May 22, 1923. 1,456,237

A. C. HOUGH

CORD GRIPPING APPLIANCE

Filed June 10, 1921 2 Sheets-Sheet 1

FIG. 1.

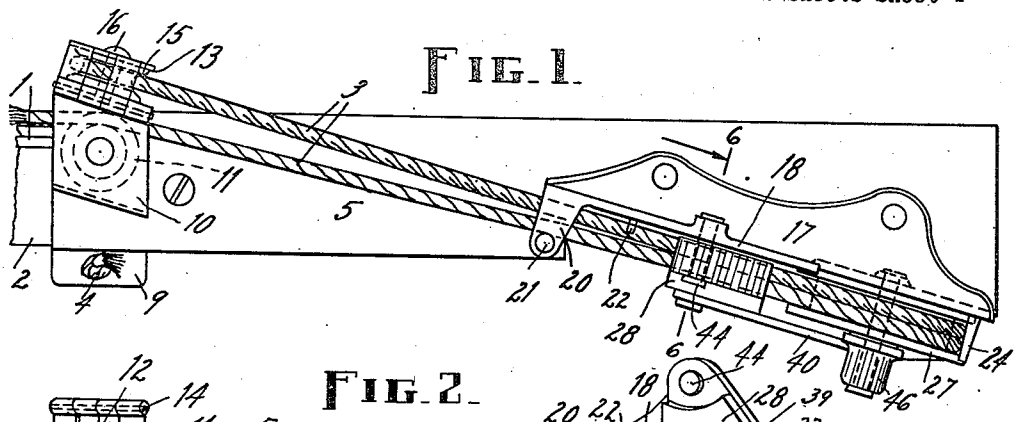
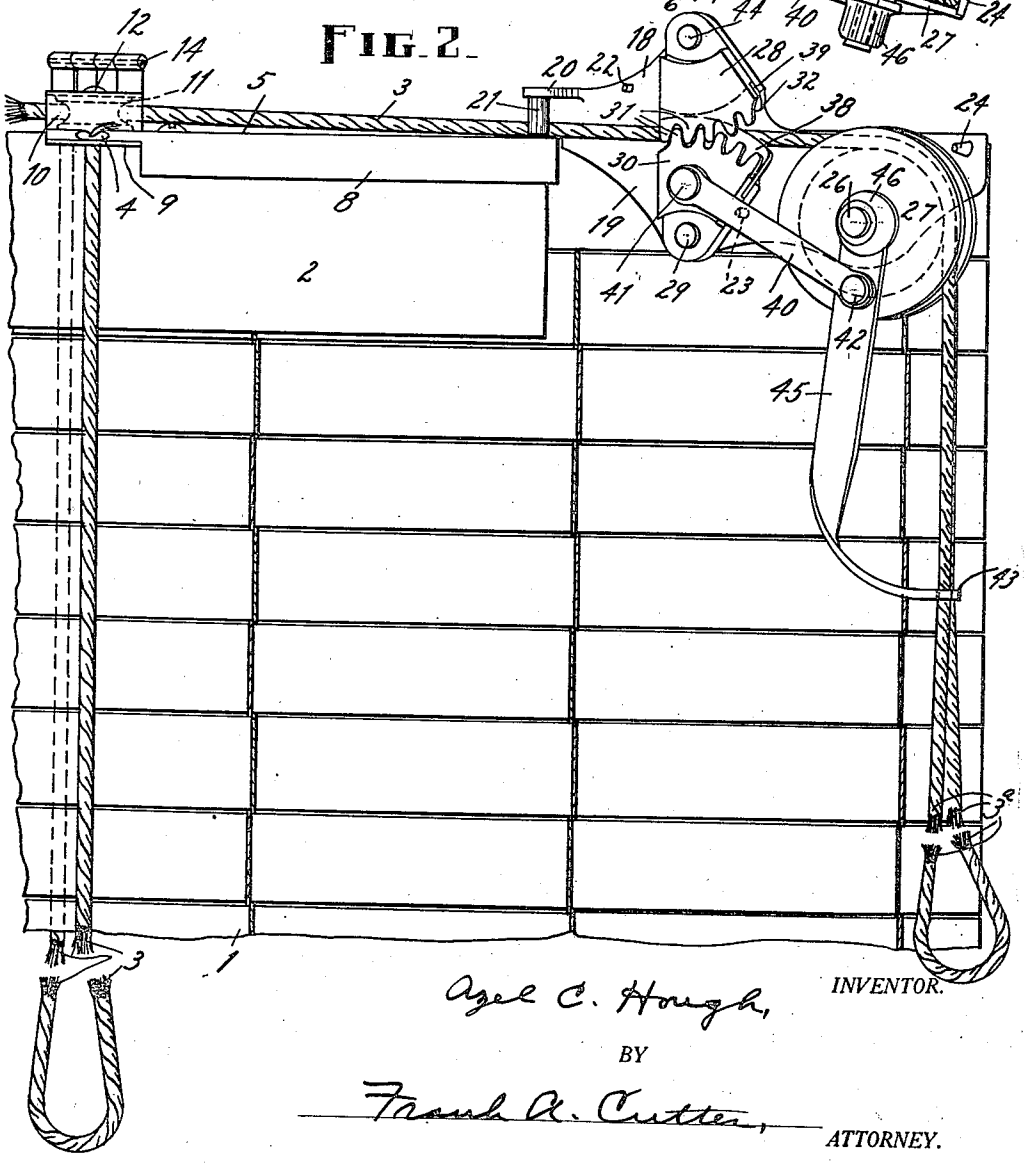


FIG. 2.



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FIG. 3.

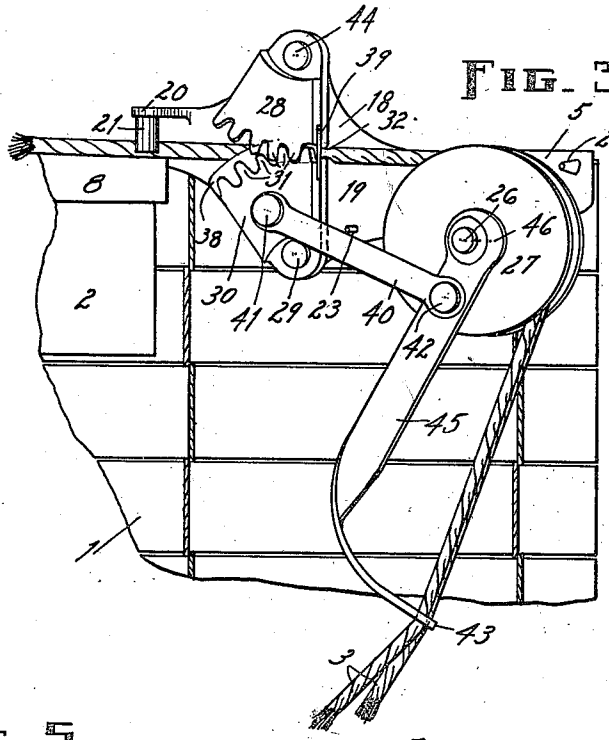


FIG. 4.

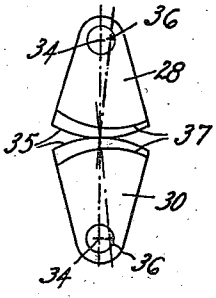


FIG. 5.

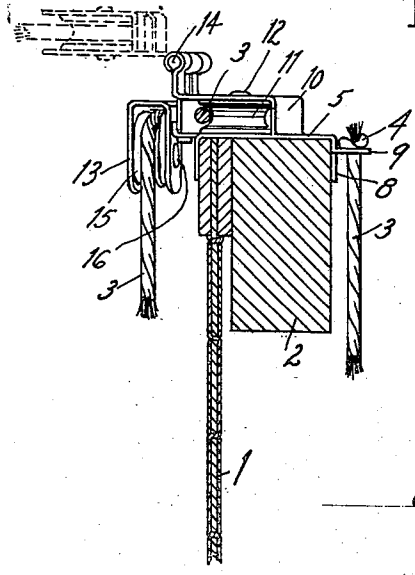


FIG. 6.

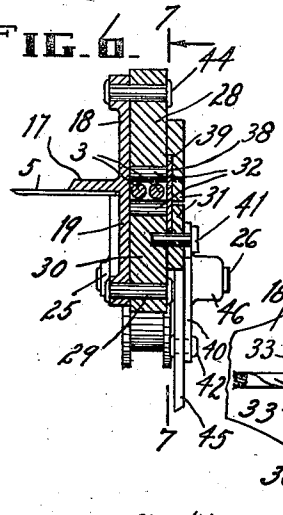


FIG. 7.

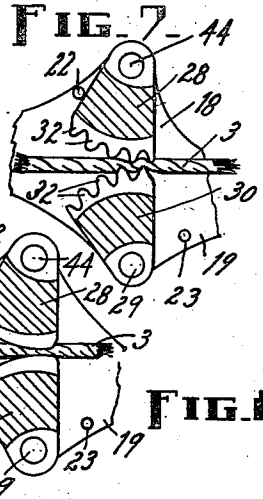


FIG. 8.

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UNITED STATES PATENT OFFICE.

AZEL C. HOUGH, OF JANESVILLE, WISCONSIN.

CORD-GRIPPING APPLIANCE.

Application filed June 10, 1921. Serial No. 476,481.

To all whom it may concern:

Be it known that I, AZEL C. HOUGH, a citizen of the United States of America, and a resident of Janesville, in the county of Rock and State of Wisconsin, have invented a new and useful Cord-Gripping Appliance, of which the following is a specification.

My invention relates to improvements in devices or appliances for use in connection with shades that are adapted to be suspended at the top and raised and lowered, through the medium of a roll-up cord, and resides in certain peculiar toothed sectors provided with arcuate cord-gripping parts that are struck from centers which render said parts eccentric to the arcs of the interengaging sector teeth, and oscillatory operating means for said sectors, together with such supports, guides, stops, and other parts and members, as may be necessary or desirable in order to render the appliance complete in every respect, all as hereinafter set forth.

As a supplementary feature of the invention, a hinged carrier or bracket is provided for one of the guide pulleys, whereby such bracket with its pulley is raised out of the way by the shade roll when said roll assumes its maximum size and approaches its greatest elevation.

The primary object of my invention is to provide an appliance of this character which is operated simply by swinging with the hand of the operator the draw portions or the draw section of the roll-up cord in one direction to cause said cord to be gripped and held against the force exerted thereon by the weight of the movable portion of the shade, and in the other direction to release said cord so as to enable the same to be freely manipulated for the purpose of raising and lowering the shade. In this appliance the gripping force on the cord is increased progressively as the gripping members are actuated in the direction necessary for the application of such force.

Another object is to provide an appliance with means for gripping and securely holding the roll-up cord, irrespective of the movement imparted to the cord-gripping members by the hand, with a force that increases in proportion to any increased tendency there may be on the part of the shade itself to draw the roll-up cord through said members.

A further object is to produce a cord-gripping appliance that is comparatively simple and inexpensive in construction, consists of few parts, can be readily attached to a shade, is not liable to cut or abrade the roll-up cord, is convenient to operate, and the operation of which is so simple and easy as to be performed readily by a mere child. The appliance is operated through the medium of the free loop or draw section of the roll-up cord, which is grasped in raising and lowering the shade, so that it is not necessary for the operator to change position or expend any effort beyond that required merely to swing such draw section of the cord in one direction to lock or secure the parts and in the other direction to unlock or release them.

This appliance is strong and durable, there is nothing about it which is liable to get out of order, and withal said appliance is highly efficient and serviceable.

Other objects and advantages will appear in the course of the following description.

I attain the objects and secure the advantages of my invention by the means illustrated in the acompanying drawings, in which—

Figure 1 is a top plan of a cord-gripping appliance which embodies a practical form of my invention, as the same appears when mounted on or atached to a shade; Fig. 2, a front elevation of said appliance and of the portion of the shade to which the same is secured; Fig. 3, a generally similar view to that shown in Fig. 2, except that the parts are disposed in gripping position; Fig. 4, a diagrammatical view of the cord-gripping members; Fig. 5, an elevation of the end of said appliance which is equipped with the swinging pulley bracket, the upper portion of the shade being shown in cross section; Fig. 6, a vertical section through the appliance, taken on lines 6—6, looking in the direction of the associated arrow, in Fig. 1; Fig. 7, a vertical section through the sectors, on lines 7—7, looking in the direction of the associated arrow, in Fig. 6, the gripping jaws being in the act of engaging and clamping the cord between them, and, Fig. 8, a similar view to the preceding one, except that the gripping jaws shown in the last view have curved gripping surfaces instead of serrated gripping surfaces.

Similar reference characters designate similar parts throughout the several views.

The appliance is illustrated herewith in connection with a flexible shade as repre-

sented at 1, and which shade is provided with or supported from a substantial bar 2 at the top. The bar 2 is of less length than the width of the shade 1, and said bar is arranged with the right-hand end somewhat remote from the adjacent end of said shade. Thus space is left between the ends of the bar 2 and the shade 1 which are remote from each other for parts of the appliance, as hereinafter more clearly will appear. The shade 1 is provided with a roll-up cord 3 as is customary with shades of this type.

The roll-up cord 3 for a flexible shade is usually applied thereto by attaching or fastening its ends at more or less widely separated points behind said shade and near the top thereof, carrying said cord under and upwardly in front of the shade, and to the right through suitable guide members, the right-hand looped portions or section of said cord being left hanging. This hanging section of the cord is the draw section that is grasped and manipulated for the purpose of raising or lowering the shade. The roll-up cord 3 in this case is similarly applied, except that the ends are attached in front of instead of behind the shade 1, one such point of attachment appearing at 4, in Figs. 1 and 2. The cord 3 is guided and supported in its passage to the right until said cord drops to form the draw section, which is the part of the cord that is grasped by the hand of the operator and manipulated for the purpose of raising or lowering the shade, as previously observed, and also for operating the cord-gripping appliance to cause the same to grasp or release the cord. The aforesaid draw section is designated by the numeral 3^a. Only the portions of the cord 3 which are at the right-hand end of the shade are involved directly in the present invention, so that such portions are all that are herein illustrated, the left-hand point of attachment, similar to that at 4, the left-hand loop beneath the shade 1, and the left-hand guiding member for the reach of said cord which is the foremost reach in the drawings, not being shown. The omitted parts and members are, however, duplicates of corresponding parts and members that appear at the right-hand end portion of the shade which is very fully illustrated.

A supporting plate 5 is rigidly secured to the top of the bar 2, and extends to the right beyond the corresponding end of said bar as far as the adjacent end of the shade 1. The plate 5 is provided with a downwardly-extending lip 8 that contacts with the front face of the bar 2, and a portion of said lip at the left-hand terminal thereof is bent outwardly to form a lug 9 for the reception and attachment thereto of the knotted terminal 4 of the roll-up cord 3, such terminal being one of the two terminals of said cord of which mention has been made.

Rising from the top of the plate 5, adjacent to the left-hand end thereof, is a casing or housing 10 in which is located a pulley or idler 11. The pulley 11 is mounted to rotate on a vertical axle 12 set in the plate 5 and the top of the housing 10. A bracket 13 is hinged at 14 to the housing 10. Parts of the hinge 14 rise vertically from the top of the housing 10 at the rear edge thereof, and other parts of said hinge are in the same plane with the forward or bottom side of the bracket 13, accordingly as said bracket be in its downward and normal position, as most clearly shown by full lines in Fig. 5, or in its elevated position, as indicated by dotted lines in said view. A pulley or idler 15 is mounted to rotate in the bracket 13 on an axle 16 set in what are properly termed the sides of said bracket.

That portion of the cord 3 which starts at 4, where said cord is attached to the lug 9, and extends downwardly in front of the shade 1, beneath said shade, and upwardly behind the same, passes to the right over the pulley 15, subsequently enters into the formation of the freely hanging or pendulous draw section 3^a, and, returning on itself, passes to the left behind the pulley 11, and on to be connected in a similar manner to said shade adjacent to the left-hand end thereof. Thus it is seen that the shade at the bottom is supported by the cord 3, and that the weight of the shade has a tendency to draw the upper reaches of said core to the left.

Secured to the overhanging portion of the plate 5 is a member 17 which is provided with an upwardly-extending bracket 18 and a downwardly-extending bracket 19. The aforesaid overhanging portion of the plate 5 is cut in from the outer end of the lip 8, so that the front edge of such portion extends obliquely from the inner end of the cut, to the right and outwardly or forwardly, to the extreme right-hand end of said plate, and the member 17 is so located on the plate that the front edge of said member and the brackets 18 and 19, which latter are at the front edge of the former, are parallel with such oblique edge of the plate.

At the left-hand end of the bracket 18 is a forwardly-extending lug 20, and a vertical guide pin 21 is set in said lug and extends downwardly into close proximity to the plate 5. The two upper reaches of the cord 3 pass from the pulleys 11 and 15 between the bracket 18 and the pin 21. A stop-pin 22 extends forwardly from the bracket 18 at the right of the lug 20. A similar stop-pin 23 extends forwardly from the bracket 19 in a vertical plane which is some

distance to the right of the vertical plane of the stop-pin 22. A pin 24 extends forwardly from the bracket 19 near the upper right-hand corner thereof.

The bracket 19 is provided on the back side with a projection 25, best shown in Fig. 6, and a stud 26 has its rear terminal fixed in said bracket and projection. The stud 26 is located at a point somewhat remote from the outer end of the bracket 19. A pulley 27 is loosely mounted on the stud 26 in front of the bracket 19, and a pendulous operating arm 45 has a hub 46 which is also loosely mounted on said stud, said hub being in front of said pulley. None of these parts and members extends beyond the adjacent end of the shade 1.

Loosely mounted on a stud 44, which projects forwardly from the top of the bracket 18, is a downwardly-extending segment 28, and loosely mounted on a stud 29, which projects forwardly from the bottom of the bracket 19 is an upwardly-extending segment 30. The segments 28 and 30 have on their adjacent arcuate edges intermeshing teeth 31. The teeth 31 are of less thickness than the segments 28 and 30, and located with the front faces of said teeth in the same plane with the front faces of said segments. The studs 44 and 29 have their axes in the same vertical plane, which plane is between the adjacent end of the bar 2 and the vertical plane of the axis of the stud 26. In addition to the teeth 31, the segments 28 and 30 are provided behind said teeth, with arcuate edge portions which constitute cord-gripping jaws that may be serrated as shown at 32—32 in Fig. 7, or unbroken as shown at 33—33 in Fig. 8. As diagrammatically indicated in Fig. 4, the arcs in which the gripping jaws 32 (or 33) are located are eccentric to the arcs in which the gear teeth 31 are located. The centers of the teeth 31 are indicated by the numeral 34, and the arcs themselves by the numeral 35 in Fig. 4, while the centers of the arcs of the jaws 32 (or 33) are indicated at 36, and these latter arcs themselves at 37, in said view. The vertical plane in which the centers 36 are located is at the right of the vertical plane in which the centers 34 are located, consequently the arcs 37 approach each other when the segments 28 and 30 are rocked on their centers 34 to the left, said centers being the pivotal centers of said segments as well as the centers of the arcs 35. The jaws 32 (or 33) are behind the teeth 31, and the width of the same is equal to or in excess of the width of two reaches of the cord 3 lying side by side.

The segment 30 is provided, behind the teeth 31 thereon, with an arcuate guard plate 38 that extends above said teeth. An arcuate slot 39 is provided in the segment 28, betwen the bases of the teeth 31 on said segment and the jaw 32 thereof, to receive the plate 38, which latter may move freely through said slot as the segments 28 and 30 are rocked on their studs 44 and 29. The office of the guard 38 is to prevent the cord 3 from coming into contact with the teeth 31. It is necessary, therefore, that the guard 38 project a sufficient distance, beyond the teeth 31 on the segment 30, to close or cover completely the spaces between the teeth 31 on the segment 28 which at any time during the movement of the segments are immediately adjacent to the cord.

The two horizontal reaches of the roll-up cord 3, which passes from the pulleys 11 and 15 behind the pin 21, continue to the right between the jaws 32 (or 33) and on to the pulley 27, finally passing over said pulley and downwardly therefrom to form the draw section 3^a. The pin 24 is in position to prevent the cord 3 from becoming accidentally disengaged from the pulley 27, but is not close enough to the periphery of said pulley to prevent the cord from being placed on the pulley, or displaced therefrom, laterally, upon the exertion of a little force.

The pin 22 is in position to be contacted with by the left-hand edge of the segment 28, when said segment is actuated to the left, and thus limits the movement of the segment and also of its companion in that direction. The pin 23 is in position to be contacted with by the right-hand edge of the segment 30, when said segment is actuated to the right, and thus limits the movement of said segment and of its companion in that direction. The vertical planes in which the stops 22 and 23 are located are sufficiently far apart to afford the required amount of uninterrupted movement or motion to the segments 28 and 30.

A link 40 has its left-hand terminal pivotally connected at 41 with the segment 30, and its right-hand terminal pivotally connected at 42 with the arm 45. Normally the arm 45 is approximately vertical, and when in that position the left-hand teeth 31, of the segments 28 and 30, are in engagement, and the jaws 32 (or 33), of said segments, are out of contact with the two reaches of the cord which pass between them, or in any event said jaws have no restraining effect on said cord—see Figs. 1, 2, and 6. At this time the segment 30 is in contact with the stop 23. Upon swinging the arm 45 on the stud 26 to the left, said arm, acting through the link 40, rocks the segment 30 and with it the segment 28 in the same direction, until said last-named segment encounters the stop 22, unless the parts be checked before such contact takes place. This action causes the jaws 32 (or 33) of the segments 28 and 30 to approach each other, engage the contiguous portions of the cord 3, and hold said

cord against the pull or strain exerted thereon at any point to the left of said segments. The parts are now disposed as illustrated in Figs. 3 and 7 (or 8). Ordinarily the segments 28 and 30 will not be caused to assume the extreme gripping position, illustrated in said last-named views, by the movement imparted to said segments from the arm 45, inasmuch as the cord 3 is usually gripped with sufficient force to hold the same, and with it support the rolled portion of the shade 1, before the segment 28 comes into contact with the stop 22. Under this usual condition, an excessive pull to the left on the cord, which is now in the grasp of the gripping jaws of the segments, will, by reason of the frictional contact existing between said jaws and said cord, cause said segments to be rocked still further to the left, and said jaws to grip said cord more tightly, until it is practically impossible to draw the cord in that direction from between said jaws, or to move it more than is sufficient to tighten the jaws on the cord to an extent that absolutely locks the cord in place. Upon swinging the arm 45 to the right again, the segment 30 is rocked in the same direction and carries with it the segment 28, the movement continuing until said first-named segment contacts with the stop 23. The movement of the segments thus produced carries the jaws 32 (or 33) farther away from each other progressively, just as they were brought nearer together progressively in the first instance, and completely releases the cord 3. When the cord 3 is thus released, it can be operated in the usual manner for rolling the shade 1 up or down.

What I have termed the draw section 3^a, of the cord 3, passes downwardly from the pulley 27 through an eye 43 in the lower terminal of the arm 45, which terminal is bent to the right and rearwardly in such a manner as to locate said eye in line with said draw section. The draw section 3^a runs freely through the eye 43 both when said section is drawn downwardly to roll up the shade, and when it ascends at the time said shade is permitted to unroll. The draw section 3^a is grasped by the hand of the operator at some point below the eye 43, and it is merely necessary to swing said section to the left in order to actuate the segments 28 and 30 into gripping position with the cord 3, through the medium of the arm 45 and the link 40; and to swing said loop to the right in order to release said cord from said segments, through the same medium as before.

From the foregoing it will readily be understood that the bottom of the shade or the roll at the bottom can be located at any desired elevation, simply by moving the hand holding the draw section 3^a to the left. In changing the elevation of the shade roll, the hand holding the draw section is moved to the right, the shade is rolled up or down, to the extent required, and the hand is moved back to the left, thus securing the shade at the desired elevation.

Owing to the construction, arrangement, and operation of the segments with their cord-gripping jaws, there is a clear passage between said jaws, when said segments are located in one position, which passage is gradually closed and the jaws caused to grip the cord more and more firmly, the farther the segments are rocked out of such position, or the greater the tension put upon said cord by the weight of the shade roll. In the latter case the jaws are closed on said cord more tightly by the pull of the cord, irrespective of the pressure produced in the first instance by rocking the segments with the hand, through the medium of the draw section 3^a, the arm 45, and the link 40, in the direction to produce the gripping action during the operation of locating said roll at the predetermined height. In this connection it should be noted that the parts are constructed to distribute the compression from the contacting surfaces of the segmental jaws over a considerable length of the cord, as well as to apply the required amount of compression to said cord. The former is an important and valuable feature, because, if the compression of the cord by the segmental jaws were at substantially one point only, the cord would become abraded at such point after a time, when the mechanism is in actual use, and eventually would part.

More or less change may be made in the size, shape, construction, and arrangement of some or all of the parts of this appliance, in addition to those hereinbefore specifically or inferentially pointed out, without departing from the spirit of my invention or exceeding the scope of what is claimed.

What I claim as my invention, and desire to secure by Letters Patent is—

1. An appliance, of the class described, comprising a supporting member, segments pivotally connected with said member and having intermeshing teeth, said segments being provided with arcuate cord-gripping jaws eccentric to said teeth, and means to prevent the cord from getting between said teeth.

2. An appliance, of the class described, comprising a supporting member, segments pivotally connected with said member and having intermeshing teeth, said segments being provided with arcuate cord-gripping jaws eccentric to said teeth, and a guard attached to one of said segments to prevent the cord from coming in contact with said teeth.

3. An appliance, of the class described,

comprising a supporting member, segments pivotally connected with said member and having intermeshing teeth, said segments being provided with arcuate cord-gripping jaws eccentric to said teeth, and a guard attached to one of said segments to prevent the cord from coming into contact with said teeth, the other of said segments being slotted to receive said guard.

4. The combination, in a cord-gripping appliance, with a supporting member, and segments pivotally connected with said member and having intermeshing teeth, said segments being provided with arcuate cord-gripping jaws eccentric to said teeth, of an operating arm also pivotally connected with said support, and independent of said segments, and a link pivotally connecting said arm with one of said segments.

5. The combination, in a cord-gripping appliance, with a supporting member, and segments pivotally connected with said member and having intermeshing teeth, said segments being provided with arcuate cord-gripping jaws eccentric to said teeth, of a guiding member for the draw section of a roll-up cord, an operating arm pivotally connected with said support, said arm being independent of said segments, and having a perforated part for the free passage of said cord after it leaves said guiding member to form said draw section, and a link pivotally connecting said arm with one of said segments.

6. The combination, in a cord-gripping appliance, with a supporting member, and segments pivotally connected with said member and having intermeshing teeth, said segments being provided with arcuate cord-gripping jaws which are eccentric to said teeth, of a stud attached to said support, a pulley mounted on said stud, an operating arm also mounted on said stud, said arm having a part to receive the cord after it passes over said pulley, and a link pivotally connecting said arm with one of said segments.

7. The combination, in a cord-gripping appliance, with a support, cord-gripping and releasing members pivotally connected with said support, a swinging arm adapted to be actuated by a pendulous section of a roll-up cord, such arm being independent of said members, and pivotally connected with said support and a link pivotally connecting said arm with said members.

8. The combination, in a cord-gripping appliance, with a support, cord-gripping and releasing members pivotally connected with said support, and cord-operated means to actuate said members, of means to guide the cord to said members, and means to guide said cord after it leaves said members, said first-named guiding means comprising pulleys, and a swinging bracket for one of said pulleys.

9. The combination, in a cord-gripping appliance, with a support, provided with guide pins for a roll-up cord, and further provided with pulleys for said cord, of cord-gripping and releasing members pivotally connected with said support between said pins and said pulleys, a swinging arm separate from said first-named members, and pivotally connected with said support, said arm being operated by a pendulous portion of the cord, and a link pivotally connecting said arm with said members.

10. The combination, in a cord-gripping appliance, with a support, and cord-gripping and releasing members connected with said support and relatively movable, of a swinging member separate from said first-named members, and pivotally connected with said support, the draw section of a roll-up cord being freely connected with said swinging member, and adapted to impart a pendulous movement to said swinging member, and a link pivotally connecting said swinging member with said first-named members.

11. The combination, in a cord-gripping appliance, with a support, cord-gripping and releasing members connected with said support and relatively movable, and a pulley carried by said support, to guide the cord, after it passes between said members, and permit the free portion of such cord to hang vertically, of a swinging member carried by said support, having loosely connected therewith such free portion of the cord, and adapted to be oscillated by such portion, and a link pivotally connecting said swinging member with said first-named members.

12. The combination, in a cord-gripping appliance, with a flexible shade and its roll-up cord, and a support, of cord-gripping means carried by said support, and operating means for said first-named means, said operating means being apart from said first-named means but pivotally connected therewith, and adapted to be operated by said cord.

AZEL C. HOUGH.

Witnesses:
HAZEL T. WEIRICK,
VERNA FLANERY.