



(11) Publication number : **0 672 478 A1**

(12) **EUROPEAN PATENT APPLICATION**

(21) Application number : **95200121.2**

(51) Int. Cl.⁶ : **B21D 28/06**

(22) Date of filing : **18.01.95**

(30) Priority : **21.01.94 IT MI940088**

(43) Date of publication of application :
20.09.95 Bulletin 95/38

(84) Designated Contracting States :
AT CH DE ES IT LI PT

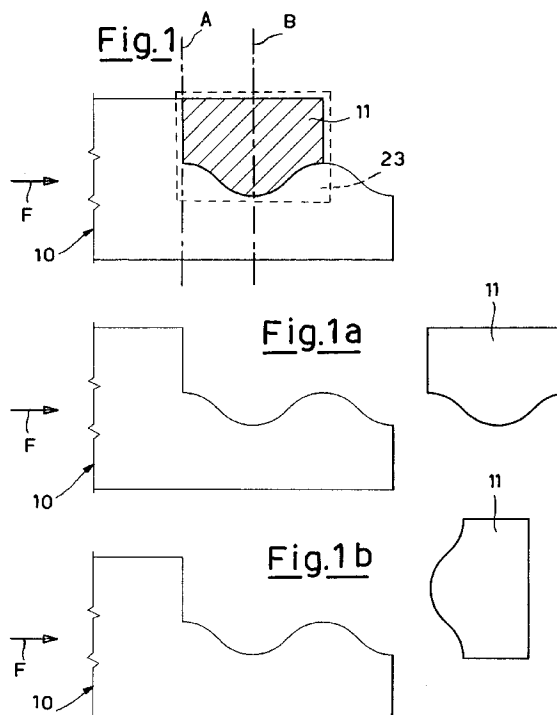
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(54) **Method for punching from metal strip a blank intended, particularly but not exclusively, for producing a furniture hinge casing.**

- (57) A method for punching from metal strip (10), by means of at least one die assembly (23), a blank (11, 13, 14, 15, 16, 17) intended particularly but not exclusively for producing a furniture hinge casing, characterised by comprising the following stages :
- in a first station, punching said blank (11) from the metal strip (10) without leaving any scrap ;
 - removing the blank (11) punched out and transferring it to a second station in a suitable position ;
 - punching out a second blank (13) identical to the first blank (11) ;
 - removing the blank (13) punched out and transferring it to said second station in a suitable position ;
 - repeating the aforesaid stages, and so on.



This invention relates to a method for punching from a metal strip a blank intended, particularly but not exclusively, for manufacturing part of a furniture hinge.

The invention also relates to products obtained by said method.

The large-scale production of parts by initially blanking a metal strip always involves solving the technical problem of material scrap, which should be as little as possible so as not to excessively affect the cost of the finished article.

It is therefore very desirable to punch out a blank with as little scrap as possible, particularly in the production of low-cost articles.

In attempting to achieve this result, various solutions have already been proposed all based on maximum utilization of the metal strip by seeking an ideal blanking line which is also compatible with the requirements of actual working practice.

The systems mostly used are those in which the blank is punched out in accordance with a pattern such that the blanked shapes copenetrate each other, the blanking operation being effected on a metal strip moving either linearly or with zig-zag movement.

In this manner the scrap is reduced to a minimum. However material must always be left between one blank and the next in order to be able to perform the actual blanking operation.

The general object of the present invention is to obviate the drawbacks of the known art by providing a method for punching a blank from metal strip such as to leave practically no material scrap.

This object is attained by a method in accordance with the accompanying claims.

The functional and structural characteristics of the invention and its advantages over the known art will be more apparent from an examination of the description given hereinafter with reference to the accompanying schematic drawings, in which:

Figures 1, 1a, 1b show the first stage of one embodiment of the method of the invention;

Figures 2, 2a, 2b show the second stage of the method;

Figure 3 is identical to Figure 1;

Figures 4, 4a, 4b, 4c, 4d show a second embodiment of the method of the invention;

Figure 5 is identical to Figure 4;

Figures 6 and 6a show a third embodiment of the method of the invention.

Figure 7 is identical to Figure 6; and

Figure 8 shows a further possible modification.

In the figures of the drawings, the reference numeral 10 indicates a metal strip which, in a first embodiment of the method of the invention, is made to advance stepwise in the direction of the arrow F by any equipment suitable for the purpose, which being well known to the expert of the art is not shown herein in detail.

According to the method of the invention, a blank defined by the hatched region 11 of Figure 1 is punched from the strip 10 without leaving any scrap at all, by means of a die assembly 23 (punch - lower die). The strip 10 from which the blanks are punched is fed in known manner through said die assembly 23. The die assembly 23 is not shown in detail as its construction lies within the scope of the expert of the art.

The blank 11 obtained is shown in Figure 1a separated from the strip 10 and can be of different configurations depending on the part to be manufactured.

The blank 11 separated from the strip 10 is conveyed to a manipulation station as shown in Figure 1b where it is rotated, for example through 90°, into the position shown in Figure 1b suitable for a subsequent operation, such as drawing. The blank 11 could also be orientated during its conveying from 1 to 1a, depending on its configuration and/or subsequent requirements.

With reference to Figures 2, 2a and 2b, the second stage of this first embodiment of the method according to the invention consists of separating a second blank 13 (identical to the blank 11) from the strip 10 along the cutting line 12 (Figure 2) and transferring it into a manipulation station as shown in Figure 2a where it is rotated, for example through 90°, into the position shown in Figure 2b suitable for a subsequent operation, such as drawing analogous to the aforementioned blank 11 (Fig. 1b). Again in this case the blank 11 could be orientated during its conveying from 2 to 2a.

After being advanced through one step in the direction of the arrow F into the position shown in Figure 3 (identical to Figure 1), the strip is ready for repeating the working cycle by punching out a third blank 14, and so on.

The strip 10 is positioned for the various working stages on the basis of the position of the die assembly or assemblies 23. More specifically, taking as reference the positions indicated by the lines A and B in Figures 1 and 2, the strip 10 is shifted forwards and/or backwards, to the right and/or to the left to achieve its correct position relative to the die assembly 23 (Figures 1 and 2) for separation of the blank.

In the first embodiment of the method of the invention, shown in Figures 1-3, the direction in which the strip 10 is fed coincides with the direction of advancement of the blanks punched from it.

With reference to Figures 4, 4a, 4b, 4c, 4d and 5, a second embodiment of the method of the invention is described hereinafter in which the direction in which the strip is fed, indicated by the arrow F1, is perpendicular to the advancement direction, indicated by the arrow F2, of the blanks punched from it.

As can be clearly seen from Figure 4, a blank 15 is punched from the strip 10 and moved into the position shown in Figure 4a suitable for a subsequent operation, such as a drawing operation.

In Figure 4b a second blank 16 (identical to the blank 15) is punched from the strip 10 along a cutting line 17, moved into the position shown in Figure 4c and rotated into the position shown in Figure 4d, identical to that of the strip 15 in Figure 4a, suitable for the required operation.

When in the position shown in Figure 5 (identical to Figure 4), the strip is ready for repeating the working cycle by punching out a third blank 17, and so on.

In this second embodiment of the invention, the strip 10 is shifted in the same manner as shown in Figures 1-3 as described with reference to the first embodiment of the invention.

Figures 6 and 7 show a third embodiment of the method according to the invention in which the direction in which the strip 10 is fed, indicated by the arrow F3, is perpendicular to the advancement direction, indicated by the arrow F4, of the blanks punched from it.

As can be clearly seen in Figure 6 of the drawings, two blanks 18, 19 are punched simultaneously from the strip 10, the blank 19 being separated from the strip 10 along a cutting line 20, N steps after the blank 18.

Said blanks 18, 19 are moved from the strip 10, as indicated in Figure 6a, into a position suitable for subsequent operations.

The strip 10 is advanced through a further step into the position shown in Figure 7 ready for commencing a new working cycle in which two successive blanks 21, 22 are punched out, and so on.

As shown in Figure 8, it is also possible for a strip 10 to be cut longitudinally along a central cutting line 24 to form two identical bands 25, 26 each reproducing a succession of identical blanks 11.

The two bands can be wound on a spool and fed to a press which shears off the individual blanks 11 in rapid succession, for feeding to subsequent operations.

Claims

1. A method for punching from metal strip (10), by means of at least one die assembly (23), a blank (11, 13, 14, 15, 16, 17) intended particularly but not exclusively for producing a furniture hinge casing, characterised by comprising the following stages:

- in a first station, punching said blank (11) from the metal strip (10) without leaving any scrap;
- removing the blank (11) punched out and transferring it to a second station in a suitable position;
- punching out a second blank (13) identical to the first blank (11);
- removing the blank (13) punched out and transferring it to said second station in a

suitable position;

- repeating the aforesaid stages, and so on.

2. A method as claimed in claim 2, characterised in that the blanks (11, 13) in said second station are orientated in the same position, suitable for the next operation.

3. A method as claimed in claim 2, characterised in that the blanks (11, 13) in said second station are both rotated through 90° about their axis of advancement, but in opposite directions.

4. A method as claimed in claim 1, characterised in that the blanks (11, 13) are orientated into a position suitable for the next operation during their transfer from said first and second station.

5. A method as claimed in claim 1, characterised in that the metal strip (10) is fed in a direction (F1) perpendicular to the axis of advancement (F2) of the blank (15, 16).

6. A method as claimed in claim 5, characterised in that the blanks (15, 16) in said second station are orientated into a position suitable for the next operation.

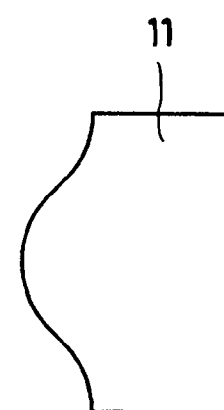
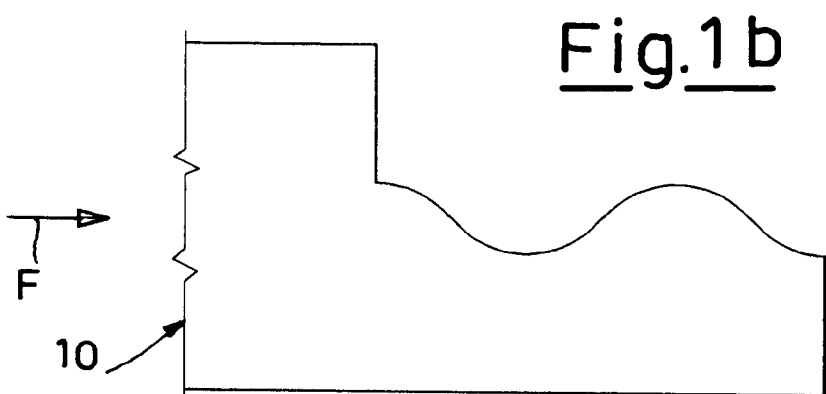
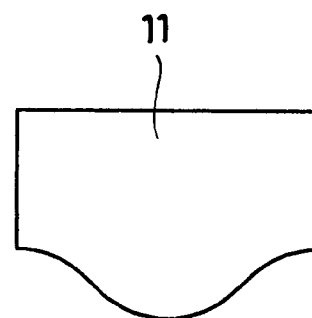
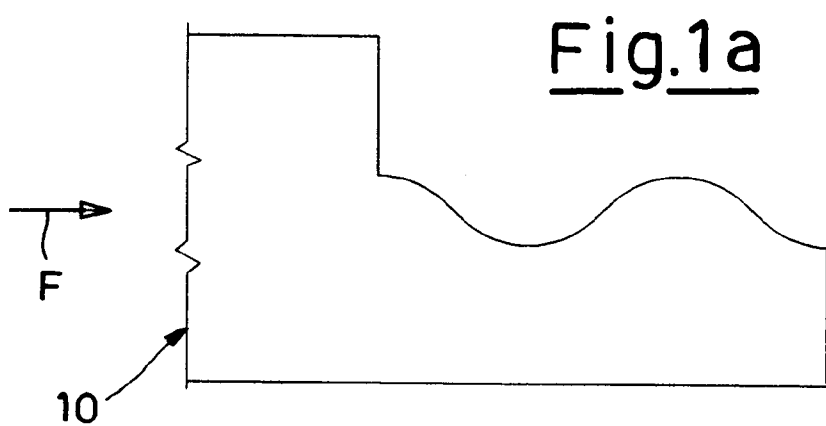
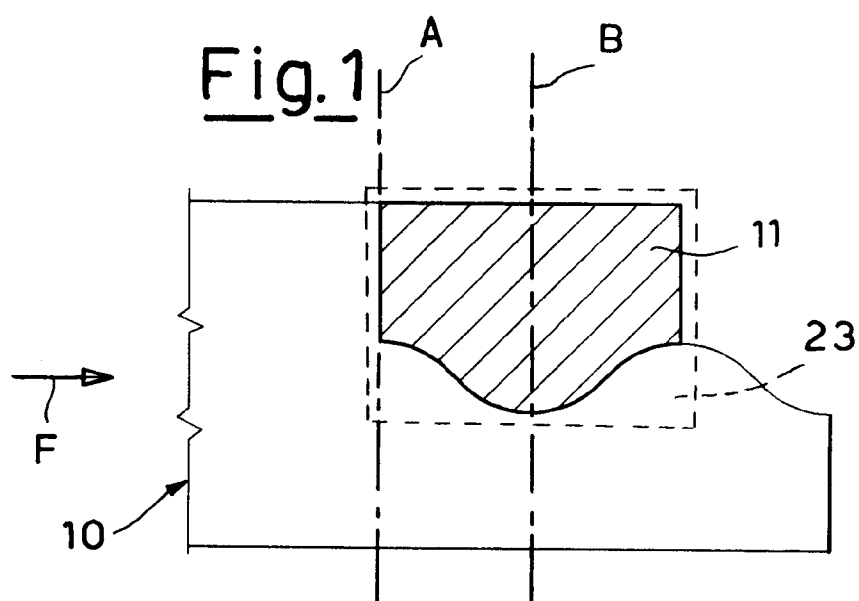
7. A method as claimed in claim 6, characterised in that the blank (16) in said second station is rotated through 180° about its axis of advancement.

8. A method as claimed in claim 5, characterised in that the blanks (15, 16) are orientated into a position suitable for the next operation during their transfer from said first and second station.

9. A method as claimed in claim 1, characterised in that two identical blanks (18, 19) are punched simultaneously from a strip (10) which is advanced stepwise in a direction perpendicular to the direction of advancement of the punched-out blanks (18, 19), said blanks (18, 19) being punched out at a distance of N steps from each other.

10. A method for forming from metal strip (10) a blank (11) intended particularly but not exclusively for producing a furniture hinge casing, characterised in that said strip (10) is cut longitudinally along a central cutting line (24) into two identical bands (25, 26) which reproduce a succession of identical blanks (11), said two bands (25, 26) being wound on a spool and fed to a press which shears off the individual blanks (11) in rapid succession, for feeding to subsequent operations.

11. A blank when obtained by the method of the preceding claims.



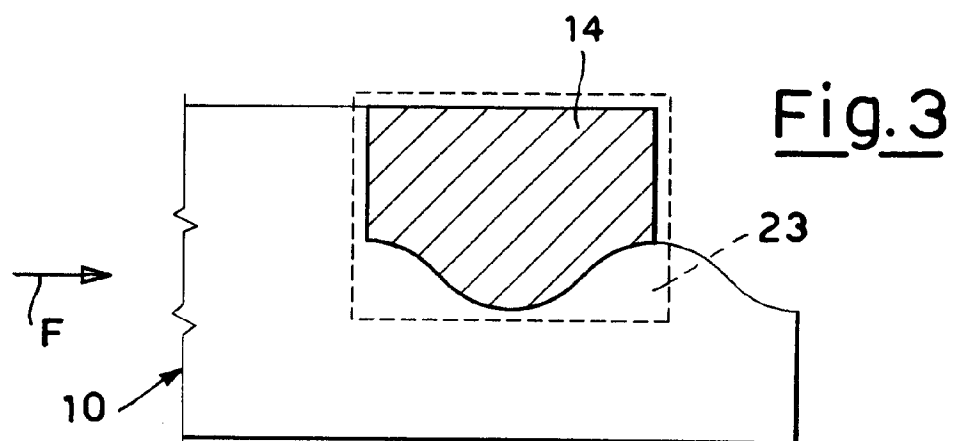
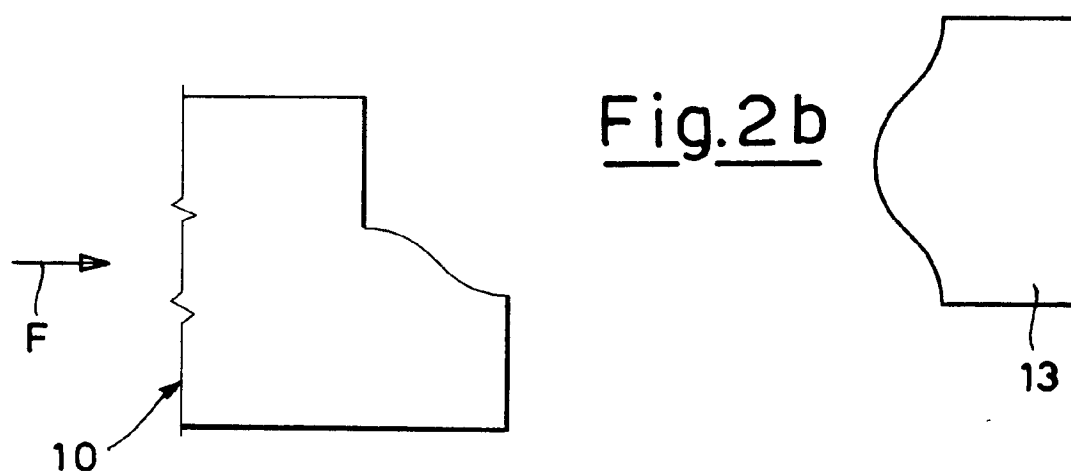
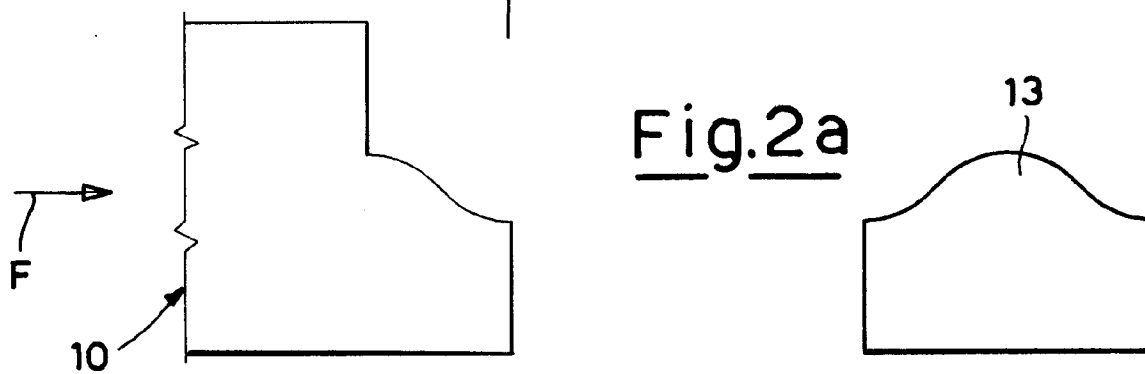
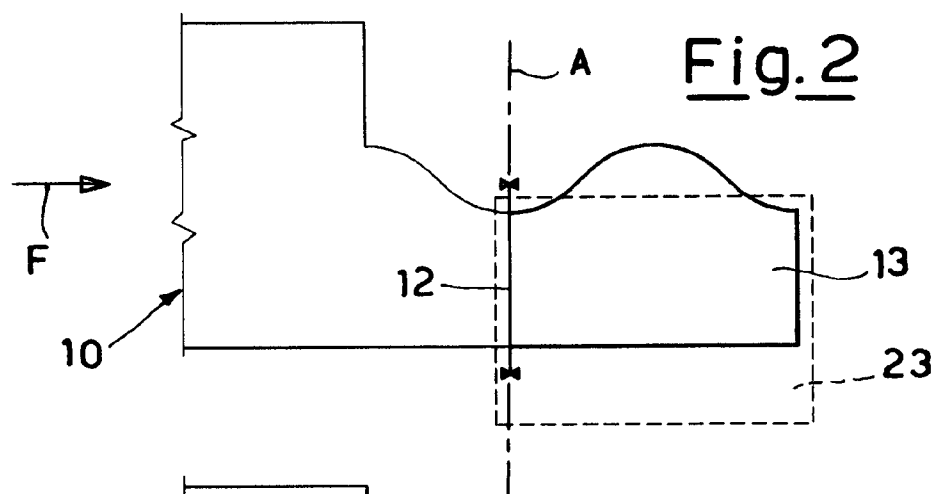


Fig. 4

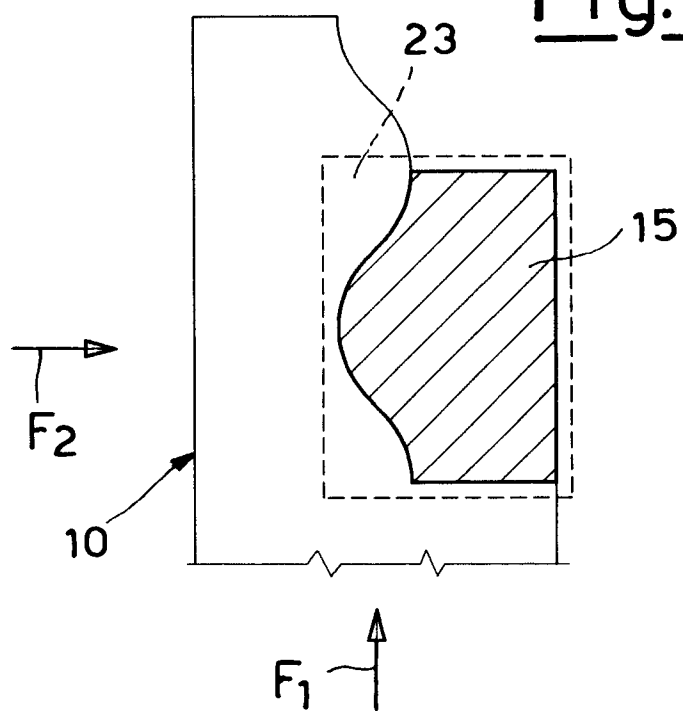
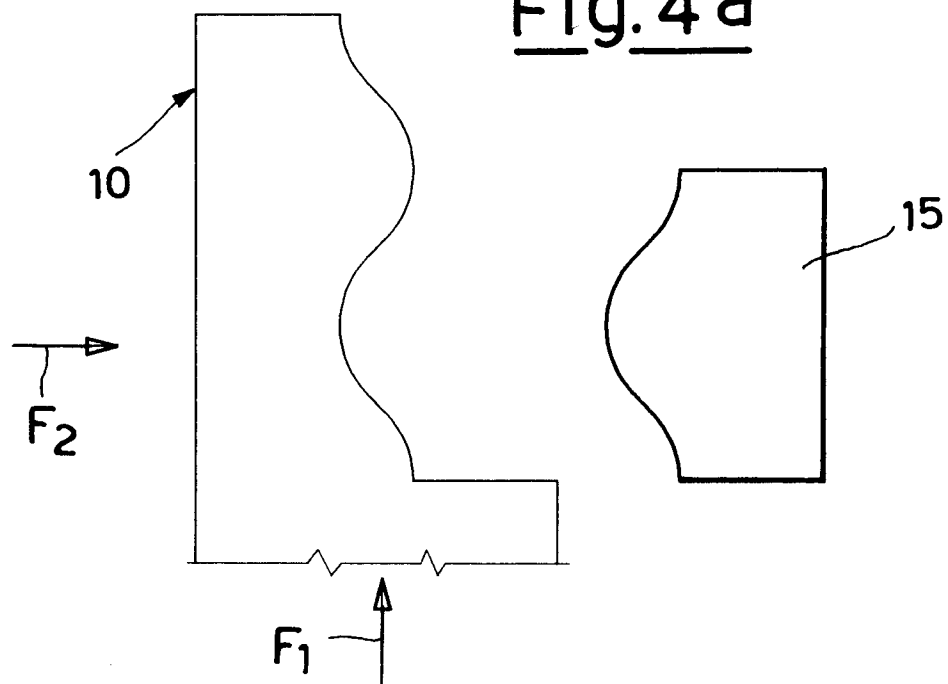


Fig. 4 a



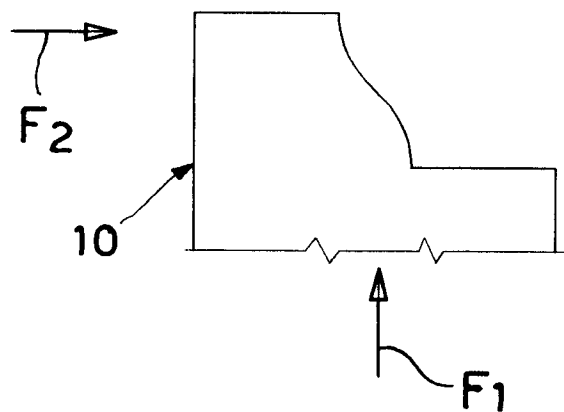
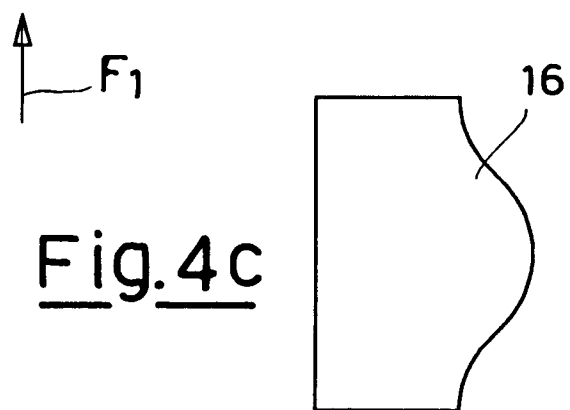
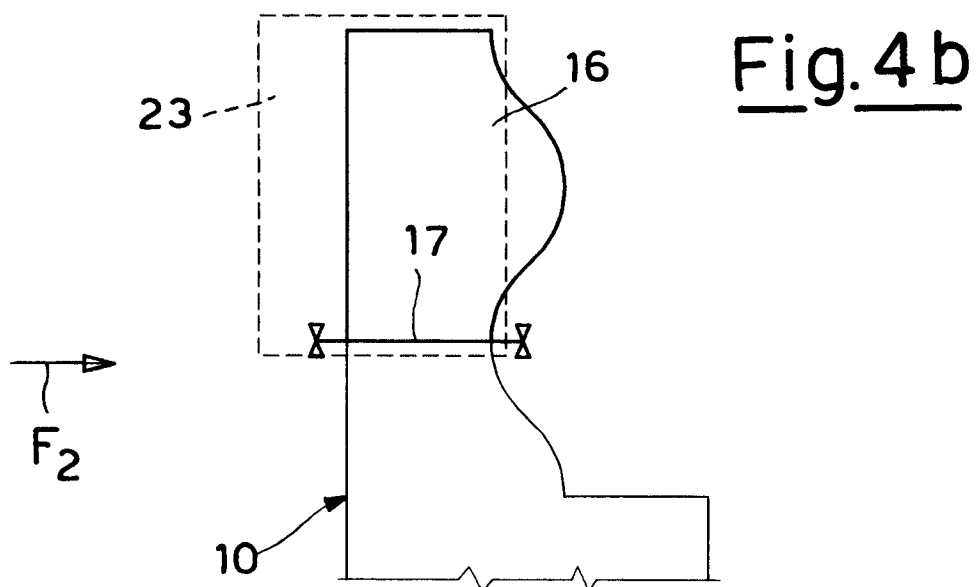


Fig. 4d

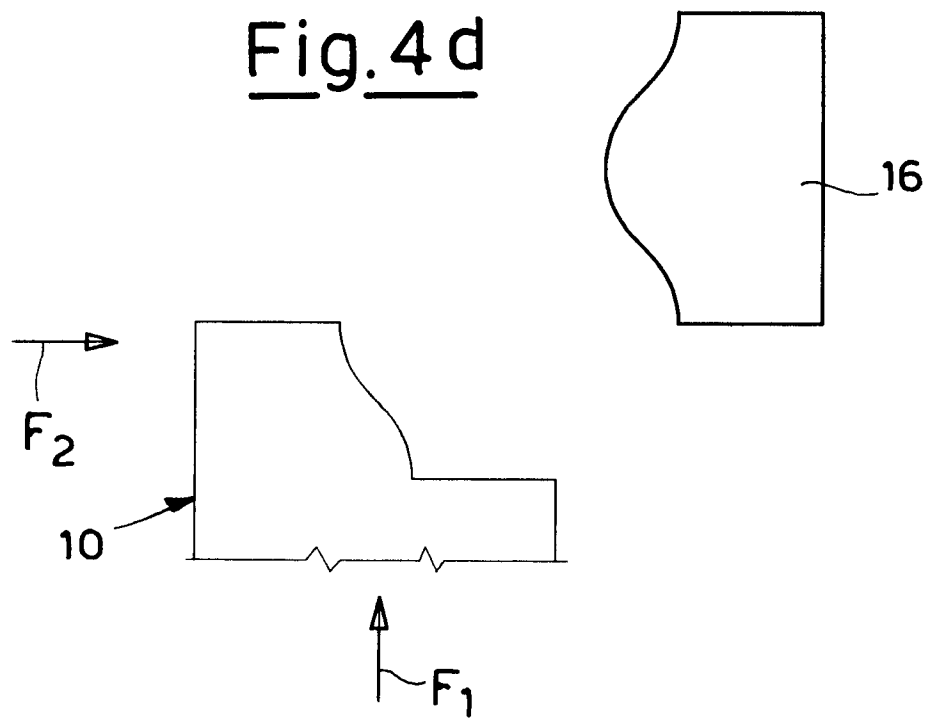


Fig. 5

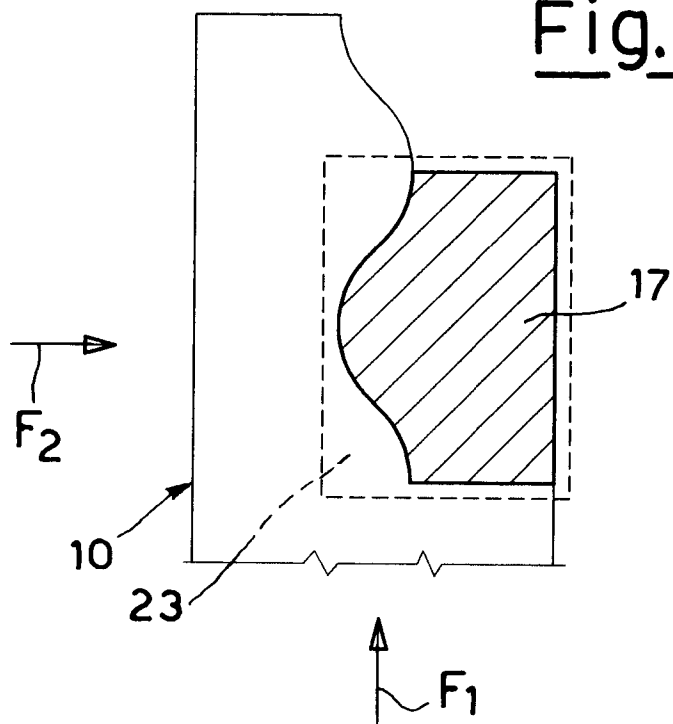
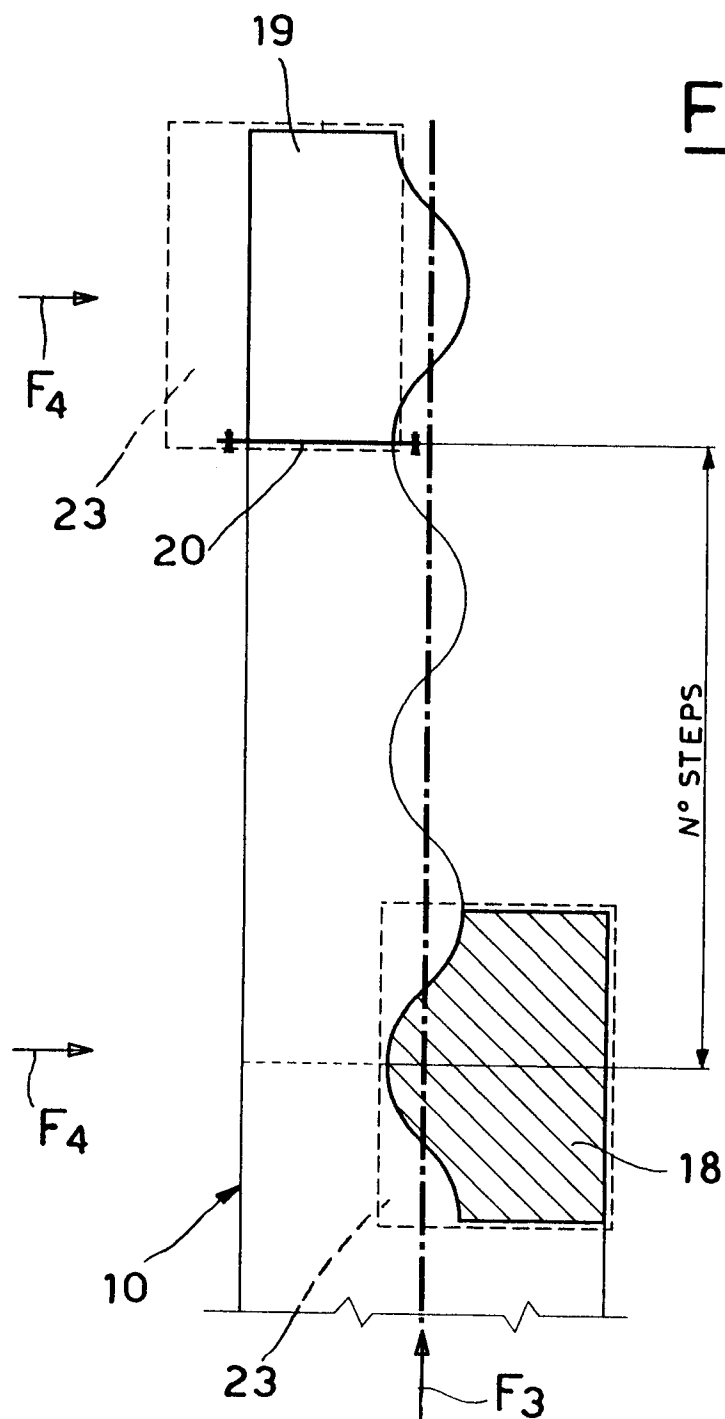
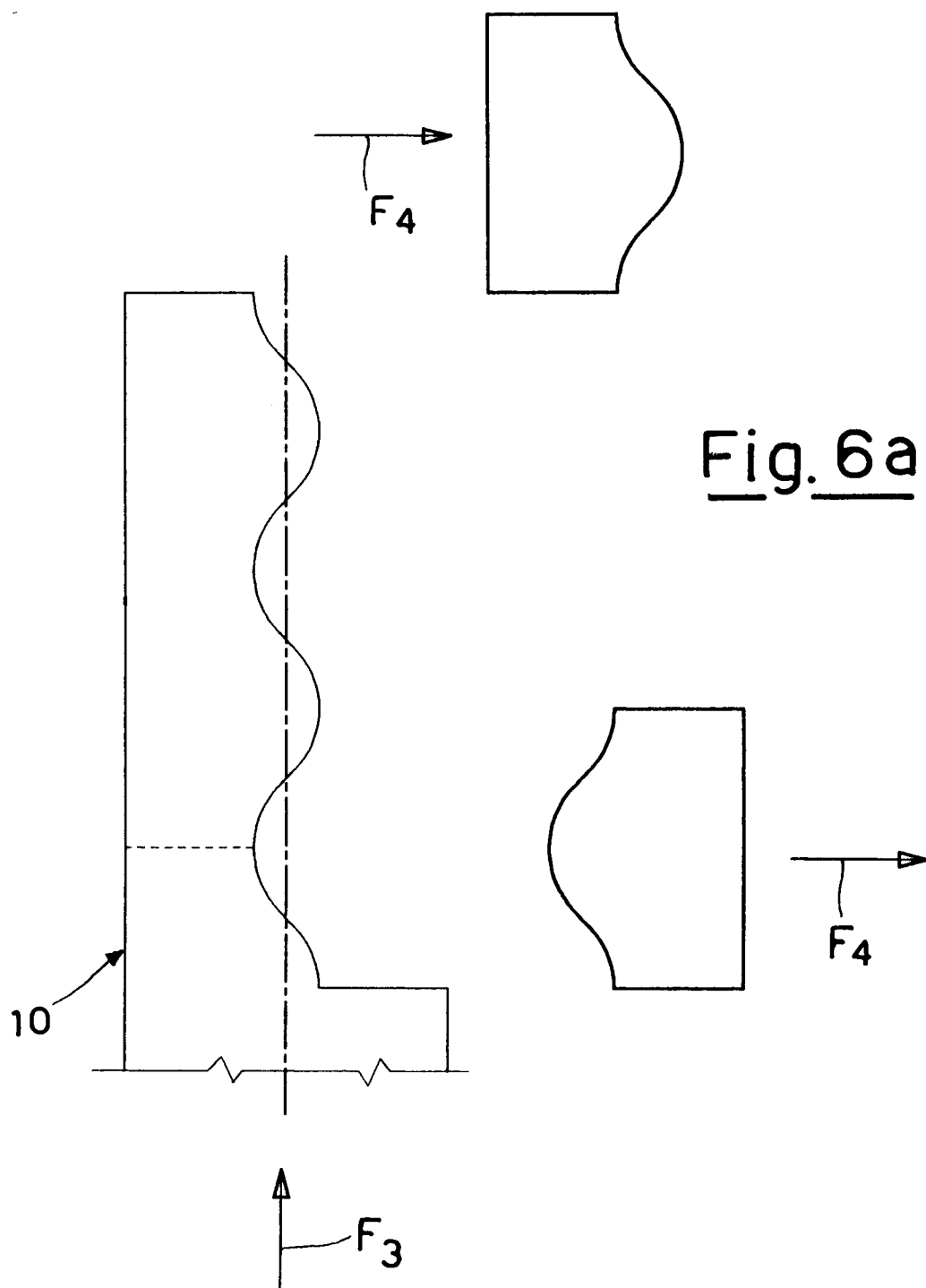
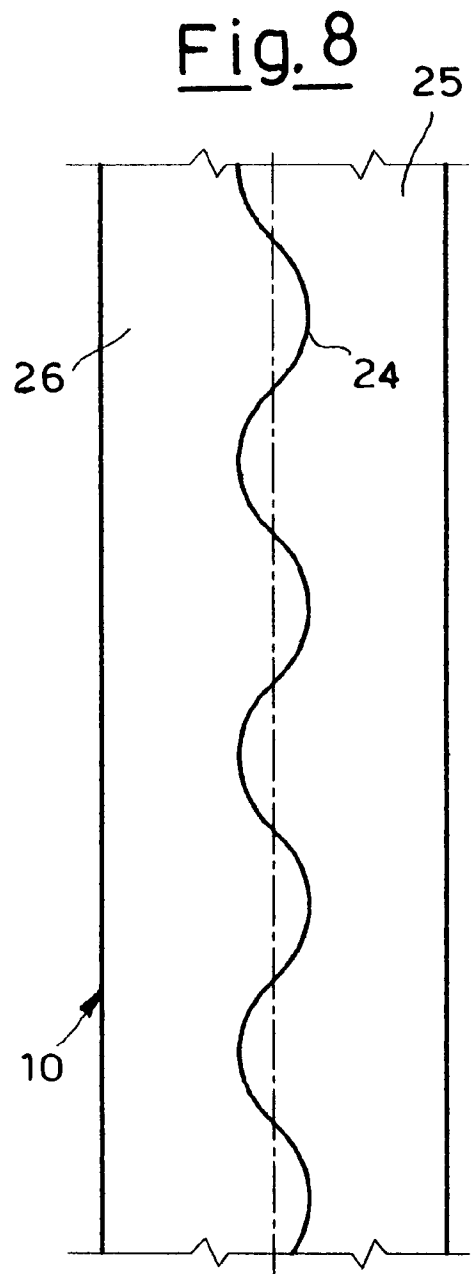
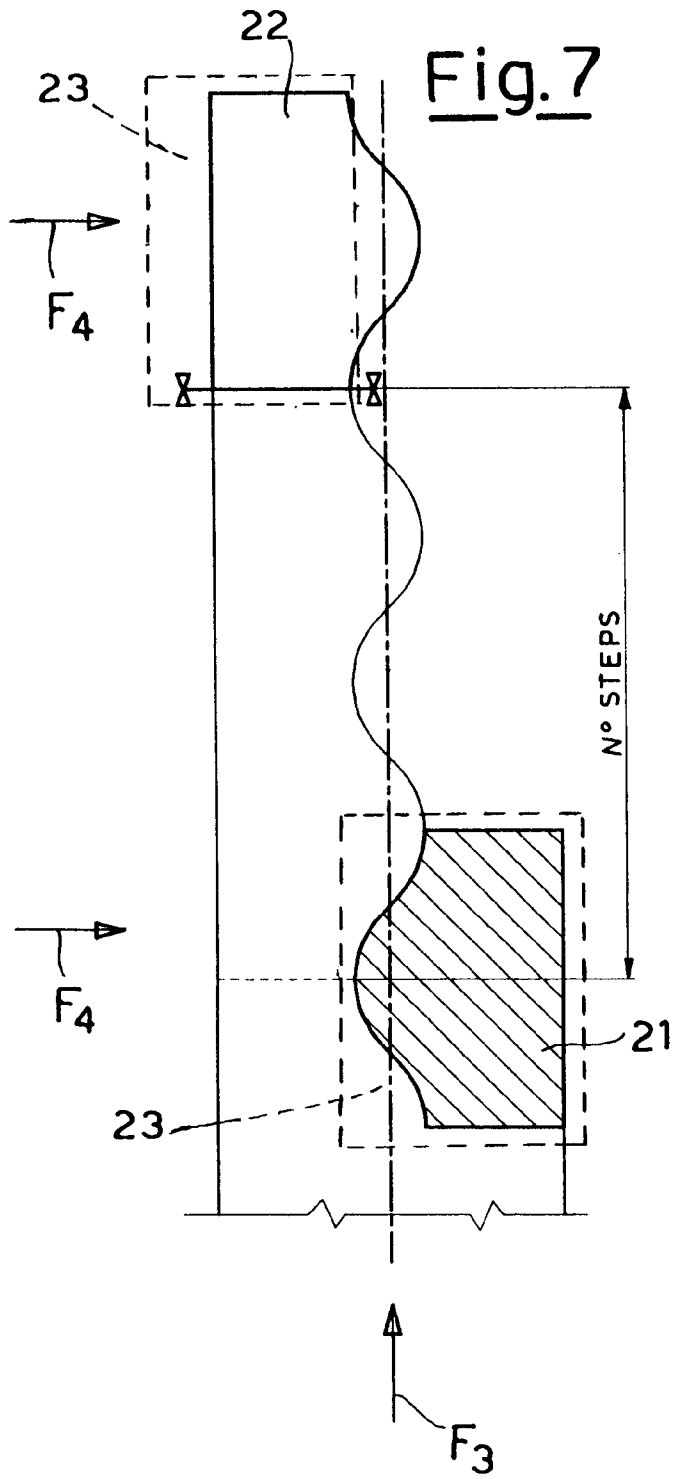


Fig. 6









European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 95 20 0121

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	FR-A-2 191 954 (MASCHINENFABRIK WEINGARTEN AG) * page 8, line 3 - line 14 * * page 9, line 31 - line 37; figure 2 *	1-8,11	B21D28/06
Y	---	9	
Y	US-A-4 114 218 (PENDELL) * claim 1; figures 1-10 *	9	
X	WO-A-86 01135 (WORKMAN) * page 10, line 9 - page 11, line 2; figures 1,9-12 *	10	
X	FR-A-1 538 257 (SCHULER GMBH) * the whole document *	1-8,11	
X	DE-A-42 32 211 (EMME) * the whole document *	1,2	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B21D
Place of search		Date of completion of the search	Examiner
THE HAGUE		3 May 1995	Gerard, O
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