June 21, 1938. W. H. MAYNARD 2,121,174

WINDOW SCREEN

Filed Feb. 4, 1937 2 Sheets-Sheet 1

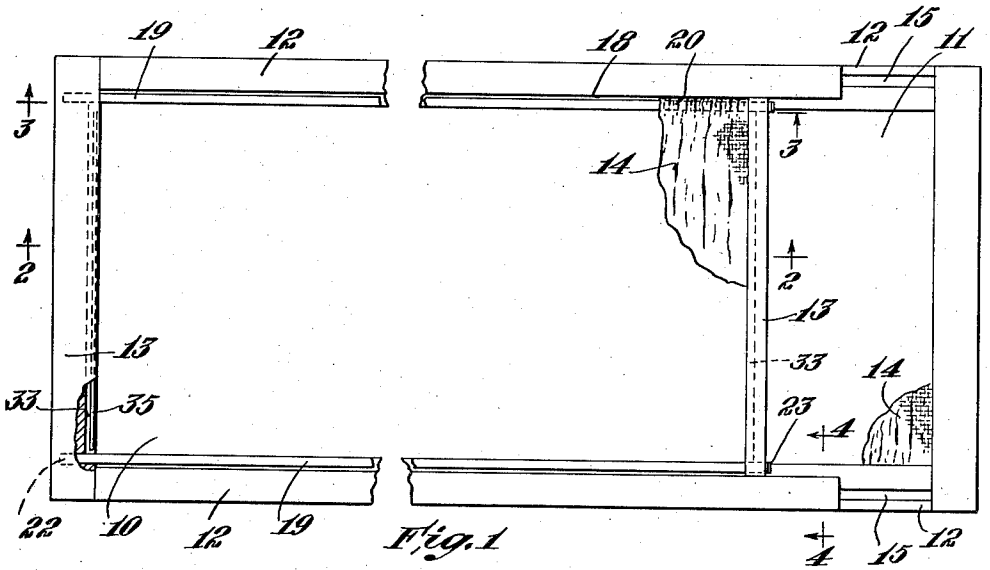


Fig. 1

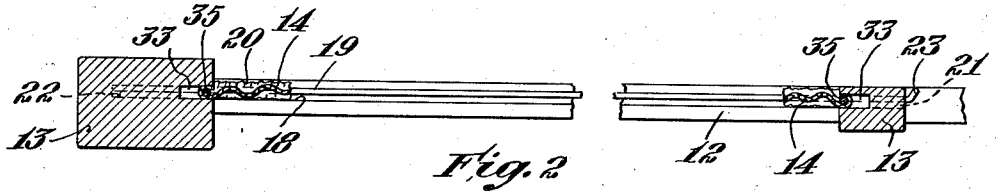


Fig. 2

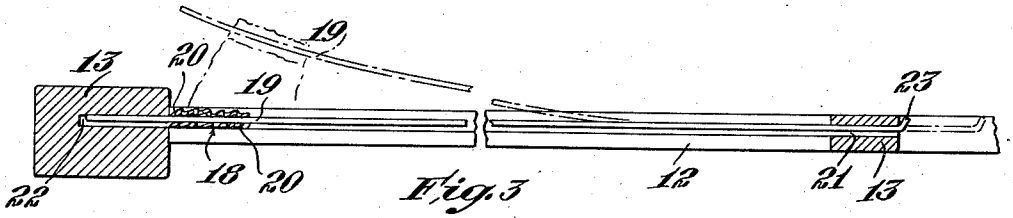


Fig. 3

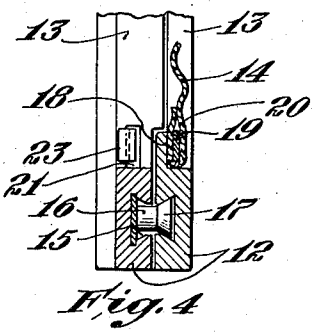


Fig. 4

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WINDOW SCREEN

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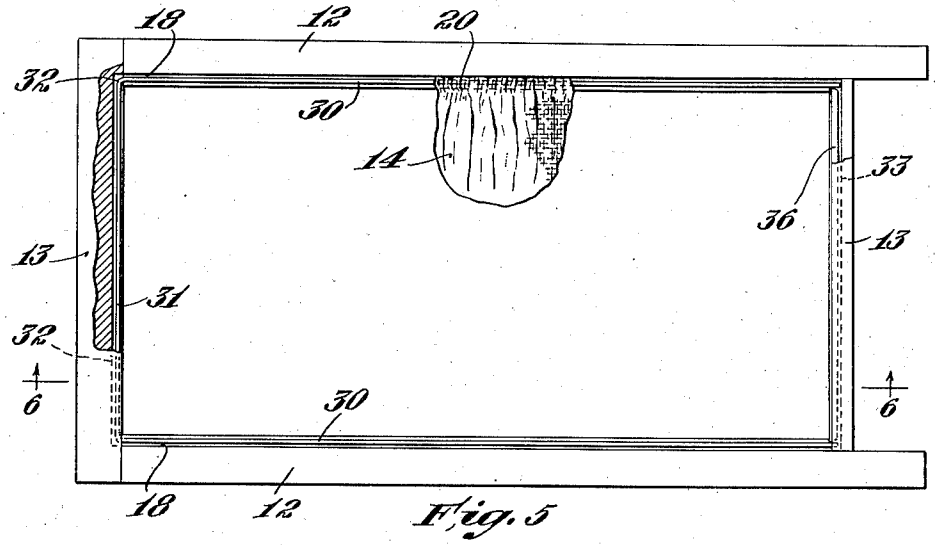


Fig. 5

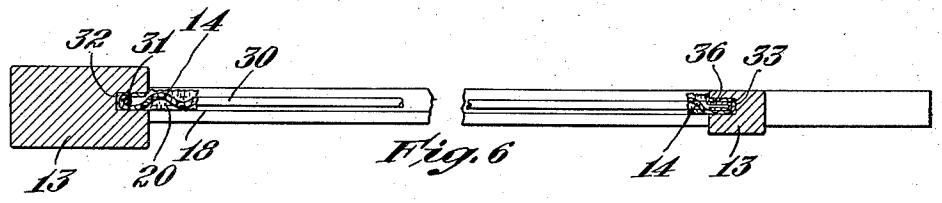


Fig. 6

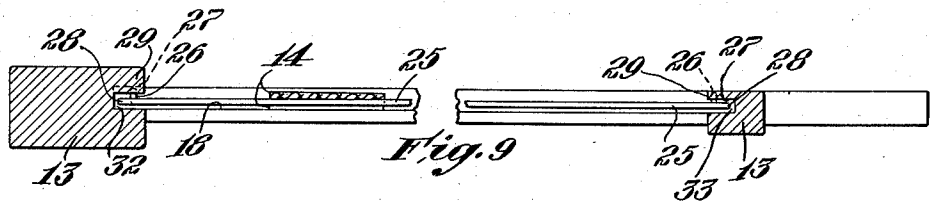


Fig. 9

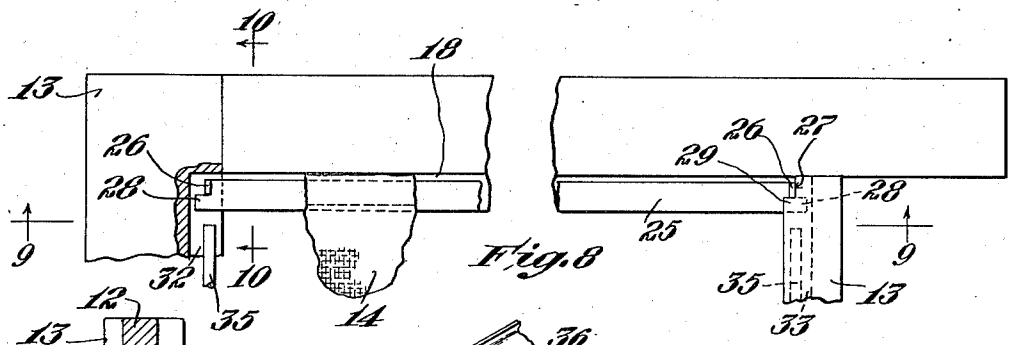


Fig. 8

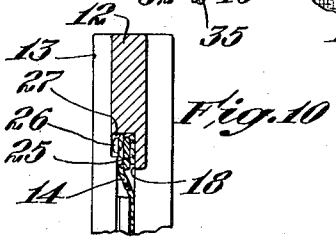


Fig. 10



Fig. 7

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Patented June 21, 1938 2,121,174

UNITED STATES PATENT OFFICE

2,121,174

WINDOW SCREEN

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Application February 4, 1937, Serial No. 124,157

7 Claims. (Cl. 156—14)

This invention relates to window screens, and more particularly to a novel and efficient construction for removably supporting fabric in a screen frame. Wherever the expression "window screen" or "screen" is used in this specification or in the appended claims, I intend it to include both the structure commonly called a screen (an adjustable example of which is disclosed in my prior Patent No. 2,015,454) which is supported vertically in a window opening, and the structure commonly called a ventilator (an adjustable example of which is disclosed in my prior Patent No. 2,014,974) which is usually supported upon the window sill at an angle from the vertical to break the direct draft of air passing into the room and to partially direct the draft upwardly. Wherever the word "fabric" is used in this specification or in the appended claims, I intend it to include both a textile fabric and a metal or wire fabric or combinations thereof.

In the prior art the fabric panel which is stretched over the space between the screen frame members has been so permanently secured to the frame members that when the fabric becomes soiled or worn out in use, it is necessary to employ tools and force to remove the worn-out or soiled fabric, and the removing operation usually results not only in considerable inconvenience to the user, but also in damage to the edges of the fabric caused by the use of tools and force in its removal.

The principal object of this invention is to provide means for securing the fabric to the frame members, which permits ready removal and replacement of the fabric.

Another object is to provide such fabric-securing means which will permit adjustment of the fabric relative to the frame opening without actual removal of the fabric from the opening.

A further object is to provide a novel and efficient window screen.

Other objects relate to the construction and mode of operation, and will be apparent from a consideration of the following description and the accompanying drawings, which exemplify several embodiments of my invention chosen for the purposes of illustration.

In the drawings:

Fig. 1 is a front elevation, with parts broken away, of an extensible window screen embodying one type of fabric-securing means of my invention;

Fig. 2 is an enlarged section taken on the lines 2—2 of Fig. 1, but only through the foremost screen section;

Fig. 3 is an enlarged section taken on the lines 3—3 of Fig. 1, but only through the foremost screen section;

Fig. 4 is an enlarged section taken on the lines 4—4 of Fig. 1;

Fig. 5 is a front elevation, with parts broken away, of one section of an extensible window screen like that shown in Fig. 1 but embodying a different type of fabric-securing means of my invention;

Fig. 6 is an enlarged section, with parts broken away, taken on the lines 6—6 of Fig. 5;

Fig. 7 is a perspective of a short section of the means for securing the transverse ends of the fabric panel shown in Figs. 5 and 6;

Fig. 8 is a front elevation, with parts broken away, of the upper portion of one section of an extensible window screen similar to that shown in Figs. 1 and 5, but embodying still a different type of fabric-securing means of my invention;

Fig. 9 is a section on the lines 9—9 of Fig. 8; and

Fig. 10 is a section on the lines 10—10 of Fig. 8.

Although my invention may be used in any window screen comprised of one or more sections of substantially rectangular shape, I have for the purposes of illustration shown it in connection with an adjustable type window screen comprised of two rectangular sections, and the construction of which is well known in the prior art.

Such an extensible screen is comprised of two relatively movable rectangular sections 10 and 11 in sliding face-to-face relation. Each section comprises side frame members 12, 12 and end frame members 13, 13 fastened together at their corners to form a substantially rectangular space therebetween. A substantially rectangular fabric panel 14 is secured across the space in each section. The inner face of each side frame member 12 is provided with a longitudinal undercut groove 15 (see Figs. 1 and 4).

The two sections of the ventilator are slidably secured to each other by means of studs 16 (Fig. 4). Each stud has one end firmly secured in the undercut groove 15 of a side frame member, and has at its other end an enlarged head 17 which is adapted to slide freely in the undercut groove 15 of the oppositely located side frame member of the other section. Ordinarily at least four such studs are used, one secured near each end of each side frame member of each section. A screen thus assembled provides an efficient, easily operable, extensible structure, and its construction is well known to the prior art.

According to this invention, each side frame member 12 is provided with a depressed surface

18 which extends between the end frame members 13 and adjacent the longitudinal edges of the rectangular space between the frame members. The back longitudinal marginal surfaces of the fabric panel are held in engagement with these depressed surfaces 18 by means of longitudinally resilient members which lie along the longitudinal marginal surfaces of the fabric panel and exert pressure thereon, thus pressing the back longitudinal marginal surfaces of the fabric panel into engagement with the underlying depressed surfaces 18 of the side frame members.

These longitudinally resilient members may be made in several forms. For example, in Figs. 1 to 4, inclusive, they comprise two strips 19 of metal, pyroxylin or other resilient material. Each resilient member prior to insertion in fabric-securing position is normally longitudinally bowed, as shown by the dot-dash position in Fig. 3.

In the embodiment shown in Figs. 1 to 4, inclusive, the fabric panel is made of textile fabric, and each longitudinal edge is provided with a heading 20. One of the end frame members is provided with two passages 21 extending transversely therethrough from outer to inner edges thereof, each passage having its inner end located adjacent the depressed surface 18 of the adjacent side frame member. The other end frame member is provided with two transverse dead end passages 22 opening from the inner edges thereof adjacent the respective depressed surfaces 18 of the adjacent side frame members.

To install the fabric panel, one end of one longitudinally resilient member 19 is passed from left to right (looking at Figs. 1 and 3) through the upper passage 21, thence through the upper heading 20 and thence into the upper dead end passage 22, and the other resilient member 19 is installed in similar manner by passing one end through the lower passage 21, the lower heading and into the lower dead end passage 22. When the ends of the resilient members 19 have been passed completely through the heading, these members, together with the fabric panel, will be outwardly bowed, as shown in Fig. 3, and the resilient members are then flexed inwardly toward the frame, so that their ends may be inserted into the dead end passages 22. After insertion in said passages each resilient member exerts pressure throughout its length against the underlying longitudinal marginal surface of the fabric panel, i. e., the heading, thus pressing it against the underlying depressed surface 18.

As shown in Fig. 1, the fabric panel may be made wider than the space between the end frame members, and it may thus be arranged in ruffled form. The pressure of the resilient members 19 against the longitudinal marginal surfaces of the fabric is such that the ruffles or the fabric may be rearranged while the resilient members are in place, and without withdrawing the ends of the resilient members 19 from the passages 22.

To remove the fabric panel for cleaning or replacement it is only necessary to withdraw the ends of each resilient member 19 from the passages 22, and this may be done by pulling on the heads 23. The pressure of the resilient members is then relieved from the fabric, and the fabric may be readily removed over the free ends of the resilient members.

In Figs. 8 to 10, inclusive, there is illustrated a modified type of resilient member 25 which is somewhat similar to the resilient members 19. Each resilient member 25 is provided with an outstanding prong 26. Notches 27 are provided in the end frame members 13, these notches being located in the inner edges of the frame members above the depressed surfaces 18, and each is made of sufficient size to receive an outstanding prong 26. The inner edge of each end frame member is also provided with a groove 32 or 33 providing an overhanging lip 29 in the inner edge of each end frame member.

This type of resilient member is particularly useful in connection with a fabric panel which is not provided with headings, since the prongs 26 are liable to catch in the headings when the resilient member is threaded therethrough.

To install resilient members 25 each longitudinal marginal edge of the fabric panel is passed around the face of its respective resilient member 25 to the back side thereof (see Figs. 9 and 10), and first one end of the resilient member is detachably secured in its end frame member by inserting the end 28 beneath the overhanging lip 29 and positioning the prong 26 in its notch 27; the other end of the resilient member is then detachably secured in the opposite end of the frame member by flexing the resilient member and passing its end 28 beneath the corresponding overhanging lip 29, and simultaneously positioning the prong 26 in the corresponding notch 27. Thus each resilient member exerts a force throughout its length to press the underlying longitudinal marginal portion of the fabric panel against the underlying depressed surface 18 of the side frame member.

To remove the fabric panel the resilient member is flexed outwardly near its center, and one end 28 is freed from the overhanging lip 29, thus removing the pressure of the resilient member from the longitudinal marginal surface of the fabric panel.

Still another form of longitudinally resilient member is the U-shaped member 30 shown in Figs. 5 and 6. The legs 30, 30 of this U-shaped member serve to press and hold the longitudinal marginal edges of the fabric panel against the underlying depressed surface 18, and the base 31 of the U-shaped member extends into a groove 32 in the inner edge of one end of the frame member. The two free ends of the legs 30, 30 extend into recesses in the inner edge of the other frame member.

In installing this U-shaped member the base 31 is first placed in the groove 32 and the free ends of the legs are then inserted in the recesses in the opposite end frame member, so that the legs 30, 30 will be detachably held in engagement with the longitudinal marginal surfaces of the fabric and press them against the underlying depressed surfaces 18 of the side frame members. The recesses for the free end of the legs 30, 30 are provided in the embodiment illustrated by the ends of the groove 33 which is in the inner edge of the end frame member 13.

It should be understood that any of the various embodiments of longitudinally resilient members above described may be used in conjunction with a fabric panel having headings upon its longitudinal edges, or may also be used in conjunction with a fabric panel which is not provided with headings.

If it is deemed necessary or desirable to secure the transverse ends of the fabric panel in the use of any of the foregoing embodiments, it may be done.

For example, in the embodiment illustrated in Figs. 5 to 7, inclusive, the base 31 of the U-shaped member may be utilized to hold one transverse

end of the fabric panel in engagement with one of the end frame members by passing the transverse marginal portion of the fabric around the base 31 before the base is inserted in the groove 32. Thus the base 31 lightly presses and holds the transverse marginal portion of the fabric in the groove 32.

The other transverse end of the fabric panel may be held in engagement with the other end frame member by means of a resilient V-shaped member 36, around which the transverse marginal portion of the fabric is placed and which is then pressed into the groove 33 to hold the fabric therein.

The transverse marginal portions of the fabric may also be held in grooves 32 or 33 provided in the inner edges of the end frame members, by means of a reed 35 (Figs. 1, 2 and 8), which is used to lightly press and hold said portions of the fabric in the groove. This is an alternative method similar to the use of the V-shaped member described above.

This invention is not directed to the use of these means for securing the transverse ends of the fabric panel, but they may be used in conjunction with my novel longitudinally resilient means if desired. It will be apparent, however, that the longitudinally resilient means of this invention may be used to secure the transverse as well as the longitudinal edges of the fabric panel, and such use would be within the scope of this invention.

It will be apparent to persons skilled in this art that this invention represents an important improvement over the prior art. By use of my novel fabric-securing means the user of the screen may quickly and easily replace or rearrange the fabric panel without the use of tools or of undue force.

The present disclosure is for the purposes of illustration only, and this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. A window screen comprising side and end frame members fastened together at their corners to form a substantially rectangular opening therebetween, each of said side frame members having a depressed surface formed in one face thereof, said surface extending between said end frame members along the adjacent side of said rectangular opening, a substantially rectangular fabric panel filling said rectangular opening, normally bowed longitudinally resilient means extending along substantially the entire length of said depressed surfaces and engaging the marginal longitudinal surfaces of said fabric panel and exerting pressure thereon to hold the opposite surfaces thereof in engagement with the adjacent depressed surfaces of the side frame members, and means for detachably securing the ends of said resilient means in the end frame members.

2. A window screen comprising side and end frame members fastened together at their corners to form a substantially rectangular opening therebetween, each of said side frame members having a depressed surface formed in one face thereof, said surface extending between said end frame members along the adjacent side of said rectangular opening, a substantially rectangular fabric panel filling said rectangular opening, a U-shaped member, each leg of which is longitudinally resilient and normally bowed and extends along substantially the entire length of the adjacent depressed surface and engages a marginal longitudinal surface of said fabric panel and exerts pressure thereon to hold the opposite surface thereof in engagement with the respective adjacent depressed surface of the side frame member, a groove in the inner edge of one of said end frame members to detachably hold the base of said U-shaped member, and means for detachably securing the free ends of the legs of said U-shaped member in the other end frame member.

3. A window screen comprising side and end frame members fastened together at their corners to form a substantially rectangular opening therebetween, each of said side frame members having a depressed surface formed in one face thereof, said surface extending between said end frame members along the adjacent side of said rectangular opening, a substantially rectangular fabric panel filling said rectangular opening, two normally bowed longitudinally resilient members, each extending along substantially the entire length of the respective adjacent depressed surfaces and one engaging one longitudinal marginal surface and the other engaging the other longitudinal marginal surface of said fabric panel and exerting pressure thereon to hold the opposite surfaces thereof in engagement with the respective adjacent depressed surface of the side frame member, and means to detachably hold the ends of said resilient members in said end frame members.

4. A window screen comprising side and end frame members fastened together at their corners to form a substantially rectangular opening therebetween, each of said side frame members having a depressed surface formed in one face thereof, said surface extending between said end frame members along the adjacent side of said rectangular opening, a substantially rectangular fabric panel filling said rectangular opening, each longitudinal edge of said fabric panel having a heading formed therein, each of said headings having a normally bowed longitudinally resilient means extending therethrough and pressing the back surface of the heading into engagement with the underlying depressed surface of the adjacent side frame member, and means to detachably hold the ends of said longitudinally resilient means in said end frame members.

5. A window screen comprising side and end frame members fastened together at their corners to form a substantially rectangular opening therebetween, each of said side frame members having a depressed surface formed in one face thereof, said surface extending between said end frame members along the adjacent side of said rectangular opening, a substantially rectangular fabric panel filling said rectangular opening, each longitudinal edge of said fabric panel having a heading formed therein, a resilient U-shaped member, each leg of said U-shaped member extending through one of said headings and pressing the back surface of the heading into engagement with the underlying depressed surface of the adjacent side frame member, a groove in the inner edge of one of said end frame members to detachably hold the base of said U-shaped member, and means to detachably hold the free ends of the legs of said U-shaped member in the other end frame member.

6. A window screen comprising side and end frame members fastened together at their corners to form a substantially rectangular opening therebetween, each of said side frame members

having a depressed surface formed in one face thereof, said surface extending between said end frame members along the adjacent side of said rectangular opening, a substantially rectangular fabric panel filling said rectangular opening, each longitudinal edge of said fabric panel having a heading formed therein, two passages extending transversely through one of the end frame members from inner to outer edges thereof, each of said passages having its inner end located adjacent one of said depressed surfaces, two longitudinally resilient members, one extending through the upper passage and thence through the upper heading and the other extending through the lower passage and thence through the lower heading, and means to detachably hold the free ends of said longitudinally resilient members in the opposite end frame member.

7. A window screen comprising side and end frame members fastened together at their corners to form a substantially rectangular opening therebetween, each of said side frame members having a depressed surface formed in one face thereof, said surface extending between said end frame members along the adjacent sides of said rectangular opening, a substantially rectangular fabric panel filling said rectangular opening, each longitudinal edge of said fabric panel having a heading formed therein, two passages extending transversely through one of the end frame members from inner to outer edges thereof, said passages being a continuation of said depressed surfaces, two longitudinally resilient members slidable respectively through said passages and one extending through the upper passage and thence through the upper heading and the other extending through the lower passage and thence through the lower heading, and means to detachably hold the free ends of said longitudinally resilient members.

WILLIAM H. MAYNARD.