William Wade
and Edwin North
INVENTORS

BY Clarence E. Threedy
THEIR ATTORNEY.
This invention relates to venetian blinds and especially to a novel form of blind structure adapted for installation on the exterior or exposed parts of a window structure, and is in part a continuation of the disclosures of our co-pending application Serial No. 122,792, filed Jan. 26, 1937.

Among the important objects of the invention is the provision of a blind mechanism including a plurality of spaced slats suspended between flexible elements from a control mechanism operable to tilt the slats about their individual axes and also to raise the same into a gathered relation independently of the tilting operation, together with means for mounting said structure exteriorly of a usual form of window structure and manually operable means disposed on the inner side of the window and adapted variously to control the aforesaid operating mechanism.

More specifically stated, the invention provides blind mechanism including a carriage, means for supporting the carriage across the outside or exposed portion of a window structure, a plurality of slats suspended in spaced relation between two flexible elements attached to said carriage, mechanism operable to pivot the carriage about its own long axis, a roller supported on said carriage and means for rotating the roller and simultaneously sliding the same in an axial direction, flexible elements windable onto said roller and adapted to raise and lower said slats, together with manual control means for rotating said roller and extended from said carriage through the wall structure adjoining the window to the inner wall surface, and other control mechanism likewise extended through the wall structure and adapted to control the pivoting or tilting of the carriage.

Other novel aspects and more specific objects of the invention will appear as the following description proceeds in view of the annexed drawings, in which:

Fig. 1 is a fragmentary front elevation of the blind and control mechanism therefor mounted in the upper exterior portion of a window;

Fig. 2 is a horizontal section through the upper window structure and taken along lines 2–2 of Fig. 1; while

Fig. 3 is an enlarged vertical section through the window structure and manual control mechanism as seen along lines 3–3 of Fig. 1.

It has heretofore been the common practice to mount blinds of the type herein described on the inner or chamber side of window structures, and by our present invention we provide a novel blind mechanism which makes possible the installation of such blinds on the exterior side of a window and at the same time retains the usual operating characteristics of the venetian blind; that is to say, the tilting and raising operation of the slats is preserved and even facilitated by control mechanism disposed on the inner side of the window structure and easily accessible by the operator.

As seen in Fig. 1, the blind structure comprises a plurality of slats 10 suspended in spaced relation between pairs of flexible elements 12 which, in turn, are suspended from a top rail or carriage structure which includes a carriage 14 provided with a roller 16 supported at one axial extremity by a combination axle and worm gear 18, and at its opposite extremity by a keyed or square shaft 20.

One chain of each pair 12 is attached at its upper extremity 22 to the bottom of the carriage 14 and at points 24 along each of the longitudinal edge portions of the several slats 10, while the remaining chain of each pair is attached at its lower extremity to a bottommost slat only and at its upper extremity extends through the bottom of the carriage for attachment to the roller 16, as at 26 for example.

The carriage 14 is supported at one axial extremity by means of a bracket 30 having a stud shaft 32 extended therefrom and provided with a gear 34 and a portion extending beyond the gear into the axial end of the carriage, thus providing a pivotal support for the latter, while at its opposite extremity the carriage is engaged by a pair of spaced trunnion pins 36 (Fig. 2) which extend from a trunnion arm 38 into the axial end of the carriage, the trunnion arm being provided intermediate of the pins 36 with a stationary riding gear 40 (Fig. 1) over which rides a gear 42 on the stationary worm shaft 44 when the carriage 14 is pivoted about its own axis.

The trunnion arm 38 is pivotally supported on an end bracket 46 and is provided with a segmental gear (not shown) which meshes with a driving worm 44, driven by special control means hereinafter to be described, for the purpose of tilting or rocking the carriage 14 about its own axis so as to tilt the several slats 10 correspondingly.

The gear 34 extended from the other bracket 30 meshes with a gear 35 on the square shaft 20, the roller 16 being keyed to slide on this shaft and also being rotatable with the same when the gear 35 is driven by gear 34, this latter movement...
being effected through the operation of a driving worm 45 engageable with a driven gear 48 on the stud shaft 32. The worm 45 is rotated by a special control mechanism shortly to be described in conjunction with the operating mechanism for operating the carriage. Rotation of the shaft 26, however, correspondingly rotates the roller 16, and the axial bore at the left-hand end of the same is provided with a stationary tooth (not shown) which rides in the worm track on stationary shaft 10, and thus the roller is caused to creep or shift along the square shaft 26 toward one or the other end of the carriage, depending upon the direction of rotation of gear 34, and when the roller thus revolves, the lifting chains attached thereto, as at 26, are wound thereon and the winding creeps in a direction opposite to the direction of axial movement of the roller. For a more detailed description of the construction and operation of this type of control mechanism, reference may be had to the above mentioned co-pending application. The brackets 30 and 31 in the present embodiment are one corner portions of the outer window structure by any suitable means, and the entire carriage as well as the brackets are covered by a shield plate having a top level 50, a front surface 51 disposed rectangularly of the top and having a drip formation along the lower edge, the under and inner surfaces respectively of the top and front 50 and 51 overlying correspondingly angled surface portions 53 of the brackets, and being secured thereto by means of screws or the like, and in this manner the operating mechanism is shielded from dirt, snow and the like, the mechanism being otherwise ruggedly designed to withstand radical temperature changes and ordinary attacks by the elements in its exposed condition. The raising and lowering movement of the slats 10 is guided by means of vertically disposed channel strips 54 attached to the sides of the window opening and in which ride axially extended studs (not shown) provided in the ends of the lowermost slat of the group, this slat usually being heavier than the remainder of the slats so as to assure quick response of the assembly in its lowering movement.

Control of the operating mechanism is effected by means of a telescoping shaft assembly 51 including a tubular sleeve portion 58 keyed by means of a pin 60 to a shaft 62 which carries the worm 46, and which is rotatably mounted on bracket portions 63 forming part of each of the brackets 30 and 31, as seen in Fig. 3, for example. The mechanism disposed at the left-hand end of the carriage as seen in Figs. 1 and 2 is provided with a driving worm and driven gear substantially identical to that seen in Fig. 3 (and corresponding to the operating mechanism at the right-hand end of the carriage) and each of the brackets has an upstanding lug or ear 65 (Fig. 3) intermediate bracket portions 63 adapted to bear against an axial end of the worm to limit its thrust movement in that direction, the opposite end of the worm being provided with a thrust bearing 67 seated in one of the bracket portions 63.

The sleeve part of the telescoping shaft is provided with a square or keyed end section 59 at its end opposite to the tubular section 58 and rotatably receives a square shaft 70 having its outer end pivotally secured, as at 72, between the sides of a U-shaped cleat 74 attached to the end of a pulley shaft 76.

The telescoping shaft assembly is adapted to extend through aligned openings 71 and 78 in the header 80 and the inner trim plate 81, respectively, and protruding beyond the plane of the wall surface a sufficient distance to provide a clearance for a special pulley 84 (Fig. 3) secured on the outer end of the telescoping shaft 70 spaced from the underlying wall surface by means of a stand-off collar 86 through which the pulley and shaft passes. As seen in Fig. 2, the stand-off collar 86 is attached to the trim plate by means of screws 87.

The pulley structure shown in Fig. 3 forms the subject matter of applicant's co-pending case Serial No. 122,797, filed Jan. 28, 1937, and includes an endless pull-chain 88 of the ball type, which rides into and out of peripheral depressions in the pulley and which is secured in operative relationship with the pulley by means of a combination guide and shield plate 90 having a lower sleeve or skirt portion through which the chain hangs. By grasping one of the chain links on either side of the same, the pulley 84 is rotated together with the telescoping shaft structure which, in turn, rotates the worm 46 and the gear 48 to revolve the roller 16 in the manner and for the purpose described above. The control shaft corresponding to the mechanism 70—67, 62—46, just described, is substantially duplicated at both ends of the carriage with the exception that the rotative movement in one instance is transmitted to the carriage itself to pivot the same about its own axis, while in the other instance the motion is transmitted to the roller to wind in or feed out the slats as the case may be.

The telescoping shaft assembly 51 facilitates the installation of the mechanism in buildings having varying depths of wall structure, a wide range of depths being readily accommodated by moving the square shaft 70 inwardly or outwardly of the sleeve portion.

If desired, the individual slats 10 may be constructed of metal or the like in accordance with the teaching of our co-pending application Serial No. 122,802, filed Jan. 28, 1937, which discloses a novel form of blind stilt stamped or cast and having integrally formed attaching lugs for supporting engagement with the chains or flexible elements.

It will be evident that we have provided a novel venetian blind structure and operating control mechanism which makes it possible to mount the blind on the outside of a window structure, and while the preferred embodiment is described herein in detail, the example is intended to be illustrative of the invention and we wish to avail ourselves of all the modifications and variations of the invention disclosed herein and defined by the appended claims.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

1. Blind supporting and operating mechanism for installation on the outside of a window structure, said mechanism including a carriage, means for pivotally supporting the carriage across the outside of a window structure, a plurality of slats suspended from said carriage by flexible elements and mechanism on said carriage for moving said slats and including a driven member, together with control means drivingly connected with said driven member and extended through the window structure to the inner wall surface adjoining said
window, and manually operable means on said control member and operable to drive the same.

2. A venetian blind adapted for installation on the outside part of a window structure and including a moveable slat-supporting device, means for supporting said device across the upper outside portion of the window structure, said means including bracket members attached to said structure, a plurality of blind slats suspended from said supporting device and the latter having slat-moving mechanism including driven elements, and means for moving said supporting device including telescoping shaft means extended from said supporting device on the exterior side of the window through the window structure to the inner adjoining wall surface, said shaft means having a driving element directly operable with said driven element, and manual means on the inner wall extremity thereof for rotating said shaft to move said supporting device and said slats.

3. A venetian blind adapted for installation on the outside portion of a window structure, said blind including an elongated carriage pivotally supported across the outside of the window by means of brackets attached to the window structure at the axial ends of the carriage, a plurality of slats normally suspended in spaced relation from said carriage by means of flexible elements, gear mechanism on said carriage and including a driven gear for pivoting the same to tilt said slats, winding means on said carriage including a roller mechanism having a second driven gear for simultaneously revolving the roller and sliding the same along its axis of rotation, flexible elements windable onto said roller and operable to lift said slats in gathered condition, and manually operable control mechanism including a shaft extended from said carriage through said window structure to the inner adjoining wall surface, said means on the exterior end of said shaft and operatively engageable with said first-mentioned driven gear to pivot said carriage when said shaft is rotated, and said shaft having pulley means on its interior end for rotating the same and tilting the carriage as aforesaid, together with a second shaft means likewise extended from said carriage through said window structure to the interior wall surface adjoining the window structure and having gear means on its exterior end engageable with said second driven gear to operate said roller and pulley means on the interior end of said second shaft means and operable to rotate the latter and the roller as aforesaid to raise and lower said slats.

4. A venetian blind structure including a slat control and supporting mechanism, and means for mounting said mechanism across the exterior portion of a window structure, a plurality of slats suspended in spaced relation below said first-mentioned mechanism by means of flexible elements, and remote control mechanism for said first-mentioned control mechanism including a control member operatively engageable with said slat supporting and control mechanism and extended from the latter through said window structure to pivot said control member adjacent the interior surface of the said window structure, and manually accessible and operable means on the inner extremity of said control member for rotating the same to operate said control mechanism and move said slats.

5. A blind structure adapted for mounting on the exterior side of a window structure and including an elongated carriage member and means for supporting the same across the exterior of a window including a pair of brackets disposed at the axial ends of the carriage and attached to the window structure, a plurality of slats suspended in spaced relation by flexible elements from said carriage and the latter having a rotateable member for raising and lowering said flexible elements and the slats, mechanism including a driven gear, a trunnion arm pivoted on one of said brackets and engageable with an axial end of said carriage, said trunnion arm being pivotable by said driven gear, a second gear means at the opposite end of said carriage and operable to rotate said roller means, together with manually operable remote control mechanism for pivoting the said carriage and revolving said roller to move said slats, said mechanism, and a pair of telescoping shafts supportably engaged at one outer extremity on one of each of said brackets and each having a worm drive at their said outer extremities and respectively engageable with said first-mentioned driven gear and said second-mentioned gear means, each of said shafts being extended through said window structure from the outside region thereof to the interior or chamber side thereof, and being supported at their interior extremities by a stand-off collar embracing the same and attached to the window structure, each of said shafts having pulley means at their interior extremities for revolving the same to pivot said carriage and revolve said roller respectively, and said carriage having shield plate means supported by said brackets.

6. A blind structure adapted for mounting on the exterior side of a window structure and including a slat-supporting and operating carriage, means for supporting said carriage across the exterior part of a window structure, a plurality of slats movably supported by said carriage, and driven mechanism forming part of said carriage and operable to move said slats, together with operating means for actuating said driven mechanism from the interior or chamber side of said window structure, said means including an elongated and longitudinally adjustable shaft member operatively connected with said driven mechanism and extended through a portion of said window structure for connection with a manipulating device disposed at the interior or chamber side of the window structure.

7. A blind structure adapted for mounting on the exterior side of a window structure and including a slat-supporting and operating carriage, means for supporting said carriage across the exterior part of a window structure, a plurality of slats movably supported by said carriage, and driven mechanism forming part of said carriage and operable to move said slats, together with operating means for actuating said driven mechanism from the interior or chamber side of said window structure, said means including an elongated and longitudinally adjustable shaft member operatively connected with said driven mechanism and extended through a portion of said window structure and pivotally attached at its inner end to a manipulating device engaging said shaft and disposed at the interior or chamber side of said window structure.