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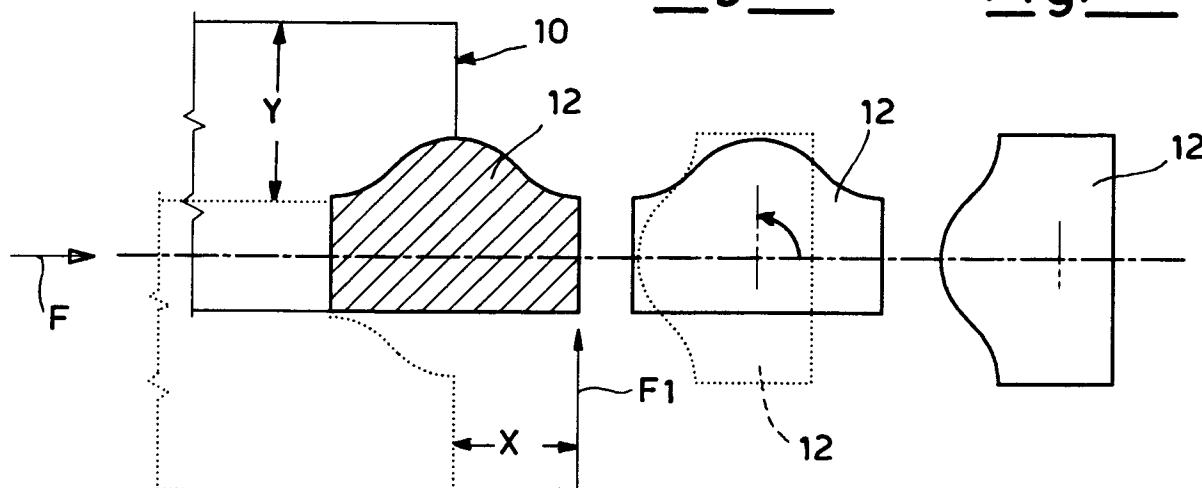
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(54) **Method for punching from metal strip a blank intended, particularly but not exclusively, for producing a furniture hinge casing.**

(57) In a method for punching a blank (11, 12, 13) from a metal strip (10) by means of a die assembly (17), each blank is punched without leaving any

scrap from the strip (10) which is advanced stepwise and shifted with reciprocating movement perpendicular to the direction of advancement.

Fig.2**Fig.2a****Fig.2b****EP 0 661 118 A1**

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 invention;

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

Figures 3, 3a, 3b show the third stage of the method;

Figures 4 and 4a show a second embodiment of the method of the invention;

Figures 5, 5a, 5b show a third embodiment of the method of the invention; and

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

In the figures of the drawings, the reference numeral 10 indicates a metal strip which, in one 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.

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 1a 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.

Simultaneously with these two operations, ie the conveying of the blank 11 (Figure 1a) and its manipulation (Figure 1b), the strip 10 is advanced longitudinally through a step X in the direction of the arrow F and shifted laterally through a step Y in a direction perpendicular thereto in accordance with the arrow F1, into the position shown in Figure 2 in which a second blank defined by the hatched region 12 is punched out without leaving any scrap.

The strip 10 is advanced in the direction of the arrow F from the position shown in Figure 1 to the position shown in Figure 2 through a distance X equal to one half the length of the blank 12 to be obtained, the lateral shift in the direction of the arrow F1 being through a distance Y which varies according to the configuration of the blank and of the final piece to be formed.

The blank 12, separated from the strip 10 as shown in Figure 2a, is then rotated, for example through 90° , into the position shown in Figure 2b suitable for a subsequent operation, such as a drawing operation.

Simultaneously with these two operations, ie the conveying of the blank 12 (Figure 2a) and its manipulation (Figure 2b), the strip 10 is advanced longitudinally through a step X in the direction of the arrow F and shifted laterally through a step Y in a direction perpendicular thereto in accordance with the arrow F2, into the position shown in Figure 3 in which a third blank defined by the hatched region 13 is punched out without leaving any scrap.

The blank 13 is then conveyed and manipulated into the positions shown in Figures 3a and 3b exactly as in the case of the blanks 11 and 12. This third stage is identical to the first.

Hence a plurality of flat blanks are obtained punched from a strip 10 without leaving any scrap, and are ready for subsequent operations, such as those well known to the expert of the art for forming furniture hinge parts (casing and/or flange).

The systems used for transferring the blanks to the various working stations and orientating them are not shown herein as they can be of a type well known to the expert of the art.

In the example described heretofore with reference to Figures 1-3b a lateral movement of the strip 10 has been assumed, however this movement is relative to the blanking die assembly.

Figures 4 and 4a show a second embodiment of the method of the invention in which the strip 10 is fed in the direction of the arrow F3, this being perpendicular to the direction indicated by the arrow F4 in which the punched blank 14 is advanced.

As clearly shown in Figure 4 of the drawings, the strip 10 is again advanced and shifted laterally at each blanking stage through the same steps X and Y as in the procedure described with reference to Figures 1-3b.

The blank 14 punched out in the blanking station of Figure 4 is removed and transferred to a second station shown in Figure 4a already in a position suitable for the next operation.

Figures 5, 5a, 5b show an embodiment of the method in which the blank 15 punched from the strip 10 is removed and transferred to the positioning station of Figure 5a in which the blank 15 is rotated through 180° in accordance with the arrow F5, into the position shown in Figure 5b suitable for the next operation.

Figures 6 and 6a show an embodiment of the method analogous to that of Figures 5-5b, but in which the blank 16 punched from the strip 10 is removed and during its transfer to the next station shown in Figure 6a is orientated in accordance with the arrow F6 into a position already suitable for the next operation.

For simplicity the die assembly (punch and lower die) through which the strip 10 is fed to enable the blanks 11-16 to be punched out is shown only in Figure 6 of the drawings, in which it is shown schematically at 17 by dashed lines.

The die assembly is not shown in detail as its construction lies within the scope of the expert of the art.

Claims

1. A method for punching from metal strip (10), by means of a die assembly (17), a blank (11, 12, 13) 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;

- simultaneously with the transfer of said blank (11), advancing the strip (10) longitudinally through a step X in a direction F and positioning it laterally by shifting it relative to said die assembly (17) through a step Y in a direction F1 perpendicular to the direction F;
- punching out a second blank (12);
- removing the blank (12) punched out and transferring it to said second station in a suitable position;
- simultaneously with the transfer of said blank (12), advancing the strip (10) longitudinally through a further step X in the direction F and positioning it laterally by shifting it relative to the die assembly (17) through a step Y in a direction F2 opposite to the preceding and perpendicular to the direction F;
- punching out a third blank (13) and so on as for the blanks (11, 12).

2. A method as claimed in claim 1, characterised in that the blank (11, 12, 13) is orientated in said second station into a position suitable for the next operation.

3. A method as claimed in claim 2, characterised in that the blank (11, 12, 13) in said second station is rotated through 90° about its axis of advancement.

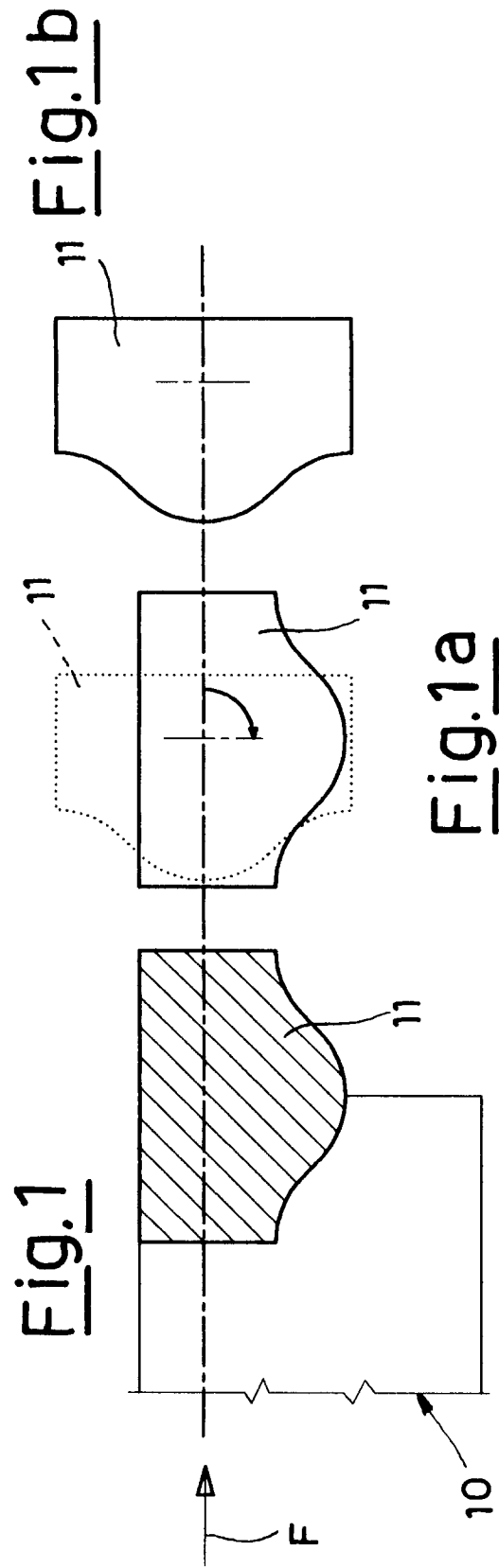
4. A method as claimed in claim 1, characterised in that the blank (11, 12, 13) is orientated into a position suitable for the next operation during its transfer from said first and second station.

5. A method as claimed in claim 1, characterised in that the metal strip (10) is fed in a direction (F3) perpendicular to the axis of advancement (F4) of the blank (14, 15, 16).

6. A method as claimed in claim 5, characterised in that the blank (14, 15, 16) is orientated in said second station into a position suitable for the next operation.

7. A method as claimed in claim 6, characterised in that the blank (14, 15, 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 blank (14, 15, 16) is orientated into a position suitable for the next operation during its transfer from said first and second station.



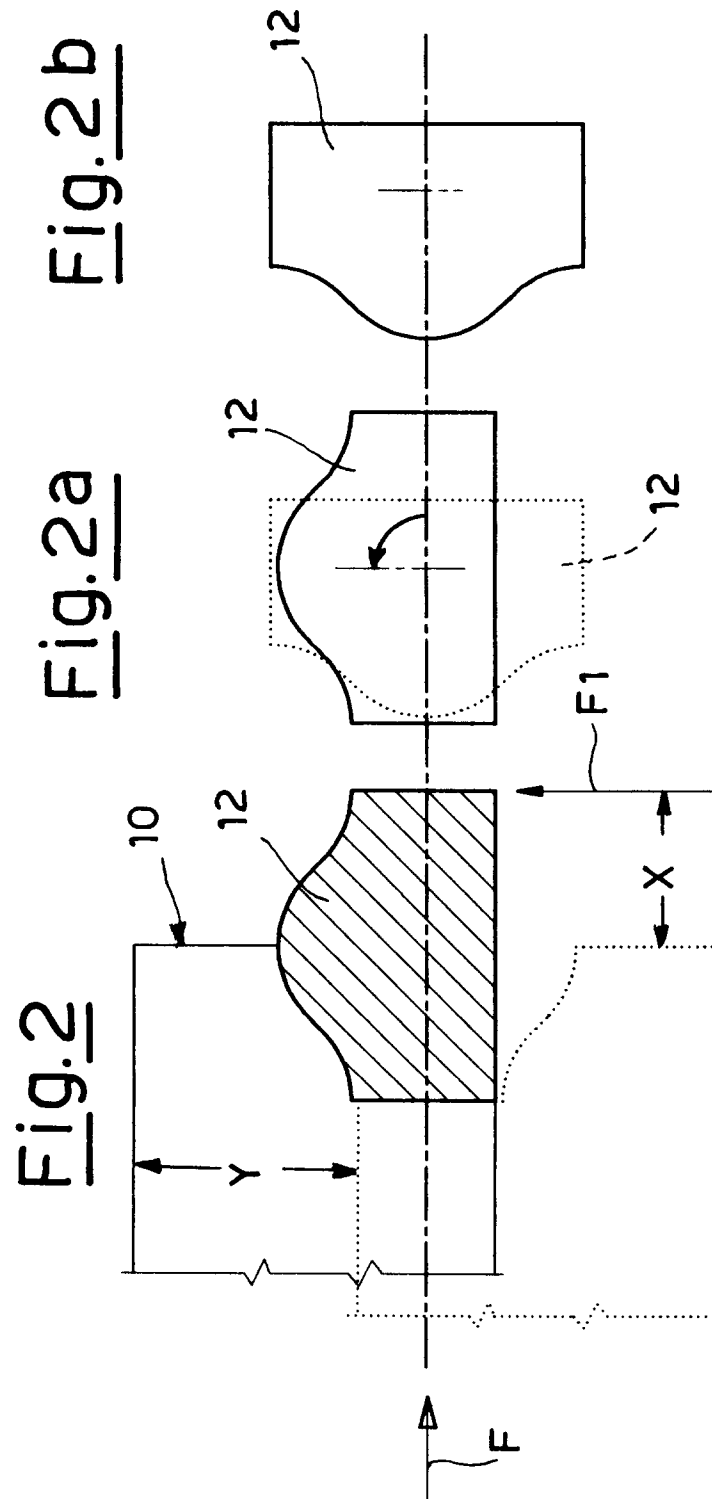


Fig.3

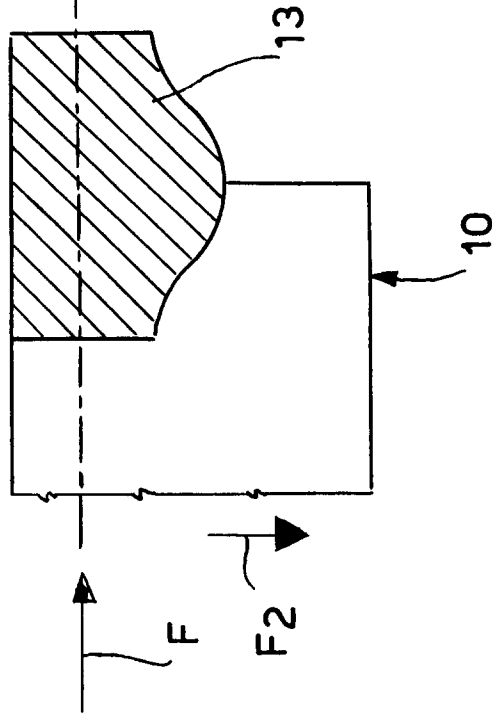


Fig.3a

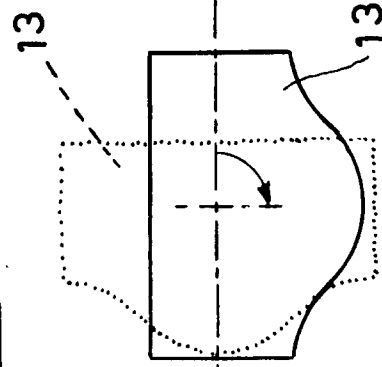
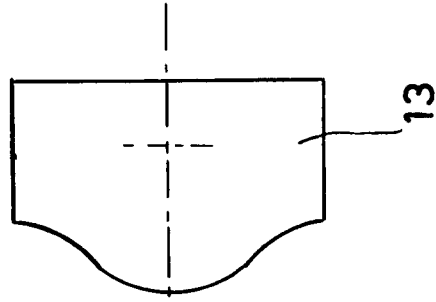
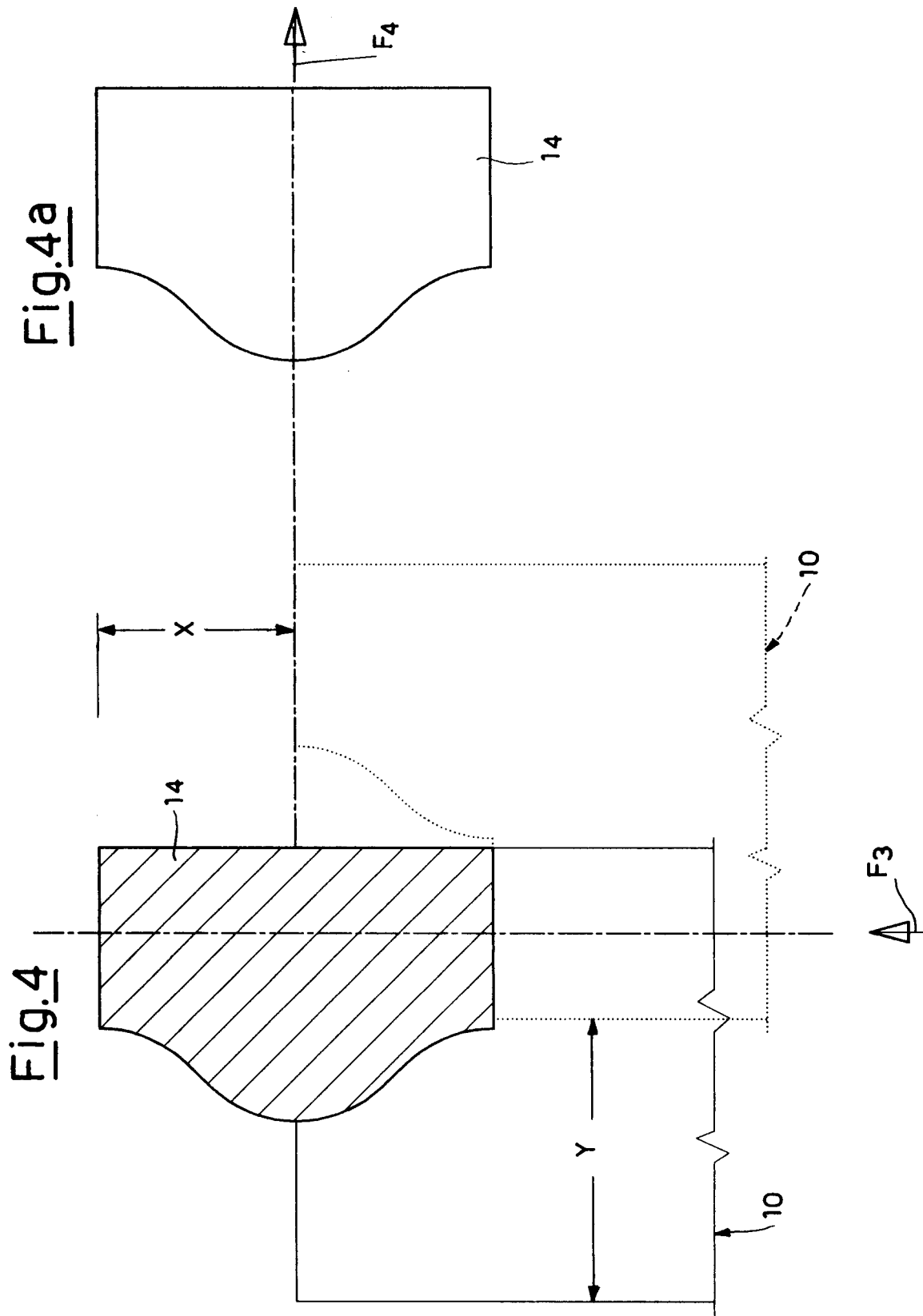
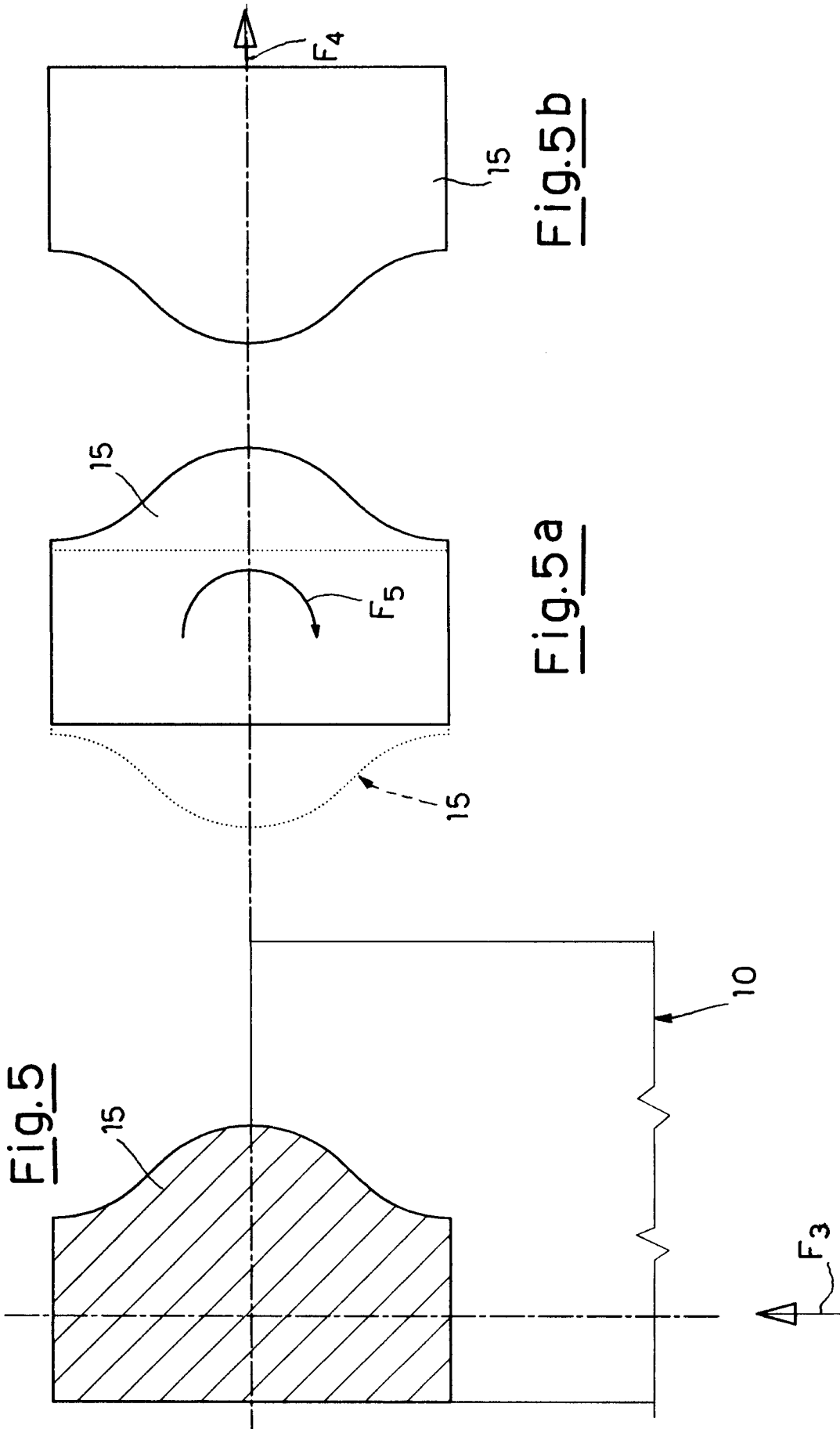
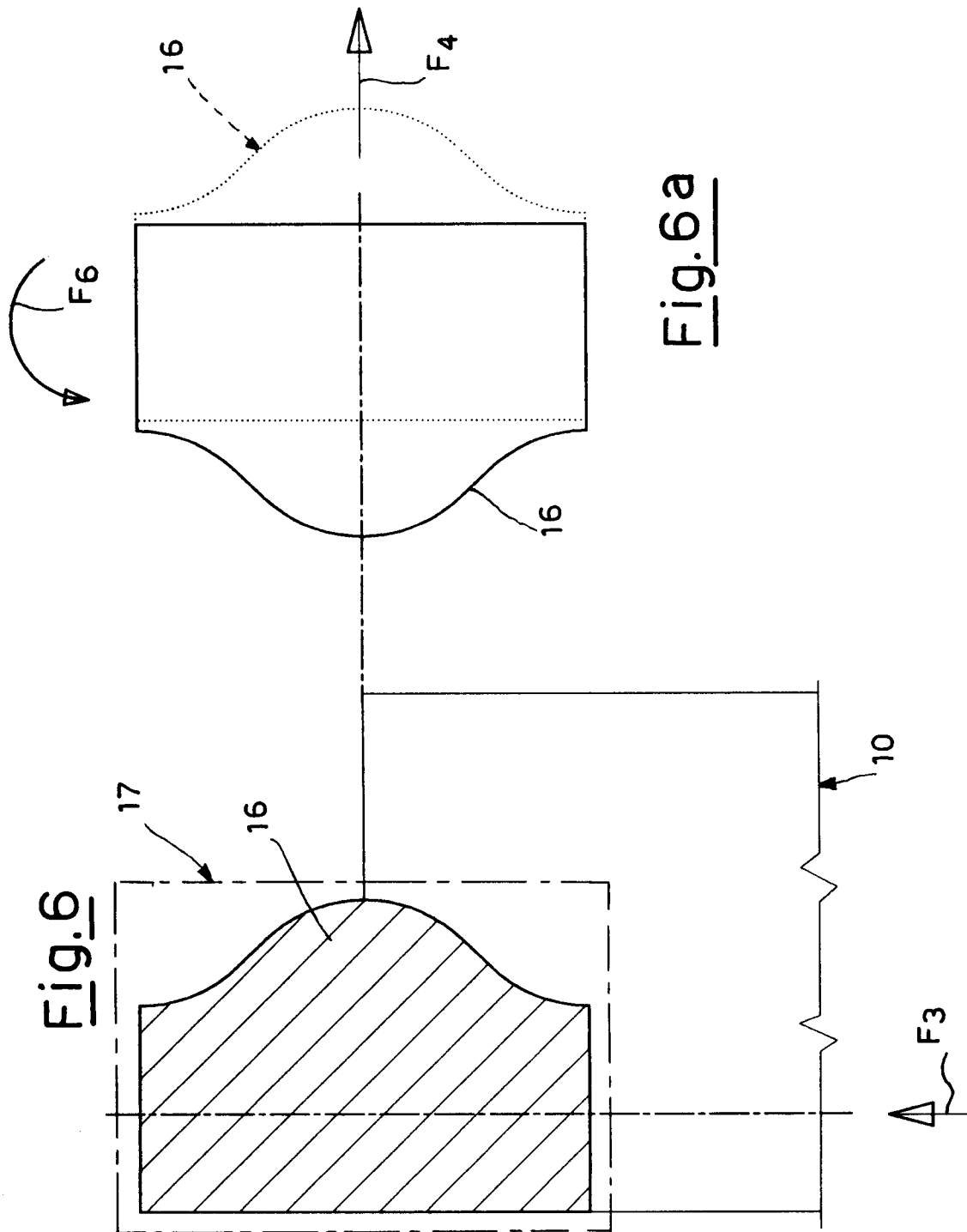


Fig.3b











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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 3505

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	DE-A-27 50 940 (KRUPP) * page 6, line 10 - line 13; figure 1 * ---	1,2,4-6,8	B21D28/06
X	GB-A-1 138 931 (INDUSTRIE-WERKE KARLSRUHE) * page 2, line 115 - line 118; figures * ---	1,2,5-7	
A	GB-A-1 193 666 (SCHULER) * page 3, line 15 - line 18 * ---	3	
A	DE-A-24 12 260 (ZIERPKA) * figures 1,2 * ---	4,8	
A	DE-A-42 32 211 (EMME) * abstract * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B21D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28 March 1995	Examiner Ris, M
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