W. B. KNAPP.

SCREEN, CURTAIN, AND THE LIKE.

APPLICATION FILED SEPT. 10, 1913.

1,138,668.

Patented May 11, 1915.

3 SHEETS—SHEET 1.

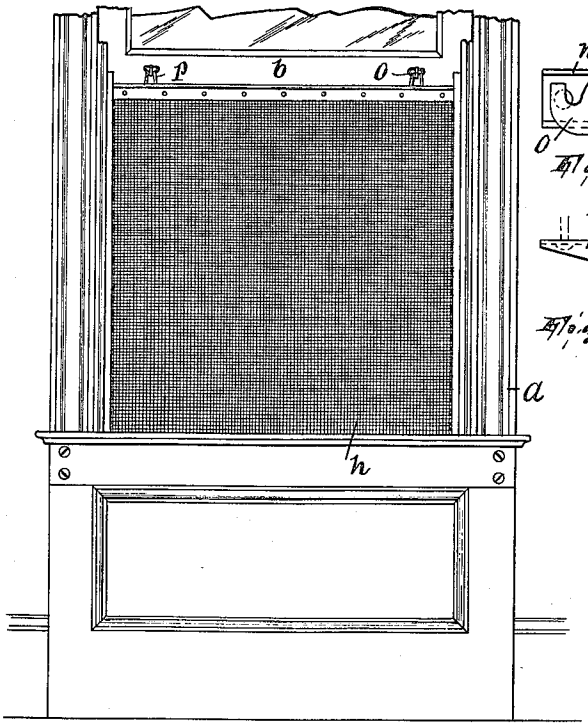
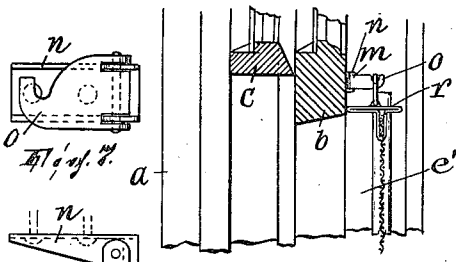


Fig. 1.



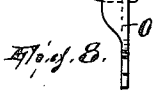


Fig. 7.

Fig. 8.

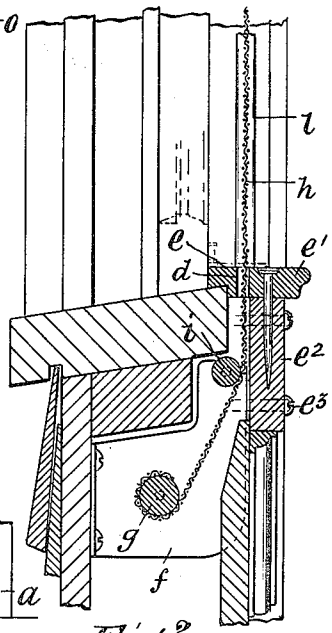


Fig. 2.

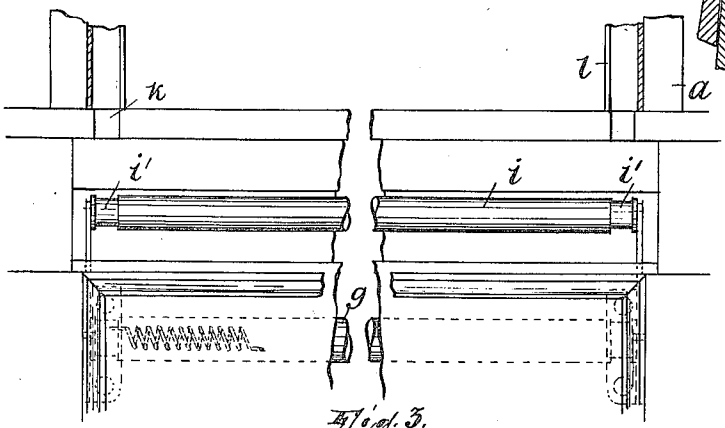


Fig. 3.

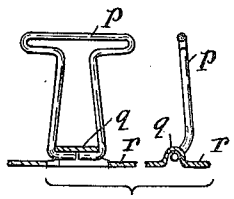


Fig. 6.

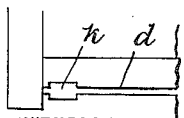


Fig. 5.

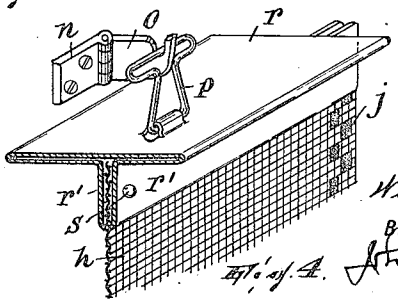


Fig. 4.

WITNESSES

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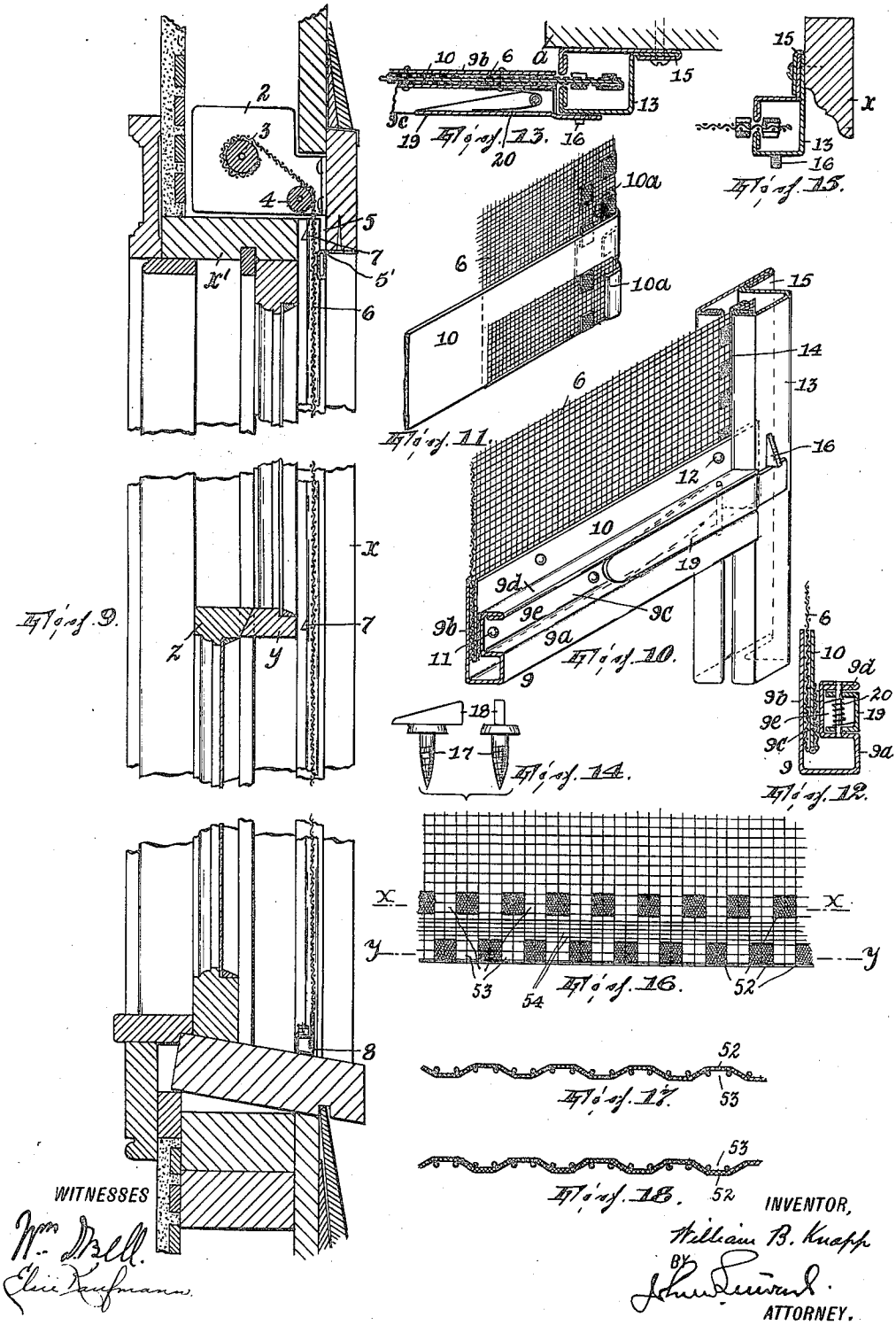
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

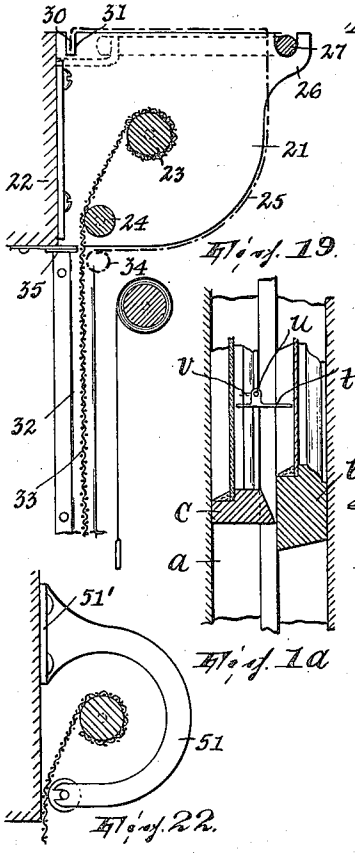


Fig. 19.

Fig. 1a.

Fig. 22.

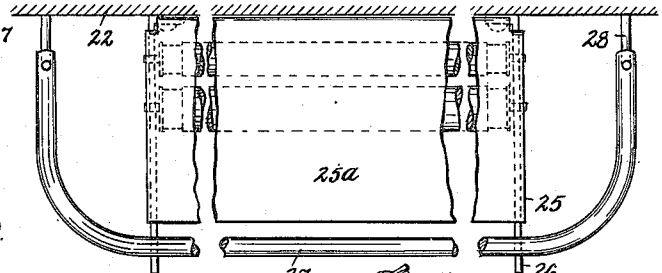


Fig. 20.

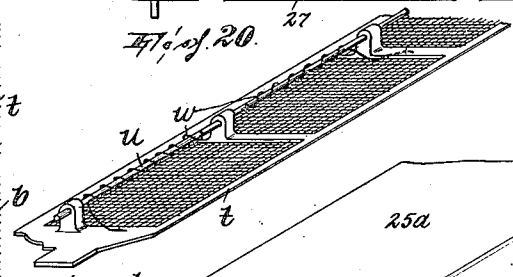


Fig. 1b.

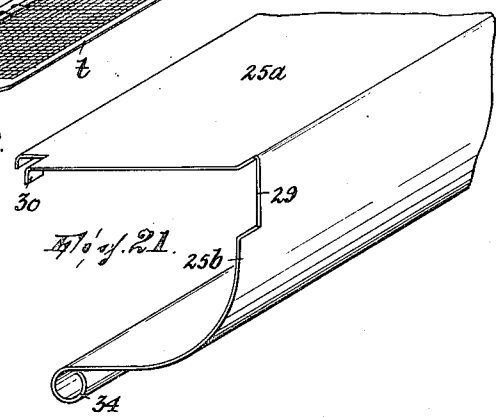


Fig. 21.

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UNITED STATES PATENT OFFICE.

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SCREEN, CURTAIN, AND THE LIKE.

1,138,668. Specification of Letters Patent. Patented May 11, 1915.

Application filed September 10, 1913. Serial No. 789,036.

To all whom it may concern:

Be it known that I, WILLIAM B. KNAPP, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Screens, Curtains, and the like, of which the following is a specification.

My invention relates to screens, curtains and the like of the kind in which the screen or equivalent element is wound on a rotary roller, and it consists in certain improvements in such appliances having for their object to simplify and cheapen the construction and increase its durability and general efficiency.

My invention is found fully illustrated in the accompanying drawings, wherein,

Figure 1 is an inside view of a window, showing a screen of the type that is attached to one of the sashes and winds or unwinds as the sash is moved; Figs. 1ª and 1ᵇ show a stop which may be employed between the sashes; Fig. 2 is a vertical sectional view of what is shown in Fig. 1; Fig. 3 is an inside fragmentary view; Figs. 4, 5, 6, 7 and 8 are details appertaining to Figs. 1 to 3; Fig. 9 is a vertical sectional view of a window, showing a screen of the kind capable of being moved to and held in any of several positions, independently of the sash, where it leaves the window opening more or less clear; Figs. 10, 11, 12, 13, 14 and 15 show details appertaining particularly to Fig. 9; Figs. 16, 17 and 18 are detail views of the preferred manner of forming the side edges of the screen, Fig. 16 being a plan and Figs. 17 and 18 sectional views on lines *x*—*x* and *y*—*y* of Fig. 16; Figs. 19 and 20 are a vertical sectional view and a plan of a screen arrangement of the general character of that shown in Fig. 9, showing how a screen or the like and a curtain rod may be supported at the one window; Fig. 21 is a detail of Figs. 19 and 20; and, Fig. 22 shows means for supporting a certain auxiliary roller under certain conditions.

Referring, first, to Figs. 1 to 8 and 1ª and 1ᵇ let *a* represent any suitable frame structure, in the present case being the frame of a window in which the sashes *b* and *c* are guided in the usual manner to slide vertically. *d* is a slit penetrating the sill *e* relatively inside of the inner stop bead *e'* and extending from one to the other side of the frame. Below the sill is arranged a pair of brackets *f* in which are journaled a spring roller *g* on which the screen *h* is wound and a guide roller *i* one side of which is vertically below the slit. The screen extends upwardly through the slit, the roller *i* not only guiding the screen and equalizing the strain thereon but assuming much of the strain that would otherwise be imposed on the roller *g*, so that the screen remains flat and equally stretched and the roller *g* runs true and remains unstrained. As will appear later, the screen has thickened-up portions *j* at its margins, and for the accommodation thereof the slit is widened at *k* (Fig. 5) near both ends thereof, while the roller *i* has grooves *i'*; the roller *i* thus keeps the screen always winding or unwinding true on the spring roller. By placing the slit *d* through which the screen extends inside of the stop bead *e'* the slit is protected from the weather.

The marginal thickened-up portions of the screen are received in vertical guides *l* (which may be a part of the woodwork of the frame or be formed as shown in Figs. 13 and 15 and as hereafter described) and which confine the edges of the screen (when more or less closing the window opening) against being withdrawn out of them.

The sash *b* has one or more fittings *m* attached thereto, each consisting of a bracket *n* and a hook *o* pivoted thereto on a vertical axis so that it may be turned to lie flat against the sash or project therefrom. With these are adapted to be coupled the eyes *p* pivoted to bent-up loops *q* formed on a cross-bar *r* that is formed and attached to the free or upper edge of the screen in the following way: A suitable length of sheet metal is bent into cross-sectionally T-shaped form with its two lateral edge portions *r'* face to face, and this is fitted over the said edge of the screen and by means of rivets *s* secured thereto as shown in Fig. 4, the edges proper being preferably bent inwardly to grip the screen and impart a proper finish. When the eyes are engaged with the hooks the screen will wind up or unwind as the sash *b* is moved and in any more or less open position of the sash the cross-bar closes the space between the same and the screen (Fig. 2). When the eyes are detached, the screen will wind up and the horizontal part of the cross-bar come to bear flatwise against the sill over the slit therein; the eyes being then turned down

against the strip, whose vertical portion is received by the slit, a neat and finished appearance at the sill of the same is presented. Each end of the vertical part r' of the metal is extended (Fig. 4) and travels in the guide l.

To form the slit the sill is preferably split and its portions e^1 permanently affixed to the apron e^2. Thus access may readily be had to the parts of the screen structure below the sill upon removing the unitary piece formed by the parts e^1 and e^2, which may be held in place by the screws e^3.

Insects are likely to find their way through a window opening where, as in the construction shown in Fig. 1, the screen only closes the opening formed between the sash b and the sill, especially if said sash be moved somewhat down so that its lower rail does not meet the lower rail of the upper sash. Referring to Figs. 1^a and 1^b, therefore, t is a guard, which may be reticulated if desired and formed to fit the space between the panes of the two sashes when standing in its normal or horizontal position, it being pivoted preferably to the upper sash on a rod u extending from one side rail thereof to the other and supported by suitable fittings v affixed to said rails. Coiled about the rod are two springs w each having one end attached to the rod and the other to the guard and arranged to counteract each other, say by one being righthand and the other lefthand, so that they normally keep the guard in its horizontal or closing position. By this construction, when either sash is lowered relatively to the other the guard will be swung on its pivot by contact with the top or bottom rail (as the case may be) of the sash b, so as to clear it.

Referring, now, to Figs. 9 to 15 of the drawings, at the top of the frame structure x, in this case being again the frame of the window and having means to guide vertically the sashes y and z, are arranged the brackets 2 affording journals for the spring roller 3 and the guiding roller 4. Immediately forward of the sash y the top portion x' of the frame has a slit 5 extending from side to side of the frame and down through which extends the screen 6 wound on the roller 3 and guided by the roller 4, all substantially the same as in the construction first described. At suitable intervals vertically on the sides of the frame are provided the stops 7 by which, in the way to be described, the screen is held more or less unwound, that is, more or less closing the window opening. A cross-bar 8 is attached to the lower or frame edge of the screen and has suitable latches to coöperate with said stops. The opening 5 may be closed at the outside of the screen by the strip 5′ shown in Fig. 9.

Describing, now, the preferred construction of the cross-bar, the guides receiving the marginal edges of the screen, the stops and the latches: The cross-bar includes a strip of sheet metal 9 bent longitudinally to form a hollow portion 9^a with one edge portion 9^b of said strip standing vertically and the other edge portion 9^c standing vertically and substantially parallel with the portion 9^b and having its edge portion 9^d bent off at right angles to form the channel 9^e; it also includes the sheet metal strip 10 having each end split for a short distance inwardly and longitudinally and the portion 10^a thereof each side of the split rebent in opposite directions, so that each grips the said edge of the lower edge portion of the screen, which latter is folded around the strip 10 in the manner shown in Fig. 11. The strip 10, having the screen thus attached thereto, is fitted between the portions 9^b and 9^c of the strip 9, whereupon rivets 11 are used to secure the parts together; rivets 12 may also be used to secure the screen to the strip 10. Each guide for the marginal portions of the screen consists of strips of sheet metal 13 bent longitudinally to form together a cross-sectionally hollow structure affording a narrow slit 14, which receives the marginal edge of the screen but is so restricted as to prevent its thickened-up portion from escaping therefrom as already alluded to in connection with the construction shown in Figs. 1 to 8. A flange 15 is formed on the guide thus produced, serving as a means to attach the same to the frame structure x, it being understood that such flange may project at any desired angle from the guide (say as in Fig. 13 or Fig. 15) to suit the surface of the frame structure x against which it is secured; in the present case this flange is formed by folding one edge of one of the strips forming the guide around the other. I do not wish to be limited to forming the guide and its flange of two pieces or strips of material. The stops above referred to may be pieces 16 soldered on or formed with the guides, each having an inclined upper surface and a horizontal underneath surface; or they may be formed as in Fig. 14, where 17 is a screw having its head 18 formed substantially like the stop 16 already described. The ends of the strip 10 project into the guides 13, their rebent portions 10^a each affording a thickened-up formation at the end of the strip preventing its escape from the guides excepting at one or the other end of the latter. In the ends of the channel of the cross bar are pivoted on vertical axes latches 19 one end of each of which overlaps the adjoining guide and the other or inner end of which forms a handle to swing the latch on its pivot and assumes the pressure of a spring 20 which holds the latch with its outer end bearing against the

guide. When the screen is drawn down the latches wipe past the stops 16 and it will be held from rising in response to the action of the spring roller by engagement of the latches with the outer sides of the stops next above them; to allow the screen to rise the inner ends of the latches are pressed inwardly to clear their outer ends from the stops.

In the construction so far described, the rollers are placed within more or less permanent structures. In Figs. 19 to 21 a special case, to be attached to a window frame or the like or adjacent structure, is illustrated. Here 21 designates two brackets to be secured to the woodwork 22 above the window opening, affording journals for the spring roller 23 and the guide roller 24. 25 is a sheet metal shell having a horizontal top wall 25^a and a downwardly and rearwardly curved wall 25^b, the same being adapted to be fitted over and form a casing with the brackets 21. The brackets have forward extensions 26 to receive a curtain pole 27 whose ends are bent rearwardly and engaged with and supported by hooks 28 projecting from the woodwork. The piece of metal 25, excepting at the points 29, where it is cut out to accommodate the extensions 26 (holding it against endwise movement), extends around the brackets 21 and in its horizontal portion 25^a is supported by said brackets, having depending lugs 30 fitting into notches 31 in said brackets to keep said piece in place. 32 represents guides substantially like those already described receiving and confining the marginal edges of the screen 33, with which the rolled edge portion 34 of the piece 25 contacts at one side thereof while a guard 35, secured to the woodwork, contacts therewith at the other side thereof, so as to close off any passage for insects at this place.

It usually being desirable to employ the guide roller herein referred to, so as to reduce the strain on the spring roller and assist in keeping the screen extended and winding true, for the support of this guide roller I may in some instances employ brackets like that shown in Fig. 22. The arm 51 of each of these brackets, in which a bearing for the roller is suitably formed, is curved, being provided with a suitable attaching base 51′, the curvature of the arm allowing the bracket to be secured to the woodwork, supporting the guide roller, and at the same time clear the superadjacent spring roller.

In this class of screens or the like it is desirable to have the side edges thereof confined in the guides in which they move. I have heretofore proposed to accomplish this object in a way calculated to insure the screen winding true on its roller, as set forth in my Patent No. 963,900. In Figs. 16, 17 and 18 I show an improvement on this feature having for its principal object to insure a more compact arrangement of the window screen. Suitable lengths of material in the nature of cord, tape, braid or the like are woven into the side or marginal edges of the screen in the process of forming the same substantially in the manner of plain weaving, that is, so that the effect in the finished product at any point in a longitudinal strip of the screen so treated is to produce on one side an upstanding projection 52 and on the opposite side a recess 53. It is not material how many meshes, measured transversely of the screen, the flexible strips of material occupy, nor is it material how many such strips are employed, or whether they be round or flat in cross-section, though it is desirable that each thickened-up portion so produced should have generally uniform transverse thickness, so that in winding the several convolutions will remain squarely imposed upon each other. In the present instance, I show two longitudinally extending thickened-up portions (Fig. 16) formed as above described and more or less spaced from each other. 54 designates extra strands of wire woven into the screen between the two thickened-up portions and serving to stiffen the screen against any tendency to kink transversely between any two projections 52.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The combination of a rectangular frame having the opening to be screened and a slit penetrating one of its top and bottom sides, a screen penetrating said slit, a roller on which the screen is wound, means exterior of the frame affording bearings for the roller, and a cross-sectionally T-shaped cross-bar secured to the free-end edge of the screen and having its vertical portion adapted to enter the slit in the open position of the screen and its horizontal portion flat and adapted to rest against said slitted side of the frame, said cross-bar consisting of a strip of bent sheet-metal having its longitudinal edge-portions arranged face to face and gripping the said edge of the screen between them, substantially as described.

2. The combination of a window frame having the opening to be screened and a longitudinally split sill and having an apron e^2 forming a unitary structure with the part of the sill at one side of the split, a screen penetrating said slit, a roller on which the screen is wound, means exterior of the frame affording bearings for the roller, and a cross-bar attached to the feed-end edge of the screen, said structure obscuring the roller and screen below the sill and being removable to expose the same, substantially as described.

3. The combination of a rectangular frame

having the opening to be screened, a screen having its side marginal portions thickened-up, a roller on which the screen is wound, a guide roller for the screen having circumferential grooves receiving the thickened-up portion thereof, and means affording bearings for the rollers, substantially as described.

4. In combination, a frame, two sashes vertically movable therein past each other, an oscillatory guard closing the space between the panes of the two sashes and pivoted in one of the sashes on an axis parallel with their planes of movement and elastic means normally holding said guard in the horizontal position, said guard being freely revoluble in each direction from the horizontal position, substantially as described.

5. A fabric screen adapted to be wound on a roller or the like having thickened-up attenuated portions, each thickened-up portion consisting of a series of spaced projections extending longitudinally of the screen, and each projection being of generally uniform thickness transversely thereof, substantially as described.

6. A fabric screen adapted to be wound on a roller or the like having thickened-up attenuated portions, each thickened-up portion consisting of flexible elongated material woven into the screen longitudinally thereof and having generally uniform transverse thickness whereby to form on each face of the screen a longitudinal series of alternating projections and recesses, substantially as described.

7. In combination with the screen roller, a screen wound thereon, guides receiving the side edges of the screen, brackets affording journals for the rollers and adapted to be supported above the guides, and a shell having a top portion resting upon the tops of said brackets and having a rearward depending part interlocked therewith and a forward depending part covering the front of the bracket and extending close to the screen, substantially as described.

8. In combination with the screen roller, a screen wound thereon, guides receiving the side edges of the screen, brackets affording journals for the roller and adapted to be supported above the guides, and a shell having a top portion resting upon the tops of said brackets and having a rearward depending part interlocked therewith and a forward depending part covering the front of the brackets and extending close to the screen, said brackets having forward extensions holding said shell against lateral displacement, substantially as described.

9. In combination, with a suitable supporting means, a screen, a roller journaled in said supporting means and on which the screen is wound, a guide roller bearing against the screen, and brackets attached to the supporting means and having arms curved around the screen roller and affording journals in their end portions for the guide roller, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM BERNARD KNAPP.

Witnesses:
JOHN W. STEWARD,
WM. D. BELL.