July 25, 1944. P. W. VALENTINE 2,354,490

MEANS FOR AND METHOD OF FORMING WELT SEAMS

Filed July 1, 1940

Fig. 1.

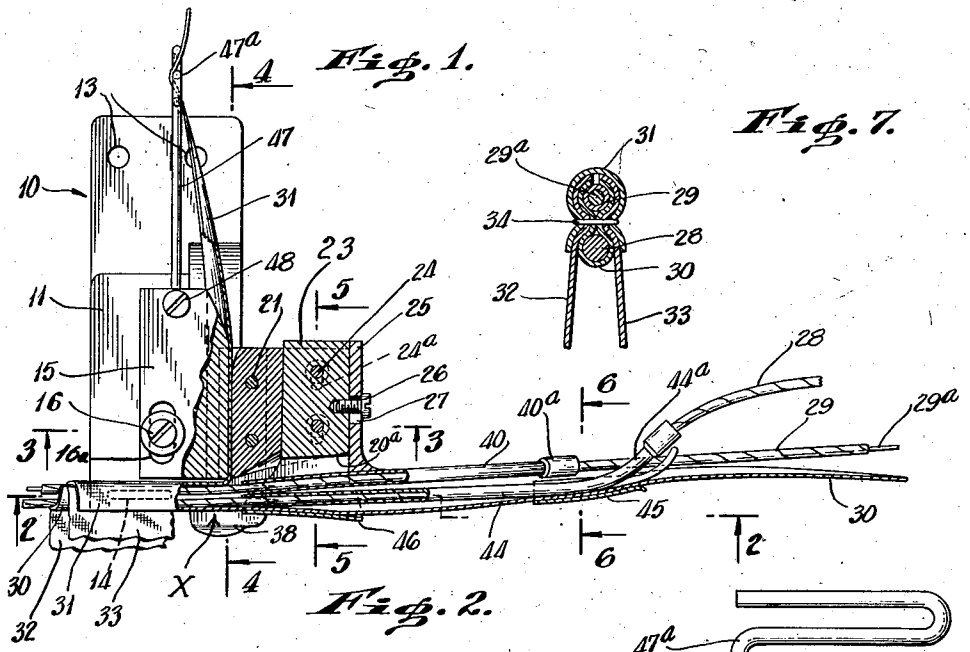
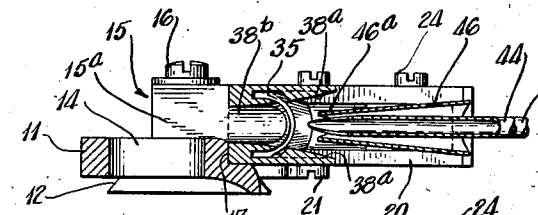


Fig. 7.

Fig. 2.



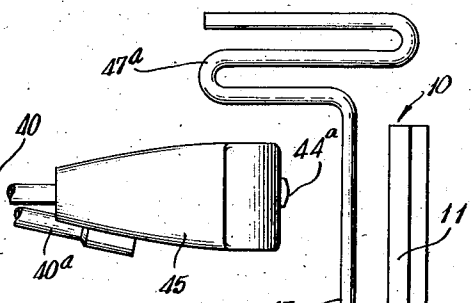


Fig. 3.

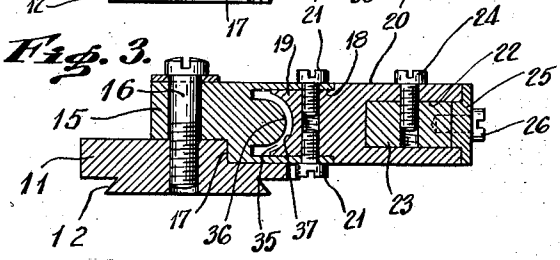


Fig. 4.

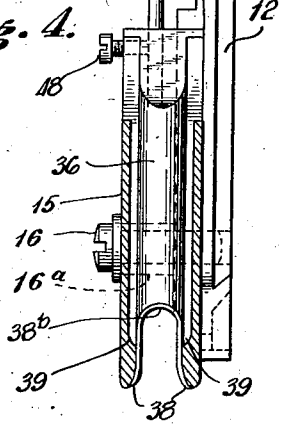


Fig. 5.

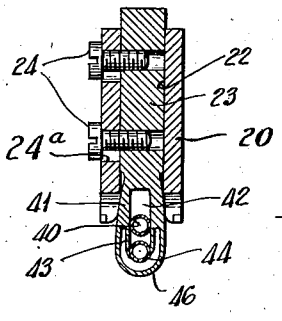
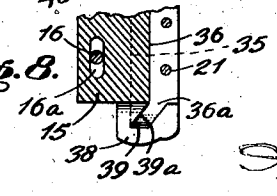


Fig. 6.



Fig. 8.



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UNITED STATES PATENT OFFICE

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MEANS FOR AND METHOD OF FORMING WELT SEAMS

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Application July 1, 1940, Serial No. 343,355

12 Claims. (Cl. 112—139)

This invention relates to a means for and method of forming welt seams, and articularly seams of the type employed when joining corresponding edges of sheet members, and the object of the invention is to provide a welt forming means of the character described comprising an attachment for use on conventional sewing machines, said attachment having means for guiding and supporting a plurality of workpieces including sheet members to be assembled in forming said seam, a further object being to provide means in an attachment of the class described for independently adjusting the guide of predetermined workpieces, a still further object being to provide a method of and means for guiding pairs of sheet, strip, and strand members into position to be united by a single line of stitching; and with these and other objects in view, the invention consists in a method of and attachment for forming welt seams which is hereinafter more fully described and claimed.

The invention is fully disclosed in the following specification of which the accompanying drawing forms a part, in which the several parts of my invention are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a plan view of my attachment with part of the structure broken away.

Fig. 2 is a view substantially on the line 2—2 of Fig. 1.

Fig. 3 is a view substantially on the line 3—3 of Fig. 1.

Fig. 4 is a view substantially on the line 4—4 of Fig. 1.

Fig. 5 is a view substantially on the line 5—5 of Fig. 1.

Fig. 6 is a view substantially on the line 6—6 of Fig. 1.

Fig. 7 is an enlarged end view of one form of welt seam made by the attachment shown, and Fig. 8 is a sectional detailed view similar to Fig. 1 omitting the workpieces and showing only part of the construction.

This invention relates essentially to the method of forming an improved welt seam such as shown in Fig. 7 of the drawing, and fully described and claimed in my companion application Ser. #339,266, filed June 7, 1940. To illustrate one means for carrying out my improved method of forming a welt seam, I have shown in the drawing an attachment 10 having a mounting plate 11 for supporting a plurality of workpiece guides in connection with a conventional sewing machine, the mounting plate is provided with a suitable key-way 12 for slidably engaging a corresponding key-way of the sewing machine, and is further provided with suitable means as indicated by the screw holes 13 for setting and retaining the mounting plate in position to aline the aperture 14 thereof with the needle of the machine.

A workpiece guide block 15 is adjustably secured to the mounting plate by a suitable screw or stud 16 passing through an elongated aperture 16a in the guide block, the guide block being maintained in proper alinement on the mounting plate by cooperating shoulders as seen at 17. The guide block 15 is provided with a channel 18 at the free edge thereof interfitting with a reduced portion 19 of an intermediate guide block 20, the blocks 15 and 20 being detachably and non-adjustably joined by the screws or studs 21.

The block 20 is in turn provided at the free edge thereof with a groove 22 having slidably arranged therein an auxiliary block 23. Means is provided as indicated by the studs 24 registering with the elongated apertures 24a in the intermediate block 20 for imparting slight longitudinal adjustment to the auxiliary block 23. The member 23 is somewhat narrower than the depth of the groove or channel 22 and an independent shoe 25 of substantially T-shape cross-sectional form is arranged in the groove to abut against the member 23. The shoe 25 is secured to the member 23 by a stud 26 registering with an elongated aperture 27 in said shoe providing longitudinal adjustment thereof.

The blocks 15 and 20 together with the independently adjustable members 23 and 25 cooperate to form the workpiece guide and guide supporting unit of the attachment. The various guide means are arranged to feed a plurality of strands 28 and 29, a plurality of tapes 30 and 31, and edge portions 32 and 33 of the sheets to be joined to a position X slightly in advance of the aperture 14 in the attaching plate, with the tapes, strands, and sheets interfitting in the manner shown in Fig. 7. When fed beyond the position X, the assembled workpieces pass beneath the needle of the sewing machine, and are securely joined together by a single line of stitching 34, the line of stitching passing between the strands 28 and 29, as will be apparent.

The tape 31 passes through a substantially semicircular groove 35 formed by opposed curved surfaces 36 and 37 of the blocks 15 and 20 respectively. The forward end of the block 15 is provided with forwardly extending portions 38 continuous with the walls of the groove 18; opposed surfaces of the extension being fashioned as at 39 to reverse the curvature of the tape 31, thereby wrapping the tape 31 about the other workpieces disposed within and between the walls 38 at the position X. In reversing the curvature of the tape 31, the tape sides folded over diagonal edges 39a, note Fig. 8, which extend from the rounded corner 36a of the curved surface 36

of the block 15. In other words, the sides of the strip 31 which are reversely folded as they pass through the groove 35 are folded at right angles over the edges 39A to bring these sides right side out, when in the position shown in the lower left hand corner of Fig. 1 and in the final stitched position as seen in Fig. 7. The stitching is omitted in Fig. 1 simply to render the illustration clearer.

The strand 29 is guided to the position X by an elongated tube 40 supported by the independently adjustable member 25, whereas, the strand 28 and the tape 30 are fed to the position X by guide means supported on the auxiliary block 23. The block 23 is provided with a forked end 41 forming a passage 42 for loosely engaging the tube 40. The forked end 41 has an inner extension 43 terminating in an elongated tube 44 somewhat longer than the tube 40, and preferably curved at the outer end 44a thereof to provide relatively wide separation of the strands. The end 44a of the tube supports a a guide sleeve 45 curved to fold the tape 30 passing therethrough around the tube 44. The fork end 41 of the member 23 is further provided with an outer extension 46 of semi-conical contour forming in conjunction with the inner extension 43 and tube 44 a substantially U-shaped guide for the tape 30. The reduced end 46a of the extension 46 conforms closely to the ends of the tubes 40 and 44 as seen in Fig. 2, thereby accurately alining and supporting the strip 30 with respect to the strands 28 and 29.

The outer surface of the conical guide extension 46 cooperates with the curved surfaces 38a of the spaced walls 38 to form inclined passages for guiding edges of sheets such as the sheets 32 and 33 into position between the tapes 30 and 31 at the point of assembly X. It will be noted in this connection that the forward edge 20a of the block 20 is inclined rearwardly away from the position X as seen in Fig. 1 to facilitate the guiding and joining of sheets having a slightly concave edge curvature. The sheets will be manually fed between the tapes 30 and 31 and firmly supported in the direction of the surface 15a of the block 15, thereby insuring a substantially complete enveloping of the strand 29 by the strip 30 and sheets 32 and 33 when the several workpieces are stitched together.

The various guide means employed provide free feeding of the several workpieces to the point of assembly X without any danger of entanglement and without interfering with the operator of the device. It will be noted in this connection that the tube 40 has a slight rearward and downward inclination at the end 40a thereof, thereby providing for more complete separation of the strands 28 and 29. It will be noted in this connection that the strand 29 has been shown as including a reinforcing core 29a of wire or other suitable material. It will be apparent, however, that the method and attachment are equally applicable in forming welt seams regardless of what combination of pliable and rigid strands are employed in forming the inner and outer welts thereof.

A guide member 47 is adjustably supported in connection with the block 15 by a suitable set screw 48, the end 47a of the guide member having a substantially N-shaped contour, as seen in Fig. 4 to provide vertical alinement of the tape 31 and also to insure a uniform flat feed of the tape to the curling or folding passage 35 of the attachment. The tape 31 as well as the tape 30 will preferably be fed from suitable storage spools, and it will be apparent that if desired, a guide member similar to the member 47 may also be provided between the guide sleeve 45 and the storage spool for the tape 30.

The various adjustments provided on the attachment are adapted to compensate for variations in the sizes of workpieces to be assembled. The adjustment between the support 23 and the shoe 25 permits relative movement of the guide tubes 40 and 44 with respect to each other, thereby compensating for variations in the size of either of the strands 28 or 29. The strands can thus be guided into closely spaced relation at the point of assembly X.

The adjustment provided between the support 23 and the intermediate block 20 provided for movement of the guide tubes 40 and 44 together with the tape guide 46 transversely with respect to the direction of feed of the workpieces. This adjustment compensates for variations in the combined dimensions of the strands 28 and 29 together with the tape 30 folded therearound. When properly adjusted, it will be apparent that the strands 28, 29, and tape 30 are firmly supported in the direction of the surface 15a of the block 15 while fed into the position of assembly X.

The adjustment provided between the guide block 15 and the attaching plate 11 provides for movement of the entire assemblage with respect to the needle aperture 14 in the mounting plate. This adjustment in other words, provides for the proper location of the line of stitching 34 between the strands 28 and 29. It will thus be apparent that the various adjustments, when properly made, insure firm and accurate assembling of the several workpieces and accurate joining of the workpieces to form an improved welt seam.

In the welt seam, as shown in Fig. 7, the strand 28 together with the cover tape 30 thereof forms the true or exposed welt, whereas the strand 29 together with the edge portions of the sheets 32 and 33 and the cover tape 31, forms an inner reinforcing welt. In some constructions it will be noted that two or more independent strands may be substituted for the inner strand 29 with a pair of independent strands arranged transversely with respect to the strand 28. Such a construction would provide added reinforcement to the seam, especially when the sheets 32 and 33 are to be flexed sharply in the use thereof.

It will be understood in this connection that it is within the scope of the present invention to modify the shape and contour of the strand guide 40 as well as the tape guides 45 and 46 to properly unite the various strand and tape members in feeding the same to the point of assembly X. It will further be noted that the particular contour of the passage or groove 38b, formed between the protruding walls 38 of the block 15, may be varied in accordance with the particular contour of the welt seam to be formed.

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

1. An attachment for joining pairs of strand, strip and sheet members in forming a welt seam, said attachment comprising a mounting plate adapted to be adjustably secured to a sewing machine, a workpiece guide block adjustably secured to said mounting plate and having protruding wall portions, an intermediate block detachably and non-adjustably secured to said first named block, independent workpiece guide

supports adjustably secured to said intermediate block, means on one of said last named supports for guiding a single strand toward a point of assembly intermediate the protruding wall portions of said first named block, means on the other of said supports for guiding one strand and one tape toward said point of assembly and simultaneously folding said tape about said strands, means formed between said first named block and intermediate block for guiding a second tape toward said point of assembly in a reverse folded position, means in the protruding walls of said first named block for reversing the fold in said tape thereby folding the same about said strands and first named tape, and the outer surface of said strand and tape guiding means and the opposed surfaces of the protruding walls of said block forming means for guiding edge portions of sheet members toward said point of assembly.

2. An attachment or joining pairs of strand, strip and sheet members in forming a welt seam, said attachment comprising a mounting plate adapted to be adjustably secured to a sewing machine, a workpiece guide block adjustably secured to said mounting plate and having protruding wall portions, an intermediate block detachably and non-adjustably secured to said first named block, independent workpiece guide supports adjustably secured to said intermediate block, means on one of said last named supports for guiding a single strand toward a point of assembly intermediate the protruding wall portions of said first named block, means on the other of said supports for guiding one strand and one tape toward said point of assembly and simultaneously folding said tape about said strands, means formed between said first named block and intermediate block for guiding a second tape toward said point of assembly in a reverse folded position, means in the protruding walls of said first named block for reversing the fold in said tape thereby folding the same about said strands and first named tape, the outer surface of said strand and tape guiding means and the opposed surfaces of the protruding walls of said block forming means for guiding edge portions of sheet members toward said point of assembly, a needle aperture in said mounting plate adjacent the protruding walls of said first named block, and said protruding walls forming means for supporting the assembled members in close engagement while the same are fed past said needle aperture and joined by a single line of stitching.

3. An attachment for joining pairs of strand, strip and sheet members in forming a welt seam, said attachment comprising a mounting plate adapted to be adjustably secured to a sewing machine, a workpiece guide block adjustably secured to said mounting plate and having protruding wall portions, an intermediate block detachably and non-adjustably secured to said first named block, independent workpiece guide supports adjustably secured to said intermediate block, means on one of said last named supports for guiding a single strand toward a point of assembly intermediate the protruding wall portions of said first named block, means on the other of said supports for guiding one strand and one tape toward said point of assembly and simultaneously folding said tape about said strands, means formed between said first named block and intermediate block for guiding a second tape toward said point of assembly in a reverse folded position, means in the protruding walls of said first named block for reversing the fold in said tape thereby folding the same about said strands and first named tape, the outer surface of said strand and tape guiding means and the opposed surfaces of the protruding walls of said block forming means for guiding edge portions of sheet members toward said point of assembly, a needle aperture in said mounting plate adjacent the protruding walls of said first named block, said protruding walls forming means for supporting the assembled members in close engagement while the same are fed past said needle aperture and joined by a single line of stitching, and the adjustment of said first named block forming means for accurately positioning the assembled members with respect to said needle aperture to pass said line of stitching between said strands.

4. An attachment for joining pairs of strand, strip and sheet members in forming a welt seam, said attachment comprising a mounting plate adapted to be adjustably secured to a sewing machine, a workpiece guide block adjustably secured to said mounting plate and having protruding wall portions, an intermediate block detachably and non-adjustably secured to said first named block, independent workpiece guide supports adjustably secured to said intermediate block, means on one of said last named supports for guiding a single strand toward a point of assembly intermediate the protruding wall portions of said first named block, means on the other of said supports for guiding one strand and one tape toward said point of assembly and simultaneously folding said tape about said strands, the relative adjustment of said supports forming means compensating for variations in size of either of said strands, the simultaneous adjustment of both of said supports with respect to said intermediate block forming means compensating for variations in the combined dimensions of said strands in guiding the same together with said strip toward the point of assembly, means formed between said first named block and intermediate block for guiding a second tape toward said point of assembly in a reverse folded position, means in the protruding walls of said first named block for reversing the fold in said tape thereby folding the same about said strands and first named tape, and the outer surface of said strand and tape guiding means and the opposed surfaces of the protruding walls of said block forming means for guiding edge portions of sheet members toward said point of assembly.

5. An attachment for joining pairs of strands, strip and sheet members in forming a welt seam, said attachment comprising a mounting plate adapted to be adjustably secured to a sewing machine, a workpiece guide block adjustably secured to said mounting plate and having protruding wall portions, an intermediate block detachably and non-adjustably secured to said first named block, independent workpiece guide supports adjustably secured to said intermediate block, means on one of said last named supports for guiding a single strand toward a point of assembly intermediate the protruding wall portions of said first named block, means on the other of said supports for guiding one strand and one tape toward said point of assembly and simultaneously folding said tape about said strands, means formed between said first named block and intermediate block for guiding a second tape toward said point of assembly in a reverse folded position, means in the protruding walls of said first named block for reversing the fold in said tape thereby folding the same about said

strands and first named tape, the outer surface of said strand and tape guiding means and the opposed surfaces of the protruding walls of said block forming means for guiding edge portions of sheet members toward said point of assembly, a needle aperture in said mounting plate adjacent the protruding walls of said first named block, said protruding walls forming means for supporting the assembled members in close engagement while the same are fed past said needle aperture and joined by a single line of stitching, and the forward edges of said intermediate block adjacent the protruding walls of said first named block being inclined rearwardly thereby facilitating the feeding of sheets having concave edge curvature toward said point of assembly.

6. A sewing machine attachment for forming welt seams of the class described, said attachment comprising a mounting plate adapted to be adjustably secured to a machine, means adjustable with respect to said mounting plate for supporting independently adjustable workpiece guides, said means comprising a block having spaced protruding walls at the front portion thereof, said means including said block having a workpiece guide passage of curved cross-sectional contour extending longitudinally of said block and registering at the forward end thereof with said protruding walls, the forward end of the passage forming portion of said block having diagonal walls for reversing the curvature of the workpiece emerging from said passage and in extending the workpieces in substantially right angles to said passage, said first named workpiece guides being adapted to feed a plurality of strands together with a tape enveloping said strands between the protruding walls of said block and said reversely folded workpiece, said protruding walls being fashioned and spaced from said workpiece guides in a manner to provide for the feeding of a pair of sheet members therebetween on opposed sides of said tape and strands adjacent said workpiece reversing means, and said protruding walls forming means for supporting the assembled workpieces in firm engagement while the same are united by a single line of stitching passing therethrough between said strands.

7. In a sewing machine attachment of the class described, adjustable means for guiding a plurality of strands, and a tape toward a point of assembly and for simultaneously folding said tape about said strands, means for guiding edges of a pair of sheet members toward said point of assembly at opposed sides of said tape and strands, means for guiding a second tape substantially at right angles to said point of assembly, means simultaneously reversing and folding the second tape about said sheets, strands and first-named tape, and means for retaining said sheet, strands, and tapes in assembled position while passing a line of stitching therethrough between said strands.

8. In an attachment of the class described, means for assembling a plurality of strands and a tape, said means comprising independent tubes for guiding the strands to a point of assembly, means for guiding a tape substantially at right angles to the strands adjacent the point of assembly, means at said point of assembly reversely folding the tape around said strands and extending the same parallel thereto, and said attachment being provided with means for receiving the needle of a sewing machine to thereby unite said strands and tape.

9. In an attachment of the class described, means for guiding and folding one tape in a substantially straight line, means for guiding and folding another tape at substantially right angles to the first named tape at the position of assemblage of said tapes, means at said position of assemblage for reversely folding the second tape and to extend the second tape parallel to the first tape with free side edges of said tapes overlapping each other at the position of assemblage, and said attachment being provided with means for receiving the needle of a sewing machine to thereby unite said strands and tape, and means for guiding independent strands between the folds of said tapes at opposed sides of said needle receiving means.

10. In an attachment of the class described, means for guiding and folding one tape in a substantially straight line, means for guiding and folding another tape at substantially right angles to the first named tape at the position of assemblage of said tapes, means at said position of assemblage for reversely folding the second tape and to extend the second tape parallel to the first tape with free side edges of said tapes overlapping each other, means for guiding edge portions of sheet members between overlapped side edges of said tapes, and said attachment being provided with means for receiving the needle of a sewing machine to thereby unite the tapes and edge portions of said sheet members.

11. In an attachment of the class described, means for guiding and folding one tape in a substantially straight line, means for guiding and folding another tape at substantially right angles to the first named tape at the position of assemblage of said tapes, means at said position of assemblage for reversely folding the second tape and to extend the second tape parallel to the first tape with free side edges of said tapes overlapping each other, means for guiding independent strands between the folded tapes, means for guiding edge portions of sheet members between overlapped side edges of said tapes, and said attachment being provided with means for receiving the needle of a sewing machine to thereby unite said tapes and sheet members intermediate said strands in uniting the assemblage.

12. The method of forming a welt seam, which comprises guiding two strands substantially parallel to each other to a point of assemblage, guiding a folded strip longitudinally of one of said strands and with said strand arranged in the fold thereof, guiding another strip at right angles to the other strand adjacent the point of assemblage, reversely folding the second named strip adjacent the point of assemblage around the second strand and then extending the same parallel thereto with said strand arranged within the fold of the second strip and with side edges of the second strip overlapping corresponding edges of the first strip, guiding edges of two sheet members between overlapped edges of said strips, and then assembling the parts by a single line of stitching passing through the overlapped portions of said strips and said sheet members with said stitching arranged intermediate said strands.

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