Dec. 30, 1941. L. K. LOEHR 2,267,869

VENETIAN BLIND

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Fig. 2

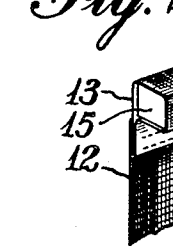


Fig. 1

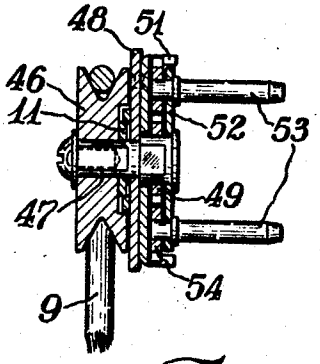


Fig. 5

Fig. 3

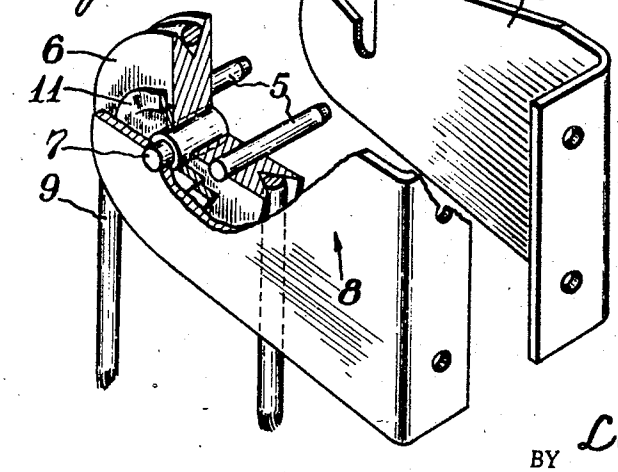


Fig. 4

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Fig. 6

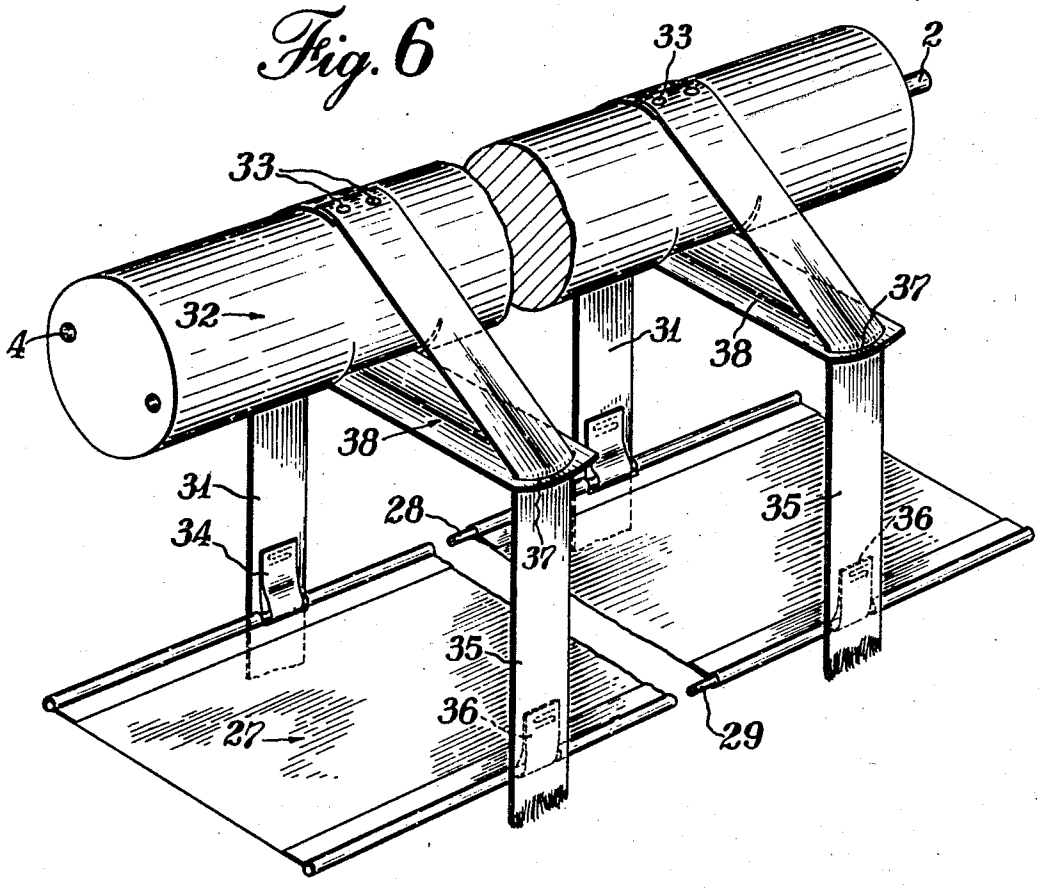


Fig. 7

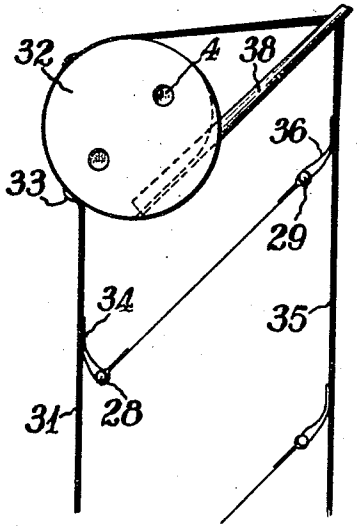


Fig. 8

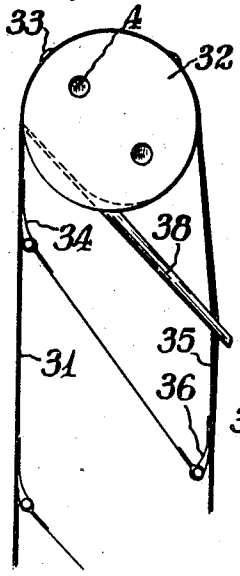


Fig. 9

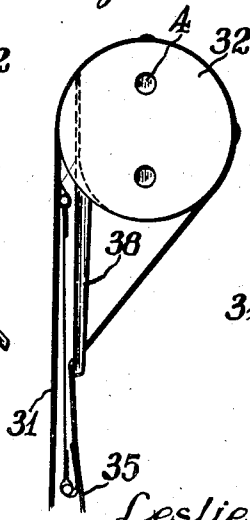
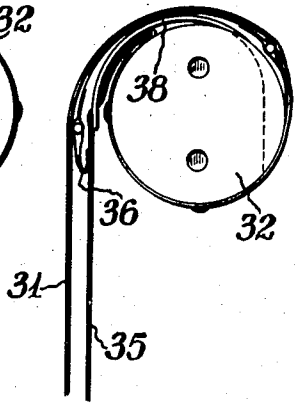


Fig. 10



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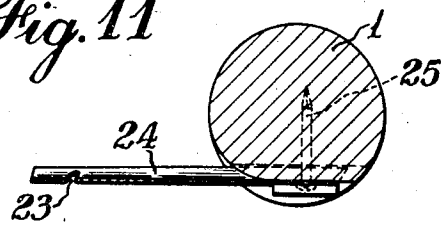
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Fig. 11



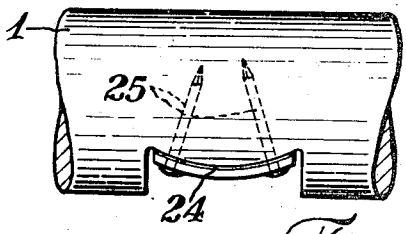


Fig. 12

Fig. 13

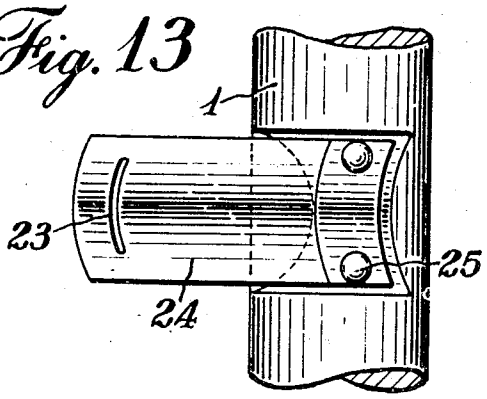


Fig. 14

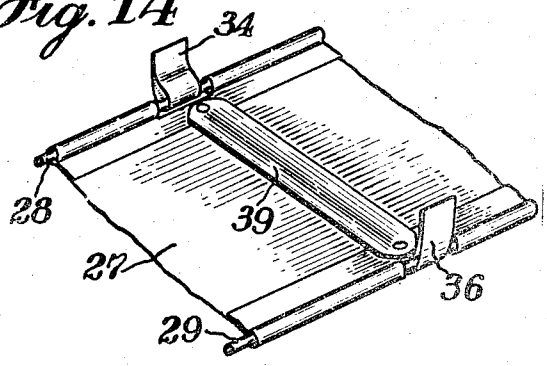


Fig. 15

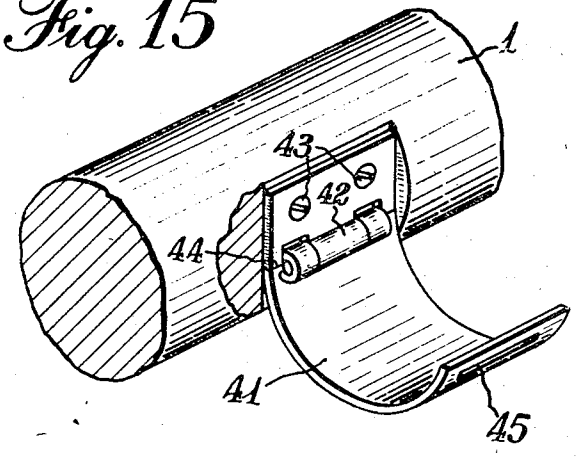
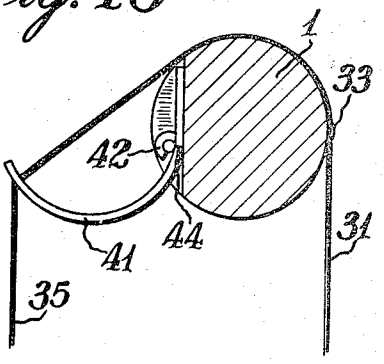


Fig. 16



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UNITED STATES PATENT OFFICE

2,267,869

VENETIAN BLIND

Leslie K. Loehr, Los Angeles, Calif.

Application May 29, 1940, Serial No. 337,877

13 Claims. (Cl. 156—17)

The present invention relates to Venetian blinds and more particularly to a blind having constructional features similar to a roller type window shade while incorporating the tiltable slats characteristic of Venetian blinds.

The present invention is in some of its aspects an improvement and simplification of the structure disclosed in Patent Number 2,110,145, issued on March 8, 1938, to the present applicant, and also has certain features in common with the structure disclosed in application Serial Number 337,876, filed by this applicant on May 29, 1940.

As Venetian blinds have increased in popularity, there has been a more and more insistent demand for simpler and less expensive light-controlling structures, and for devices which lend themselves readily to decorative treatment in conformity with their environment. Moreover, it is desirable that the blind should be easily installed and removed and that the operating mechanism thereof be simple and unobtrusive.

It is an object of the present invention to provide a novel Venetian blind which possesses in a high degree the desirable features above set forth.

It is another object to provide a Venetian, shutter or louvre type of blind which is adapted to be adjusted in height by rolling it up similarly to a roller type window shade.

It is a further object to provide such a device in which the adjusting means for the blind is also operable to tilt the shutter elements thereof.

It is another object to provide such a device which may be constructed as a combined roller type curtain and Venetian blind.

It is another object to provide such a device which is simple and economical in construction, efficient in operation and decorative in appearance.

Further objects and advantages will be apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a perspective view of a portion of a Venetian blind with parts broken away, incorporating a preferred embodiment of the present invention;

Fig. 2 is a detail in perspective showing the method of fastening the curtain to the supporting roller;

Fig. 3 is a perspective detail partly broken away, showing the supporting and operating mechanism for the roller;

Fig. 4 is a similar view showing the supporting bracket for the opposite end of the roller;

Fig. 5 is a sectional detail showing a modified form of supporting and actuating mechanism for the roller;

Fig. 6 is a view similar to Fig. 1 showing a second embodiment of the invention;

Fig. 7 is an end view of the structure illustrated in Fig. 6, showing the parts in the positions assumed when the slats are tilted upwardly;

Fig. 8 is a view similar to Fig. 7 showing the slats tilted downwardly;

Fig. 9 is a similar view showing the slats in closed position;

Fig. 10 is a similar view showing the blind partially rolled up;

Fig. 11 is a detail showing a section through the roller and one of the flexible supporting arms;

Fig. 12 is a detail showing a flexible arm in end elevation;

Fig. 13 is a top view of a flexible arm with its mounting;

Fig. 14 is a detail in perspective showing stiffening and reenforcing means for a slat;

Fig. 15 is a detail in perspective showing a hinged form of supporting arm; and

Fig. 16 is a sectional detail of the structure illustrated in Fig. 15, showing the hinged arm in side elevation.

In Fig. 1 of the drawings there is illustrated a roller 1 of wood or other suitable material having a gudgeon pin 2 axially inserted in one end and arranged to be detachably journalled in a bayonet slot in a bracket 3 (Fig. 4) fixed in any suitable way to the frame of the window or other opening. The opposite end of the roller 1 is provided with a pair of sockets 4 arranged to receive pins 5 (Fig. 3) fixed to a pulley 6 which is journalled as indicated at 7 in a bracket 8 mounted in alignment with the bracket 3.

Means for rotating the pulley 6 to turn the roller 1 is shown in the form of a cord 9 depending from the pulley for convenient manipulation. A friction washer 11 is preferably interposed between the side of the bracket 8 and the pulley 6 to serve as a detent for maintaining the pulley and roller in adjusted position.

A curtain 12 of any suitable foraminous material is supported from roller 1 and attached at its upper end thereto in any suitable way. One preferred method of attachment is illustrated in Fig. 2 which shows a loop of closely woven material 13 sewed to the upper edge of the cur-

tain. The loop 13 is arranged to enter an axial channel 14 in the roller 1 and be retained therein by means of a batten 15 of wood or other suitable material fixed in the channel as by means of nails or screws 16.

Slats 17 for controlling the admission of light through the curtain are attached at one edge thereof to the curtain in spaced relation parallel to the roller 1. The slats are of any suitable light-controlling flexible material which may be sewed to the curtain as indicated at 18, and are preferably stiffened by means of wires or rods 19 passing through hems 21 on their free edges.

Means for supporting and adjusting the free edges of the slats 17 is provided in the form of tapes 22 attached to the roller 1 as by means of the nails 16, and passing through slots 23 in the ends of cantilever arms 24 fixed tangentially to the roller 1. Arms 24 are made of thin flexible material such as sheet steel and are mounted in slots 20 in the roller which provide convex seats to which the arms are made to conform by suitable fastening means such as nails 25, as best shown in Figs. 11, 12 and 13. The consequent flexure or longitudinal warping of the arms renders them comparatively stiff when they are in extended position. The flexibility of the material is such, however, that when the curtain is rolled up, the extending portions of the arms flatten out and wrap closely around the roller 1.

Arms 24 are of such length that when horizontally extended, the slots 23 therein are spaced from the curtain 12 a distance slightly greater than the width of the slats 17. Tapes 22 extend through the slots 23 downwardly adjacent the free edges of the slats, and hangers or pendicles 26 (Fig. 1) fixed to the tapes at their upper ends are arranged to encircle the reenforcing rods 19 of the slats so as to pendulously support the free edges of the slats from the tapes.

It will be understood that a sufficient number of slats 17 are provided to overlap and completely cover the surface of the curtain 12 when the slats are in their lowered position. The bottom slat may be of the same material as the others or may be of heavier material in order to place tension on the blind if desired.

The slots 23 in arms 24 are preferably curved as illustrated in order that the downward tension of the tapes 22 may be applied to the arms 24 principally at the center thereof. This arrangement stiffens the arms 24 when they are extended by tending to increase the axial flexure thereof.

In Figs. 6 to 10 inclusive there is illustrated an embodiment of the invention in which no curtain is used, its supporting function being taken by a second set of tapes. As there shown, slats 27 are reenforced at both edges by wires or rods 28 and 29, and tapes 31 attached to the roller 32 by means such as nails 33, support the rods 28 by means of pendicles or hangers 34. The opposite edges of the slats 27 are supported in the same manner as the free edges of slats 17 in the first embodiment of the invention. For this purpose, tapes 35, connected by pendicles 36 to the reenforcing rods 29, pass through slots 37 in tangential arms 38 and are fixed to the roller 32 by the nails 33.

Where the slats are formed of very flexible material, it may be preferred to reenforce or stiffen them laterally to insure proper flatness when extended. One suitable form of such stiffening means is illustrated in Fig. 14 which shows a strip 39 which may be of thin spring material axially bowed to provide the proper stiffness and attached at its ends to the edges of the slat preferably adjacent the attachment of the pendicles thereto.

Figs. 15 and 16 illustrate a form of cantilever arm having a hinged connection with the roller. As there shown, the arms 41 are made of material which is substantially rigid but is curved to conform to the outer diameter of the roller. Hinges 42 are provided for anchoring the arms to the roller as indicated at 43, said hinges having abutments 44 defining the extended position of the arms. Arms 41 are provided with straight slots 45 adjacent their free ends for the passage of the supporting tapes therethrough.

Where the blind is large and/or constructed of heavy materials, it may be desirable to introduce a gear reduction between the operating pulley and the roller. Such a construction is illustrated in Fig. 5 in which a pulley 46 is fixedly mounted on a shaft 47 journalled in a bracket 48 and having a sun gear 49 fixed thereto. An orbit gear 51 is fixed to the bracket 48, and a planet carrier 52 rotatably mounted on the end of shaft 47 has a pair of pins 53 suitably fixed therein in position to engage the sockets 4 of roller 1. Planet pinions 54 journalled on the inner ends of pins 53 are arranged to mesh simultaneously with the sun gear 49 and orbit gear 51 so that rotation of the sun gear by the pulley 46 causes planetation of the pins 53 at reduced speed, which rotation is transmitted to the roller 1 when the roller is mounted on said pins.

In operation, the roller and blind are mounted on the bracket 8 by introducing the pins 5 axially into the openings 4 of the roller. The gudgeon 2 is then introduced into the bayonet slot in the bracket 3 (Fig. 4) in a similar manner to an ordinary roller shade. The blind may then be extended by simply drawing it down like a shade, or by rotating the pulley 6 in the direction to unroll the blind. When the blind is fully extended, rotation of the pulley 6 by the cord 9 is effective to tilt the slats upwardly as shown in Fig. 7 or downwardly as shown in Fig. 8 to control the admission of light through the curtain, or further rotation may close the slats as shown in Fig. 9 and roll up the blind to any desired degree as indicated in Fig. 10. Since the arms 24 and slats 17 with reenforcing means 39, when used, are all made of thin flexible material, they conform closely to the roller when the blind is raised.

Although certain embodiments of the invention have been shown and described in detail, it will be understood that other embodiments are possible and various changes may be made in the design and arrangement of the parts without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. In a device of the class described, a roller having one end pivoted and the other end arranged to engage a manually operable rotating means, flexible supporting means fixed at one end to the roller, a series of slats of light-obstructing material hinged at one edge of the flexible supporting means in parallel spaced relation, and means attached to the roller for raising and lowering the free edges of the slats.

2. In a device of the class described, a roller having one end pivoted and the other end arranged to demountably engage a manually operable rotating means, flexible supporting means fixed at one end to the roller, a series of slats of light-ob-

structing material hinged at one edge to the flexible supporting means in parallel spaced relation, means for rolling up the flexible supporting means and slats on the roller, means operative by the final unrolling movement of the supporting means from the roll to raise the slats into open position, and means operable on the rotating means for retaining the roll in any position of rotary adjustment.

3. In a device of the class described, a roller, a curtain of foraminous material fixed at one end thereto, a series of slats of light-obstructing material hinged at one edge to the curtain in parallel spaced relation, means pivotally supporting one end of the roller, and means engaging the opposite end of the roller to support and rotate the roller in either direction to raise and lower the free edges of the slats and to roll up the curtain and slats on the roller with the slats in closed overlapping relation, said rotating means being arranged to frictionally hold the roller in any position in order to maintain the angular adjustment of the slats.

4. In a Venetian blind, a horizontally arranged cylindrical roller, a flexible support dependent therefrom, a series of horizontally arranged slats hinged to the support, and means for opening and closing the slats by rotary adjustment of the roller comprising a flexible tension device connected to the free edges of the slats and rigidly attached to the roller at a point spaced from said support, said tension device being adapted to wrap around the roller when the roller is rotated to raise the blind.

5. In a Venetian blind, a cylindrical roller, flexible supporting means fixed to the roller and arranged to roll up thereon, flexible slats hinged to the supporting means and adapted to roll up on the roller with the flexible supporting means, stiffening means for the slats, a flexible tension member connected to the free edges of the slats rigidly attached to the roller at joints spaced from the supporting means, for tilting the slats by rotation of the roller, and manually operable means for pivotally supporting and rotating the roller.

6. In combination, a roller curtain of foraminous material, flexible slats of light-obstructing material hinged at one edge to the curtain in parallel overlapping relation, means for rolling up and unrolling the curtain, means for flattening out the slats as they are unrolled, and means for opening the slats responsive to the final unrolling movement of the curtain.

7. In combination, a roller curtain of foraminous material, flexible slats of light-obstructing material hinged at one edge to the curtain in parallel overlapping relation, means for rolling up and unrolling the curtain and slats, means for stiffening and reenforcing the slats, and means for opening the slats responsive to the final unrolling movement of the curtain, the stiffening and reenforcing means and the opening means being arranged to roll up with the curtain.

8. In combination, a horizontally arranged roller, flexible supporting means attached thereto, a plurality of slats of light-obstructing material hinged to the supporting means, an arm fixed tangentially to the roller, and tilting means for the slats fixed to the roller and guided by said arm, the slats, arm and tilting means being arranged to roll up with the supporting means on the roller.

9. In combination, a horizontally arranged roller, flexible supporting means attached thereto, a plurality of slats of light-obstructing material hinged to the supporting means, an arm of flexible sheet metal fixed tangentially to the roller and axially curved to stiffen the same, and a flexible tension member fixed to the roller guided by the arm and attached to the free edges of the slats.

10. In combination, a horizontally arranged roller, flexible supporting means attached thereto, a plurality of slats of light-obstructing material hinged to the supporting means, an arm of flexible sheet metal fixed tangentially to the roller and axially curved to stiffen the same, said arm having a curved slot near its free end, and a flexible tape fixed to the roller passing through the slot in the arm and hinged to the free edges of the slats.

11. In a roller type Venetian blind, a horizontal roller, a pivotal support for one end thereof, a manually operable rotating support for the other end of the roller, flexible supporting means fixed to the roller and dependent therefrom, a plurality of light obstructing slats of pliable material hinged horizontally to the supporting means, means normally holding the slats stretched flat, flexible tilting means fixed to the roller and hinged to the free edges of the slats, and means fixed substantially tangentially to the roller for spacing the tilting means from the supporting means, said stretching means and spacing means being arranged to conform to the roller when the blind is rolled up on the roller.

12. In a roller type Venetian blind, a horizontal roller, a pivotal support for one end thereof, a manually operable rotating support for the other end of the roller, flexible supporting means fixed to the roller and dependent therefrom, a plurality of light obstructing slats of pliable material hinged horizontally to the supporting means, means normally holding the slats stretched flat, flexible tilting means fixed to the roller, and means connecting the free edges of the slats to the tilting means, the supporting means, slats and tilting means being arranged to conform to the roller when the blind is rolled up on the roller, and the connecting means providing compensation between the free edges of the slats and their attached tilting means during the rolling and unrolling process, in order to prevent bunching of the tilting means or crumpling of the slats.

13. A Venetian blind as defined in claim 11 in which the flexible supporting means and tilting means are formed of woven fabric, and the hinged connections of the slats thereto comprise fabric hangers fixed to the supporting and tilting means and pivotally connected to the slats.

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