July 21, 1953 O. J. HUELSTER ET AL 2,646,185

APPARATUS FOR ATTACHING AND SPACING FASTENER ELEMENTS ON SUPPORTS

Filed March 29, 1947 6 Sheets-Sheet 1

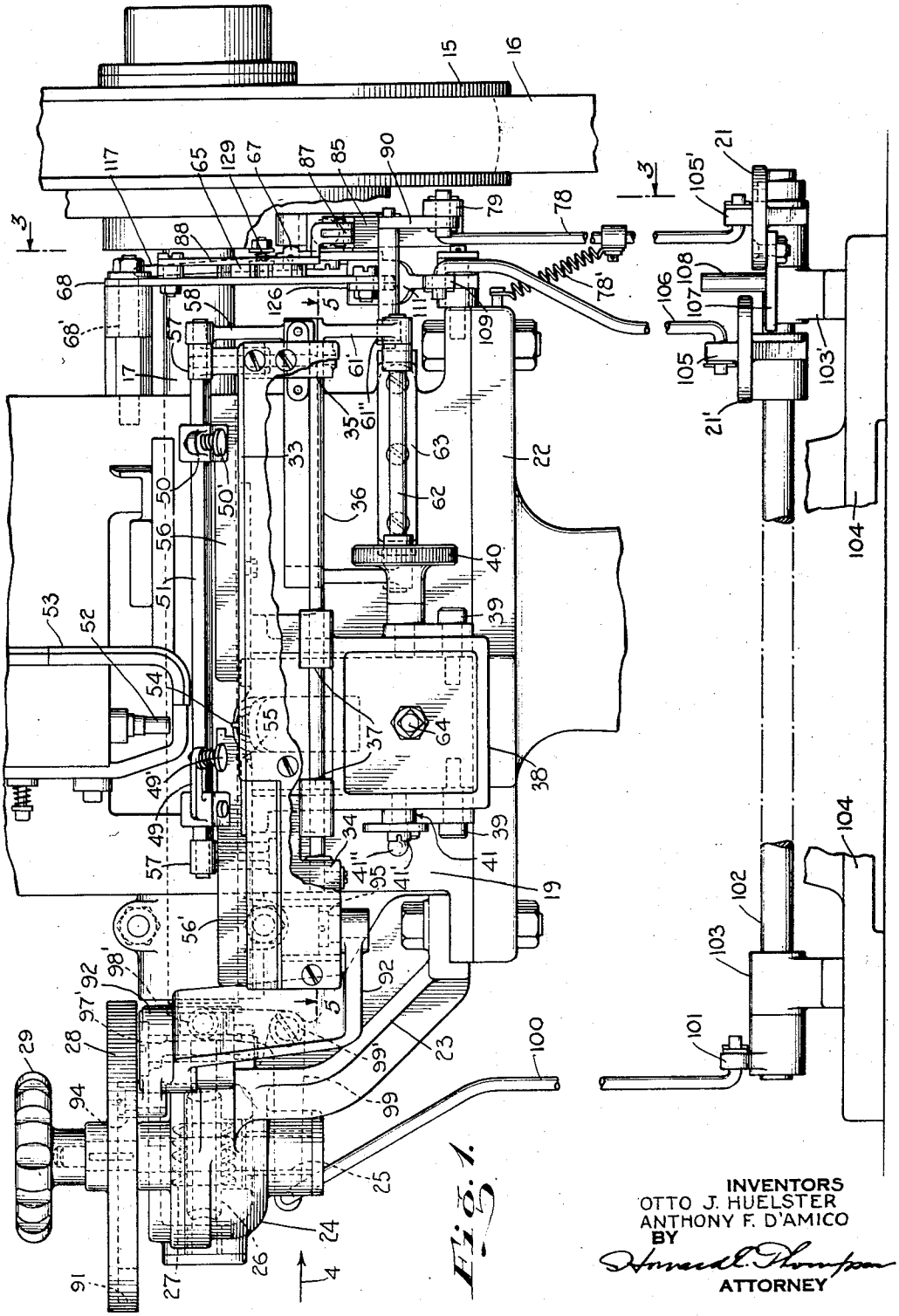


Fig. 1.

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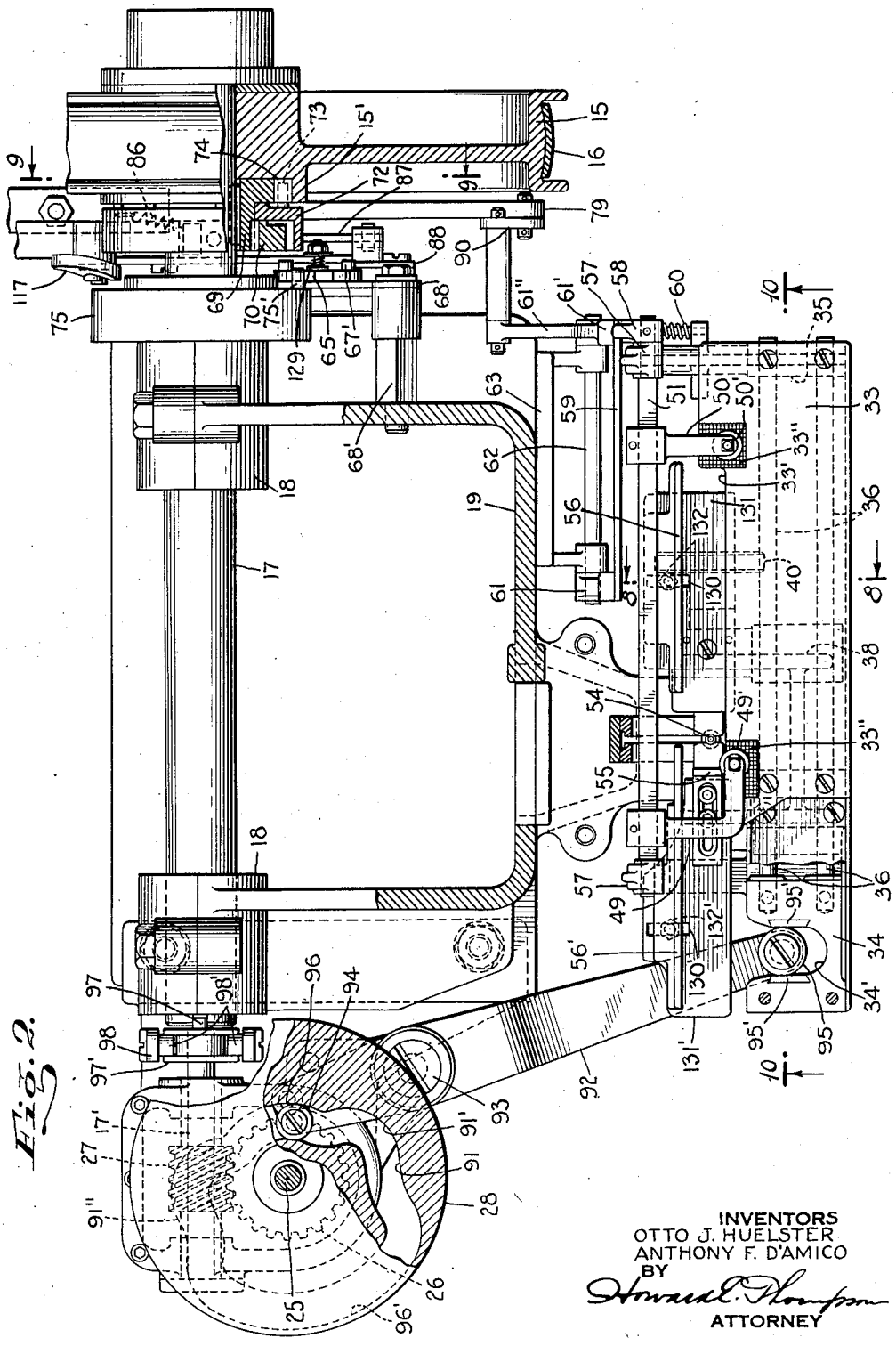


Fig. 2.

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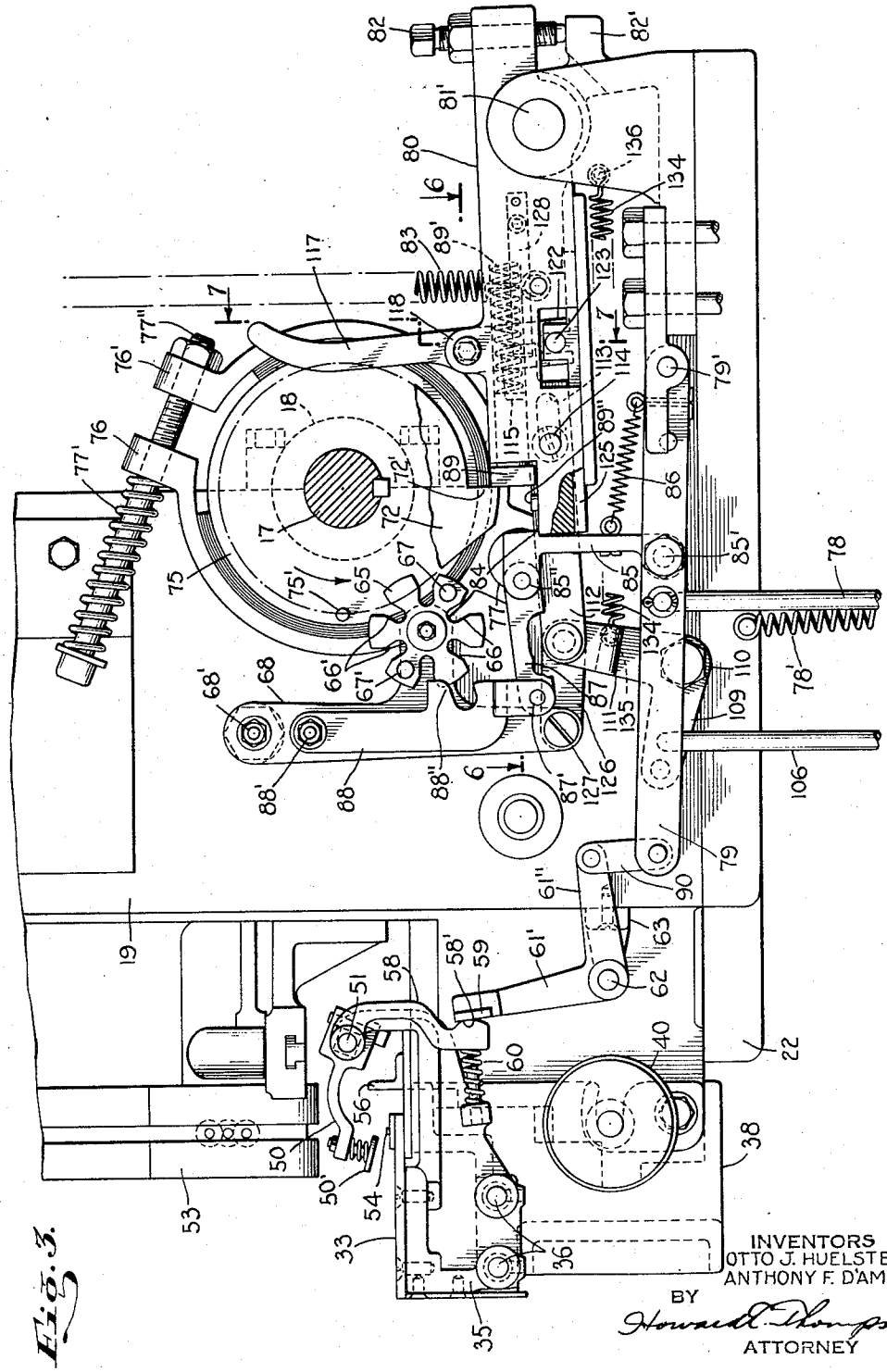


Fig. 3.

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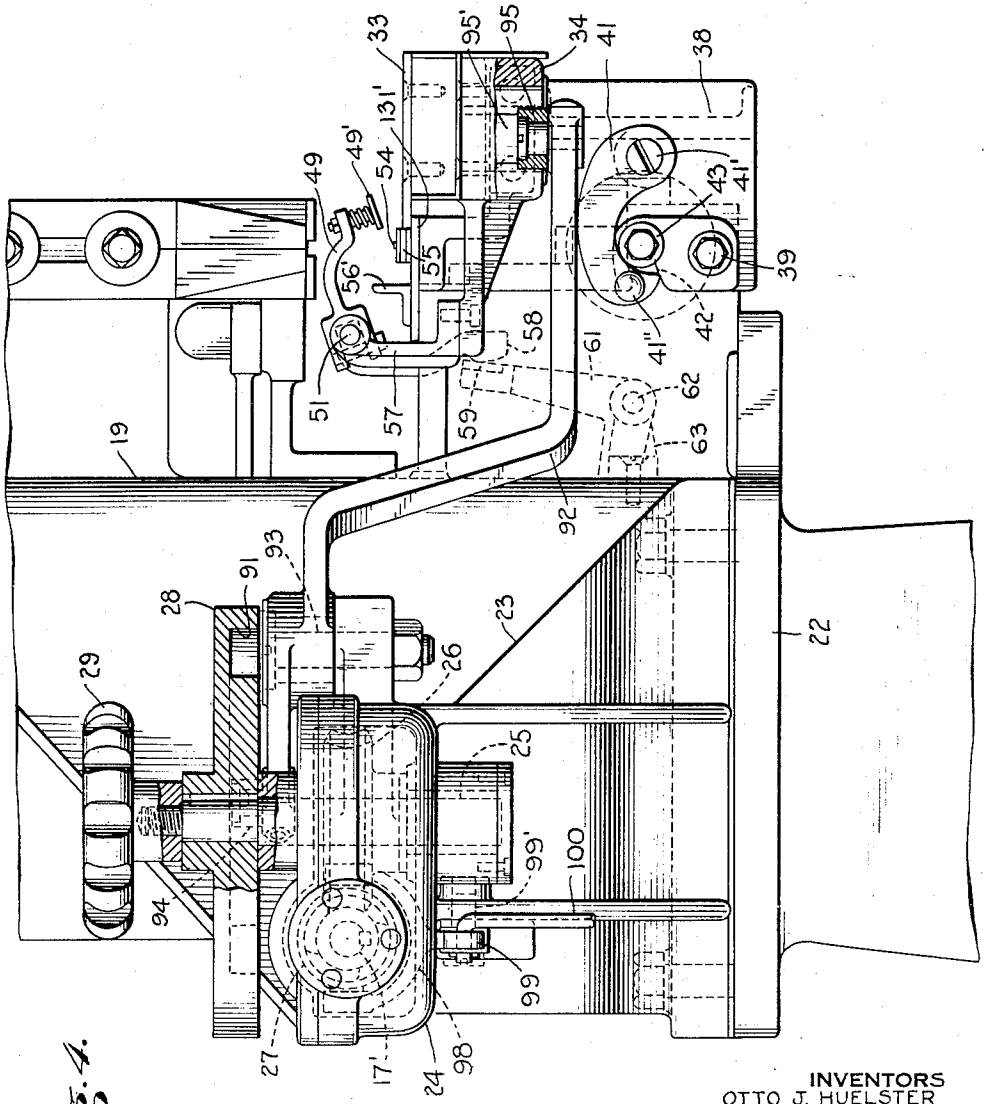


Fig. 4.

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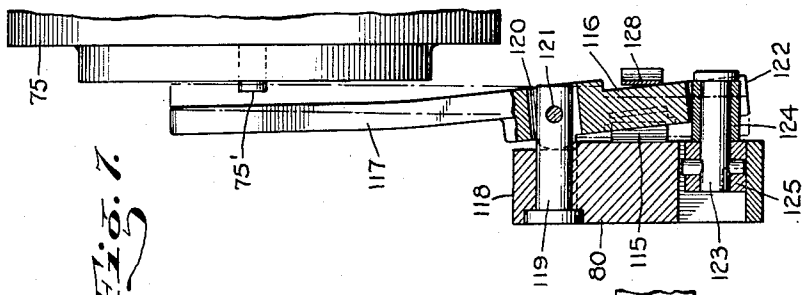


Fig. 7.

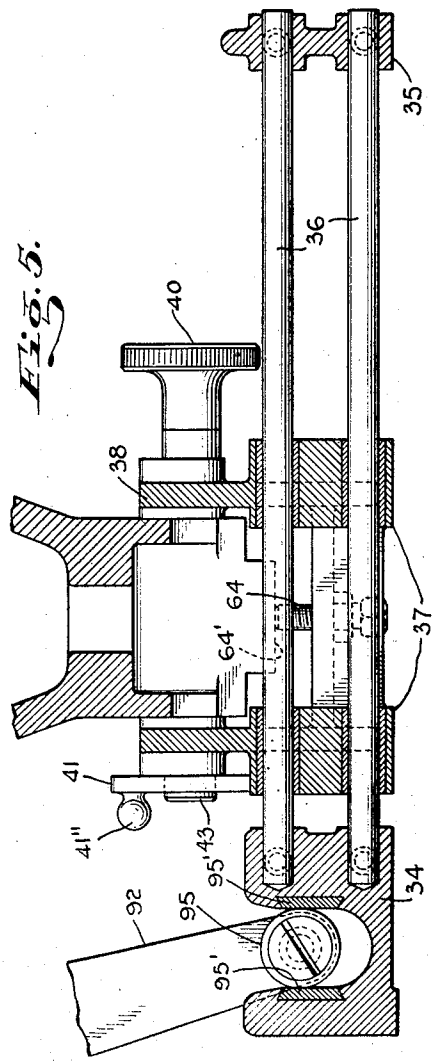


Fig. 5.

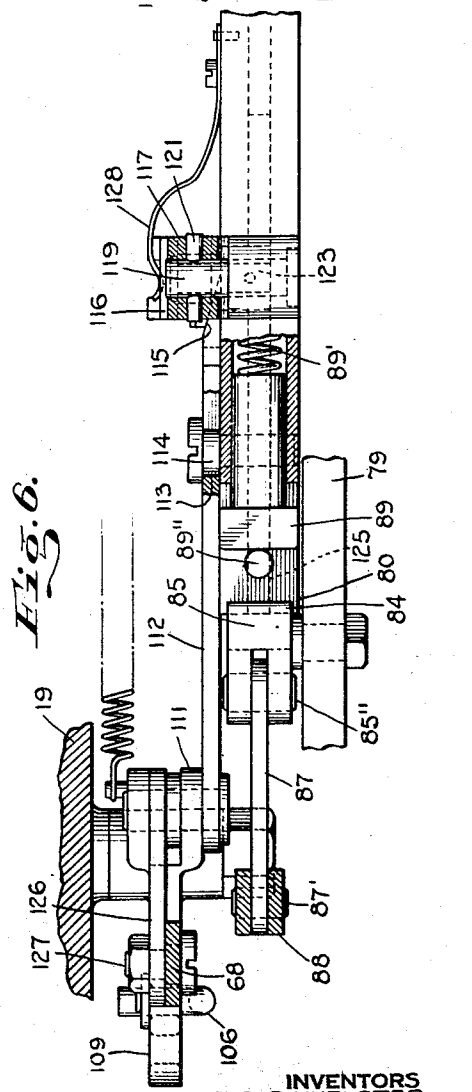


Fig. 6.

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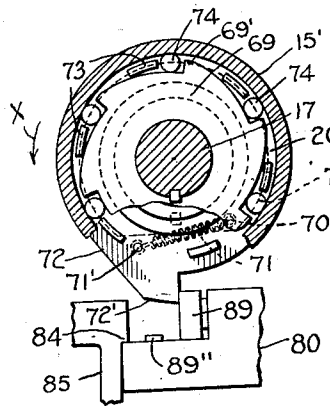


Fig. 9.

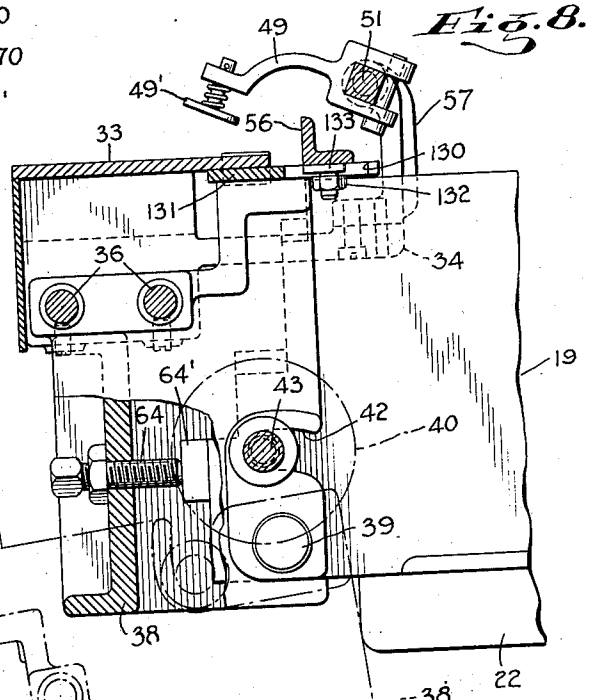


Fig. 8.

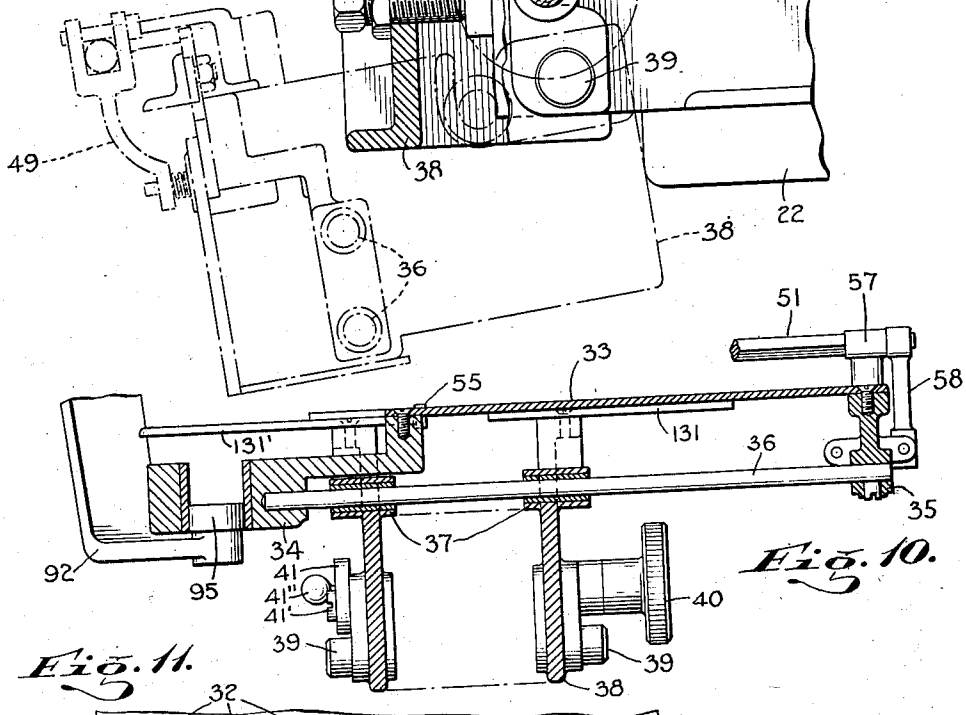
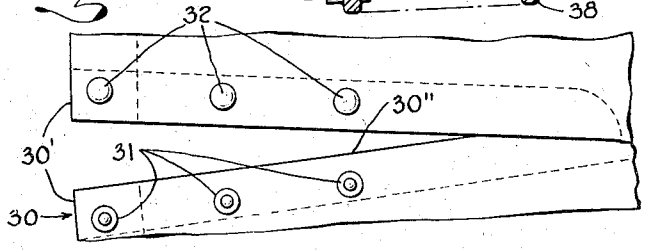


Fig. 10.

Fig. 11.



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UNITED STATES PATENT OFFICE

2,646,185

APPARATUS FOR ATTACHING AND SPACING FASTENER ELEMENTS ON SUPPORTS

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Application March 29, 1947, Serial No. 738,124

15 Claims. (Cl. 218—6)

1

This invention relates to apparatus or machines for securing fasteners to suitable supports, particularly snap fasteners of the stud and socket type. More particularly, the invention deals with apparatus or machines of this kind employing automatically actuated gauges for setting or securing a plurality of fastener elements at predetermined spaced intervals on a garment or other support, so that companion elements, on separate parts of the garment, will be in common alinement one with respect to the other and to a predetermined edge portion or part of the garment.

Still more particularly, the invention deals with machines or apparatus of the kind described, wherein a series of fastener elements are attached, at spaced intervals, on a workpiece in the movement of a workpiece supporting table in two directions in the machine, that is to say, attachment of one series to a workpiece in movement of the table in one direction and another series to another workpiece in movement of the table in the opposite direction, thereby avoiding lost motion in the machine of the kind under consideration.

The novel features of the invention will be best understood, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

Fig. 1 is a front view of the machine with parts of the construction broken away.

Fig. 2 is a plan view with parts of the construction broken away and in section and with parts omitted for sake of clarity.

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

Fig. 4 is a side view, looking in the direction of the arrow 4 of Fig. 1, with parts shown in section.

Fig. 5 is a sectional plan on the line 5—5 of Fig. 1.

Fig. 6 is a section on the line 6—6 of Fig. 3.

Fig. 7 is a section on the line 7—7 of Fig. 3.

Fig. 8 is a cross-section on the line 8—8 of Fig. 2 on an enlarged scale.

Fig. 9 is a section on the line 9—9 of Fig. 2 with parts of the construction broken away.

Fig. 10 is a section on the line 10—10 of Fig. 2; and

Fig. 11 is a diagrammatic view of the front upper portion of a pair of shorts showing two series of snap fastener devices secured thereto in opposed alinement with respect to each other.

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Considering Figs. 1 and 2 of the drawing, we have shown, at 15, a drive pulley driven by a belt 16 from a suitable driving source for rotation of a drive shaft 17 of the machine. The shaft 17 is supported in suitable bearings, as at 18, at the upper part of the casing or frame 19 of the machine.

The shaft 17 is driven through a suitable clutch mechanism, generally identified at 20 in Fig. 9 of the drawing, through actuation of a primary pedal 21 and a secondary pedal 21', shown in Fig. 1 of the drawing. The actuation of the clutch or other mechanisms of the machine or apparatus will be later described. The casing or frame 19 is supported on a bed-plate 22. Extending up from one side of the casing, or frame 19, is a bracket 23 having, at its upper end, a gear housing 24 in which is arranged a transverse cam shaft 25 geared to the shaft 17 or extension 17' through worm gear 26 and worm 27, note Fig. 2 of the drawing. On the shaft 25, outwardly of the housing 24, is a cam disc 28 mounted for quick detachable coupling with the shaft end through the medium of a large clamp nut 29. This provides re-placement of cam discs from time to time to suit different travel and spacing of fasteners on supports or workpieces of different types and kinds, for example, in spacing fasteners on the separate parts of a pair of shorts 30, indicated in part in Fig. 11 of the drawing. In this figure, 31 represents a series of stud parts and 32 a series of socket parts for engagement with the stud parts 31, in what are commonly referred to as snap fasteners.

The workpiece, such for example as 30, is adapted for support upon a workpiece supporting table or platform 33 mounted to move across the front of the machine from right to left, and left to right, the table 33 having spaced brackets 34 and 35 secured to the lower portions thereof. Each bracket has a pair of apertures in which are mounted a pair of guide rods 36, the latter slidably engaging spaced pairs of bearings 37 in a frame 38 pivoted to the main frame, as seen at 39, and adjustably clamped to the main frame 19 by a clamp screw 40 and a clamp hook 41, note Figs. 1, 4 and 10. The pivoted frame 38 has side walls with arc-shaped recesses 42 therein for movement over pin or screw portions, as at 43, on one of which is arranged the clamp screw 40 and the other of which is arranged by the clamp hook 41, the hook 41 being pivoted to the frame 38, as seen at 41' and has a finger-piece portion at its free end, as at 41''.

The rear central portions of the table 33 is cut-out, as seen at 33' and, adjacent the cutout por-

tions, the surface of the table has roughened sections 33'' to grip a workpiece, such as 30, urged upon said surfaces by fingers 49 and 50 each supporting yieldable pad members 49', 50'. The fingers are adjustably secured longitudinally of a square rod 51 to engage workpieces of different sizes.

The gauge attachment, which comprises most of the mechanisms of the machine described, constitutes part of a fastener setting or securing machine of any type or kind and, in Fig. 1 of the drawing, we have indicated at 52 the punch for setting the upper fastener part fed into position through suitable guides, as at 53, onto the workpiece or another fastener part 54 arranged on a suitable support. This determines a fastener locating station, which is also indicated by representation of the fastener 54 in Fig. 2 of the drawing and this station is exposed to the cutout portion 33' of the table 33. Adjacent the station defined by the fastener 54 is an adjustable workpiece stop or gauge 55, against which the edge of the workpiece, for example the edge 30', note Fig. 11, is adapted to be placed. The gauge is adjustably clamped on the table 33, as will appear from a consideration of Fig. 2 of the drawing.

Adjustably supported on the frame 38 are two other workpiece guides 56, 56' arranged longitudinally with respect to the table and against which an edge of the workpiece is adapted to be placed, for example, the edge 30'', note Fig. 11, in gauging the spacing of the fasteners inwardly with respect to said edge. The shaft 51 is rotatably supported in brackets 57 secured to the brackets 34—35. Secured to the shaft 51, beyond one of the brackets, the bracket 57 to the right of Fig. 1, is an arm 58, which extends downwardly and has a surface 58' normally held against an elongated plate 59 by a spring 60, note Fig. 3. The spring 60, when the plate 59 releases the arm 58, also is of sufficient tension to support the fingers 49, 50, or their pads 49', 50', in firm engagement upon the work. The plate 59 is supported, at its ends, by arms 61, 61' mounted on an elongated rod or shaft 62 supported in end bearings of a bracket plate 63, note Fig. 2. The arm 61' differs from the arm 61 in having an integral extension 61'' thereon forming a bell-crank of said arm, as will clearly appear from a consideration of Fig. 3. The arms are adapted to move the plate 59 to free the fingers 49, 50 for gripping action, as later described. It will be apparent that the frame 38 and the several parts coupled therewith constitutes a swinging frame unit, which is adapted to swing forwardly and downwardly into the dotted line position, as seen in Fig. 8 in order to give free access to the fastener mechanism of the machine and, particularly, the feed and guide for the fastener 54. Swinging movement of the frame unit is accomplished by simply releasing the screw or nut 40 and the clamp hook 41. Upward movement of the frame unit is checked and controlled by an adjustment screw 64 adjustably supported in the frame 38, note Fig. 8, and operating upon the part 64' on the frame 19, as clearly illustrated in said figure. The elongated plate 59 compensates for movement of the table into its different positions to aline the workpiece with respect to the station 54 in spacing the fasteners 31—32 at predetermined spacings longitudinally of the workpiece or apparel 30.

The machine, according to the present disclosure or illustration of one adaptation and use of the invention, is to apply a series of three fasteners 31 or 32 in a successive series of automatic operations of the machine and in continued uninterrupted operations controlled by a single depression of the pedal 21. Let us say, for example, that, in the first operation, fasteners are attached to the workpiece from left to right. Then, upon completion of the first cycle of three operations, another workpiece is inserted into the machine and another series of fasteners are attached in another cycle of operation, the fasteners being attached to the workpiece from right to left and in the reverse movement of the workpiece table 33. To control this operation, I provide a Geneva 65 having two sets of circumferentially spaced notches or recesses 66, 66', three notches being employed in each set and the Geneva carries, between the sets, opposed pins 67, 67'. The Geneva 65 is rotatably supported upon a lever 68, pivoted in the frame, as seen at 68'. This Geneva controls the two three cycle operations of the workpiece supporting table, as will later appear. It will be understood that the pulley 15 is freely rotatable on the shaft 17 and is clutched to drive the shaft 17 through the clutch mechanism 20, as later described.

Partially arranged in the hub of the pulley 15 and keyed to the shaft 17 is a clutch driven member 69, and to member 69 in turn is keyed a disc ring 70. The disc ring 70, as shown in dotted lines in Fig. 9 and in section in Fig. 2, is provided with a projecting post 70', which is connected to a similar post 71' projecting from a clutch cage or stop disc 72 by a tension spring 71 which tends to urge said stop disc 72 in a counter-clockwise direction relative to the disc ring 70 and the driven member 69. The stop disc 72 is mounted to freely rotate on a hub portion of the driven member 69 (note Fig. 2) between the ring disc 70 and a flange projection on said member 69. Projecting from and rigidly secured to the disc 72 are a series of circumferentially spaced clutch control elements 73 (note Fig. 9) operating between the clutch driven member 69 and that part of the pulley 15 overlying and spaced from said clutch driven member, for example, the flange portion 15' illustrated in Fig. 2 of the drawing, and shown in section in Fig. 9. The driven member 69 has a series of circumferentially spaced teeth or projections 69', between which and the elements 73 are freely disposed clutch rollers 74. The curvatures on each of the teeth or projections 69' form wedge-like surfaces so that, when the elements 73 are moved in the direction of the arrow X, Fig. 9, the rollers are free to move into the gripping or clutching position to transmit the constant drive of the pulley 15 to the shaft 17 through the driven member 69 attached to shaft 17.

Arranged inwardly of the pulley 15, or to the left thereof, as seen in Fig. 2, is a brake-drum 75 keyed to the shaft 17 and this drum has secured thereto a projecting pin 75', which extends into the path of the geneva 65 to intermittently rotate said geneva a partial revolution in each revolution of the shaft 17, as will clearly appear from a consideration of Fig. 3 of the drawing.

Arranged around the break-drum 75 are break-shoes 76, 76' pivoted at 77 to the frame 19, Fig. 3, and having spring means, as at 77', to apply a constant frictional engagement upon the drum controlled by the bolt 77'' so as to control rotation of the shaft 17 and the mechanism driven thereby and prevent excessive strains in stopping rotation of the shaft.

Connected with the foot pedal 21 is a connecting rod 78 which couples, at its upper end, with a lever 79 pivoted, as seen at 79'. Arranged above the lever 79 is a clutch arm 80 pivoted, as seen at 81'. Adjacent the pivoted end of the arm is an adjustable screw 82 cooperating with a stop 82' to set upward swinging movement of the arm, upward movement being contributed to the arm by a spring 83 suitably fixed to a part of the machine or casing, not shown.

The free end of the arm 80 is adapted to be engaged by an offset or catch 84 on a link 85 pivoted to the lever 79, as at 85'. A spring 86 is coupled with the pivot end of the lever 79 and to the link 85 to normally hold the catch in engagement with the arm 80 as will clearly appear from Fig. 3. The upper end of link 85 is forked and pivoted, as seen at 85'' to a link 87, the latter being pivoted, as at 87', to the forked portion of a Geneva engaging lever 88, which is pivoted to the lever 68, as seen at 68'. The lever 88 has a projection, as at 88'', adapted to be engaged by the pins 67, 67' of the Geneva so that, upon completion of three cycles of operation of the shaft 17 and three intermittent partial rotations of the Geneva 65, one of the pins 67, 67' will actuate lever 88 to disengage the catch 84 of lever 85 to release the clutch arm 80 when the latter is held in the downward position.

In Fig. 3 of the drawing, the arm 80 and the other associated parts are shown in what might be termed the normal stop-position of the machine. Upon depressing the foot pedal 21, the link 85, engaging the arm 80, will pull the arm downwardly against the action of the spring 83 and, in this operation, the stop plunger 89 mounted in the arm 80 is moved out of engagement with the projecting stop lug 72'. The plunger 89 is advanced forwardly or outwardly by a spring 89' to a stop pin 89''. The spring 89' forms a means to cushion the blow when the lug 72' strikes the plunger 89 in stopping a revolution of the shaft 17, as will be apparent.

The free end of the lever 79 has a link-connection, as at 90, with the bell crank arm 61'', so that, when the lever 79 is drawn downwardly by the foot pedal 21 and connecting rod 78, simultaneously the plate 59 will be moved out of engagement with the lever 58 and the spring 60 will then move both fingers 49 and 50 into firm engagement with the workpiece which, at this time, will be positioned on the table 33 of the machine.

Upon releasing the stop lug or element 72' in the aforesaid downward movement of the clutch arm, the spring 71 will cause the control elements 73 to move in the direction of arrow X, allowing the clutch rollers 74 to move into clutching position for the pulley 15 to operate the driven member 69, thus contributing rotation to the shaft 17 as will appear from a consideration of Fig. 9 of the drawing. Rotation of the shaft 17 causes the worm gear 26 and worm 27 to be driven, thus actuating the shaft 25 to rotate the cam 28. In the surface of the cam or cam disc 28 is a double cam groove 91, one series of surfaces 91' of which are adapted to control movement of the table 33 in one direction and the other series 91'' of which will actuate the table in the opposite direction, the table being operated by a long offset lever 92 pivoted, as seen at 93, and carrying at its upper end a roller 94 which operates in the cam groove 91. The other lower end of the lever has a roller 95 arranged in a yoke or recess portion of the support 34 at the end of the table, the roller 95 operating upon bearing plates 95', as seen in Fig. 2 of the drawing. Each series 91, 91', in the cam grooves, are of a contour to control the particular shifting of the table as required and the number of shiftings that may be required. In the present illustration, three shifting stations are employed to attach three fasteners, as at 31—32, to a garment at equally spaced distances and between the two shifting stations are what might be termed idling stations in the cam groove as, for example, at 96, 96', the station 96 controlling the support of the table 33 at the extreme right end of the machine and the station 96' positioning the table at the extreme left of the machine, as seen in Fig. 2.

The shaft 17 couples with a worm shaft 17', on which the worm 27 is mounted through a clutch pin or bar 97. The pin 97 is part of a flanged clutch sleeve 97' keyed to and slidable longitudinally of the shaft 17'. The clutch sleeve 97' is moved into inoperative position by the upper forked end 98 of a bell crank 99 pivoted, as seen at 99', note Fig. 1, the forked end 98 having rollers 98' operating in the sleeve 98 as in other devices of this kind. Coupled with the other end of the bell crank 99 is a rod 100 which couples with an arm 101 secured to one end of a long shaft 102 supported in spaced bearings 103, 103' on the base 104 of the machine, part of which is indicated in Fig. 1 of the drawing. The foot pedal 21' is secured to the shaft 102 adjacent and to the left of the bearing 103' and coupled to an arm 105 of the pedal is an upwardly extending rod 106. The pedal 21 is rotatably mounted on the shaft 102 to the right of the bearing 103' and has an arm 105', with which the rod 78 is coupled. Secured to the under-surface of the pedal 21 is a plate 107 which extends to the under-surface of the pedal 21', so that, when the pedal 21' is depressed, the pedal 21 will be correspondingly depressed. On the other hand, the pedal 21 can be depressed without actuation of pedal 21'. The plate 107 has a stop 108 for keeping the operator's foot away from accidentally stepping on the pedal 21'. Secured to the rod 78 and to the bed plate 22 of the machine is a spring 78' which normally supports the pedal 21 in raised position. The pedal 21' is held in raised position by reason of spring 134 attached to lever 111.

It will be understood, from the foregoing, that the clutch pin or bar 97 is thrown out of engagement with the shaft 17 only when the pedal 21' is depressed and in the single operation of the machine, or when the machine is used to secure a single fastener.

Considering now Fig. 3 of the drawing, it will appear that the upper end of the rod 106 couples with one end of a bell crank 109 pivoted, as seen at 110, and the other end 111 of the bell crank is pivoted to a link 112 coupled with and movable longitudinally of an elongated slot 113 in the arm 80 by coupling, as at 114. The link 112 has a cam portion 115, note Fig. 6, which operatively engages the lower end portion 116 of a finger 117; note also in this connection Fig. 7 of the drawing. The finger 117 has a two-way pivotal or swinging mounting upon a raised portion 118 of the arm 80. This mounting comprises a pin 119 rotatable in the raised portion 118 and entering and operating freely in an aperture 120 in the finger and the finger 117 has pivot portions 121 on the pin 119. It will, thus, be apparent that the finger 117 can swing inwardly and outwardly with respect to the path of movement of the pin 75', as seen in Fig. 7, in which operation the finger swings on the pivot axes 121 and can also swing at right angles to the first movement by ro-

tation of the pin 119 when the finger is engaged and operated by the pin 75'. The lower end 116 of the finger 117 is forked, as seen at 122, to engage a pin 123 or a bearing sleeve 124 thereon, the pin 123 being secured to an elongated trip plate 125 mounted to move longitudinally of the arm 80 and to move the lever 85 to the left, as noted in Fig. 3, to disengage the catch 84 from the arm 80. Also pivoted to the upper end 111 of the bell crank 109 is a link 126 pivoted to the lower end of the lever or arm 68, as seen at 127, note Fig. 3. From the foregoing, it will appear that, as and when the pedal 21' is depressed, the bell crank 109 is actuated to move the upper end 111 thereof to the left, as seen in Fig. 3, thus withdrawing the wedge or cam surface 115 from the finger 117, allowing the finger to be moved by a spring 128, note Fig. 3, into the dotted line position of Fig. 7, that is, into the path of the pin 75'. At the same time, the actuation of the bell crank 109 will move the arm or lever 68 to the left throwing the geneva 65 out of the path of the pin 75', thereby permitting single operation or rotation of the machine in applying a single fastener. In depressing the pedal 21', the pedal 21 is also depressed which causes the arm 80 to be drawn downwardly and all of the other functions of the machine, for example moving the fingers 49, 50 into engagement with the work and releasing the clutch for operation or rotation of the shaft 17, depression of the pedal 21' having disengaged the clutch pin or bar 97 from the shaft 117 so that the cam 28 is disengaged and rendered inoperative; thus the table 33 of the machine will remain stationary. The operator will have positioned the workpiece to bring the desired section or portion thereof in proper alinement with respect to the fastener attaching mechanism of the machine.

In the aforesaid one-cycle of operation of the machine and the pin 75' striking the finger 117, the connector or trip plate 125 is operated to disengage the catch 84 from the arm 80, allowing this arm to move upwardly by the spring 83 to bring the stop plunger 89 in position to engage the projection 72' checking the machine after one revolution. It will be understood that, as the arm 80 is moved down in the initial operation, above described, the stop plunger 89 moves out of the path of the projection 72, allowing the shaft 17 to perform its single rotation. Upon releasing pressure of the foot upon the pedal 21', the pedal will be returned to normal position, thus returning the parts to the normal position, as shown in Fig. 3, where the machine is at rest. Either pedal 21, 21' may now be operated. If the pedal 21' is again operated for application of another single fastener, this can be done. On the other hand, the pedal 21 my be operated to perform the three successive operations and these operations will be performed as follows.

In actuating the machine to perform three successive operations or to apply three fasteners, as at 31—32, to a garment or other support, the following procedure will be followed. Here it might be well to mention first, however, that one machine is used to apply one set of fasteners, as at 31, and another machine, the other set of fasteners, as at 32. After alining a workpiece, such as 30, upon the table 33 with the edge 30' up-against the stop or gauge 55 and the edge 30'' up-against the stops or gauges 56, 56', the pedal 21 is depressed and held depressed until after attachment of the third fastener. This draws downwardly upon the lever 79, which, through the link 99, bell crank 61', releases the fingers 49, 50' to grip the workpiece in position upon the table 33. In the aforesaid downward movement of the lever 79, the link 85 draws the arm 80 downwardly disengaging the stop plunger 89 from the projection 72'. The spring 71 then puts the clutch into operation in the manner previously described causing the shaft 17 to be rotated. In the first complete revolution of the shaft, the pin 75' will rotate the Geneva 65 ⅙ of a revolution to advance one of the pins, the pin 67, in the direction of the cam 88''. In the beginning of the aforesaid operation, the fastener attaching means of the machine is actuated to apply a fastener to the workpiece, for example, the first fastener 31 to the left of Fig. 11. In the above operation, the cam 28 is rotated ⅙ of a revolution and, during this one complete rotary motion of the shaft 17, the arm 92 will be actuated by the cam to advance the table 33 (to the left in Fig. 2) to position another portion of the workpiece in position for receiving, for example, the middle fastener 31 shown in Fig. 11. Then the cam 28, by reason of the shape of cam groove 91, will maintain a dwell in actuation of the arm 92 to hold the table 33 momentarily at rest and simultaneously the fastener attaching means of the machine will be again operated and at this stage the shaft 17 will be completing its second rotation, again actuating the Geneva 65 to advance the same another ⅙ of a revolution and this operation is again repeated in attaching the fastener 31, shown to the right of Fig. 11 in the third rotation of the shaft 17, at which time the pin 67 has engaged the cam surface 88'' on the lever 88, moving said lever to the left, note Fig. 3, disengaging the catch 84 from the arm 80, allowing said arm to be drawn upwardly by the spring 83 to bring the plunger 89 into the stop position, thus checking rotation of the disc 72 and disengaging the clutch driven member 69 attached to the shaft 17 from the drive pulley 15.

In each of the aforesaid attachments of the series of three fasteners 31, the workpiece is retained in engagement with the table by the fingers 49, 50. However, upon removal of the foot from the pedal 21, the lever 79 will be raised (Fig. 3) which will automatically raise the fingers 49 and 50, allowing the workpiece to be removed from the table.

Another garment will then be positioned upon the table 33 when the latter is in its farthermost left position as viewed in Fig. 2 and the machine again operated to set the plural number of fasteners 31 or 32 to the garment during the return movement of the table to the right.

In the operation of the arm or lever 92, the roller 95 moves in the elongated slot 34' in the bracket 34 as the table moves back and forth across the machine.

Considering Figs. 1 and 2 of the drawing, it will be seen that on the pivot of the Geneva 65 is arranged an adjustably tensioned spring 129 to maintain the Geneva from rotating beyond the movement imparted thereto by the pin 75'.

In the above described operations, the foot is maintained on either the pedal 21 or the pedal 21' during the complete operation of attaching the three series of fasteners or the individual fasteners in order to maintain the fingers 49, 50 in engagement with the workpiece.

Considering Figs. 2 and 8 of the drawing, it will appear that the workpiece guides 56, 56' are adjustably mounted to control positioning of the

fasteners 31, 32 with respect to an edge of the garment, for example, the edge 30''. This adjustment consists in providing elongated slots 130, 130' in the plate 131 of the frame 38 and a clamp nut 132, 132' for holding the gauges 56, 56' in position. Keys, one of which is shown at 133 in Fig. 8, are employed on the gauges to prevent rotatable shifting thereof and to maintain alinement as will be apparent.

Considering Fig. 3 of the drawing, a long spring 134 is shown extending between a pin 135 on the bell crank 111 to a suitable fastening on the frame of the machine, as seen at 135. This spring urges the link or lever 112 to the right, as seen in Fig. 3, with the pin 114 in the left end of the elongated slot 113 and maintains the wedge 115 in engagement with the finger 117. Note in this connection Fig. 6 of the drawing. The spring 134 also supports the pedal 21' in raised position when the pedal 21 is depressed. The spring 134 further operates through intermediate linkage to hold the clutch pin 97 in operative position within the adjacent slotted end of shaft 17.

In the drawings, parts of a conventional or standard type of fastener attaching machine are shown, but as the present invention is concerned primarily with the control and operation of the workpiece in gauging the setting of fasteners on the workpiece, no reference is made specifically to the standard machine and detail structures only of the mechanism or apparatus for performing the desired function are dealt with. At this time, it will also be understood that the machine may be adjusted through the cam employed to control the setting or attachment of any desired number of fasteners and at different positions on a workpiece such as a garment or other support and in applying different numbers of fasteners thereto in a successive series of operations.

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

1. In machines of the class described, a mechanism for automatically shifting a workpiece with respect to a fastener attaching station of the machine, said mechanism comprising main and supplemental shafts, means keying said shafts together, a workpiece supporting table, means for holding a workpiece in alined position on said table, a drive member rotatable on said main shaft, a clutch between the drive member and said main shaft, means holding the clutch normally in inoperative position, manually actuated means releasing said last named means in the drive of said main shaft, a member controlling the number of revolutions of the main shaft by the drive member, means actuated by the supplemental shaft for shifting said table in each revolution of the main shaft and said supplemental shaft, and means for returning the clutch holding means to position stopping rotation of the main shaft upon completing a predetermined number of revolutions.

2. In machines of the class described, a mechanism for automatically shifting a workpiece with respect to a fastener attaching station of the machine, said mechanism comprising main and supplemental shafts, means keying said shafts together, a workpiece supporting table, means for holding a workpiece in alined position on said table, a drive member rotatable on said main shaft, a clutch between the drive member and said main shaft, means holding the clutch normally in inoperative position, manually actuated means releasing said last named means in the drive of said main shaft, a member controlling the number of revolutions of the main shaft by the drive member, means actuated by the supplemental shaft for shifting said table in each revolution of the main shaft and said supplemental shaft, means for returning the clutch holding means to position stopping rotation of the main shaft upon completing a predetermined number of revolutions, said table actuating means comprising a cam having two series of cam surfaces, one controlling one series of movements of the table in one direction in the machine in one series of rotations of said main shaft, and the other controlling movement of the table in the opposite direction in another series of operations of said main shaft.

3. In machines of the class described, a mechanism for automatically shifting a workpiece with respect to a fastener attaching station of the machine, said mechanism comprising main and supplemental shafts, means keying said shafts together, a workpiece supporting table, means for holding a workpiece in alined position on said table, a drive member rotatable on said main shaft, a clutch between the drive member and said main shaft, means holding the clutch normally in inoperative position, manually actuated means releasing said last named means in the drive of said main shaft, a member controlling the number of revolutions of the main shaft by the drive member, means actuated by the supplemental shaft for shifting said table in each revolution of the main shaft and said supplemental shaft, means for returning the clutch holding means to position stopping rotation of the main shaft upon completing a predetermined number of revolutions, other manually operated means for actuating said keying means to uncouple the supplemental shaft from the main shaft, and said last named means actuating said member limiting rotation of the main shaft to one revolution.

4. In machines of the class described having an attaching station with means for attaching fasteners to a workpiece supported at said station, a mechanism for shifting a workpiece with respect to said station in attaching fasteners at predetermined spaced intervals to the workpiece, said mechanism comprising a workpiece supporting table, workpiece holders for clamping the workpiece in predetermined position on said table, a drive pulley, main and supplemental shafts, a clutch controlling the drive between the drive pulley and said main shaft, a stop normally holding the clutch in inoperative position, a catch engaging the stop, a Geneva, means on the main shaft actuating said Geneva to rotate the same a partial revolution in each rotation of said main shaft, means actuated by said Geneva, upon completion of a predetermined number of partial rotations of the Geneva for releasing said catch to bring the stop into operative position controlling the number of revolutions of the main shaft and said supplemental shaft, a cam actuated by the supplemental shaft, said cam operatively engaging means to move said table in two directions to bring different sections of the workpiece supported on the table in alinement with said station for attachment of a series of fasteners, the number of which is controlled by the number of revolutions contributed to said main shaft, and manually actuated means for moving the stop into inoperative position in initially starting drive of the main shaft by said drive pulley through said clutch.

5. In machines of the class described having an attaching station with means for attaching fasteners to a workpiece supported at said station, a mechanism for shifting a workpiece with respect to said station in attaching fasteners at predetermined spaced intervals to the workpiece, said mechanism comprising a workpiece supporting table, workpiece holders for clamping the workpiece in predetermined position on said table, a drive pulley, main and supplemental shafts, a clutch controlling the drive between the drive pulley and said main shaft, a stop normally holding the clutch in inoperative position, a catch engaging the stop, a Geneva, means on the main shaft actuating said Geneva to rotate the same a partial revolution in each rotation of said main shaft, means actuated by said Geneva, upon completion of a predetermined number of partial rotations of the Geneva, for releasing said catch to bring the stop into operative position controlling the number of revolutions of the main shaft and said supplemental shaft, a cam actuated by the supplemental shaft, said cam operatively engaging means to move said table in two directions to bring different sections of the workpiece supported on the table in alinement with said station for attachment of a series of fasteners, the number of which is controlled by the number of revolutions contributed to said main shaft, manually actuated means for moving the stop into inoperative position in initially starting drive of the main shaft by said drive pulley through said clutch, and said last named means controlling movement of the workpiece holders into operative position.

6. In machines of the class described having an attaching station with means for attaching fasteners to a workpiece supported at said station, a mechanism for shifting a workpiece with respect to said station in attaching fasteners at predetermined spaced intervals to the workpiece, said mechanism comprising a workpiece supporting table, workpiece holders for clamping the workpiece in predetermined position on said table, a drive pulley, main and supplemental shafts, a clutch controlling the drive between the drive pulley and said main shaft, a stop normally holding the clutch in inoperative position, a catch engaging the stop, a Geneva, means on the main shaft actuating said Geneva to rotate the same a partial revolution in each rotation of said main shaft, means actuated by said Geneva, upon completion of a predetermined number of partial rotations of the Geneva, for releasing said catch to bring the stop into operative position controlling the number of revolutions of the main shaft and said supplemental shaft, a cam actuated by the supplemental shaft, said cam operatively engaging means to move said table in two directions to bring different sections of the workpiece supported on the table in alinement with said station for attachment of a series of fasteners, the number of which is controlled by the number of revolutions contributed to said main shaft, manually actuated means for moving the stop into inoperative position in initially starting drive of the main shaft by said drive pulley through said clutch, said last named means controlling movement of the workpiece holders into operative position, means coupling and uncoupling the main and supplemental shafts, manually actuated means for moving the last named means into uncoupled position, and to simultaneously move the Geneva into inoperative position in providing one revolution only of the main shaft.

7. In machines of the class described having an attaching station with means for attaching fasteners to a workpiece supported at said station, a mechanism for shifting a workpiece with respect to said station in attaching fasteners at predetermined spaced intervals to the workpiece, said mechanism comprising a workpiece supporting table, workpiece holders for clamping the workpiece in predetermined position on said table, a drive pulley, main and supplemental shafts, a clutch controlling the drive between the drive pulley and said main shaft, a stop normally holding the clutch in inoperative position, a catch engaging the stop, a Geneva, means on the main shaft actuating said Geneva to rotate the same a partial revolution in each rotation of said main shaft, means actuated by said Geneva, upon completion of a predetermined number of partial rotations of the Geneva, for releasing said catch to bring the stop into operative position controlling the number of revolutions of the main shaft and said supplemental shaft, a cam actuated by the supplemental shaft, said cam, operatively engaging means to move said table in two directions to bring different sections of the workpiece supported on the table in alinement with said station for attachment of a series of fasteners, the number of which is controlled by the number of revolutions contributed to said main shaft, manually actuated means for moving the stop into inoperative position in initially starting drive of the main shaft by said drive pulley through said clutch, said last named means controlling movement of the workpiece holders into operative position, means coupling and uncoupling the main and supplemental shafts, manually actuated means for moving the last named means into uncoupled position, to simultaneously move the Geneva into inoperative position in providing one revolution only of the main shaft, and means actuating a trip in revolution of the main shaft to release said catch and permitting movement of the stop into position to disengage the clutch upon completion of one revolution of said main shaft.

8. In mechanism for automatically shifting position of a workpiece supporting table in a cycle of operation of said mechanism, a driven shaft, means in operative engagement with the shaft for shifting said table, a clutch controlling drive of said shaft, means comprising a pivoted arm having a cushioned stop thereon normally maintaining the clutch in inoperative position, a catch engaging said arm, manually actuated means for moving said catch to trip said arm including the stop to inoperative position and thereby releasing said clutch for activating said drive shaft, an intermittently rotatable catch releasing member, means on said shaft engaging said member to rotate the same a partial revolution upon each revolution of said shaft, and means actuated by said member to release the catch in moving said arm and stop thereof into position disengaging the clutch in stopping rotation of said shaft upon completing a predetermined number of revolutions.

9. In mechanism for automatically shifting position of a workpiece supporting table in a cycle of operation of said mechanism, a driven shaft, means in operative engagement with the shaft for shifting said table, a clutch controlling drive of said shaft, means comprising a pivoted arm having a cushioned stop thereon normally

maintaining the clutch in inoperative position, a catch engaging said arm, manually actuated means for moving said catch to trip said arm including the stop to inoperative position and thereby releasing said clutch for activating said drive shaft, an intermittently rotatable catch releasing member, means on said shaft engaging said member to rotate the same a partial revolution upon each revolution of said shaft, means actuated by said member to release the catch in moving said arm and stop thereof into position disengaging the clutch in stopping rotation of said shaft upon completing a predetermined number of revolutions, other manually actuated means releasing the first named means to maintain the table stationary and moving said catch releasing member into inoperative position, and means controlled by said other manually actuated means for releasing said catch in limiting rotation of said shaft to one revolution.

10. In mechanisms of the class described, a shaft, means comprising main and supplemental pedals controlling rotation of said shaft through a clutch, a clutch control arm having a stop normally maintaining the clutch in inoperative position, a catch engaging said arm, a lever directly coupled with said main pedal and to which said catch is pivotally coupled, whereby actuation of said main pedal will move said arm and its stop into inoperative position, releasing said shaft for rotation through the clutch, a drum on said shaft, said drum having a drive pin, a catch releasing member normally supported in position to be engaged by said drive pin, whereby said member is rotated a partial revolution upon each revolution of said shaft and drum, and means actuated by said member releasing said catch upon completion of a predetermined number of revolutions of said shaft to return said arm and its stop to operative position in stopping rotation of said shaft by moving an element of the clutch into inoperative position.

11. In mechanisms of the class described, a shaft, means comprising main and supplemental pedals controlling rotation of said shaft through a clutch, a clutch control arm having a stop normally maintaining the clutch in inoperative position, a catch engaging said arm, a lever directly coupled with said main pedal and to which said catch is pivotally coupled, whereby actuation of said main pedal will move said arm and its stop into inoperative position, releasing said shaft for rotation through the clutch, a drum on said shaft, said drum having a drive pin, a catch releasing member normally supported in position to be engaged by said drive pin, whereby said member is rotated a partial revolution upon each revolution of said shaft and drum, means actuated by said member releasing said catch upon completion of a predetermined number of revolutions of said shaft to return said arm and its stop to operative position in stopping rotation of said shaft by moving the clutch into inoperative position, and brake means engaging said drum to check rotation of said shaft upon release of the clutch.

12. In mechanisms of the class described, a shaft, means comprising main and supplemental pedals controlling rotation of said shaft through a clutch, a clutch control arm having a stop normally maintaining the clutch in inoperative position, a catch engaging said arm, a lever directly coupled with said main pedal and to which said catch is pivotally coupled, whereby actuation of said main pedal will move said arm and its stop into inoperative position, releasing said shaft for rotation through the clutch, a drum on said shaft, said drum having a drive pin, a catch releasing member normally supported in position to be engaged by said drive pin, whereby said member is rotated a partial revolution upon each revolution of said shaft and drum, means actuated by said member releasing said catch upon completion of a predetermined number of revolutions of said shaft to return said arm and its stop to operative position in stopping rotation of said shaft by moving the clutch into inoperative position, brake means engaging said drum to check rotation of said shaft upon release of the clutch, a catch tripping device, and means whereby operation of said supplemental pedal will move said catch releasing member into inoperative position with respect to said drive pin and release said catch tripping device for movement by said drive pin to release the catch in controlling single rotation of said shaft.

13. In machines for attaching fasteners to workpieces at spaced intervals in a successive series of automatic operations, a workpiece supporting table, means for clamping a workpiece on said table, means for automatically shifting the table to bring successive spaced sections of the workpiece in position for attachment of fasteners thereto in one directional movement of the table in the machine, and said table shifting means including means to then move the table in the opposite direction in attaching a second set of fasteners to the same or a second workpiece in the same spaced relationship as attachment of the first set of fasteners.

14. In a mechanism for automatically shifting a workpiece for attachment of a predetermined number of fasteners separately at predetermined spaced positions on the workpiece, a workpiece supporting table reciprocating back and forth in said mechanism, table actuating means including a power operated rotatable shaft and connections between said shaft and table including a cam and a lever for shifting the table to the next position and for stopping the table for a predetermined time at such position upon each complete rotation of said shaft, a brake applying constant friction to resist rotation of said shaft, a clutch controlling rotation of said shaft, a clutch controlling member normally held in position for disengaging said clutch, a manually actuated member for moving said clutch controlling member to clutch-engaging position, and an automatic means for rendering said manually actuated member ineffective upon completion of a predetermined number of rotations of said shaft to permit disengagement of said clutch, said brake stopping rotation of said shaft upon disengagement of said clutch.

15. The combination defined by claim 14 wherein fingers are provided for holding the workpiece in position on the table, and means connecting said fingers to said manually actuated member for control thereby.

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