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(54) **Method for punching a blank from a metal strip intended for automatically manufacturing metal components**

Verfahren zum Stanzen eines Rohlings aus einem Metallband für die automatische Herstellung von Bestandteilen aus Metall

Procédé de découpage d'une ébauche d'une bande métallique pour la fabrication de composants en métal

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Description

[0001] This invention relates to a method for punching from metal strip a blank intended, particularly but not exclusively, for manufacturing a component (flange) of a furniture hinge, and drawer guides.

[0002] 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.

[0003] It is therefore very desirable to punch out a blank with as little scrap as possible, particularly in the production of low-cost articles.

[0004] 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.

[0005] 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.

[0006] 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.

[0007] As is well known to the expert of the art, two basic systems are known for punching from metal strip a blank intended to undergo subsequent working.

[0008] A first method uses progressive die assemblies, whereas the second method uses retake die assemblies for the blank formed in a preceding die.

[0009] The first system, using progressive die assemblies, has the drawback of dies and punches of relatively complex construction with a very thin and hence delicate cutting section, because the blanks to be cut from the metal strip must be as close as possible to each other if maximum material saving is to be achieved.

[0010] Moreover, the metal strip must have a width sufficient to maintain the pieces joined together during their progression from one die to the next. Hence the material saving is relative.

[0011] Finally, the blank being worked is difficult to move along planes different from that along which the metal strip advances.

[0012] By using retake dies instead of progressive dies, improved results can be obtained, in terms both of material saving and the ease of moving the blank along two different planes.

[0013] However, devices have to be used able to automatically move the blank being worked from one die to the next.

[0014] Known methods are described for example in EP-A-661118 and EP-A-672478.

[0015] EP-A-661118 describes a method for punching from metal strip, by means of a die assembly, a blank intended particularly but not exclusively for producing a furniture hinge casing, characterised by comprising the following stages:

- in a first station, punching a first blank from the metal strip without leaving any scrap;
- removing said punched-out blank and transferring it to a second station in a suitable position;
- simultaneously with the transfer of said first blank, advancing the strip longitudinally through a step X in a direction F and positioning it laterally by shifting it relative to said die assembly through a step Y in a direction F1 perpendicular to the direction F;
- punching out a second blank;
- removing the second punched-out blank and transferring it to said second station in a suitable position;
- simultaneously with the transfer of said second blank, advancing the strip longitudinally through a further step X in the direction F and positioning it laterally by shifting it relative to the die assembly through a step Y in a direction F2 opposite to the preceding and perpendicular to the direction F;
- punching out a third blank, and so on as for the other blanks.

[0016] EP-A-672478 describes a method for punching from metal strip, by means of a die assembly, a blank intended particularly but not exclusively for producing a furniture hinge casing, characterised by comprising the following stages:

- in a first station, punching said blank from the metal strip without leaving any scrap;
- removing said punched-out blank and transferring it to a second station in a suitable position;
- punching out a second blank identical to the first blank;
- removing the second punched-out blank and transferring it to said second station in a suitable position; and
- repeating said stages, and so on.

[0017] The general object of the present invention is to provide a method for punching a blank from metal strip with maximum material saving, using an extremely simple apparatus.

[0018] This object is attained by a method in accordance with claim 1, in which the blank is punched out by a progressive system, but with the advantage of being separated from the advancing metal strip, hence enabling it to be shifted in any direction, even along planes different from that in which the strip lies.

[0019] 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, which show two embodiments of the method of the invention, and in which:

Figures 1 to 4 show the operational stages of the first embodiment of the method according to the invention; and

Figures 5 to 8 show the operational stages of the second embodiment of the method according to the invention.

[0020] In Figures 1-4 of the drawings, the reference numeral 10 indicates a metal strip which 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.

[0021] According to the method of the invention, a punch indicated schematically by 11 is used to punch out simultaneously a first blank 12, bounded by the dashed region of Figure 1, and a second blank 13 (different from the first 12) indicated by full lines (without dashes).

[0022] The two blanks 12, 13 are separated from each other and from the metal strip 10, as shown in Figure 2, to be carried to a subsequent working station where, as shown in Figures 3 and 4, from said mutually different blanks 12, 13 there are simultaneously punched out two identical pieces 14, 15 ready for subsequent working, for example bending and drilling.

[0023] As can be clearly seen from Figure 3 of the drawings, to obtain the piece 14 from the blank 12, the parts 16, 17 indicated by hatching are punched from this latter, whereas to obtain the piece 15 from the blank 13, the parts 18, 19 indicated by full lines are punched from this latter.

[0024] The semi-finished pieces 14, 15 are suitable for forming furniture hinge flanges.

[0025] With reference to Figures 5-8 of the drawings, according to the method of the invention, two pieces for forming drawer guides can be obtained by punching from a strip 20, advancing in the direction of the arrow F1, using a punch indicated by dashed and dotted lines at 21, as shown in Figure 5 of the drawings.

[0026] The punch 21 simultaneously punches from the strip 20 two blanks 22, 23 which are separated, as shown in Figure 6.

[0027] The blank 22 is already in the shape of the desired piece, whereas the parts 25, 26, 27, 28 are punched from the blank 23 to obtain the piece 24, as shown in Figures 7 and 8.

[0028] In this case the pieces 22, 24 are mutually different, being suitable for forming drawer guides by subsequent bending and drilling, however said pieces 22, 24 could also be identical.

[0029] In both the aforesaid embodiments, the production method allows operations to be carried out within the boundary of each blank before it is punched out, such as drilling, drawing, stamping etc.

[0030] Finally, with the method of the invention, the burrs on the pieces obtained-are orientated in the same manner for both said pieces, with substantial advantages in terms of finished product quality.

[0031] The object stated in the introduction to the description is hence achieved, ie of operating with maximum material saving and with a every simple apparatus in which the piece is worked progressively, but separated from the strip, hence allowing it freedom of movement.

Claims

1. A method for punching, from metal strip (10, 20), blanks intended for the automatic manufacture of metal components by subsequent operations, **characterised by** comprising the following stages:

   - in a first station, punching out and releasing from said metal strip (10, 20), at least one first blank (12, 22), while simultaneously releasing from said metal strip (10, 20) at least one second blank (13, 23);
   - automatically transferring said blanks (12, 13; 22, 23) into a successive station in which from said blanks (12, 13; 22, 23) there are obtained, by further punching, two pieces (14, 15; 22, 24) ready to undergo subsequent operations,

2. A method as claimed in claim 1, **characterised in that** said blanks (12, 22; 13, 23) are mutually identical.

3. A method as claimed in claim 1, **characterised in that** said blanks (12, 22; 13, 23) are mutually different.

4. A method as claimed in claim 1, **characterised in that** said two pieces (14, 15; 22, 24) are mutually identical.

5. A method as claimed in claim 1, **characterised in that** said two pieces (14, 15; 22, 24) are mutually different.

6. A method as claimed in claim 2, **characterised in that** said pieces (14, 15) are intended for producing furniture hinge flanges.

7. A method as claimed in claim 2, **characterised in that** said pieces (22, 24) are intended for producing drawer guides.

Patentansprüche

1. Verfahren zum Ausstanzen von Rohlingen aus einem Metallstreifen (10, 20), die zur automatischen Herstellung von Metallbauteilen durch anschließende Arbeitsgänge vorgesehen sind, **dadurch**

gekennzeichnet, daß es die folgenden Stufen umfaßt, daß:

- an einer erste Station aus dem Metallstreifen (10, 20) mindestens ein erster Rohling (12, 22) ausgestanzt und herausgelöst wird, während gleichzeitig aus dem Metallstreifen (10, 20) mindestens ein zweiter Rohling (13, 23) herausgelöst wird, und
- die Rohlinge (12, 13; 22, 23) automatisch zu einer nachfolgenden Station übertragen werden, an der aus den Rohlingen (12, 13; 22, 23) durch weiteres Stanzen zwei Stücke (14, 15; 22, 24) erhalten werden, die bereit sind, anschließende Arbeitsgänge zu erfahren.

2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, daß** die Rohlinge (12, 22; 13, 23) einander identisch sind.

3. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, daß** die Rohlinge (12, 22; 13, 23) voneinander verschieden sind.

4. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, daß** die beiden Stücke (14, 15; 22, 24) einander identisch sind.

5. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, daß** die beiden Stücke (14, 15; 22, 24) voneinander verschieden sind.

6. Verfahren nach Anspruch 2, **dadurch gekennzeichnet, daß** die Stücke (14, 15) dafür vorgesehen sind, Möbelscharnierschenkel herzustellen.

7. Verfahren nach Anspruch 2, **dadurch gekennzeichnet, daß** die Stücke (22, 24) dafür vorgesehen sind, Schubladenführungen herzustellen.

Revendications

1. Procédé de découpage, à partir d'une bande de métal (10, 20), de flans destinés à la fabrication automatique de composants métalliques au cours d'opérations successives, **caractérisé en ce qu'**il comprend les étapes suivantes :

- à un premier poste, découper et dégager de la bande de métal (10, 20) au moins un premier flan (12, 22) tout en dégageant simultanément de cette bande de métal (10, 20) au moins un deuxième flan (13, 23) ;
- transférer automatiquement les flans (12, 13 ; 22, 23) vers un poste suivant dans lequel sont obtenus, à partir des flans (12, 13 ; 22, 23), toujours par découpage, deux éléments (14, 15 ; 22, 24) prêts à subir les opérations suivantes.

2. Procédé selon la revendication 1, **caractérisé en ce que** les flans (12, 22 ; 13, 23) sont identiques.

3. Procédé selon la revendication 1, **caractérisé en ce que** les flans (12, 22 ; 13, 23) sont différents les uns des autres.

4. Procédé selon la revendication 1, **caractérisé en ce que** les deux éléments (14, 15 ; 22, 24) sont identiques.

5. Procédé selon la revendication 1, **caractérisé en ce que** les deux éléments (14, 15 ; 22, 24) sont différents les uns des autres.

6. Procédé selon la revendication 2, **caractérisé en ce que** les éléments (14, 15) sont destinés à la production de feuillets de charnières pour meubles.

7. Procédé selon la revendication 2, **caractérisé en ce que** les éléments (22, 24) sont destinés à la production de guides pour tiroirs.

Fig.1

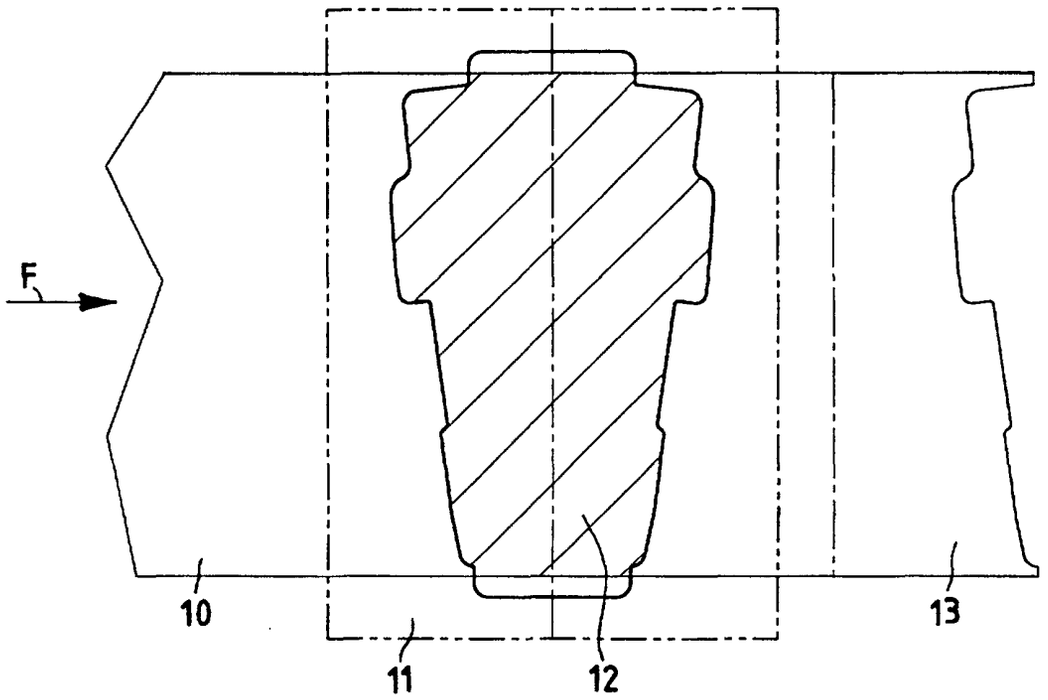


Fig.2

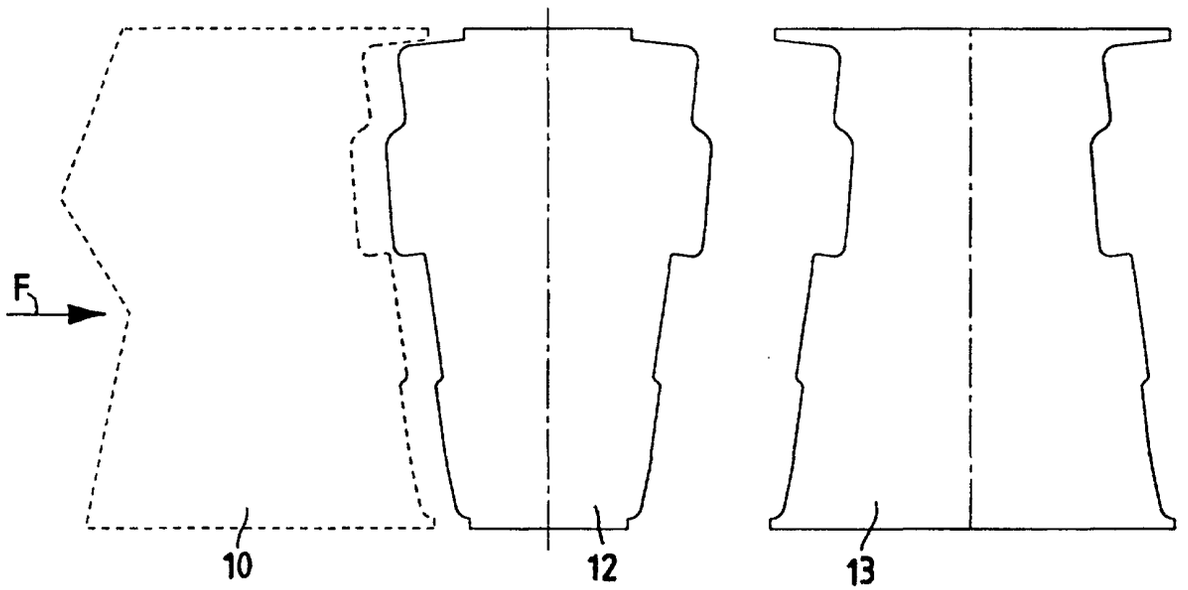


Fig.3

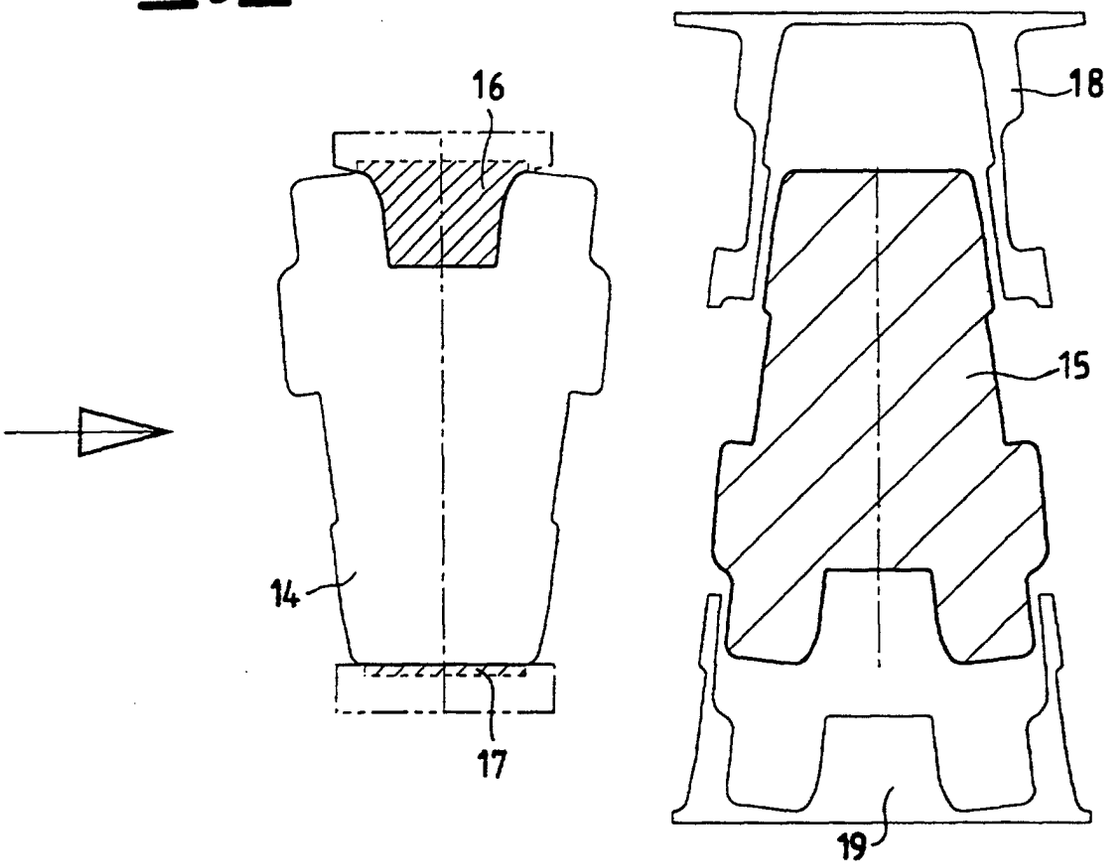


Fig.4

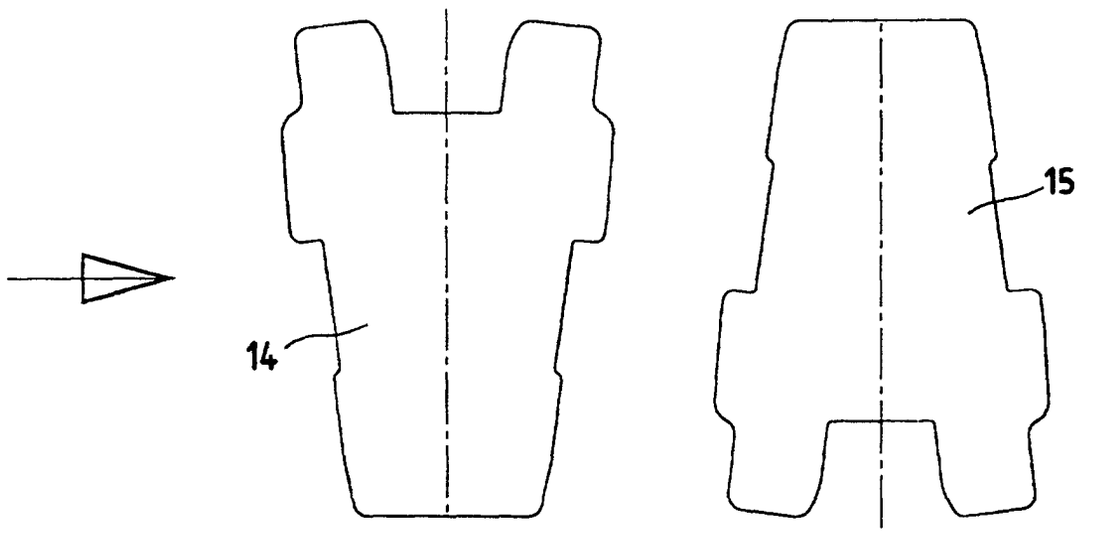


Fig.5

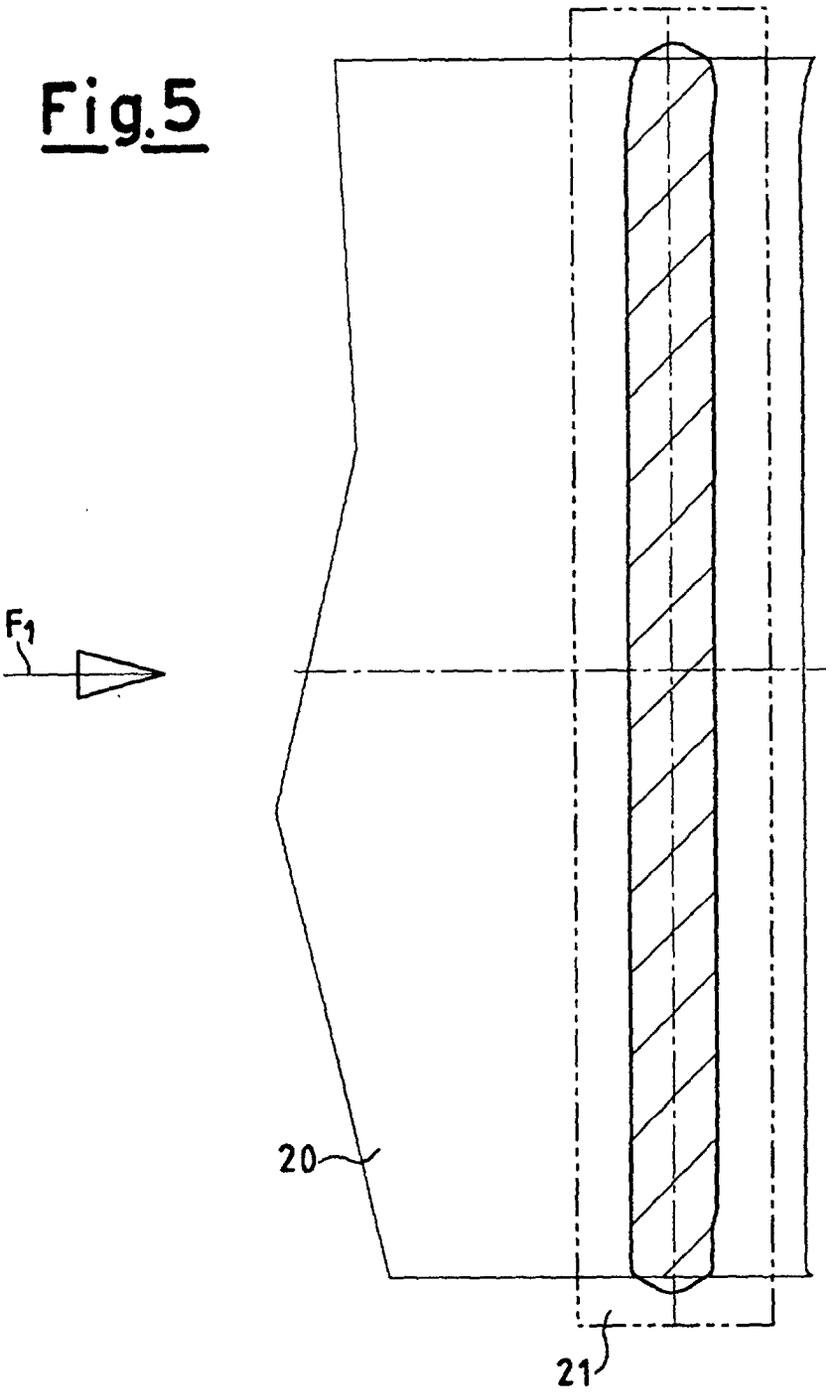


Fig.6

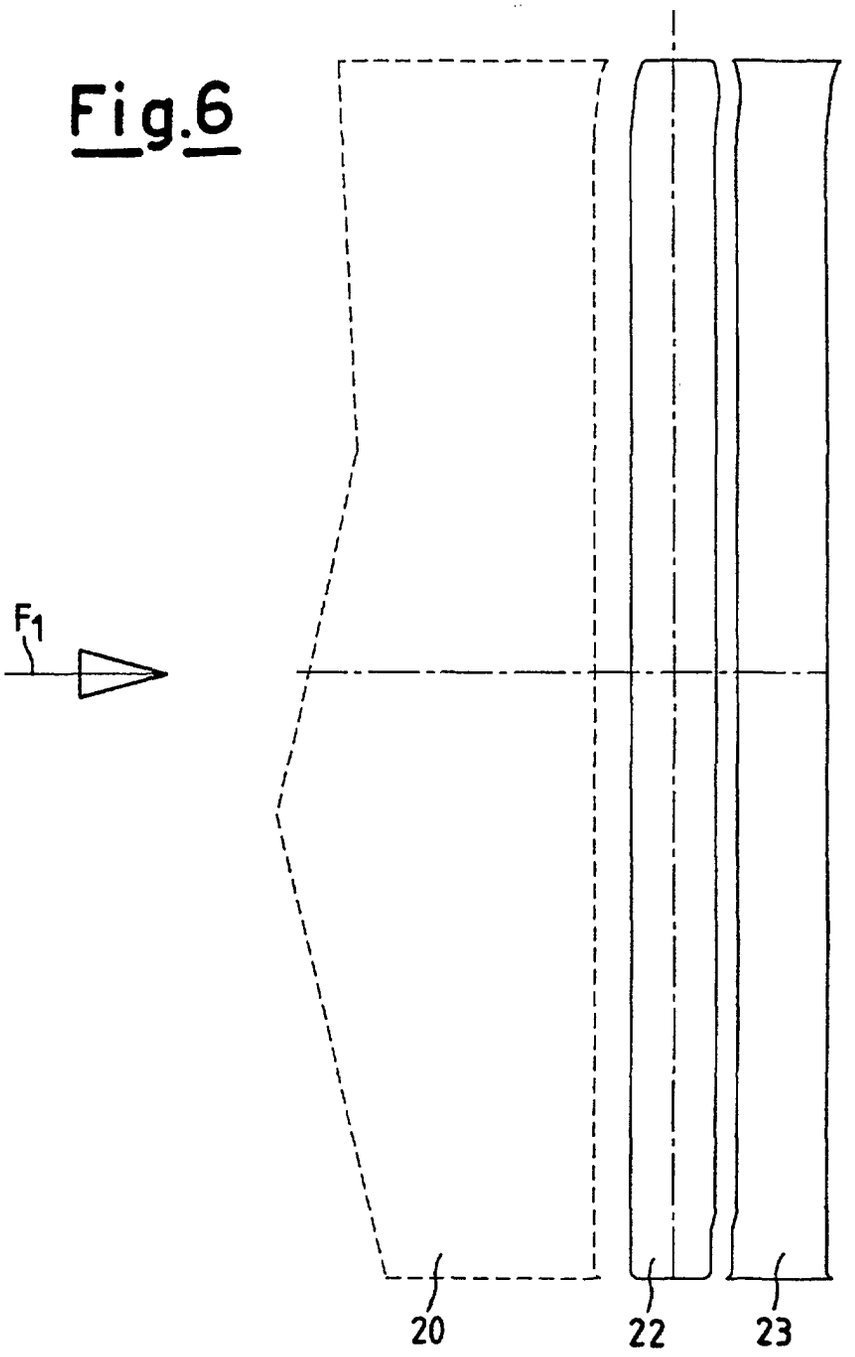


Fig.7

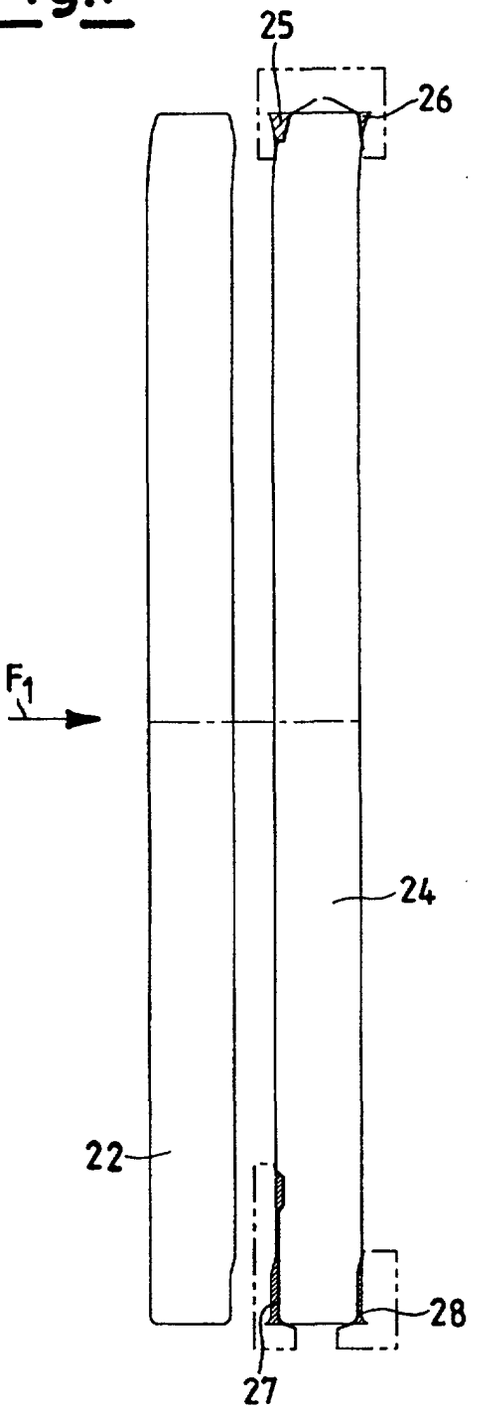


Fig.8

