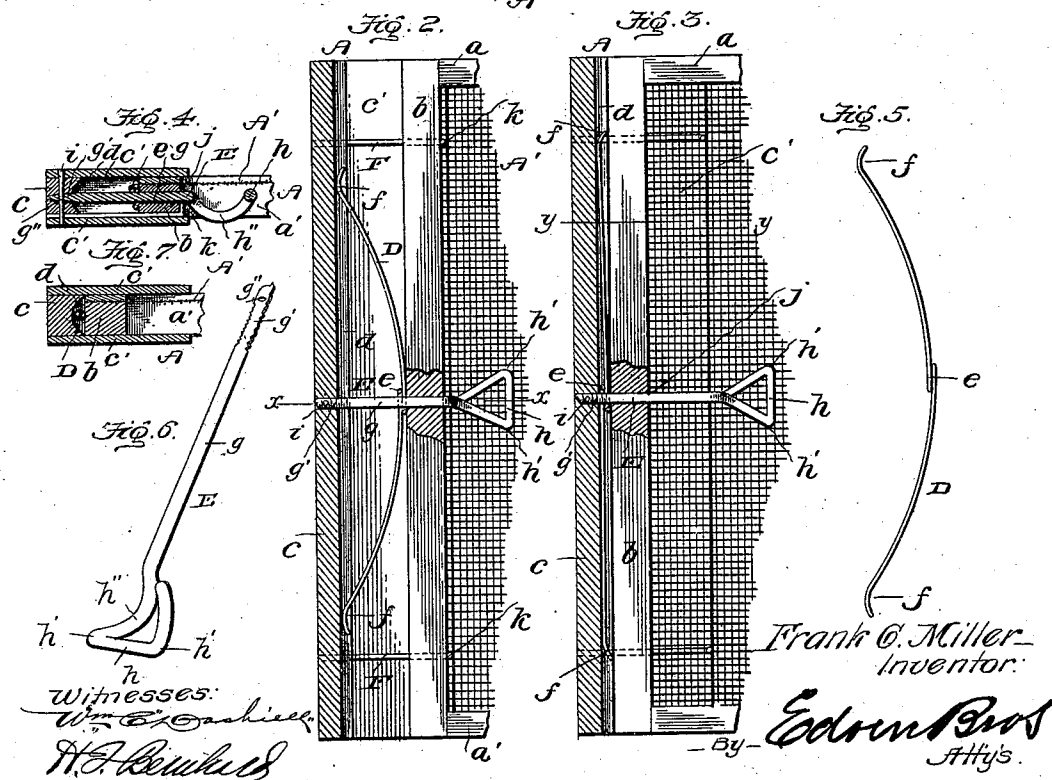
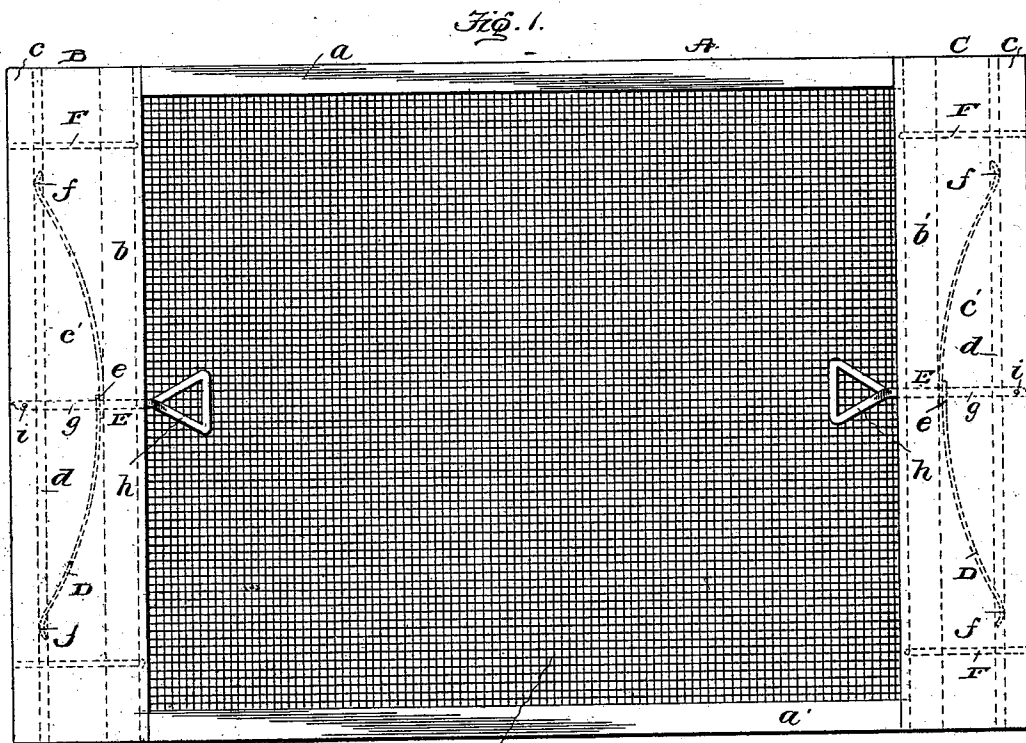


(No Model.)

F. C. MILLER.
WINDOW SCREEN.

No. 564,529.

Patented July 21, 1896.



UNITED STATES PATENT OFFICE.

FRANK C. MILLER, OF EASTON, PENNSYLVANIA.

WINDOW-SCREEN.

SPECIFICATION forming part of Letters Patent No. 564,529, dated July 21, 1896.

Application filed January 31, 1895. Serial No. 536,867. (No model.)

To all whom it may concern:

Be it known that I, FRANK C. MILLER, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented certain new and useful Improvements in Window-Screens; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to improvements in window-screens of that class which employ box-like panels that fit over the ends of a screen-frame and which panels are normally forced away from the end rails of the screen-frame by the action of springs interposed between the screen-frame and the panels.

The object of this improvement is to provide an improved form of spring-wire bowed spring and pull-bar, which are so organized that the pull-bar serves to assist in retaining the bowed spring in place within the box-like panel and between the end stile of the panel and the end rail of the frame.

A further object of the invention is to construct the end stile of the panel so as to receive the free-bearing ends of the bowed spring in order that said stile may assist, in connection with the pull-bar, to hold the bowed spring in proper position between the frame and panel, and also to enable the spring, when it is compressed or straightened out by adjusting the panel inward on the frame, to be housed within the end stile of the panel, whereby the range of adjustment of the panel upon the screen-frame is increased because the bowed spring does not interfere with the inward movement of the panel as it is housed within the end stile; and a further object of the invention is to provide an improved form of pull-bar which is fastened to the end panel in a strong and durable way.

With these ends in view my improvements consist in the construction and combination of parts which will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation of a window-screen constructed in accordance with this invention. Figs. 2 and

3 are longitudinal vertical sectional views through a portion of the screen-frame and one of the slidable panels thereof, Fig. 2 showing the position of the parts when the panel is extended the full distance and Fig. 3 showing the spring housed within the end stile of the box-like panel when the latter is forced inward so its end stile practically abuts against the end rails of the screen-frame. Fig. 4 is a transverse sectional view on the plane indicated by the dotted line *xx* of Fig. 2. Fig. 5 is a detail perspective view of the bow-shaped wire spring. Fig. 6 is a detached perspective view of the pull-bar, and Fig. 7 is a sectional view on the line *yy* of Fig. 3.

Like letters of reference denote corresponding parts in all the figures of the drawings.

As is usual in this class of adjustable window-screens, I employ the frame A and two box-like slidable panels B C, which are fitted to the ends of the frame A. This frame A consists of the top and bottom rails *a a'* and end rails *b b'*, all of which are united together in a strong and durable manner; and over this frame is stretched the wire-cloth A', the edges of which are fastened to the said rails in any approved way. Each end panel consists of the vertical stile *c* and the side pieces *c' c'*, which are rigidly fastened together to form a box-like inclosure, the outer side of which is closed by the stiles *c*, while the inner side and the two ends of the panel are left open. Previous to assembling and fastening these stiles *c* and sides *c' c'* to form the panel I produce in one edge or face of the stile *c* a longitudinal groove or channel *d* of sufficient depth to receive the bowed spring when it is compressed by the inward adjustment of the panel upon the frame; and in assembling the parts *c c' c'* the stile *c* is placed with its grooved concave face *d* between the sides *c' c'*. The end rails *b b'* of the screen-frame are fitted in the open inner sides of the panels B C, so that the grooved sides *d d* of the panels are opposite to or face the vertical end faces of the end rails *b b'* of the screen-frame.

Between the end rails of the screen-frame and the stile *c c* of the panels are interposed the bowed springs D D, and these springs are held in position between the panels and screen-frame by the pull-bars E E, which are passed through the middle of the end rails

b b' and are fixed in a novel way to the stiles *c c* of the panels B C.

I am aware that, broadly, it is not new to employ a bowed spring arranged longitudinally between the end rails of a screen-frame and slidable panels; but I construct the springs of wire in a peculiar way, so that the pull-bars E can be combined therewith in a manner to prevent endwise displacement of said spring through the open ends of the box-like panels.

In making the spring I take a piece of spring-wire of appropriate strength or resiliency and length, and then I manipulate the wire to produce a coil *e* at the middle of the wire, thus forming an eye, the axis of which is at right angles to the length of the wire. The spring is now curved or bowed longitudinally, as indicated in Figs. 2, 3, and 5, and the ends of the wire spring are bent or curved outward to form the bearing extremities *f f*. Each pull-bar E is made from a single piece of wire, which has a straight shank *g* and a finger-piece *h*. The free end of the shank is flattened and tapered, as at *g'*, and through this tapered end of the shank is formed an aperture *g''*. The other end of the wire shank is bent at *h' h'* to form the broad finger-piece *h*, and this finger-piece is concaved at *h''* to conform to the shape of the finger and to enable a firm grasp to be had on the pull-bar when adjusting the screen.

I may provide the tapered free end of the straightshank *g* with screw-threads and a cutter-bit, as shown in Fig. 6 of the drawings, to bore or cut its way into the end stile *c* of the panel to which the pull-bar is to be connected.

In order to firmly secure the pull-bar to the panel, I first screw or insert its free tapered end into the stile, and drive a nail or brad *i* through the stile and through the aperture *g''* in the shank, whereby the pull-bar is firmly secured to the stile of the slidable panel.

The end rails *b b'* of the screen-frame are each provided with a central passage or hole *j*, and through this passage and the eye of the bowed spring is loosely passed the straight shank *g* of one pull-bar, the free end of the pull-bar being inserted in the stile *c* of the panel, after which the brad or nail *i* is driven through the stile *c* and the aperture *g''* of the pull-bar.

The outer movement of the slidable panel under the influence of the bowed spring is limited by the stop-rods F F, which are arranged on opposite sides of the central pull-bar and are fitted between the end rail *b* or *b'* of the screen-frame and one of the sides *c'* of the panel. Each stop-rod has a prong at one end which is driven into the side of the stile *c*, and the other end of the rod is bent to form the lug or shoulder *k*, which lies in the path of the end rail *b* or *b'* and is adapted to abut against the inner edge of said rail, all as shown and described in a prior application for a patent filed by me on the 4th day of January, 1895, Serial No. 533,856.

The bowed spring is held or confined in place between the sides *c' c'* of the box-like panel by reason of its loop being fitted on the centrally-arranged pull-bar and by having its bearing extremities fitted into the groove or channeled face *d* of the stile *c* of the panel, whereby the spring is not only held against endwise movement within the panel, but is also held or confined centrally therein and prevented from sidewise or tilting movement, which sidewise displacement if it took place would tend to bind the spring within the box-like panels. The spring is thus sustained in a manner to secure its free and proper operation at all times, and at the same time the pull-bar and the end stile *c* do not in any way interfere with the free action of the ends of the spring.

Each panel is forced away from the end rail of the screen-frame to the full extent permitted by the stop-bars F F by the pressure of the spring E on the stile *c*, but it is obvious that the panel can be retracted its full width or until the end stile *c* abuts against the end rail of the screen-frame by pulling on the pull-bar E. When the panel is retracted, the spring D is compressed or straightened according to the extent of adjustment of the panel; and when the spring is thus compressed its bearing extremities ride or slide upon the grooved face *d* of the stile *c*, forming part of the box-like panel. If the panel is drawn in until the end stile *c* thereof is very close to or abuts against the end rail of the screen-frame, the bowed spring D is practically straightened out and it is housed or contained within the groove *d* in said stile, which groove is of sufficient depth to receive the spring when thus straightened. This is a novel feature in my improved screen, as it enables the panel to be drawn in its full width instead of only part of the way, as is the case where a coil-spring is arranged in the direction of adjustment of the panel.

My improved pull-bar is simple and cheap of manufacture, and as the two pull-bars are arranged centrally with relation to the screen-frame and the panel the screen will balance itself nicely in the hands of the operator and both panels can be retracted in placing the screen in or withdrawing it from the window-casing.

I do not limit myself strictly to the construction of the pull-bar having the threaded and tapered free extremity and provided with a cutter-bit, as I am aware that the taper threads and bit can be dispensed with, and that other changes in the form and proportion of the parts herein shown and described as the preferred embodiment of my invention can be made by a skilled mechanic without departing from the spirit of the invention.

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

1. In a window-screen, the combination with the screen-frame, and a slidable panel,

of a bowed wire spring having a central eye and arranged between said frame and panel, and a central pull-bar passing through the screen-frame and the eye of the bowed spring, the outer end of said pull-bar being fastened to the panel, substantially as and for the purposes described.

2. In a window-screen, the box-like panel having the inner face of its end stile formed with a longitudinal groove or channel, combined with a screen-frame, a bowed spring provided with an eye and having its free ends fitted in the groove or channel of the panel,

and a pull-bar passing through the screen-frame and the eye of the spring and secured to the panel, whereby the spring is held in position or centered by the pull-bar and the grooved end stile, substantially as and for the purposes described.

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

FRANK C. MILLER.

Witnesses:

ROBERT J. RICHARDS,
B. B. HORN.