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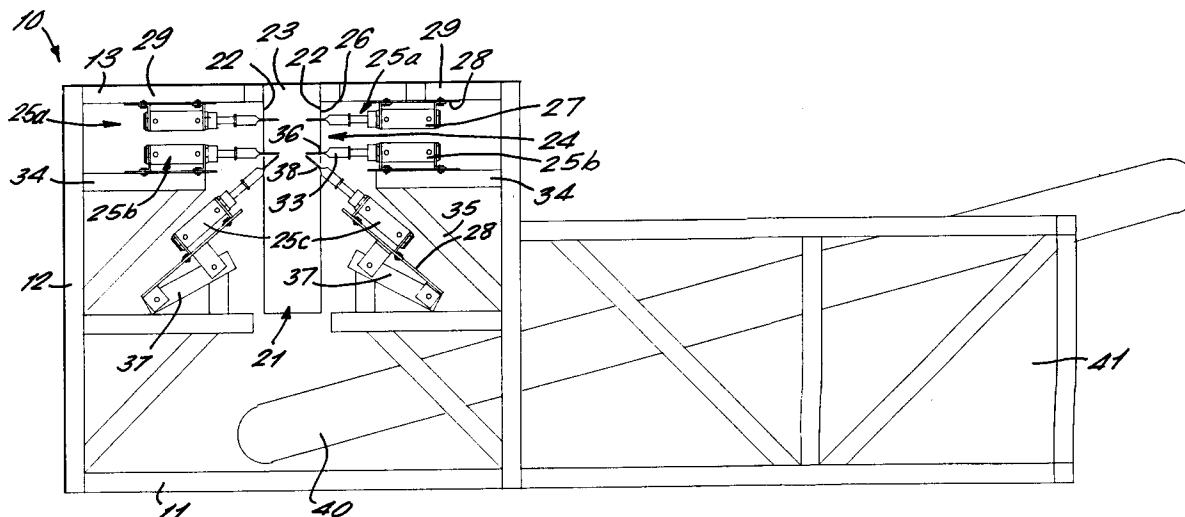
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54 Improvements in or relating to brick cleaning machines.

57 The disclosure relates to a brick cleaning machine consisting of a frame (10) in which a vertical chute (21) of rectangular cross-section is mounted with a top opening (20). The chute defines a brick cleaning station in which an upper pair of horizontally acting face cutters (25a) act through slots (26) in sides (22) of the chute. A second lower plan of horizontally cutting cutters (25b) acts through slots

(36) in the chute immediately below cutters (25a) and a further pair of cutters (25c) act in upwardly inclined directions through slots (38) in the chute walls. The cutters are all vibrated by pneumatically operated cylinders and the horizontally acting cutters (25a, 25b) are arranged to act out of phase so that one set of cutters is always in engagement with a brick to regulate the fall of the brick down the chute.

FIG. 1.



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This invention relates to brick cleaning machines.

There is a large and growing market for reclaimed bricks salvaged from the demolition of a building for use in a new building or in an extension to an existing building. Old bricks have a mellow appearance which may be required when building an extension to an existing building so that the new building harmonises with the existing building. Sometimes owners/architects wish new buildings to be built using reclaimed bricks either because they wish the building to have an old appearance or they wish the building to be in sympathy with adjacent older buildings.

Currently bricks are cleaned of residual mortar/cement after a building has been demolished by hand which is a laborious process and inflates the cost of using reclaimed bricks. There is a need therefore to provide an efficient means for cleaning old bricks ready for re-use.

The invention provides a brick cleaning machine comprising means to guide bricks to be cleaned to move lengthwise along a path through a cleaning station, and vibrating cutter means disposed on the four sides of the path for acting on each of the four sides of the brick at the cleaning station, said cutter means each comprising at least one cutter means acting transversely to the path and one adjacent cutter means angled to said path to face obliquely towards the direction of approach of the brick to the cleaning station to remove mortar/cement adhered to the sides of a brick as it passes through the cleaning station. By way of example, the vibrating cutter means may be capable of vibrating at between 1 to 60 cycles per minute.

Preferably the guide means guides the bricks vertically through the cleaning station and the vibrating cutter means on each side of the path each comprise a horizontally acting cutter means and an upwardly angled cutter means disposed below the horizontally acting cutter means. More specifically, the guide means is arranged to allow bricks to fall through the cleaning station under gravity.

In an alternative arrangement means may be provided for moving the bricks along said guide means through the cleaning station.

In any of the above arrangements, the cutter means may be mounted for adjustment towards and away from said path to enable the effect of the cutter means on the faces of the brick to be varied.

Also in any of the above arrangements, the means to guide the bricks through the cleaning station may comprise a rectangular cross-section chute and said cutter means may act through slots in the walls of the chute at the cleaning station.

Preferably the vibrating cutter means acting on

each face of the brick are arranged to move in phase with each other to extend and retract with respect to said path together. More specifically, the vibrating cutters on opposite sides of the cleaning station act in phase with each other.

In any of the above arrangements the sides of the cleaning station which the top and bottom faces of a brick to be cleaned move past are each provided with two vibrating cutter means acting transversely to the path and spaced apart along the path.

In the latter arrangement the two cutter means on each said side face may operate 180° out of phase so that when one of the cutters is acting on a brick face the other is retracted and vice versa.

In any of the above arrangements each cutter means may have a full face cutter for acting across the full width of a face of the brick presented to the cutter.

Each cutter means may have a double acting pneumatic or hydraulic powered ram for vibrating the cutter thereof.

Alternatively, each cutter means may have a motor driven cam for projecting the cutter towards the path of the brick through the cleaning station and spring means for biasing the cutter away from the path to effect the vibration of the cutter. The motor of each cutter may be hydraulic, electric, air or vacuum driven.

In a further arrangement motor driven crank mechanisms may be provided for vibrating the cutters.

In a further arrangement, motor driven crank mechanisms may be provided for vibrating the cutters.

The following is a description of some specific embodiments of the invention, reference being made to the accompanying drawings in which

Figure 1 is a diagrammatic side view of a brick cleaning machine;

Figure 2 is a more detailed view of the machine shown in Figure 1;

Figure 3 is an end view of the machine;

Figures 4 and 5 show detailed arrangements of the machine;

Figure 6 is a plan view of a frame of the machine;

Figures 7 and 8 are side and end views of the frame of the machine;

Figure 9 is a diagrammatic view of a pneumatically operated vibrating cutter system of the machine;

Figure 10 shows various forms of cutter which may be utilised; and

Figures 11 to 14 show various alternative arrangements for driving the vibrating cutters.

Referring firstly to Figures 1 to 3 of the drawings, there is shown a brick cleaning machine

comprising a frame indicated generally at 10 of generally rectangular box form and having a rectangular base 11, uprights 12 mounted at the corners of the base and a rectangular top 13.

The top of the frame is illustrated in plan view in Figure 6 to which reference should now be made.

Like the base, the top of the frame is a rectangular form comprising side members 14 and end members 15. The side members are interconnected by intermediate cross-members 16 which themselves are interconnected by a pair of spaced fore and aft extending members 17 and linked to the side members by further members 18. The fore and aft extending members are connected by a pair of spaced cross-members 19 to create a rectangular opening indicated at 20 at the centre of the frame from which a rectangular section chute 21 depends the side walls of which are referenced 22 and the ends walls 23.

Used bricks to be reclaimed are fed lengthways into the chute for cleaning of mortar, cement or other material from their faces. The bricks drop down the chute through a brick cleaning station indicated at 24 located partway down the chute. The bricks are oriented in the chute with their wider top and bottom faces aligned with the sides 22 of the chute and their narrower front and back faces aligned with the faces 23 of the chute.

At the cleaning station, the side faces 22 of the chute have an upper pair of horizontally acting face cutters 25a which act through slots 26 in the sides 22 of the chute. Each cutter comprises a double acting pneumatic ram device 27 mounted on a slotted plate 28 for adjustment of the ram towards and away from the chute and the plate is mounted to the underside of member 29 of the frame top 13. The form of slotted plate 28 is illustrated in Figure 4 of the drawings. The fore and aft extending slots are indicated at 31 to receive bolts 32 for securing the pneumatic rams of the cutters to the plates. Each cutter carries a full face chisel cutter 33 for acting on the sides of the brick as it falls through the chute.

The second pair of similar pneumatically operated cutters 25b is mounted to act horizontally immediately below the first pair of cutters on intermediate supports 34 supported on struts 35. The chisels 33 of the second pair of cutters act through slots 36 in the side walls 22 of the chute. Finally, a further pair of pneumatically operated cutters 25c is mounted on adjustable brackets 37 to act in upwardly inclined directions through slots 38 in the side walls 22 of the chute immediately below the lower pair of cutters 25. The chisels 33 of the upwardly angled pair of cutters may act through the same slots as the chisels of the lower pair of cutters or may act through their own separate slots.

The upwardly angled cutters 25c are also mounted on slotted plates 28 to provide adjustment towards and away from the chute as indicated above and the brackets are adjustable to permit the angle of the cutters 25c to be varied as described later.

The opposite ends of the cylinders of the cutters are connected to an air supply as described later to apply air pressure first to one end for the cylinder and then the opposite end to cause the cutters to vibrate at frequencies in the region of 1 to 60 cycles per minute. The two pairs of horizontally acting cutters in conjunction with the upwardly angled pair of cutters ensures that the heavy deposits of mortar/cement likely to be found on the upper and lower faces of the bricks will be removed. As will be appreciated from the circuit indicated in Figure 9, the upper pair of cutters is arranged to operate out of phase with the lower pair of horizontally acting cutters and the adjacent upwardly angled pair of cutters so that one set of cutters is always in engagement with the brick to regulate the fall of the brick through the cleaning station as deposits are removed from the surface of the bricks.

The cylinders of the vibrating cutters are adjusted to ensure that the required degree of force and penetration are applied to the brick to remove extraneous material from the surface of the brick without damaging the brick proper.

Figure 3 of the drawings shows the simplified arrangement applicable to the end walls 23 of the chute in which the upper most pair of cutters is omitted and only a single horizontally acting pair of cutters is provided supported by a single pair of upwardly inclined cutters all mounted as aforesaid. It will be appreciated that front and back faces of the brick which pass these cutters are likely to have less material deposited on them and therefore a reduce number of cutters is required to act on those surfaces.

Figure 5 of the drawings shows the mounting of the upwardly inclined cutters 25c at angles of about 30° with a provision for adjustment of the mounting brackets 37 through about 8°.

After the brick has passed through the cutters acting on it from either side of the chute, it falls on to a conveyor indicated at 40 which extends underneath the chute and is supported in a subsidiary side frame 41. The conveyor transports the cleaned bricks away to a collection site.

Figure 10 shows the forms of a number of different types Of chisels 33 which may be used for the cutters according to the nature of the material to be dislodged and the type of brick.

Figures 11 and 12 of the drawings show an alternative drive mechanism for the vibrating cutters in which the cutters are advanced by cam mechanisms 50 acting on shafts 51 projecting from

the rear ends of the cutters and powerful springs embodied in the housings of the cutters effect the return action.

Figures 13 and 14 show a further arrangement in which the cutters are driven by crank mechanisms indicated at 52 and co-ordinated so that the upper cutters of each horizontally acting pair act out of phase with the lower pair which act together with the upwardly angled pair.

It will be appreciated that many further modifications may be made to the invention without departing from the scope of the invention. For example the bricks may be moved through the cleaning station by a power operated feed mechanism and in this case the bricks may move vertically or horizontally through the cleaning station.

Claims

1. A brick cleaning machine comprising means to guide bricks to be cleaned to move lengthwise along a path through a cleaning station, and vibrating cutter means disposed on the four sides of the path for acting on each of the four sides of the brick at the cleaning station, said cutter means each comprising at least one cutter means acting transversely to the path and one adjacent cutter means angled to said path to face obliquely towards the direction of approach of the brick to the cleaning station to remove mortar/cement adhered to the sides of a brick as it passes through the cleaning station.
2. A brick cleaning machine as claimed in Claim 1, wherein the guide means guides the bricks vertically through the cleaning station and the vibrating cutter means on each side of the path each comprise a horizontally acting cutter means and an upwardly angled cutter means disposed below the horizontally acting cutter means.
3. A brick cleaning machine as claimed in Claim 2, wherein the guide means is arranged to allow bricks to fall through the cleaning station under gravity.
4. A brick cleaning machine as claimed in Claim 1 or Claim 2, wherein means are provided for moving the bricks along said guide means through the cleaning station.
5. A brick cleaning machine as claimed in any of the preceding claims, wherein the cutter means are mounted for adjustment towards and away from said path to enable the effect of the cutter means on the faces of the brick to

be varied.

6. A brick cleaning machine as claimed in any of the preceding claims, wherein the means to guide the bricks through the cleaning station comprise a rectangular cross-section chute and said cutter means act through slots in the walls of the chute at the cleaning station.
7. A brick cleaning machine as claimed in any of the preceding claims, wherein the vibrating cutter means acting on each face of the brick are arranged to move in phase with each other to extend and retract with respect to said path together.
8. A brick cleaning machine as claimed in Claim 7, wherein the vibrating cutters on opposite sides of the cleaning station act in phase with each other.
9. A brick cleaning machine as claimed in any of the preceding claims, wherein the sides of the cleaning station which the top and bottom faces of a brick to be cleaned move past are each provided with two vibrating cutter means acting transversely to the path and spaced apart along the path.
10. A brick cleaning machine as claimed in Claim 9, wherein the two cutter means on each of the cleaning stations operate 180° out of phase so that when one of the cutters is acting on a brick face the other is retracted and vice versa.
11. A brick cleaning machine as claimed in any of the preceding claims, wherein each cutter means has a full face cutter for acting across the full width of a face of the brick presented to the cutter.
12. A brick cleaning machine as claimed in any of the preceding claims, wherein each cutter means has a double acting pneumatic or hydraulic powered ram for vibrating the cutter thereof.
13. A brick cleaning machine as claimed in any of Claims 1 to 12, wherein each cutter means has a motor driven cam for projecting the cutter towards the path of the brick through the cleaning station and spring means for biasing the cutter away from the path to effect the vibration of the cutter.
14. A brick cleaning machine as claimed in Claim 13, wherein the motor of each cutter is hydraulic, electric, air or vacuum driven.

15. A brick cleaning machine as claimed in any of Claims 1 to 11, wherein motor driven crank mechanisms may be provided for vibrating the cutters.

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FIG. 1.

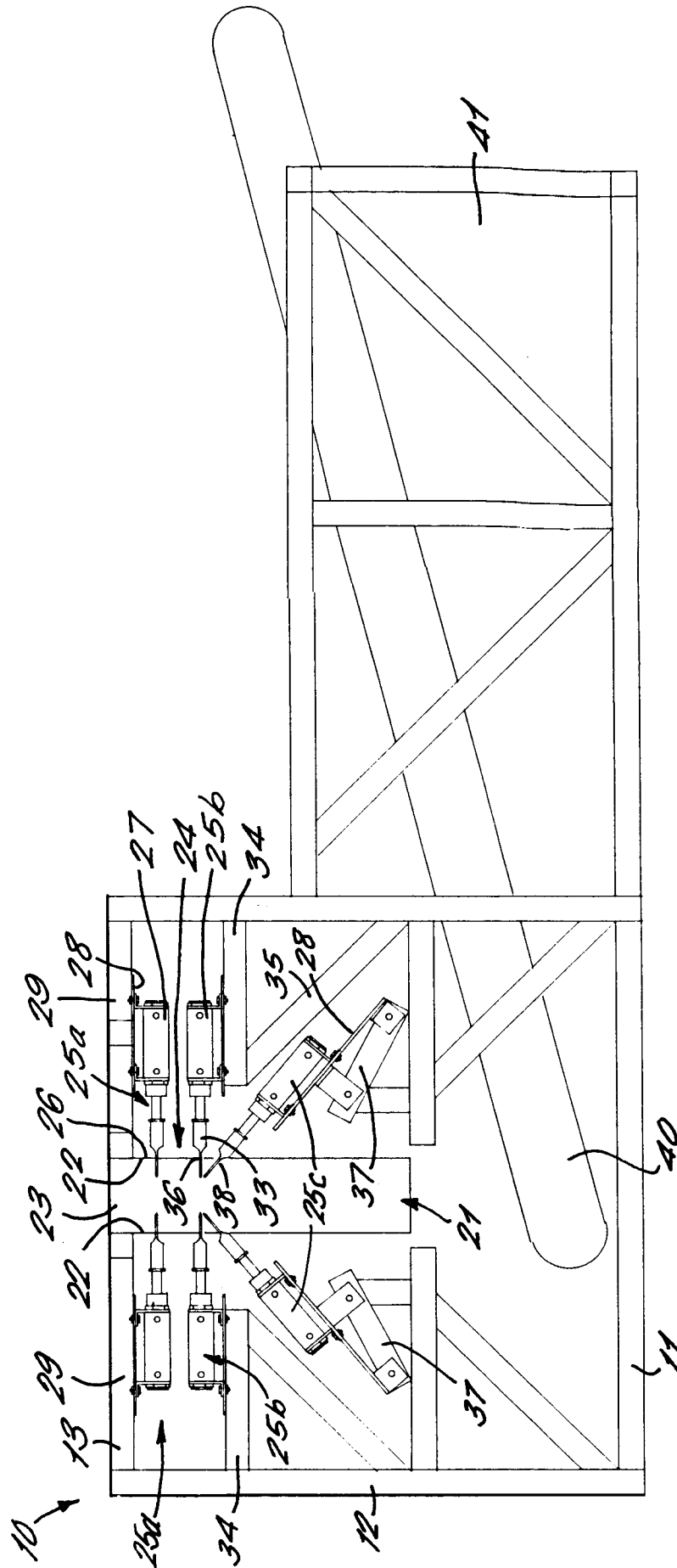
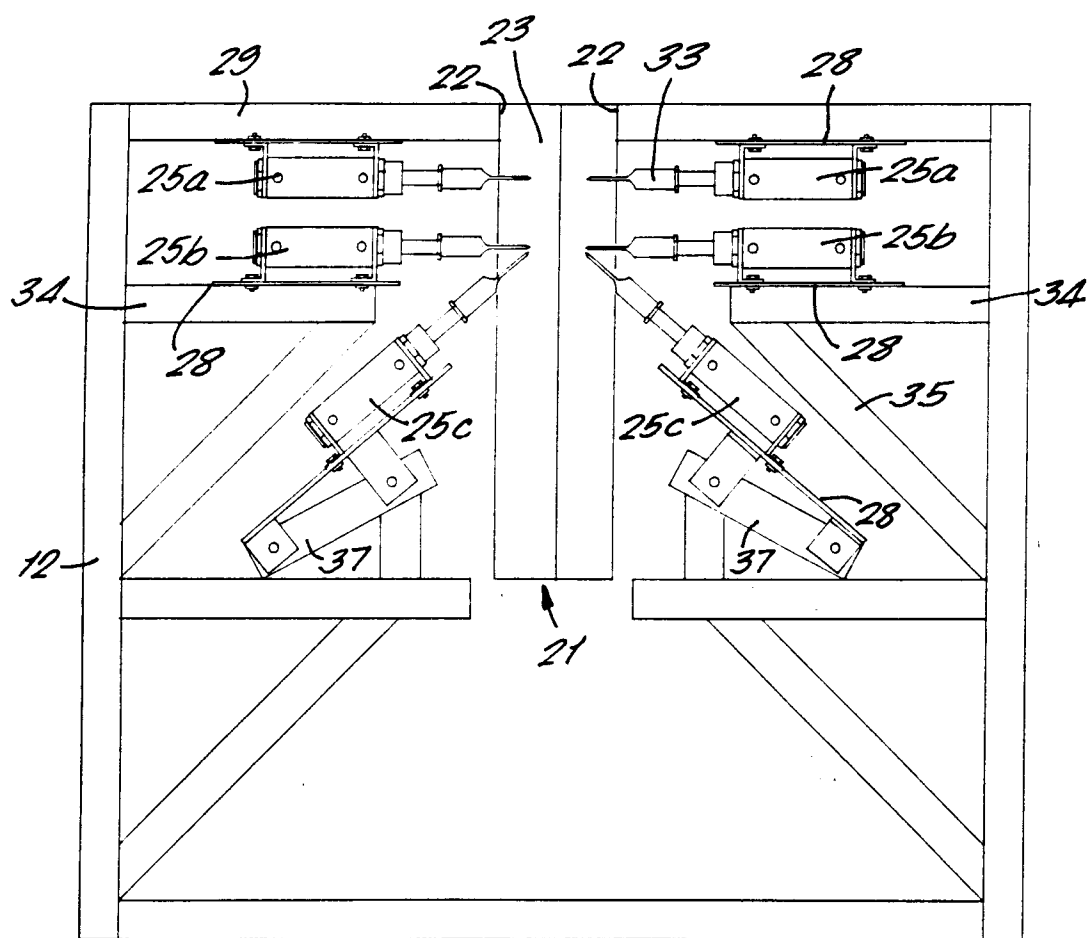


FIG. 2.



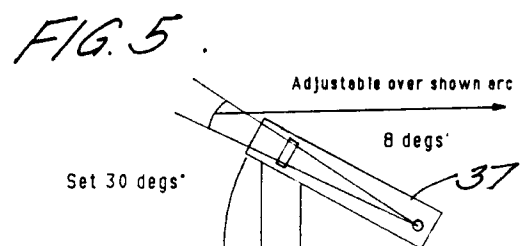
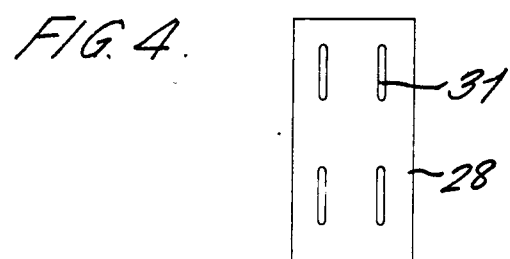
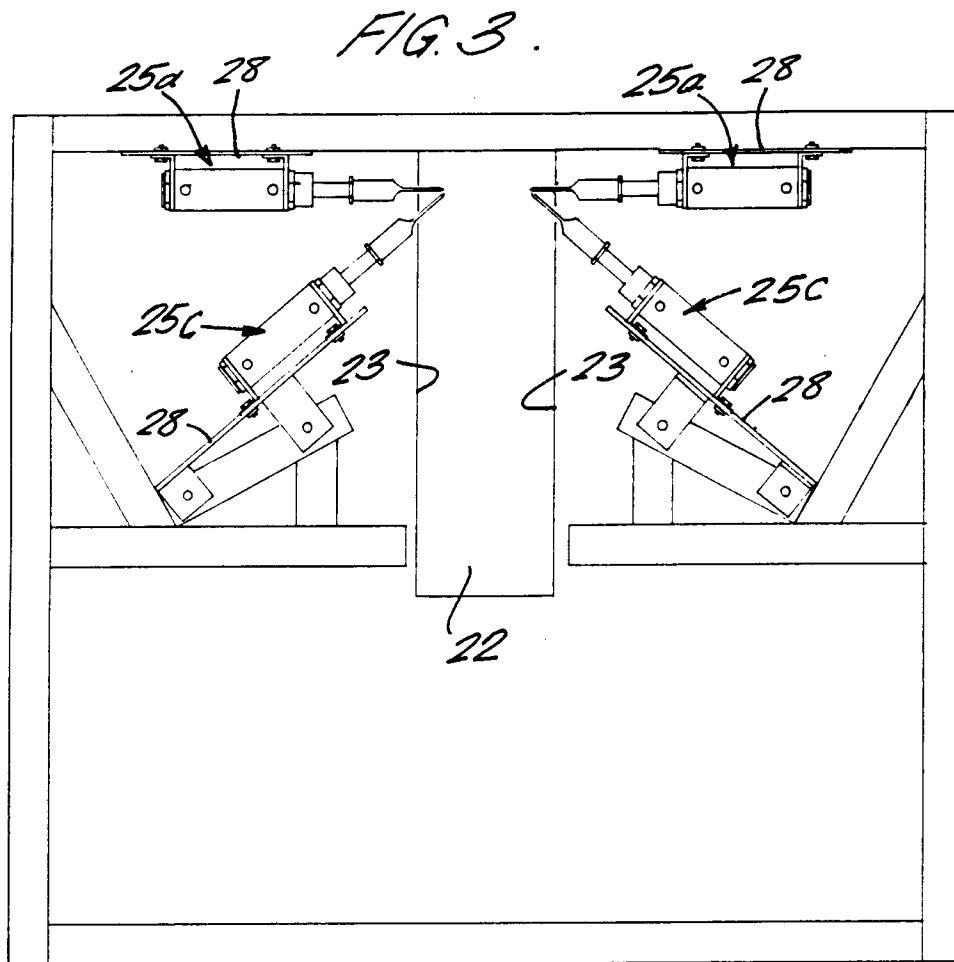


FIG. 6.

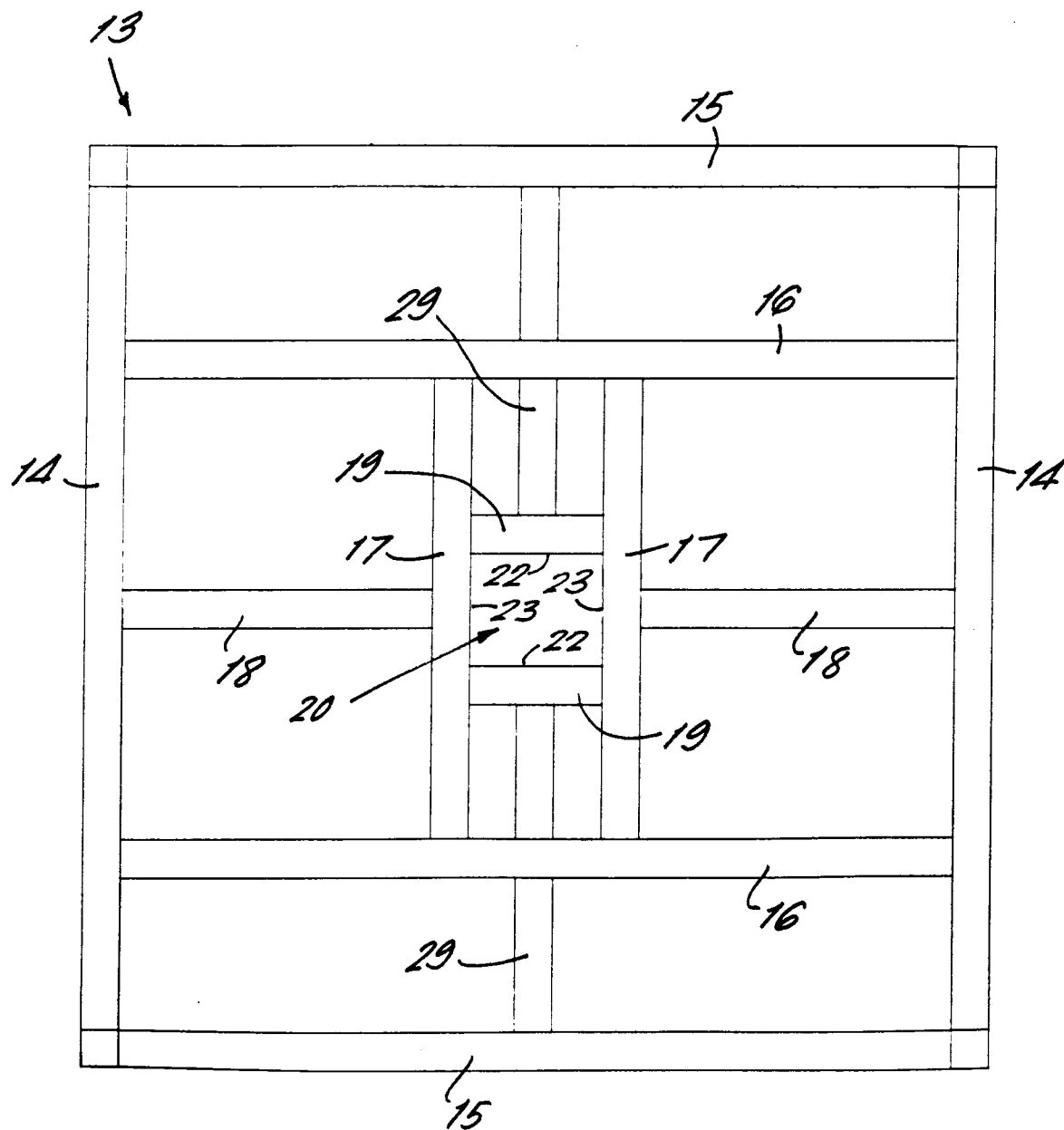


FIG. 7.

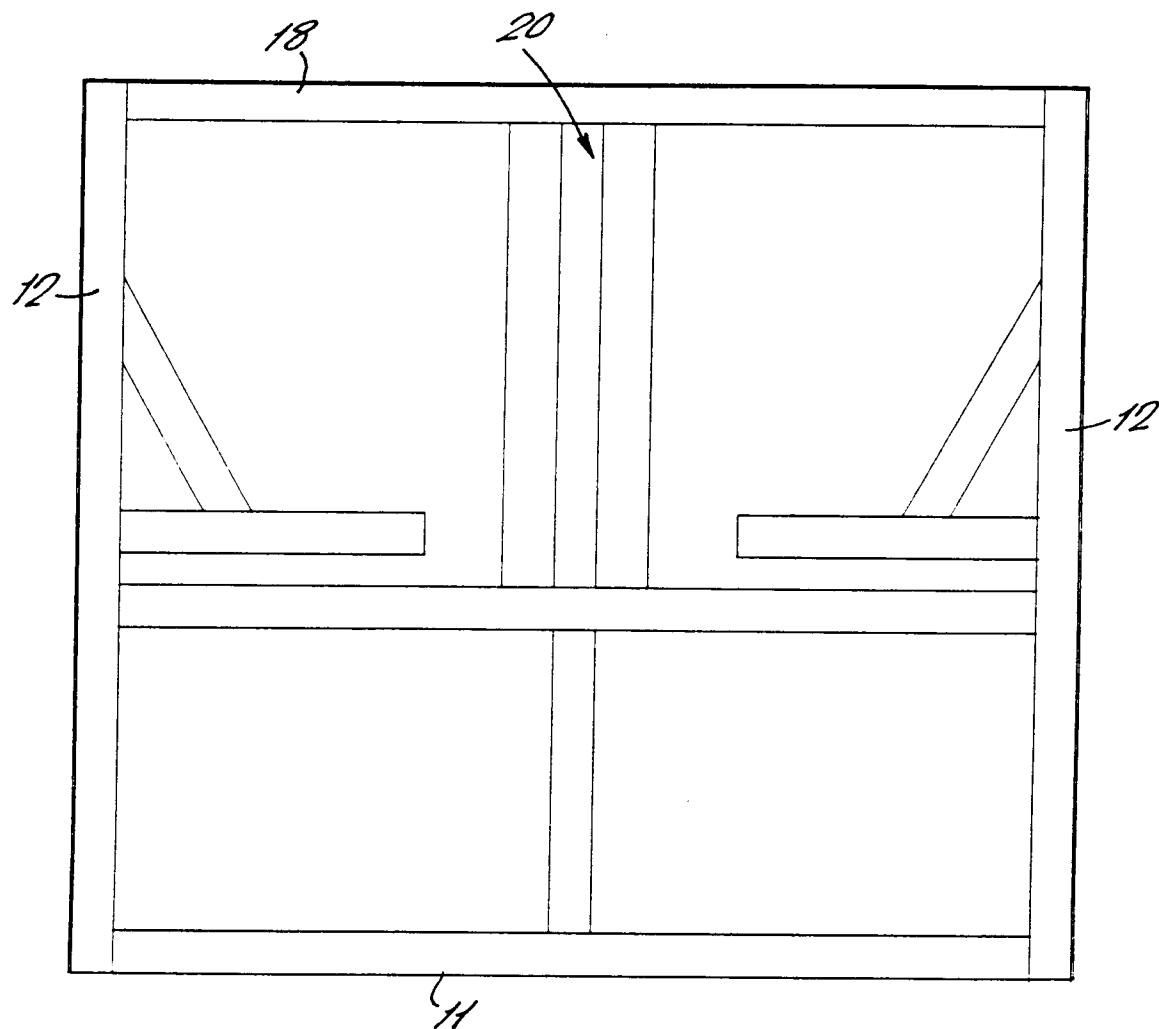


FIG. 8.

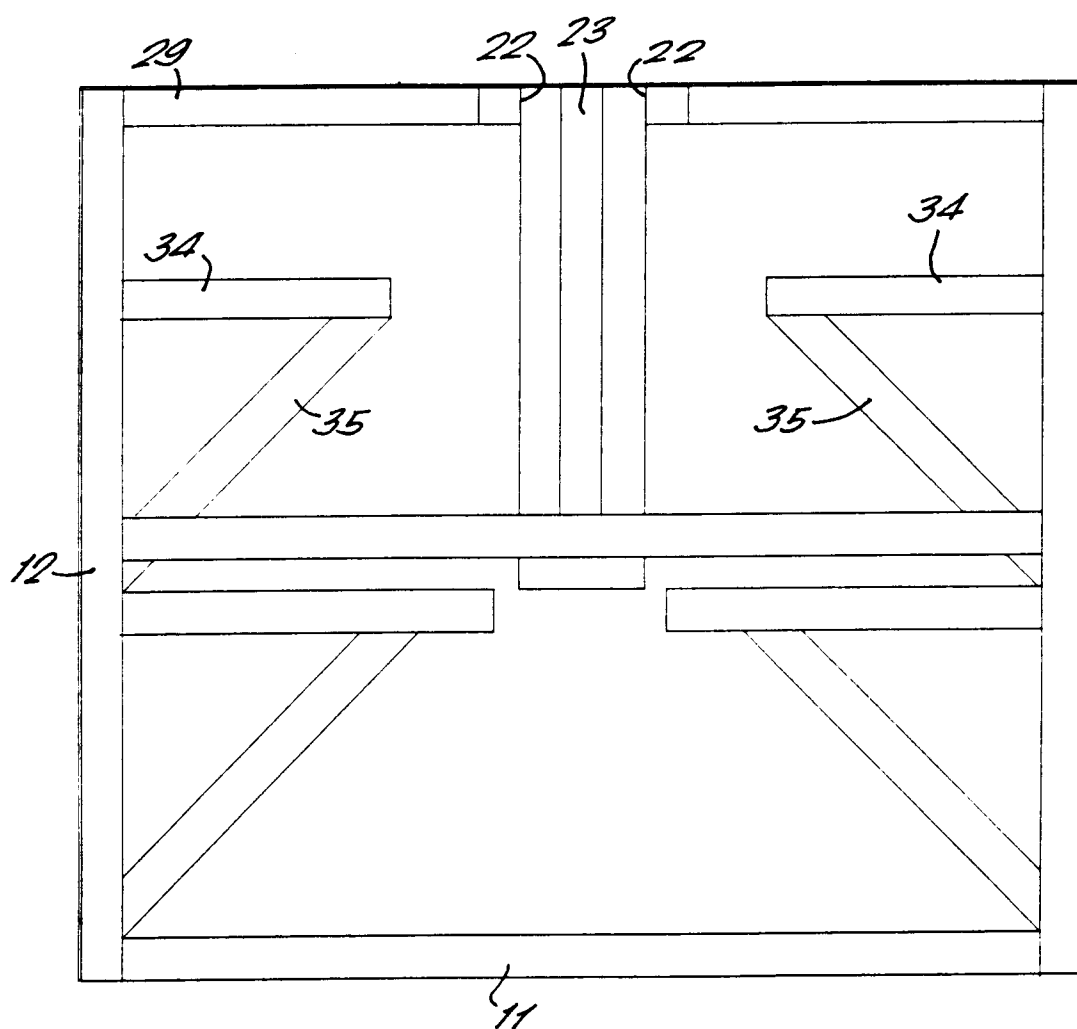


FIG. 9.

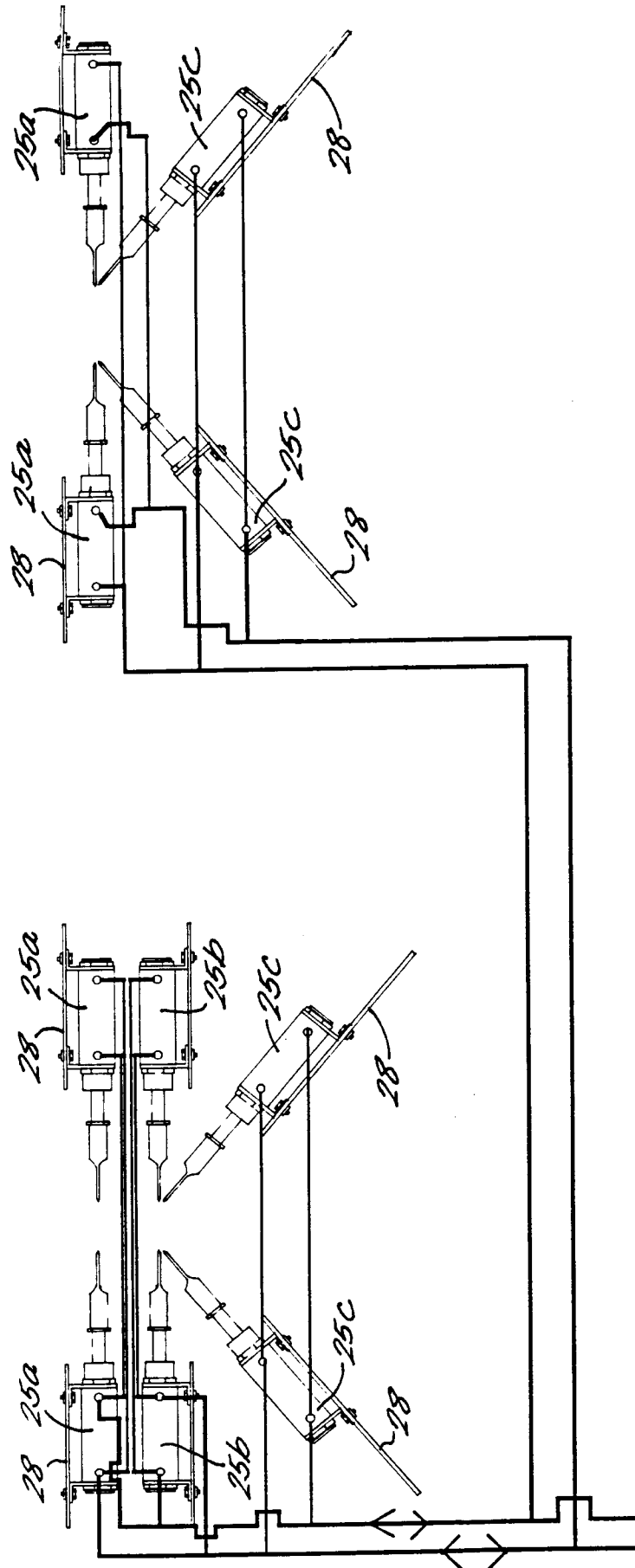


FIG. 10.

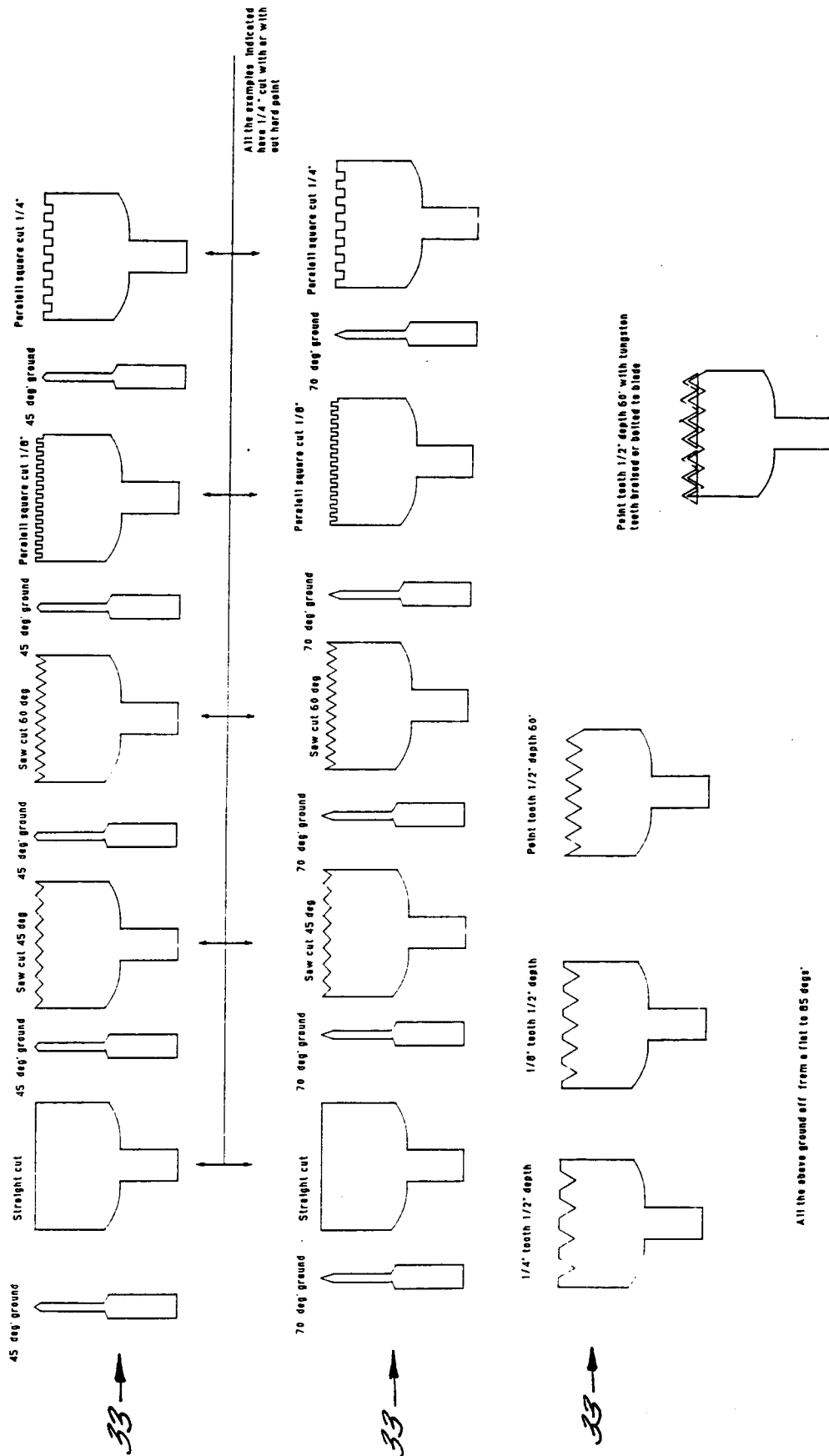


FIG. 11

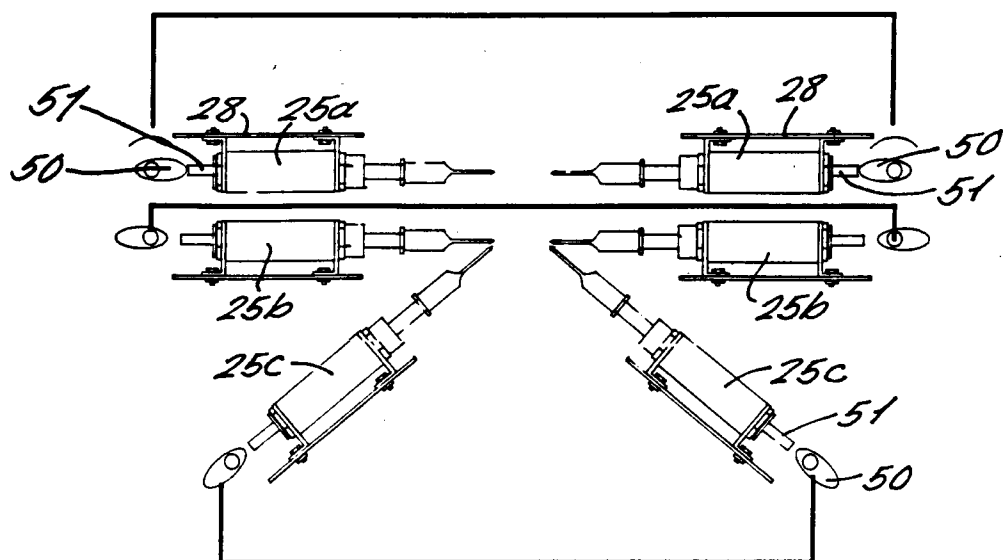


FIG. 13

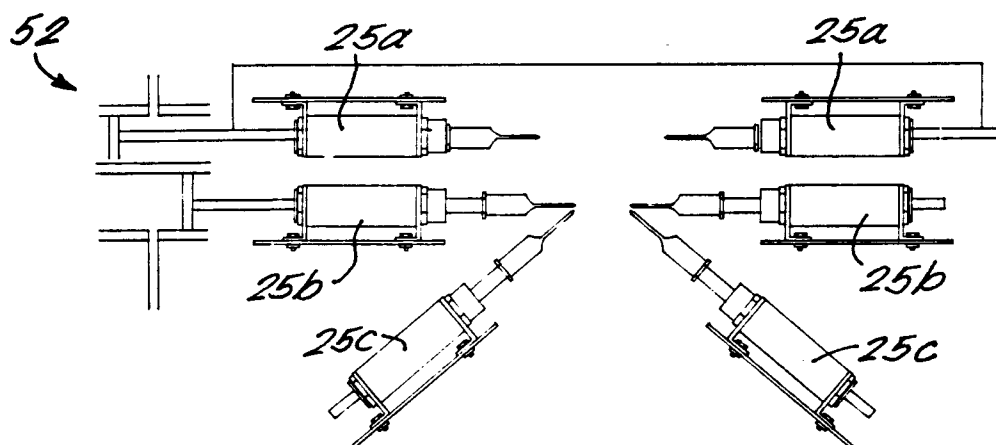


FIG. 12.

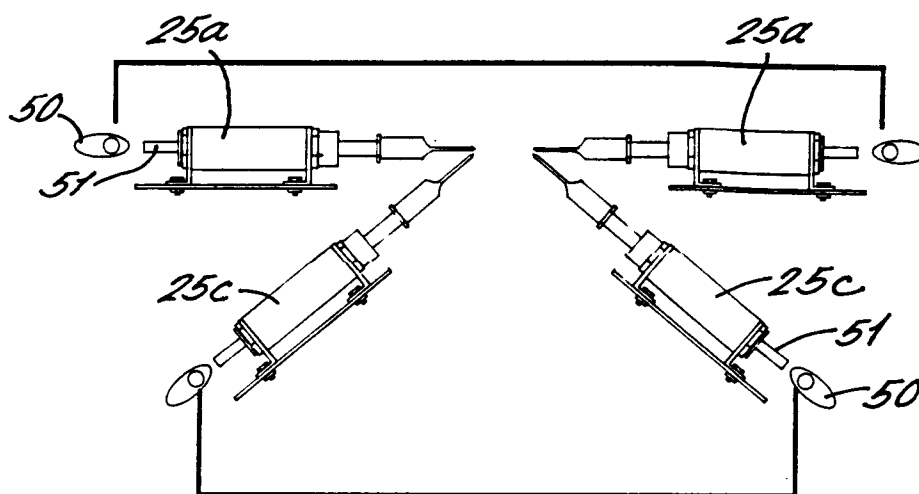
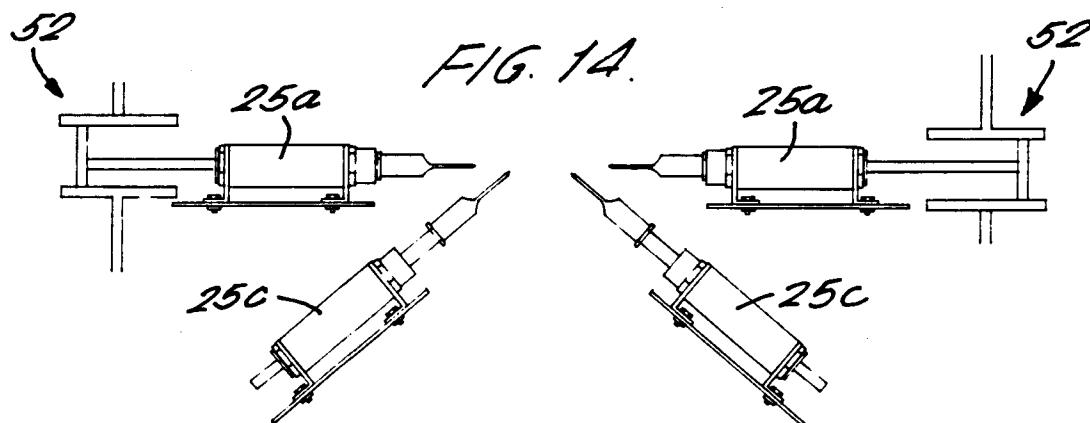


FIG. 14.





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EUROPEAN SEARCH REPORT

Application Number

EP 92305864.8

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.5)
A	EP - A - 0 048 386 (FELDHUES) * Abstract * --	1	B 08 B 1/00
A	DE - A - 3 402 010 (MÖCKEL) * Fig. 1 * --	1	
A	US - A - 4 418 435 (ARNOLD) * Fig. 4,5 * --	1	
A	US - A - 4 543 970 (NOH et al.) * Fig. 7,8 * --	1	
A	SOVIET INVENTIONS ILLUSTRATED, P,Q section, week 8618, June 11, 1986 DERWENT PUBLICATIONS LTD., London, P 43 * SU-1183 202-A (LATV LOCAL IND PROG) * ----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 08 B 1/00
Place of search VIENNA		Date of completion of the search 13-08-1992	Examiner KNAUER
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