retraction mechanism. Known roller shades are only operable with flat shade material which rolls up neatly into a confined location. As the shade retracts, the operator must keep some downward force on the shade to prevent violent shade retraction which may cause injury or damage to the shade.

Cellular, pleated or multi-cellular window covering treatments have superior light-blocking, insulation, and aesthetic properties over conventional roller shades. However, physical properties of pleated, cellular, and multi-cellular shades have heretofore prevented their use with roller shade mechanisms. In particular, a cellular or pleated shade is itself a spring, tending to return to a collapsed condition at the top of a window opening where it is usually stored. When fully retracted at the top of a window opening, the weight of the cellular shade still requires supplementary retention, because in that fully collapsed condition of the cells, the cellular shade has no remaining upward bias force of its own due to its own spring characteristics when retracted. On the other hand, when a cellular shade is fully extended to cover a window opening, it exerts a maximum upward bias force due to its own spring characteristics. Additionally, conventional roller shades utilize traditional torsional coil springs which also provide maximum upward bias force when fully extended. In order to support the weight of a fully retracted shade, a torsional coil spring would have to be pre-loaded, which would greatly increase the force of the spring on the shade when it is fully extended. A combination of the upward bias force of a shade demonstrating its own inherent spring characteristics and the upward bias force of a traditional torsional coil spring at maximum extension would create excessive force and acceleration in retraction of the shade, causing danger of striking a person or of damaging the shade itself when it reaches the top of the stroke.

In addition, the large variation among window areas covered by pleated, cellular or multi-cellular shades leads to a large variation in the weight of the shade itself. Conventional torsional coil spring shade retraction mechanisms require more torsional spring length as the weight of the shade increases. For long but relatively narrow window openings, the take-up roller of a conventional roller shade retraction mechanism does not have enough length along the roller for the required torsional spring length. Therefore, a need exists for a roller spring mechanism which may be utilized with pleated, cellular or multi-cellular shades to eliminate the requirement of a cord in a lock or clutch mechanism, to limit the velocity and force of upward travel of the shade as it retracts, and to use with heavier shades in narrower window openings.

SUMMARY OF THE INVENTION

The present invention is directed to a cordless window shade which offers an alternative to cord-operated shades, with added safety and improved aesthetics. The shade utilizes a retraction mechanism which includes a constant torque spring system for lift, and a clutch/brake system for positioning and retraction speed control. A shaft is driven by the constant torque spring system, the speed and force of travel of which is regulated by the brake/clutch system. A tape spool system attached to the shaft provides the means by which the shade is raised or lowered. The tape spool system includes a length of tape determined by the length of the shade, a tape spool, a tape guide, a tape guide retainer and a bottom plug. The tape spool, also driven by the shaft, serves as a reel upon which the tape winds. The tape is connected at one end to the tape spool and at the other end to a bottom rail at the bottom of the shade via the bottom plug, which is threaded onto the tape at a fixed location and inserted into pre-drilled holes in the bottom rail. The tape guide serves as a bearing support for the tape spool, and also as a guide for the tape to direct it through an aperture in the top rail. The tape guide retainer is secured to the tape guide at one end. At its other end, the tape guide retainer is provided with a curved finger which is resiliently biased against a portion of the external circumference of the tape spool, thereby preventing the tape from coming unraveled from the tape spool. The tape guide retainer is further provided along an intermediate portion with an angled tape retention wall located substantially vertically above the

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