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(71) Applicant: **AMF INCORPORATED**
World Headquarters 777 Westchester Avenue
White Plains New York 10604(US)

(72) Inventor: **Off, Joseph W.A.**
1201 Limetree Lane
Irving Texas 75061(US)

(72) Inventor: **Ferguson, Vivian**
7121 Al Patterson
Dallas Texas 75241(US)

(72) Inventor: **Waller, Robert Bruce**
4101 Tacoma
Irving Texas 75062(US)

(74) Representative: **Matthews, Howard Nicholas et al,**
MATTHEWS HADDAN & CO Haddan House 33 Elmfield Road
Bromley Kent BR1 1SU(GB)

(54) Sewing machine attachment.

(57) The sewing machine attachments of this invention include an arm (56) that is pivotally mounted and controlled by a pneumatic motor (58) whereby the arm (56) can be pivotally moved relative to the sewing machine. In one embodiment, the outer end of the arm is provided with gripping apparatus (38), (40) arranged to receive and hold an overlay (36). Upon pivotal movement of the arm (56), the overlay (36) is placed in position on the workpiece and held there by the presser foot (30) of the sewing machine so that the overlay (36) can be sewed to the workpiece. In another embodiment, the outer end of the arm is provided with gripping apparatus and with folding blades so that an overlay placed therein can have edges thereof folded and gripped by the gripping apparatus. Upon pivotal movement of the arm, the folded overlay is deposited adjacent to the workpiece and held there by the presser foot while the overlay is sewed on the workpiece.

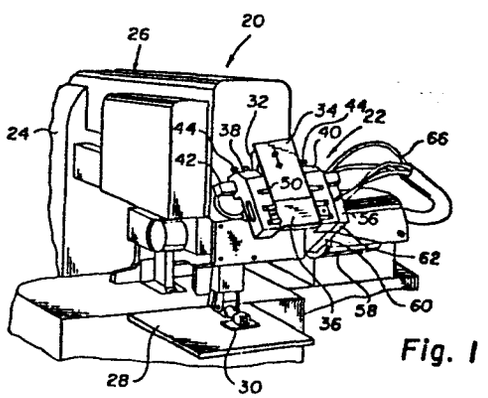

Fig. 1

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Sewing Machine Attachment

Background of the Invention

This invention relates generally to sewing machines. More particularly, but not by way of limitation, this invention relates to an attachment for sewing machines that are used for sewing tags, labels, pockets, etc. onto a piece of material.

For convenience of description, tags, labels, pockets and similar items that are to be sewn onto another piece of material will be referred to hereinafter as "overlays."

Label sewing apparatus is illustrated in U. S. Patent No. 3,513,791 issued to J. B. Fulp on May 26, 1970 for Label Sewing Apparatus and in U. S. Patent No. 4,305,338 issued December 15, 1981 to Fletcher D. Adamson entitled Process and Apparatus For Fixing Labels To Garments and the Like. While the foregoing illustrate various approaches to the problem of sewing labels and the like onto materials, they are entirely different from the apparatus of this invention.

Overlays are sometimes manually placed in the machine or attachment wherein they are sewn on a piece of material. Such machines, constructed in the past, have included so much apparatus adjacent to the sewing area that it is difficult, at best, for the operator to see the overlay and where the overlay is to be placed on the material or workpiece.

An object of this invention is to provide an attachment for sewing machines wherein the overlay is placed therein in a position clearly observable by the operator and in which the apparatus moves the overlay into position adjacent to the work piece for sewing the overlay thereon.

Summary of the Invention

This invention then provides an improved sewing machine attachment for sewing overlays to a workpiece wherein the sewing machine includes a base, an arm, a reciprocating needle carried by the arm and a presser foot on the arm adjacent to the needle and arranged to engage and hold the workpiece against the base. The attachment comprises holding means for retaining the overlay; and pivot means located on the arm and carrying the holding means for pivoting a portion of the holding means from a first position adjacent to the arm for placing an overlay in the holding means to a second position wherein the overlay is disposed between the presser foot and the base and adjacent to the workpiece.

Brief Description of the Drawing

The foregoing and additional objects and advantages of the invention will become more apparent as the following detailed description is read in conjunction with the accompanying drawing wherein like reference characters denote like parts and all views and wherein:

FIGURE 1 is a fragmentary, perspective view of the sewing machine having attachment thereon that is constructed in accordance with the invention.

FIGURE 2 is an enlarged, fragmentary view, also in perspective, of one of the gripper members utilized in the attachment of FIGURE 1.

FIGURE 3 is an enlarged, fragmentary view, partially in cross-section, and taken generally along line 3-3 of FIGURE 2.

FIGURE 4 is an operational schematic illustrating the movement of a portion of the apparatus of FIGURE 1 from a first position as illustrated in FIGURE 1 to a position wherein the overlay is ready to be sewed on the workpiece.

FIGURE 5 is a view similar to FIGURE 4, but showing the apparatus moving from adjacent the base of the machine to the position illustrated in FIGURE 1.

FIGURE 6 is an enlarged, fragmentary elevational view of another embodiment of apparatus that is also constructed in accordance with the invention.

FIGURE 7 is schematic, plan view of a portion of the apparatus of FIGURE 6 taken generally along the line 7-7 of FIGURE 6.

FIGURE 8 is a schematic diagram illustrating the interconnection of various components of the apparatus of FIGURE 6.

FIGURE 9 is a fragmentary view similar to FIGURE 6, but illustrating the components thereof in another operating position.

FIGURE 10 is a view similar to FIGURE 9, but illustrating the components thereof in still another operating position.

FIGURE 11 is a generally schematic view illustrating the folding of an edge of an overlay.

FIGURE 12 is a top plan view of a modified form of gripping member that can be utilized in the apparatus of FIGURE 1 or FIGURE 6.

FIGURE 13 is an end view of the gripping member FIGURE 12.

FIGURE 14 is a cross sectional view taken generally along the 14-14 of FIGURE 12.

Detailed Description of the Embodiment of FIGURE 1

Referring to the drawing and to FIGURE 1 in particular shown therein and generally designated by the reference character 20 is a sewing machine having an attachment 22 thereon that is constructed in accordance with the invention. The sewing machine 20 includes a head 24 having an arm 26 projecting outwardly over a base 28. The arm 26 carries a presser

foot 30 that extends downwardly therefrom for holding materials against the base 28. The sewing machine 20 also includes a needle and thread (not shown) that are located in the vicinity of the presser foot 30 that is used to sew pieces of material together.

Projecting outwardly from the end of the arm 26 and affixed thereto is a support 32 which carries a platen 34 at its outermost end. The platen 34 serves as a base or table upon which the overlays, in this case a label 36, can be placed by the operator.

The attachment 22 also includes a pair of gripping members 38 and 40 that are located on opposite sides of the platen 34. The grippers 38 and 40 may be mirror images of each other. However, if the overlay is of some special configuration, the grippers 38 and 40 may be suitably configured to hold such overlay.

The gripping members 38 and 40 are mounted on a support bar 42 and are adjustable thereon and relating to each other by a pair of set screws 44. The construction of the gripping member 38 is shown more clearly in FIGURES 2 and 3.

Gripping member 38 also includes a gripper body 46 having a recess 48 formed therein that pivotally receives a cloth engaging member 50. A pneumatic cylinder 52 located on the body 46 is arranged to engage the cloth engaging member 50 to cause it to pivot in the cavity 48. A stop plate 54 is mounted on the side of the body 46 so the material to be gripped by the gripping member 38 is trapped between the cloth engaging member 50 and the stop plate 54.

The support bar 42 is securely fastened to a pivot arm 56 that has its opposite end attached to a motor 58 for pivoting the arm and attached gripping members 38 and 40 through the positions illustrated in FIGURES 4 and 5. The arm 56 is composed of two parts 60 and 62 (see FIG. 6) which are, as shown in FIG. 10, movable

together and apart by a pneumatic cylinder 64 that is carried by the arm 56.

Appropriate conduits 66 are provided to actuate the various pneumatic devices contained in the attachment 22. The circuit associated with such apparatus will be described more fully in connection with the description of FIGURE 7.

After the operator has placed label 36 on the platen 34, the gripping members 38 and 40 engage the label 36. The arm 56 is then extended and the first pivotal movement occurs. This movement is illustrated by the upper portion of FIGURE 4.

It is necessary to be able to extend the length of the arm 56, that is to separate the part 60 from the part 62 thereof to elevate the label 36 above the platen 34 as shown in FIG. 4 so that the label 36 clears the platen 34 as the arm 56 pivots.

Upon reaching a predetermined location during the arcuate motion, the cylinder 66 is actuated to move the parts 60 and 62 relatively together. Further pivotal motion of the arm 56 follows until the label 36 is located above the base 28. Upon reaching the base 28, the cylinder 66 is aain actuated to move the label 36 and gripping member 40 toward the base 28 as illustrated in FIGURE 4.

After the label 36 is engaged by the presser foot 30 as shown in the lower portion of FIGURE 5, the cylinders in the gripping members 38 and 40 are actuated to release the label 36. At this time, cylinder 66 is again actuated to raise the gripping member, and the arm 56 is pivoted upwardly returning the gripping members 38 and 40 to the position illustrated in FIGURE 1. Since the label 36 is retained on the base 28, it is not necessary to extend the arm 56 during the return motion. The extension is

only necessary so that the label 36 will clear the platen 34 and the material on the base 28.

From the foregoing, it will be appreciated that the operator has full visibility of the area in which the label 36 is to be placed and that the pivotal action of the attachment 22 will quickly and accurately place the label 36 in the proper position to be sewn to the workpiece.

Detailed Description of the Embodiment of Figure 6

As shown in FIGURE 6, an attachment 122 for sewing pockets onto a workpiece is illustrated. The attachment 122 includes a bifurcated support member 124 having an upper tine 126 and a lower tine 128. The support member 124 is fastened to the arm 26 of sewing machine 22 by threaded fasteners 130 or other suitable means. It will be noted that the attachment 122 is positioned so that it will operate in conjunction with the pivot arm 56 previously described in connection with the embodiment of FIGURE 1.

Mounted on the upper tine 126 is a pneumatic cylinder 132. Fixed relative to the cylinder 132 is a guide plate 134 and attached to a piston rod 136 of the cylinder 132 is a mounting plate 138. Projecting upwardly from the mounting plate 138 are guide pins 140 that extend through and are slidable in the guide member 134.

Mounted on the bottom of the mounting place 138 is a pneumatic cylinder 142 that has a reciprocable piston 144 therein. As may be seen in FIGURE 7, the cylinder 142 is in actuality two cylinders having pistons 144 and 146 projecting therefrom in opposite directions.

Also mounted on the mounting plate 138 is a pair of pneumatic cylinders 148 and 150 (see FIG. 7). A piston rod 152 projects from the cylinder 148 and a piston rod 154 projects from the cylinder 150.

Mounted on the lower end of the cylinders 142, 148 and 150 is a hold-down plate 156. A sheet of soft, high friction material 158, such as sponge rubber or the like, is attached to the lower end of the hold-down plate 156 for engaging the overlay.

The lower tine 128 supports a platen 160 upon which the overlay is placed in a manner similar to the positioning of the overlay 36 on the platen 34 of the embodiment of FIGURE 1. (The initial position of an overlay 162 relative to the platen 160 is shown in FIGURE 7.)

In the embodiment of FIGURE 1, the arm 56 carries a pair of spaced gripping members 38 and 40. Due to the more complex configuration of the overlay 162, the arm 56 in the attachment 122 carries gripping members 164, 166, 168 and 170. Depending upon the configuration of the overlay, the gripping members may be arranged in various positions. The gripping members herein described are arranged to conform to the pocket overlay 162. Although the gripping members 164, 166, 168 and 170 may be slightly different in size, as compared to the gripping members 38 and 40, they are constructed in the same manner, that is, they include appropriate pneumatic cylinders for actuating the cloth engaging members located in each of the gripping members.

In FIGURE 6, the gripping members 164 and 168 are not shown so that the support 126 can more clearly seen and thus, only the gripping member 166 and the gripping member 170 are visible therein. As shown, a pneumatic cylinder 172 is provided for the gripping member 166 and a pneumatic cylinder 174 is provided for the gripping member 170.

Again, for clarity of illustration, the folding blade structures utilized to fold the edges of the overlay 162 are not illustrated in FIGURE 6. The

schematic of FIGURE 7 generally shows such structures. As shown therein, a folding blade 176 is connected to the piston 144 of cylinder 142 and is disposed adjacent to and is cooperable with the gripping member 164. A folding blade 178 is attached to the piston rod 146 which also extends from the cylinder 142 and is disposed adjacent to the gripping member 166. Similarily, folding blade 180 is connected to the piston rod 152 that extends from the cylinder 148 and is disposed adjacent to and cooperable with gripping member 168. Folding blade 182 is attached to the piston rod 154 in the cylinder 150. Folding blade 182 functions in conjunction with the gripping member 170.

FIGURE 8 is a schematic diagram illustrating a pneumatic circuit involved in controlling and operating the various cylinders mentioned hereinbefore. In addition, FIGURE 8 also shows a pneumatic cylinder 184 for actuating the gripping member 164 and a pneumatic cylinder 186 for actuating the gripping member 168.

FIGURE 8 illustrates each of the cylinders as being a single-acting cylinder, that is a cylinder having a piston that is spring loaded in one direction. If desired, double-acting cylinders could be utilized and further, solenoids could be substituted therefor to provide for the electrical operation of the entire system instead of the pneumatic system described.

To actuate the single-acting cylinders, each is provided with a pilot-operated valve 188 that includes the first position wherein an air supply conduit 190 is connected to the appropriate cylinder and a second position wherein the cylinder is connected to an exhaust port.

The motor 58, which causes the pivoting of the arm 56, is provided with an appropriate valve 192 that is also pilot-actuated and connected with an air supply line 190 to cause the motor 58 to rotate in the

appropriate direction.

A controller 194 is also schematically illustrated in FIGURE 8. The controller 194 is provided with an air supply 196 and is connected by appropriate conduits with each of the pilot-actuated valves 188 and 192. Although not illustrated, the controller 194 may be of the rotary cam type wherein each of the valves 188 is controlled by a cam in the controller so that proper sequencing occurs. If desired, the controller may be a solid state electronic device with each of the pilot actuations being provided by a solenoid connected thereto.

Operation of the attachment 122, with the exception of the folding of the overlay 162 is very similar to the operation of the embodiment of FIGURE 1 previously described. FIGURE 6 illustrates the attachment 122 in a position ready to receive the overlay. As illustrated therein, the holding member 156 is elevated above the platen 160 permitting the operator to place the overlay 162 on the platen 160 in the position illustrated in FIGURE 7.

Once the overlay 162 is placed in position, the cylinder 132 is actuated moving the holding member 156 down and into engagement with the overlay 162 as illustrated in FIGURE 9. During this stage of the operation, the arm 56 does not move.

FIGURE 11 illustrates schematically, the way that the attachment 122 accomplishes the folding of the edges of the overlay 162. As shown therein, the attachment 122 is in the position illustrated in FIGURE 9, that is, in the position with the holding member 156 securely pressing the overlay 162 into engagement with the platen 160. The dashed-line outline of the overlay 162 in FIGURE 7 indicates that the overlay 162 does extend outwardly over the gripping members. Accordingly, the cylinder 142 is actuated by the

controller 194 to cause the folding blade 178 to move along the surface of the overlay 162 toward the gripping member 166 and, due to the size of the overlay 162, the edge thereof bends back over the folding blade 178.

As soon as the folding blade 178 has reached the extent of its outward movement, the cylinder 172 and the gripping member 166 are actuated to cause the cloth engaging members to move in a direction to clamp the cloth in the gripping member 166. This movement also holds the folded edge intact. As the cloth engaging members approach the top surface of the folding blade 178, the cylinder 142 is actuated so that the folding blade 178 retracts and is not clamped by the gripping member 166.

It has been found desirable when the overlay 162 is a pocket to first activate the cylinder 148 folding the edge of the overlay 162 adjacent to the folding blade 180. Then, the cylinder 150 is activated to fold the edge of the overlay 162 adjacent to the folding blade 182 and gripping member 170. After the two angled edges have been folded and gripped by the gripping members 168 and 170, the cylinder 142 is actuated to fold the edges adjacent to the gripping members 164 and 166 and to actuate the gripping members to retain those edges in the folded condition.

After all the edges have been folded and gripped, the cylinder 132 is actuated to move the holding member 156 away from the platen 160, that is, to the position illustrated in FIGURE 10. Once the holding member 156 has been moved away from the platen 160, the cylinder 64 is actuated to separate the portion 60 and 62 of the arm 56 and lift the gripping members and the overlay 162 away from the platen 160 thereby providing the necessary clearance between the overlay 162 and platen 160 so that the arm 56 can be pivoted downwardly. The

arm 56 carries the gripping members and the overlay 162 into a position adjacent to the base 28 so that the presser foot 30 can engage and retain the overlay 162 on the base 28 and in position for sewing the overlay 162 onto the workpiece.

Also, as previously discussed in connection with the embodiment of FIGURE 1 and as shown in FIGURE 5, the arm 56 is then pivoted upwardly returning the arm 56 and the gripping members mounted thereon into the position illustrated in FIGURE 6 and ready to receive the next overlay.

The Modification of FIGURE 12

The modified form of gripper illustrated in FIGURES 12, 13 and 14 can be used in lieu of the grippers 38, 40, 164, 166, 168 or 170. As illustrated in those figures, the gripping member is generally designated by the reference character 200.

The gripping member 200 includes an elongated body 202 upon which there is pivotally mounted a cloth engaging member 204. It will be noted that the body 202 is provided with a notch or shoulder 206 that extends along the length thereof and is arranged to be disposed under the cloth engaging member 204. The notch 206 is sized to receive the particular overlay with which the gripping member 200 is to be used.

As shown most clearly in FIGURE 14, the gripping member 200 is provided with a pair of spaced bores 208 that are connected with the source of pressurized air by conduit 210. Each of the bores 208 is provided with a reciprocating piston 212 that is movable in the bore 208 in response to pressure in the conduit 210 to engage and raise the cloth engaging member 204 to permit placing the overlay in the notch 206 or to release the overlay therefrom.

Also as illustrated most clearly in FIGURE 14, the

body 202 is provided with a pair of spaced spring bores 214. Each of the spring bores 214 is provided with a tension spring 216. The springs 216 have one end fastened to the cloth engaging member 204 and the opposite end connected to the body 202 so that the springs 216 continually urge the cloth engaging member 204 in the direction to clamp an overlay in the notch 206.

It should be understood that the length and specific configuration of the gripping member 200 will be determined by the configuration of an overlay with which it is to be used. Also, it should be pointed out that other spring arrangements could be used therewith and that only one piston may be utilized if desired and particularly if the gripping member 200 is of relatively short length.

It will be appreciated that the attachments 22 and 122 provide a means for placing overlays of various configurations in proper position for sewing onto a workpiece by the sewing machine 22. The overlays can be seen thoroughly by the operator since the overlays are positioned when placed into the attachments in an orientation so that they face the operator. The pivotal action of the attachment is such that the overlay is positioned precisely for the sewing of the overlay onto the workpiece.

It will also be appreciated from the foregoing detailed description that many changes and modifications can be made to the embodiments described in detail without departing from the spirit or scope of the invention.

What I claim is:

1. A sewing machine attachment for sewing overlays to a workpiece, said sewing machine including a base, an arm, a reciprocating needle carried by said arm, and a presser foot on said arm adjacent to said needle and arranged to engage and hold said workpiece against said base, said attachment comprising in combination:

holding means for retaining said overlay; and

pivot means located on said arm and carrying said holding means for pivoting a portion of said holding means from a first position adjacent to said arm for placing an overlay in said holding means to a second position wherein said overlay is disposed between said presser foot and said base and adjacent to said workpiece.

2. The attachment of Claim 1 wherein said holding means includes:

fixed means mounted on said arm for initially supporting said overlay when said pivot means is in the first position; and

a gripping portion mounted on said pivot means for releasably engaging said overlay when said pivot means is in said first position and holding said overlay whereby said overlay is moved with said pivot means to said second position.

3. The attachment of Claim 2 wherein said gripping portion includes:

spaced gripper bars straddling said fixed portion;

a gripper member movably located on each bar for engaging and holding said overlay

between said gripper bar and gripper members; and

means on each said bar for moving said gripper members.

4. The attachment of Claim 3 wherein said pivot means includes:

an arm member having a first end portion supporting said holding means and having a second end portion; and

means connected to said arm and second end portion for moving said arm member between said first and second positions.

5. The attachment of Claim 4 wherein said gripping portion also includes variable spacing means for permitting adjustment of the space between said gripper bars to accommodate various sizes and shapes of overlays.

6. The attachment of Claim 5 wherein:

said first and second end portions of said arm member are movable relative to each other to move said overlay relatively away from said holding means; and

said attachment also includes means mounted on said arm member and connected with said first and second end portions for moving said end portions relatively together and apart.

7. The attachment of Claim 2 wherein said fixed portion also includes overlay stretching and holding means comprising:

overlay engaging means for pressing said overlay against said fixed portion when said pivot means is in said first position; and

folding means for engaging said overlay

along an edge portion thereof and moving said edge portion into engagement with said gripping portion whereupon the edge of said overlay is folded over said folding means and retained in such folded condition by said gripping portion.

8. The attachment of Claim 7 wherein said folding means includes:

a folding blade for engaging and moving said overlay into engagement with said gripping portion; and

power means carried by said fixed portion for moving said blade.

9. The attachment of Claim 8 wherein one said folding blade is provided for each edge of said overlay that is to be sewed to said workpiece.

10. The attachment of Claim 9 wherein said overlay engaging means includes:

a plate having a resilient surface thereon, said plate being movable into engagement with said overlay; and

second power means for moving said plate.

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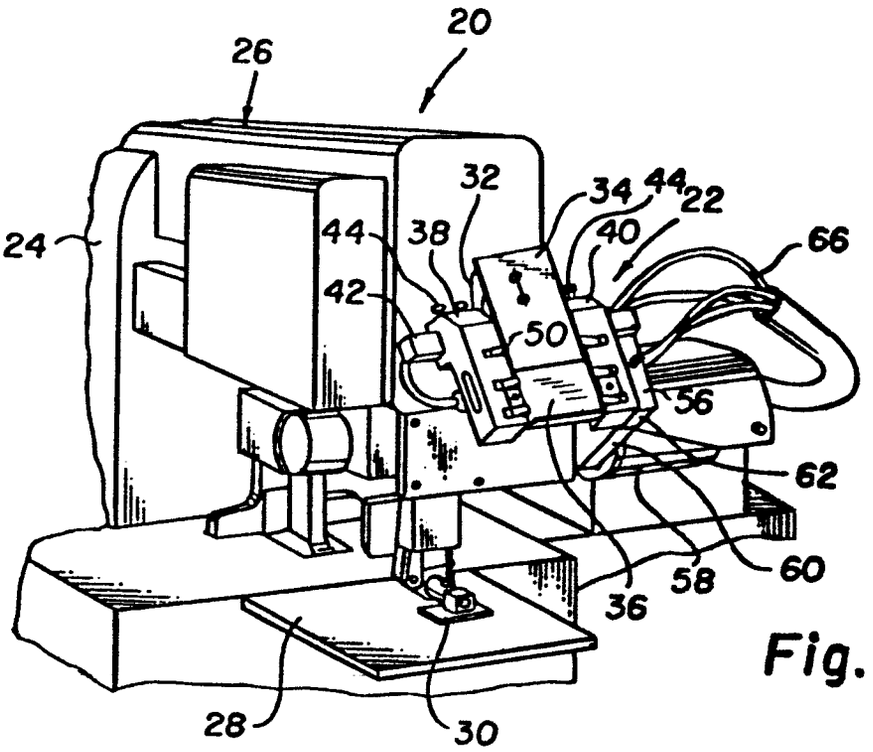

Fig. 1

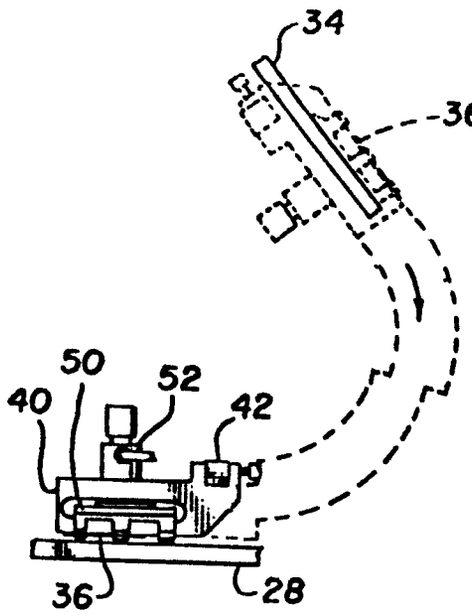

Fig. 4

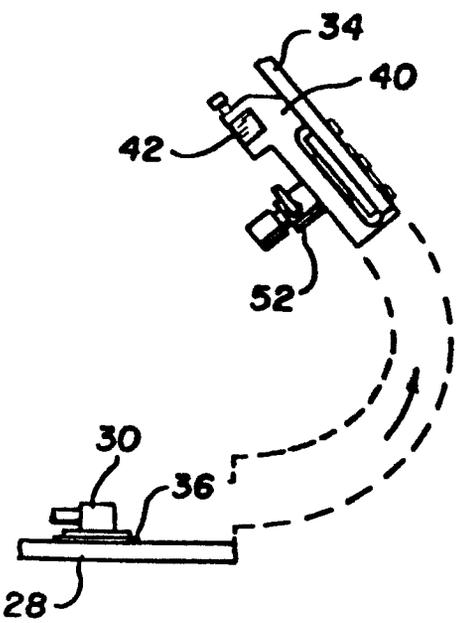

Fig. 5

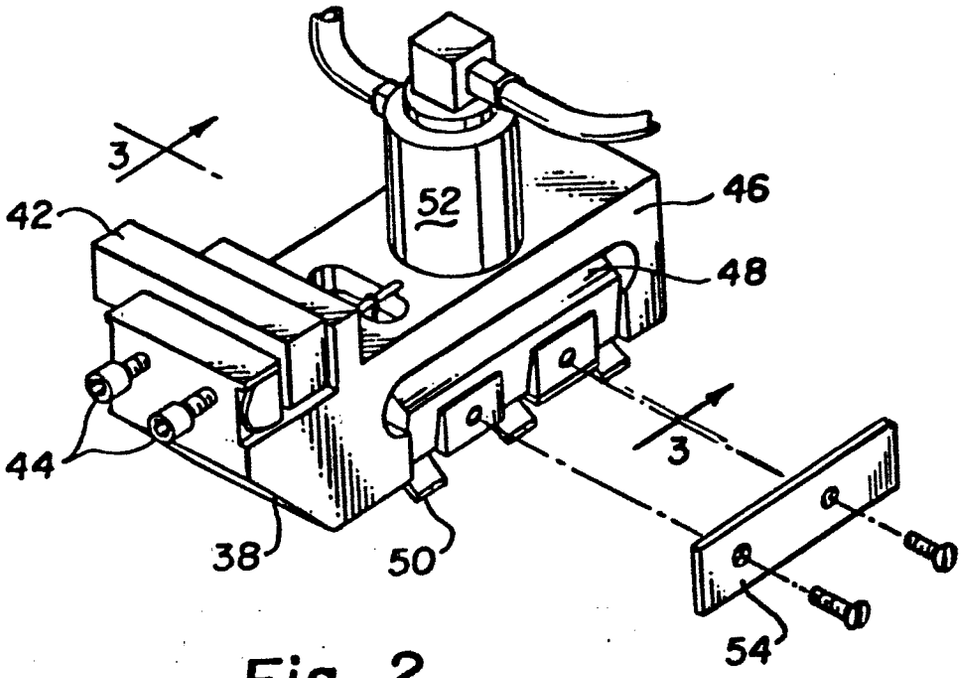

Fig. 2

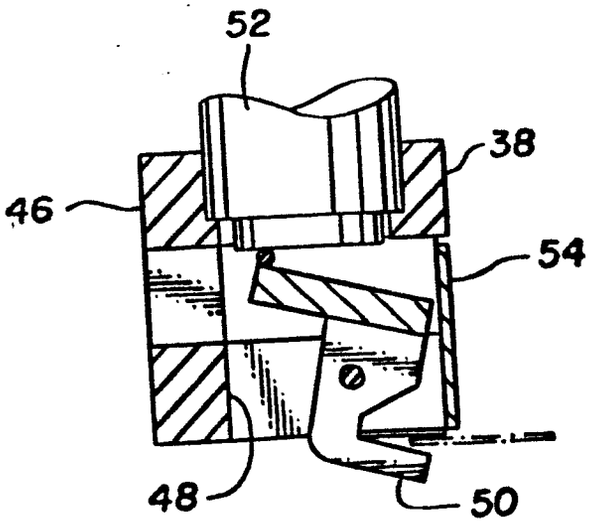

Fig. 3

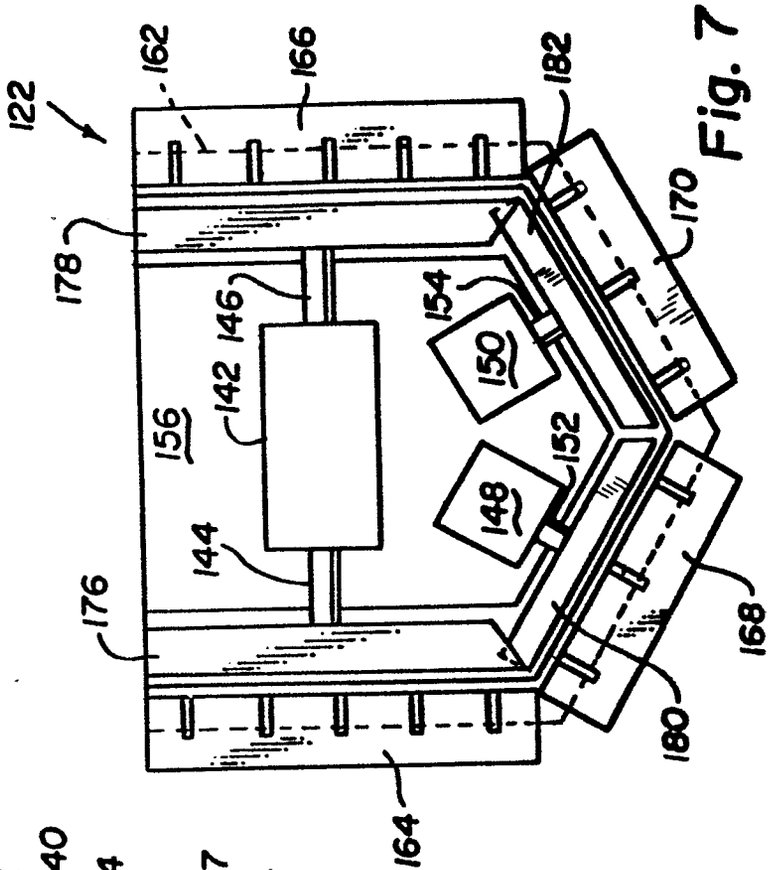
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Fig. 7

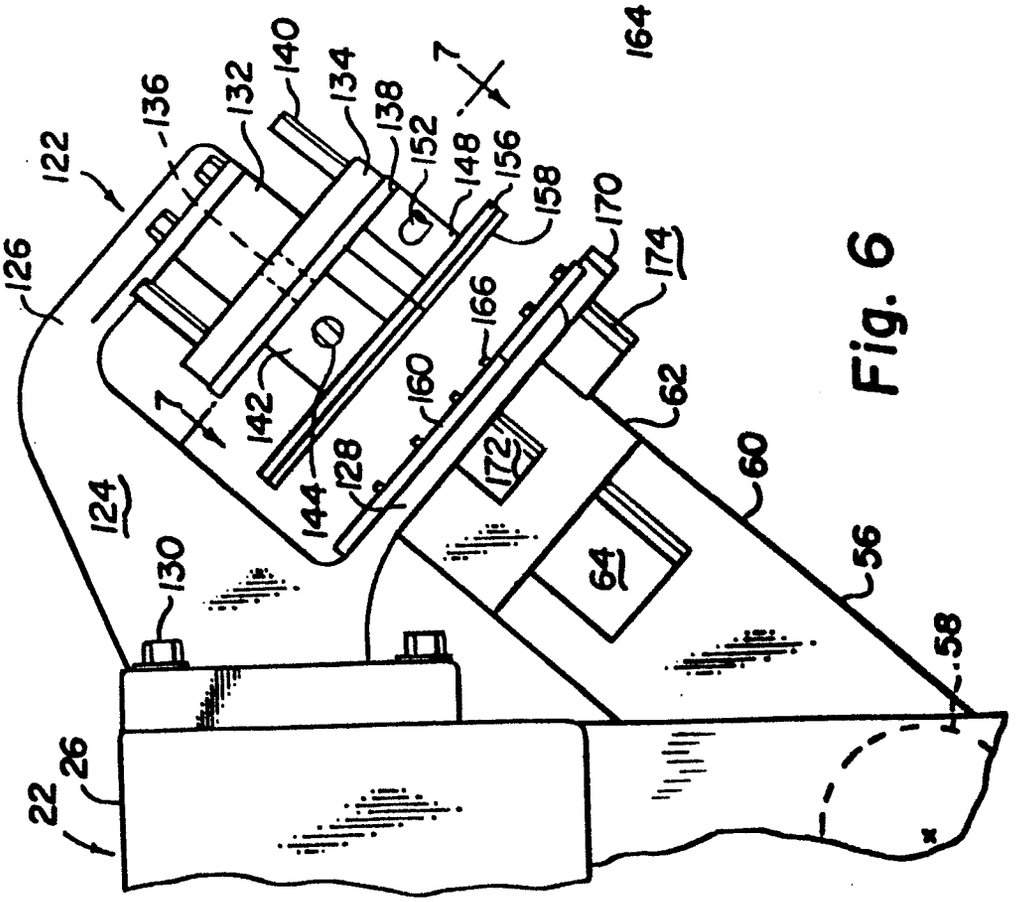
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Fig. 6

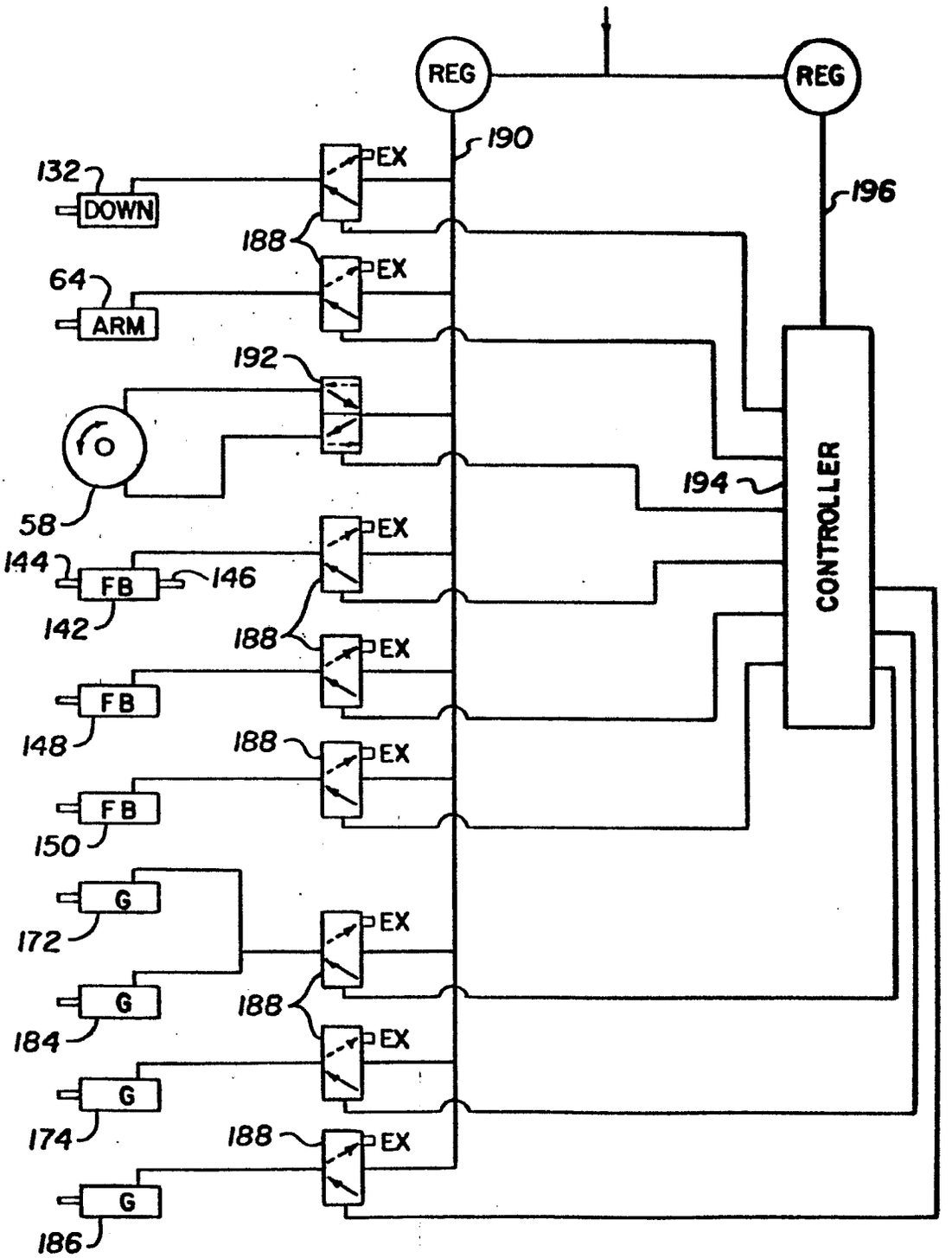
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Fig. 8

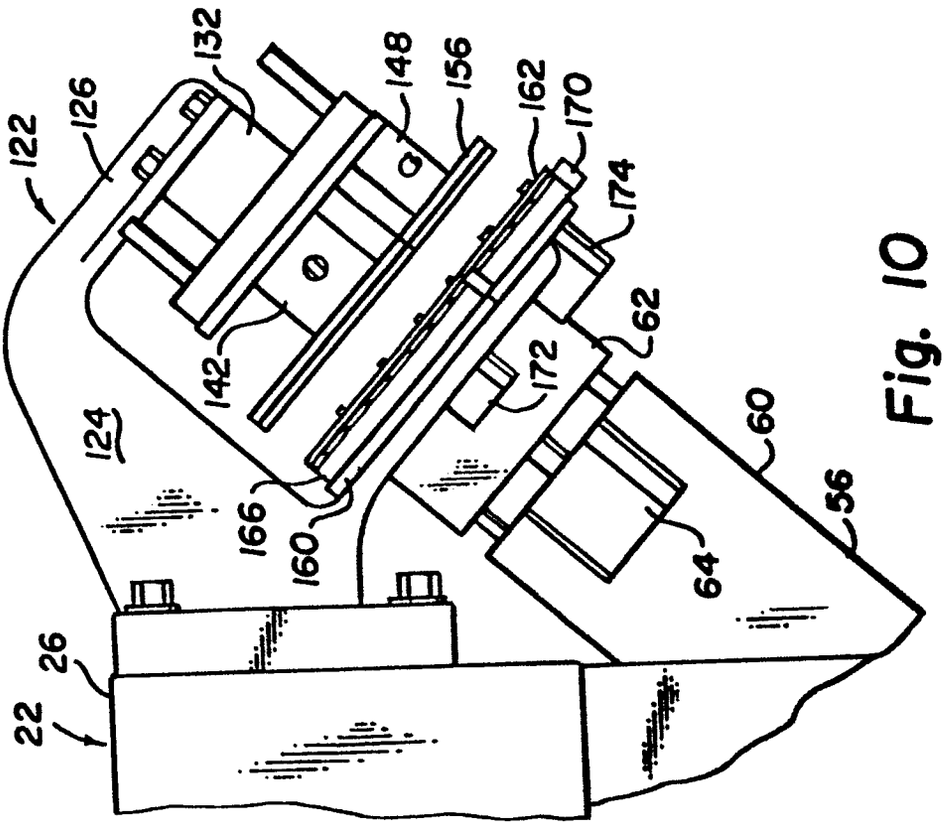
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Fig. 10

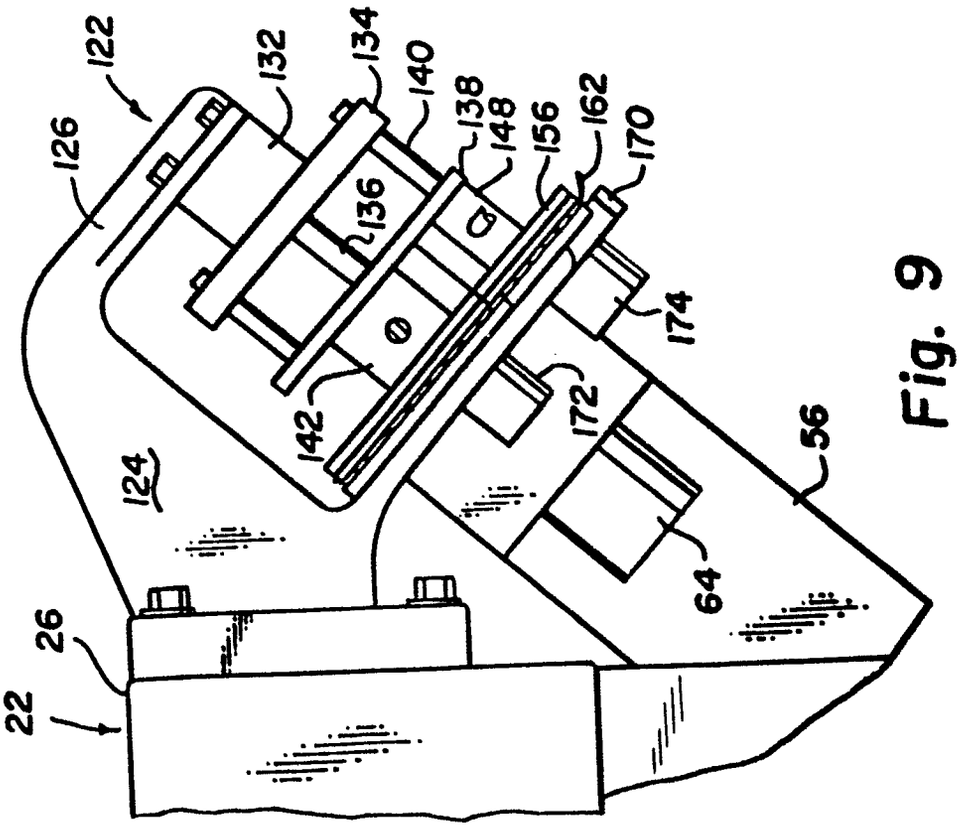
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Fig. 9

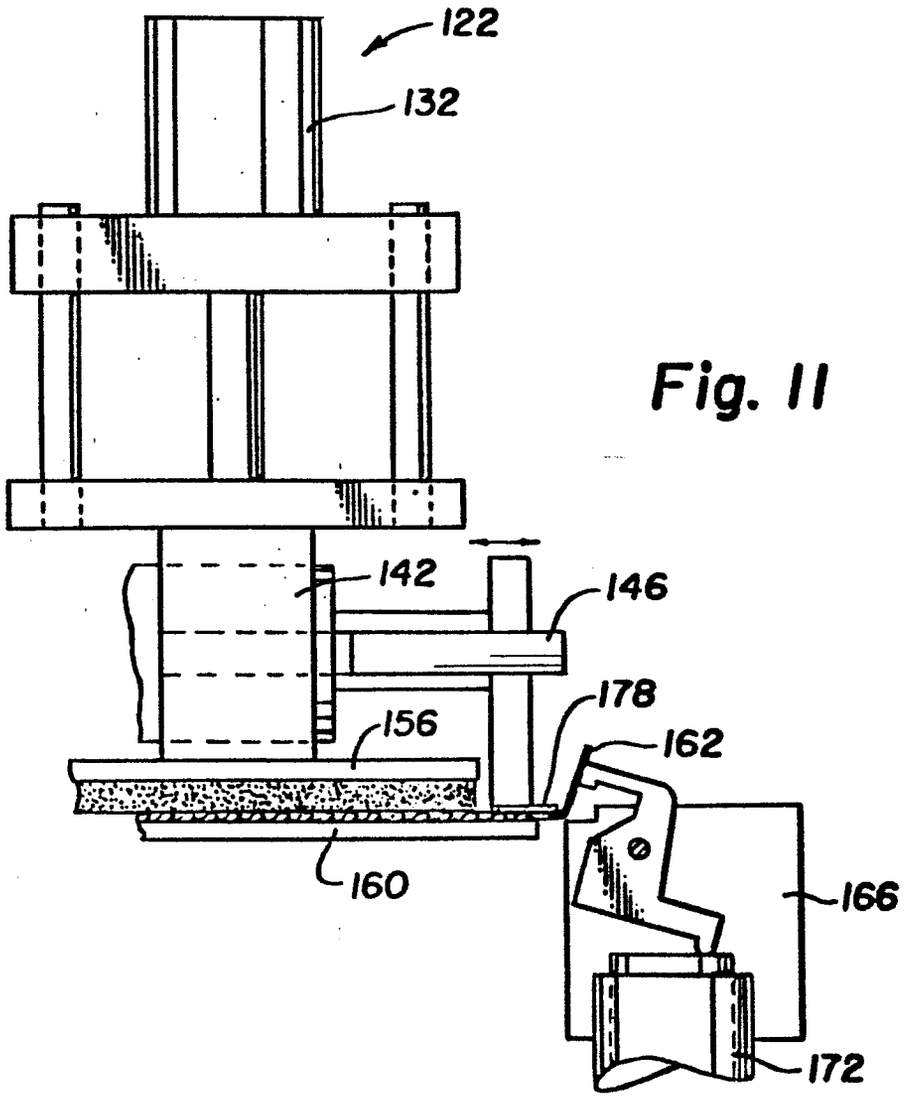

Fig. 11

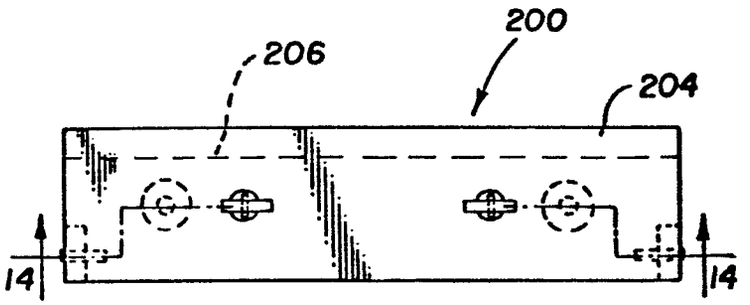

Fig. 12

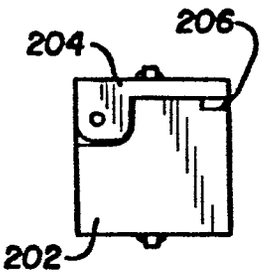

Fig. 13

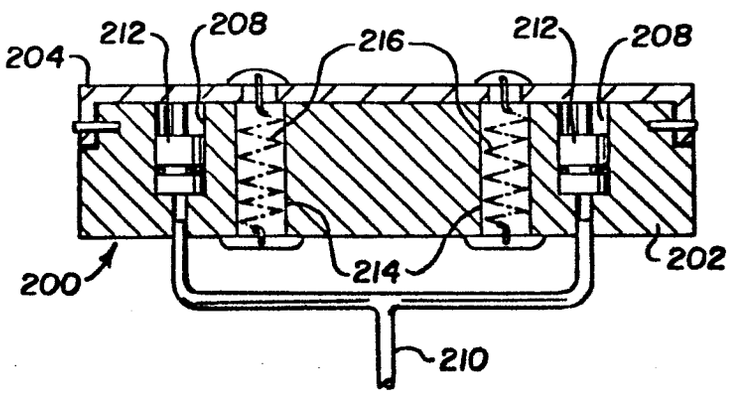

Fig. 14

European Patent Office

EUROPEAN SEARCH REPORT

0172630

Application number

EP 85 30 4608

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl 4)
A	US-A-3 766 870 (WEIGERT) * Figure 4 *	1	D 05 B 33/00
A	DE-B-1 137 296 (PFAFF) * Column 5, line 33 - column 6, line 59 *	1	
A	DE-A-2 656 720 (VELVA) * Page 8, paragraph 2 *	1	
A	US-A-4 445 631 (CASTILLO) * Abstract *	1	
A	FR-A-2 048 842 (SINGER) * Figures 9-15 *	1	
A	US-A-3 528 378 (WESTHOFF) * Column 1, lines 64-71 *	1	TECHNICAL FIELDS SEARCHED (Int. Cl 4) D 05 B
A	US-A-4 157 692 (BROCKLEHURST) * Abstract *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	08-11-1985	VUILLEMIN L.F.

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