May 19, 1942. S. R. GITTENS 2,283,803

SELF ATTACHING PATCH FOR WIRE CLOTH OR SCREENS

Filed June 26, 1941

Fig. 1.

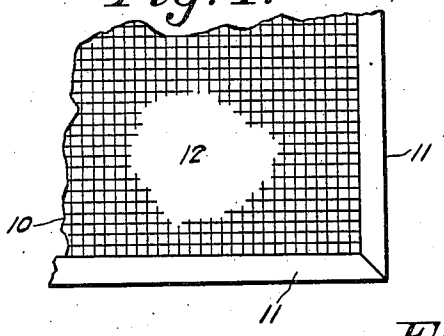


Fig. 2.

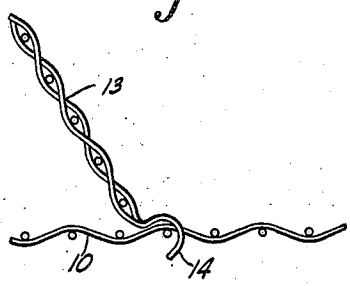


Fig. 3.

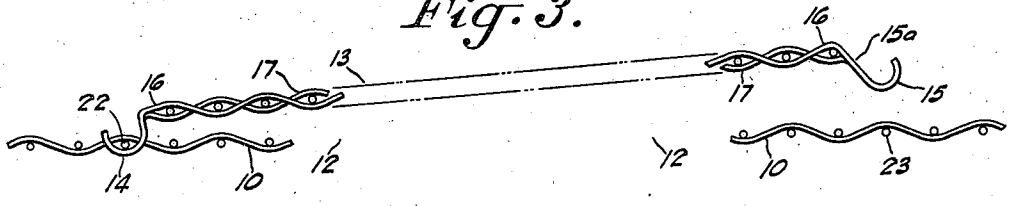


Fig. 4.

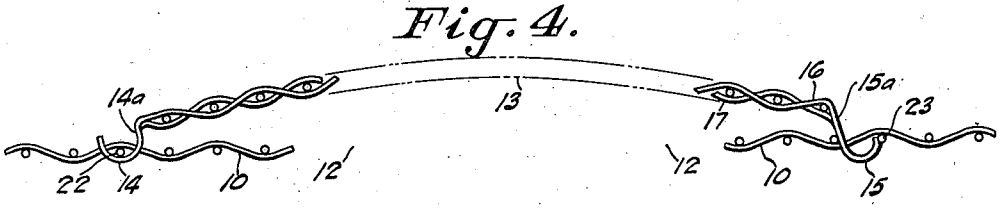


Fig. 5.

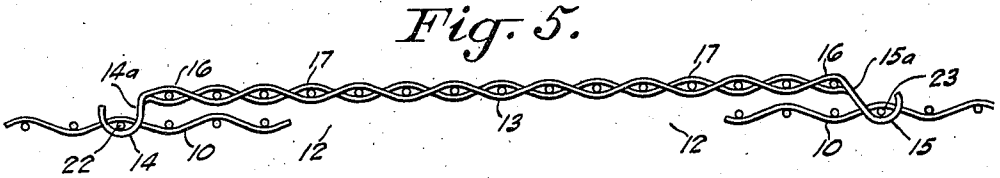


Fig. 6.

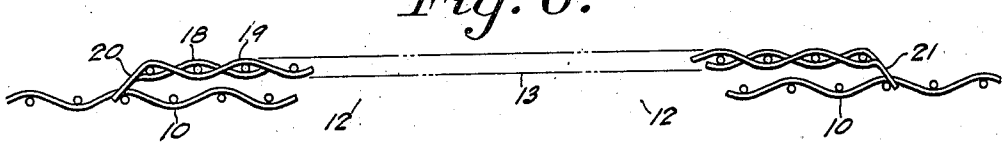
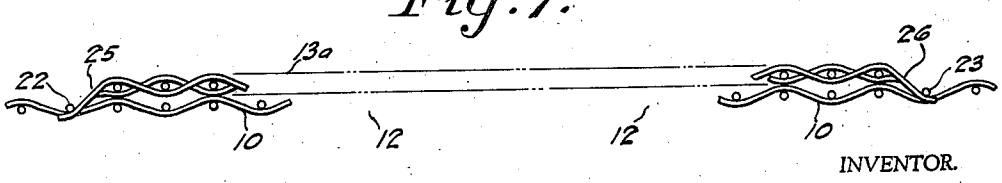


Fig. 7.



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SELF-ATTACHING PATCH FOR WIRE CLOTH OR SCREENS

Sidney R. Gittens, Philadelphia, Pa.

Application June 26, 1941, Serial No. 399,795

9 Claims. (Cl. 156—14)

My invention relates to an article of manufacture, more particularly to a simple and inexpensive patch to be used in the repair of screens of woven wire cloth, wire fabric, and the like.

It is an object of my invention to provide a patch which may be easily and readily applied to a hole or rupture in a screen and which besides accomplishing the effective repair of the screen presents a neat appearance.

It is a further object of my invention to provide a self-attaching patch, made entirely from resilient woven wire, which may be of the same or of a different character than that of the screen to be mended, and which may be readily made by relatively inexpensive dies.

It is a further object of my invention to provide a patch, formed of woven wire, with a plurality of out-turned hooks pre-formed from the wires of the patch, the hooks being disposed along opposite edges and arranged for encirclement or interlocking engagement with wires of the screen to be mended for the secure engagement of the patch thereto.

The protection afforded by the use of window screens, screen doors, and the like, is wholly defeated if through accident, or otherwise, the woven material is pierced or ruptured to an extent to leave an opening large enough through which insects may pass. Numerous schemes for patching screens have been devised. For example, it has been suggested that re-enforcing rings be covered with woven wire, the rings themselves carrying protruding elements which are to be bent around wires of the screen. It has also been suggested that clamps of the safety pin type be used to hold the patch in place and specially woven wire mesh has also been proposed, where, after application of the patch to the screen to be mended the individual wires of the patch are to be bent into a holding position. In accord with another suggestion, after wires of the patch have been woven into the screen the ends of the wires of the patch are then to be bent around wires of the screen to be mended.

The devices of the past all appear to require operations on both sides of the screen to be mended and upon both the patch and screen after application of the patch thereto, and all fail to provide a patch, all the attaching elements of which are pre-formed and always ready for active engagement with the screen to be mended.

The present invention is a further improvement over patches of the type shown in my copending application Serial Number 375,153, filed January 21, 1941, now Patent No. 2,272,196, issued Feb. 10, 1942, and entitled Self-attaching patch for wire cloth or screens.

In carrying out my invention in one form thereof, attaching elements are preferably located along opposite edges of the patch with a spacing such that after final attachment of the patch they are in position for engagement with wires of the screen to be mended. The gripping or attaching means preferably comprise a series of out-turned hooks or elements formed from the ends of a number or all of the wires of the patch, the individual hooks or elements extending at an obtuse angle to the plane of the patch and outturned away from the patch proper. The attaching elements along one side of the patch are disposed individually to engage one wire of the screen to be mended. The attaching elements along the other edge of the patch require the patch to be temporarily deformed to shorten the distance between said opposite edges before entry of the elements into the screen to be mended. After entry of said elements the patch is released and the resilience thereof causes it to resume its flat shape and to move the attaching elements beneath and into attaching position or interlocking engagement with a wire of the screen to be mended. The ends of the wires at the remaining edges of the patch are preferably bent toward the screen to be mended, effectively to provide intimate engagement of the entire periphery of the patch with the screen to be mended. The generally concave shape of the patch further eliminates all sharp edges and provides a patch which is smooth and which does not leave any sharp edges on either side of the screen to be mended. The resilience of the generally concave shape of the patch makes possible the shortening of the distance between the attaching elements and after application to the screen the lengthening of that distance to maintain the attaching elements in screen-gripping or interlocking engagement.

For a more complete understanding of my invention, reference should now be had to the drawing, in which:

Fig. 1 is a fractional elevation of a window screen with a hole in need of repair;

Fig. 2 is an enlarged fractional elevation of one end of the patch showing the first position of the patch as it is applied to a screen;

Figs. 3 to 5, inclusive, are enlarged sectional views of the patch and screen to be mended, and respectively show the patch in different positions during its application to the screen;

Fig. 6 is an enlarged sectional view of the patch

and screen, taken at right angles to the section shown in Figs. 2 to 5, which shows the remaining sides of the patch after application of the patch to the screen; and

Fig. 7 is an enlarged sectional view showing a modified construction of the patch.

Referring to the drawing, I have shown my invention in one form as applied to a screen 10, carried by a frame 11, which may be mounted in the usual way in a window frame (not shown). The screen 10 is shown with a hole 12 which is to be repaired. Holes of this character frequently appear in screens and they are caused by a wide variety of accidents: from objects thrown therethrough, children at play, rust, and by rough handling of the screens when they are taken from or placed in storage over the winter months.

While I have illustrated my invention as applied to a window screen, it is to be understood that it is not limited thereto since it may be applied to the repair of woven wire or woven cloth of widely differing character.

The article of manufacture comprising the primary subject matter of my invention consists of the patch 13, formed from woven wire of limited area, to which there need be added no fastening means other than those which are preformed from, and made an integral part of, the woven-wire patch itself. More particularly, from a plurality of the ends of the wires of the patch 13 at the periphery or perimeter thereof, there are formed individual attaching elements which serve to hold the patch in place against the screen 10 to be mended. Each of these elements has a portion disposed for engagement with a wire of the screen to be mended and which opposes withdrawal therefrom effectively to hold the patch in place. In the preferred form of my invention, these elements may be in the form of out-turned hooks, or hook-like elements, spaced from the plane of the patch. Thus at the left-hand side of the patch as viewed in Figs. 3–5, hooks 14 are formed from the end of every wire along that side of the patch. Similarly, the hooks 15 are formed from the end of every wire along the opposite side of the patch 13.

In the illustrated form of the invention, the patch 13 has been made from wire cloth having sixteen mesh or openings to the inch. The patch, shown enlarged, is about one and one-half inches square although, as will be later explained, it may be made in many different sizes. Preferably it is made from bronze-wire cloth, or material with considerable resiliency or elasticity. In Fig. 5, the patch 13 is spaced above the screen 10, also of 16-mesh wire cloth. To simplify the drawing, Figs. 2–7, only one of the two cross wires of the screen has been illustrated, while the two cross-wires 16 and 17 and the two warp wires 18 and 19 of the patch are shown in Figs. 2–7, inclusive.

As will be seen from Fig. 6, the ends of the warp wires along the two sides or edges of the patch are bent toward each other and away from the plane of the patch to form a series of resilient arms or elements 20 and 21 along the respective left and right hand sides of the patch as viewed in Fig. 6. Thus the patch 13 is concave in shape and has provided at its periphery attaching elements 14 and 15, and resilient arms or elements 20 and 21.

To repair a screen, the patch 13 is centered over the opening or hole therein, and one end, such as the left end as viewed in Fig. 3, is brought into a position such that the hooks 14 pass through the mesh of the screen 10 to be mended. This is best done by placing the patch 13 in the position shown in Fig. 2, in which position the open ends of out-turned hooks 14 readily pass through the mesh of the screen. From the position in Fig. 2, the patch is now swung in a clockwise direction, the hooks 14 serving as hinge-elements. During rotation of the patch, the hooks move into encircling position around a wire 22 of screen 10 as shown in Figs. 4 and 5.

If rotation of the patch 13 were continued, the attaching elements or out-turned hooks 15 would come to rest against and across a wire 23 of the screen 10. As shown in Fig. 4, however, the body portion of the patch is now flexed, bowed or arched to shorten the distance between the two sides of the patch, thereby to bring the elements 15 to the left of wire 23. This bowing or bending may be readily accomplished by holding the center of the patch upwardly between the thumb and finger and pressing down on the side of the patch adjacent elements 15. The patch may also be made to assume its bowed position by sliding a straight-edge, such as a piece of cardboard, against the shank-portions 15*a* of elements 15.

Since the patch 13 is of bronze wire, the spring or resilience thereof causes the patch to return from its bowed position to its normal flat position shown in Figs. 3, 5, 6, and 7. Thus after the elements 15 are pushed through the openings of the screen, the resilience straightens the patch, lengthens the distance between the elements 14 and 15, and moves out-turned hooks 15 into the wire-encircling positions as shown in Fig. 5.

At the same time the resilient arms 20 and 21 engage the screen to be mended or at least nest therein to complete the effective repair of the hole 12 in the screen 10.

It will be observed the out-turned hooks 14 have relatively short shanks 14*a* as compared with shanks 15*a* of hooks 15; this for the purpose of producing a patch which in its final position, Figs. 5 and 6, rests against and merges with the screen 10 to be mended. In its snugly fitting final position, the patch practically rests against screen 10. The short shanks 14*a* contribute to this desirable result. However, by a corresponding lengthening of the opposite shanks 15*a*, and by having the attaching elements out-turned and spring pressed into screen engaging positions, the patch is easily applied to the screen 10 to be mended or repaired. That is, shanks 14*a* need not bend since the necessary resiliency is obtained by bowing the patch and the longer shanks 15*a* also may be deflected from their normal positions for insertion of the hooks 15 through the screen. Moreover, by reason of the out-turned hooks the cost of dies for making the patch is considerably less than for the more complicated collapsible dies needed for in-turned hooks.

In accord with my present invention in which the resilience of the patch as a whole is used to exert a biasing force which resists movement of the attaching elements from their screen gripping positions, it is possible, Fig. 7, to provide the modified patch 13*a* with inclined arms or elements 25 and 26 which by the movement of the patch from a bowed position as shown in Fig. 4 to that of Fig. 7, will move the inclined elements 25 and 26 below and under wires 22 and 23 of the screen. The extreme ends of ele-

ments 25 and 26 are preferably bent outwardly, or in a direction parallel with the plane of the screen 10 and of the patch 13a to eliminate sharp edges. The opposite sides of the patch may be provided with arms 20 and 21, Fig. 6. The resilience of the patch opposes withdrawal of elements 25 and 26 and they effectively hold the patch 13a in position.

In the normal or final position of the patch 13, Fig. 5, it will be observed the ends of the hooks 14 and 15 have moved into the body of the screen 10. That is, the ends of the hooks do not protrude from the screen 10 but are disposed between the outer planes of it. Similarly, Fig. 6, the ends of the arms 20 and 21 do not protrude and there are no sharp edges anywhere along the perimeter of the patch 13.

While the drawing is not to scale, a relative idea of the proportioning of the parts may be obtained by keeping in mind the fact the patch 13 is approximately one and one-half inches square. Since the screen 10 is of 16-mesh wire cloth the distance between wires 22 and 23 is exactly one and one-half inches—though the patch may be made larger if desired. Exact dimensions need not be given since considerable latitude is permissible in the proportioning of the parts.

Though the actual dimensions of the hooks 14 and 15 and the arms 20, 21, 25, and 26 are very small indeed, I have found that the attaching elements and arms may be uniformly made and the patch may be easily applied to the repair of screens.

Wire cloth of the foregoing type is manufactured and sold in rolls of different widths. The long wires or those extending lengthwise of the cloth are called the warp wires, while those that extend across the cloth are called the crosswires. A characteristic of woven wire or wire cloth is the remarkable accuracy of the spacing of the warp wires. The crosswires are not spaced so accurately and the variation may in an inch be as much as a sixteenth of an inch as between cloth of different manufacture. In consequence, the patch is preferably applied to the screen so that the hooks 14 and 15 engage the warp wires thereof which in nearly all makes will be evenly spaced and in position to be engaged by the gripping elements or hooks, as previously described. However, the patch 13 may be applied either to the crosswires or the warp wires but the latter are preferred for the reasons given.

Now that the principles of my invention have been explained it will be apparent many modifications may be made. For example, the arms 20 and 21 may be omitted entirely or they may be formed into gripping ends such as into hooks 14 and 15. Or, there may be a less number of hooks 14 and 15 along opposite sides of the patch. However, I prefer that there shall be at least two hooks at opposite sides of the patch 13. Additional hooks may also be provided in lieu of certain of the arms 20 and 21 although I do not now prefer such a construction. A patch may also be made with out-turned hooks 14 along one side thereof and with attaching elements 26 along the opposite side thereof, or vice versa.

In accord with my invention the patch may be of any size. In general a one inch, a one and one-half, and a two inch patch will take care of most holes that may occur in screens. By making patches of the foregoing sizes or multiples thereof, a patch of selected weave, one of 14, 16, 18, or 20 mesh, can be applied to a screen or wire cloth of selected weave, one of 14, 16, 18, or 20 mesh, or any multiple thereof since there will be present below the hooks at opposite sides of the patch, warp wires of the screen to be engaged thereby. The foregoing is made possible by the fact wire cloth is made with reference to the number of mesh to the inch. A warp wire is located at every half inch across the screen. Thus, there will always be a warp wire at the beginning and end of every inch regardless of mesh, and a patch of any mesh, if its hooks are spaced apart a half inch or an even multiple thereof will be universally applicable to wire cloth of widely differing types and weaves. In the preferred form of my invention the attaching elements are formed from the ends of the cross wires and the resilient arms are formed by or from the ends of warp wires.

In all forms of my invention, a patch is provided which is low in cost, neat in appearance, and which effects a permanent and satisfactory repair of holes in woven wire cloth. There are no sharp projecting ends to catch in clothing or which may be used to pull the patch from the screen.

While I have shown particular embodiments of my invention, it will be understood that I do not limit myself thereto, since many modifications may be made, and I therefore contemplate by the appended claims to cover any such modifications as fell within the spirit and scope of my invention.

What I claim is:

1. Means for repairing wire cloth, comprising a patch of wire cloth, a number of the ends of the wires at the perimeter thereof terminating in preformed out-turned hooks for interlocking engagement with wires of the cloth to be repaired.

2. A patch for wire cloth, comprising woven wire of limited area, the ends of a plurality of the wires at opposite edges thereof preformed into out-turned hooks, the hooks alone one of said opposite edges when engaged with one of the wires of the screen to be mended forming a hinge for rotation of the patch toward the screen to be mended, and the hooks at the other of said opposite edges having a spacing which requires bowing of the patch to bring them into wire-engaging position with another of the wires of the screen to be mended.

3. A patch for screens of woven wire, comprising woven resilient wire of limited area, the ends of a number of the wires at opposite sides thereof preformed into attaching elements disposed for passage through mesh of the screen to be mended, and each of which elements includes a portion disposed to engage a wire of the screen to be mended and to resist withdrawal therefrom, said elements along at least one of said sides being out-turned, the spacing between said elements at said opposite sides being such that after said elements at one of said sides interlock with one of the wires of the screen to be mended and the patch is rotated toward the screen to be mended, the elements at said opposite side being insertable through the screen to come into wire-engaging and interlocking position with another of the wires of the screen to be mended only after the distance between said sides is temporarily shortened by a flexing of the patch for movement of said elements through the screen and into interlocking position, the resilience of said woven wire thereafter exerting a force to oppose move-

ment of said elements from their said interlocking wire-engaging position.

4. A patch for screens of woven wire, comprising woven wire of limited area, a number of the ends of the wires at opposite sides thereof preformed to provide a plurality of out-turned wire-engaging hooks, the hooks at one of said sides being spaced from the hooks at the other of said opposite sides for the engagement thereby of a screen of selected weave, and the ends of the wires at the remaining sides of the patch being inclined slightly from the plane of the patch in the same direction as the hooks so that after engagement of said out-turned hooks with wires of the screen to be mended, the said inclined portions nest within the woven wire of the screen to produce a patch which is snugly-fitted throughout the perimeter thereof.

5. Means for repairing wire cloth, comprising a patch of resilient wire cloth the ends of the wires along opposite edges thereof preformed into attaching elements disposed at an obtuse angle to the plane of the patch, the distance between said elements along said opposite edges requiring a temporary shortening of that distance for insertion of said elements into wire-engaging position with the cloth to be repaired, and the resiliency of said patch resisting movement of said elements from their said wire-engaging positions and against movement to produce said temporary shortening of said distance between said elements.

6. Means for repairing wire cloth, comprising a patch of resilient wire cloth, each of a number of the ends of wire along one side thereof preformed into out-turned hooks, and each of a number of the ends of the wires along the opposite side thereof preformed into out-turned hooks, the shanks of which are materially longer than those of said first-named hooks.

7. Means for repairing wire cloth, comprising a patch of wire cloth, a number of the ends of the wires at the perimeter thereof disposed to extend through the cloth to be repaired and out-turned to present shoulder-portions for engagement with wires of the cloth to be repaired and to resist withdrawal therefrom.

8. Means for repairing wire cloth, comprising a patch of resilient wire cloth, each of a number of the ends of the wires along opposite sides thereof preformed into an attaching element disposed at an obtuse angle to the plane of said patch, and the normal spacing between said elements along one side and said elements along said opposite side requiring temporary shortening thereof for movement of said elements through the mesh and behind spaced wires of the cloth to be repaired, said resilience of the patch wires urging said elements to their normally spaced positions and resisting movement of said elements from said positions behind said wires of the cloth to be repaired.

9. Means for repairing wire cloth, comprising a patch of resilient wire cloth, each of a number of the ends of wires along one side thereof preformed into an out-turned hook, including a shank, and each of a number of the ends of wires along the opposite side thereof preformed into an out-turned hook each shank of which is materially longer than the shanks of said first-named hooks, and the ends of the wires along the opposite remaining sides of the patch disposed at an obtuse angle to the plane of the patch and of a length shorter than said shanks of said first-named hooks.

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