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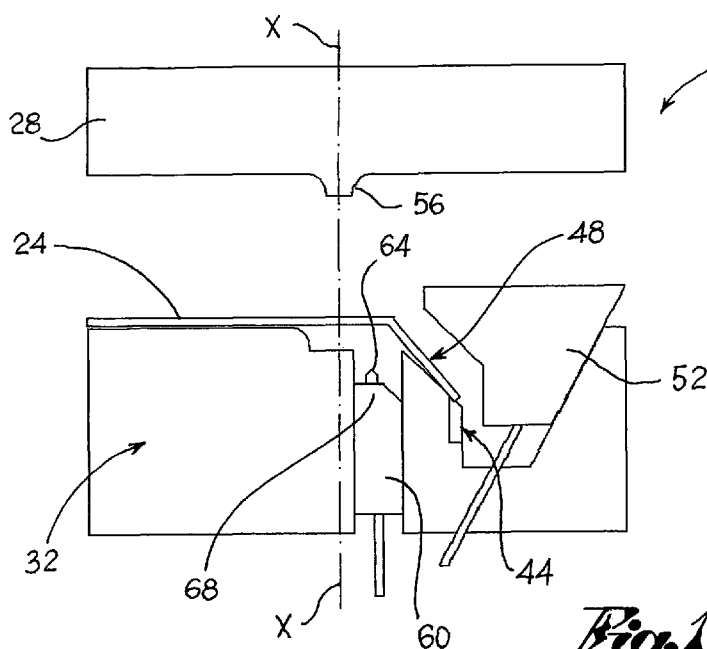
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(54) Title: MOULDING METHOD OF A COMPONENT AND COMPONENT THEREOF



(57) Abstract: Moulding method of a compo-
nent (8) with a component body (12) and at least
one insert (24) able to be at least partially in-
cluded in the component body (12). The method
comprises the phases of making a first injection
in a first injection chamber (36) separated from a
second injection chamber (40) by means of the
insert (24). Subsequently at least one hole is
made in the insert (24) to place the second in-
jection chamber (40) in communication with the
first moulded portion (16) and a second in-
jection of plastic material is made inside the second
injection chamber (40). The material injected
traverses at least one hole so as to join the sec-
ond moulded portion (20) to the first moulded
portion (16) and to include the portion of insert
(24) lodged in the second injection chamber
(40).

Fig. 1

DESCRIPTION

**"MOULDING METHOD OF A COMPONENT AND COMPONENT
THEREOF"**

5 [001] The present invention relates to the moulding method of a component and relative component made using said moulding method.

 [002] It is known of in the art to make moulded components comprising a body and a covering or
10 insert, for example in fabric or leather, joined at least partially to the body.

 [003] According to the technique known by the name of 'back injection', the insert is fitted onto the die of the mould using hooks positioned
15 outside the injection chamber; so that the surface of the insert is always bigger than the surface of the component body.

 [004] The mould is closed therefore blocking the insert at its respective fastenings and the plastic
20 material is injected from the back so as to press the insert against the die of the mould, making the insert adapt to said mould.

 [005] The pressure of the injection is such as not to pierce the covering of faux fabric or faux
25 leather which is therefore solidly joined to the

component body.

5 [006] When the moulding cycle is completed, the piece is sent to a (laser or manual) cutting station to eliminate the part of the covering excess to the outline of the component body; lastly the piece is sent to a (manual or automatic) gluing or attachment station to "seal" the free edges of the covering onto the back of the piece, for example by gluing or stapling.

10 [007] The state of the art technique presents numerous drawbacks and limitations.

[008] First of all, the considerable production waste. Moreover, the known state of the art method foresees various processing phases essentially connected with removal of the strips of covering in excess of the body outline, following extraction of the piece from the mould.

20 [009] High processing costs due overall to the time, waste, and presence of specific cutting stations of the covering result.

[0010] The purpose of the present invention is to resolve the drawbacks mentioned with reference to the known technique.

25 [0011] Such drawbacks are resolved by a method according to claim 1 and by a component according

to claim 19.

[0012] Other embodiments of the method and of the component according to the invention are described in the subsequent claims.

5 [0013] Further characteristics and advantages of the present invention will be more easily comprehended from the description below, made by way of a preferred, non-limiting example of embodiment, wherein:

10 [0014] Figures 1-5 shows schematic cross-section views of successive moulding phases of a component according to the method of the present invention;

[0015] Figure 6 shows an enlarged view of a part of a mould according to the present invention.

15 [0016] With reference to the aforesaid figures reference numeral 4 globally denotes a mould for injection moulding, specifically for the production of a component 8.

20 [0017] The component 8 comprises a component body 12 having a first portion 16 and a second portion 20, and an insert 24 able to cover at least partially said component body 12.

25 [0018] The mould 4 comprises a die 28 and a punch 32 reciprocally moving according to an axial direction X-X of opening/closing of the mould 4.

[0019] The die 28 and the punch 32, in a closed configuration, define a first and a second injection chamber 36,40 which respectively reproduce in negative the first and the second portion 16,20 of the component body 12 to be moulded.

[0020] The injection chambers 36,40 are defined by the die 28 and the punch 32, and are beside each other.

[0021] According to one embodiment, said insert 24 is a sheet of fabric and/or faux leather able to cover the moulded component 8 at least partially.

[0022] Said insert 24 may also be a reinforcement element of the component 8, such as a mesh, a preliminary mould and/or metal sheet.

[0023] According to one embodiment, the insert 24 is attached to the inside of the mould 4 by means of a suction device 44 able to create negative pressure between an attachment portion 48 of the insert 24 and the punch 32.

[0024] According to a further embodiment, the insert 24 is blocked inside the mould 4 by a moving block 52 which clamps it for example to the punch 32 at an attachment portion 48 of the insert 24.

[0025] According to one embodiment, the die 28 of

the mould 4 comprises a separation wall 56 between the first and second injection chamber 36,40; as better described below, the wall 56 influences the insert 24 and co-operates with it to prevent the passage of the injected material between the first and the second injection chamber 36,40.

[0026] The mould 4 comprises, in addition, a moving cursor 60 able to tauten the insert 24 inside the mould 4. The cursor 60 co-operates with the wall 56 and with the insert 24 to insulate the two injection chambers 36,40 from each other.

[0027] According to one embodiment, the cursor 60 is aligned with the wall 56 so that, in an extracted configuration, it forms, with the insert 24 a barrier to the passage of the first injection in the second injection chamber 40.

[0028] Preferably, the cursor 60 is fitted with at least one nipper 64 positioned on a work head 68 which comes into contact with the insert 24 in the extracted configuration of the cursor 60, to make at least one hole on the insert 24.

[0029] According to one embodiment, the cursor 60 comprises at least one tooth 72 able to grasp the insert 24, so as to facilitate the phase of tautening the insert 24 and of making through holes

on the insert 24.

[0030] Preferably, the cursor 60 is positioned between the wall 56 and the attachment portion 48 of the insert 24.

5 [0031] In other words, in the closed configuration of the mould 4, the insert 24 is blocked both by the punch 32, at the attachment portion 48, and by the wall 56.

10 [0032] The cursor 60, by means of the work head 68, acts on the portion of insert projecting between the punch 32 and the wall 56, tautening it and making the holes using nippers 64.

15 [0033] The method of the present invention comprises the phases of positioning the insert 24 inside the first injection chamber 36, for example resting it on the punch 32 at the first injection chamber 36 (figure 1).

20 [0034] The insert 24 is then blocked into position by the suction device 44 and/or moving block 52 which is made to hit against the punch 32, pinching it in the middle of the attachment portion 48 of the insert 24 (figure 2).

25 [0035] The insert 24 is predisposed so as to separate the first injection chamber 36 from the second injection chamber 40 which reproduces in

negative the second portion 20 of the component body 12 to be moulded.

[0036] The first injection of plastic material is made inside the first injection chamber 36.

5 Preferably, the first injection is made from the side of the punch 32 so as to fill the first injection chamber 36 and compress the insert 24 against the die 28, joining the insert 24 at the first injection (figure 3).

10 [0037] During the first injection, the cursor 60 is in an extracted position so as to tauten the insert 24 pinched between the wall 56 and the block 52.

15 [0038] Preferably, the cursor itself advances so as to form a barrier to the passage of the first injection which remains confined in the first injection chamber 36.

20 [0039] Following the first injection, at least one hole is made in the portion of insert occupying the second injection chamber 40, so as to put the second injection chamber 40 in communication with the first moulded portion 16.

25 [0040] Preferably, the holes in the insert 24 are made by the nippers 64 placed on the work head 68 of the cursor 60 during the extraction of the

cursor 60 to tauten the insert 24 (figure 3).

[0041] The tautening of the insert is in turn facilitated by the teeth 72 placed on the cursor 60 which catch in the insert and pull it with the movement of the cursor 60.

[0042] After the solidification of the first injection, the cursor 60 moves rearwards so as to free the holes made by the nippers 64 on the insert, and the second injection of plastic material is made inside the second injection chamber 40. In this phase, the cursor 60 defines the second injection chamber 40, together with the die 28 and the punch 32.

[0043] The injected material traverses at least one hole so as to join the second moulded portion 20 to the first moulded portion 16 and to include the portion of insert 24 lodged in the second chamber (figure 4).

[0044] Specifically, the second injection may cause breakage of the insert 24 at the holes previously made; in any case the torn edges of the insert 24 are included in the second injection.

[0045] The second injection is made directly into the second injection chamber 40, for example on the side opposite the wall 56 which defines the first

and the second injection chamber 36,40.

5 [0046] The first and the second injections are made injecting plastic materials compatible with each other, so as to produce adhesion between the first and second portions 16,20 of the component body 12. In other words, the second injection traverses the holes in the insert and joins with the first portion 16 creating the moulded component in a single piece.

10 [0047] After having made the second injection, the mould 4 is opened and the component 4 expelled in a single piece, comprising the first portion 16, the insert 24 and the second portion 20.

15 [0048] For example, the expulsion phase of the component 8 from the mould 4 may be facilitated by the block 52 (figure 5).

20 [0049] As may be seen from the description, the method of the present invention makes it possible to overcome the drawbacks presented in the known technique.

[0050] Advantageously, the piece moulded according to the present invention, once extracted from the mould requires no further processing and is ready for assembly.

25 [0051] In fact the edges of insert comprised

between the first and the second portion are directly included in the second injection; any edges not included are in any case located on the inner side of the component, that is on the side opposite the insert and therefore not on view, thereby requiring no subsequent removal operations. All the manual or automatic cutting phases subsequent to extraction of the piece from the mould are thus eliminated.

[0052] As a result, the piece extracted from the mould is already ready for assembly in that it requires no further processing in terms of cutting or attachment to any other part.

[0053] This way production costs and times of moulded pieces comprising coverings are considerably reduced.

[0054] The spheres of application of the present invention are varied. For example, bodywork parts of vehicles may be made, such as door panel parts or car mouldings.

[0055] In addition, it is also possible to make parts such as airbag pieces, where the mesh holding the cover which explodes after the airbag opens, is used as the insert.

[0056] It is also possible to make parts such as

engine sheaths, where a preliminary mould or metal sheet is used as the insert.

[0057] A person skilled in the art may make numerous modifications and variations to the methods described above so as to satisfy contingent
5 and specific aims while remaining within the sphere of protection as defined by the following claims.

CLAIMS

1. Moulding method of a component (8) composed of a component body (12) and at least one insert (24) suitable for including at least partially in the component body (12), the method comprising the phases of:
- predisposing a mould (4) comprising at least one die (28) and one punch (32) which, in a closed configuration, define a first injection chamber (36) which respectively reproduces in negative a first portion (16) of the component body (12) to be moulded,
 - positioning an insert (24) inside the first injection chamber (36),
- the method being characterised by the fact of comprising the steps of
- predisposing the insert (24) so as to use it to separate the first injection chamber (36) from a second injection chamber (40) reproducing in negative a second portion (20) of the component body (12) to be moulded, the second injection chamber (40) being defined by the die (28) and by the punch (32) and being beside the first injection chamber (36),
 - making a first injection of plastic material inside

the first injection chamber (36),

- making at least one hole in said insert (24) so as to put the second injection chamber (40) into communication with the first moulded portion (16),

5 - making a second injection of plastic material inside the second injection chamber (40), the injected material traversing at least one hole so as to join the second moulded portion (20) to the first moulded portion (16) and to include the insert portion (24)
10 lodged in the second injection chamber (40).

2. Method according to claim 1, wherein said insert (24) is a sheet of fabric and/or faux leather able to cover the moulded component (8) at least partially.

3. Method according to claim 1, wherein said insert
15 (24) is a reinforcement element of the component (8), such as a mesh, preliminary moulding and/or metal sheet.

4. Method according to claim 1, 2 or 3, wherein said insert (24) is attached inside the mould (4) by means
20 of at least one suction device (44) able to create negative pressure between an attachment portion (48) of the insert (24) and the punch (32).

5. Method according to any of the previous claims, wherein the insert (24) is attached by means of a
25 moving block (52) which clamps it to the punch (32) at

an attachment portion (48).

6. Method according to any of the previous claims, wherein the die (28) comprises a separation wall (56) between the first and the second injection chamber (36,40), said wall (56) influencing the insert (24) and co-operating with it to prevent the passage of injected material from the first to the second chamber (36,40).

7. Method according to any of the previous claims, wherein the mould (4) comprises a moving cursor (60), able to tauten the insert (24) inside the mould (4).

8. Method according to claim 7, dependent on claim 6, wherein the cursor (60) co-operates with the wall (56) and the insert (24) to insulate the two injection chambers (36,40) between them.

9. Method according to claim 7 or 8, wherein the cursor (60) is aligned with the wall (56) so that, in the extracted configuration, it forms, together with the insert (24) a barrier to the passage of the first injection in the second injection chamber (40).

10. Method according to claim 7, 8 or 9, wherein said cursor (60) is fitted with at least one nipper (64) on a work head (68), so that in the extracted configuration it makes at least one hole in the insert (24).

11. Method according to any of the claims from 7 to 10, wherein the cursor (60) comprises at least one tooth (72) able to catch the insert (24), so as to facilitate the phase of tautening the insert (24) and making the through holes on the insert (24).

12. Method according to any of the claims from 7 to 11, dependent on claim 6, wherein the cursor (60) is positioned between the wall (56) and an attachment portion (48) of the insert (24) to the mould (4).

10 13. Method according to any of the claims from 7 to 12, wherein, between the first and second injection, the cursor (60) is positioned in a retracted configuration, so as to at least partially free the second injection chamber (40) and leave the holes open for the passage of the material injected during the second injection.

14. Method according to any of the previous claims, wherein the first injection is made from the side of the punch (32) so as to fill the first injection chamber (36) and to compress the insert (24) against the die (28), joining the insert (24) to the first portion (16) of the component body (12).

15. Method according to any of the claims from 7 to 14, dependent on claim 6, wherein the second injection is made directly into the second injection

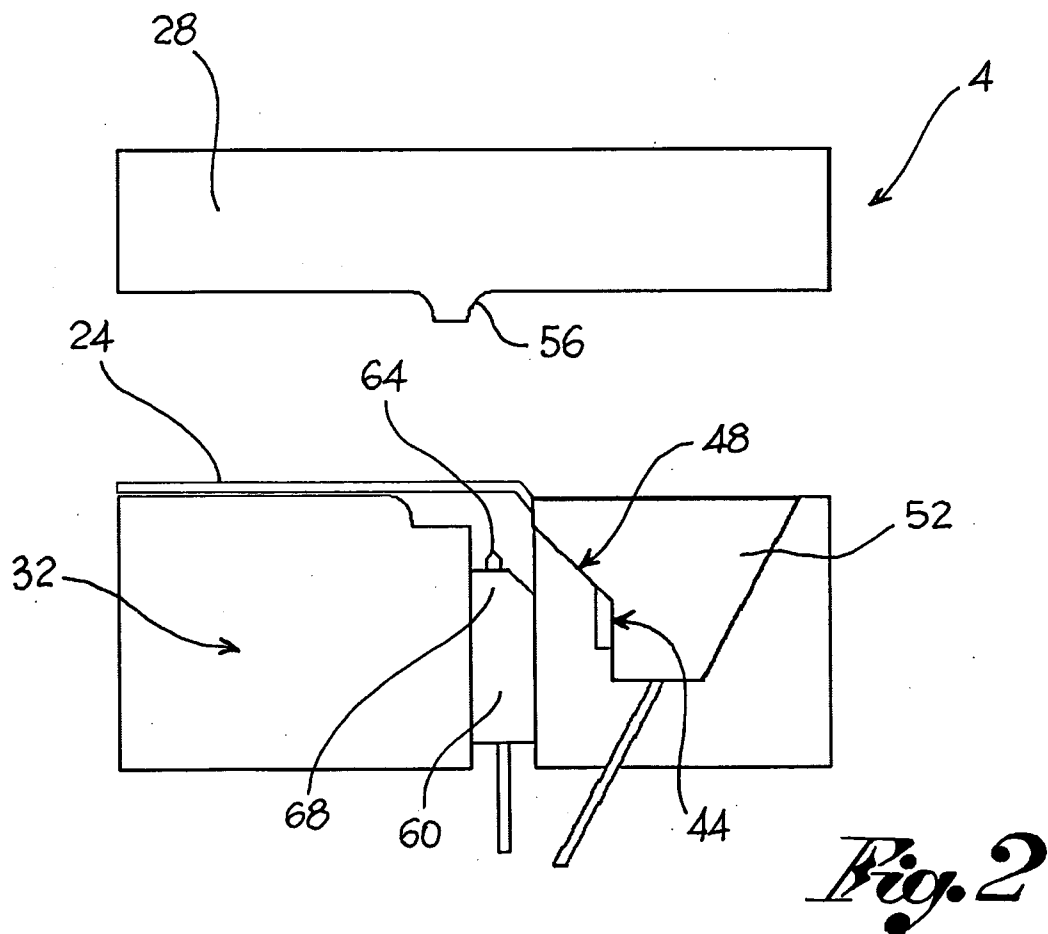
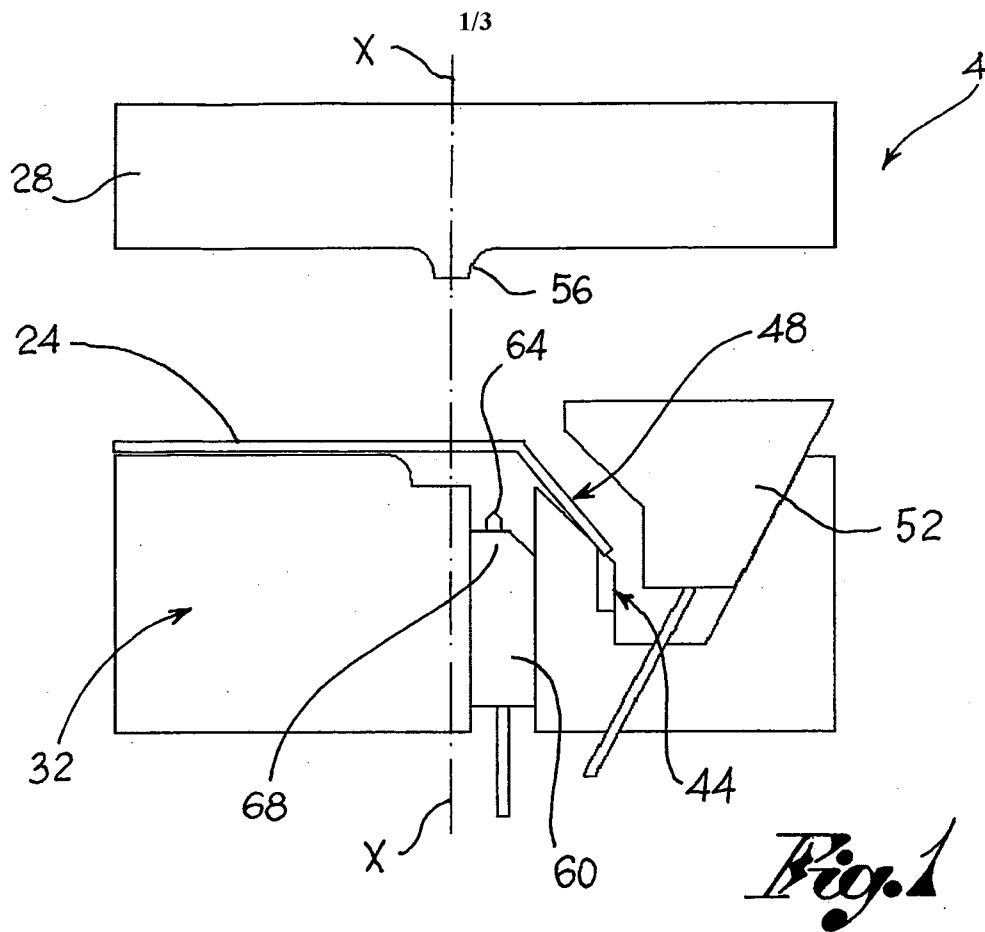
chamber (40), from the side opposite said wall (56) defining the first and the second injection chamber (36,40).

5 16. Method according to any of the previous claims, wherein following the second injection, the mould (4) is opened and the component (8) made in a single piece, comprising la first portion (16), the insert (24) and the second portion (20), is expelled from the mould.

10 17. Method according to any of the previous claims, wherein the expulsion phase of the component (8) from the mould (4) is performed by means of a block (52) which acts as a blocking element of the insert (24) in the mould (4).

15 18. Method according to any of the previous claims, wherein the first and the second injection are made by injecting plastic materials compatible with each other, so as to produce adhesion between the first and second portions (16,20) of the component
20 body (12).

19. Moulded component (8) made using a moulding method according to any of the claims from 1 to 18.



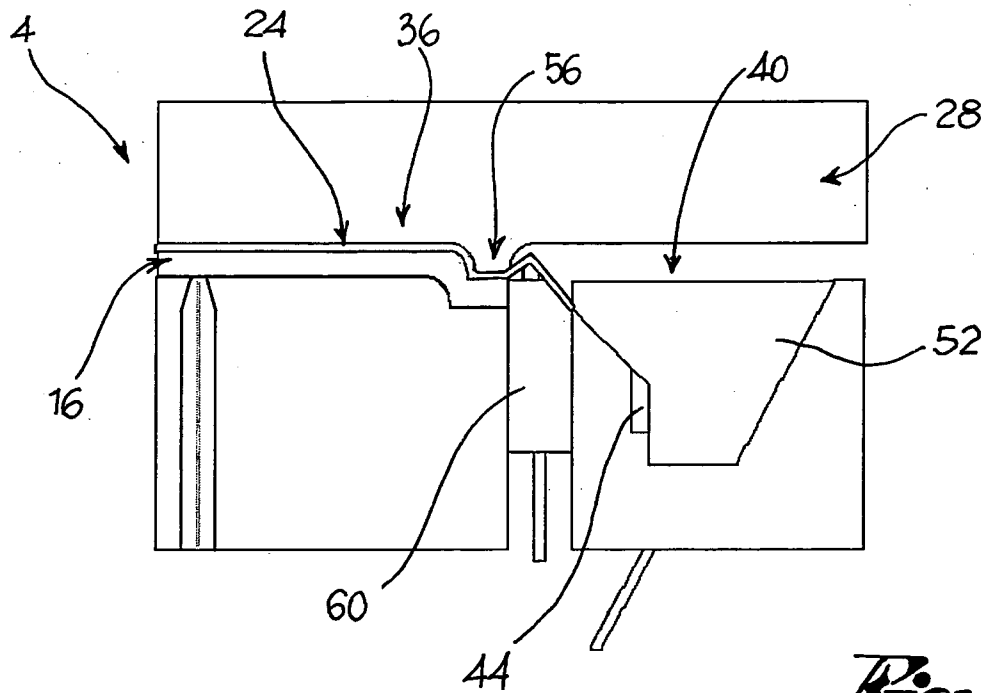


Fig. 3

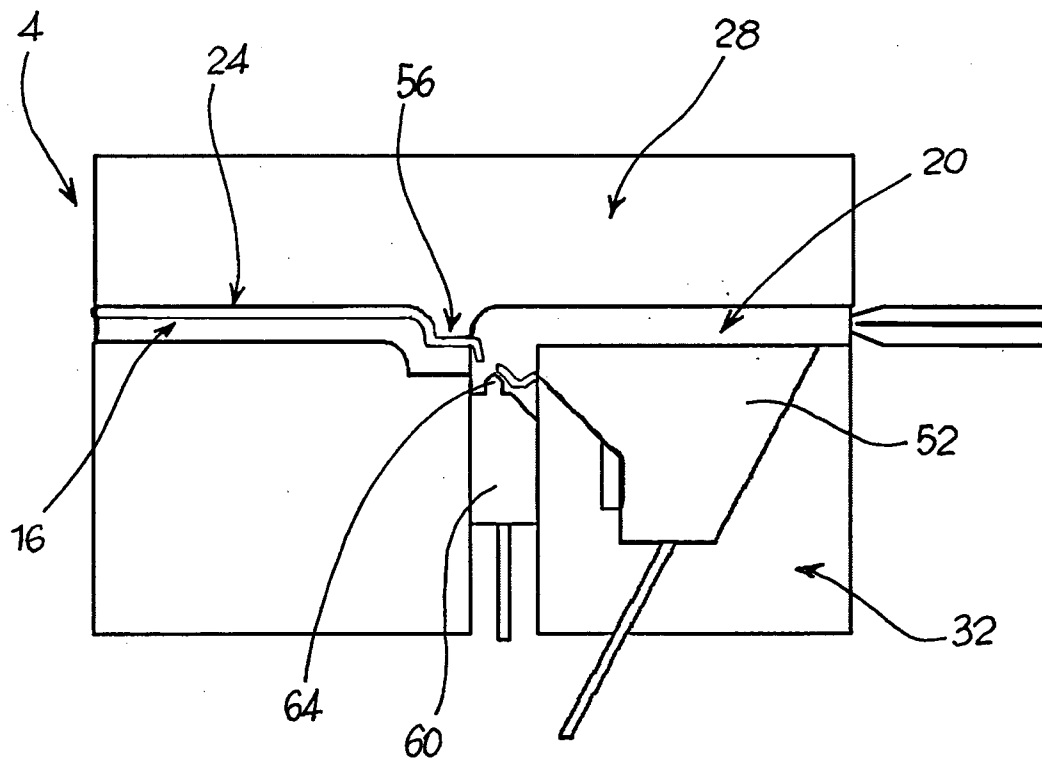


Fig. 4

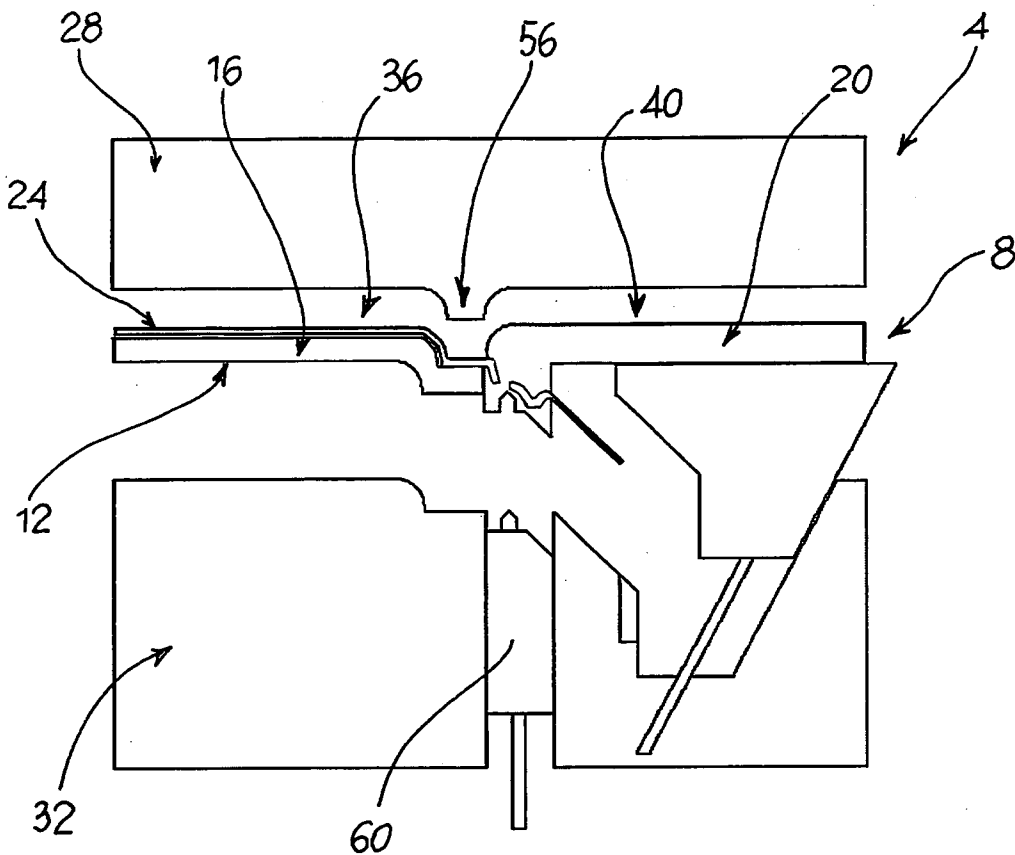


Fig. 5

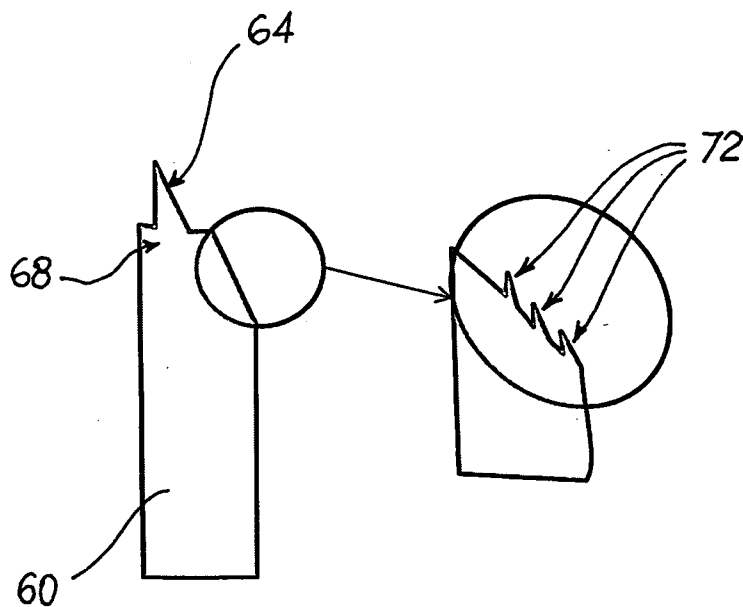


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER

INV. B29C45/16

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B29C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 751 582 A1 (ALLIBERT IND [FR]) 30 January 1998 (1998-01-30)	1-3,5-9, 12-19
Y	page 7, line 20 - page 8, line 16; figures -----	1,4
Y	JP 07 276425 A (TOYODA GOSEI KK) 24 October 1995 (1995-10-24) abstract -----	4
Y	US 6 004 497 A (BISOGNIN JULIEN [FR] ET AL) 21 December 1999 (1999-12-21) column 5, line 59 - column 6, line 14; claim 8 -----	1
A	US 6 054 087 A (NOIROT DANIEL [FR] ET AL) 25 April 2000 (2000-04-25) column 5, lines 6-12; claims; figures -----	1-19

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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