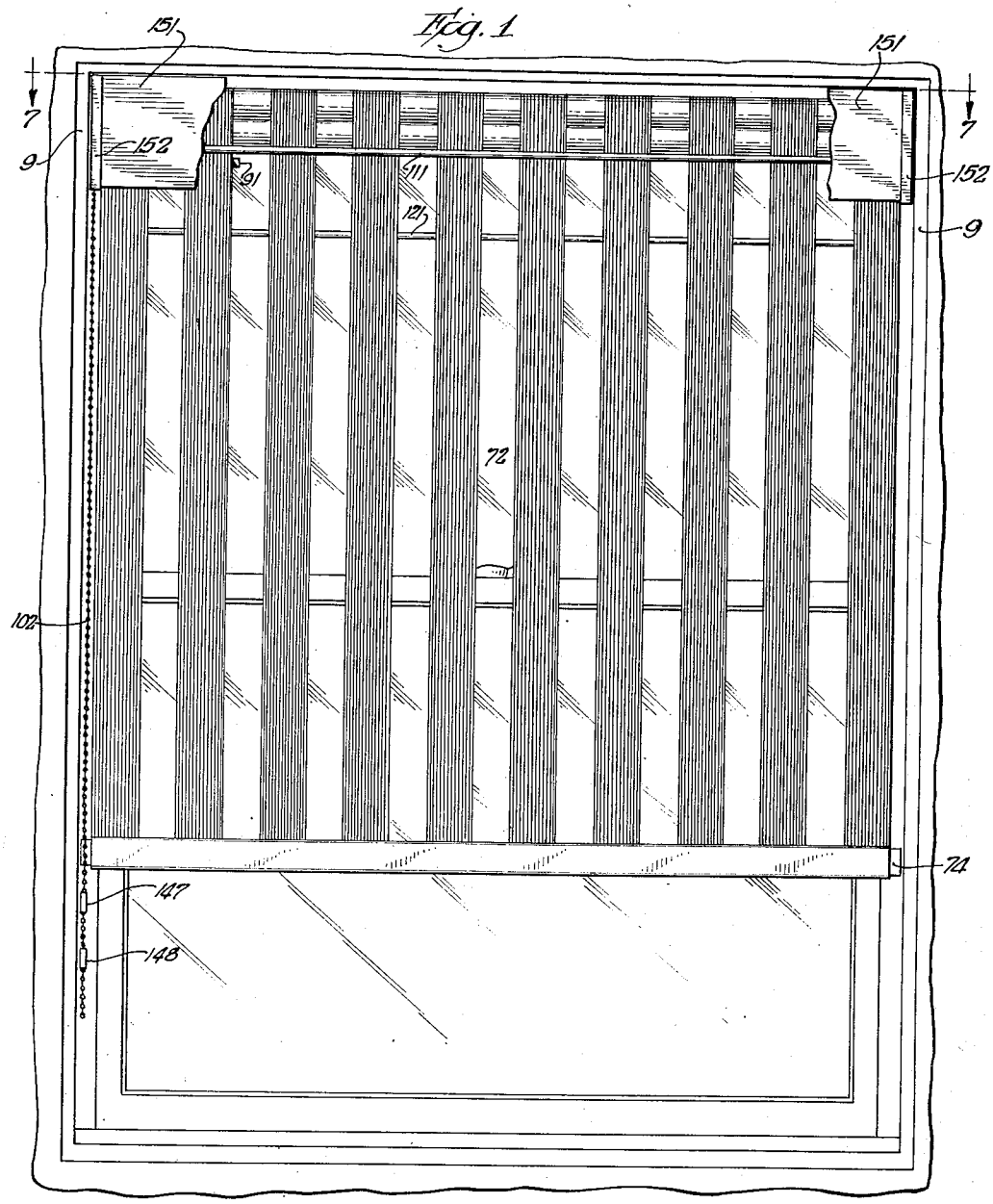
Jan. 8, 1952 J. NORTH ET AL 2,581,433

WINDOW SHADE

Filed Sept. 29, 1945 4 Sheets-Sheet 1

Fig. 1



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WINDOW SHADE

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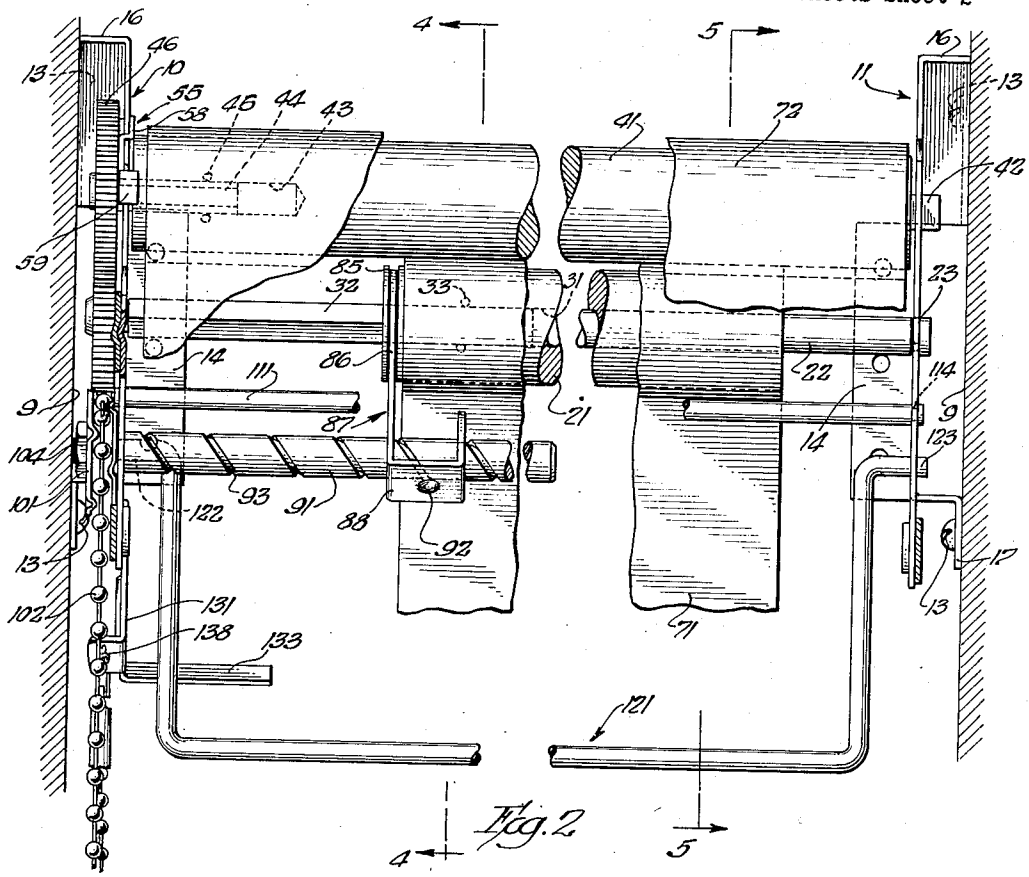


Fig. 2

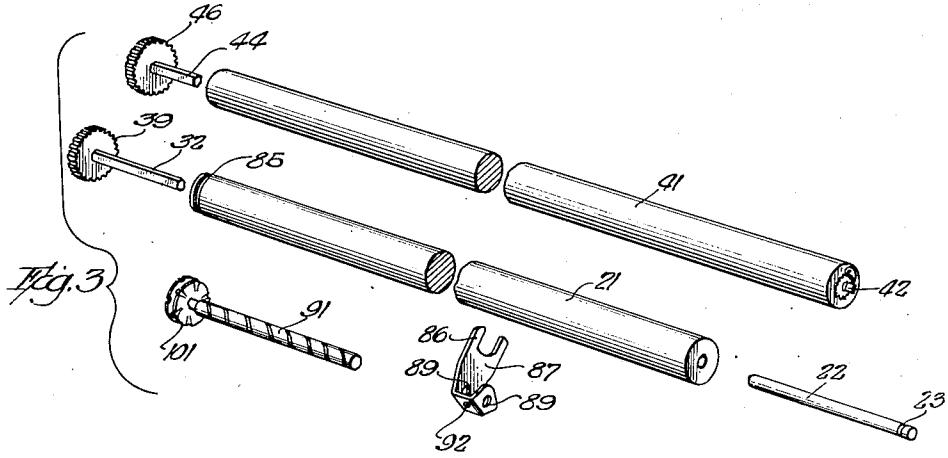


Fig. 3

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WINDOW SHADE

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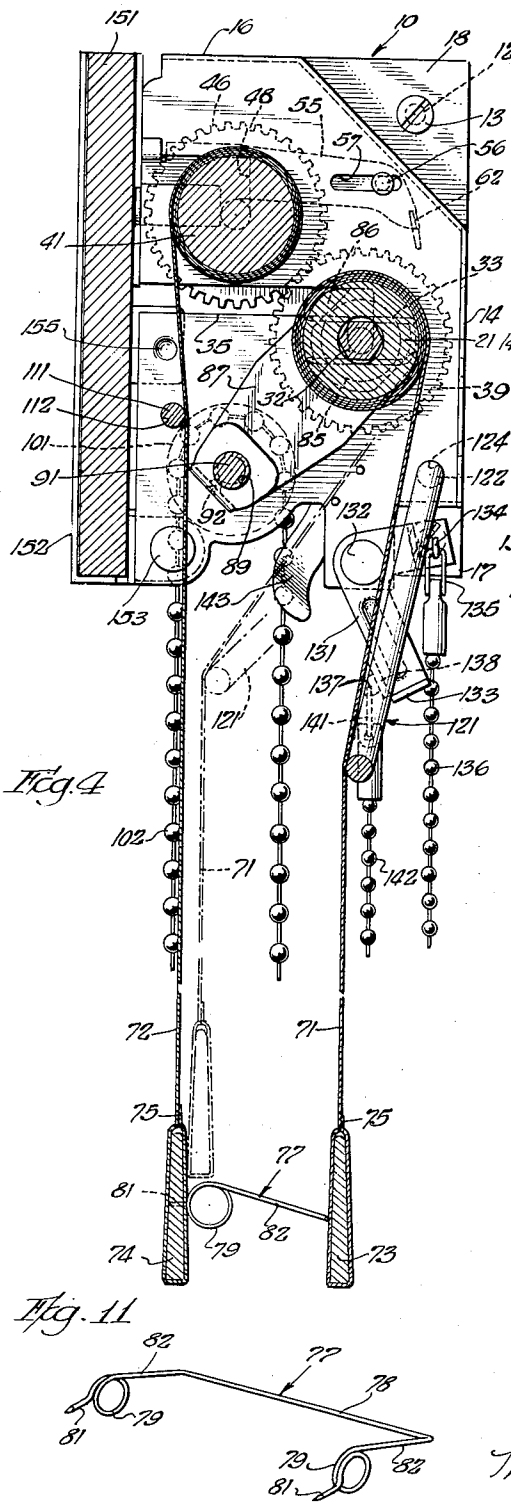


Fig. 4

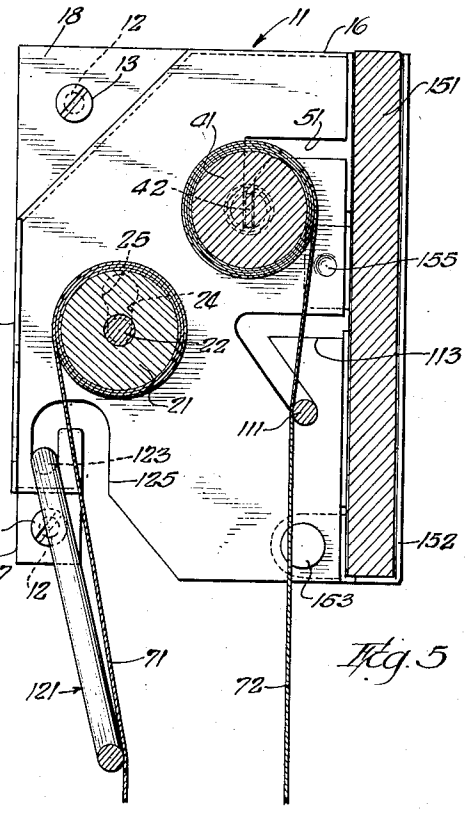


Fig. 5

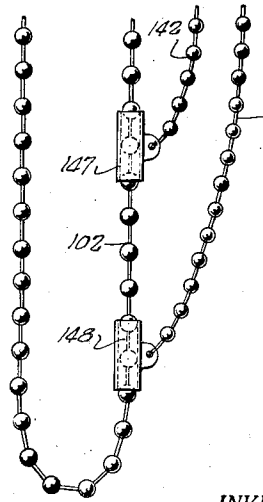


Fig. 12

Fig. 11

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WINDOW SHADE

Filed Sept. 29, 1945 4 Sheets-Sheet 4

Fig. 7

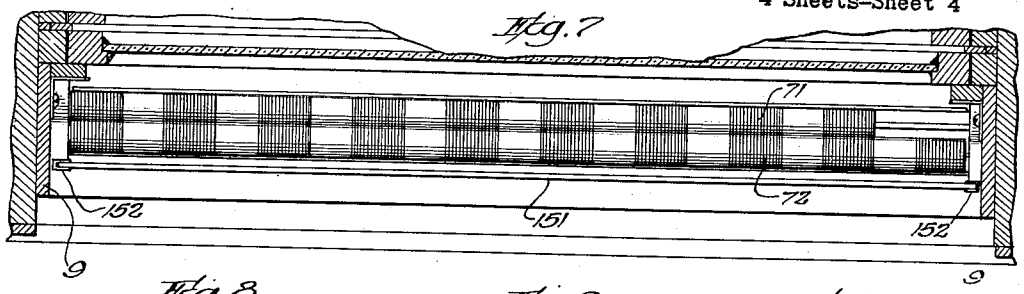


Fig. 8

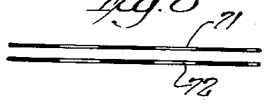


Fig. 9

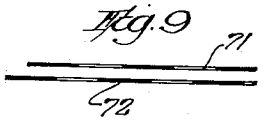


Fig. 10

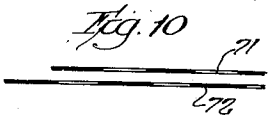


Fig. 13

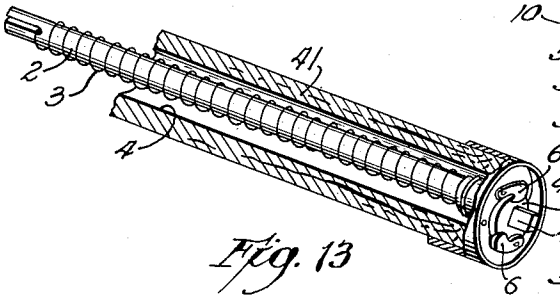


Fig. 6

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UNITED STATES PATENT OFFICE

2,581,433

WINDOW SHADE

John North and Esther North, Chicago, Ill.

Application September 29, 1945, Serial No. 619,394

19 Claims. (Cl. 160—120)

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Our invention relates to a window shade or blind, and more particularly to a blind having in combined relation features of the conventional roller-type shade and the Venetian or shutter-type of blind.

Window shades commonly available are of two types. One, the plain roller type, including an opaque sheet of flexible material attached to a roller having elements co-operating with brackets whereby the sheet may be unrolled or rolled with respect to the roller to cover or uncover a specific area of the window. Thus the light-blocking action is concomitant with a definite area of visibility through the window, i. e., the upper half of a window may be blocked-out while the lower half is unshaded. No protection against unwanted eyes may be had without accompanying interference with light through the window. Venetian blinds possess inherent defects in that while they remedy some of the shortcomings of the roller-type shade, they are relatively heavy and thus require no little effort to raise. They are difficult to keep clean, and particularly so by reason of the tapes and cords standing in the way of efficient dusting and washing. Furthermore, the slats are subject to breakage or bending and are expensive to replace or repair.

The principal object of our invention is the provision of a window shade characterized by combining the underlying advantages of the roller shade and the Venetian blind in a shade utilizing a pair of rollers upon which flexible sheets are adapted to wind and unwind, each sheet having a plurality of non-transparent, vertically disposed stripes alternated with a plurality of transparent, vertically disposed stripes, one shade being arranged to move horizontally with respect to the other to yield a light-blocking action.

Another object is to provide a shade as aforesaid in which the two flexible sheets are arranged in parallel facing relationship and are adapted, when one sheet is moved horizontally and the two sheets moved closer together or farther apart, to yield a condition of maximum light-passing capacity infinitely variable to a condition of maximum light-blocking capacity.

Still a further object is to provide a shade as aforesaid in which the sheets are of transparent material, one flexible sheet being provided with a predetermined number of parallel, vertical, non-transparent stripes of uniform width spaced a predetermined uniform width apart across the sheet, and the other sheet being provided with a lesser number of parallel, vertical, non-transparent stripes of the same or greater width as those of the first sheet and of like spacing. Alternatively, the sheets may be composed of non-transparent and transparent strips of material suitably joined along abutting edges or overlapped and joined to form continuous sheets having the respective number and arrangement of non-transparent and transparent areas aforesaid. If desired, a suitably woven, netted, or knitted material may be employed, the respective contrasting zones being the result of suitable choice of yarns and fillers, by variation of the density of the weave or stitches, by variation in yarn size or by a combination thereof.

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Another object is to provide a pair of opposed flexible sheets as aforesaid and mechanism associated therewith whereby the spacing between the sheets may be infinitely varied from zero to a predetermined maximum to yield a shutter-like action for passage of light through the transparent areas of the sheets.

An additional object is to provide a shade as aforesaid in which one of the sheets is mounted for winding on a conventional roller of the type used for common window blinds, for example having a pivot at one end and a detent and spring winding mechanism at the opposite end, the other sheet being mounted for winding on a second roller having pivots at both ends and gearing arranged between the two rollers to provide joint rotation thereof.

Still a further object is to provide a window shade as aforesaid having mechanism associated with the one horizontally shiftable sheet and adapted, upon force being applied, manually to a pull chain or cord or to other suitable means, to shift the sheet to the right or left, and vice versa.

Another object is to provide mechanism for moving the two sheets perpendicularly to their principal planes, the mechanism being operable by application of force manually to a pull chain or cord or other suitable means associated therewith, the said chain or cord, for example, being adjacent the chain or cord used for horizontal shifting of the one sheet as aforesaid, whereby both shade controls are convenient of access at one side of the window.

A further object is to provide means associated with the pull chains aforesaid whereby, notwithstanding their juxtaposition, entanglement thereof is successfully obviated.

A further object is to provide a fixed rod for guiding the front sheet into contact with its roller for insuring endwise alignment of the

several convolutions as rolling proceeds, and a bail for similarly guiding the rear sheet with respect to its roller, the bail being swingable to actuate the rear sheet for varying the spacing between the sheets as aforesaid.

An additional object is to provide a splined shaft in connection with the horizontally shiftable sheet and roller and to which shaft a gear is affixed whereby rotation of the roller is insured while permitting free lateral shifting of the roller.

Another object is to provide a pull bar at the lower end of each sheet for manual operation of the sheets in a vertical direction, and a resilient member intermediate the said bars for maintaining the lower edges a selected distance apart regardless of the extent to which the sheets are unwound from their rollers.

A further object is to provide end brackets for supporting the complete blind as a unit with respect to the window jambs, the brackets and the parts carried thereby being so adapted and arranged as to permit rapid installation of the blind and to allow proper installation and operation thereof notwithstanding normal variations of window widths from recognized standards or norms.

Another object is to provide pull bars as aforesaid the length of that one of which associated with the wider sheet being such as to insure that the bar will abut the end brackets when the sheets are fully rolled up and thus prevent over-rolling.

Another object is to provide a selectively operable catch associated with the gearing aforesaid to maintain the rear roller is a fixed position against the weight of the sheet suspended therefrom to permit intermesh during assembly of the front roller gear with the rear roller gear in a predetermined circumferential relation.

Other and further objects will appear as the description proceeds.

In carrying out our invention in one form, we provide a pair of rollers of substantially the same diameter as the common type of window-shade roller, the front roller having the conventional detent mechanism and torsion coil spring whereby the shade may be unrolled to apply torsion to the spring, the detent mechanism maintaining the shade in any selected position, whereupon a slight downward and upward movement will premit the shade to re-roll, all as has been well understood for many years. The rear roller is an idler shorter than the front roller and driven in unison therewith by intermediate gearing. Attached to each roller by one end is a sheet of flexible material, the front sheet being wider than the rear sheet, and each sheet being provided with two series of vertically disposed parallel stripes, one series being transparent and the other non-transparent—that is, opaque or translucent. The rear roller is provided with a splined shaft to which its driven gear is attached, and is adapted to be shifted laterally from left to right and vice versa in order that the non-transparent stripes of the sheet supported by the same may be placed into register with the transparent stripes of the front sheet. Means operable from a position convenient to the operator are provided for lateral shifting of the rear roller as aforesaid. The pair of shades may be simultaneously rolled up or drawn down by grasping a pull bar at the bottom of either shade, or by grasping both of them, the winding and unwinding operation in this respect being the same as with the conventional roller-type of window blind. Means

also are provided for maintaining a predetermined spacing between the two sheets and for infinitely varying the spacing from zero to a maximum.

In the drawings which show one form of the invention,

Fig. 1 is a front elevational view of a window and a portion of the window frame with the assembled shade in position between the jambs;

Fig. 2 is a front elevational view of the mechanism with a major portion of the center of the blind broken away for clarity and scale;

Fig. 3 is an exploded perspective view showing certain details of the rollers and the driving and adjusting mechanism;

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a cross-sectional view taken on the line 5—5 of Fig. 2;

Fig. 6 is a perspective view of the left-hand bracket;

Fig. 7 is a sectional view through the window taken on the line 7—7 of Fig. 1 to show the assembled shade of our invention in plan;

Fig. 8 is a somewhat diagrammatic view to indicate the relative lateral positioning of the two flexible sheets wherein the respective non-transparent and transparent stripes are in register;

Fig. 9 is a view similar to Fig. 8, but showing the rear sheet shifted to the right;

Fig. 10 is a view similar to Fig. 8, but with the rear sheet shifted even further to the right;

Fig. 11 is a detail of the resilient member for maintaining the spacing between the two pull bars;

Fig. 12 is a detail showing the means for preventing entanglement of the shade operating chains, and

Fig. 13 is a detail showing the Hartshorne mechanism for returning the pair of shades to a higher position and to lock the same in a predetermined downward position.

Referring to the figures, there is provided a pair of similar brackets 10 and 11 disposed respectively on the left- and right-hand jambs 9 of the window. Preferably the brackets are of relatively thin sheet metal appropriately punched and formed to the shape indicated most clearly in Fig. 6, which shows only the left-hand bracket. For mounting the brackets 10 and 11 against the window jambs, they are provided with apertures 12 for the reception of wood screws 13 whereby the brackets may be firmly secured. For mounting the brackets to windows wherein the jamb is insufficient in width or absent, for example wherein a plaster wall continues to meet the window frame, the brackets 10 and 11 are provided with flanged portions 14 extending perpendicularly to the principal plane thereof and having a plurality of holes 15 whereby the brackets may be mounted against the window stop strip. To provide suitable spacing of the principal plane of the brackets 10 and 11 with respect to the jamb for accommodation of certain parts of the mechanism, there are additional offset or flanged portions 16, 17, and 18, two of the screws 13 aforesaid passing through the flanges 18.

The rear roller 21 is preferably of wood and somewhat shorter than the lateral spacing between the brackets 10 and 11 and as clearly seen in Figs. 2 and 7. At its right-hand end the roller 21 is bored to receive the idling spindle 22 with a sliding fit, the latter having a periph-

eral groove 23 at its right-hand extremity adapted to be received in the narrower portion 24 of the keyhole-shaped aperture 25. Thus, for mounting and supporting the right-hand end of the spindle 22, the same is passed through the larger portion of the aperture 25 and then dropped into the narrower portion, the groove 23 securing the right-hand end of the spindle laterally while permitting rotation thereof.

The roller 21 is provided at its left-hand end with a circular bore 31 to receive the driving spindle 32 of splined form, for example, and as shown, hexagonal in cross section. To maintain driving relation between the roller 21 and driving spindle 32, a staple 33 may be driven through the roller 21 in such manner that the inner surfaces of the legs thereof bear against any two opposed flat sides of the spindle 32. The spindle 32 (Fig. 6) is provided with an annular groove 34 adapted to fit within the slot 35 in the bracket 10, the connection between the slot 35 and groove 34 being similar to that between the spindle 22 and aperture 25 and for a similar purpose. Insertion of the left-hand end of the roller 21, and therefore of the spindle 32, is attained by inserting the latter within the horizontally extending portion of the slot 35 and then permitting the spindle 32 to drop into the downwardly depending portion thereof. A gear 39 is fixed to the extreme outer left-hand end of the spindle 32 and between the bracket 10 and jamb 9.

The rear roller 41 is preferably of wood and similar to a conventional window-shade roller, being provided at its right-hand extremity with the usual flattened bit 42, notched wheel and detent, as well as the spindle extending inwardly from the bit and the coil spring attached thereto and to the roller. The mechanism just described is in every respect the same as has been used for many years with the usual window-shade roller, frequently referred to as the Hartshorne mechanism and further explanation thereof is deemed superfluous. Such mechanism generally comprises a rod 2 and a coil spring 3 thereover carried in a bore 4 in one end of the roller, for example the roller 41 (Figs. 2 and 13). The inner end of the coil spring is attached to the rod and the outer end of a toothed wheel 5 mounted at the end face of the roller. The spring is suitably secured to the roller at its outer end and the rod and wheel are rotatable with respect to the roller. Pawls 6—6 are used to engage the teeth of the wheel in such manner that the same may be disengaged upon a slight downward pull of the window shade for unrolling thereof and reengagement permitted upon relaxation of such tension. There may be employed equivalent mechanism capable of allowing the shade to be drawn downwardly, locked there temporarily, and released for winding by a slight pull on the shade. Where, in this description and in the claims we refer to "Hartshorne" mechanism, we intend to include equivalent devices. However, at its left-hand end the roller 41 is provided with an axial aperture 43, splined spindle 44, and staple 45 similar in construction and function with the spindle 32 and staple 33. However, in this instance the longitudinal adjustment between the spindle 44 and roller 41 is to permit accommodation of the rear roller mechanism to varying window widths and not for permitting definite lateral motion to be imparted to the roller 41. In practice, and as will be pointed out more particularly hereinafter, the roller 41 will be tailored to fit a specific width of window, but due to normal slight variations in window widths it is necessary to provide the adjustment aforesaid between the spindle 44 and roller 41.

At the extreme left-hand of the spindle 44 is affixed the gear 46, the same being adapted to mesh with and drive the gear 39. To retain the left-hand end of the spindle 44 there is provided therein an annular groove 47 adapted to engage the downwardly extending portion of the L-shaped slot 48, this slot being generally the same in shape and function to the slot 35. The bit 42 is adapted to be engaged in its slot 51 (Fig. 5) by inserting the same flatwise in the front open end of the slot 51 and rotating the same through 90 degrees as it is dropped into operative position.

For retaining the spindle 44 laterally in its slot 48, and to insure constant meshing of the gear 46 with the gear 39, there is provided a catch 55 (Fig. 6). The catch 55 is generally elongated and provided with a headed pin 56 adapted to slide in the horizontally disposed slot 57. At its forward end the catch 55 is provided with an offset upwardly-extending lug 58 and an offset laterally-extending lug 59, the former maintaining the catch 55 downwardly by engagement of the offset thereof with the upper edge of the slot 48, and the latter maintaining the catch transversely by engagement with the front edge of the bracket 10. The lower edge 61 of the catch 55 bears lightly against the spindle 44. To disengage the spindle 44 from its slot 48, the catch 55 is manually moved forwardly by means of the lug 59 until the lug 58 clears the upper edge of the slot 48, movement of the pin 56 in the aperture 57 occurring meanwhile. As soon as the lug 58 is clear of the front edge of the bracket 10, the catch 55 may be swung upwardly to expose the horizontal portion of the slot 48 and permit the lifting and withdrawal of the spindle 44.

During and after removal of the spindle 44 and its associated gear 46 from the assembly, the gear 39 must be maintained against accidental rotation, since the weight of the sheet attached to the roller 21 tends to rotate the same. Accordingly, we provide at the rear end of the latch 55 a pawl 62 in order that when the latch 55 is lifted upwardly and outwardly, the pawl 62 will engage one of the teeth of the gear 39 and thereby lock the roller 21. It will be understood that when the spindle 44 is reinserted, the gears 46 and 39 will re-mesh and the catch 55 may then be swung downwardly to the normal position shown in Fig. 6.

Attached, as by stapling, gluing, or otherwise, to each of the rollers 21 and 41 is the pair of flexible sheets 71 and 72, respectively. The sheets 71 and 72 may be of any suitable material as mentioned hereinabove, but we prefer to use plastic composition because of its cheapness, durability, ease of cleaning, and permanent retention of transparency. The sheets 71 and 72 are made thick enough to withstand the abuse to which the shade may be subjected in use, but thin enough to permit easy rolling thereof on the rollers 21 and 41 and without the several convolutions occupying undue bulk.

At the lower end thereof, each sheet 71 and 72 is provided with a pull bar 73 and 74, respectively (Fig. 4), the same being of light, rigid material—for example hardwood—and retained in relationship with the sheets 71 and 72 pre-

ferably by folding the said sheets thereover as shown, and cementing along the seam 75. It is to be noted that the bar 74 projects at each end thereof beyond the sheet 72 in order that the sheet 72, and hence the sheet 71, will not overwind on their respective rollers, the bar 74 striking the bottom of the brackets 10 and 11 in the extreme upper position. Alternatively, the pull bar may be of tubular metal having an open longitudinally-extended seam or groove in which the end of the sheet may be inserted and crimped or clamped.

To provide the maximum required predetermined transverse spacing between the pull bars 73 and 74 while permitting variation in such spacing, there is a member 77 of resilient wire (Fig. 11) substantially of U shape and inclined downwardly, the bottom 78 of the U bearing against the inner surface of the sheet 71, and the ends of the legs of the U being twisted into single coils 79 and terminating in piercing points 81. Thus the resilient member 77 may be easily and cheaply affixed to the pull bar 74 by driving the points 81 therein. Suitable resiliency to the member 77 is provided not only by the yielding of the legs 82 thereof, but by the coils 79.

The rear sheet 71 is narrower (Fig. 7) than the front sheet 72. It will be noted from that figure that the sheet 72 extends practically the entire width intermediate the brackets 10 and 11, whereas the sheet 71 is narrower by the amount of one transparent and one non-transparent stripe, the roller 21 (Fig. 7) being shown shifted completely to the left.

In forming the flexible sheets 71 and 72, the non-transparent stripes may be achieved by painting or imprinting the same on a transparent sheet, any suitable ouaque or translucent material being used. Alternatively we may substitute a suitable textile fabric embodying the said stripes integrally therewith or by suitably looping or sewing alternated stripes of the contrasting materials. It will be understood that the color of the stripes will generally be at the whim of the purchaser in order to match the color-scheme of the interior of the room in which the shade is to be employed. Moreover, it will be understood that by the use of the word "non-transparent" in this description and in the claims, we intend to include not only materials which are completely or substantially opaque, but those which are translucent. Alternated non-transparent and transparent stripes may be had by joining strips of material of the proper nature by cementing or fusing them along their margins in overlapped or abutting relation. Furthermore, we do not intend to limit the invention to an arrangement of alternated non-transparent and transparent stripes disposed vertically, since it will be understood that a diagonal arrangement of stripes or a checkerboard or other distribution of non-transparent and transparent zones may be utilized.

We have found that by providing stripes within the range of 1¾ to 2¼ inches, the blind is most readily adaptable to those widths of windows generally encountered, for example those in homes. It is important that the non-transparent stripes be preferably wider than the transparent stripes, as clearly shown in Fig. 10 and for a reason to be explained. The invention is not, however, to be limited to stripes falling within the range just mentioned, since the width thereof may be below or above that range.

For effecting lateral shifting of the roller 21, it is provided at its left end with a peripheral groove 85 (Fig. 2) formed by cutting the same in the surface of the roller 21 or by attaching a suitable single or double flanged metallic member to the end of the roller. Adapted to engage in the groove 85 are the prongs 86 of the fork 87 (Fig. 4). The fork 87 is preferably of light sheet metal bent at its lower end (Fig. 2) into the U form 88, each leg of the U being provided with a circular aperture 89 adapted to slidably fit over the screw 91. The bottom of the U is indented as at 92, the peak of the indentation fitting within the screw thread 93. It is to be noted that the pitch of the thread 93 is somewhat steep so that a relatively small degree of rotation of the screw 91 will effect a relatively large axial movement of the fork 87 with respect to the screw, the engagement of the indentation 92 with the thread 93 serving as the driving connection.

At its left-hand extremity the screw 91 is reduced in diameter and inserted through a bearing aperture 94 in the left-hand bracket 10. If desired the aperture 94 may be provided with a bushing of substantially greater length than the thickness of the bracket 10 for additional bearing. On the opposite side of the bracket 10 the screw 91 is provided with the chain pulley 101 comprising two formed disks having radial corrugations whereby a bead chain 102 may be guided therein for rotation of the pulley 101 while retaining the circumferential location of the chain 102 with respect to the pulley. A locking nut 104 serves to secure the pulley 101 to the screw 91. Overtravel of the fork 87 is avoided by providing sufficient length to screw 91 so that when the right-hand end of the roller 21 is stopped against the bracket 11, the fork remains in engagement with the screw. Alternatively, we may substitute for the screw 91 a double-threaded screw having one left-hand and one right-hand thread of the same pitch. In such case the fork 87 would be provided with a swivelled, diamond-shaped follower for engaging either of the threads. Thus rotation of the pulley 101 in only one direction will effectuate right and left movement of the fork.

For maintaining proper winding relationship between the sheet 72 and its roller 41, there is provided a rigid front guide rod 111 extending intermediate the brackets 10 and 11 through an aperture 112 (Fig. 6) in the bracket 10 and a slot 113 (Fig. 5) in the bracket 11. The slot 113 comprises a horizontal portion and an inclined, generally downwardly-extending portion, the right-hand extremity of the rod 111 being upset to insure against accidental lateral dislodgement thereof.

It will be noted from Fig. 4 that the transverse position of the rod 111 is such that the sheet 72 is held in wrapping relation with the roller 41 regardless of the number of convolutions wound upon the roller. That is to say, a vertical plane tangent to the inside of the rod 111 will lie just within that surface of the roller 41 whereat winding begins. By so positioning the rod 111 with respect to the roller 41, a certain degree of tension is applied to the sheet 72 as it winds. Thus misalignment of the edges of the several convolutions is effectively avoided.

To vary the degree of light-blocking action it is preferable that the sheets 71 and 72 be arranged not only for relative lateral shifting, but also relative transverse variation of the spacing therebetween. This object is effected by providing a bail 121 substantially of U form (Fig. 2), the

bottom of the U extending over substantially the entire width of the sheet 71 and the upper ends of the legs of the U being bent outwardly to form pivots 122 and 123, these being received respectively in circular aperture 124 in the bracket 10 and slotted aperture 125 in the bracket 11. Thus the bail 121 may be easily inserted and removed from the brackets while in operation, being effectively held against lateral displacement by reason of the ends of the pivots 122 and 123 striking the window jambs 9 upon displacement in either direction. If desired, one or both ends may be upset.

To swing the bail 121 against the sheet 71 and thereby vary the transverse spacing of the sheets 71 and 72, there is provided the bell crank 131 (Fig. 4) pivoted at 132 to the bracket 10 and having the laterally extending arm 133 adapted to engage the left-hand leg of the bail 121. A staple 134 attached to the substantially horizontal arm of the lever 131 carries the clevis 135 of the bead chain 136, and a staple 137 carried by a leg 138 on the other arm of the lever 131 carries the clevis 141 of the bead chain 142. In order to maintain the bell crank 131 in its foremost position, a leaf spring 143 is attached to the bracket 10 and has an inwardly-bent, arcuately-contoured end 144 to engage frictionally the depending arm of the crank 131. It will be understood that the inwardly-bent portion 144 may be arcuate to a greater degree than shown so as to engage the crank 131 at the various positions to which it may be rotated, or we may use a fixed catch on the window jamb in which the chain may be engaged for retaining the same in a predetermined position.

For supporting the usual fascia board 151, the brackets 10 and 11 may be provided with the usual receptacles 152 hinged at 153 thereto and lockable to the brackets by means of a depression 154 engaging a corresponding depression 155 in the bracket. Thus the fascia board and its receptacles may be manually swung downwardly out of position for access to the mechanism. The construction of the fascia board and receptacles is no part of our invention, the same being well known in connection with the common type of Venetian blind.

The operation of the blind of our invention comprises a combination of positions of the sheets 71 and 72. First we may, by means of the pull bars 73 and 74, draw the sheets 71 and 72 downwardly to any desired position with respect to the window. For example, in Fig. 1 the shade is shown stopped with its pull bars about midway of the lower sash.

By positioning the sheet 71 with respect to the sheet 72 laterally as shown in Fig. 8, maximum light transmission is obtained. In that figure the shades are indicated as being at maximum spacing transversely and with the respective transparent stripes of each sheet in register. The corresponding lateral position of the rear roller 21 is as indicated in Fig. 7. To vary the degree of overlap of the transparent and non-transparent stripes, the rear roller 21 is shifted to the right. Such result is obtained by operation of the chain 102 to rotate the pulley 101 and with it the screw 91, whereby the fork 87 is moved laterally to carry the roller 21 to the right. Regardless of the lateral positioning of the roller 21, the same is free for rotation by reason of the groove 85 rotating between the prongs 86. Thus winding or unwinding of the sheet 71 may be achieved without binding. It will be obvious

that reverse lateral movement of the roller 21 results from reverse movement of the chain 102. In Fig. 9 the non-transparent stripes of sheet 71 are shown as substantially bisected by the transparent stripes of sheet 72 so that light-blocking is substantially 50 per cent. In Fig. 10 the non-transparent stripes of sheet 71 are completely in register with the transparent stripes of sheet 72, and all direct rays of sunlight are blocked while permitting diffused light to enter the room, variation of spacing between sheets 71 and 72 effecting selected degrees of diffusion.

To provide the two sheets 71 and 72 with an even greater range of action in so far as light-blocking action is concerned, the bail 121 may be operated. This result is obtained by applying tension to the chain 136 to rock the bell crank 131 clockwise, as seen in Fig. 4, whereby the projection 133 will swing the bail 121 and thus the sheet 71 closer to the sheet 72 and as indicated by dot and dash lines in that figure. It is to be noted that the transverse spacing of sheets 71 and 72 in Fig. 4 is thereby reduced to a fraction of the maximum and that the sheets 71 and 72 may be brought into complete juxtaposition. Upon movement of the sheets to closed position, the bar 73 will rock about the portion 78 of the member 77 to permit sheet 71 to lie against sheet 72. It will be appreciated that if desired, the pull bars 73 and 74 may be offset with respect to their respective sheets 71 and 72 to facilitate complete closure of the space intermediate the sheets. When such close adjacency of the sheets 71 and 72 is effected, and assuming that the two sheets are in the relative lateral position shown in Fig. 10, there is in effect one sheet which is entirely non-transparent. Thus, practically total light-blocking action is achieved. For any transverse spacing of the sheets 71 and 72 between the maximum indicated in Fig. 4 and zero spacing, variations in light-blocking may be effected. The combination of such selected transverse spacing with appropriate lateral positioning of the two sheets will yield varying degrees of light transmission and light diffusion between the two shades. Inasmuch as the light rays are reflected to some extent intermediate the two sheets 71 and 72, a transversely spaced condition thereof will combine controlled degrees of light transmission with light diffusion.

The function of the member 77 is to assist in maintaining the pull bars 73 and 74 and the sheets attached thereto in their maximum spaced-apart position. It is to be noted from Fig. 4 that as the transverse spacing of the sheets 71 and 72 is varied, the effective length of the rear sheet 71 is shortened to permit the bottom edge of the pull bar 73 to travel over and across the member 77. Furthermore, in any intermediate spaced position of the sheets, the pull bar 73 is retained against the rearwardly sloping upward edge of the member 77, and thus air currents blowing against either sheet are prevented from varying the predetermined parallel relation of the sheets.

From the foregoing description it will be comprehended that each element of the mechanism may be quickly and easily assembled and disassembled from the brackets and from each other. Referring to Fig. 3, it will be seen that the gear and spindle 46 and 44, as well as 39 and 32, may be slipped out of their respective rollers 41 and 21, and that the spindle 22 may be slipped out of its roller 21. Additionally, the fork 87 is easily disengageable from its roller 21 and from

the screw 91. The bead chains 102, 136, and 142 are easily assembled and disassembled with respect to the members with which they are adapted to operate.

To obviate possible entanglement of the chains 102, 136, and 142, we may provide guiding tubes 147 and 148 adaptable to slide freely with respect to the chain 102 and attached as shown to the ends of the chains 136 and 142. Thus the said ends are always in accessible position and not subject to entanglement with each other and the chain 102, while permitting movement of the chain 102 throughout its whole range. If desired, the chain 142 may be brightly plated or colored to indicate that the same is operable for lesser light diffusion and the chain 136 may be painted black or other dark color to indicate operation for greater light diffusion.

The shade has been so constructed that the maximum number of parts may be used without alteration on an infinite number of widths of windows. The only parts requiring alteration for different widths of windows are the rollers 41 and 21, their respective sheets 72 and 71, the pull bars 73 and 74, and the rod 111 and bail 121.

It will be comprehended that both the front and rear shade may be comprised of strips of non-transparent material spaced apart upon their respective rollers and attached in any convenient manner thereto and to the pull bars, the transparent areas being the result of absence of shade material rather than presence of transparent material. As a modification thereof, the non-transparent strips may be constituted by punching or otherwise cutting out areas from a full sheet of non-transparent material so as to leave the non-transparent strips. In order to reinforce the front and rear shade members proper, it it within the scope of this invention to tie the adjacent strips together by any convenient means, as by transverse cords, wires, or similarly functioning means.

While we have shown particular embodiments of our invention, it will be understood, of course, that we do not wish to be limited thereto since many modifications may be made, and we therefore contemplate by the appended claims to cover any such modifications as fall within the true spirit and scope of our invention.

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

1. A window shade comprising in combination a front sheet and a rear sheet disposed in parallel facing relation, each sheet comprising flexible material and having a series of parallelly disposed vertical stripes of non-transparent material alternated with a series of parallelly disposed vertical stripes of transparent material, the respective stripes of each sheet being of the same width, there being one less non-transparent and one less transparent stripe in one sheet than in the other, and means for laterally shifting the sheets relatively to each other.

2. A window shade comprising in combination a front sheet and a rear sheet disposed in parallel facing relation, each sheet having a series of parallelly disposed vertical stripes of non-transparent material alternated with a series of parallelly disposed vertical stripes of transparent material, the respective stripes of each sheet being of the same width, there being one less non-transparent and one less transparent stripe in one sheet than in the other, and means for laterally shifting the sheets relatively to each other.

3. A window shade comprising in combination a front sheet and a rear sheet disposed in parallel facing relation, each sheet comprising flexible material and having a series of parallelly disposed vertical non-transparent stripes alternated with a series of parallelly disposed vertical transparent stripes, one sheet being narrower than the other by the amount of one transparent and one non-transparent stripe, a roller for supporting each sheet for winding and unwinding of the associated sheet with respect thereto, and means for axially shifting the rollers with respect to each other.

4. A window shade comprising in combination a front sheet and a rear sheet disposed in parallel facing relation, each sheet comprising flexible material and having a series of parallelly disposed vertical non-transparent stripes alternated with a series of parallelly disposed vertical transparent stripes, one sheet being narrower than the other by the amount of one transparent and one non-transparent stripe, a roller for supporting each sheet for winding and unwinding of the associated sheet with respect thereto, and means for axially shifting the roller carrying the narrower sheet with respect to the other roller.

5. A window shade comprising in combination a pair of flexible sheets disposed in parallel facing relation and each sheet comprising a plurality of vertically disposed non-transparent stripes alternated with a plurality of vertically disposed transparent stripes, means for shifting the sheets laterally with respect to each other, each sheet having a roller associated therewith and upon which the sheet is adapted to be wound and unwound.

6. A window shade comprising in combination a plurality of flexible sheets, each sheet having a plurality of non-transparent vertically disposed stripes alternated with a plurality of vertically disposed transparent stripes, the said sheets being disposed in parallel relation, and means for effecting shifting of the sheets relative to one another in a lateral direction.

7. A window shade comprising in combination a front sheet and a rear sheet, each sheet being of flexible material and each sheet being provided with a roller individual thereto and upon which the sheet is supported for winding and unwinding, each sheet being provided with a plurality of vertically disposed non-transparent stripes alternated with a plurality of transparent stripes, means connecting the rollers whereby rotation of one roller will drive the other roller to effect simultaneous winding and unwinding of the sheets, and means for shifting one sheet laterally with respect to the other to effect a selected overlap of the non-transparent stripes of one sheet with respect to the transparent stripes of the other sheet.

8. A shade for a window set in a frame including opposed jambs comprising in combination a pair of brackets adapted to be mounted on the opposing jambs, a pair of rollers, a flexible sheet supported by each roller for winding and unwinding of the sheet relatively thereto, one of said rollers being provided at one end with Hartshorne mechanism for rotation of the roller to rewind the sheet thereon and to effect its maintenance in a selected unwound position, return of said sheet to wound position being effected upon release from said selected position, the said one roller having an aperture and a splined shaft freely slidable within said aperture for supporting said roller at the other end thereof, a gear se-

cured to said shaft, said gear being retained axially by said bracket whereby the said one roller may be carried on said brackets notwithstanding variations in the distance between the jambs from a standard dimension, and gearing interconnecting said gears to the other roller whereby rotation of either of said rollers drives the other roller in unison therewith.

9. A window shade device comprising in combination a pair of parallelly disposed rollers each supporting a flexible sheet for winding and unwinding with respect to the roller individual thereto, each said sheet having a plurality of transparent zones and a plurality of non-transparent zones, the respective non-transparent zones of one sheet being at least equal in area to the respective transparent zones of the other sheet, and means for selectively shifting one of said rollers axially with respect to the other to move the non-transparent zones of one sheet into and out of register with the transparent zones of the other sheet.

10. A window shade device comprising in combination a pair of parallelly disposed rollers each supporting a flexible sheet for winding and unwinding with respect to the roller individual thereto, each said sheet having a plurality of transparent zones and a plurality of non-transparent zones, the respective non-transparent zones of one sheet being at least equal in area to the respective transparent zones of the other sheet, and means for selectively shifting one of said sheets transversely with respect to the other said sheet to move the non-transparent zones of one sheet into and out of register with the transparent zones of the other sheet.

11. A window shade device comprising in combination a pair of parallelly disposed rollers each supporting a flexible sheet for winding and unwinding with respect to the roller individual thereto, each said sheet having a plurality of transparent zones and a plurality of non-transparent zones, the respective non-transparent zones of one sheet being at least equal in area to the respective transparent zones of the other sheet, and means for selectively shifting one of said sheets transversely with respect to the other sheet to move the non-transparent zones of one sheet into and out of register with the transparent zones of the other sheet, said shifting means including a member having a helical operating portion, an element engaged with said portion and with the shiftable sheet and means for rotating said portion in either direction.

12. A window shade comprising in combination a pair of flexible sheets disposed in parallel facing relation, a pair of rollers, one individual to each said sheet and adapted to support the sheet by one end thereof and support the sheet in wound and unwound relation with respect thereto, a rigid member associated with each said sheet and disposed at the opposite freely suspended end thereof, an element intermediate the said members and attached to only one said member, and means for actuating at least one sheet for varying the spacing between the sheets, said element being disposed in abutting relation to said other member to maintain the selected spacing.

13. A window shade comprising in combination a pair of flexible sheets normally disposed in spaced-apart parallel facing relation, means for varying the said spacing including an elongated member disposed transversely of one sheet and against the outer face thereof and an elongated second member disposed transversely of the other sheet and adapted to bear against the outer face of said other sheet, and mechanism for moving said second member to carry the sheet juxtaposed thereto toward the other sheet.

14. A window shade comprising in combination a pair of brackets, a pair of rollers supported for rotation in said brackets, a pair of flexible sheets each mounted on one said roller for winding and unwinding with respect thereto, said sheets being normally positioned in spaced-apart parallel relation, a rod supported in said brackets and adapted to bear against the outer face of one said sheet, and a substantially U-shaped bail swingably supported in said brackets and adapted to bear against the outer face of the other of said sheets and means for swinging said bail to carry the sheet juxtaposed thereto against the other sheet to vary the spacing between said sheets.

15. A window shade comprising in combination a front shade member and a rear shade member disposed in parallel facing relation, each member comprising a series of parallelly disposed vertical strips of non-transparent material alternated with a series of parallelly disposed vertical strips of transparent material, the respective non-transparent strips being at least equal in width to the transparent strips, one member being wider than the other member by the amount of one non-transparent strip and one transparent strip, and there being a non-transparent strip bordering each edge of each of the members, and means for laterally shifting the members relatively to each other.

16. A window shade comprising in combination a front sheet and a rear sheet disposed in parallel facing relation, each sheet comprising a series of parallelly disposed vertical stripes of non-transparent material alternated with a series of parallelly disposed vertical stripes of transparent material, the respective non-transparent stripes being at least equal in width to the transparent stripes, one sheet being wider than the other sheet by the amount of one non-transparent stripe and one transparent stripe, and there being a non-transparent stripe bordering each edge of each of the sheets, and means for laterally shifting the sheets relatively to each other.

17. A window shade comprising in combination a front shade member and a rear shade member disposed in parallel facing relation, each member comprising a plurality of strips of flexible non-transparent material spaced apart widthwise of said strips, each member including a roller whereupon the said member may be wound, and means for laterally shifting one of said rollers relatively to the other.

18. A window shade comprising in combination a pair of brackets adapted to be mounted on window jambs, a pair of rollers, each of said rollers having an individual flexible sheet supported thereon for winding and unwinding with respect to its respective roller, one of said rollers having at one end thereof conventional Hartshorne mechanism whereby the sheet individual thereto may be unwound therefrom and the said one roller locked with its associated sheet in a selected unwound position, the said one of said rollers having an axial non-circular aperture at the other end thereof, a mating non-circular shaft axially slidable in said aperture and supported on the one of said brackets adjacent thereto, means for rotatably supporting the other of said rollers, said supporting means including

a shaft supported and locked against axial movement in the said one of the said brackets, the other of said rollers having an aperture for engagement over the second shaft and provided with a non-circular supporting shaft carried in the other of said brackets, and the said other of said rollers having a mating non-circular aperture to receive said supporting shaft for rotation of the said other of said rollers by rotation of said second shaft, and gearing interconnecting said two shafts whereby rotation of one of said rollers will rotate the other of said rollers, whereby the shafts facilitate the mounting of the pair of rollers in proper supporting relation with the brackets, notwithstanding variation in the distance between the jambs from a nominal standard dimension.

19. A window shade comprising in combination a front shade member and a rear shade member disposed in parallel facing relation, each member comprising a plurality of strips of

flexible non-transparent material spaced apart widthwise of said strips, and means for shifting one of the members relatively to the other in a direction laterally widthwise of the window.

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