

No. 609,134.

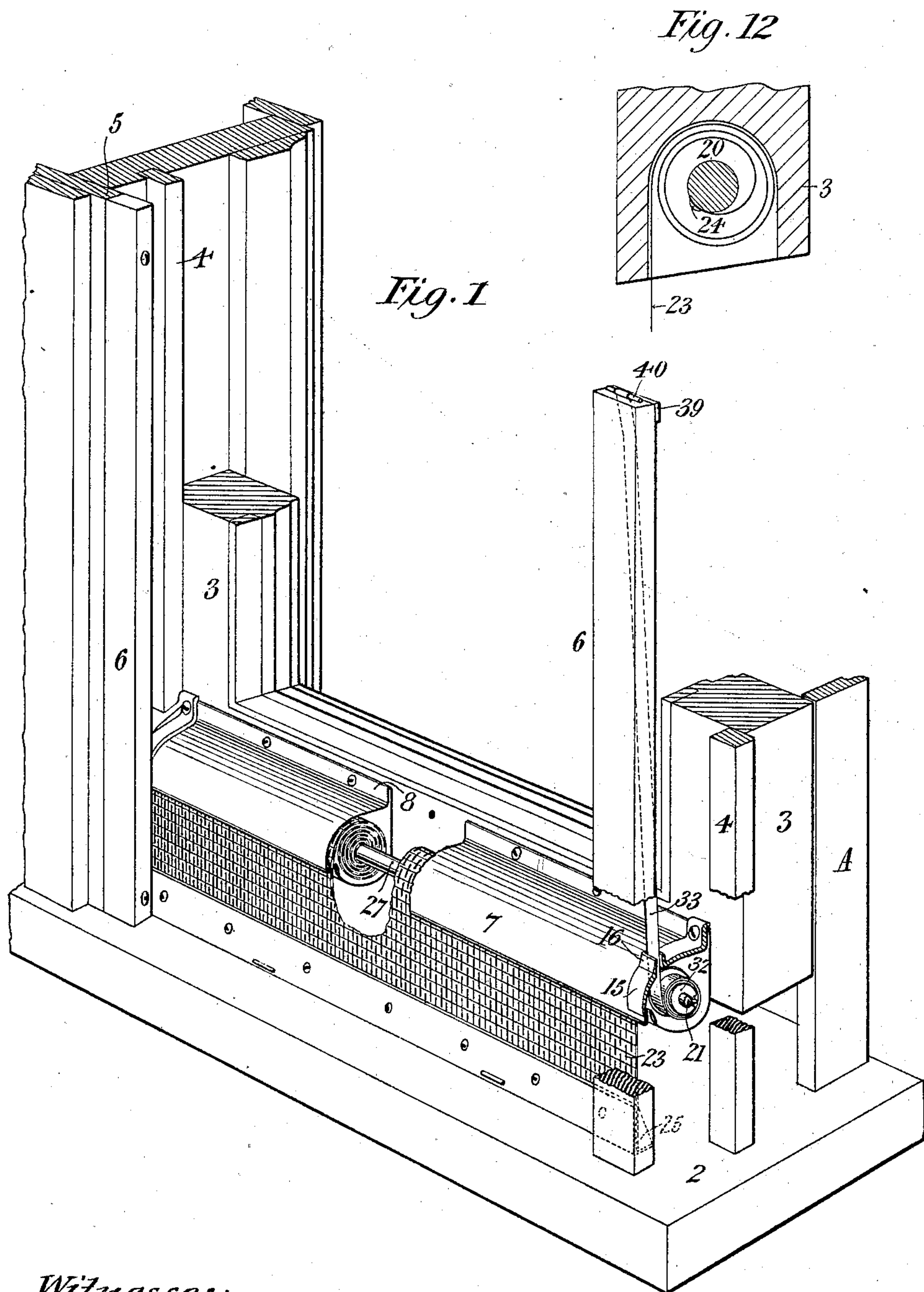
Patented Aug. 16, 1898.

G. R. BECKWITH & W. F. McCOLLUM.
WINDOW SCREEN.

(No Model.)

(Application filed Jan. 31, 1898.)

2 Sheets—Sheet 1.



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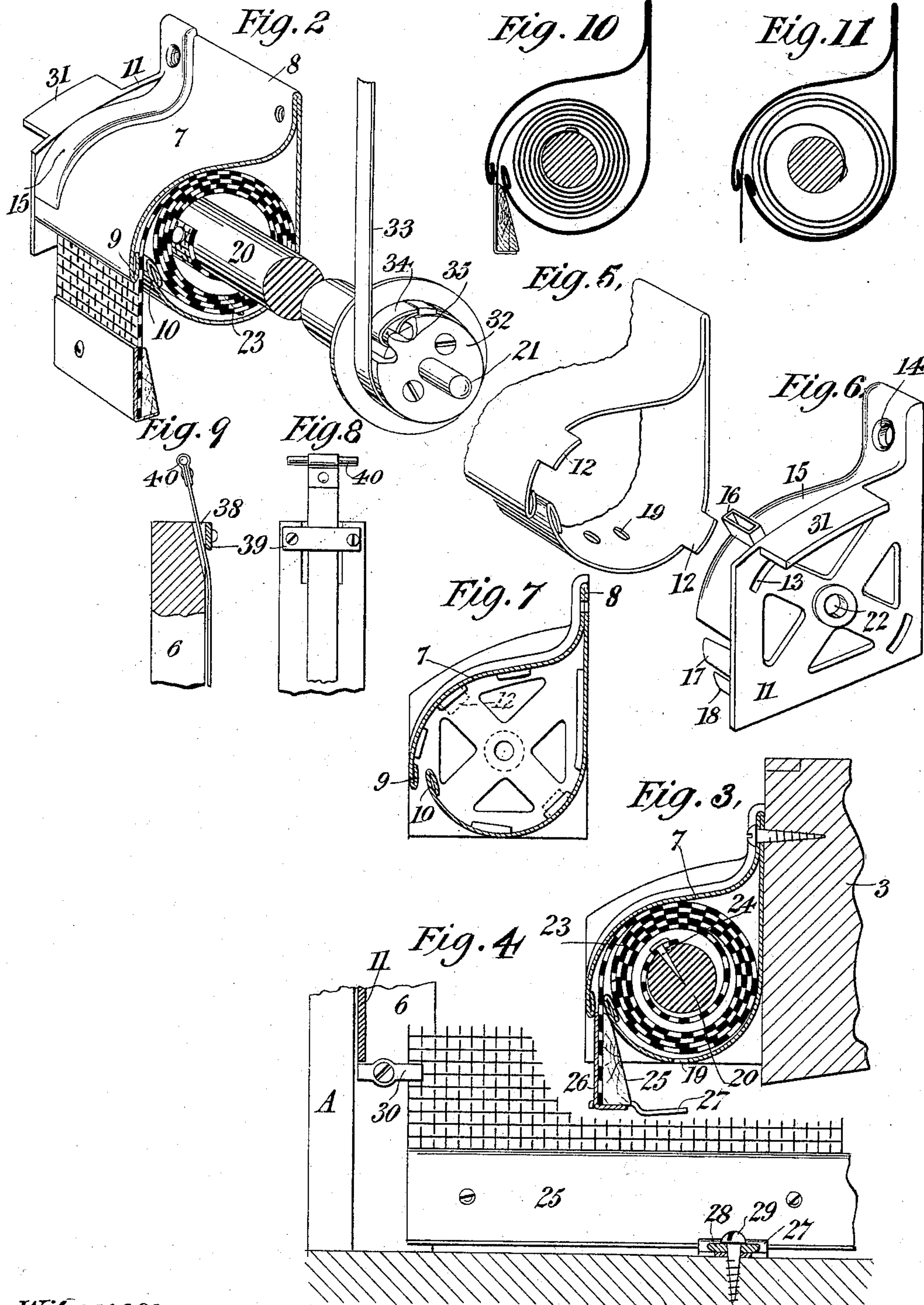
G. R. BECKWITH & W. F. McCOLLUM.

WINDOW SCREEN.

(Application filed Jan. 31, 1898.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

GROVE R. BECKWITH AND WILLIAM F. MCCOLLUM, OF MINNEAPOLIS,
MINNESOTA, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO
THOMAS COCHRAN, JR., OF ST. PAUL, MINNESOTA.

WINDOW-SCREEN.

SPECIFICATION forming part of Letters Patent No. 609,134, dated August 16, 1898.

Application filed January 31, 1898. Serial No. 668,519. (No model.)

To all whom it may concern:

Be it known that we, GROVE R. BECKWITH and WILLIAM F. MCCOLLUM, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Window-Screens, of which the following is a specification.

Our invention relates to window-screens, its object being to provide an improved form of the automatic type thereof which are wholly concealed from view while the window is closed and exposed to view when the sash is opened and extended to cover the open space only, being "paid out" or "taken up" by the mere movement of the sash.

To this end our invention consists in the features of construction hereinafter described and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a perspective view of part of a window and its lower sash shown fitted with our invention. Fig. 2 is a sectional detail showing manner of connecting the winding-ribbon to the roll. Fig. 3 is a cross-sectional detail showing the screen in the coiled position assumed when the sash is closed. Fig. 4 is a detail showing means of attachment of the screen to the frame. Fig. 5 is a sectional perspective detail of the screen-case. Fig. 6 is a perspective detail of one of the case-brackets. Fig. 7 is a detail cross-section of the case, showing the inside of the connected bracket. Figs. 8 and 9 are details of a modified construction of the connections of the winding-ribbon to the frames shown in the position assumed when the screen is disconnected from the sill and the sash partly raised. Fig. 10 is a diagrammatic drawing illustrating the position and shape of the screen-coils around the roll when wound up or with the window closed. Fig. 11 is a similar view showing their form and position when the screen is extended by the opening of the sash; and Fig. 12 shows, illustratively, how the screen may be mounted without a special form of case, but contained in a chamber, as in the rail of the sash.

In Figs. 1 to 11 of the drawings the device

is shown as ordinarily constructed and applied, while Fig. 12 suggests one of a number of modifications.

1 represents the window-frame; 2, its sill; 3, the lower sliding sash; 4, the parting-bead; 5, the outer stop, and 6 the supplementary stop.

7 is a sheet-metal case folded together at 8, where it may be attached to the sash 3 by nails or screws. The edges of the case are formed with open folds or hems 9 and 10, interspaced sufficiently for the screen 23 to run through and be guided by them, as hereinafter described. The case is curved into substantially cylindrical form and provided with drainage-openings 19, serving as outlets for water and inlets for air to protect the screen-coils from moisture.

11 are brackets adapted to hold the ends of the case and having slots 13 to receive the tongues 12 on the case, which are clenched over after insertion to secure the parts together. Spurs 17 enter the hems 9 and 10 to position them and maintain proper width of the slot, other spurs 18 entering the case and supporting its walls. The brackets are secured to the sash by screws entering holes 14. A hood or flange 15 covers and protects the joint between the case and bracket, and has a hollow stud 16, forming a slotted opening and guide for the winding-ribbon 33.

20 is a cylindrical bar or roll having guide-grooves 21, journaled in the openings 22 in the brackets. The screen 23 has one end secured to the roll, as by nails 24, the other end extending through the slot in the case and carrying the wedge-shaped strip 25, being secured between it and the protecting angle-iron 26. Lips 27 project laterally from the strip toward the sash and are engaged by buttons 28, turning upon the screws 29, so as to attach the screen to the window-sill. Buttons 30 upon the inner face of the stops 6 may be employed to secure the edges of the extended screen and prevent its being blown inward, the buttons being tripped to release the screen by the brackets 11 as the sash descends. The space between the parting-bead

4 and stops 5 and 6 is closed against the admission of insects by the flange 31 on the bracket.

The roll 20 carries at one end a drum 32, to which the winding-ribbon 33 is attached by the end 34 of the ribbon being folded around the bar 35, formed by cutting away the periphery of the drum, as shown in Fig. 2, to form an eye. The ribbon is wound upon the drum oppositely to the windings of the screen upon the roll, and its free end is attached to the stop 6, so as to give a fixed support to resist a pull upon the ribbon while permitting the ribbon to slip or slide thereon under a thrusting force for the purpose hereinafter set forth. This is preferably accomplished by channeling the stop 6 at 38 and bridging the channel by a strip 39, the ribbon being passed through the channel under the strip and having a cross bar or pin 40, which normally engages the strip 39, while the ribbon is free to run or slide upward in the channel. Any slack of the ribbon caused by lifting the sash when the screen is disconnected from the sill is thus taken up by the slip of the ribbon, thereby preventing its doubling upon itself. The screen is formed of wire-netting possessing a limited degree of stiffness and resiliency, and the ribbon is preferably made from thin sheet metal to secure in a moderate degree both stiffness and flexibility.

The object in using a winding-ribbon is to dispense with a screen-winding spring which offers resistance to the movement of the sash and a varying tension upon the screen. The object in employing a stiff resilient fabric for the screen is to secure compensation for the varying speed of winding and unwinding of the oppositely-coiled screen and ribbon as the roll is carried by the sash. As the sash descends and the roll is rotated to take up the screen the screen is wound up progressively faster with uniform rotation of the roll, owing to the progressively-increasing diameter of the superimposed coils. Since, however, the roll is rotated by the ribbon as it is unwound therefrom and as the diameter of the ribbon-coils decreases, the rotative speed of the roll relatively to the travel of the sash progressively increases, thus multiplying the variance in "take-up" of the screen. As it is important to employ an inelastic ribbon and non-stretching screen fabric some means for compensating for the variances noted must be provided. This is secured in the highest degree of practical efficiency by the resiliency of the screen fabric, and its action is illustrated in Figs. 10 and 11. When the window is closed, Fig. 10, the pull of the winding-ribbon with its drum-coils of minimum diameter tends to compress the coils of the screen, which are the maximum in number to minimum diameter, and draws them closely toward the roll, while with the sash raised the winding of the ribbon requires a progressively-slower rotation of the roll relative to the movement of

the sash and consequent expansion of the screen-coils.

The resiliency of the screen fabric, which offers elastic resistance to the winding or coiling of the web, therefore causes the coils to assume maximum diameter and expands them away from the roll to the limits determined by the size of the case and the tension of the winding-ribbon. With proper adjustment of the parts when the sash is opened at all the outer screen-coil is expanded into contact with the case, so as to close the case against the passage of insects therethrough, and the expansive resiliency of the coils serves to always maintain slight tension upon both ribbon and extended screen-web. The stiffness of the screen fabric as the sash is closed tends to thrust the extended web into the case, which action is assisted by the tension of the ribbon, which leads or draws it into the case by rotating the connected roll. The winding-ribbon or its equivalent is absolutely necessary to assist in coiling or carrying the fabric into the case. With a fabric of this character the friction upon the inner wall of the case would prevent the extended web from thrusting itself thereinto, nor could the fabric be given a permanent coiled shape or set which could serve to alone draw the extended web into the case when released. The ribbon or equivalent winding attachment to rotate the roll at a predetermined speed either uniform or progressively increasing as the sash is closed therefore could not be dispensed with, and the resiliency of the fabric is equally essential for the purpose of compensation, as above set forth, in lieu of additional attachments, which add both friction, variable strains, and cost to the apparatus. It is evident that except for limiting the maximum diameter of the screen-coils and furnishing them proper protection and closing the space against insects a case such as shown and described is not essential, but may be dispensed with, as illustrated in Fig. 12.

The manner of attachment and the operation of our device are easily understood from the drawings and foregoing description, but may be particularly described as follows: The stops 6 are secured in place, the screen wound upon the roll, the roll inserted into the case, the free end of the screen extending through the slot. The brackets are then secured upon the ends of the case by means of the tongues 12 with the ribbon 33 drawn out through the slot 16. The brackets and case are then screwed to the sash, the buttons 28 screwed to the sill and turned so as to engage the lips 27, and thus connect the screen to the sill. The ribbon is drawn out and attached to the stop 6 with sufficient tension applied to the roll to compress the screen-coils the requisite amount. The sash can then be raised and lowered without the attachment exerting any appreciable resistance or drag upon it, the ribbon and extended web of the screen being

always under slight tension by reason of the expansive resiliency of the screen-coils. The hems 9 and 10 serve as guides for the running of the web into and out of the case, so that it is always held close to the stops 6, against which it may be secured by the buttons 30. As the sash descends the brackets 11 trip these buttons and release the web, allowing it to be drawn into the case. When the sash is closed, the wedge strip 25 enters and tightly closes the slot between the hems 9 and 10, the spring of the lips 27 permitting it to oscillate sufficiently for that purpose. The perforations 19 serve to drain off any moisture adhering to the screen and admit air to dry the same. When it is desired to open the window without the screen being extended over the opening, the buttons 28 are turned to release it from the sill and allow it to run into the case. The sash may then be raised, the ribbon sliding upward through the channel 38, thereby protecting it from kinking or breakage.

In the modified construction of Fig. 12 the functions of the parts are the same except as to the guiding and controlling action of the case.

By proper rearrangement the device may be efficiently applied to the top sash or mounted upon the window-frame instead of the sash.

We claim—

1. In a device of the class described, in combination, a frame, a sliding sash, a roll, a screen fabric attached thereto and expansively resilient as coiled thereon, and means for automatically rotating said roll to impart a predetermined peripheral speed of the superposed coils variable with respect to the travel of the sash, whereby the resiliency of said coils compensates for such variable speed, as and for the purposes set forth.

2. In combination with the frame and sliding sash, the roll, the means controlled by the travel of the sash for positively rotating the roll at a predetermined relative speed, and a resilient screen attached to and adapted to be wound upon said roll by its rotation, the elasticity of its coils compensating for the varying tension upon the screen.

3. In combination with the fixed part and the sliding part, the roll journaled on one part, the resilient screen attached to and coiled thereon, the drum upon said roll, and the ribbon wound thereon oppositely to the windings of the screen, the free end of both ribbon and screen being normally fixed to the other part whereby the resiliency of the screen maintains substantially constant tension upon both screen and ribbon.

4. In a structure of the class described, the combination with the frame, the sliding sash, the roll journaled on the sash, the resilient screen attached to and wound upon said roll, the means for detachably connecting the free end of the screen with the frame, and the winding-ribbon attached to said roll, of the

slip connection for the free end of the ribbon with the frame, as and for the purposes set forth.

5. In combination the sheet-metal screen-case having overlapping open hems, and the brackets having spurs entering said hems, flanges overlapping the abutting ends of the case and flanges projecting into the spaces between the window parting-beads and stops, as and for the purposes specified.

6. In an apparatus of the class described, a sheet-metal screen-case, folded upon itself to form an attaching-flange, and having edges formed into overlapping open hems constituting a guide-slot for the screen, brackets having spurs entering and positioning said hems, and being secured to the case by tongues upon the latter passed through slots in the brackets and clenched, and flanges upon the brackets overlapping the abutting ends of the case.

7. In an apparatus of the class described, in combination with a screen-roll, a ribbon-drum thereon having a peripheral eye to receive a loop of the ribbon formed by cutting away the drum with a bar spanning the opening substantially parallel to the axis of the drum, as and for the purposes specified.

8. In a window-screen, the combination, of a window-frame and sliding sash, with a longitudinally-slotted barrel adapted to be attached to said sash, a roll journaled in said barrel, a resilient screen fabric attached to said roll and also to the window-frame, to be drawn from the said barrel by the opening movement of said sash, and an inelastic cord or tape having a normally-fixed point of attachment actuated by the closing movement of the sash to rotate said roll and draw the fabric into said barrel, substantially as described.

9. The combination, in a window-screen, of a longitudinally-slotted barrel, with a roller arranged therein, resilient screen fabric attached to said roller expanded within said barrel, and extending through the slot in said barrel, and an inelastic tape or band attached to said roller and wound thereon oppositely to said fabric, and having a relatively-fixed point of attachment, substantially as described.

10. The combination in a window-screen, of a window-frame and sliding sash, with a barrel or case mounted upon said sash and provided with a longitudinal slot, a roller to rotate within said case or barrel, a stiff resilient screen fabric having one end attached to said roller, and having the other end extended through the slot in said barrel and attached to the window-frame, and a winding-tape attached to and wound upon said roller, and having a fixed point of attachment to said frame, whereby said roller is actuated by the movement of the sash, to lead the fabric into said barrel, substantially as described.

11. In combination, with a window and a

sliding sash, a barrel or case mounted upon the sash, and having a longitudinal slot formed by the overlapping edges thereof, a roller journaled in said case, a stiff resilient screen fabric having one end attached to said roll and extending through the slot in said barrel, a wedge-shaped strip carried by the other end of the fabric and adapted to be attached to the window-frame, and to closely fit into the slot in said case when the sash is closed, and a winding-tape connected to said roll, and having a fixed point of attachment to said frame whereby it is actuated by the closing of the sash to turn said roll and lead the fabric into the barrel.

12. In an attachment of the class described, in combination, a barrel or case for the screen-fabric coil mounted upon the sash and having a longitudinal opening formed by one edge thereof overlapping, but spaced from, the other edge and through which opening the screen fabric travels, means for carrying the fabric into and out of said barrel, a wedge-shaped strip secured to the outward end of the fabric, and having an oscillating connection with the frame and adapted to fit into the opening in the barrel.

13. In an attachment of the class described, a barrel or case for the coil of screen fabric, formed of sheet metal and substantially cylindrical in shape, the edges thereof being brought adjacent to but not in contact with each other, and each provided with a hem or fold, in combination with the end plates for

said case, having prongs entering said hems so as to position the same, substantially as described.

14. The combination, in a window-screen, of the tubular guard or casing, with the shaft or roller provided therein, the wire-screen fabric coiled within said guard or casing, the inner end of said fabric being attached to said roller, the differential pulley provided in connection with said roller and within said casing, the ribbon or band arranged upon said pulley and having one end attached thereto, and a slot in said casing through which the other end of said ribbon is carried, substantially as described.

15. The combination, in a roller or automatic window-screen of the window frame and sash, with a coil of wire-screen fabric, means for securing the outer end of the coil, said coil and outer end being connected respectively with the window-sash and the window-frame, turn-buttons on said frame to hold the edges of the fabric when drawn from the coil, and said turn-buttons being automatically operated by the movement of the window-sash, substantially as described.

Witness our hands this 15th day of November, 1897.

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WILLIAM F. McCOLLUM.

Witnesses:

FRANK M. SMITH,
GEO. K. SMITH.