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(54) A blank press device for variable assembly with pre-determined steps for folding apparatuses

(57) A blank press device for use in a folding apparatus for the production of folded sheet panels is provided with a central member (1) which is capable of being raised and substituted for the purpose of permitting the final regulation of the width of the same blank press device, while the regulation of the base is based on the variation of the number of additional members (3,3'). The blank press device in addition is provided with a movable automated storehouse (12) for the central members (1) and a raising group (13) for descending and for raising the same central members away and towards their working position and/or for their transfer towards or away from the movable automated storehouse (12).

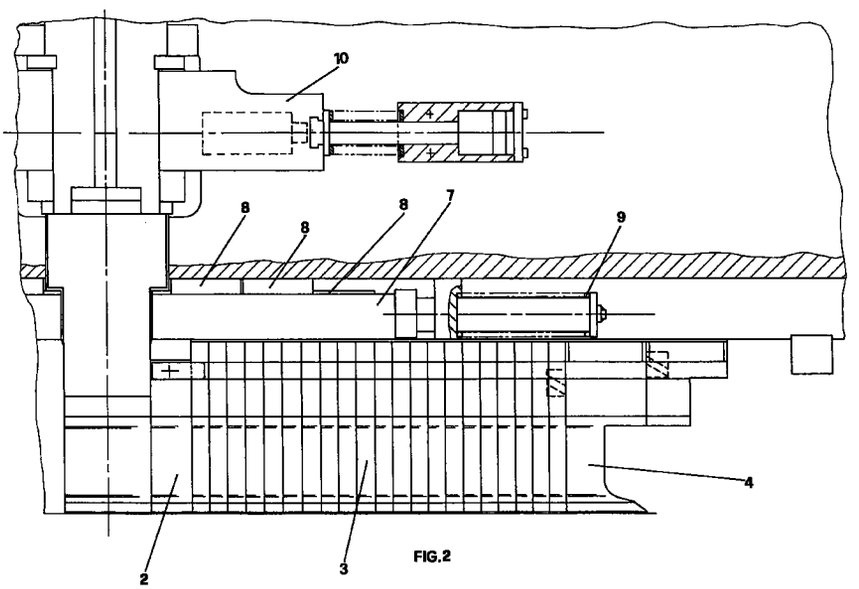

FIG.2

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Description

Field of the Invention:

The present invention relates to a blank press device for use in the apparatuses used for folding panels for the production of sheet panels using as a starting material planar sheets as defined in claim 1.

Background of the Invention:

Sheet panels which have folded borders are used very extensively in the manufacture of household electrical appliances, tool cases, furniture and metallic shelving. The manufacture of these sheet panels is carried out with suitable folding apparatuses, the main elements of which are an assembly of blades and a blank press device, the action of which produces the desired folding on the planar sheets which are subjected to the action of the folding apparatus.

At the present state of the art, there are known some folding apparatuses in which there is used a pair of blades opposite one to the other supported by a cutter block shaped as a "C" and movable in the vertical direction with respect to the blank press device.

In the case in which panels with borders folded towards the interior must be produced, this blank press device must be capable of undergoing contraction in order to allow the movement of the same panel. In addition, there must be the possibility of varying the extension of the same blank press device so as to change rapidly the dimension of the produced panels and the profile of the folding of the same panels.

According to the present state of the art, there are folding machines capable of modifying in a programmed manner the length of the blank press device. The variation of the length of the base of the blank press device is achieved in the known apparatuses by varying the number of the suitable segments which constitute the same blank press device. The final regulation of the length of the blank press device is then obtained by substitution of the extremity members of the same blank press device. The apparatus must provide on the side of the blank press device for the presence of two storehouses containing a plurality of the symmetrically corresponding extremity members and suitable means for the automatic and programmed substitution. The latter may consist for instance of programmed carriages provided with suitable separation systems which also are capable of sliding along suitable guides by means of the rotation of screws of the same length as the same guides, said screws being placed in motion by suitable motors in the two directions. The motion of the carriages which achieve the substitution of the extremity members must occur contemporaneously and must be suitably synchronized with the phase of the contraction of the same blank press device.

This type of configuration in the case of the known folding apparatuses has the drawback of several functional limitations due to their complexity which involve problems of mechanical type which increases the cost of administration and maintenance. The considerable dimension and consequently the space occupied by the known apparatuses is another problem of this type of the known folding apparatus. By way of summary, the limitations of the known apparatuses are:

1) Two storehouses containing a plurality of devices, a fact which causes an increase in cost and requires considerable space;
2) Excessive machinery of the system of hooking and unhooking of the extremity members with mechanical problems and increase of the maintenance costs;
3) Necessity of carrying out the change of the extremity members only in a fixed vertical position of the blank press device with respect to the front plate of the apparatus which is vertically fixed.

Summary of the Invention:

The above problems are effectively solved by means of the blank press device which is the object of the present invention.

The blank press device according to the present invention is composed of two extremity members which enclose a plurality of additional members and a central member. The latter may be raised and may be substituted by means of a suitable handling group capable of motion and provided with a raising device which connects the same blank press device with a movable storehouse, the latter being automated and comprising a plurality of the central members. The raising device is capable of arranging in a programmed and automated manner the raising of the central member during the phase of contraction of the blank press device and eventually the contemporaneous substitution of the same in a single operation. This operation occurs contemporaneously with the eventual re-equipment of the blank press device by a variation of the number of additional members located in the same blank press device, this variation being achieved by the action of a pair of programmed carriages and the action of two suitable expanders placed on the sides of the central member in the blank press device. The expanders are provided with arms capable of sliding on suitable guides and provided in addition with expansion means. These sliding arms support the expanders during the phase of contraction of the blank press device.

The object of the expanders is to move away from the center towards the exterior according to the manner programmed by means of the programmed carriages, the two sets formed by the additional members disposed between the extremities and the same expanders for the purpose of permitting the insertion of the central member. Contemporaneously with the action of the same expanders is the action of the programmed carriages. A single gripping group for the extremities and a simple

splitting-parcelling group are mounted on each of the carriages. The gripping group for the extremities seeks and blocks the same extremities, afterwards the splitting-parcelling group proceeds with the assembly of the totality of the additional members, then proceeds to the disposition of the new equipment with a different number of additional members and afterwards to the separation in order to obtain the same equipment. The gripping group for the extremities at this stage performs again a function disposing the extremities on the sides of the blank press device and this is followed by the final formation of the set by the splitting-parcelling group.

The programming of the number of the additional members permits the regulation of the dimension of the blank press device while the choice of the central member in the plurality of the members located in the storehouse permits the final regulation of the same dimension of the blank press device. In any event, the minimum configuration is provided in addition to the smallest central member and to the two lateral expanders by only the extremities without any other additional member. The maximum configuration is achieved on the contrary by inserting the central member having the greatest dimension among the available members, together with the "n" members placed on the sides between the expanders and the extremities.

Brief description of the drawings:

The present invention will be better understood by reference to the attached drawings which illustrate one non-limiting embodiment of the blank press device for folding apparatuses of which:

Fig. 1 illustrates an overall view of the folding apparatus provided with the blank press device which is the object of the present invention;
Fig. 2 is an enlarged view of one of the two sides of which the blank press device is schematically composed.
Fig. 3 is a side view partially in cross section of the group which sets in motion the central members of which the blank press device is provided.
Fig. 4 is a plan view of the programmed carriages of which the blank press device is provided.
Fig. 5 is a plane view partially in cross section of the gripping group of the extremities which is placed on the programmed carriages of which the blank press device is provided.
Fig. 6 is a side view of the gripping group of Fig. 5.
Fig. 7 is a plan view partially in cross section of the splitting-parcelling group which is placed on the programmed carriages of which the blank press device is provided.
Fig. 8 is a side view of the splitting-parcelling group of Fig. 7.
Fig. 9 is a side view partially in cross section of the mobile automated storehouse automated for storing a plurality of the central members of which the blank press device is provided.
Figs. 10 and 11 illustrate two views of the extremity member and the movable guide.

A description of the functioning of the apparatus according to the Figs. 1-11 by way of a known limiting example of the present invention is believed to be useful for an understanding of the concept which is the basis of the present invention. Starting with the beginning of a new equipment by reference to Fig. 1, the blank press device which is the object of this invention is applied to the support (6) and is provided with the programmed carriages (16,16') in the expanded position. Each programmed carriage is provided with the splitting-parcelling group (15,15'). The latter is brought towards the folding wire and carries out the folding operation. In the following phase, this splitting-parcelling group (15) moves away from the folding wire. At this time, the gripping group for the extremities (14,14') proceeds towards the folding wire, this gripping group (14,14') being also placed on each of the two programmed carriages of which the blank press device of the present invention is provided. This gripping group for the extremities seeks the extremity members (4,4') as shown in Figs. 1 and 2 with the descent of the movable guide (18) as shown in Figs. 10 and 11 and blocks the same extremities by means of presser (17) shown in Figs. 4 and 5. The gripping groups for the extremities (14, 14') returns at this time from the folding wire with the extremity members aboard and the entire programmed carriage (16,16') returns to zero which is the initial entering extremity position of the re-equipment. At this time, the splitting-parcelling group (15,15') returns again towards the folding wire and carries out a new folding; thereafter, it moves away from the folding wire and comes in position of splitting off for the new equipment after the value of "n" additional members (3,3'). The splitting-parcelling group (15) thereafter returns towards the folding wire thus determining a first spacing between two additional members in the programmed position. At this time, the splitting operation for the addition of the extremities (4,4') to the new configuration takes place and thereafter a new return of the splitting-parcelling group (15) from the folding wire takes place.

The programmed carriage (16) is then brought in the entering extremity position and the gripping group (14) is brought in the direction of the folding wire. At this time, the presser (17) shown in Figures 4 and 5 of the gripping group (14) is released thus releasing the same extremities so that the programmed carriage (16) is brought back to the initial position with the programmed carriages expanded. The gripping group of the extremities (14) returns from the folding wire and the splitting-parcelling group (15) returns towards the folding wire in order to carry out the final folding.

Contemporaneously, the expander (2,2') by means of supporting arms (7) and elastic means (9) create, by moving along the rolling guides (8) shown in Fig. 2 a

space of width greater, with respect to the width of the central member (1) which has a greater thickness so that the raising and simultaneously the substitution of the same is made possible by means of the group (11) which sets in motion the central members. These expanders (2) remain in such a position during all the phases of the above described re-equipment and the entire complex of the additional members (3) remains in position reciprocally parallel due to the action of the suitable carriages (5,5') of the extremities. After the substitution or the raising of the central member (1), the latter is blocked in the working position due to the action of the blocking group (10) shown in Fig. 2. The group (11) which sets in motion the central members is superimposed by the movable storehouse (12) which is automated for storing a plurality of central members (1), the storehouse being provided with a raising group (13) for the same members.

Claims

1. A blank press device for use in a folding machine for the production of folded sheet panels which comprises:

   a) a central member (1);
   b) two extremity members (4,4');
   c) a plurality of additional members (3,3') disposed between said extremity members and said central member, said additional members having a variable number;
   d) two programming carriages (16-16') for the the equipment and re-equipment of the blank press device;
   e) a group for setting in motion said central member;

   wherein said blank press device has a base, said base having variable length, said central member (1) is capable of being raised and being substituted whereby final regulation of the length of the base of the blank press device is achieved in combination with the variation of the number of said additional members (3,3').

2. A blank press device according to claim 1 wherein said additional members form sets, said blank press device additionally comprises programming carriages (16, 16'), said central member (1) has edges and said blank press device comprises two additional lateral expansion members (2,2') disposed on said edges of said central member (1), said two lateral expansion members being adapted to move said two sets formed by said additional members (3,3'), from the center towards the exterior, said sets being formed between said extremities (4,4') and said expansion members (2,2') by means of said programming carriages (16, 16'), whereby said central member (1) may be inserted according to a program.

3. The blank press device according to claim 2 which is capable of undergoing a phase of contraction and wherein said expansion members (2,2') are provided with arms (7), said arms being capable of sliding on guides (8) and being provided with expansion means (9), said arms being capable of supporting said expansion members during said phase of contraction of said blank press device.

4. The blank press device according to claim 1 wherein a single group for gripping the extremities (14,14') and a single splitting-parcelling group (15,15') are mounted on each of said programming carriages (16,16').

5. The blank press device according to claim 1 which comprises at least one blocking group (10) and wherein said central member (1) is maintained in a working position by means of said at least one blocking group (10).

6. The blank press device according to claim 1 which comprises two extremity carriages (5,5') disposed on the sides thereof, said extremity carriages being adapted to maintain said additional members (3,3') in a position orthogonal with respect to the sliding plane of said additional members during the phases of parcelling and splitting.

7. The blank press device according to claim 1 which is provided with a group (11) for moving said central members, said group (11) comprising a raising group (13) for lowering and raising said central members for the descent and rise of said central members, for the working position and for the transfer thereof to a movable automated storagehouse (12).

8. The blank press device according to claim 7 wherein said automated storagehouse (12) is provided with seats for a plurality of said central members (1) and the removal and the discharge of said central members is carried out automatically and is programmable.

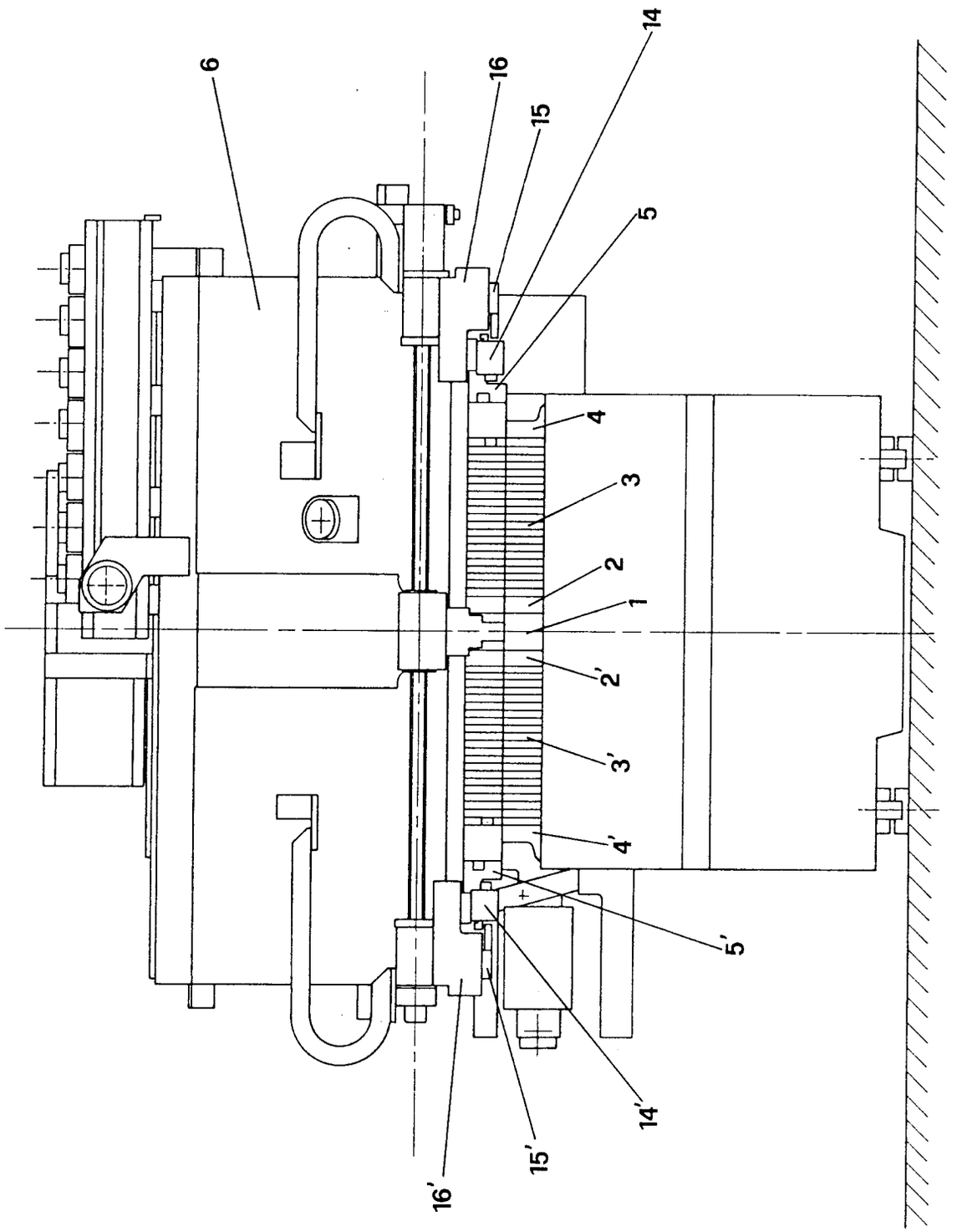

FIG.1

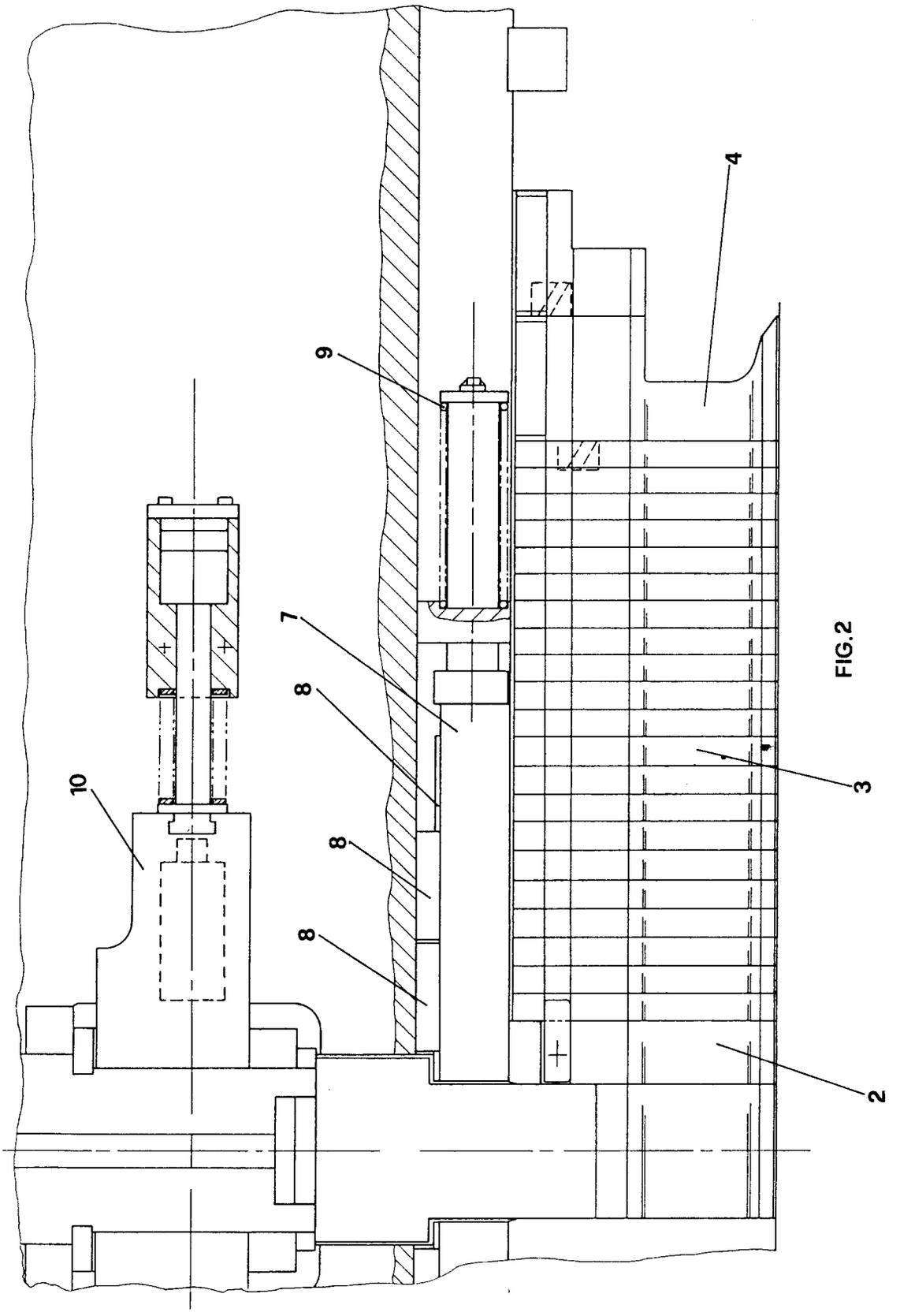

FIG.2

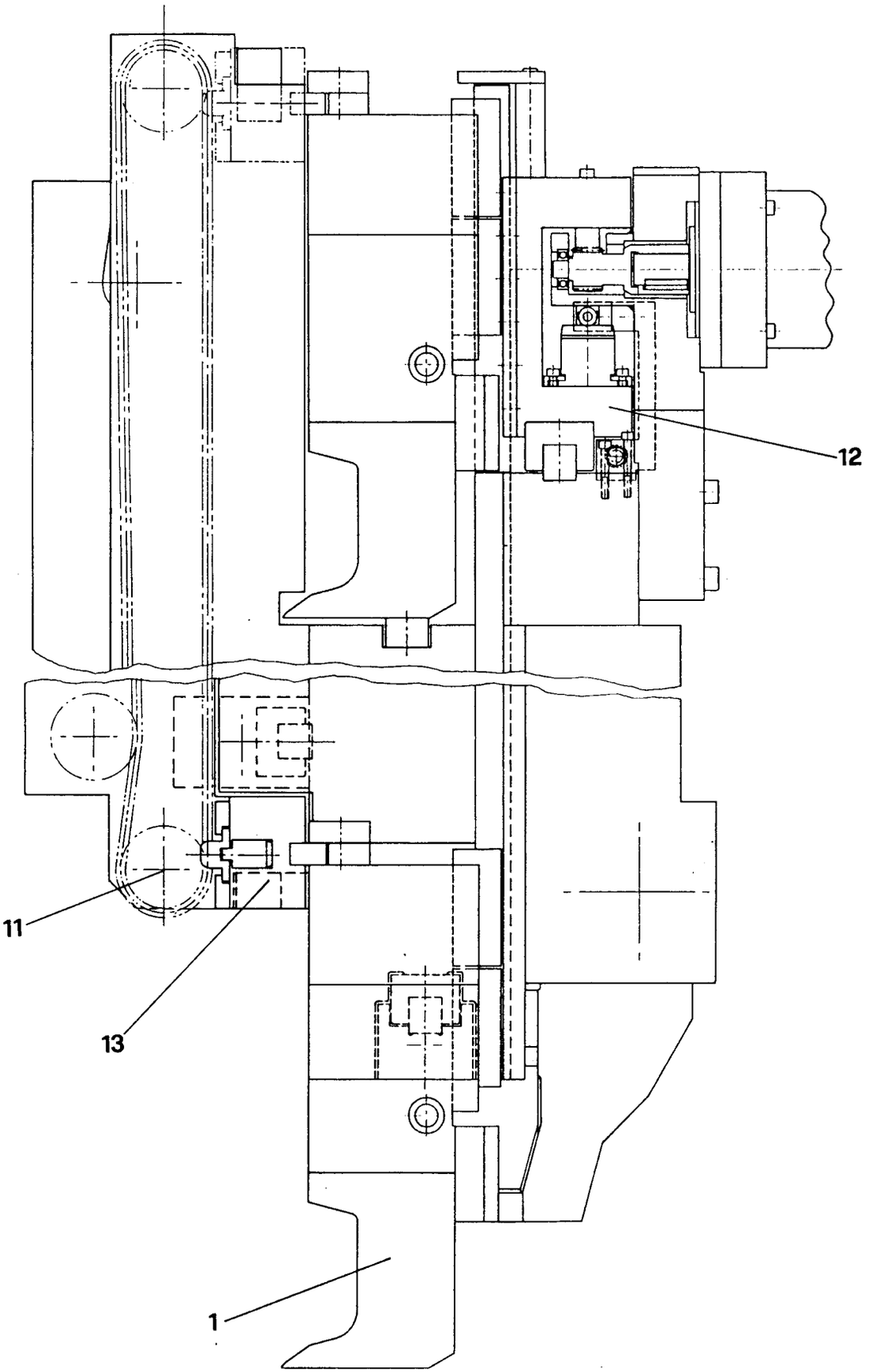

FIG. 3

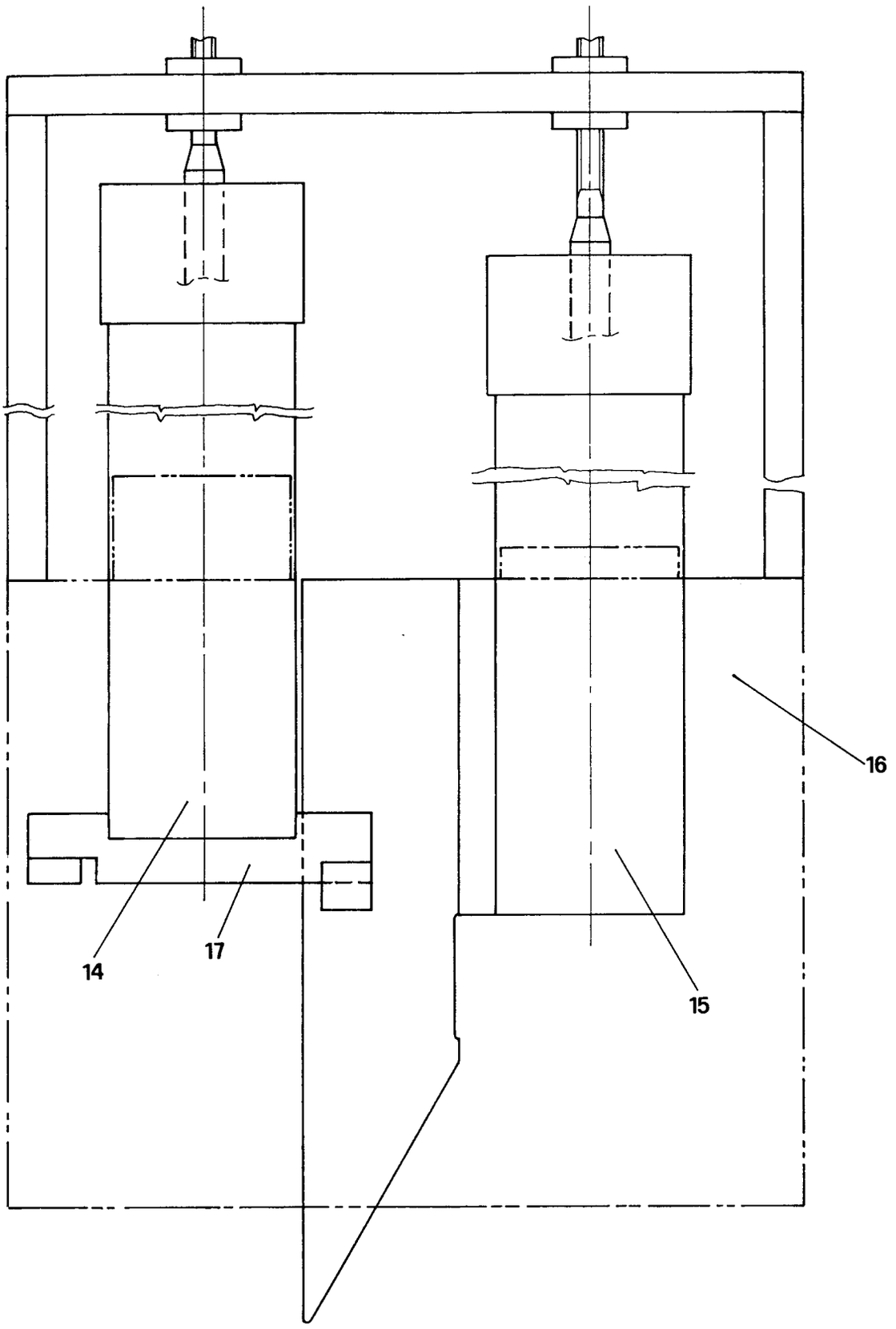

FIG.4

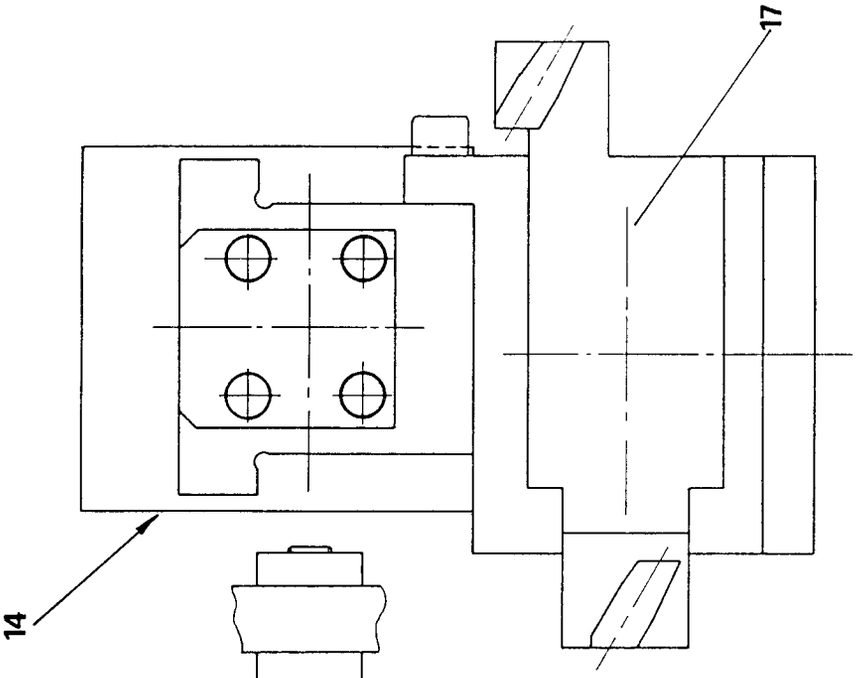

FIG.6

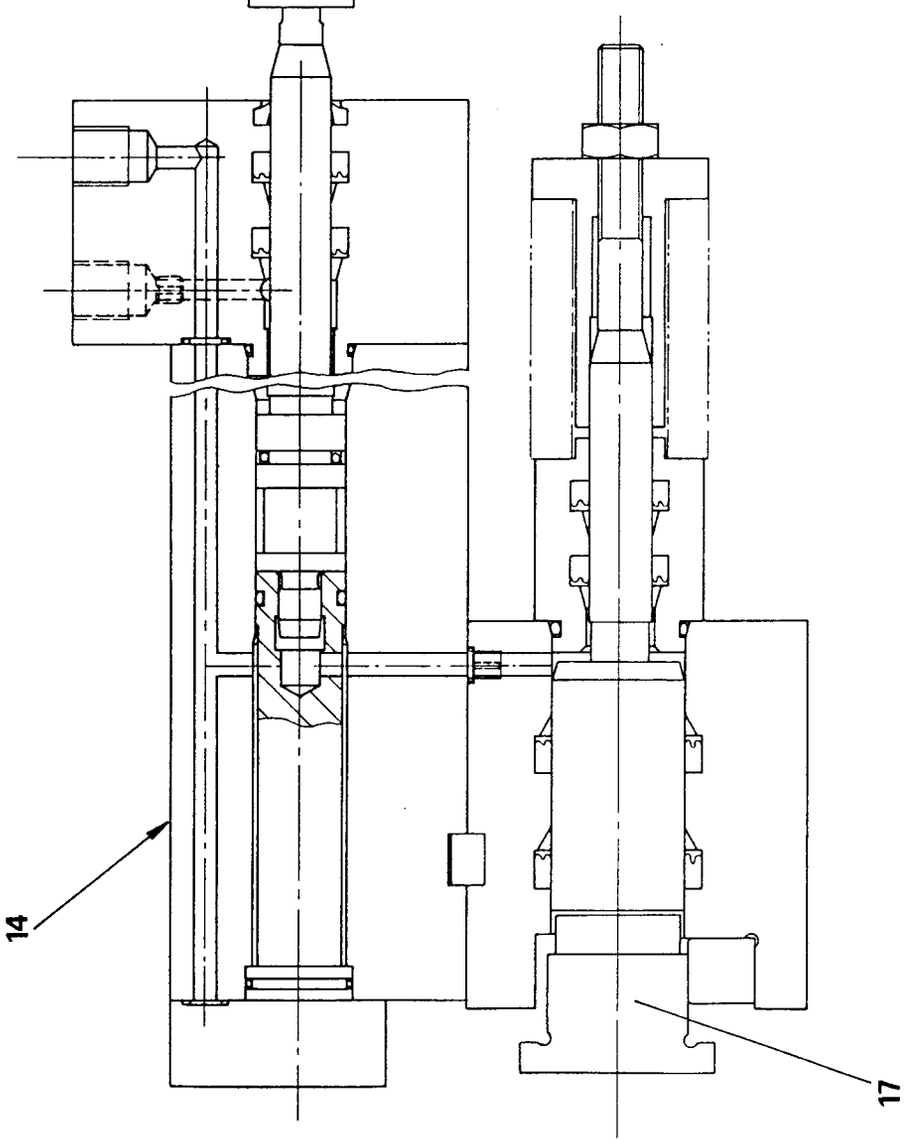

FIG.5

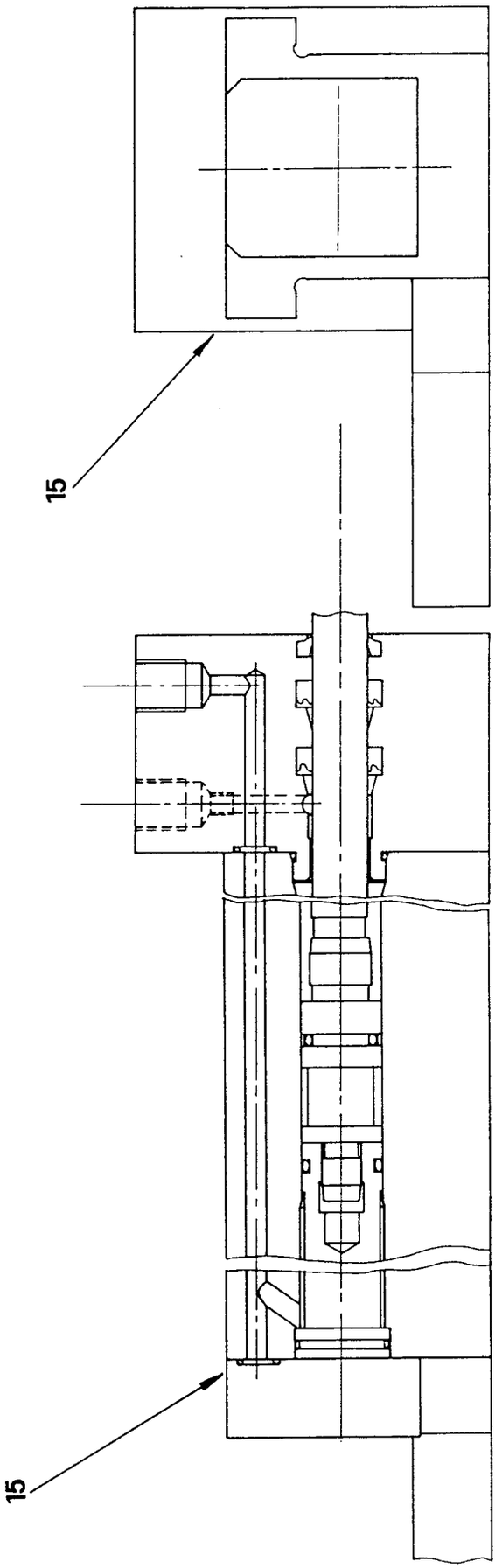

FIG.8

FIG.7

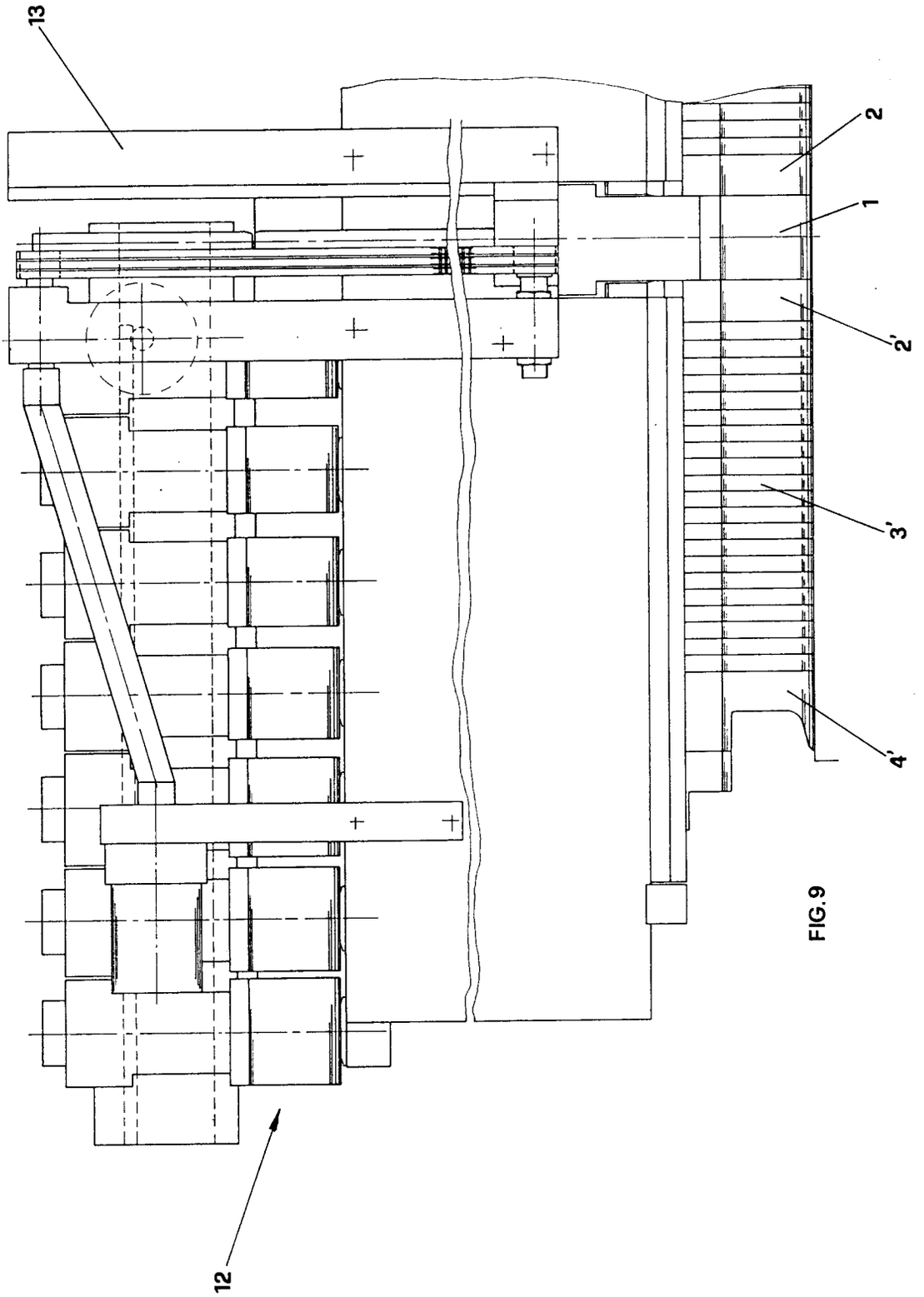

FIG.9

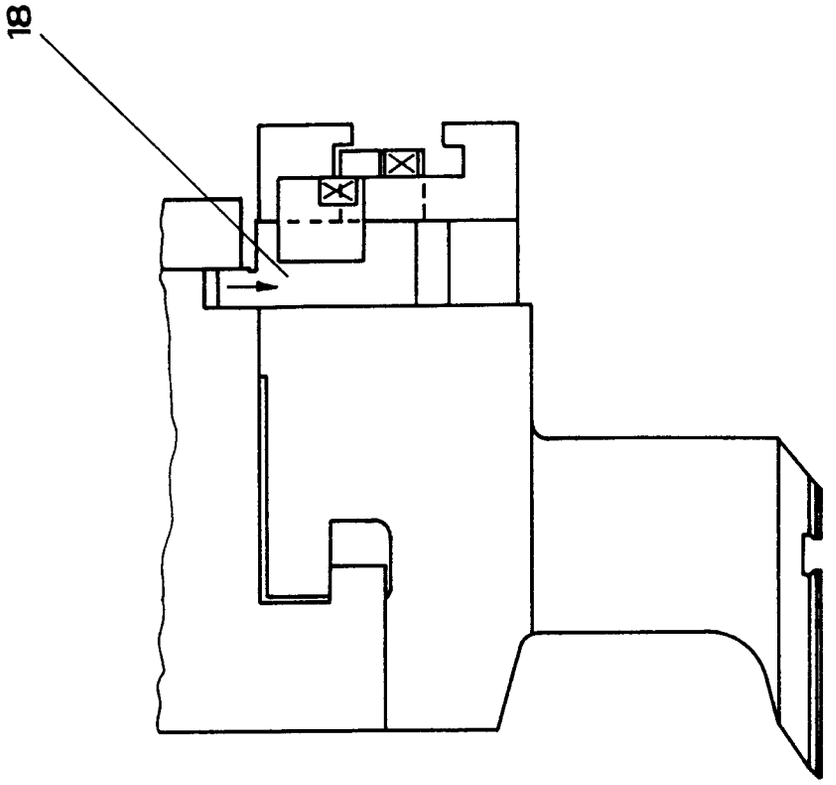

FIG. 11

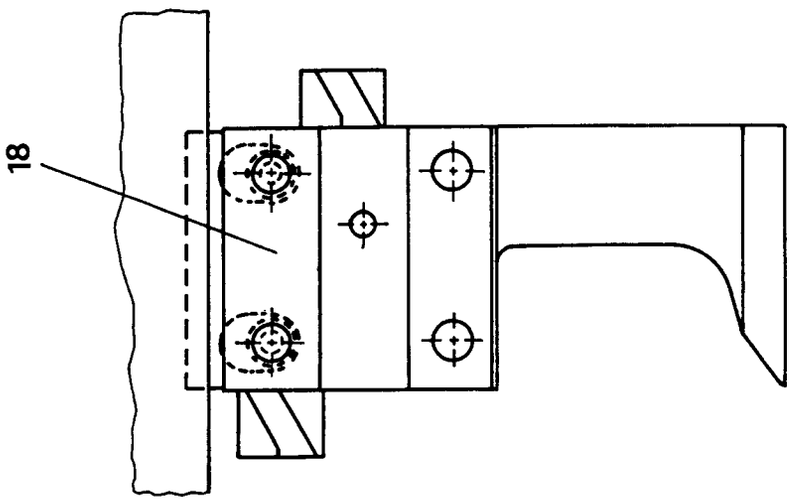

FIG. 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 20 3424

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-0 186 909 (MARU KIKAI KOGYO) * claims 1-5; figures 2-14 *	1-4	B21D5/02
X	EP-A-0 310 145 (MARU KIKAI KOGYO) * column 4, line 1-12; claims 1-3; figures 10-13 *	1-4	
A	EP-A-0 251 287 (MARU KIKAI KOGYO) * claims 1,2; figures 1-10 *	1-3	
A	EP-A-0 096 211 (INVENTIO AG) * claim 1; figures 1-3 *	1	
A	AT-B-304 996 (HÄMMERLE AG) * claims 1,5; figures 4-6 *	1	

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
BERLIN	18 April 1995	Schlaitz, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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