

(No Model.)

E. C. HUNT.
DARNING APPARATUS.

No. 592,955.

Patented Nov. 2, 1897.

FIG. 1.

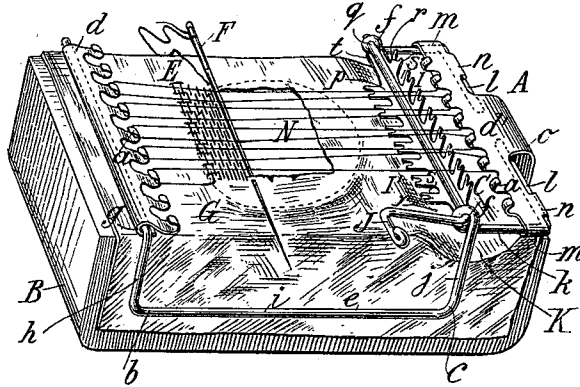


FIG. 2.

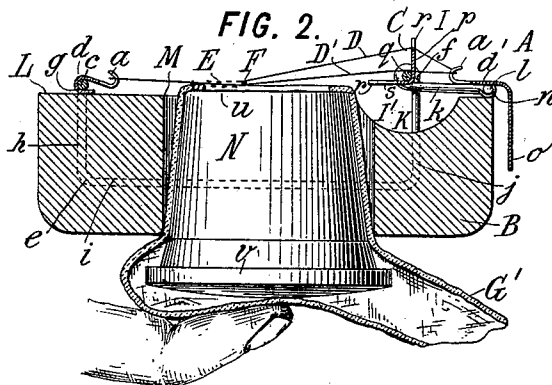
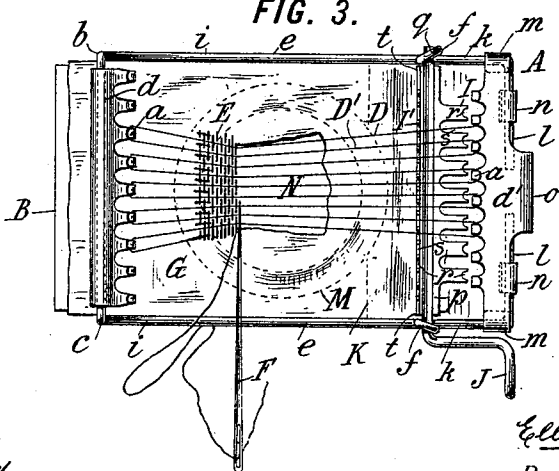


FIG. 3.



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ELLWOOD C. HUNT, OF BAITING HOLLOW, NEW YORK.

DARNING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 592,955, dated November 2, 1897.

Application filed March 2, 1897. Serial No. 625,777. (No model.)

To all whom it may concern:

Be it known that I, ELLWOOD C. HUNT, a citizen of the United States, residing in Baiting Hollow, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Darning Apparatus and the Like, of which the following is a specification.

This invention relates to darning apparatus, and aims to provide certain improvements therein.

It is common in apparatus for darning holes in stockings and other articles to provide a frame having opposed rows of hooks for the warp-threads and a warp-shifter for changing the sheds, this frame being adapted to fit over a stretcher for the goods to be darned or mended.

My invention aims to provide a darner of simple, cheap, and convenient construction which can be easily operated to change the sheds and in which there shall be no danger of missing the threads which should be lifted by the warp-changer, and in which the warp-threads can be arranged without removing the shedder.

To this end I provide certain improvements, which will be hereinafter fully set forth with reference to the accompanying drawings, which illustrate the preferred form of the invention, and in which—

Figure 1 is a perspective view of my improved darning apparatus, showing one set of warp-threads lifted during the operation of darning a piece of cloth. Fig. 2 is a longitudinal vertical section of the apparatus, showing the operation of darning the toe of a stocking; and Fig. 3 is a plan view of the apparatus shown in Fig. 1, showing the other set of warp-threads lifted and the reverse position of the parts.

Referring to the drawings, let A represent the warp-holder; B, the work holder or stretcher; C, the warp-shifter or shed-former; D and D', the alternate warp-threads; E, the woof-threads; F, the needle or shuttle therefor, and G and G' the work to be darned or mended. The warp-carrier A has a number of hooks *a*, between which the warp-threads are stretched across the space within the frame *b*, which frame carries the shifter adjacent to one set of these hooks and is adapted

to fit over the stretcher B to hold the work thereon during darning. The implement and work are held in the hand and the needle is passed between the warp-threads first in one direction and then in the other, as the sheds are shifted, the point of the needle being passed through the fabric beyond the threads at the end of each movement to fix the weft-thread to the fabric at this point. After each passage of the needle it is used to beat up the weft-thread before the warp is shifted.

According to the preferred form of my invention I provide an improved construction of warp-holder, an improved warp-shifter, an improved stretcher, and certain structural features of improvement which I will now describe in detail.

The warp-holder A consists of the rectangular frame *b*, which is preferably constructed of a single length of wire *c*, bent into the desired form and carrying hooked plates *d d'* at opposite ends of the frame, downwardly-extending clamping-wings *e* at each side, and intermediate bearings *f* between the plates. The middle of the wire is straight opposite the plate *d* and is fixed thereto, preferably, by folding the rear edge *g* of the plate about the wire. At the ends of this plate the wire bends down in vertical portions *h*, from which it extends toward the other plate in a straight portion *i* at each side until the bearing *f* is reached, where it rises in a vertical portion *j*, at the upper end of which it is bent in a loop to form the bearing *f*, from which it extends forwardly in a straight portion *k* to the plate *d'*, beneath which the ends are bent toward each other in horizontal portions *l*, which terminate beneath the plate and preferably out of contact with each other. The plate *d'* is fastened to the wire at each end by inturned ends *m*, and at its outer side by inturned ears *n*, which latter are folded around the wire to fasten it and the plate together and permit slight inward spring of the wire relatively to the plate, the ends *m* of the plate being preferably bent under but not around the wire to permit this inward springing of the latter. The plate *d'* has a downwardly-bent guiding-finger *o* near its middle, which extends into the plane of the stretcher B, by pressing on which the user can hold the frame in correct position relatively to the stretcher.

The shifter C is a rotary or oscillating shifter having two sets of warp-catchers I and I' projecting angularly of each other and preferably arranged at angles of ninety degrees to each other. These are best formed in a bent plate *p*, which is carried by an axial wire shaft *g*, having a laterally-projecting handle J at the outside of the frame by which it can be shifted. Each edge of the plate *p* is provided with alternate teeth *r* and notches *s*, the teeth of one edge being staggered relatively to those on the other edge, so that opposite one tooth *r* there is a groove *s* and opposite the adjacent groove there is a tooth *r*. A tooth and groove are provided on each edge for each hook *a*, the center of the tooth on one edge being opposite one edge of the hook and the adjacent groove being opposite the other edge thereof, and the tooth and groove on the other edge occupying reverse relations to the same hook. The end of each hook is notched or otherwise adapted to catch and hold the warp-thread, and the teeth are constructed to move in close proximity to the hooks, so that as the shaft *g* is oscillated or revolved the teeth will rise so close to the hooks as to insure picking up the proper thread. The grooves between the teeth in this operation receive the alternate threads and retain them in place while the others are lifted. When the shifter is revolved to bring the next edge near the hooks, the teeth of this edge catch the threads which were before in the grooves and the grooves of this edge receive the threads which were before lifted, or if the shifter is merely oscillated instead of revolved the grooves of one edge hold their threads in position to be properly caught by the teeth of the other edge.

The shifter is fixed against axial movement by the ends *t* of the plate *p*, which abut against the bearings *f* and insure that the plate shall be held in proper position relatively to the hooks.

The axis of the shifter or the body of the latter between its bearings is at the under side of the plane of the warp-threads, so that when inverted the shifter is below and out of the way of these threads and does not interfere with arranging them.

The stretcher B may be of any suitable construction for holding the work to be mended within the carrier A. According to my improvements I provide it with a recess K in its top face opposite the shifter C to give abundant room for movement of the latter, and with a flat top surface L at each side of this recess, on which the work G or the carrier A can rest during the darning operation. I also preferably construct the stretcher with an aperture M opposite the point at which the darning is to be effected and with an auxiliary stretcher N, fitting movably in this aperture and capable of being projected through the aperture to a sufficient extent to bring its top face *u* above the face L of the stretcher

and give an elevated surface beneath the work when desired.

The auxiliary stretcher is preferably a tapering block of wood proportioned when forced home in the stretcher to fit tightly therein and having a head *v*, limiting its inward movement. The auxiliary stretcher is adapted for insertion in the toe of a stocking to be mended, so that the stocking and the block can be forced together through the aperture M and projected above the top face of the stretcher B, thus facilitating mending of the stocking without necessitating an attempt to stretch it over the entire stretcher B. This employment of the block is shown in Fig. 2, while in Figs. 1 and 3 the use of the block to elevate the part of the cloth being mended is shown, in which use the cloth is held by the stretcher B and the auxiliary stretcher is forced through the aperture M until its end projects above the plane of the top of the stretcher B and lifts the cloth above it up against the warp-threads.

In operation the goods to be darned are placed over the stretcher B or over the auxiliary stretcher N, according to the character of the goods. The warp-carrier is then forced over the stretcher, and the warp-threads are fastened about the hooks over the hole in the goods to be mended. The warp-shifter is then turned to raise one set of threads, the needle is passed through the shed close to the shifter and then pushed back to the opposite end of the hole, the thread is fixed to the goods beyond the warp, and the shifter C is turned or oscillated to change the shed. The needle is then passed through the shed in the opposite direction and into the fabric beyond the warp, the woof-thread is pressed up with the needle as a beater close to the previous thread, and the warp is again shifted by the shifter, this operation being repeated until the mending is finished.

It will be seen that with my improved darning apparatus the construction is simple and cheap and that the warp-threads are shifted without danger of missing a thread and without requiring special care or skill. A deep shed is obtained and a correct guiding of the alternate threads is preserved. The axis of the shifter is close to and substantially on a line with the warp-threads and the surface of the goods to be darned, and the shifting is effected by lifting the threads above this surface. There is no danger of cutting or wearing the threads or the fabric being repaired, and only one movement is requisite to shifting the threads. The shifter being below the threads permits of arranging these without interference from the shifter, so that the latter can be irremovably and permanently mounted in the carrier.

What I claim is—

1. In darning apparatus, a warp-carrier having hooks from the warp side of which warp-threads can be stretched to form a warp,

and having bearings at the warp side of said hooks, in combination with a warp-shifter carried by and oscillating in said bearings on an axis at the warp side of said hooks, and
 5 having a trough-shaped body crossing said carrier at the warp side of said hooks, for passing below all such warp-threads, having upwardly-moving teeth on its opposite edges rising close to said hooks for lifting alternate
 10 threads to form successive sheds, and movable below the plane of said hooks for permitting application of the warp-threads, whereby the warp-threads can be applied to such hooks above said shifter, and without
 15 removing the latter.

2. In darning apparatus, a warp-carrier having hooks from the warp side of which warp-threads can be stretched to form a warp, and having bearings for a warp-shifter at the
 20 warp side of said hooks, in combination with an oscillating warp-shifter, having two series of teeth, projecting from its edges, on one side, and smooth on its other side, the teeth of one series alternated relatively to
 25 those of the other series for catching alternate warp-threads, and the teeth of one series projecting angularly to those of the other series, and said shifter mounted in said bearings and crossing said carrier adjacent to and
 30 at the warp side of said hooks, for passing below all the warp-threads, whereby the shifter can be turned with its toothed side down and then the warp-threads can be arranged on such hooks over the shifter without interference from the latter, and then the shifter
 35 can be turned up and oscillated to form successive sheds.

3. In darning apparatus and the like, the combination of a warp-carrier consisting of a
 40 frame for resting on the fabric to be darned, having warp-hooks from which warp-threads can be stretched, and having bearings at the warp side of said hooks, and an irremovable and axially-immovable oscillating warp-shifter permanently mounted in said bearings
 45 on an axis at the warp side of said hooks, having a body over which warp-threads can be stretched, crossing said carrier at the warp side of and parallel with said hooks, and having a series of alternate notches and teeth for
 50 shifting the warp-threads to form the shed and means for moving said teeth below said hooks, whereby the threads can be applied to said hooks over said shifter, substantially
 55 as and for the purpose set forth.

4. In darning apparatus and the like, a warp-carrier A, for resting on the fabric to be darned, having two opposed sets of hooks *a* between which warp-threads can be stretched
 60 in a plane above such fabric, and bearings *f* between said hooks, in combination with an irremovable warp-shifter C, having a rod *q* pivoted in said bearings, on an axis between said hooks and adjacent to one set of the opposed
 65 hooks, and having a plate *p* crossing said carrier, having on its opposite edges teeth *r* and intermediate notches *s*, said teeth

on one edge projecting angularly to those on the other edge, said shifter oscillating with its teeth close to said hooks for shifting alternate warp-threads to form successive
 70 sheds, whereby the threads are held by one set of teeth until caught in the notches between the other set.

5. In darning apparatus and the like, the combination of a warp-carrier A, consisting of a frame having two series of hooks *a*, and having bearings *f* between and adjacent to one series of said hooks, and downwardly-extending clamping portions, a warp-shifter
 80 carried by said frame, mounted in said bearings and oscillating below said hooks, and a stretcher fitting within said frame below said hooks and shifter, having a top bearing-face near the plane of said hooks for sustaining
 85 the work to be darned, and having a transverse recess in said face opposite said shifter for permitting oscillation thereof and said shifter oscillating in said recess below said bearing-face and between said stretcher and
 90 said hooks, whereby the shifter is between the warp-threads and said work and the latter is supported at the side of the shifter.

6. In darning apparatus, a warp-carrier having two separated series of hooks between
 95 which threads can be stretched in a horizontal plane, and a warp-shifter for such threads, in combination with a stretcher fitting said warp-carrier, and having a top bearing-face below said hooks for supporting the work
 100 to be darned, and an auxiliary stretcher for such work, movable relatively to said first stretcher, and having a top bearing-face movable upwardly from and above that of said first stretcher for raising such work above the
 105 latter.

7. In darning apparatus and the like, a warp-carrier having hooks for carrying warp-threads, and a warp-shifter for such threads, in combination with a stretcher fitting said
 110 carrier and having an aperture beneath the plane of said hooks, and an auxiliary stretcher movable toward and from such plane and movably mounted in said aperture.

8. In darning apparatus, a warp-carrier and
 115 warp-shifter, in combination with a stretcher for said carrier, having an aperture through which the work to be darned can be passed, and an auxiliary stretcher, for entering the work to be darned, movable through said aperture
 120 toward and from said carrier for holding the work in position, and removable bodily from such aperture whereby the auxiliary stretcher can be placed within such work and passed therewith through such aperture to
 125 hold the work in position opposite the carrier.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ELLWOOD C. HUNT.

Witnesses:

GEORGE H. FRASER,
 FRED WHITE.