Aug. 22, 1944. H. GUNTHER 2,356,665

ARTICLE ATTACHING MACHINE

Filed March 6, 1943 2 Sheets-Sheet 1

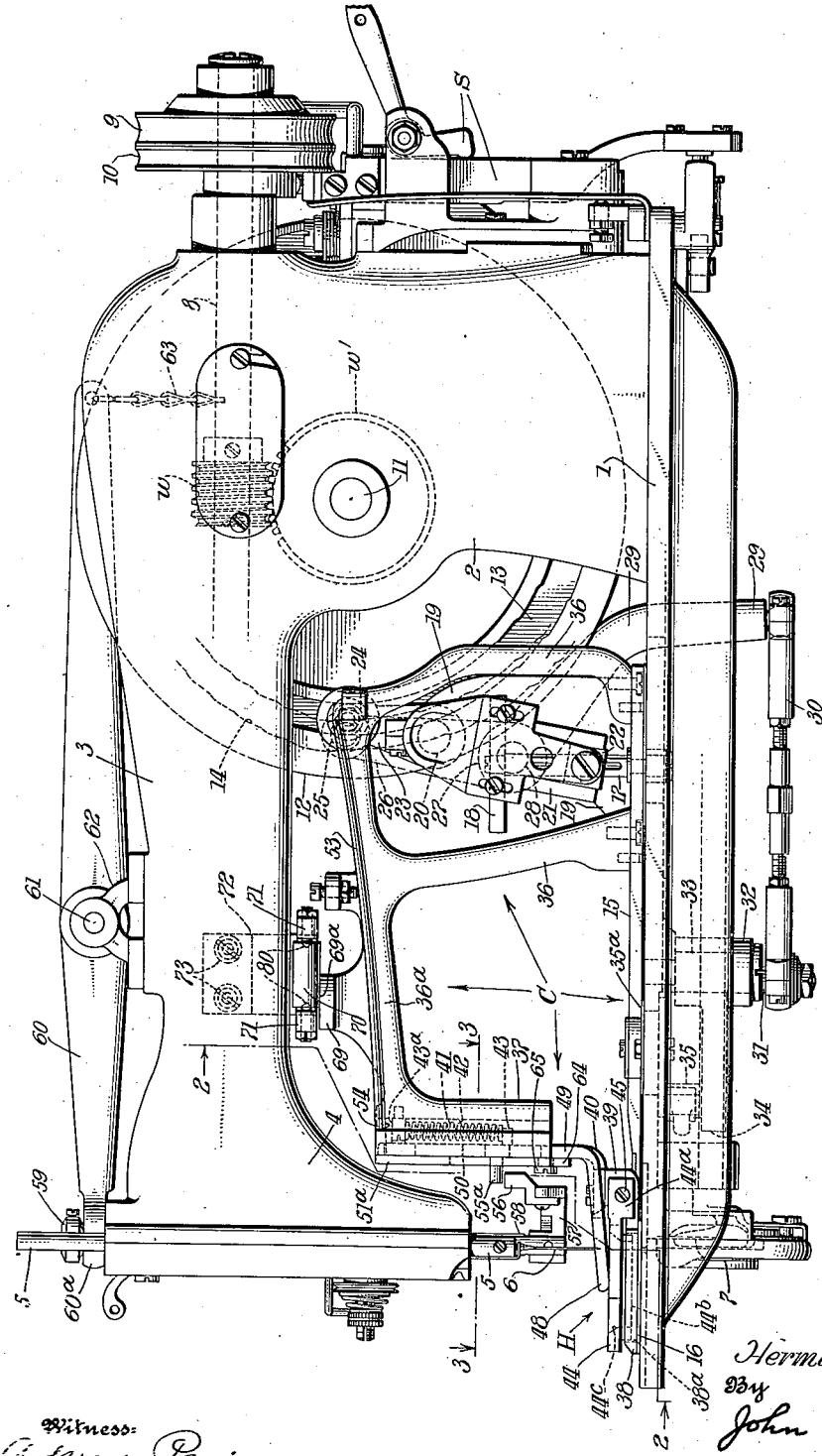


Fig. 1.

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Filed March 6, 1943 2 Sheets-Sheet 2

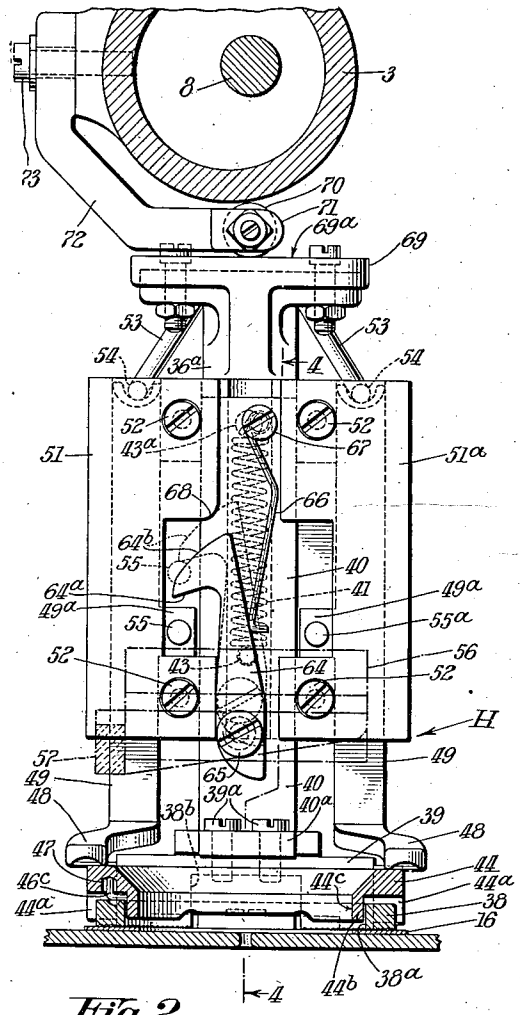


Fig. 2.

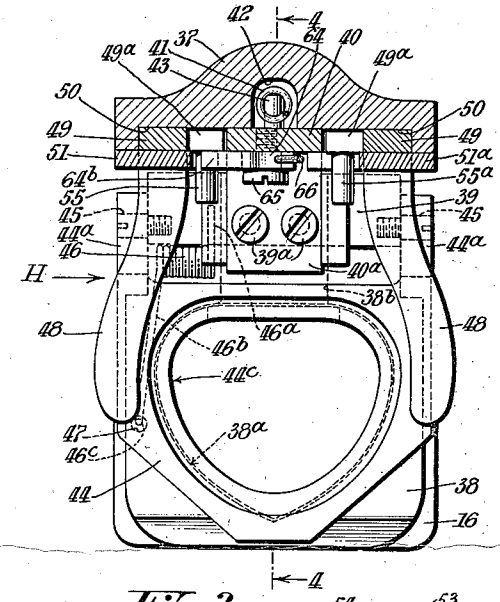


Fig. 3.

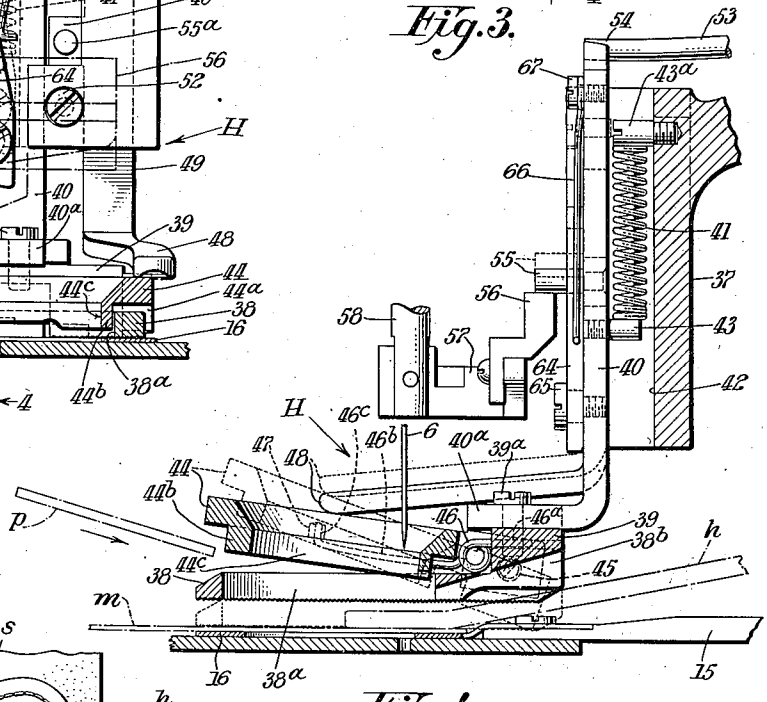


Fig. 4.

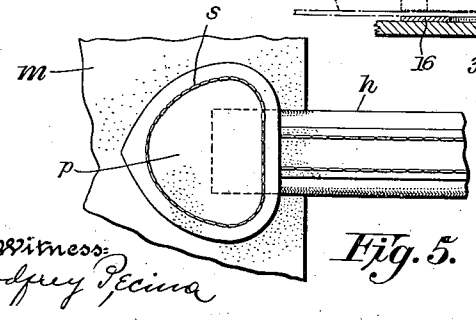


Fig. 5.

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UNITED STATES PATENT OFFICE

2,356,665

ARTICLE ATTACHING MACHINE

Hermann Gunther, Elizabeth, N. J., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application March 6, 1943, Serial No. 478,246

13 Claims. (Cl. 112—114)

This invention relates to article attaching machines and more particularly to an improved work-holder for such machines.

It is quite common to sew handles to hand bags etc., and at the same time to secure thereto a reinforcing pad of leather; certain ones of the stitches which attach the pad to the article also serving to secure the handle thereto. In performing this operation there are three articles, viz.—the bag, the handle and the pad, which have to be accurately positioned relative to each other, and clamped against movement, prior to the beginning of the sewing operation. This has been difficult to do, because the operator has only two hands to hold the three articles and the articles are of such nature that their positions are easily disturbed.

In my pending U. S. patent application Serial No. 454,899, filed August 15, 1942, I have disclosed a work-holder for article attaching machines comprising a work-supporting plate adapted to support a body material and two separable work-clamping members overlying the work-support with one clamp member above the other, common means for lifting both of said clamp-members and hand-actuated releasable means for disconnecting one of said clamp-members from said lifting means so that the upper of said clamp-members may be held elevated, to permit positioning of the pad, after the lower clamp-member has been lowered upon the workpiece.

The present invention is an improvement of my prior construction and it has as an object to obtain all the advantages of said prior construction plus the advantage of successively lowering the clamp-members into contact with the work without the necessity of releasing, by hand, either of said clamp-members from the common lifting means.

Stated more specifically, this invention has as its primary object to provide an improved work-holder for article attaching machines which is adapted to hold a number of separate articles in assembled relation and so to construct and arrange the work-holder and its lifting means that, during one complete manipulation of a suitable treadle, the articles may be positioned and clamped successively.

A further object of the invention is to provide improved means for rigidly supporting the work-clamp against deflection under the influence of the clamp-lifting means.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings, Fig. 1 is a side elevation of an article-attaching machine embodying the present invention.

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

Fig. 3 is a horizontal section taken substantially on the line 3—3 of Fig. 1, with the needle-bar and clamp-lifter omitted.

Fig. 4 is a vertical sectional view taken substantially on the lines 4—4 of Figs. 2 and 3, with certain elements shown in elevation.

Fig. 5 is a face view of the product of the machine illustrated in Fig. 1 and comprising a body material, a handle and a reinforcing pad, all sewed together by a single continuous row of stitching.

Referring more specifically to the drawings, the invention is disclosed as embodied in an article-attaching machine comprising a frame including a bed-plate 1, column 2, arm 3 and a bracket-arm head 4. Within the head 4 there is mounted, for endwise reciprocation, a needle-bar 5 carrying, at its lower end, an eye-pointed needle 6. Cooperating with the needle, in the formation of stitches, is a loop-taker designated generally as 7, in Fig. 1. Both the needle-bar and the loop-taker are actuated by conventional means, not shown, from a main shaft 8 journaled lengthwise of the arm 3 and carrying at its rear end loose and fast belt-driven pulleys 9 and 10, respectively. Mounted horizontally in the standard 2 is a shaft 11 on which is journaled a clamp-actuating and cycle-control cam-wheel 12 having clamp-actuating cam-grooves 13 and 14 in the opposite faces thereof, see Fig. 1. The cam-wheel is rotated from the main shaft 8 through the medium of a worm *w* and cooperating worm wheel *w'*.

Located at the upper side of the bed-plate 1 is a work-holding clamp designated generally as C which receives endwise and sidewise movements from the cam grooves 13 and 14 through the medium of mechanism which is generally similar to that disclosed in United States patent to Horton, No. 807,676, Dec. 19, 1905, and shown also in my application Serial No. 454,899 above mentioned. This clamp comprises a feed-bar 15 which is slidingly mounted on the upper surface of the bed-plate. At its forward end the feed-bar carries a work-supporting plate 16 while at

its rear end it carries a vertically disposed post 17 having at its upper end a cross-head 18. Secured upon the upper surface of the bed-plate 1 is a bracket 19 in the upper end of which is journaled a rock-shaft 20. At one end of the shaft 20 there is attached a downwardly extending slotted arm 21 which engages a swivel block 22 slidingly fitted upon the post 17. At its other end the shaft 20 has secured to it an upwardly extending arm 23 which carries a stud 24 tracking the cam groove 13. Through this mechanism, rotation of the cam-wheel 12 effects endwise movement of the work-clamp.

Sidewise movement of the clamp is effected from the cam-groove 14. That cam-groove is tracked by a stud 25 carried by the upper arm 26 of a two-armed lever 27 fulcrumed, at 28, on the bracket 19. The lower arm 29 of the lever 27 is connected to one end of a link 30, the other end of which is adjustably connected on one arm 31 of a bell-crank lever 32 fulcrumed on a stud 33 threaded into the bed-plate 1. The other arm 34 of the bell-crank lever 32 is connected, by a link 35, with a plate 35a slidingly mounted on the bed-plate 1 and connected with the clamp feed-bar 15 to move it laterally.

Thus by rotation of the cam-wheel 12 the work-clamp is given both lengthwise and sidewise movements. These movements are so combined as to cause the clamp, and the work carried thereby, to be moved in a substantially heart-shaped path, whereupon the stitch-forming mechanism sews the seam *s*, shown in Fig. 5.

The cycle of operation of the machine is controlled by a conventional stop-motion mechanism S.

The work, consisting of a body material *m*, a strap-like handle *h* and a reinforcing pad *p*, is held in assembled relation on the work-supporting plate by an improved work-holder H forming a part of the work-clamp C which also includes a bifurcated frame or bracket 36 secured upon the clamp feed-bar 15 and having, at its free end, a head 37.

The work-holder H includes a horizontally disposed substantially rectangular work-clamping member 38 having, at its rear end, a transversely disposed portion 39 to which is secured, by screws 39a the foot portion 40a of an L-shaped work-holder supporting bar 40 the leg portion of which is slidingly mounted in the head 37 of the clamp bracket 36. A coil spring 41, seated in a cavity 42 in the head 37 and bearing at its lower end on a screw stud 43 carried by the bar 40 and at its upper end on a screw stud 43a carried by the head 37, tends to hold the bar 40 and the member 38 depressed so that the member will hold the body material *m* in pressure contact with the work-supporting plate 16 of the work-clamp. The work-clamping member 38 is formed with a substantially heart-shaped cavity or pocket 38a adapted to receive the reinforcing pad *p*. At its rear end the member 38 is provided, on its underside, with a clearance aperture 38b which affords clearance for the handle *h* (see Fig. 4). Cooperating with the member 38, in holding the work, is a second-clamping member 44 having spaced, rearwardly extending legs 44a pivotally mounted on screws 45 threaded into the portion 39 of the member 38. The work-clamp 44 has a downwardly extending flange 44b (Figs. 2 and 4) which fits within the pocket 38a of the member 38 and bears upon the upper face of the peripheral portion of the pad *p* to hold it in said pocket with the end of the handle *h* clamped between the body material *m* and the pad. The work-clamping member 44 is formed with a substantially heart-shaped opening 44c within which the stitch-forming mechanism sews the seam *s* through the pad *p*, handle *h* and body material *m*.

The work-clamping member 44 is normally urged upwardly about its pivot screws 45 by a coil spring 46 located between the rear end of that member and the portion 39 of the work-clamping member 38. That spring has one arm 46a entering an aperture in the cross-bar 39 and another arm 46b underlying the member 44 and having its free end 46c located in an aperture 47 therein.

Overlying the member 44 and bearing downwardly thereon, in opposition to the spring 46, are two presser-feet 48 projecting laterally from the lower ends of upright presser-bars 49 slidingly mounted in a cavity 50 in the clamp-head 37. Face plates 51, 51a secured to the forward face of the clamp head 37, by screws 52, retain the presser-bars in the cavity 50. Bar springs 53, supported by the clamp bracket 36 and having their free forward ends 54 bearing upon the upper ends of the presser-bars 49, normally hold the presser-feet 48 and the work-clamping member 44 depressed.

Each of the presser-bars 49 is formed with a lateral projection 49a which carries forwardly projecting studs 55, 55a which, when the machine is in "stop" position overlie a cross-bar 56 secured upon a clamp-lifter bracket 57 secured upon the lower end of a clamp-lifter bar 58 slidingly mounted in the machine head 4. At its upper end the bar 58 carries a collar 59 beneath which engages the forked end 60a of a clamp-lifter lever 60, fulcrumed at 61 on a bracket 62, secured upon the arm 3. The opposite end of the lever 60 has connected thereto one end of a chain 63 the other end of which is connected to a suitable treadle (not shown) by means of which the lever 60 may be turned about its fulcrum in two stages of movement to lift the bar 58. Initial upward movement of the bar 58 lifts the bracket 57, cross-bar 56 and presser-bars 49, thus relieving the pressure of the feet 48 on the work-clamping member 44 and permitting it to be tipped upwardly about its pivots 45 by the coil spring 46. Continued upward movement of the clamp-lifter bar causes bodily lifting of the work-holder supporting bar 40 and the work-clamping members 38 and 44 carried thereby in opposition to the spring 41. This is effected by the stud 55 engaging beneath the hooked upper end 64a of a latch-lever 64 fulcrumed on a shoulder screw 65 threaded into the bar 40. A wire spring 66 secured to the bar 40 by a screw 67 has one end bearing against the latch lever 64 and normally holds it in the position shown in full lines in Fig. 2 i. e. with its end 64a overlying the stud 55. The upper end of the latch lever is formed with a cam surface 64b which, during the first stage of upward movement of the bar 40 and the latch-lever carried thereby, engages a shoulder 68 formed on the plate 51. The second stage of movement of the lifter-means causes the shoulder to turn the latch-lever clockwise, as seen in Fig. 2, thus freeing the hooked end 64a thereof from the stud 55 and permitting the bar 40, and the parts carried thereby, to be forced downwardly by the spring 41 while the presser-bars 49 are held elevated by the cross-bar 56.

To prevent deflection of the clamp bracket 36 under the upward thrust of the work-holder lifting means, I have provided means for transmitting that thrust to the rigid arm 3 of the machine frame. This has been effected by forming, on the upper arm 36a of the clamp-bracket, a horizontally disposed substantially rectangular shelf or platform 69, the upper flat surface 69a of which is constantly engaged by a roller 70 rotatably journaled on pintles 80 within the bifurcated end 71 of a rigid bracket 72 secured to the rear side of the arm 3 by screws 73. The sizes and proportions of the surface 69a and the roller 70 and the movements of the work-clamp relative to the axis of the roller are such that the roller is maintained in rolling contact with said surface in all of the positions and movements of the work-clamp during a sewing cycle.

To load the work-holder the operator gives a first stage of actuation to the treadle connected with the lever 60, thereby swinging that lever clockwise, as seen in Fig. 1. This raises the clamp-lifter bar 58, which, through the bracket 57, cross-bar 56, pins 55, 55a and latch-lever 64 simultaneously raise the presser-feet 48, the work-holder supporting bar 40 and the lower and upper work-clamping members 38 and 44, respectively, carried by the bar 40. This places the work-clamping members 38 and 44 in the positions shown in full lines in Fig. 4. The body material *m* is then placed upon the work-supporting plate 16 beneath the lower member 38 and one end of the handle *h* is inserted through the clearance aperture 38b in the portion 39 of the lower clamp member into overlapping relation with the body material as shown in Figs. 4 and 5. When the body material and handle have been properly positioned relative to the clamp and to each other, the operator gives the clamp lifter treadle its second stage of operation thereby further swinging the lever 60 in a clockwise direction as seen in Fig. 1. This final movement of the treadle causes the shoulder 68 on the plate 51 to swing the latch lever 64 clockwise, as seen in Fig. 2 thereby disengaging the end 64a thereof from the stud 55 whereupon the spring 41 forces the work-holder supporting bar 40 downwardly thus causing the work-clamping member 38 to be brought into pressure contact with the body material *m* and the handle *h* to hold them in their assembled positions. Dropping of the lower clamp-member 38 carries with it the pivots 45 and the rear portion of upper clamp-member 44 while the spring 46 maintains the forward portion of the member in contact with the under side of the overlying presser-feet 48, which latter are maintained elevated by continued depression of the clamp-lifter treadle. This causes the space between the forward end of the member 44 and the member 38 to be increased thereby giving easy access to the pocket 38a in the lower work-clamping member for insertion of the pad *p*. After the pad has been located in the pocket, which is done very readily inasmuch as the shape of the pocket conforms to the shape of the pad, the operator releases the clamp-lifting treadle and permits the presser-feet 48 to descend under the influence of the springs 53. This lowering of the presser-feet under the heavy pressure of the springs 53 causes the work-clamping member 44 to be swung downwardly about its pivots 45, in opposition to the lighter spring 46, causing the flange 44b of the member 44 to bear upon the marginal portions of the pad, whereupon the body material, the handle and the pad are all held against relative movement. The sewing machine is then started and the uniting seam *s* is sewed through the three elements held by the work-clamp, as shown in Fig. 5. After the seam has been completed the machine is automatically brought to rest by the stop-motion.

From the foregoing it will be perceived that this invention has provided a work-holder for article-attaching machines which greatly facilitates the proper locating and clamping of a plurality of articles which are of such nature that they are difficult to arrange relative to each other and easily disarranged.

It will also be apparent that decided advantages flow from the ability to give to the work-clamping members all of their movements by one complete actuation of a suitable clamp-actuating treadle and without the necessity of actuating any devices by hand.

Having thus set forth the nature of the invention what I claim herein is:

1. A work-holder for article-attaching machines comprising a work-supporting plate; a lower work-clamping member located above said plate and provided with an article-receiving pocket; spring means acting to depress said member to cause it to clamp a work-piece on said plate; a pivotally mounted upper work-clamping member overlying said pocket and having a portion extending thereinto for engaging an article therein; spring means tending to tip said upper work-clamping member upwardly about its pivot to expose said pocket; and other spring means operative in opposition to the second mentioned spring means to depress said upper work-clamping member into contact with an article in said pocket.

2. A work-holder for article-attaching machines comprising a work-supporting plate; a lower work-clamping member located above said plate and provided with an article-receiving pocket; spring means acting to depress said member to cause it to clamp a work-piece on said plate; an upper work-clamping member pivotally mounted on said lower work-clamping member and overlying said pocket; spring means tending to tip said upper work-clamping member upwardly about its pivot and away from the lower work-clamping member to expose said pocket; and a spring-depressed presser-foot engaging said upper work-clamping member and acting in opposition to the second mentioned spring means to depress said upper work-clamping member into contact with an article in said pocket.

3. A work-holder for article-attaching machines comprising a work-supporting plate; a lower work-clamping member located above said plate and provided with an article-receiving pocket; spring means acting to depress said member to cause it to clamp a work-piece on said plate; an upper work-clamping member pivotally mounted on said lower work-clamping member and overlying said pocket; spring means tending to tip said upper work-clamping member upwardly about its pivot to expose said pocket; a spring-depressed presser-foot engaging said upper work-clamping member and acting in opposition to the second mentioned spring means to depress said upper work-clamping member into contact with an article in said pocket; and lifter means for simultaneously lifting said work-clamping members and said presser-foot to permit a new work piece to be placed beneath said lower work-clamp-

ing member and a new article to be inserted into said pocket.

4. Work-holding means for sewing machines comprising a work-support; upper and lower relatively movable clamp-members overlying said work-support, said lower clamp-member having an article receiving pocket; individual spring means for depressing said clamp-members; a two-stage-movable lifter-means for simultaneously lifting both of said members, in opposition to said spring means, during its first stage of movement to permit a work-piece to be placed on said work-support beneath said clamp-members; means actuated by said lifter-means during its second stage of movement to disconnect the lower one of said clamp-members from said lifter-means, thereby to permit said lower member to be depressed upon a work-piece placed upon said work-support and to expose its article-receiving pocket for the insertion of an article; and means thereafter to render said lifter means ineffective to maintain the upper clamp-member elevated, whereupon said upper clamp-member is lowered by its spring means into contact with said article.

5. Work-holding means for sewing machines comprising a work-support; a lower clamp-member overlying said work-support and having an article receiving pocket; an upper clamp-member pivotally mounted relative to the lower clamp-member; a relatively weak spring tending to tip said upper clamp-member upwardly about its pivot; spring means for bodily depressing said lower clamp-member; a spring depressed presser-foot engaging said upper clamp-member and normally holding it depressed about its pivot; a two-stage-movable lifter-means for simultaneously lifting both of said members and said presser-foot, in opposition to said spring means, during its first stage of movement to permit a work-piece to be placed on said work-support beneath said clamp-members; means actuated by said lifter-means during its second stage of movement to disconnect the lower one of said clamp-members from said lifter-means to permit said lower member to be depressed upon a work-piece placed upon said work-support and to expose its article-receiving pocket for the insertion of an article; and means thereafter to render said lifter means ineffective to maintain the presser-foot elevated whereupon said presser-foot depresses said upper clamp-member into contact with said article.

6. Work-holding means for sewing machines comprising a work-support; upper and lower work-clamp members overlying said work-support, the lower clamp-member having an article-receiving pocket; a common support for both of said work-clamp members, the upper of said members being pivotally mounted relative to said common support; means tending to tip said upper work-clamp member upwardly about its pivot; means acting on said common support to lift both of said work-clamp members bodily away from said work-support; spring means to depress the lower of said work-clamp members into contact with a work-piece on said work-support, and other means to depress said upper work-clamp member into contact with an article located in the pocket of said lower work-clamp member.

7. Work-holding means for sewing machines comprising a work-support; upper and lower work-clamp members overlying said work-support, the lower clamp-member having an article-receiving pocket; a common support for both of said work-clamp members, the lower clamp-member being fixedly secured thereon and the upper of said members being pivotally mounted relative thereto; means tending to tip said upper work-clamp member upwardly about its pivot; restraining means engaging said upper work-clamping member normally to prevent tipping thereof; two-stage movable means acting on said common support during its first stage of movement to lift both of said work-clamp members and said restraining means away from said work-support to permit a work-piece to be placed on said work-support; spring means rendered effective by the second stage of movement of said lifting means to depress the lower of said work-clamp members into contact with a work-piece on said work-support and to expose said article-receiving pocket for the reception of an article; and other means thereafter to depress said upper work-clamp member into contact with an article located in said pocket.

8. In an article-attaching machine having a frame including a bed-plate; a work-clamp movably supported above said bed-plate and including a bracket provided with a head; a work-holder supporting-bar slidingly mounted in said head; a spring normally urging said bar downwardly; a pair of work-holders carried by said bar; one of said work-holders being pivoted to swing relative to said bar; a spring normally urging said pivoted work-holder upwardly about its pivot; a spring depressed presser-member slidingly mounted in said head and normally holding said pivoted work-holder depressed about its pivot; means to lift said presser-member; a latch member carried by said bar and engaging said presser-member to effect upward movement of said bar with said presser-member; and means rendered effective by a further upward movement of said presser-member to disconnect said latch therefrom to permit said bar to be moved downwardly under the influence of the spring acting thereon.

9. In an article-attaching machine having a frame including a bed-plate, a standard, and an overhanging arm; a work-clamp movably supported above said bed-plate and including a bracket provided with a head; first and second work-holders slidingly mounted on said head; a spring normally urging said first work-holder downwardly; a spring-depressed presser-member slidingly mounted in said head and normally urging said second work-holder downwardly; means effective in two stages to lift said presser-member; a latch connected with said first work-holder and engaging said presser-member to effect upward movement of said first work-holder with said presser-member during its first stage of movement; and means effective by the second stage of movement of said presser-member to disconnect said latch therefrom to permit said first work-holder to be moved downwardly under the influence of the spring acting thereon.

10. A sewing machine comprising a frame including a bed-plate and an overhanging arm; a work-clamp mounted for horizontal movement on said bed-plate; means for moving said work-clamp horizontally; lifter means for lifting a portion of said work-clamp to permit work to be applied to and removed from said work-clamp; and means to transmit to said overhanging arm the upward thrust of said lifter means.

11. A sewing machine comprising a frame including a bed-plate and an overhanging arm; a work-clamp including a clamp-frame mounted for horizontal movement on said bed-plate and

a vertically movable work-holder carried by said clamp-frame; spring means carried by said clamp-frame normally depressing said work-holder; means for lifting said work-holder in opposition to said spring means; and means including contacting elements carried by said clamp-frame and said overhanging arm for transmitting to said arm the upward thrusts transmitted to said clamp-frame by said work-holder lifting means.

12. A sewing machine comprising a frame including a bed-plate and an overhanging arm; a work-clamp including a clamp-frame mounted for horizontal movement on said bed-plate and a vertically movable work-holder carried by said clamp-frame; spring means carried by said clamp-frame normally depressing said work-holder; means for lifting said work-holder in opposition to said spring means; and means comprising a roller rigidly supported by said arm and a cooperating flat surface provided by said clamp-frame and contacting said roller for transmitting to said arm the upward thrusts transmitted to said clamp-frame by said work-holder lifting means.

13. A sewing machine comprising a frame including a bed-plate and an overhanging arm; a work-clamp including a clamp-frame mounted for horizontal movement on said bed-plate and a vertically movable work-holder carried by said clamp-frame; spring means carried by said clamp-frame normally depressing said work-holder; means for lifting said work-holder in opposition to said spring means; and means to transmit to said arm the upward thrusts transmitted to said clamp-frame by said work-holder lifting means, comprising a rigid horizontally disposed abutment surface and a cooperating thrust roller engaging said surface, one carried by said clamp-frame and the other carried by said arm, said surface and roller being so proportioned that the two are maintained in contact in all of the positions of said work-clamp on said bed-plate.

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