(No Model.) 2 Sheets—Sheet 1.

S. ABBOTT.

WINDOW SCREEN.

No. 525,381. Patented Sept. 4, 1894.

Fig. 1.

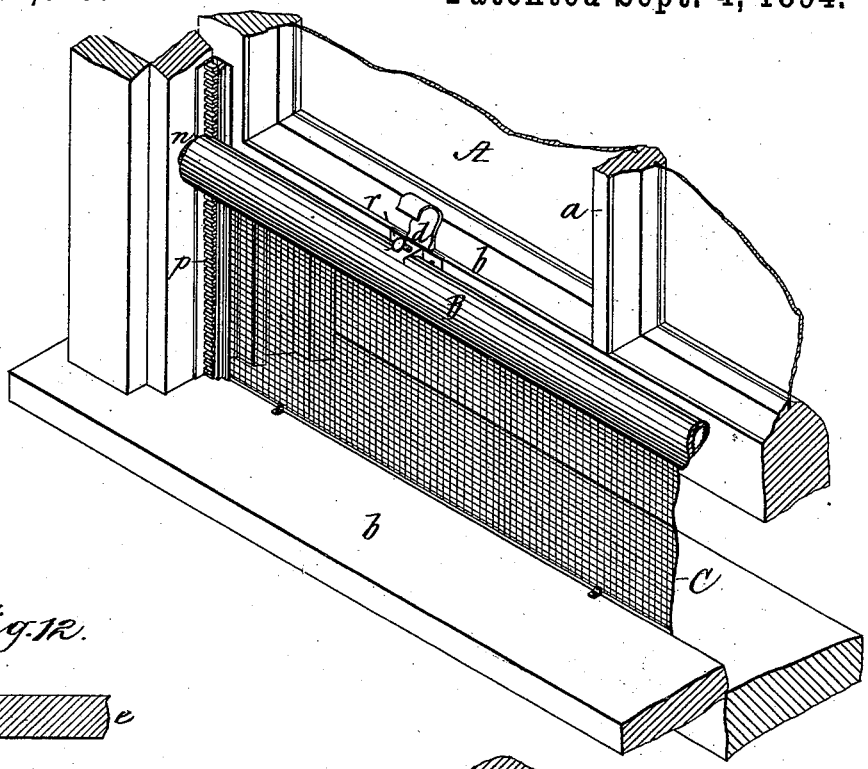


Fig. 1a.

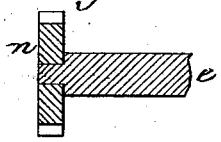
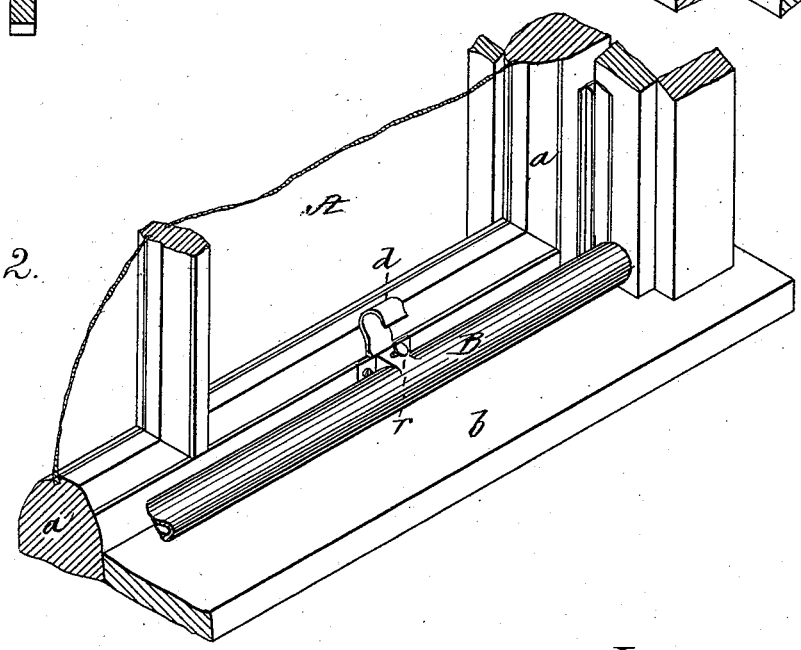


Fig. 2.



Witnesses
Albert G. Pray
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Atty.

(No Model.) 2 Sheets—Sheet 2.

S. ABBOTT.

WINDOW SCREEN.

No. 525,381. Patented Sept. 4, 1894.

Fig. 3.

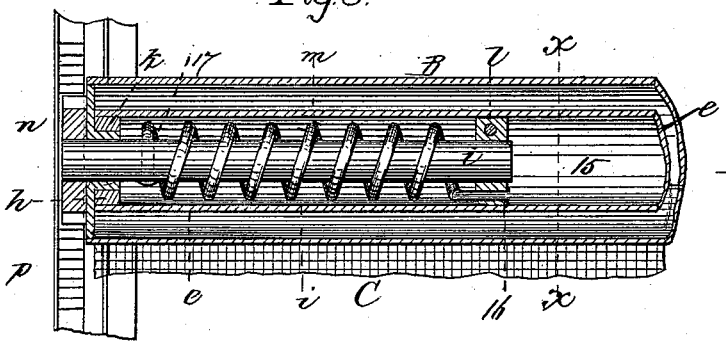


Fig. 4.

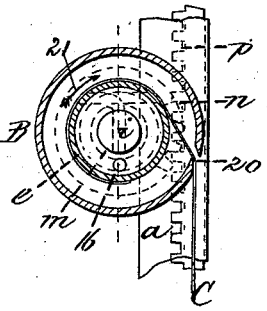


Fig. 5.

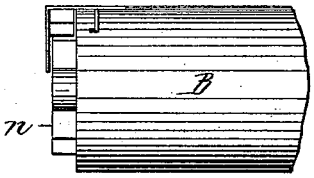


Fig. 6.

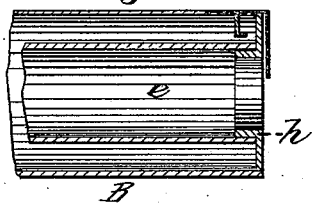


Fig. 7.

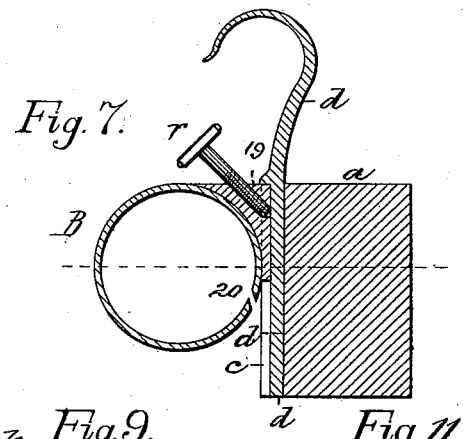


Fig. 8.

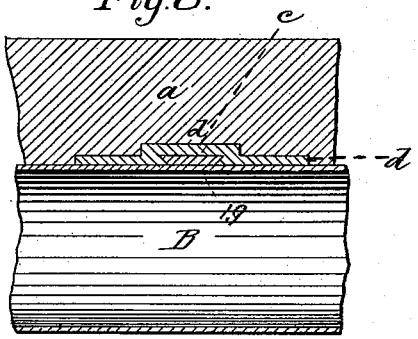


Fig. 9.

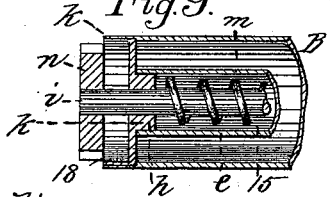


Fig. 11.

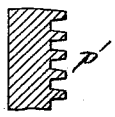
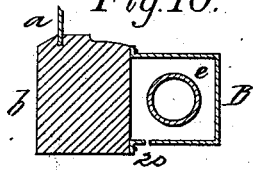


Fig. 10.



Witnesses.
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Isaac C. Bunnell

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Atty.

UNITED STATES PATENT OFFICE.

SAMUEL ABBOTT, OF SALEM, MASSACHUSETTS.

WINDOW-SCREEN.

SPECIFICATION forming part of Letters Patent No. 525,381, dated September 4, 1894.

Application filed December 13, 1893. Serial No. 493,546. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL ABBOTT, of Salem, Essex county, Massachusetts, have invented certain Improvements in Window-Screens, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figures 1 and 2 represent the two opposite sides of a window having my screen applied thereto, the screen being unwound in one and wound up in the other; Fig. 3 the interior of one end of the shaft to which the screen is attached, with its operating mechanism; Fig. 4 a section on the line *x x* of Fig. 3; Fig. 5 a plan of one end of my device; Fig. 6 a section at its opposite end. Figs. 7 and 8 are respectively, a vertical section and a horizontal section of the devices for holding the screen and its casing to the sash and for elevating the latter. Figs. 9, 10, 11 and 12 are details to be referred to.

My present invention relates to a window screen arranged within a casing on a roll or shaft on which it is unwound and wound by the rotation of a pinion upon a rack when the sash is raised and lowered in the ordinary operations of opening and closing the window; the screen when unwound, controlling and snugly fitting the open space, whereby the entrance of insects into the apartment is effectually prevented. And this invention consists in the combination with the shaft of such screen, of a compensating device for insuring the taking up and letting out of the same without unnecessary strain upon, or looseness of the folds or turns, the construction and arrangement of the parts being hereinafter described and claimed.

In the said drawings A represents a window, *a* its lower sash and *b* the sill of the ordinary construction, and although my improved screen is applicable with equally good results to either sash or to the cap or sill, I have selected the lower sash upon which (in the drawings) to locate the same.

B is a casing which may be of cylindrical tubular form, Fig. 4, or three sides of a square, Fig. 10, secured near its opposite ends in dovetail sockets *c c* formed in hooks *d d* attached to the lower sash which is raised thereby to disclose the open space which it is desired to close by the netting or screen C to permit the circulation of the air to ventilate and cool the apartment while preventing the entrance of insects thereto.

One edge (the upper one for instance) of the screen is secured to a cylindrical shaft or roll *e* which extends transversely through and has its bearings *h* located in the casing B near its ends. The interior of the roll or shaft *e* (which I will designate the major shaft) is hollow, and at one end 15 thereof receives a short pin or auxiliary shaft *i* (which I will designate the minor shaft), free to rotate independently of the major shaft, in bearings *k l* located in the said end 15,— a spiral spring *m* surrounding the minor shaft, being secured at one end 16 to the interior of the major shaft or to the bearing *l* and its other end 17 to the outside of the minor shaft. On the outer end of the minor shaft projecting outside of the casing B is mounted a pinion *n* which engages with a vertical rack *p* (Figs. 1, 3 and 4). The bearing *k* may be provided with a recess 18 in its outer face (Fig. 9) of sufficient size to receive the pinion *n* when it is desired to disconnect it from the said rack or from a serrated surface made in the side of the window casing as seen at *p'* (Fig. 11) to permit of the removal of the device from the window.

r r are two set screws passing through dovetail brackets 19 secured to the casing B— said screws also passing into the sockets *c c* of the hooks *d d* for holding said casing B to the sash, and being loosened to allow of said removal of the device. A longitudinal opening 20 is left within the lower side of the casing B near the sill *b* for the passage of the screen, the lower end of which is provided with a selvage or strip which always projects outside of said opening and is fastened to the upper surface of the sill by suitable catches.

By reference to Fig. 2 it will appear that, the screen being wound up within the casing B and the bottom of the screen secured to the sill *b*, the application of upward pressure on the hooks *d d* will cause the sash to raise and the pinion to revolve in the direction of the arrow 21 and ascend the rack or serrated surface, the major shaft *e* being simultaneously

rotated and the screen C unwound therefrom and laid snugly against the sides of the window casing over the open space vacated by the ascending sash, Fig. 1. The rationale of this movement is as follows, viz:—Owing to the constantly increasing diameters of the turns or circular folds of the screen as they are successively wound on the major shaft and the varying differences between their respective increasing diameters and the constant unchanging diameter of the pitch line of the pinion in moving down the rack due to the different peripheral distances traveled by them, the folds or turns would be too tightly drawn by and upon the major shaft *e*, and on the other hand when the pinion moves in the opposite direction (*i. e.* up the rack) the folds would be unwound too loosely from the shaft *e* unless the latter had some compensating device to overcome this difficulty;—I therefore connect the major shaft with the minor shaft by a spiral spring in the manner described, and thus accomplish the only successful and practical working of this class of screen that I am aware of. Instead of installing the screen on the lower sash, it may be attached to the upper sash or to the cap or sill of the window. The pinion *n* may be secured directly upon the major shaft *e* (see Fig. 12) and the minor shaft and its surrounding spring be dispensed with, but in such case the result would not be as satisfactory as with the employment of the minor shaft, consequently when my minor shaft is employed with a solid (not tubular) major shaft the latter would preferably be provided with a recess similar to 15 for its reception.

I claim—

1. The combination of a window screen C arranged in the form of a roll—a revolving major shaft *e* upon which it is wound and unwound—a minor shaft *i* located within the major shaft and having a common axis therewith, a spiral spring *m* surrounding the minor shaft, and secured thereto and to the major shaft—a pinion *n* mounted on the minor shaft and a rack *p* located on the window casing, all constructed to operate as set forth.

2. As an improvement in window screens—a revolving major shaft *e* having a recess 15—a minor shaft *i* located therein—bearings *k l* therefor—one *k* of said bearings being recessed and a spiral spring *m* surrounding the minor shaft and secured thereto and to the major shaft, in combination with a rack *p* and a pinion *n* adapted to slide in the recessed bearing out of engagement with the rack, constructed and operating as described.

3. The hooks *d d* having sockets *c c* and attached to the sash *a*, in combination with the casing B and the interposed connections 19, 19, and set screws *r r* for securing the same thereto, substantially as set forth.

Witness my hand this 6th day of December, 1893.

SAMUEL ABBOTT.

In presence of—
G. P. KAVANAGH,
CHARLES H. ODELL.