Jan. 24, 1956 F. GRIESSER 2,732,010

VENETIAN BLINDS

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FIG. 1

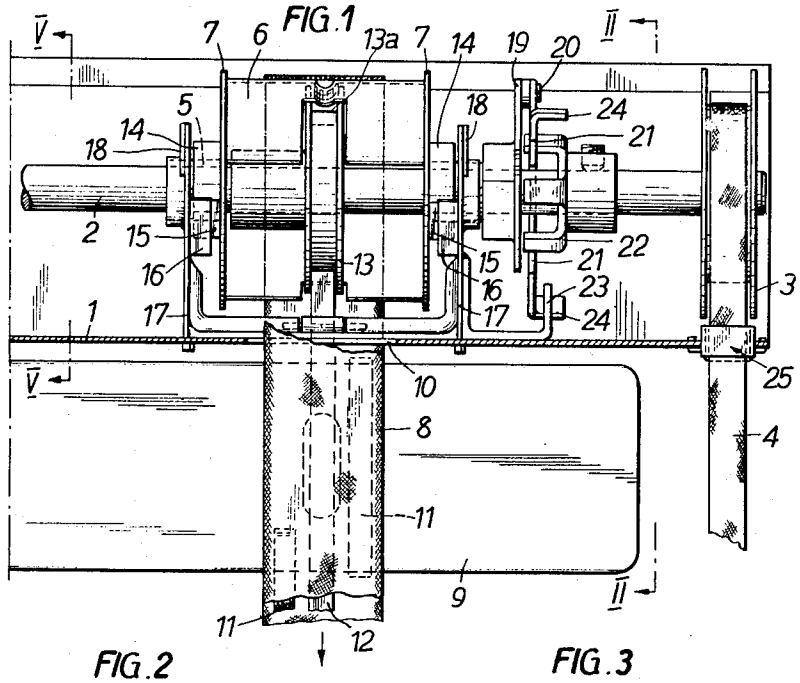

FIG. 2

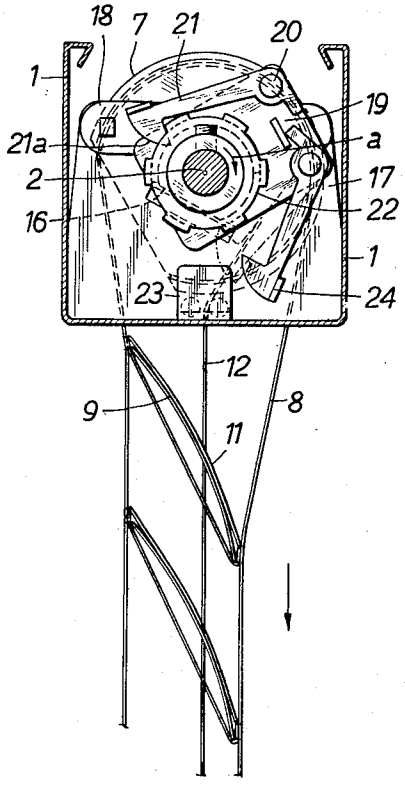

FIG. 3

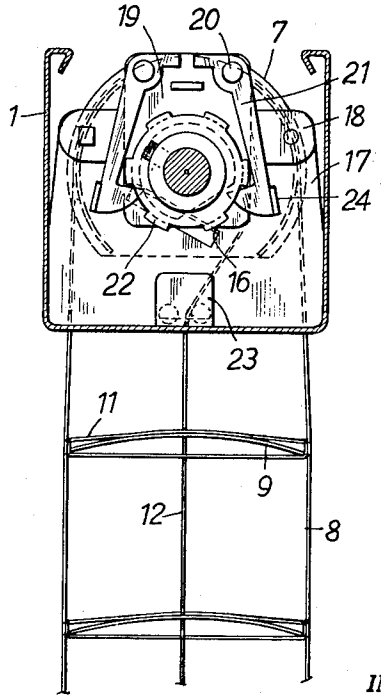

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FIG. 4

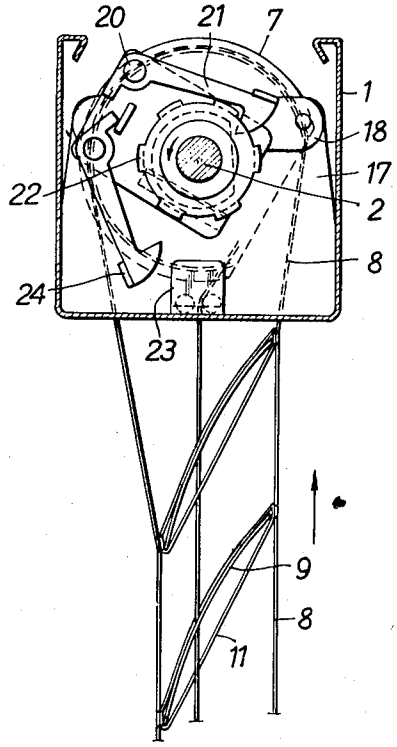

FIG. 5

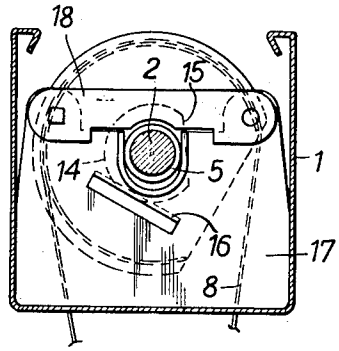

FIG. 6

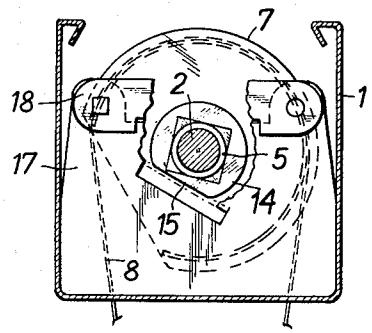

FIG. 7

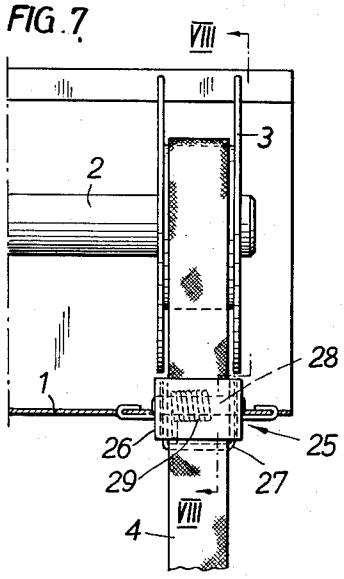

FIG. 8

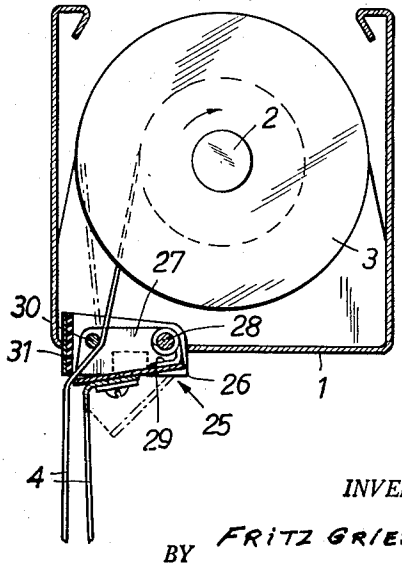

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FIG. 9

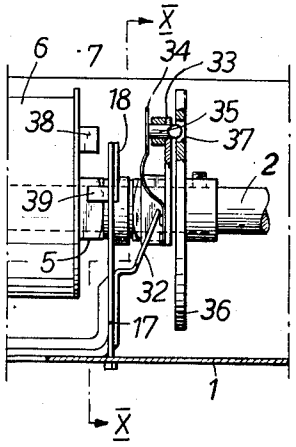


FIG. 10

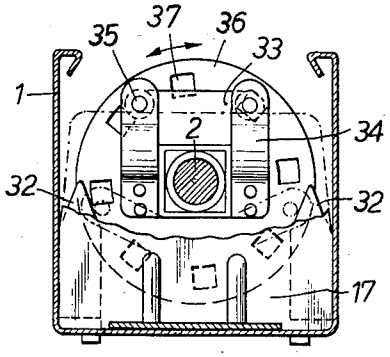
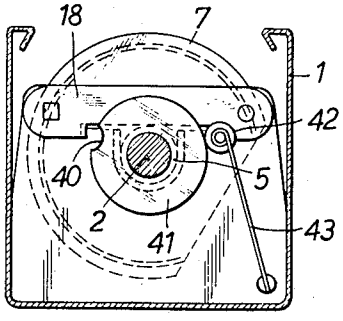


FIG. 11



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2,732,010

VENETIAN BLINDS

Fritz Griesser, Aadorf, Switzerland

Application September 18, 1953, Serial No. 381,027

Claims priority, application Switzerland February 21, 1953

5 Claims. (Cl. 160—170)

The present invention relates to Venetian blinds of the type in which the laths are carried by ladder tapes suspended from tilting frames pivoted on the winding shaft and movable to tilt the laths from horizontal or open to inclined or closed position, and in which a pull member, suspended from a winding drum of the winding shaft, is attached to the lowermost lath and may be wound or unwound from the drum in order to raise or lower the blind.

Venetian blinds of this type are known, in which clutch means are provided for changing the position of the laths, which clutch means are only operative for one direction of rotation of the winding shaft. Usually in this type of blinds the return of the tilting frame into its starting position is obtained by a spring.

In contradistinction thereto the object of the present invention is to provide a Venetian blind, in which the tilting frame is forced into its corresponding end position upon actuation of the winding shaft in either direction of rotation.

For this purpose the Venetian blind according to the present invention is provided with a ratchet and pawl device comprising a ratchet wheel rigidly mounted on the winding shaft and two pawls provided on the tilting frame, the arrangement being such that one of said pawls cooperates with the ratchet wheel when the winding shaft is operated to lower the blind and the other when the winding shaft is operated to raise the blind in order to pivote the tilting frame and adjust the laths.

In the annexed drawings:

Fig. 1 is a side view, partly in longitudinal section of the end portion of the casing containing the driving elements of the blind;

Fig. 2 is a section on the line II—II of Fig. 1;

Figs. 3 and 4 are similar sections as the one of Fig. 2 but in other working positions.

Fig. 5 is a section on the line V—V in Fig. 1;

Fig. 6 is a section similar to the one of Fig. 5 but showing another working position;

Fig. 7 shows in enlarged scale a detail of Fig. 1;

Fig. 8 is a section on the line VIII—VIII of Fig. 7;

Fig. 9 is a side view, partly in section, through another embodiment;

Fig. 10 is a section on the line X—X of Fig. 9, and

Fig. 11 is a section corresponding to the one of Fig. 5 but through another embodiment.

In the drawings reference numeral **1** designates a casing of U-shaped cross-section and in which is located the winding shaft **2**. According to Figs. 1, 7 and 8 one end of said shaft **2** carries a winding drum **3** to which is fixed one end of a draw tape **4**. A tilting frame **6**, **7** is pivotally mounted on the winding shaft **2** by means of two sleeve portions **5**. The ladder tapes **8** for the laths **9** are formed of one piece and laid over the bent sheet metal part **6** of the frame and held there against sliding in not represented manner, e. g. by means of a spring clamp. The ladder tapes **8** pass through transversal apertures **10** provided in the bottom of the casing **1**. The laths **9** are held in bridges **11** fixed to the ladder tapes **6**. A tape **12**, preferably of steel or of a synthetic material passes through slots provided in the laths. Each bent sheet metal part **6** partly surrounds a drum **13** rigidly mounted on the winding shaft **2**. This drum **13** is provided with a peripheral groove **13***a* on the bottom of which the end of the tape **12** is fastened so that said tape may be wound around the drum **13** by rotation of the shaft **2**. The tape **12** passes through the bottom of the casing **1** and as already mentioned through a slot in each lath **9** in order to be attached to the lowermost lath in not represented but known manner.

The outer ends of the two sleeve portions **5** are formed as square blocks, each of which carrying a bearing disc **14**, provided on its circumference with a plane abutting surface **15**. The portion of the disc **14** comprising the abutting surface **14** rests, in order to support the winding shaft **2**, on a ledge **16** inclined with respect to a horizontal line. The ledges **16** are formed by cut out and bent-in portions of supports **17** secured to the bottom of the casing **1**. Swingable stirrups **18** provided at the supports **17** prevent the winding shaft **2** from escaping its bearings.

A plate **19** is fixed to the sleeve portion **5** and provided with two bolts **20** disposed in spaced relationship on an arc and carrying each a pivotally mounted pawl **21**. A ratchet wheel **22**, adapted to cooperate with the said pawls **21** is mounted on the winding shaft **2**, while an abutment **23**, provided at the support **17**, is adapted to cooperate with outwardly projecting flanges **24** of the pawls **21**.

As further shown in Figs. 1, 7 and 8, the end of the casing **1** comprising the winding drum **3** is provided with a clamping device **25** for the draw tape **4**. This device **25** comprises a casing **26** having an open top and bottom and in which a tape guiding frame **27** of U-shaped cross-section is pivotally mounted on a pin **28**. A helical spring **29** wound around the pin **28** is secured with its one end to said pin **28** while the other end of said spring is anchored at the bottom of the tape guiding frame **27** in such a way that it tends to pivot the frame **27** in counterclockwise direction in Fig. 8. The draw tape **4** coming from the drum **3** passes over a guiding roll **30** provided at the frame **27** and passes on its way downwards over the free bottom edge of the frame **27**. A rubber piece **31** is provided on the front wall of the frame **27** adjacent to the aforementioned free edge. As long as the draw tape **4** is not operated it is pressed by the free edge of the frame **27** against the lower edge of said rubber piece **31**. Thus clamped tape **4** prevents a lowering of the blind due to the weight of the laths. The other end of the draw tape **4** is secured to the lower side of the frame **27**.

The operation of the described Venetian blind is as follows assuming that the blind is partly raised and the tilting frame and ratchet and pawl device are in the positions shown in Figs. 1, 2 and 6. The abutting surface **15** of the discs **14** rests upon the respective ledge **16** while one of the two pawls **21** is in engagement with the ratchet wheel **22**. The tape clamping device **25** clamps the draw tape **4** and prevents a self-acting lowering of the blind. The laths **9** are in the closed position shown in Fig. 2 and are locked in this closed position owing to the cooperation of the abutting surface **15** with the ledge **16**.

If the blind shall be lowered the clamped portion of the draw tape **4** leading to the winding drum **3** is liberated by downwardly pulling the end of the tape **4** secured to the clamping device **25**, thus pivoting the frame **27** downwardly into a position shown in dot-and-dash lines in Fig. 8. Owing to the weight of the laths the drum **13** and thus the shaft **2** turn in the direction of the arrow *a*

in Fig. 2. Thereby the tape 12 unwinds from the drum 13. As may be seen from Fig. 2 the rounded edge 21*a* of the upper pawl 21 slides over the notches of the ratchet wheel 22 so that the latter may freely turn without tilting of the tilting frame. Thus the blind may be lowered to its lowermost position, without the laths 9 being affected by this movement, the latter remaining, during the lowering of the blind, in the outwardly closed position shown in Fig. 2.

When the blind is to be raised, the winding shaft 2 is turned in counterclockwise direction (Figs. 4 and 8) by exerting a pull on the draw tape 4 to unwind it from the winding roll 3. Thereby the pawl 21 engaging the ratchet wheel 22 in Fig. 2 pivots the tilting frame 6, 7 and the laths 9 are first tilted into the open position shown in Fig. 3 and subsequently into the inwardly closed position shown in Fig. 4. As soon as the pawl 21 driven by the ratchet wheel 22 has reached the end position shown in dot-and-dash lines in Fig. 2, it is brought out of engagement with the ratchet wheel by the abutment 23 cooperating with the flange 24 of the pawl, while the heretofore free other pawl 21 jumps over the notches of the rotating ratchet wheel. The tilting frame 6, 7 has thereby attained its second end position (Fig. 5) in which the disc 14 rests with a cylindrical circumferential portion on the ledge 16. A further pivoting of the tilting frame is prevented by not represented cooperating abutments on the part 7 of the tilting frame and on the support 17 respectively.

Due to the self-acting tape clamping device 25 the blind as well as the laths may be locked in any desired position.

As may be seen from the foregoing description the adjustment of the laths is obtained by a corresponding rotation of the winding shaft, as always at least one of the pawls 21 is in engagement with the ratchet wheel 22. As further the ratchet and pawl device acting as coupling between the tilting frame and the winding shaft has no parts coupling by friction, the proper weight of the lath is sufficient even with the blind half or almost completely lowered, to produce a rotation of the winding shaft in the direction of lowering the blind as soon as the tape unwinding from the drum 3 is liberated by the clamping device 25.

The Figs. 9 and 10 represent a further embodiment of a ratchet and pawl device. Two abutments 32 projecting from the outer supports 17 are secured to the latter. A plate 33 is fixed to the sleeve portion 5, which plate carries spring pawls 34 adapted to cooperate with the abutments 32. The free ends of the pawls 34 are provided with pins 35 having chamfered end surfaces and which slidably protrude through openings in the plate 33. The winding shaft 2 carries a ratchet wheel 36 having equidistantly spaced peripheral cut-outs 37 having the same radial distance as the pins 35 of the pawls 34. A notch 38 is provided at the arm 7 of the tilting frame, which notch is adapted to cooperate with two abutments 39 on the support 17, in order to limit the tilting movement of the tilting frame.

The described ratchet and pawl device operates as follows if, for example, owing to the proper weight of the blind, the winding shaft 2 is turned in the clockwise direction (Fig. 10), the ratchet wheel 36 drives the pins 35 engaged each in a cut-out 37 of this wheel and thus pivots the sleeve portion 5 and the tilting frame 67. The pivotal movement of the frame is limited by the abutment 38 cooperating with the corresponding abutment 39. Simultaneously the first pin 35 in direction of rotation abuts against the inclined surface of the abutment 32 on the right hand side in Fig. 10. Thereby the spring arm 34 carrying the pin 35 is pressed away from the plate 33 in such a manner that the pin 35 comes out of engagement with the cut-out 37 of the ratchet wheel 36. Upon further rotation of the winding shaft 2 the second pin 35, due to its chamfered surface jumps the cut-outs of the ratchet wheel. If on the contrary the winding shaft 2 is turned

in clockwise direction in order to raise the blind, both pins 35, pressed into the cut-outs of the ratchet wheel under the action of the spring arms 34 follow the rotation of the ratchet wheel until the abutment 38 of the tilting frame abuts against the abutment 39 limiting its other end position. Simultaneously the first pin 35 in the direction of rotation has been lifted from the cut-out of the ratchet wheel 36 by the inclined surface of the abutment 32. Upon further rotation of the shaft 2 the second pin 35 owing to its chamfered surface slides over the cut-outs of the ratchet wheel. As may be seen from the foregoing the clutching of the tilting frame with the winding shaft 2 is obtained respectively by the first pin 35 in direction of rotation of the shaft.

Fig. 11 represents another embodiment of the support for the winding shaft 2 as shown in Figs. 5 and 6. A disc 41 provided with a circumferential groove 40 and secured against rotation with respect to the sleeve portion 5 replaces the disc of the first embodiment. Upon rotation of the winding shaft 2 in clockwise direction (Fig. 11) the disc 41 and with it the tilting frame 6, 7 is rotated by the not represented ratchet and pawl device. At the end of the rotation of the tilting frame a roller 42 carried by a spring arm 43 engages the groove 40. Upon rotation of the winding shaft 2 in the counterclockwise direction the tilting frame and with it the disc 41 is tilted after disengagement of the roller 42 into the other end position shown in Fig. 11. Preferably this end position of the tilting frame is limited by suitable abutments provided at the tilting frame and at the support 17, respectively. Such abutments may of course also be provided in the embodiment according to Figs. 1–8.

I claim:

1. In a Venetian blind of the type having a winding shaft, tilting frames pivoted thereon, ladder tapes suspended from said tilting frames, laths carried by said ladder tapes and adjustable by tilting of said tilting frames, a winding drum mounted on said winding shaft, pull members attached to the lowermost lath and windable around said winding drum for raising and lowering of the blind, that improvement comprising a ratchet and pawl device for pivoting the tilting frame to adjust the laths comprising a ratchet wheel rigidly mounted on said winding shaft, a sleeve portion rotatably mounted on the winding shaft and secured to the tilting frame, a plate carried by said sleeve, two pawl arms pivotally mounted on said plate adapted to cooperate with said ratchet wheel, one being acted on by said ratchet wheel to tilt said tilting frame in one direction when said winding shaft is operated to raise the blind and the other being acted on by said ratchet wheel to tilt said tilting frame in the opposite direction when said winding shaft is operated to lower the blind, and means to operate said winding shaft.

2. In a Venetian blind, a ratchet and pawl device as claimed in claim 1 in which the free ends of said pawl arms are provided with flanges, and a stationary abutment on said blind with which said flanges cooperate at the extremity of the tilting of said tilting frame to urge the free ends of said pawl arms out of contact with said ratchet wheel and limit the movement of said tilting frame.

3. In a Venetian blind as claimed in claim 1, means to operate said winding shaft comprising a further winding drum mounted on said winding shaft, a drawtape having one end secured to said further winding drum and adapted to be wound on and unwound from said winding drum for rotation of said winding shaft, a tape clamping device adapted to cooperate with said drawtape and comprising an open-bottom casing, a pin provided in said casing, a guiding frame pivoted on said pin, a spring having one end anchored to said pin and the other end acting upon said guiding frame to hold said frame in its working position in which the drawtape is clamped between one wheel of said casing and a free bottom edge of said guiding frame, the other end of said

drawtape being secured to the frame for pivoting the latter out of its working position against the action of said spring for releasing the drawtape.

4. In a Venetian blind, as claimed in claim 1, each tilting frame comprising a sleeve portion carried by the winding shaft, a disc on each of said sleeves secured against rotation, said discs having a flat portion on the circumference thereof, a pair of supports in which said tilting frame and shaft are journaled, a ledge on each of said supports adapted to cooperate with said discs in order to support the winding shaft, a cylindrical circumferential portion of the discs resting on the ledges when the tilting frame is in the extreme tilting position in one direction, the flat portion of said discs resting on the ledge when the frame is in the opposite tilted position, said flat portion and ledge locking the laths in their tilted position.

5. In a Venetian blind as claimed in claim 1, each tilting frame comprising a sleeve portion carried by the winding shaft, means for pivoting the tilting frame to adjust the laths comprising a disc carried by at least one of said sleeve portions of said tilting frames, said disc provided with a peripheral notch, a spring arm mounted on said blind, a roller on the free end thereof cooperating in one end position of the tilting frame with said notch in said disc.

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