July 18, 1939. P. H. KUYPER 2,166,599

VENETIAN BLIND

Filed Dec. 5, 1938 2 Sheets-Sheet 1

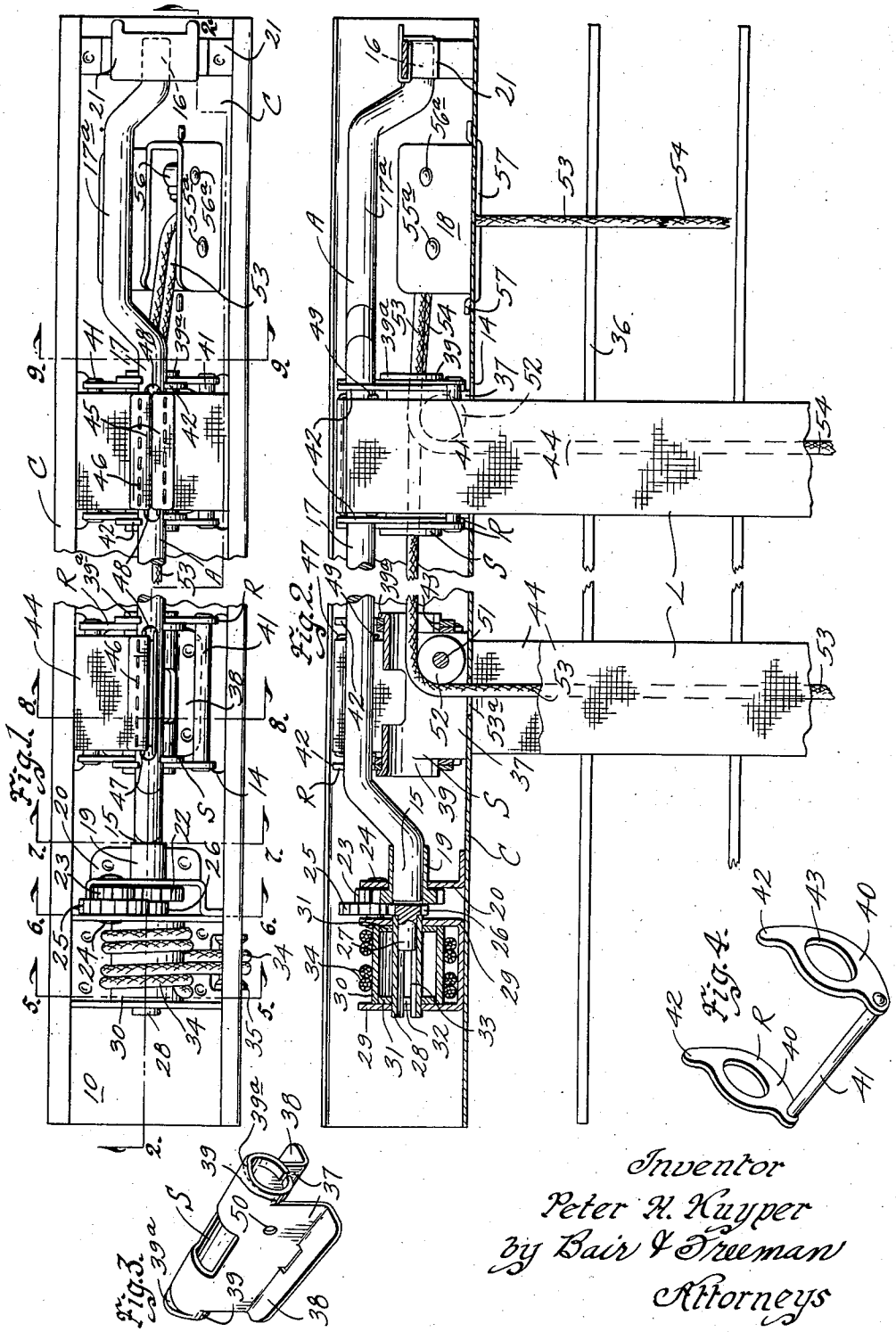


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Inventor
Peter H. Kuyper
by Bair & Freeman
Attorneys

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Fig. 5.

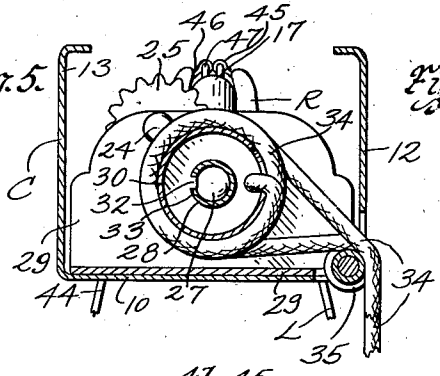


Fig. 6.

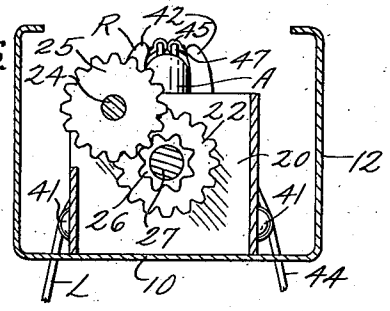


Fig. 7.

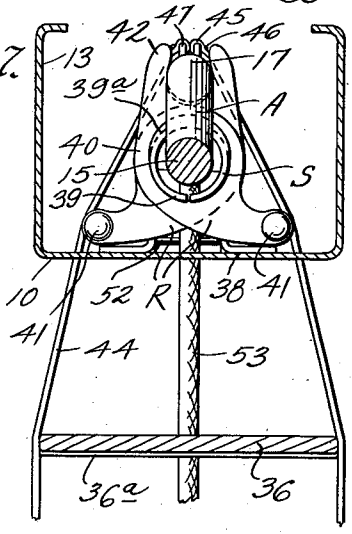


Fig. 8.

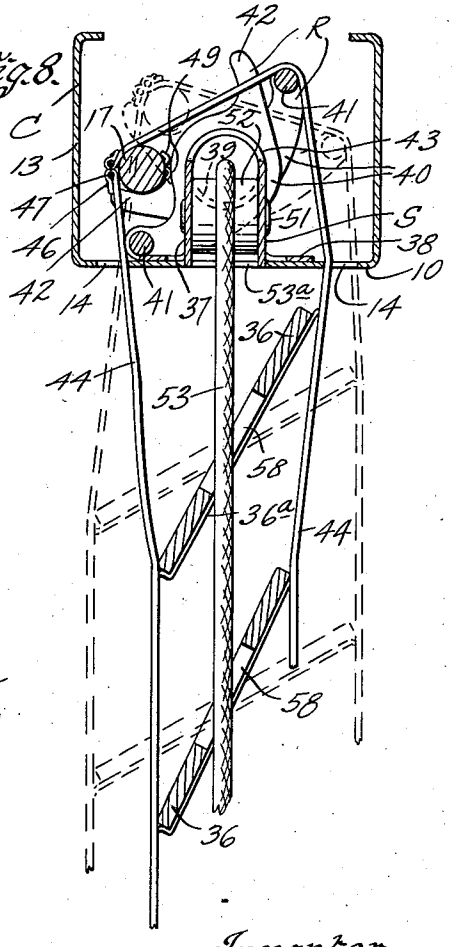
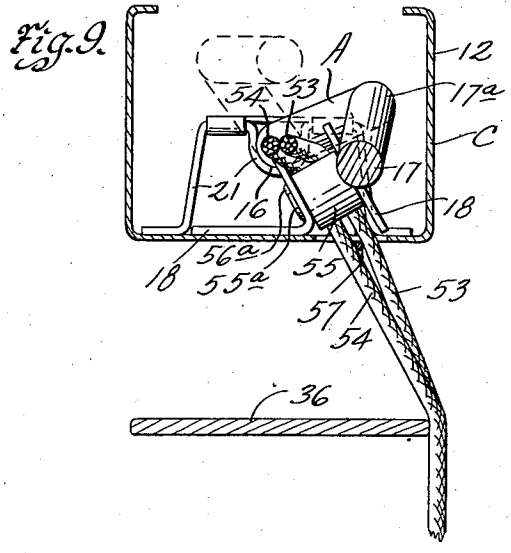


Fig. 9.



Inventor
Peter H. Kuyper
by Bair & Freeman
Attorneys

Patented July 18, 1939 2,166,599

UNITED STATES PATENT OFFICE

2,166,599

VENETIAN BLIND

Peter H. Kuyper, Pella, Iowa, assignor to Rolscreen Company, Pella, Iowa, a corporation of Iowa

Application December 5, 1938, Serial No. 243,958

20 Claims. (Cl. 156—17)

An object of my present invention is to provide a Venetian blind structure having mechanism for controlling the tapes of a tape ladder to effect tipping of the blind slats in a simple and efficient manner.

A further object is to provide tipping mechanism which will give the desired tipping action to the blind slats and yet keep the tapes spread apart the desired distance without the necessity of having to provide a large drum over which the tapes operate, and one of the desirable results of the present invention is that the mechanism is so designed that it can be contained in a sheet metal casing of relatively low height.

A further object is to provide a tape actuating member in the form of a crank shaft with the tapes secured to the crank pin and the crank pin swinging over the raising rope pulleys so as to give the desirable clearance at this point, rocker members being provided to keep the tapes spaced apart even when the blind is tipped to one extreme or the other.

Another object is to provide a rocker and pulley supporting member secured to the bottom of the casing underneath the crank pin of the tape actuating member and adaptable to support the raising rope pulley and to journal the rocker members which are provided with tape-engaging elements to effect spacing of the tapes from the rocker and pulley supporting member.

Still a further object is to provide rocker members which have fingers engageable with the crank pin of the tape actuating member in such manner that the tape engaging elements of the rocker members tend to remain in a lowered position but are elevated by operation of the crank pin as it moves in one direction or the other from a central position, its movement in one direction effecting elevation of one of the tape-engaging elements and its movement in the other direction effecting elevation of the other tape-engaging element.

Other objects, purposes and characteristic features of my invention will be partially obvious from the accompanying drawings and partially pointed out as the description of the invention proceeds. In describing the invention in detail, reference will be made to the accompanying drawings, in which like reference characters designate corresponding parts throughout the several views and in which—

Figure 1 is a plan view on a slightly reduced scale of a Venetian blind embodying my invention, the central portion of the casing being broken away to conserve space on the drawings;

Figure 2 is a sectional view on the line 2—2 of Figure 1 showing parts of the Venetian blind in front elevation;

Figure 3 is a perspective view of a rocker and pulley supporting member used in my structure;

Figure 4 is a perspective view of a rocker member used therein, and

Figures 5, 6, 7, 8 and 9 are full-sized sectional views on the respectively indicated section lines of Figure 1.

On the accompanying drawings, I have shown a casing C in the form of a channel shaped sheet metal housing having a bottom wall 10 and front and rear walls 12 and 13. Laterally spaced tape openings 14 are provided in the bottom wall 10.

I provide a tape actuating member A which is in the form of a crankshaft having end portions 15 and 16 and an elongated crank pin 17. The actuator A is provided with an offset crank pin portion 17*a* for the purpose of clearing a bracket 18.

The portion 15 of the crankshaft A is secured in a sleeve 19 which is journaled in a bracket 20. The portion 16 of the crankshaft is journaled in a bearing 21.

For rocking the crankchaft A, I provide gear teeth 22 on the sleeve 19 which mesh with a pinion 23. The pinion 23 is journaled on a pin 24 and has connected thereto a gear 25. The gear 25 meshes with a pinion 26 having an extension 27. The extension 27 is secured in a sleeve 28 which in turn is journaled in a channel shaped bracket 29.

In the bracket 29 is a drum 30 having end plates 31. The end plates 31 are secured to the drum 30 and are provided with lugs 32 entering a slot 33 of the tube 28. From the foregoing description, it is obvious that the drum 30 is operatively connected to the pinion 26 for causing oscillation of the crankshaft A through the gearing 26—25—23—22 when the drum is rotated.

For rotating the drum 30, I provide a tilting rope 34 wound about the drum and extending over a pulley or roller 35. The ends of the rope 34 depend from the pulley 35 so that when one of the ropes is pulled upon, the drum 30 will rotate in one direction, and when the other one is pulled upon it will rotate in the opposite direction.

Under the crank pin 17 and between the tape openings 14 is a rocker and pulley supporting member S, shown in Figure 3. One of the members S is provided for each ladder tape L of the blind, two of which are shown on the drawings. The slats of the blind are indicated at 36 and are supported in the usual manner by the rung tapes

36a. The member S includes a pair of side flanges 37 terminating in outwardly directed base flanges 38. The flanges 38 are spot welded or otherwise secured to the bottom 10 of the casing C. The member S is formed of sheet metal and has a pair of tubular end portions 39. A part of each tubular portion indicated at 39a originally assumes the position shown at the right end of Figure 3 but after the rocker members are journaled on the portions 39 the portions 39a are turned upwardly as at the left end of Figure 3 to retain the rocker members in position.

The rocker members just referred to are indicated generally at R (see Figure 4). Each one consists of two perforated plates 40 connected together by a rod 41 which constitutes a tape-engaging element. Each of the plates is provided with a finger element 42 and with an opening 43. The openings 43 are adapted to surround the cylindrical portion 39 of the supporting members S whereby the rockers R are oscillatably mounted thereon.

Tapes 44 of the ladder tapes L extend upwardly through the tape openings 14 and at their upper ends are formed into a loop 45 and stitched as at 46. The loops 45 are adapted to receive U-shaped wires 47, the arms of which extend through openings 48 drilled through the crank pin 17, the lower ends of the wires 48 then being bent (as shown in Figures 2 and 8) at 49 to retain them in position. After the tapes pass upwardly through the openings 14 they pass over the tape-engaging rods 41, as illustrated in the drawings, the forward left tape 44 being omitted from Figure 1 to show details of construction and the relationship of parts.

Each of the supporting members S is provided wtih openings 50 adapted to receive a pin 51. On each pin 51 is a raising rope pulley 52. Raising ropes 53 and 54 extend from the Venetian blind over the pulleys 52 (one for each supporting member S) and through the bracket 18. The bracket 18 has a pulley 55 therein over which the ropes extend, as shown in Figure 9, and a cam 56 is provided for wedging the ropes against the pulley when it is desirable to retain the blind at any desired elevation. A wire 57 is provided along the bottom of the casing C to separate the ropes 53 and 55 from each other. The ropes 53 extend through slots 58 in the blind slats 36, as shown in Figure 8, in the usual manner.

Practical operation

In the operation of my Venetian blind, when the slats 36 are in a level position the crankshaft A is in a central position with its crank pin 17 substantially vertically above the axis of rotation of the crankshaft, as shown in Figure 7. In this position, gravity acting on the rods 41 of the rockers R, in addition to the tension of the tapes 44 thereon, retains the rods 41 spread apart and adjacent the tape openings 14.

When it is desirable to tip the blind slats one way or the other, either end of the rope 34 is pulled upon to effect rotation of the drum 30. In Figure 8, a dotted line position shows the crank pin 17 swung part way toward the left. The left-hand tape engaging rod 41 has dropped slightly to its lower limit of movement, while the right-hand tape engaging rod 41 has been elevated substantially vertically above the right-hand tape opening 14 and thus serves to keep the right-hand tape 44 spaced from the pulley 52 and its support S. The left-hand tape 44 depends through its tape opening 14.

Further tipping of the actuator A in the same direction will cause the parts to assume the full line position shown in Figure 8 wherein the right-hand rod 41 has been further elevated and the left-hand tape 44 lowered until it starts to slacken. The slackening of the tape results from the action of the right-hand rod 41 taking up the right-hand tape 44 faster than the motion of the crank pin 17 lowers the left-hand tape. The actuator A may be tipped slightly further if it is desired to completely close the blind slats and in so tipping it the slats will be entirely supported by the right-hand tape 44 and thus closed to their maximum extent.

Obviously, a reverse rocking of the crank pin 17 of the actuator A will cause the crank pin to engage the finger 42 of the rocker member R that has its rod 41 at the left side in Figure 8, and the left-hand rod will thereby be elevated as the actuator is rocked. This will effect closing of the blind in the opposite direction or with its slats inclined opposite from the inclination shown in Figure 8.

As illustrated in Figure 9, the offset portion 17a of the actuator A will clear the bracket 18 when the crankshaft is rocked to and beyond the full-line position shown. The rocker members R effectively retain the tapes spaced apart so that they do not interfere with the pulleys 52 nor the support S therefor. This provides ample space for the support and for the pulleys and at the same time permits of a relatively lower casing and a spreading apart of the tapes is effected without a relative large rocker member, as would be necessary if the tape engaging rods 41 were not provided. The rocker members, due to their peculiar engagement with the crank pin 17, rock alternately as the slats are tipped in one direction and then the other, whereby they effect their purpose of keeping the tapes spread without the rods 41 at all times moving simultaneously with the actuator A. This contributes to the possibility of keeping down the over-all height of the casing C, yet providing plenty of motion to secure full closing of the blind when its slats are tipped in either direction.

Having described one specific embodiment of my invention together with the operation thereof, I desire it to be understood that this form is selected merely for the purpose of facilitating disclosure of the invention rather than for the purpose of limiting the number of forms which it may assume. It is to be understood further that various modifications, adaptations and alterations may be applied to the specific form disclosed to meet the requirements of practice without in any manner departing from the spirit and scope of the present invention except as set forth in the claims appended hereto.

I claim as my invention and desire to secure by Letters Patent of the United States:

1. In a Venetian blind structure, a casing having laterally spaced tape openings, a tape actuating member pivotally mounted within said casing on an axis lying in a plane between said openings and having an extension spaced from the pivotal axis, tapes of a ladder tape extending through said openings into said casing and connected with said extension, rocker members rotatable on an axis substantially coincident with the axis of said tape actuating member, said rocker members having tape engaging elements

located adjacent said openings when said extension is at a central position and cooperating means of engagement between said rocker members and said tape actuating member to rock one of said rocker members and thereby elevate its tape engaging element when the tape actuating member is tipped in one direction and to rock the other of said rocker members and thereby elevate its tape engaging element when the tape actuating member is tipped in the opposite direction.

2. In a Venetian blind structure, a sheet metal casing of greater width than height and having laterally spaced tape openings, a tape actuating member pivotally mounted within said casing and having an extension spaced from the pivotal axis, tapes of a ladder tape extending through said tape openings and into said casing and connected with said extension, rocker members in said casing, said rocker members having tape engaging elements and cooperating means of engagement between said rocker members and said tape actuating member to rock one of said rocker members and thereby elevate its tape engaging element when the tape actuating member is tipped in one direction and to rock the other of said rocker members and thereby elevate its tape engaging element when the tape actuating member is tipped in the opposite direction.

3. In a Venetian blind structure, a channel shaped casing having spaced tape openings, a tape actuating member pivotally mounted within said casing between said openings and having an extension spaced from the pivotal axis, tapes of a ladder tape extending through said tape openings into said casing and connected with said extension, rocker members rotatable on an axis between said tape openings, said rocker members having tape engaging elements located adjacent said openings when said extension is at its central position and cooperating means of engagement between said rocker members and said extension of said tape actuating member to rock said rocker members and thereby elevate their tape engaging element alternately as the tape actuating member is tipped alternately in opposite directions.

4. In a Venetian blind structure, a casing having laterally spaced tape openings, a tape actuating member pivotally mounted within said casing on an axis lying in a plane between said openings and having an extension spaced from the pivotal axis, tapes of a ladder tape extending through said openings into said casing and connected with said extension and rocker members rotatable on an axis substantially coincident with the axis of said tape actuating member, said rocker members having tape engaging elements located adjacent said openings when said extension is in central position and having finger elements located on opposite sides of said extension with the tape engaging elements and finger elements of each rocker member lying across the axis of the tape actuating member from each other.

5. In a Venetian blind structure, a casing having tape openings, a tape actuating member pivotally mounted within said casing having an extension spaced from the pivotal axis, tapes of a ladder tape extending from said tape openings into said casing and connected with said extension and rocker members having tape engaging elements and finger elements located on opposite sides of said extension with the tape engaging elements and finger elements of each rocker member lying across the axis of the tape actuating member from each other.

6. In a Venetian blind structure, an elongated casing, a tape actuating member pivotally mounted within said casing on an axis extending longitudinally of said casing and having an extension spaced from the pivotal axis, tapes of a ladder tape connected with said extension and rocker members rotatable on an axis substantially coincident with the axis of said tape actuating member, said rocker members having tape engaging elements spaced laterally from each other and located below the axis of said extension when it is in central position and having finger elements engageable with said extension whereby said rocker members are rocked by said tape actuating member to elevate their tape engaging elements, one when the tape actuating element is pivoted in one direction from central position and the other when it is pivoted in the opposite direction from center.

7. In a Venetian blind of the character described, a supporting member, a tape actuating member journaled thereon and having an extension which assumes an upstanding position when said tape actuating member is in central position, a pair of tapes of a tape ladder connected with said extension, a pair of rocker members having tape engaging elements spaced apart from each other, said tape engaging elements serving, when said tape actuating member is in central position, to spread said tapes apart, a raising rope pulley between said tape engaging elements and below said extension, said rocker members being engaged by said extension as it is rocked from center position and the rocker members being thereby rocked to positions retaining said tapes spaced from said raising rope pulley.

8. In a Venetian blind of the character described, an elongated supporting member, a tape actuating member journaled longitudinally thereon and having an extension which assumes an upstanding position when said tape actuating member is in central position, a pair of tapes of a tape ladder connected with said extension, a pair of rocker members having tape engaging elements spaced apart from each other, said tape engaging elements serving, when said tape actuating member is in central position, to spread said tapes apart, a raising rope pulley between said tape engaging elements and below said extension, said rocker members being engaged alternately by said extension as it is rocked in opposite directions from center position and the rocker members being thereby rocked alternately in opposite directions, each tape engaging element, as its rocker member is so rocked, moving substantially vertically away from said supporting member.

9. In a Venetian blind of the character described, a supporting member, a tape actuating member journaled thereon and having an offset portion which assumes a substantially upstanding position with respect to said supporting member when said tape actuating member is in central position, a pair of tapes of tape ladder connected with said offset portion, a pair of rocker members having tape engaging elements spaced apart from each other, said tape engaging elements serving, when said tape actuating member is in central position, to spread said tapes apart, a raising rope pulley between said tape engaging elements and below said extension, said offset portion being swingable thereover to clear the same during operation, said rocker members being engaged by said offset portion as it is rocked from

center position and the rocker members being thereby rocked to positions which elevate said tape engaging elements substantially vertically with relation to said supporting member and thereby retain the tape spaced from said raising rope pulley.

10. In a Venetian blind, a supporting member, a tape actuating member comprising a crankshaft having its ends journaled on said supporting member and having its crank pin extending upwardly therefrom when the tape actuating member is in central position, a pair of tapes of a tape ladder connected with said crank pin, a pair of rocker members having tape engaging elements spaced apart from each other, said rocker members being journaled on said supporting member in a position below said crank pin and having portions engaged by said crank pin to rock the rocker members upon rotation of the crankshaft, a raising rope pulley mounted on said support beneath said crank pin, said tape engaging elements of said rocker members effecting a spreading apart of the tapes adjacent said raising rope pulley to space the tapes therefom and said tape engaging elements being alternately moved by said crank pin whereby one of them is elevated when the crank pin swings in one direction from central position and then in the other direction from central position.

11. In a Venetian blind, a supporting member, a tape actuating member comprising a crankshaft journaled on said supporting member and having its crank pin extending upwardly therefrom when the tape actuating member is in central position, a pair of tapes of a tape ladder connected with said crank pin, a pair of rocker members having tape engaging elements spaced apart from each other, said rocker members being journaled on said supporting member and having portions engaged by said crank pin to rock the rocker members upon rotation of the crankshaft, said tape engaging elements of said rocker members effecting a spreading apart of the tapes, said tape engaging elements being alternately moved by said crank pin when the crank pin swings in one direction and then in the other direction from central position.

12. In a Venetian blind of the character described, a supporting member, a tape actuating member comprising a crankshaft journaled on said supporting member, a pair of tapes of a tape ladder connected with said crank pin, a pair of rocker members having tape engaging elements spaced apart from each other, and having portions engaged by said crank pin to rock the rocker members upon rotation of the crankshaft, a raising rope pulley mounted on said support between said tape engaging elements, said tape engaging elements effecting a spreading apart of the tapes adjacent said raising rope pulley to space the tapes therefrom.

13. In a Venetian blind structure, a support in the form of a channel shaped sheet metal casing, the bottom of said casing having laterally spaced tape openings, a tape actuator within said casing comprising a crankshaft oscillatably mounted relative thereto, tapes of a ladder tape extending through said tape openings into said casing and being connected with the crank pin of said crankshaft, rocker members rotatable on an axis substantially coincident with the axis of said crankshaft, said rocker members having tape engaging elements spaced apart from each other and located adjacent said tape openings when said crank pin is in central position, said rocker elements cooperating with said crank to effect elevation of one of said tape engaging elements when the crank pin is moved in a direction away from the tape opening adjacent said tape engaging element and to effect elevation of the other of said tape engaging elements when said crank pin is moved away from the tape opening thereadjacent.

14. In a Venetian blind structure, a support in the form of a casing, the bottom of said casing having laterally spaced tape openings, a tape actuator within said casing comprising a crankshaft oscillatably mounted relative thereto, tapes of a ladder tape extending through said openings into said casing and being connected with the crank pin of said crankshaft, rocker members rotatably mounted in said casing, said rocker members having tape engaging elements spaced apart from each other and located adjacent said tape openings when said crank pin is in central position, said crank pin being engageable with said rocker elements to effect elevation of one of said tape engaging elements when the crank pin is moved in a direction away therefrom and to effect elevation of the other of said tape engaging elements when said crank pin is moved away from it.

15. In a Venetian blind structure, a support having laterally spaced tape openings, a tape actuating member pivotally mounted thereon on an axis lying in a plane between said openings, a rocker and pulley support between said openings and extending upwardly from said support, said tape actuating member having an offset portion extending to a position above said rocker and pulley support when said tape actuating member is in central position, tapes of a tape ladder extending through said openings and connected with said offset portion, a raising rope pulley in said rocker and pulley support, rocker members having openings surrounding said rocker and pulley support whereby to journal said rocker members relative to said casing, said rocker members having tape engaging elements adjacent said tape openings when said rocker members are in a position to which they tend to gravitate, said tapes of the tape ladder extending over said tape engaging elements, said tape engaging elements having fingers engageable with said offset portion of said tape actuating member whereby said tape engaging elements are elevated in an arc about their journaled axis to retain said tapes spaced from said rocker and pulley support.

16. In a Venetian blind structure, a support in the form of a casing having laterally spaced tape openings, a tape actuating member pivotally mounted longitudinally within said casing on an axis spaced above the bottom of said casing, a rocker and pulley support between said openings and extending upwardly from the bottom of said casing, said tape actuating member having an offset portion extending to a position above said rocker and pulley support when said tape actuating member is in central position, tapes of a tape ladder extending through said openings and connected with said offset portion, a raising rope pulley in said rocker and pulley support, rocker members having openings surrounding said rocker and pulley support whereby to journal said rocker members relative to said casing, said rocker members having tape engaging elements adjacent said tape openings when said lever members are in normal position, said tapes of the tape ladder extending over said tape engaging

elements, said tape engaging elements having fingers engageable with said offset portion of said tape actuating member whereby said tape engaging elements are elevated from said normal position in an arc about their journaled axis to retain said tapes spaced from said rocker and pulley support when said crank is swung from central position.

17. In a Venetian blind structure, a support having laterally spaced tape openings, a crankshaft oscillatably mounted on said support on an axis lying in a plane between said openings and spaced above the support, a rocker supporting member between said openings and extending upwardly from said support, the crank pin of said crankshaft being positioned above said rocker supporting member when said crankshaft is in central position, tapes of a tape ladder extending through said openings and connected with said crank pin, said rocker members being journaled on said rocker supporting member and having tape engaging elements adjacent said tape openings when said crankshaft is in central position, the tapes of the tape ladder extending over said tape engaging elements and the elements having portions engaged by said crank pin whereby the tape engaging elements are elevated in an arc about their journaled axis to retain said tapes spaced from said rocker supporting member and to take up one tape faster than the other one is let out whereby to substantially close the slats of the blind.

18. In a Venetian blind structure, a support having laterally spaced tape openings, a crankshaft oscillatably mounted thereon, a rocker supporting member between said openings, the crank pin of said crankshaft being positioned above said rocker supporting member when said crankshaft is in a central position, tapes of a tape ladder extending through said openings and connected with said crank pin, said rocker members being journaled on said rocker supporting member, having tape engaging elements adjacent said tape openings when said crankshaft is in central position and having portions engageable with said crank pin whereby the rocker members are rocked by oscillations of said crankshaft.

19. In a Venetian blind structure of the character disclosed, a support having spaced ladder tape openings, a tape actuating member pivotally mounted thereon on an axis lying in a plane between said tape openings and spaced above the support, said tape actuating member having an offset portion extending upwardly when in central position, tapes of a tape ladder extending through said tape openings and connected with said offset portion, a rocker and pulley supporting member mounted on said support between said tape openings and below said offset portion of said tape actuating member, a raising rope pulley in said rocker and pulley supporting member, said last member being hollow to permit passage of a raising rope thereinto to depend from said pulley, and means for spacing said tapes from said supporting member comprising rocker members oscillatably mounted on said supporting member.

20. In a Venetian blind structure, a support having spaced ladder tape openings, a tape actuating member pivotally mounted thereon on an axis spaced thereabove, said tape actuating member having an offset portion extending upwardly when in central position, tapes of a tape ladder extending through said tape openings and connected with said offset portion, a pulley on said support between said tape openings and below said offset portion of said tape actuating member and means for spacing said tapes from said pulley comprising rocker members oscillatably mounted on said support and provided with tape engaging elements spaced laterally from said pulley.

PETER H. KUYPER.