

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 723 827 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

31.07.1996 Bulletin 1996/31(51) Int Cl.⁶: **B21D 53/74**(21) Application number: **96830009.5**(22) Date of filing: **15.01.1996**

(84) Designated Contracting States:

AT BE CH DE DK ES FR GB GR LI NL PT SE• **Santini, Paolo****I-50041 Calenzano, Firenze (IT)**(30) Priority: **18.01.1995 IT FI950009**

(74) Representative:

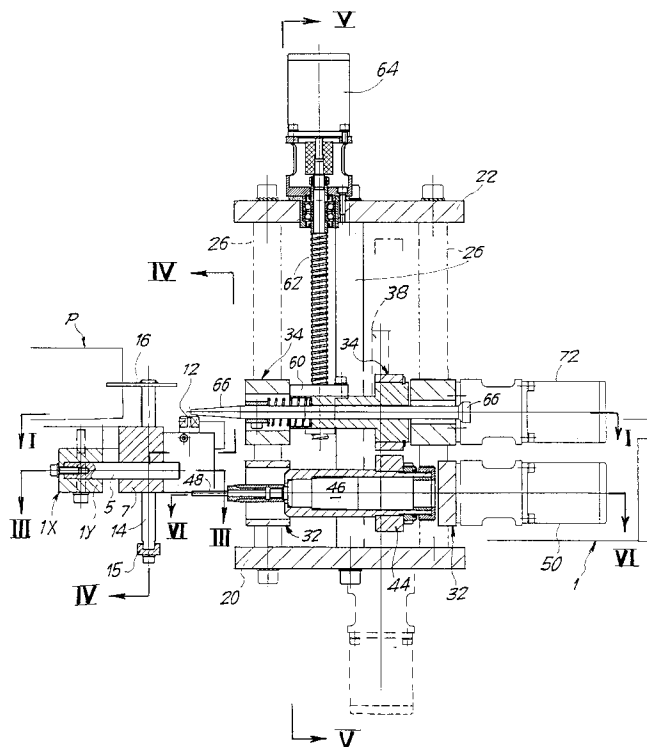
Mannucci, Gianfranco, Dott.-Ing. et al**Ufficio Tecnico Ing. A. Mannucci****Via della Scala 4****I-50123 Firenze (IT)**

(72) Inventors:

• **Parigi, Stefano****I-50041 Calenzano, Firenze (IT)****(54) Equipment for coupling profiles converging at an angle in a metal frame for casings**

(57) On a fixed structure (1, 1X) in front of the corner formed by the converging profiles (P) arranged in the seat, there are provided essentially vertical guides (26) for two assemblies (32; 34), one (32) of which bears the implement for perforating (48) and the other (34) of which bears the implement for injecting (66), the axes

of which implements are situated in and move in the plane bisecting the corner defined by the two converging profiles; each of said assemblies (32; 34) is actuated by a corresponding servomotor (40; 64) while the active part of each of the two implements (48; 66) is capable of advancing axially to carry out its own function.

FIG. 2**EP 0 723 827 A1**

Description

The invention relates to equipment for coupling - with the aid of a square - the two profiles converging at an angle of a metal frame for casings. Such equipment generally comprises a seat for the components (profiles and square) to be assembled, two calking implements capable of causing the deformation of walls of the profiles to contrast with corresponding rabbets which are present in the square; also provided are an implement for perforating and an implement for injecting, arranged to act on the external corner formed by the two abutting profiles. The active parts of said two implements act essentially in a plane bisecting the dihedron defining the corner of the casing.

The aim of the invention is to simplify the structure, to allow greater flexibility in handling, and so forth. These and other aims and advantages will become clear from the text which follows.

According to the invention, on a fixed structure in front of the corner formed by the converging profiles arranged in the seat, there are provided essentially vertical guides for two assemblies, one of which bears the implement for perforating and the other of which bears the implement for injecting, the axes of which implements are situated in and move in the plane bisecting the corner defined by the two converging profiles; also provided, for each of said assemblies, are actuating means for the movement of the respective assembly; the active part of each of the two implements is capable of advancing axially to carry out its own function and then to move back.

Each of the two actuating means is capable of making the respective assembly reach an adjustable limit of travel which defines the active position of the associated implement.

Said actuating means can be step motors or equivalent, which actuate threaded bars, with which screw nuts borne by the relevant assemblies interact. Alternatively, the actuating means can be cylinder/piston means controlled hydraulically or pneumatically.

In one possible embodiment, said fixed structure comprises two plates, between which columns extend forming the vertical guides; the same columns can constitute the guides for both said assemblies.

The seat for the profiles has support and positioning members, with which external lateral walls of the converging profiles make contact; according to the invention, said support and positioning members can be borne by an assembly which is adjustable in an essentially horizontal direction and parallel to the bisecting plane. Such support and positioning members are adjustable on said assembly in an essentially vertical direction, by column guide means or equivalent.

The invention will be better understood by following the description and the attached drawing which shows a non-limiting exemplary embodiment of the invention itself. In the drawing, on different scales for convenience

of consultation,

Fig. 1 shows a plan view in partial section along I-I in Fig. 2 of equipment made according to the invention;

Fig. 2 shows a vertical section along II-II in Fig. 1; Figs 3 and 4 show local sections along III-III and IV-IV in Fig. 2;

Fig. 5 shows a vertical section essentially along the lines V-V in Figs 1 and 2, and

Fig. 6 shows a section along VI-VI in Figs 2 and 5.

According to what is illustrated in the attached drawing, 1 indicates in a very concise manner a fixed structure which is situated positioned in front of and in the region of the corner S formed by two profiles P1 and P2 which are placed on the equipment to converge at the angle to which the corner S belongs, to be connected by means of a square SQ inserted inside the two profiles P1 and P2. The seat for the positioning of said profiles P1 and P2 is formed by components 1X and 1Y of the basic structure, of which the portion of structure 1 positioned in front of said seat for the profiles P1 and P2 forms part. 3 indicates calking tools which are used traditionally for anchoring the profiles P1 and P2 to the square SQ enclosed by them; the tools cause a deformation of external walls of the profiles in the region of hollows arranged in the square to receive the portions of said walls which are deformed by the tools 3. Integral with a component 1Y of the fixed structure 1X are horizontal guides 5 which are parallel to the vertical bisecting plane of line A-A in Fig. 1 which is the plane bisecting the corner S formed by the profiles P1 and P2 converging to form the angle of the frame with said two profiles P1 and P2 already indicated. A block 7 can be moved and adjusted on the horizontal guides 5; this block 7 can be positioned by means of the angular maneuvering of a threaded shaft 9 with an axis parallel to the guides 5, which can be controlled by means of a coupling with bevel gears 10 from a maneuvering terminal 12 with a quadrangular head or similar. The block 7 forms vertical seats for the sliding of two small columns 14 which are interconnected by a lower bridge 15 and which at the top support two pawls 16 which are capable of being adjusted so as to create supports which are adjustable according to the dimensional characteristics of the profiles to be coupled. The pawls 16 are adjustable vertically by the sliding and locking of the small columns 14 and in the horizontal direction parallel to the bisecting plane of line A-A for the positioning of the block 7.

The structure X, which is positioned in front of the seat for the corner S of the profiles P1, P2 to be coupled, comprises a pair of horizontal plates 20, 22 interconnected by columns 26 which constitute vertical sliding guides. Small support columns 28 serve for the connection of the lower plate 20 to the structure 1, 1X. In a practical manner, there are three guide columns 26, two of which are close and aligned parallel to the abovementioned

tioned bisecting plane of symmetry of line A-A in Fig. 1; the third column 26 is removed from and on the opposite side to the pair of columns 26 in relation to the bisecting plane of line A-A in Fig. 1.

Two assemblies 32 and 34 are movable vertically and independently on the guide and sliding columns 26. The lower assembly 32 is shaped like a rectangular frame (see in particular Fig. 6) equipped with a threaded bush 36, with which a threaded shaft 38 is coupled; said shaft 38 is controlled by an actuator 40 which can be constituted by an electric step motor or another equivalent; by means of the actuator 40, the assembly 32 can be raised and lowered along the columns 26. The assembly 32 has two horizontal guides 42 (see in particular Fig. 6) which have a development parallel to the bisecting plane of line A-A and on which horizontal guides 42 a group 44 slides which bears the motorization 46 of a perforation implement 48, the horizontal axis of which, parallel to the guides 42, lies in the vertical bisecting plane of symmetry with line A-A referred to a number of times. The movement of the group 44 along the guides 42 and parallel to the axis of the perforating implement 48 can be obtained by means of an actuator 50, such as a step motor or another equivalent, with a threaded shaft 52 which engages in a threaded bush 54 integral with the group 44. In this manner, a perforation can be obtained with the implement 48 in the region of the corner S of convergence of the two profiles P1 and P2. The actuator 50 controls the implement 48 in the advance direction and in the return direction, which in turn is actuated in rotation by means of the motorization 46. The perforation with the implement 48 can be actuated at a level which is adjustable by means of the positioning of the assembly 32 and therefore of the group 44 on the guide columns 26; adjustment can be actuated electrically when the actuator 40 is a step motor or equivalent.

The assembly 34, shaped similarly to that 32 and bearing (see in particular Fig. 1) a pair of horizontal guides 56 which are similar to those 42 and on which a group 58 similar to that 44 can slide, also slides on the columns 26. The assembly 34 is equipped with a threaded bush 60 which is coupled to a threaded shaft 62 formed vertically which can be controlled in rotation by means of an actuator 64 similar to that 40 and for example also constituted by a step motor or another equivalent. The actuator 64 moves the assembly 34 vertically along the columns 26 independently of the assembly 32. The group 58 forms a sliding seat parallel to the guides 56 for a nozzle 66 of an injection tool for an adhesive with which provision is to be made for sticking the square SQ inside the profiles P1 and P2 for locking the connection. The implement for injecting 66 is situated parallel to the perforating implement 48 in the plane A-A referred to a number of times. This implement 66 for injecting is slidable on its own axis guided by a rod 68 and stressed by a spring 70 towards the corner S to offer a tolerance for adaptation to the hole. The group 58 can be controlled for sliding along the guides 56 by means of an actuator 72 similar to that 50, which controls a threaded shaft 74 which is coupled to a bush 76 borne by the group 58. The assembly 34 - and with it the group 58 - can be adjusted vertically along the columns 26 by means of the actuator 64, with a positioning which is expediently fixed, perhaps electrically or by a system of the type of a mechanical pawl; in this manner, positioning of the implement for injecting 66 is achieved in perfect alignment with the hole which has previously been formed, by means of the implement 48, along the corner S through the material of the profiles P1 and P2 and if appropriate of the square SQ also.

In operation, provision is initially made for bringing the assembly 34 of the injector 66 upwards into an inactive position while the assembly 32 can be moved by raising it as far as a desired level in order to be able to proceed with the perforation with the implement 48 in the corner S along the bisecting plane of line A-A, at a desired level in relation to the profiles P1 and P2 which have been placed in the seat defined by the squares 16 and by the supports formed by the structure 1X. After having carried out the perforation, the assembly 44 of the perforating implement 48 is lowered and the assembly 34 is lowered followed by the point of the implement for injecting 66 until it is made to coincide with the geometrical axis along which the perforation has been effected by the implement 48 in the region of the corner S of the frame being formed. Provision is then made - with the advance of the group 58 - for pressing the point of the injecting implement 66 into the hole previously formed by the implement 48, the pressure for coupling the end of the injecting implement 66 being ensured by the spring 70 which yields with the advance of the group 58 by means of the actuator 72.

With each operation effected for the perforation and for the injection of the adhesive, the respective groups 44 and 58 are returned by the respective actuators 50 and 72 into a position removed from the corner S to allow the vertical movements of the respective assemblies 32 and 34 by the respective actuators 40 and 64. The operations of perforation and of injection can be repeated at two different points of one and the same corner. The adjustments necessary for adaptation to the morphology and to the dimensional characteristics of the profiles P1 and P2 are thus obtained, by independent operations and therefore with considerable flexibility for adaptation to the requirements of individual manufacturing processes. The equipment can be made in a relatively very simple and economical manner given the standardization of the components which can be used. These and other aims and advantages will be evident to experts in the field.

It is understood that the drawing shows only an example given only by way of practical demonstration of the invention, it being possible for this invention to vary in form and arrangement without however leaving the scope of the concept which forms the invention itself.

Any presence of reference numbers in the enclosed claims has the aim of facilitating reading of the claims with reference to the description and to the drawing and does not limit the scope of protection represented by the claims.

The actuators can also be different from those which are electric step motors and for example can be constituted by pneumatic or hydraulic cylinder/piston or equivalent systems, equipped with appropriate limits of travel which are adjustable for defining the position of the common axis on which the implements 48 and 66 have to arrive for the respective operations.

Claims

1. Equipment for coupling - with the aid of a square - the two profiles converging at an angle of a metal frame for casings, comprising a seat for the components (profiles and squares) to be assembled, two calking implements (3) capable of causing the deformation of walls of the profiles (P1, P2) to contrast with corresponding rabbets which are present in the square (SQ), and also an implement for perforating (48) and an implement for injecting (66), arranged to act on the external corner formed by the two abutting profiles, the active parts of said two implements (48; 66) acting essentially in a plane bisecting the dihedron defining the corner (S) of the casing, wherein, on a fixed structure (1, 1X) in front of the corner (S) formed by the converging profiles (P1, P2) arranged in the seat, there are provided essentially vertical guides (26) for two assemblies (32; 34), one (32) of which bears the implement for perforating (48) and the other (34) of which bears the implement for injecting (66), the axes of which implements are situated in and move in the plane bisecting the corner (S) defined by the two converging profiles; wherein there are provided, for each of said assemblies (32; 34), actuating means for the movement of the respective assembly; and wherein the active part of each of the two implements (48; 66) is capable of being made to advance axially to carry out its own function and then to move back.

2. The equipment as claimed in claim 1, wherein each of the two actuating means (40; 64) is capable of making the respective assembly reach an adjustable limit of travel which defines the active position of the associated implement.

3. The equipment as claimed in claim 1 or 2, wherein at least one of said actuating means is a step motor (40; 64) or equivalent which actuates a threaded bar, with which a screw nut borne by the relevant assembly interacts.

4. The equipment as claimed in at least claim 1,

wherein said fixed structure comprises two plates (20, 22), between which columns (26) extend forming the vertical guides, it being possible for the same columns to constitute the guides for both said assemblies (32; 34).

5. The equipment as claimed in at least claim 1, in which said seat for the profiles has support and positioning members (16), with which external lateral walls of the converging profiles make contact, wherein said support and positioning members (16) are borne by an assembly (7) which is adjustable in an essentially horizontal direction and parallel to the bisecting plane.

6. The equipment as claimed in claim 5, wherein said support and positioning members (16) are adjustable on their assembly (7) in an essentially vertical direction, by column guide means (14) or equivalent.

7. Equipment for coupling profiles converging at an angle in a metal frame for casings; the whole as described above and represented by way of exemplification in the attached drawing.

FIG. 1

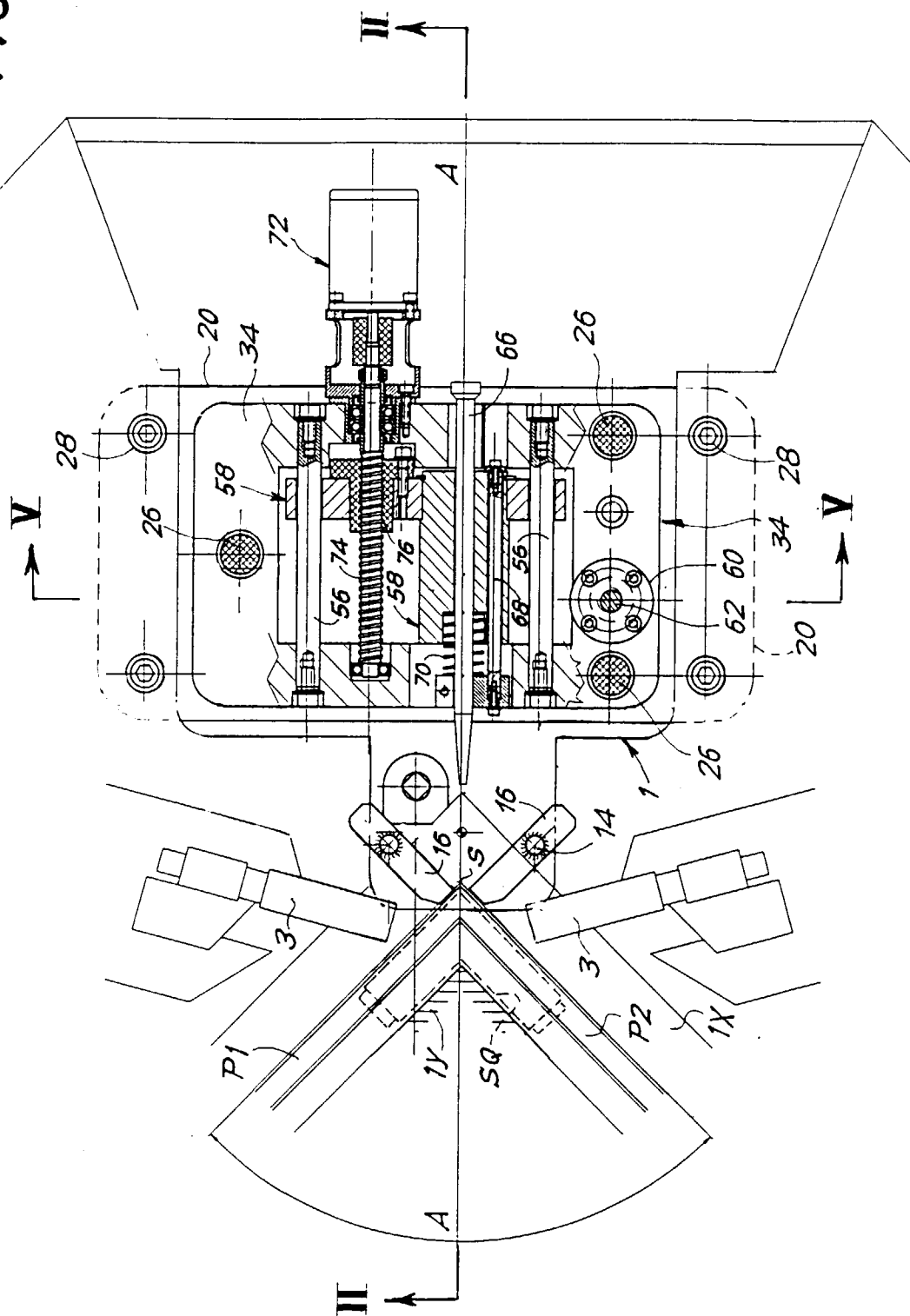
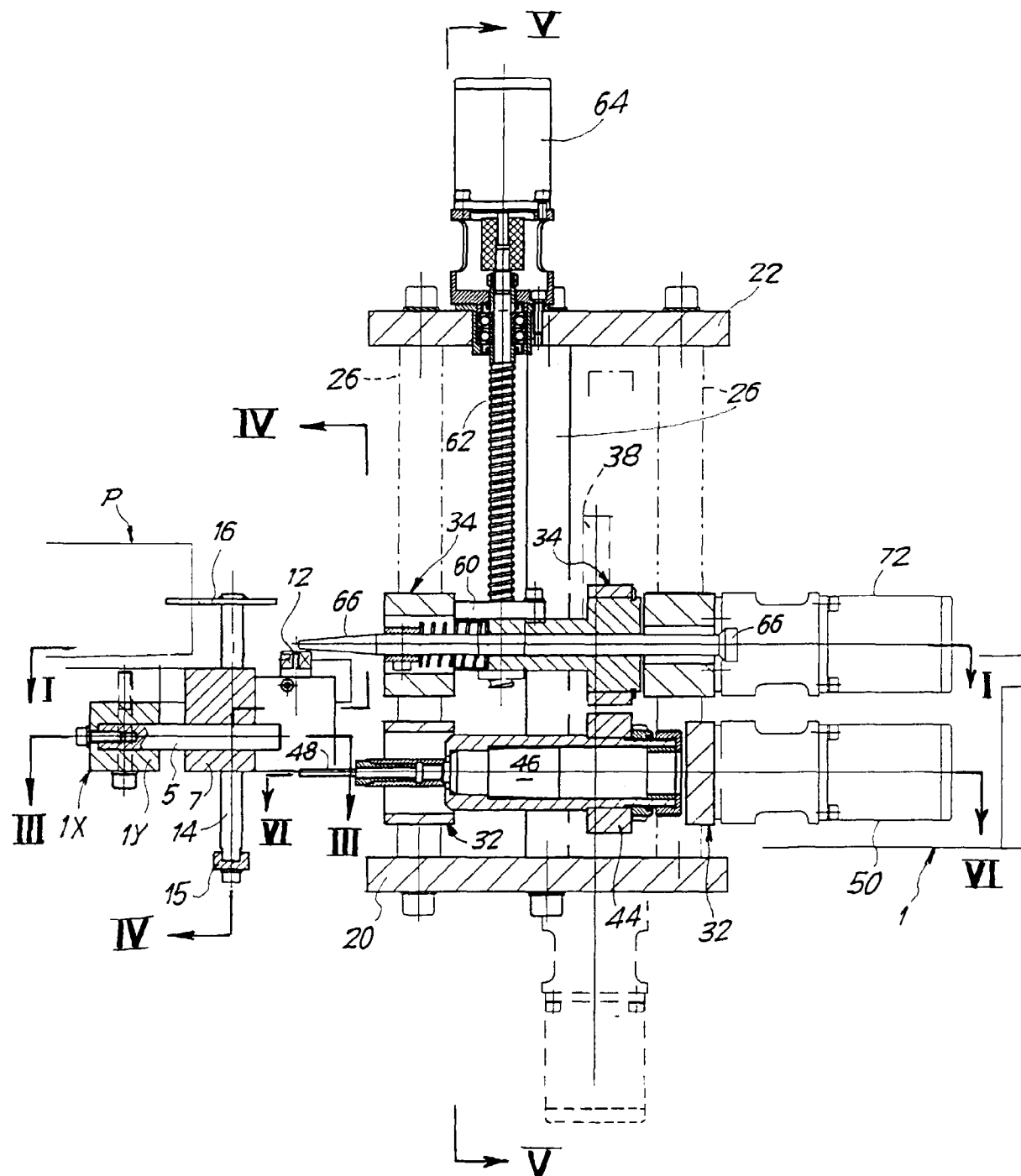
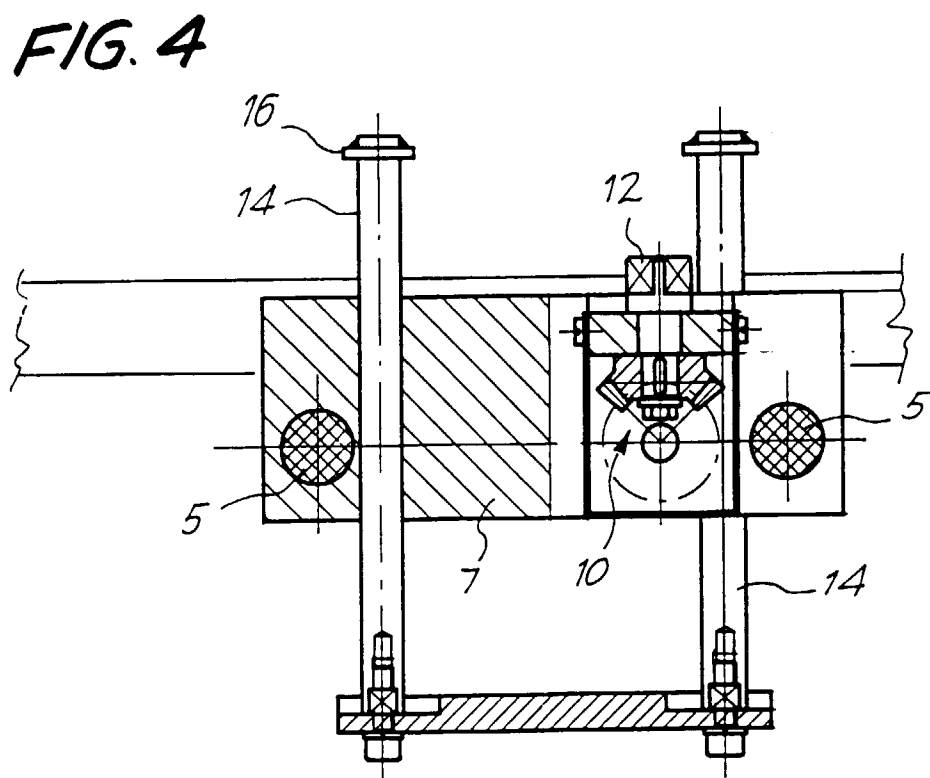
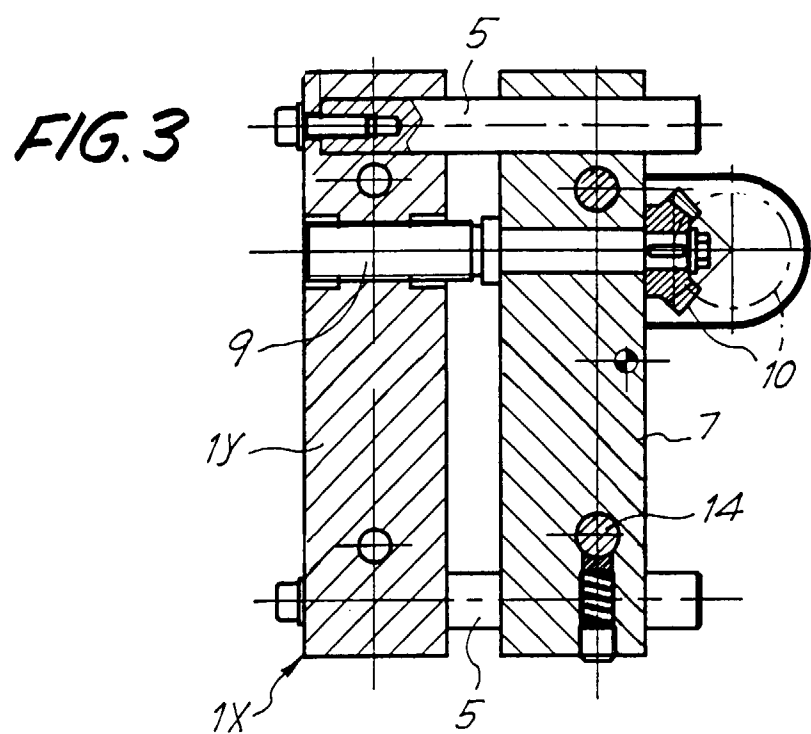


FIG. 2





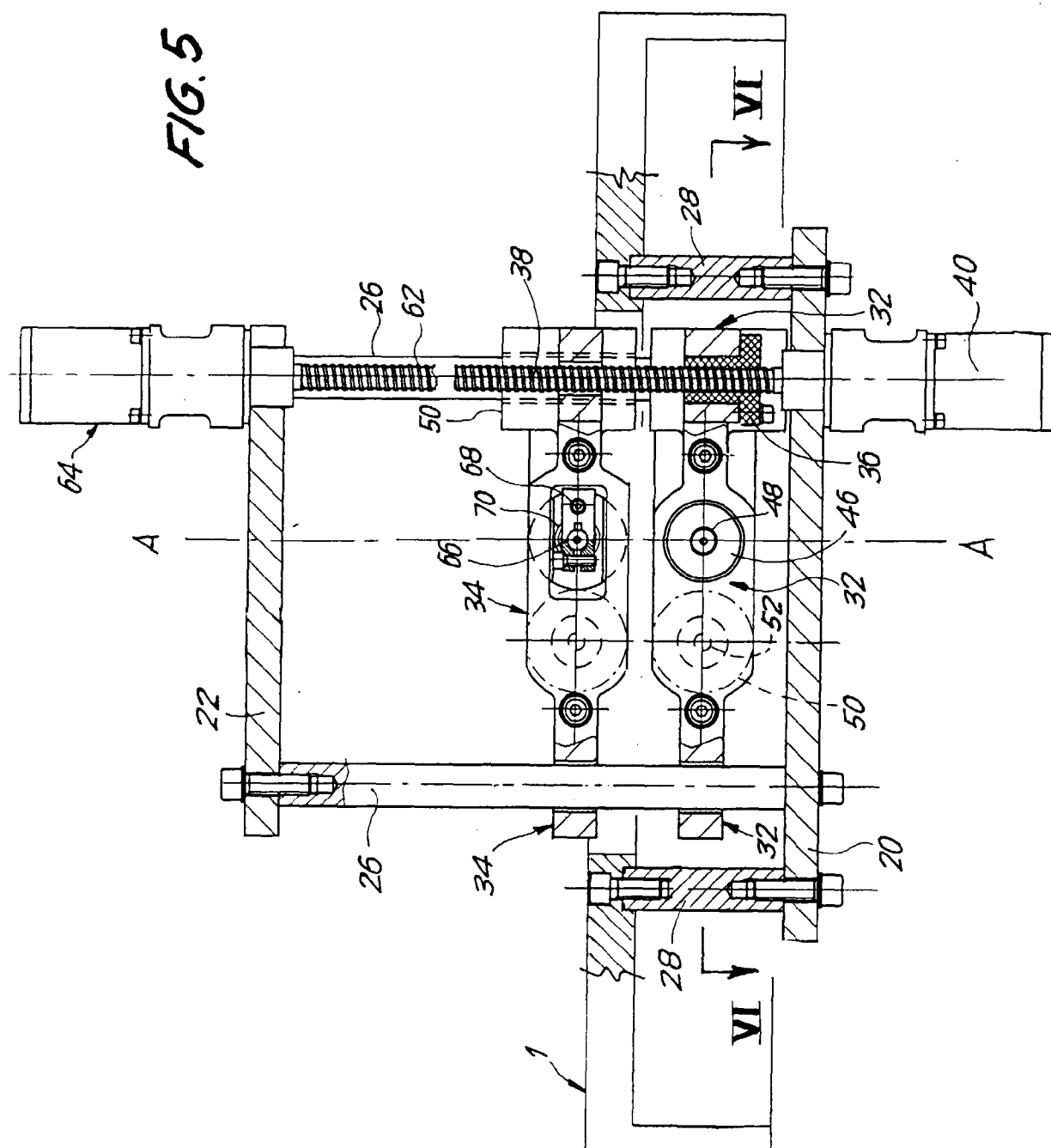
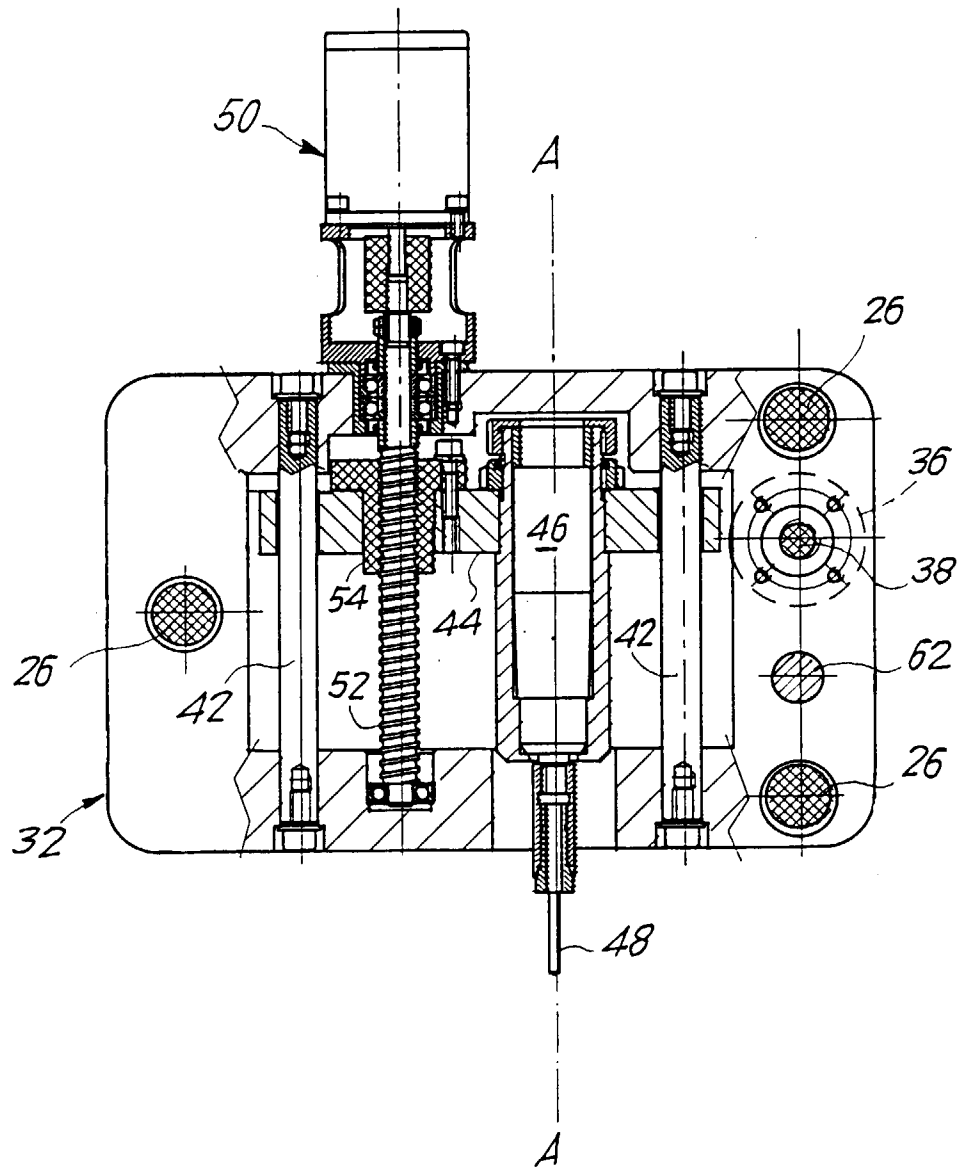


FIG. 6





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0009

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.6)
X	EP-A-0 563 018 (ATLA COOP SOC COOP A R L) 29 September 1993 * the whole document *	1	B21D53/74
A	DE-C-41 00 946 (LOTH) 6 February 1992		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B21D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		2 May 1996	Peeters, L
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)