May 22, 1951 J. L. HUNTER 2,554,331

PULLEY AND CORD FOR VENETIAN BLINDS

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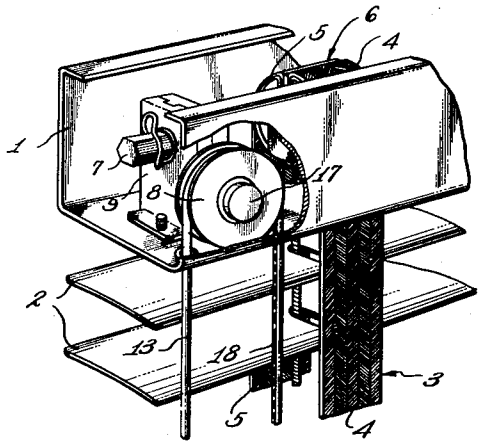


Fig. 1

Fig. 2

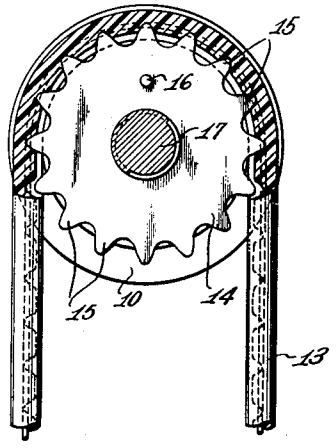
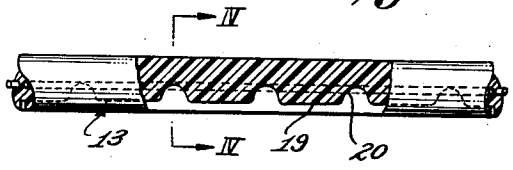


Fig. 3



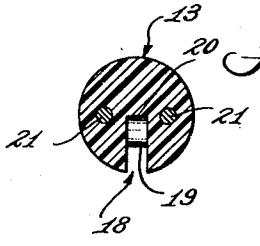


Fig. 4

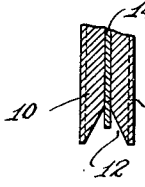


Fig. 5

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PULLEY AND CORD FOR VENETIAN BLINDS

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3 Claims. (Cl. 74—238)

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This invention relates to Venetian blind cords and has particular reference to a cord which may be employed for operating the tilting mechanism of Venetian blinds or may be employed to operate pulley actuated lifting and lowering devices employed in connection with such blinds.

In the construction of Venetian blinds, it is the common practice to employ a headrail to secure the blind in place in a door or window opening, the headrail constituting a support for a tilt rail or tilting mechanism pivotally mounted so as to permit its being oscillated to tilt the slats of the blind between the various open and closed positions of the slats. The tilting mechanism is employed to support a plurality of tape ladders upon which a plurality of slats making up the blind are mounted, the tilting mechanism when actuated lifting one of the vertical tapes of each of the ladders and lowering the other tape so as to accomplish the tilting of the slats between open and closed positions.

In certain forms of Venetian blinds, the tilting mechanism comprises a rail pivotally suspended from the headrail while in other types of Venetian blinds the tilt rail is eliminated and tilting mechanisms are employed located within the headrail structure, comprising rotatable or oscillatable members to which the ladders are attached.

In both of these types of blinds the mechanism for operating the tilting mechanism or tilt rail ordinarily constitutes a worm or similar gear attached to the tubing mechanism to be actuated by the rotation of a tilting mechanism pulley.

Heretofore the pulleys which have been used have been either of the smooth V-groove type or of a serrated V-groove type. With the smooth grooved pulley it has been the common practice to employ a cord as a pulley drive, the cord ordinarily comprising a braided thread cord of sufficient diameter to provide considerable frictional engagement between the groove of the pulley and the surface of the cord, the cord either extending as a single loop over the pulley with its ends hanging free to operate the pulley by drawing down upon one or the other of the free ends of the cords. However, in some instances an endless cord has been employed looped over the pulley so that the cord may be moved through relatively great distances without becoming disengaged from the pulley.

With the serrated grooved pulley the cords which have been heretofore employed have usually comprised braided thread cords having a bead chain insert in the cord of sufficient length to engage the serrations of the pulley through whatever lineal distance the cord was required to move to rotate or oscillate the pulley between the extreme open and closed positions of the slats.

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The present invention relates to a pulley construction and a cord construction which is particularly adapted for the rotation of the tilting mechanism pulleys or for the rotation of pulleys employed for lifting and lowering mechanisms on Venetian blinds, and it is an object of this invention to provide pulleys and cords of novel construction which include in effect a chain and sprocket interengagement between the pulleys and cords.

Another object of my invention is to provide a pulley of the character described, in which the pulley is constructed with a substantially V-shaped groove but has a serrated portion projecting into the interior of the V-shape from the apex thereof to form a sprocket-like member for engagement with the cord.

A still further object of this invention is to provide a cord which is in effect a substantially circular cross section cord but is provided with a longitudinal slot having serrations at the base thereof for engagement with the serrations of the pulley.

Another object of this invention is to provide a cord of the character described which may be readily manufactured from plastics of the type which may be readily molded or extruded to facilitate the manufacture thereof while a still further object of the invention is to provide a cord of the character described wherein reinforcing threads may be so imbedded within the cord as to reinforce the cord against undue longitudinal stretch under load and yet will not interfere with the slot employed in the cord.

Other objects and advantages of this invention will be apparent from a study of the following specifications, read in connection with the accompanying drawing, wherein

Fig. 1 is a fragmentary perspective view of a portion of a Venetian blind illustrating the headrail, one form of tilting mechanism and a cord and pulley for operating the tilting mechanisms constructed in accordance with this invention;

Fig. 2 is an elevational view of the pulley shown in Fig. 1, one side of the pulley being removed to expose the member forming the serrations on the pulley;

Fig. 3 is a detailed elevational view, partly in section, of a portion of the cord shown in Figs. 1 and 2;

Fig. 4 is a vertical sectional view of the cord taken along line IV—IV of Fig. 3; and

Fig. 5 is a fragmentary cross sectional view of a portion of the pulley shown in Figs. 1 and 2.

Referring to the drawings, there is illustrated a typical Venetian blind structure including a headrail 1 from which is suspended a plurality of slats 2 supported upon ladder tapes 3, the showing of the Venetian blind being only fragmentary. Only two slats are shown and only one of the ladder tapes is shown though it will be understood by those skilled in this art that there may be any number of slats sufficient to fill the window or door opening in which the blind is to be used and that the number of ladder tapes which will be employed will depend upon the width of the window opening and consequently the length of each of the slats which will be used in the blind. Ordinarily at least two ladder tapes are employed, each of which includes a pair of vertical tape members 4 and 5 secured at their upper ends to a tilting mechanism indicated generally at 6. The tilting mechanism as heretofore described may be a tilt rail or may be a drum, such as is illustrated at 6, adapted to be rotated or oscillated by means of a shaft 7 to which power is applied by a tilting mechanism pulley 8 through reduction gearing indicated in the box or housing at 9.

The construction hereinbefore described is illustrated and described in detail in the copending application of Joseph L. Hunter, Serial No. 584,654, filed March 24, 1945 for Tilting Device Mechanisms for Venetian Blinds, now Patent No. 2,498,079, dated February 21, 1950, but it will be understood by those skilled in this art that the pulley 8 may be arranged to oscillate the more conventional tilt rail of Venetian blind structures of the type which have been in use for many years.

The pulley 8 is illustrated as being of the V-grooved type and may be readily constructed as is illustrated in Fig. 5 by assembling a pair of disk members 10 and 11 together, each having a beveled edge facing the edge of the other disk in such fashion as to define a V-groove 12 over which is trained the operating cord 13.

As is illustrated particularly in Figs. 2 and 5, a serrated member or disk 14 may be assembled together between the disks 10 and 11 to provide a plurality of serrations or teeth 15 which project into the bottom of the V-groove 12 and in effect provide sprocket teeth adapted to engage the cord 13. The disks 10, 11 and 14 may be held together in any suitable manner as by means of rivets such as indicated at 16 and the disks may be secured to a stub shaft 17 in any suitable manner so as to rotate the shaft 17 upon rotation of the pulley 8. However, it will also be understood that the pulley may be made in any suitable manner so long as serrations or teeth are formed which project into the bottom of the V-groove.

By referring particularly to Figs. 2, 3 and 4, it will be observed that the cord 13 is generally circular in cross section but is formed with a slot 18 extending from one of the side walls to a suitable depth into the cross section of the cord, the bottom of the slot being made irregular by providing hills and valleys 19 and 20, respectively, at the base of the slot to thereby provide serrations or tooth-like members which will interengage with the serrations 15 of the pulley 8 and in effect provide a sprocket-chain interengagement between the cord and pulley and this provides for a positive interengagement of the cord and pulley which will prevent slippage between them.

At the same time it will be observed that the cord, being generally circular in configuration, presents a smooth exterior to the sides of the pulley groove so that there is no interengagement of irregularities between the cord and pulley which might produce noise.

The cord 13 is preferably constructed of a flexible plastic such as the vinyl chloride plastics and similar plastics which are flexible at atmospheric temperatures while at the same time have great resistance to change in temperature and moisture conditions and will not become brittle with age. Such material may be readily molded or extruded by any of the processes well known for the handling of plastics of this nature, the molding or extruding steps forming not only the circular cross section for the cord but also forming the slot with its irregularities.

While such plastics may have sufficient tensile strength to be suitable without reinforcement, it is preferred to provide a reinforcement against longitudinal stretch as by embedding within the material of the cord one or more strong threads 21 such as nylon, glass fiber, wire or other suitable material having great tensile strength.

By constructing the cord as described herein and by the employment of the interengagement of the serrations in the cord with serrations on the pulley, the cord may be employed as the single loop cord with free hanging ends or the hanging ends of the cord may be welded together by any of the suitable and well known plastic welding processes to form an endless cord.

The latter arrangement is particularly useful where the cords and pulleys are to be used for the operation of winding mechanisms employed on large Venetian blinds for the purpose of lifting and lowering the blinds since by employing an endless cord a relatively great gear reduction may be employed between the pulley and the winding mechanism.

By employing cords and pulleys of the character described and particularly utilizing the cords formed of plastic material, the operation of the pulley and cord is rendered silent as compared with the beaded chain arrangement which has been previously used and at the same time the interengagement of the serrations in the cord with the serrations on the pulley giving a positive interaction, the V-groove may be made of relatively wide angle since there is no need for high pressure contact between the sides of the cord and the sides of the pulley groove.

While I have shown and described the preferred embodiment of my invention, I do not desire to be limited to any of the details of construction shown and described, except as defined in the appended claims.

I claim:

1. In a cord for Venetian blinds comprising a plastic cord of substantially circular cross section having a longitudinal slot extending radially into the cord, the base of said slot having serrations to engage teeth on a pulley with which it is associated, and a plurality of reinforcing threads of great tensile strength extending longitudinally of said cord.

2. For use with a pulley having a peripheral groove and a plurality of teeth projecting radially outward from the bottom of said groove, a cord of substantially circular cross section and having a longitudinally extending slot formed therein, the base of said slot having serrations formed in-

tegrally therein conforming with the spacing of the teeth on said pulley to provide a positive interengagement between the cord and the pulley.

3. A cord for Venetian blinds comprising a plastic body of substantially circular cross section and having a longitudinal slot extending radially into the cord, the base of said slot having serrations formed therein to engage teeth on a pulley with which the cord is associated.

JOSEPH L. HUNTER.

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