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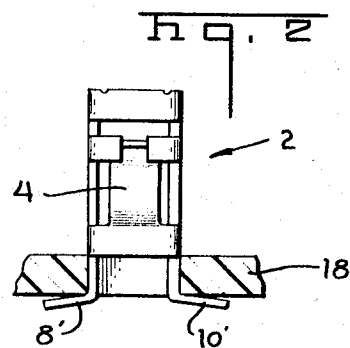
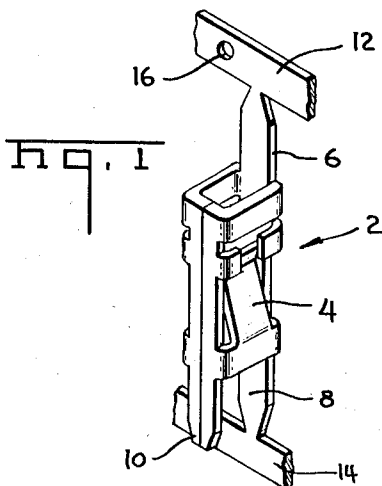
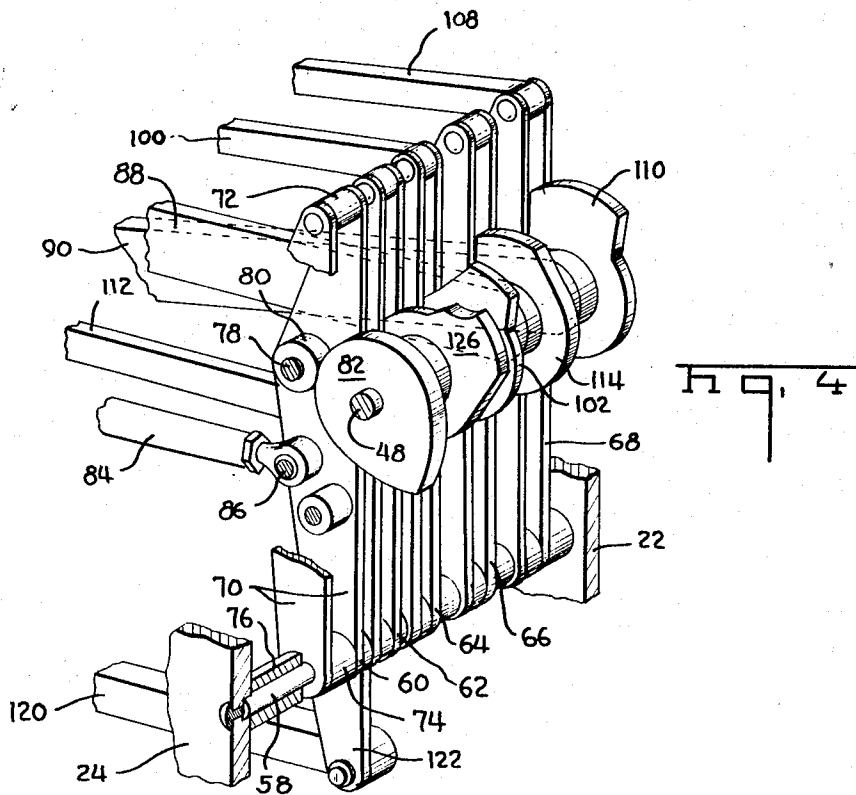
C. M. LOVENDUSKY

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Filed June 9, 1965

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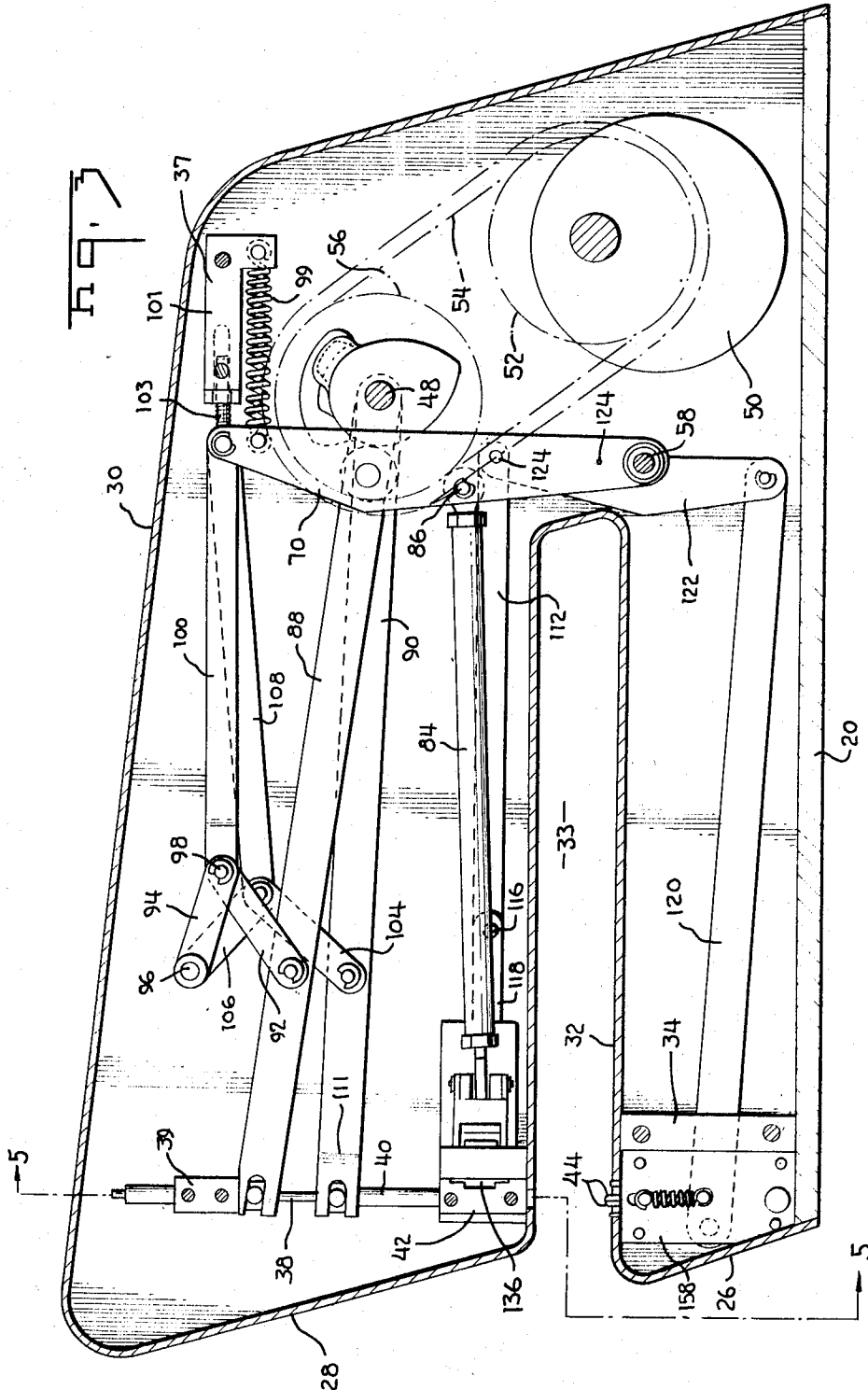
C. M. LOVENDUSKY

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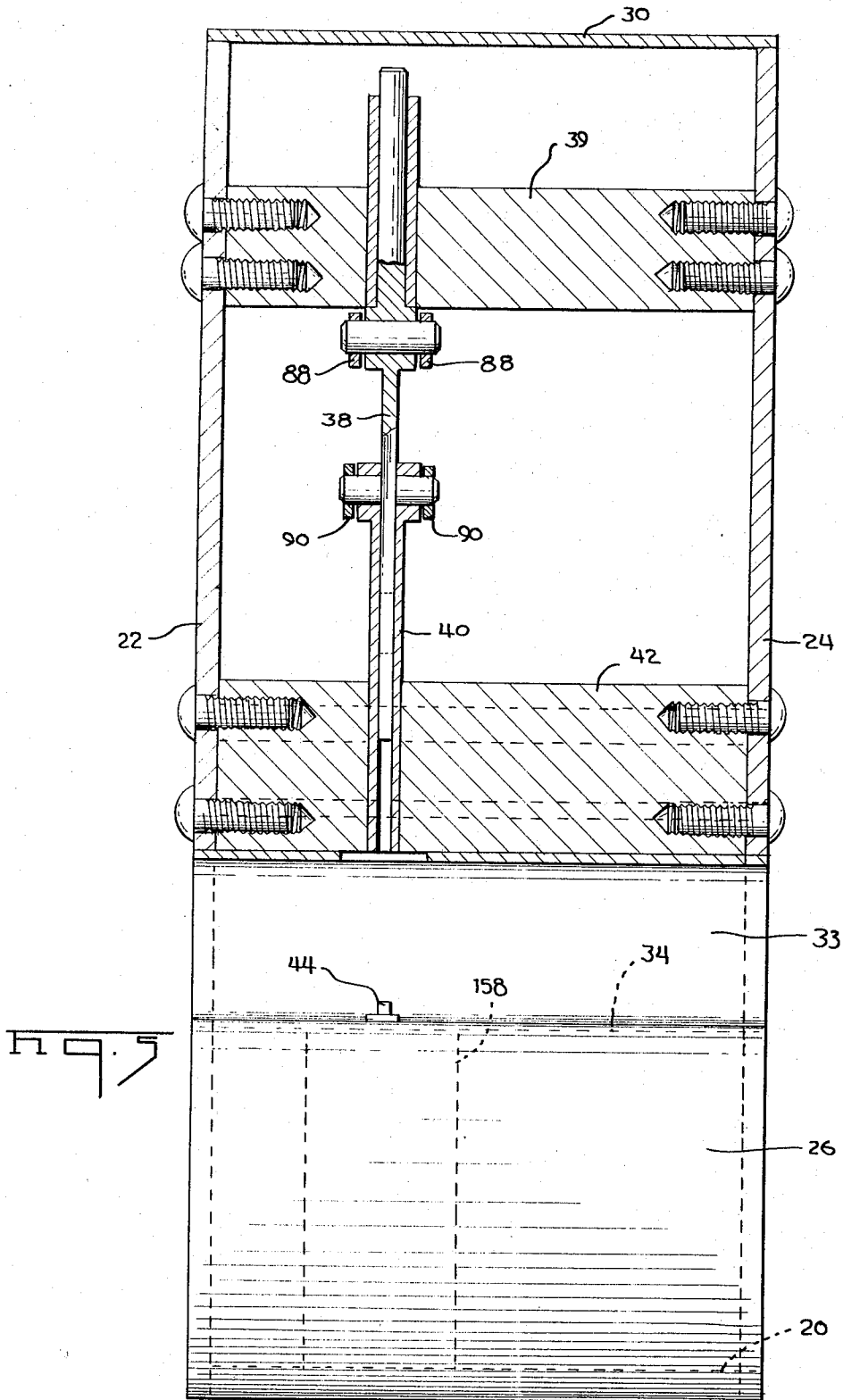
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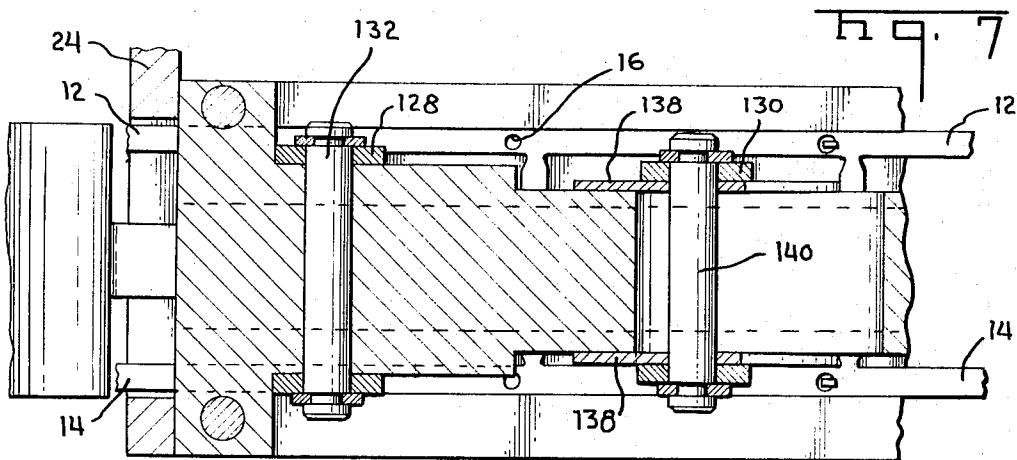
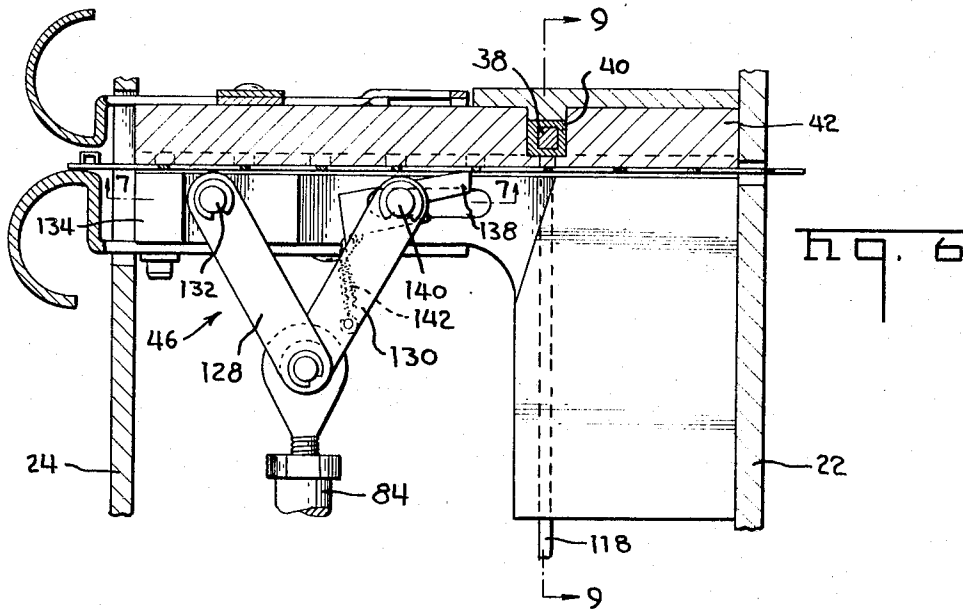
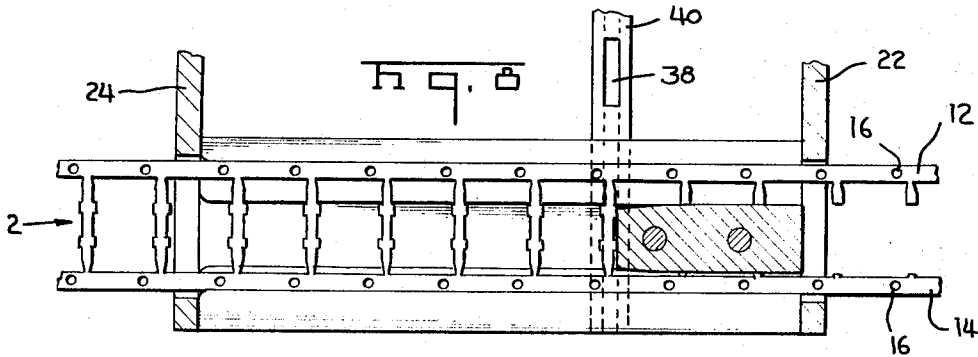
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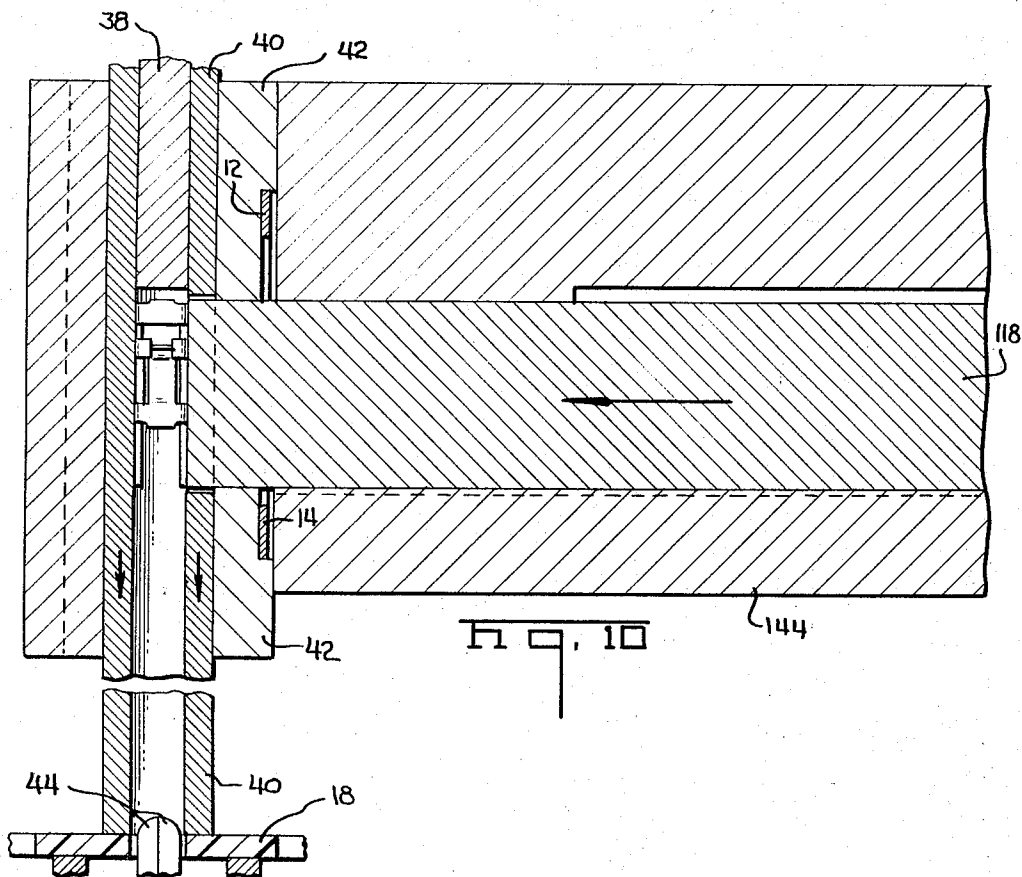
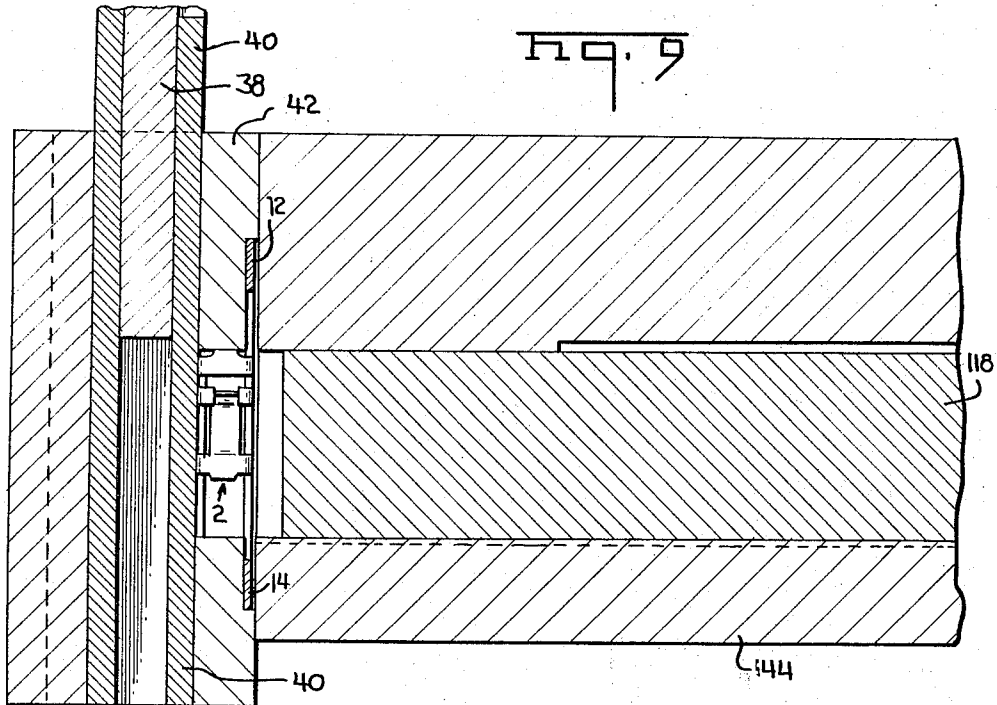
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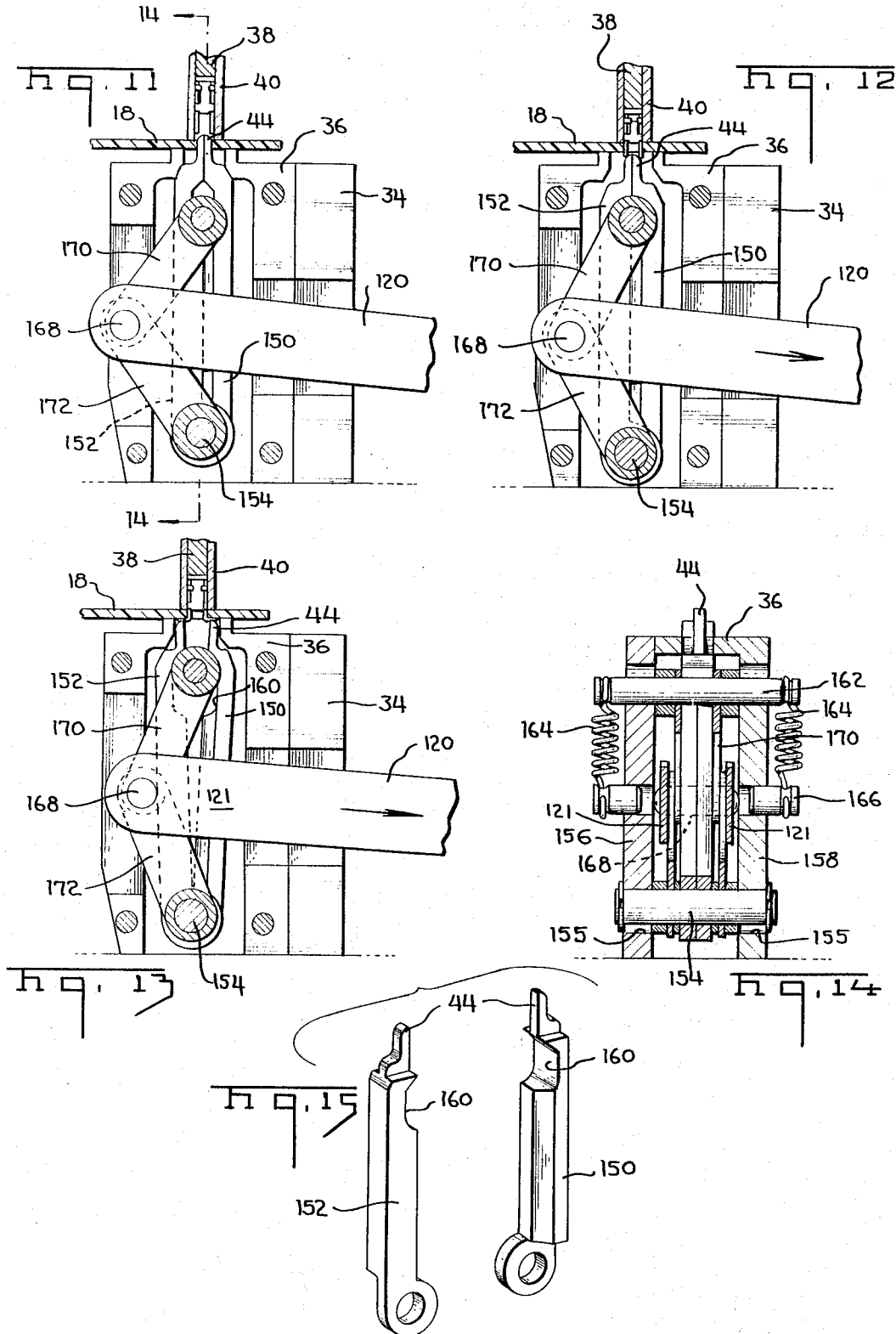
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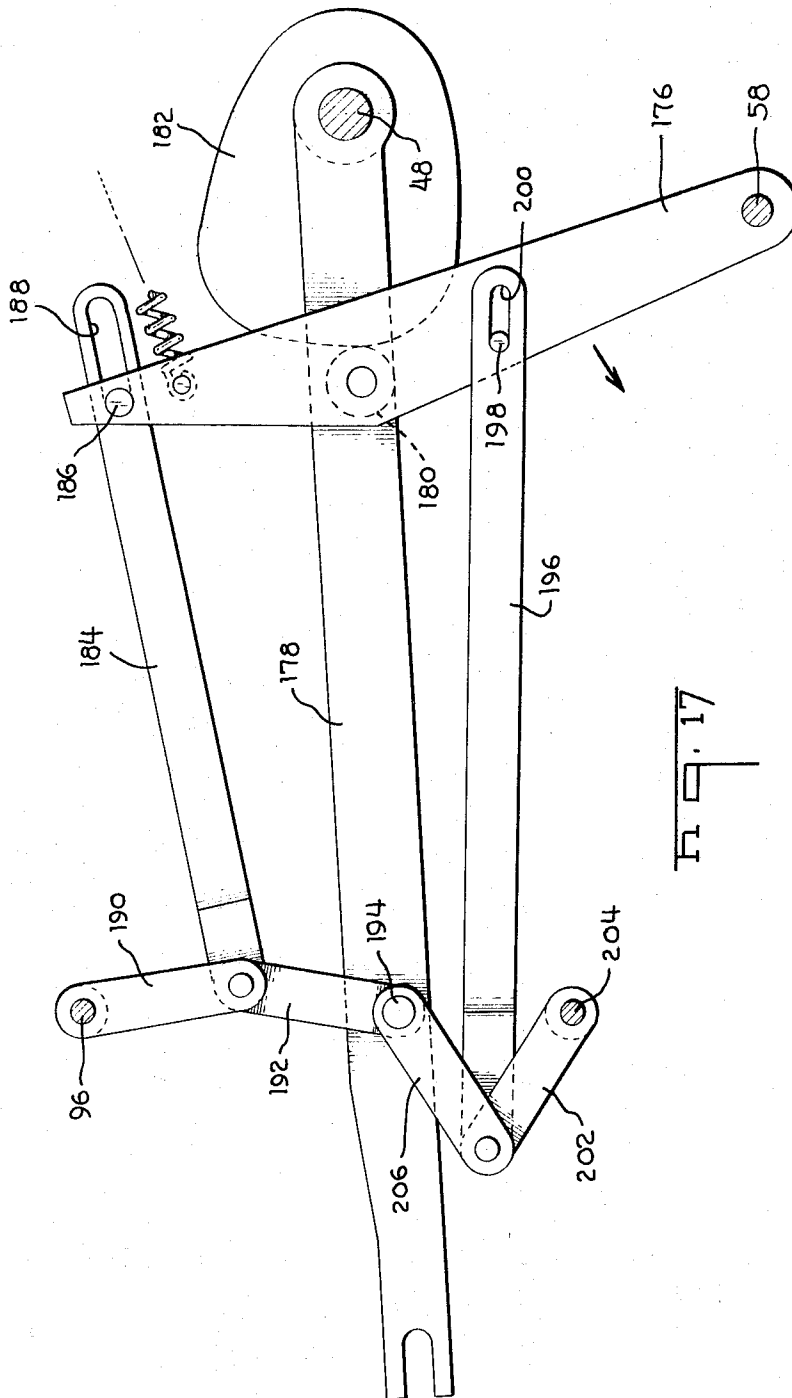
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Filed June 9, 1965

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INSERTING APPARATUS

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AMP Incorporated, Harrisburg, Pa.
Filed June 9, 1965, Ser. No. 462,705
8 Claims. (Cl. 29—203)

This application is a continuation-in-part of my co-pending application, Serial No. 391,490, filed August 24, 1964, for Contact Inserting Apparatus.

This invention relates to an apparatus for inserting contact devices such as terminal posts, contact sockets, etc. into panel members such as printed circuit boards.

An object of the invention is to provide an improved contact inserting apparatus. A further object is to provide a contact inserting apparatus capable of inserting contact devices into panels of any desired size. A further object is to provide a contact inserting device which can be easily modified to accommodate a variety of types of contact devices. A further object is to provide a contact inserting device which is capable of performing a variety of types of operations such as feeding of contacts in strip form, severing of contacts, positioning the contacts in the board, and clinching the contacts to the board.

These and other objects of the invention are achieved in a preferred embodiment thereof comprising a rotatable power shaft and a stationary jack shaft disposed in parallel spaced-apart relationship to each other. A plurality of actuator levers are pivotally mounted on the jack shaft and extend past the power shaft. A number of cams, corresponding to the number of actuator levers, are mounted on the power shaft and engage cam followers on the actuator levers, the arrangement being such that during each complete rotation of the power shaft, the actuator levers are oscillated about the jack shaft. One or more rods may be pivotally connected to one or more of the actuator levers so that these rods are caused to reciprocate during each rotation of the power shaft. Each rod can thus be assigned a function in the overall inserting operation such as feeding terminal strip, severing a terminal from the strip, or clinching of a previously inserted terminal to a panel board. These operations are carried out by suitable mechanisms actuated by the rods. In addition to these reciprocable rods, a plurality of actuated levers may be pivotally mounted on the power shaft for free rotation with respect to the shaft; in other words, although the power shaft rotates, it does not cause the actuated levers to rotate but merely serves as a pivotal axis for these levers. Suitable linkage means acts between the actuator levers and the actuated levers to cause the actuated levers to oscillate about the power shaft axis during each rotation of the power shaft. As with the reciprocable rods, the actuated levers each carry out one of the functions of the overall inserting operation such as movement of the contact towards, and into, the panel board and movement of a guide tube for the contact towards the panel.

The basic elements comprising the power shaft, the jack shaft, the actuator levers, the actuated levers, and the reciprocable rods can be used with a variety of types of mechanisms for carrying out particular operations on a particular type of terminal.

In the drawing:

FIGURE 1 is a perspective view of a short section of strip material having contact sockets integral therewith;

FIGURE 2 is a front view, partially in section, showing the socket of FIGURE 1 positioned in, and clinched to, a printed circuit board;

FIGURE 3 is a sectional side view of a preferred form of inserting apparatus in accordance with the invention;

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FIGURE 4 is a fragmentary perspective view showing the power shaft, the jack shaft, the cams which actuate the actuator levers and the associated reciprocable rods and actuated levers;

FIGURE 5 is a view taken along the lines 5—5 of FIGURE 3;

FIGURE 6 is a view taken along the lines 6—6 of FIGURE 3 and showing the strip feed mechanism which is actuated by one of the reciprocable rods;

FIGURE 7 is a view taken along the lines 7—7 of FIGURE 6;

FIGURE 8 is a sectional view similar to FIGURE 7 but showing the full width of the apparatus, the feed mechanism itself being omitted from this view;

FIGURE 9 is a view taken along the lines 9—9 of FIGURE 6 showing the positions of the parts prior to severing and transferring of the leading terminal of the strip to the inserting guide;

FIGURE 10 is a view similar to FIGURE 9 but showing the position of the parts after transfer of the leading terminal and immediately before insertion of the socket into the panel;

FIGURE 11 is a sectional side view of the clinching mechanism, the parts of this view being shown in the positions they occupy before insertion of the terminal into the panel;

FIGURES 12 and 13 are views similar to FIGURE 11 but showing the positions of the parts during successive stages of the clinching operation;

FIGURE 14 is a view taken along the lines 14—14 of FIGURE 11;

FIGURE 15 is a perspective view showing the clinching fingers;

FIGURE 16 is a fragmentary side view of an alternative linkage for the actuated levers; and

FIGURE 17 is a view similar to FIGURE 16 but showing the positions of the parts when the actuated lever is in a lowered position.

A common type of contact socket 2 (FIGURE 1) adapted to be inserted into a printed circuit board has a generally rectangular cross section and has inwardly directed integral spring arms 4 on its opposite sides for engagement with an inserted pin. The socket 2 has integrally extending legs 6, 8 on one side which are, in turn, integral at their ends with a pair of parallel carrier strips 12, 14. Additionally, a leg 10 extends from the lower end of the socket as viewed in FIGURE 1 and on the opposite side of the socket from the side of the leg 8. When the socket 2 is to be mounted in the panel 18 with its axis extending vertically with respect to the plane of the panel, the legs 8, 10 are inserted through the opening of the panel and clinched to the underside as shown at 8', 10'. The leg 6 is severed from the socket when it is used in this attitude although the legs 6, 8 would be used if the socket were mounted in a horizontal attitude on the panel. The particular machine in accordance with the invention described below is particularly adapted to insert sockets into panels in the manner shown in FIGURE 2 although, as will be subsequently pointed out, machines in accordance with the invention can be adapted to insert sockets in a horizontal attitude into the board.

Referring now to FIGURES 3 and 5, one preferred form of machine in accordance with the invention comprises a base plate 20, a pair of side plates 22, 24 which extend vertically from the base plate, and a cover generally indicated at 26, 28, 30, and 32. The cover has a reentrant portion 32 which provides an extended surface 33 for the accommodation of the board to which terminals are being secured. This reentrant portion of the cover is relatively deep so that contacts can be mounted on the center portion of a relatively wide board. The side plates 22, 24 are maintained in spaced-apart relationship by

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means of transversely extending blocks 34, 37, 39, and 42. As will be explained more fully below, the contacts are pushed through a reciprocable guide tube 40 by means of an inserting punch 38 and are clinched to the board by a pair of spreadable fingers 44. The strip is fed by a feeding mechanism generally indicated at 46 (FIGURE 6) the details of the strip feeding, contact severing, and inserting mechanism are also described more fully below.

Power for the several operations which are carried out is obtained from a power shaft 48 which extends between the side plates 22, 24 and which is coupled to a motor 50 through a suitable belt and pulley arrangement 52, 54, 56. Advantageously, a single revolution clutch (not shown) is provided which, upon engagement, causes the power shaft to rotate through a single revolution to drive all of the inserting mechanisms through their cycles of operation. A stationary jack shaft 58 extends parallel to the power shaft 48 and between the side plates and has a plurality of actuator levers generally indicated at 60, 62, 64, 66, 68 pivoted thereon. Each of these levers comprises a pair of spaced-apart plates as illustrated particularly by the plates 70 of the actuator lever 60 (FIGURE 4). These plates are maintained in spaced apart relationship by spacers 72, 74. A spacer 76 on the jack shaft 58 maintains this lever at a fixed distance from the side plate 24.

A pin 78 extends between the plates 70 at their upper ends and a cam follower 80 is mounted on this pin. This cam follower is engaged by a cam 82 on the power shaft 48. During each revolution of the power shaft, the lever 60 is thus oscillated about the axis of jack shaft 58.

A rod 84 is pivotally mounted between the plates of the lever 60 on the pin 86 and extends forwardly or leftwardly in FIGURE 3 towards the front end of the machine. This rod is thus reciprocated as a result of the oscillation of the lever 60 to actuate the strip feed mechanism 46.

A pair of actuated levers 88, 90 are freely mounted on the power shaft 48. This shaft is thus permitted to rotate independently of the levers 88, 90 although it serves as a pivotal axis for them. The lever 88 has a link 92 pivotally connected thereto adjacent to its front end, this link also being pivoted at 98 to a pin on the end of a relatively long lever 100. A second link 94 is pivoted at one end to the pin 98 and at its other end to a fixed rod 96 which extends between, and is secured to, the side plates 22, 24. The lever 100 extends rearwardly and has its right-hand end, as viewed in FIGURE 3, pivoted between the spaced-apart plates of the actuator lever 64. A cam follower (similar to the cam follower 80) is provided between the plates of the actuator lever 64 for engagement with a cam 102 on the power shaft 48. It will thus be apparent that upon each rotation of the power shaft, the actuator lever 64 will be oscillated about the axis of jack shaft 58 and the lever 100 will be moved leftwardly as viewed in FIGURE 3. As a result of this leftward movement of the lever 100, the toggle linkage comprising the links 92, 94 is straightened and the actuated lever 88 will be swung downwardly as viewed in FIGURE 3. The actuator lever 64 is biased rightwardly as viewed in FIGURE 3 by a spring 99 having one end thereof secured to the lever and having its other end secured to the block 37. Advantageously, an adjustable screw 103 is provided in the block 37 to limit the rightward movement of the upper end of actuator lever 64. The spring 99 and set screw 103 are not shown in FIGURE 4 in the interest of clarity.

The actuated lever 90 is oscillated about the axis of shaft 48, on which it is mounted, by an actuating means similar to the actuating means for the lever 88. Thus, a link 104 is pivotally connected to the lever 90 and is also pivoted to the end of a lever 108. A link 106 extends from the end of the lever 108 to the previously identified rod 96. The link 108 is pivoted to the actuator lever 68 at the upper end thereof and the actuator lever 68 is, in turn, swung through a counterclockwise arc as viewed in FIGURE 3, by a cam 110 which engages a cam follower between the plates of the lever 68.

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It will be understood that the left-hand ends of the actuated levers 88, 90 must be in vertical alignment with each other since these levers function to raise and lower the guide tube 40 and the inserting punch 38. To achieve this, the left-hand end of the lever 90 is offset as indicated at 111. It will also be understood that the actuated lever 88 is pivotally mounted on shaft 48 beside the actuator lever 64 while lever 90 is mounted on shaft 48 beside actuator lever 66.

During each operating cycle, it is necessary to shear the leading contact socket from the strip and move this sheared socket leftwardly and into alignment with the inserting punch, see FIGURES 9 and 10. This shearing operation is carried out by a rod 112 having an extension 118 pivotally connected at 116 to its end. This rod 112 is disposed above the gap 33 and is pivotally connected at its right-hand end to the lever 66 in the same manner as the rod 84 is pivotally mounted to the lever 60. A cam 114 causes the actuator lever 66 to be swung about the axis of jack shaft 58 to move the rod 112 leftwardly as viewed in FIGURE 3.

A rod 120 is contained in the housing beneath the gap 33 and is pivotally connected at its right-hand end to a plate 122. This plate extends upwardly and has a notch therein providing clearance for the jack shaft 58 and is connected at its upper end by means of pins 124 between the plates of the actuator lever 62. A cam 126 engages a cam follower between the plates of actuator lever 62 to swing the lever in a counterclockwise direction. Such movement of the actuator lever causes the plate 122 to swing in a counterclockwise direction with respect to the axis of jack shaft 58 thereby moving the rod 120 rightwardly. This rod actuates the clinching mechanism as will be described in detail below.

It is understood that a spring similar to the spring 99 will be provided for each of the actuator levers thereby to bias these levers to the positions shown in FIGURES 3 and 4. It will also be apparent that by virtue of the structure described thus far, the rods 84, 112, and 120 will be reciprocated during each revolution of the power shaft while the actuated levers 88, 90 will be swung about the axis of the power shaft 48.

The rods and actuated levers referred to above can be utilized to actuate any suitable combination of specifically designed feeding, clinching, shearing, and inserting mechanisms. The specific mechanisms described below are thus to be considered only as being exemplary of many possible arrangements.

Referring now to FIGURES 6-8, a pin 132 extends through a block 134 disposed between the side plates and secured to block 42. A link 128 is pivotally connected to this pin at one of its ends and has its other end pivotally connected to the end of the rod 84. An additional link 130 has one of its ends pivoted to rod 84 and is pivoted at its opposite end to a pin 140 which extends through a slot in the block 134. A feed pawl 138 is mounted on the pin 140 and is biased in a counterclockwise direction as viewed in FIGURE 6, by a spring 142. It will thus be apparent that upon leftward movement of the rod 84 as viewed in FIGURE 3 (i.e., upward movement as viewed in FIGURE 6) the pawl 138 will be moved rightwardly in FIGURE 6 to advance the strip. A suitable recess 136 is provided in the block 134 to permit feeding of the strip therethrough as shown in FIGURES 3 and 8.

After feeding of the strip, the leading contact socket will be positioned, as shown in FIGURE 9, in alignment with the shearing rod 118, previously identified. The guide tube 40 is moved downwardly from the position of FIGURE 9 to the position of FIGURE 10, by the actuated lever 90 by the pin-slot connection between these members. When the opening in the guide tube is in alignment with the leading terminal, the shearing member 119 moves leftwardly, shears the leading connector from the strip, and transfers it into the interior of the guide tube.

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The guide tube 40 also serves to clamp the panel or board 18 against the supporting surfaces of plates 36 when it is moved downwardly as shown in FIGURE 11.

Insertion of the terminal into the board is brought about by the lowering of the plunger 38 which has a pin-slot connection at its upper end with the actuated lever 88. The upper end of the plunger 38 also extends through the block 39 for guiding and supporting purposes.

As previously mentioned, the clinching of the inserted contact to the board is achieved by the fingers 42 which move apart in the manner illustrated in FIGURES 11-13. These fingers are provided on the upper ends of a pair of arms 150, 152 which are pivotally mounted on a common pin 154. This pin extends through slightly oversized openings 155 in a pair of side-by-side plates 156, 158. The adjacent sides of the arms 150, 152 have opposed recesses 160 at their upper ends and a pin 162 extends through oversized openings in the upper ends of the plates 156, 158, through the opening formed by the recesses 160 and beyond the sides of the plates. This pin is normally biased downwardly by springs 164 which are anchored to fixed pins 166 in the plates 156, 158 although the pin 162 is capable of limited upward movement. The end of the rod 120 is bifurcated to provide ears 121. These ears are pivotally connected at 168 to pairs of parallel links 170, 172 which are pivoted to the pins 162, 154. The arrangement is such that the parts will normally be in the position of FIGURE 11 with the fingers 44 extending partially through an opening in the upper side 36 of plate 158. When the rod 120 moves rightwardly, the pin 154 moves relatively downwardly (upward movement of the pin 162 being prevented at this juncture by the spring 164) and the fingers move to a position below the board as shown in FIGURE 12. Upon further rightward movement of the rod 120, the pin 162 moves downwardly against the force of springs 164 camming the fingers apart and bending the legs 8, 10 of the socket outwardly.

A complete operating cycle for the apparatus involves all of the operations discussed above. The feeding operation advantageously takes place at the end of the operating cycle and after a terminal has been inserted into a board although the feeding operation can, if desired, take place in the beginning of the cycle. As previously pointed out, a wide variety of types of contact terminals, receptacles, posts, etc., of the general type shown in FIGURES 1 and 2 are manufactured. While the general operations of feeding a strip of contacts, severing the leading contact from the strip, and inserting the contact in the board are substantially the same for all contacts, the differences between the many types of contacts require specific mechanisms for each contact. An important advantage of the present invention is, therefore, that an inserting apparatus for a particular contact can be made using many standard parts of the applicator disclosed herein. For example, for a particular type of contact, a specifically designed feeding mechanism, shearing mechanism and inserting mechanism would be required but such mechanisms could be fitted in the front portion of the applicator in FIGURE 1 and actuated by selected ones of the actuated levers and reciprocable rods. Specifically designed cams would, of course, be required for a particular contact but the amount of new design work required for a specific terminal or contact would be comparatively minor involving only specific mechanisms within the applicator.

It should be mentioned that one or more of the mechanical functions carried out by the applicator disclosed above might be eliminated in the case of some contacts; for example, under some circumstances it may be found unnecessary to clinch the contacts to the board so that the clinching mechanism actuated by the rod 120 could be eliminated.

FIGURES 16 and 17 show an alternative linkage for an actuator lever 176 and an actuated lever 178, these

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levers being analogous to the previously described actuator and actuated levers shown in FIGURE 3. The actuator lever 176 again comprises spaced-apart plates pivotally mounted in their lower ends on the jack shaft 58. The actuated lever 178 is pivotally and freely mounted on the power shaft 48. The actuator lever 176 is oscillated during each rotation of the power shaft by a cam follower 180 mounted by the plates of the actuator lever and which is engaged by a cam 182 on the power shaft. The linkage between the actuator lever and the actuated lever comprises a lever 184 having a pin-slot connection 186, 188 with the upper end of actuator lever 176. At its left-hand end, the lever 184 is pivotally connected to a link 190 which, in turn, is pivoted to the fixed rod 96. Lever 184 is also connected to a second link 192 which is pivotally connected to a pin 194 mounted in the actuated lever 178. The linkage for transmitting motion from the actuator lever also includes a lever 196 below the actuated lever 178 having a pin-slot connection 198, 200 with the actuator lever. At its left-hand end, the lever 196 is pivoted to a pair of links 202, 206. The link 202 is pivotally connected at its end to a rod 204 extending between, and secured to, the side plates. The link 206 is pivotally connected to the previously identified pin 194 in the actuated lever 178.

In use, when the cam 182 is rotated by the power shaft 48, the actuator lever 176 is swung leftwardly to, and beyond, the position of FIGURE 17. During initial movement of this actuator lever, the pin 198 will push the lever 196 leftwardly to lower the actuated lever 178. During this portion of the cycle, a relatively high force will be imparted to the lever 178 by virtue of the fact that the toggle comprising the links 202, 206 is almost straight. Thus, the actuated lever 178 can be utilized to carry out an operation requiring a relatively highly degree of force during initial swinging movement of the actuator 176.

The pin 186 moves leftwardly in the slot 188 during initial swinging of actuator 176 until this pin moves against the left-hand side of the slot. The toggle comprising the links 190, 192 will have been partially straightened during downward swinging of the actuated lever 178 so that when the parts reach the position of FIGURE 17, the pin 186 will be effective to move the lever 184 leftwardly beyond the position of FIGURE 17 and swing the actuated lever 178 as the actuator 176 swings further in a counterclockwise direction from the position shown in FIGURE 17.

The modification of FIGURES 16 and 17 thus provides added versatility to the basic applicator and permits the carrying out of a function which requires a relatively high force at the beginning and at the end of the stroke of the lever 178. For example, a high force might be required at the beginning of the cycle for a shearing operation and this force would be developed by the toggle 202, 206. After the severed part has been moved to the board, and at the end of the stroke, a high force might again be required for inserting operation. A high force at this stage would then be supported by the toggle comprising the links 190, 192.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective against the prior art.

I claim:

1. Apparatus for removing an individual contact element from a strip of such elements and inserting the removed element into a printed circuit board or the like comprising, means for supporting said board, means for shearing said individual element from said strip, means

for feeding said strip, and inserting means for moving said individual element into said board, said supporting, shearing, feeding, and inserting means being disposed in cooperative relationship in an operating zone, a plurality of actuator levers pivotally mounted on a common axis, a power shaft extending parallel to and spaced from said common axis, a plurality of actuated levers pivotally mounted on said power shaft, cam means effective between said power shaft and said actuator levers for oscillating said actuator levers about said common axis, linkage means effective between said actuator levers and said actuated levers for oscillating said actuated levers about said power shaft, said actuated levers having pin-slot connections with said inserting means and said actuator levers being operatively connected to said feeding means and said shearing means.

2. Apparatus for inserting a contact element into a printed circuit board or the like comprising, guide tube means for guiding said element towards said board, plunger means reciprocable through said guide tube means to push said element towards said board, support means for supporting said board, actuator lever means pivotally mounted on a first common axis, actuated lever means pivotally mounted on a second common axis, said first and second common axes extending parallel to each other and being spaced from said guide tube and inserting means, cam means for swinging said actuator lever means about said first common axis, linkage means effective between said actuator lever means and said actuated lever means for swinging said actuated lever means about said second common axis, and pin-slot connecting means between said actuated lever means and said guide tube and inserting means for moving said guide tube towards a panel member on said supporting means and subsequently moving said inserting means through said guide tube.

3. An assembling apparatus comprising, a plurality of actuator levers and a plurality of actuated levers, said actuator levers being pivotally mounted on a first pivotal axis and said actuated levers being pivotally mounted on a second pivotal axis, means for swinging said actuator levers about said first pivotal axis, linkage means effective between said actuator levers and said actuated levers for swinging said actuated levers about said second pivotal axis concomitantly with swinging said actuator levers about said first axis, and assembling means on said actuated levers for performing assembling operations.

4. A device as set forth in claim 3 wherein said means for swinging said actuator levers comprises cams on a cam shaft, said actuated levers being pivotally and freely mounted on said cam shaft, said cam shaft constituting said second pivotal axis.

5. A device as set forth in claim 3 wherein said assembling means comprises a plunger, said plunger being reciprocated by one of said actuated levers.

6. A device for inserting parts into a panel, said parts being in the form of a continuous strip, said device comprising, an operating zone, a jack shaft and a cam shaft, said shafts being parallel to, and spaced from each other and being remote from said zone, a plurality of actuator levers pivotally mounted on said jack shaft and extending transversely past said cam shaft, cams on said cam shaft in engagement with said actuator levers for swinging said actuator levers about said jack shaft, a plurality of actuated levers pivotally mounted on said cam shaft for

free rotation with respect thereto and extending towards said operating zone, a guide tube on a first one of said actuated levers in said operating zone and a plunger on a second one of said actuated levers, said plunger being coaxially disposed in said guide tube, linkage means effective between said actuator levers and said actuated levers for swinging said actuated levers about said cam shaft in response to swinging of said actuator levers about said jack shaft whereby, said plunger and said guide tube are reciprocated in said zone, said guide tube being movable against a panel in said zone and said plunger being movable through said guide tube to move a part into assembled relationship with said panel, a rod pivotally connected to one of said actuator levers and extending towards said zone, strip feeding means in said zone for feeding a strip of said parts towards said guide tube, said rod being reciprocable upon swinging of said one actuator lever to actuate said strip feeding means.

7. An assembling apparatus comprising, a plurality of actuator levers and a plurality of actuated levers, said actuator levers being pivotally mounted on first pivotal axis means and said actuated levers being pivotally mounted on second pivotal axis means, means for swinging said actuator levers about said first pivotal axis means, linkage means effective between said actuator levers and said actuated levers for swinging said actuated levers about said second pivotal axis means in response to swinging said actuator levers about said first pivotal axis means, and assembling means on said actuated levers for performing assembling operations.

8. An assembling apparatus comprising, a plurality of actuator levers and a plurality of actuated levers, said actuator levers being pivotally mounted on first pivotal axis means and said actuated levers being pivotally mounted on second pivotal axis means, means for swinging said actuator levers about said first pivotal axis means, linkage means effective between said actuator levers and said actuated levers for swinging said actuated levers about said second pivotal axis means in response to swinging said actuator levers about said first pivotal axis means, said actuated levers extending alongside each other from said second pivotal axis means and having offset end portions lying substantially in a common plane, and assembling means on said actuated levers for performing assembling operations, said assembling means comprising coaxial guide tube and inserting means, said guide tube and inserting means being movable independently of each other under the influence of said actuated levers.

References Cited by the Examiner

UNITED STATES PATENTS

988,365	4/1911	Mayo	227—97
1,333,648	3/1920	Wennberg	25—89
2,054,428	9/1936	Klocke	72—446
2,390,615	12/1945	Paterson	72—424
2,748,388	6/1956	Cardani	227—88
2,814,802	12/1957	Maximoff	29—203 X
2,902,689	9/1958	Petersen	227—155 X
2,978,707	4/1961	Runciman	227—90
2,979,721	4/1961	Helda	227—97

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