Oct. 1, 1940. W. J. STUBER 2,216,678

VENETIAN BLIND STRUCTURE

Filed Feb. 7, 1939 2 Sheets-Sheet 1

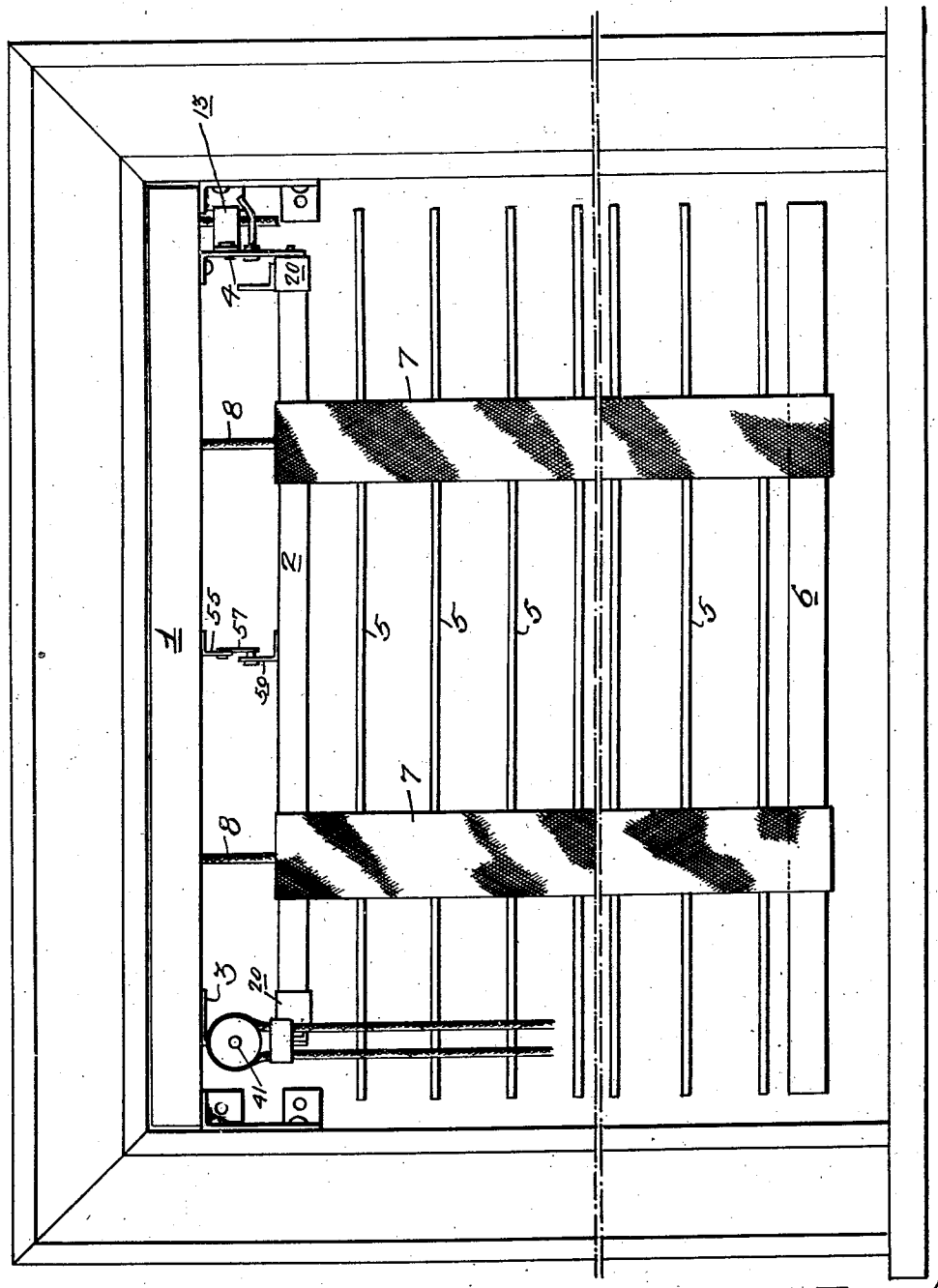


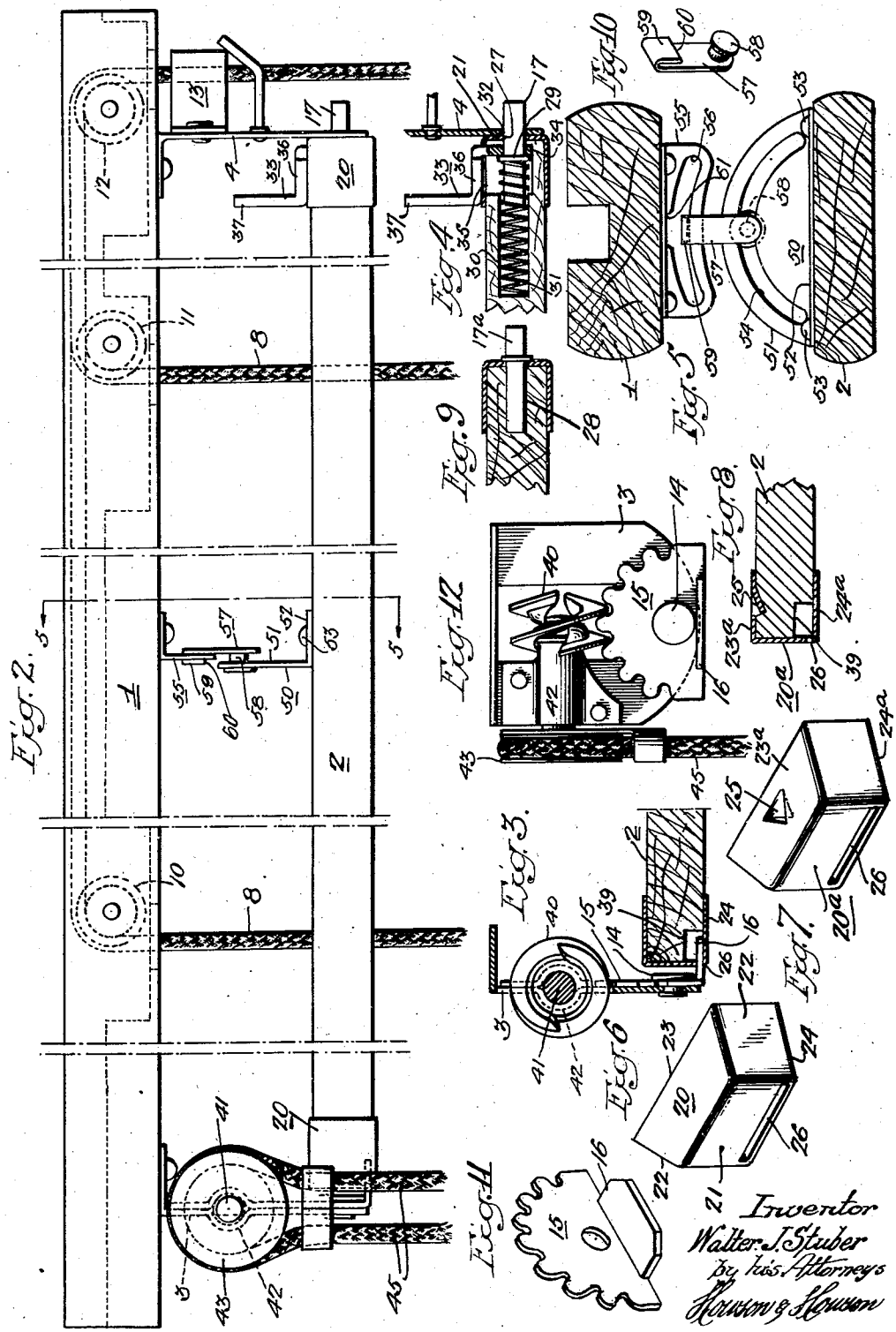
Fig. 1.

Inventor
Walter J. Stuber
By his Attorneys
Howson & Howson

Oct. 1, 1940. W. J. STUBER 2,216,678

VENETIAN BLIND STRUCTURE

Filed Feb. 7, 1939 2 Sheets-Sheet 2



Patented Oct. 1, 1940 2,216,678

UNITED STATES PATENT OFFICE

2,216,678

VENETIAN BLIND STRUCTURE

Walter J. Stuber, Philadelphia, Pa., assignor to Carey-McFall Company, Philadelphia, Pa., a corporation of Pennsylvania

Application February 7, 1939, Serial No. 255,119

1 Claim. (Cl. 156—17)

This invention relates to Venetian blinds and more particularly to what is commonly termed the "tilt-rail" of the blind, i. e. a bar, usually composed of wood, to which the slat supporting ladder tapes of the blind are secured and which is provided with trunnions at its opposite ends journaled in brackets secured to and depending from the lower side of the "head-rail." The head-rail is adapted to be supported on brackets secured to the side rails or top rail of a window frame, adjacent the latter, and carries the operating mechanism of the blind such as the elevating pulleys and cord lock in addition to the tilt-rail brackets, one of which carries the mechanism by which the tilt-rail, and consequently the slats supported thereby, is rocked transversely to set the slats at any desired angle relative to the horizontal.

Heretofore, it has been deemed necessary to make the tilt-rail of heavy construction, to support the weight of the slats and to prevent splitting of the tilt-rail at the trunnions. Such heavy construction gives the tilt-rail an awkward clumsy and undesirable appearance, due to its thickness in relation to that of the slats. Also the heavier the wood the greater the cost of the tilt-rail and this in mass production amounts to a considerable item of cost.

The objects of the present invention are to reduce the thickness of the tilt-rail; to provide means for preventing splitting of the thinner tilt-rail; to provide support, in addition to the trunnions, for the thinner tilt-rail in blinds of extra width; and to provide for readily detaching the tilt rail from its trunnions and central support for facilitating installation of the blind and for cleaning puroses.

Referring to the drawings:

Fig. 1 shows a window frame with a Venetian blind installed therein;

Fig. 2 is a front elevation of the tilt-rail and head-rail and sufficient of the other elements of the Venetian blind to illustrate the present invention;

Fig. 3 is a fragmentary longitudinal sectional elevation showing the support for one end of the tilt-rail;

Fig. 4 is a fragmentary longitudinal sectional elevation showing the support for the opposite end of the tilt-rail;

Fig. 5 is a transverse sectional elevation showing the center support for the tilt-rail, as taken on the line 5—5, Fig. 2;

Fig. 6 is a perspective view of the split preventing means;

Fig. 7 is a perspective view of a modified form of split preventing means;

Fig. 8 is a fragmentary longitudinal sectional view showing the means of Fig. 7 installed on one end of a tilt-rail;

Fig. 9 is a fragmentary longitudinal sectional elevation showing a modified trunnion support for one end of the tilt-rail;

Figs. 10 and 11 are perspective views of details of the invention; and

Fig. 12 is a detail view of the tilt-rail rocking mechanism.

As shown in Figs. 1 and 2, the head-rail of a Venetian blind is illustrated at 1, the tilt-rail at 2, and the supporting brackets for the tilt-rail at 3 and 4 respectively as being secured to the underside of the head rail 1.

The slats 5 and bottom rail 6 are supported by laterally spaced ladder tapes 7, 7 which are secured to the tilt-rail 2. Elevating cords for the bottom rail 6 and slats 5, 5 are shown at 8. These cords pass around pulleys 10, 11 and 12 in the head rail 1 and through a cord locking mechanism 13 carried by the bracket 4, as shown in Fig. 2.

A worm wheel segment 15 is pivotally mounted on the bracket 3 and is provided with a flange 16 extending perpendicular to the plane of said segment, for supporting one end of the tilt-rail 2. The opposite end of the tilt-rail 2 is supported by a trunnion 17 journaled in the bracket 4. The trunnion 17 is axially aligned, or substantially so, with the pivot 14 of the segment 15.

In order to prevent splitting of the opposite ends respectively of the tilt-rail 2 each end is provided with a cap or ferrule 20, which in the present instance is composed of a sheet metal stamping and comprises an end wall 21, side or end walls 22, 22 and top and bottom walls 23 and 24 respectively, as clearly shown in Fig. 6. The end walls 22, 22 are arranged in convergent relationship to each other to fit correspondingly tapered ends of the tilt-rail 2.

The ferrules 20 are preferably force fitted to the ends of the tilt-rail to hold the wood or equivalent material of which the rail 2 is composed in a more or less compressed state to discourage any tendency toward splitting. However, as shown in the ferrule 20a of Figs. 7 and 8, one or both of the top and bottom walls 23a and/or 24a may be provided with a prong 25 pressed out of the metal of the ferrule or cap into the wood of the tilt rail to prevent the ferrule from slipping off the end of the rail. A dowel, tack or other medium driven into the wood through a

suitable opening formed in the cap or ferrule will serve the same purpose, or a suitable cementitious material may be employed between the interior of the cap or ferrule and the exterior surfaces of the end of the rail 2, if desired.

The ferrule or cap on the end of the tilt-rail 2 lying adjacent the bracket 3 is preferably provided with an elongated slot 26 in the wall 21 thereof, adjacent and parallel to the bottom wall 24, for reception of the tongue or flange 16 of the worm wheel segment 15, whereby the end of the tilt-rail 2 is supported by and keyed to the worm-wheel 15 for rocking therewith and thereby.

The ferrule or cap 20 on the opposite end of the tilt-rail 2 is provided with a centralized opening 27 in the wall 21 of the cap or ferrule for reception of the trunnion 17.

In some instances the trunnion may be of the fixed type as shown at 17a in Fig. 9, driven into or otherwise seated in an opening 28 formed in the end of the tilt-rail.

Preferably the trunnion 17 is of the retractable type and comprises a pin slidably mounted in the opening 27 formed in the cap or ferrule 20 with an annular shoulder or flange 29 formed thereon intermediate the opposite ends thereof and disposed in an opening 30 formed in the end of the tilt-rail, as shown in Fig. 4, with a compression spring 31 seated in the base of said opening 30 and bearing against the inner surface of the annular flange 29 to force the trunnion 17 axially outward from the end of the tilt-rail 2 into a bearing or journal 32 formed in the bracket 4.

In order to retract the trunnion 17 from its journal 32, a finger release element 33 having a leg 34 disposed between the outer surface of the collar or flange 29 of said trunnion and the inner surface of the wall 21 of the cap or ferrule 20 is provided. The leg 34 projects through a slot 35 formed in the upper wall 23 of the ferrule and is formed with a main body portion 36 which rides on the upper wall 23 of the ferrule and normally closes the slot 35. An outward lug or protuberance 37 is formed at the opposite end of the body 36 to facilitate inward movement of the trunnion 17.

When the retractable trunnion 17 is used the opposite end of the tilt-rail is cut away as at 39, above the tongue 16 of segment 15 in order that, upon retracting the trunnion 17 that end of the tilt-bar in which the trunnion is located may be swung downwardly, using the flange 16 of the segment 15 as a fulcrum. The end of the tilt-bar 2 lying adjacent the segment 15 may then be slipped off the flange or tongue 16 to release the tilt-bar completely from its end supporting means.

The tilting of the tilt-bar 2 is accomplished, as noted above, by rocking the segment 15 about its pivot 14 and this is effected through a worm 40, see Fig. 12, which meshes with the teeth of the segment 15. The worm 40 is fixed to one end of a shaft 41 which is rotatably mounted in a bearing 42 formed on or in the bracket 3. The opposite end of the shaft 41 has secured thereto a rope or cord sheave 43 around and depending from opposite sides of which is a tilt-cord 45 by which rotation of the sheave 43, shaft 41 and worm 40 may be produced.

In some instances, particularly if the blind is of extra width, i. e. a width, for example, in excess of thirty inches, it is advisable to provide additional support for the tilt-rail intermediate the brackets 3 and 4 and for this purpose the tilt-rail 2 is provided with a vertically extending flange 50 formed of a plate 51 having a right angle bend 52 secured by screws 53 to the upper surface of the tilt-rail 2. The plate 51 is provided with an arcuate slot 54 formed about a center substantially coinciding with the axis of the trunnion 17 and the worm wheel segment 15. Secured to the underside of the head-rail 1 is a similar plate 55 having an arcuate slot 56 formed therein which is substantially concentric to the slot 54 of the plate 51. Connecting the plate 51 and 55 is a freely movable link 57 which is provided at one of its ends with a headed stud 58 mounted in the slot 54 of the plate 51 and by which free movement throughout the length of the arc of the slot of the stud 58 within the slot is permitted. The opposite end of the link 57 is provided with a hook portion 59 which passes through the slot 56 formed in the plate 55 attached to the head rail 1, the end of the hook 59 passing to the opposite side of the plate 55 from that adjacent to which the link 57 proper is located. The link 57 forms a connection between the plates 51 and 55 by which the weight of the central portion of the tilt-rail 2 is supported from the head-rail 1. The arrangement is such that free tilting movement of substantially 180 degrees of the tilt-rail is permitted, the link 57 at all times providing the necessary support and allowing for the tilting movement of the rail 2 by the stud 58 sliding in the slot 54 and the hook 59 sliding in the slot 56 of the plates 51 and 55 respectively.

The central support provided through the link 57 is readily detachable from the head rail 1 by flexing the tilt-rail 2 upwardly until the lower edge 60 of the hook 59 on the link 57 is above the lower edge of the slot 56 in the plate 55 while the elements are in the relation shown in Fig. 5. In order to provide for this detachability the upper edge of the slot 56 is recessed as shown at 61. With the elements in the position shown in Fig. 5 and by flexing the tilt-rail 2 upwardly as noted, the top portion of the hook 59 moves into the recess 61. The link 57 may then be moved laterally with respect to the plate 55 until the lower edge 60 of the hook 59 passes outwardly over the lower edge of the slot 56, there being sufficient relative movement permitted between the link 57 and the head of the stud 58 to provide for sufficient lateral movement of the link 57 to effect its release from the plate 55.

Preferably when the center support is used the link 57 is released from the plate 55 prior to the release of the trunnion 17 from its bearing in the bracket 4. Thus, the trunnion 17 may be retracted and the tilt-bar swung downwardly without hindrance from the center support. In reinstalling the tilt-bar the one end thereof is first positioned on the tongue or flange 16 of the worm wheel segment 15 and with the trunnion 17 retracted the opposite end of the tilt-rail is swung upwardly untitl the trunnion 17 is in line with its bearing 32 in the bracket 4 whereupon release of the finger element 33 will permit the spring 31 to project the trunnion 17 into its bearing 32 leaving the tilt-rail supported at its opposite ends by the brackets 3 and 4 respectively. By flexing the tilt-rail upwardly in the manner above noted the central supporting link 57 may then be replaced in the slot 56 of the plate 55 to provide the necessary support at the center of the tilt-rail.

I claim:

In a Venetian blind comprising a tilt-rail,

readily detachable means pivotally supporting each of the opposite ends of said tilt-rail and intermediate said ends thereof, the pivotal support at one end of said tilt-rail comprising a retractable trunnion slidably mounted in the end of said tilt-rail, a ferrule on said end of said tilt-rail provided with an opening through which said trunnion projects, a spring mounted in an opening formed in the end of said tilt-rail for slidably supporting said trunnion for projecting the trunnion outwardly through the opening formed in the ferrule and a finger release element connected with said trunnion and projecting laterally therefrom through a slot formed in said ferrule.

WALTER J. STUBER.