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Dr. R. Jorritsma c.s. te Den Haag.(54) **Mold and process for obtaining a bicycle frame made of recyclable polymer.**

(57) A mold and an injection process for obtaining a bicycle frame made of recyclable polymer, more specifically, it is related to a mold and an injection process for obtaining a bicycle frame from which a single-piece and polymeric bicycle frame is obtained with resistant and flexible mechanical features; said mold is made up of two complementary parts, namely: one stationary part and one movable part whereof sliding columns are provided with guiding lower portions provided in the stationery part; both the stationary part and movable part are provided with base plates and whereof respective bearing cavities plates plates are assembled and to jointly make up a structural channel so as to receive the thermal injected polymer and to obtain a bicycle frame subsequently; the cavity bearing plate in the movable part is provided with a longitudinal bed whereof the main central drawer is assembled in and is further provided with side beds whereof secondary drawers are assembled in. Said longitudinal bed is provided with peripheral tracks to allow the main drawer to slide therethrough; further, said bed is provided with drawing pins positioned in an angle so as to allow the main drawer to horizontally move on. Side beds are also provided with drawing pins for the secondary drawers.

NL C 2008187

Dit octrooi is verleend ongeacht het bijgevoegde resultaat van het onderzoek naar de stand van de techniek en schriftelijke opinie. Het octrooischrift komt overeen met de oorspronkelijk ingediende stukken.

MOLD AND PROCESS FOR OBTAINING A BICYCLE FRAME MADE OF RECYCLABLE POLYMER

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority to Brazilian Patent Application PI1100578-5 filed on
5 January 31, 2011, the entire contents of which are herein incorporated by reference.

FIELD OF INVENTION

This invention relates to a mold and process for obtaining a bicycle frame made of recyclable polymer and, more particularly, it relates to an injection mold of a type
10 having a drawer for an injection process specially designed for the manufacture of a single piece bicycle frame made with polymeric material that is particularly originated from recycled and re-used polyethylene terephthalate (PET) bottles; such bicycle frame made into a design having resistant and flexible mechanical features.

The object claimed in this invention aids in preserving the environment by the use of
15 recyclable materials.

BACKGROUND OF THE INVENTION

It is widely known that the manufacture of products made of polymers has increased very fast since polymer-made products remarkably offer a good mechanical resistance,
20 flexibility, lightness, long durability in addition to offer an option for variation in the colors used, shapes, dimensions and other particulars.

The possibility of having a plastic re-used by recycling is a basic feature to use a polymer for the manufacture of several products, notably the recycling of PET bottles that allows the manufacture of numerous products such as undershirts, solar panels,
25 brooms and so on; further, this considerably helps in the preservation of the environment and all the chain linked to the environment by reducing a considerable volume of garbage disposed into garbage dumps and by providing an improvement in the process of decomposition of organic matters, by achieving considerable savings in the use of petroleum, considerable savings in the use of electrical energy for the
30 production of a new plastic and as well by making possible to create new jobs for people in the area of recycled materials and mainly by reducing the cost of products based on recycled materials.

A few conventional methods are available for the manufacture of products based on polymers such as injection process; however, it is indispensable for a good molding process to follow some criteria, notably the mold design and the steps of the injection process and as well the mechanisms working with the mold, the site in which the injection will be done, the way of pushing out the manufactured product from the mold, the system used to assemble the product, the engraving conditions and other processing features so as to avoid additional working operations and to ensure mechanical, physical and aesthetic functions of the resulting product.

In a general aspect the molds used today for injection process are made into at least two parts. One of said parts is placed on a stationary plate and the other part is placed on a moving plate. Both parts are interconnected by columns and guiding bushes that guide the moving part so as to be jointed to the stationary part.

The alignment of both halves is crucial since it prevents any kind of plastic leakage when plastic is injected under a high pressure into the cavity whilst feeding channels are points planned between the injection channel and the cavity.

Another factor extremely crucial in the mold for plastic injection is related to how injection points are placed and provided. Injection points are also known as gate points and correspond to a point invaded by melted materials in the cavities of the mold since the cavities have a role of allowing the melted materials to flow through. Several ways of inputting materials are used such as those known as gate with restricted rectangular entry and yet an input entry shaped either as a fan or as a rim, as a restricted entry and others. Each type of injection point, e.g., a gate, is correspondent with the type of product that will be pushed out from the mold and therefore such type of end product has to do with the design of said mold.

Another crucial feature of the injection point is related to its dimension since some care must be necessarily taken with respect to the rate of and applied tension of shear force which should be the lowest possible without, however, provoking molecules or fibers to break.

The site the injection point, or also known as gate, is located is one place seldom used or never seen and the closest possible to the centre of the mold and a part of the mold which is provided with its thicker area; that is meant to say that areas that suffer intense tension or are mechanically often used should be avoided.

However, a few detailed complex molds are designed with two or more injection points which will make it unable to follow the aforesaid criteria mainly those molds that require the use of a drawer since the motion of the drawer will provoke intense friction action and tension in the injection point and a consequent degradation of materials.

5 This patent applicant has been working in the area of development of thermally molded plastic products and had filed a previous patent application related to a single-piece bicycle frame for which conventional parts that make up a bicycle, such as the saddle supporting tube, the front wheel fitting fork, the main sprocket wheel, the rear wheel and the secondary sprocket wheel were specially designed. The single-piece bicycle
10 frame of the previous patent application is integrally molded with a virgin or recycled rigid polymer and manufactured into a single piece and made of a central bar whereof identical side arms are provided. Such single-piece bicycle frame may be made with an adequate pigment color, opaque or translucent. In spite of the developments provided in such single-piece frame some difficulties remained in relation with the injection
15 process and therefore adjustments would be required as it concerns to design.

SUMMARY OF THE INVENTION

Further considering the improvement of the previous bicycle frame molding process and yet considering the use of recyclable materials in the composition of the injected
20 plastic materials this patent applicant developed a mold with its corresponding process for obtaining a recyclable polymer bicycle frame and, more specifically, an injection mold of the type provided with a drawer used in the injection process and specially designed to manufacture a single piece bicycle frame made with polymeric material specifically originated from recycled and re-used PET made bottles. Said single bicycle
25 frame is made with design configurations provided with resistant and flexible mechanical features. The object claimed in this instant claimed invention aids in the preservation of the environment since recyclable materials are employed.

The main advantage of the instant claimed invention is found in that the new functional design of the mold prevents failures to occur during the production process of said
30 bicycle frame thus also preventing the existence of worn-out parts, grippings or broken parts.

Another relevant feature of the instant claimed invention is found in that the mold allows a versatile removal of bolts, screws and drawing pins in a way to make

maintenance easier and as a consequence also making easier the serial production of the single piece bicycle frame. Further, this ensures production safety for the worker.

Another advantage is found in that at least two hundred PET bottles are used for the production of said recyclable polymer bicycle frame and this significantly offers a contribution for preservation of the environment. Further, it means an extremely reduced production cost when compared to the bicycle frames currently used.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to complement the patent application specification so as to obtain a better understanding of the features of this invention and in accordance with a preferred embodiment of the invention a set of drawings goes together whereof in an exemplified manner the working details are taught without, however, meant to limit the scope of the invention.

Figure 1 is a perspective exploded view of the mold now innovated.

Figure 2 illustrates a perspective view of an assembled mold.

Figure 3 illustrates a longitudinal section view.

Figure 4 illustrates a cross section view.

Figure 5 and 6 illustrate side views of cavities bearing plates.

Figure 7 illustrates a side view of cavities bearing plate in which the main drawer and the secondary drawers are illustrated in a exploded view.

Figure 8 illustrates a block diagram of the process for obtaining the bicycle frame, and

Figure 9 illustrates a perspective view of the resulting bicycle frame.

DETAILED DESCRIPTION OF THE INVENTION

With reference to the accompanying drawings this instant claimed invention relates to a mold and a process for obtaining a bicycle frame made of recyclable polymer, more specifically it teaches a mold (1) and a process (PO) for obtaining said mold whereof a polymeric and single-piece bicycle frame (QB) is obtained with mechanical resistant and flexible features.

In accordance with this instant claimed invention said mold (1) is made of two complementary parts. One stationary part (2) and one movable part (3) which are provided with sliding columns (3A) with guiding lower portions (2A) provided in the stationary part (2). Both stationary part (2) and movable part (3) are provided with

base plates (2b) and (3b) to assemble respective cavity bearing plates (2c) and (3c) which make up a structural channel (CE) whereof the injected thermal polymer (TI) is received and the bicycle frame (QB) is obtained subsequently.

The cavity bearing plate (3c) of the movable part (3) is provided with a longitudinal bed (3d) whereof the main central drawer (GP) is assembled and yet said cavity bearing plate is provided with side beds (3e) whereof the secondary drawers (GS) are assembled. Said longitudinal bed (3d) is provided with peripheral tracks (3f) whereof the main drawer (GP) slides through and further said longitudinal bed is provided with drawing pins (3g) which standing angle allows the main drawer (GP) to move on horizontally (MH) whilst side beds (3e) are also provided with drawing pins (3g') for secondary drawers (GS).

Said main drawer is provided with an oblong configuration (4) which side edges (4a) are surrounded by straight frames (4b) whilst a slight cut entry is provided close to the bottom edge (4c) so as to couple a locking wedge (5) provided in the cavity bearing plate (2c) of the stationary part. Said main drawer (GP) is also provided with a receiving channel (4e) to receive the injected thermal polymer (TI) and an outlet flowing channel (4f) to distribute the injected thermal polymer (TI) and subsequently to form a unique injection point (PI) on said structural channel (CE) which configuration into an "Y" makes up a central bar (LC) whereof identical side arms (RL) are originated in order to obtain a single-piece bicycle frame (QB).

The central part located amongst the arms (RL) of upper and lower cavities is aligned in relation with said central drawer (GP) whilst in the vertices of structural channel (CE) said secondary drawers (GS) are assembled in.

The process (PO) for obtaining the recyclable polymer bicycle frame (QB) is comprised of the following steps:

- a) Reception of the recycled materials such as PET bottles;
- b) Grinding the bottles so as to become a powder;
- c) Processing the powder into polymeric granules mixed with additives so as to impart protection against bad weather conditions;
- d) Injection of a thermal plastic into the innovated mold;
- e) Obtaining a bicycle frame.

The product that results from the obtaining process (PO) is a bicycle frame (QB) made as one-piece frame in a shape that is usually in the form of a "Y" and making up a

central bar (6) whereof identical side arms (6a) are originated having two tubular vertices (6b). One of tubular vertices stands horizontally (6b') and is meant to have the sprocket wheel axle (EP) assembled thereof; the other tubular vertex stands vertically (6b'') and is meant to have handlebar axle (EG) assembled thereof.

- 5 The end portions of each arm are provided with the shape of a hook (G) whereof an axle meant to engage the rear wheel (not shown) is assembled.

It is certain that when this instant claimed invention is put into practise modifications might be made as to some design and form details, however, without departing from the basic principles clearly supported by the full set of claims. Thus it is to be
10 understood that the terminology herein employed was not meant to any limit of the invention.

Conclusies

1. Vorm- en injectieproces voor het verkrijgen van een fietsframe dat is gemaakt uit recyclebaar polymeer, meer in het bijzonder heeft de uitvinding betrekking op een
 5 vorm (1) en een proces (PO) waaruit een polymeer en uit één stuk bestaand fietsframe (QB) wordt verkregen met resistente en flexibele mechanische eigenschappen; met het kenmerk, dat de vorm (1) is gemaakt van twee complementaire delen, namelijk: één stationair deel (2) en één beweegbaar deel (3) dat is voorzien van schuifstaanders (3A) met onderste geleidingsgedeelten (2A) die zijn voorzien in het stationaire deel (2);
 10 zowel stationair deel (2) als beweegbaar deel (3) zijn voorzien van basisplaten (2b) en (3b) die bedoeld zijn om respectieve holte-draagplaten (2c) en (3c) te hebben die daaruit zijn samengesteld, en derhalve gezamenlijk een constructiekanaal (CE) vormen dat is bedoeld om een geïnjecteerd thermisch polymeer (TI) en derhalve vervolgens een fietsframe (QB) te verkrijgen; een langsbed (3d) is voorzien in de holte-draagplaat van
 15 het beweegbare deel (3) dat bedoeld is om daaruit de centrale hoofdkast (GP) samen te stellen en zijbedden (3e) die zijn bedoeld om daaruit de secundaire kasten (GS) samen te stellen, waarbij het langsbed (3d) is voorzien van randsporen (3f) zodat de hoofdkast (GP) daar doorheen schuift en verder is voorzien van trekpenen (3g) die zijn gepositioneerd onder een hoek die het voor de hoofdkast (GP) mogelijk maakt om
 20 horizontaal (MH) te bewegen; en de zijbedden (3e) ook zijn voorzien van trekpenen (3g') voor de secundaire kasten (GS).

2. Vorm- en injectieproces voor het verkrijgen van een fietsframe dat is gemaakt van recyclebaar polymeer overeenkomstig de voorgaande conclusie, met het kenmerk,
 25 dat de hoofdkast (GP) is gemaakt uit een rechthoekig stuk (4) waarvan de zijranden (4a) zijn omgeven door rechte framestroken (4b) terwijl de onderrand is voorzien van een uitsnijding (4d) waarmee een wig (5) in ingrijping kan komen die is voorzien in de holte-draagplaat (2c) van het stationaire deel (2); verder is de hoofdkast (GP) voorzien van een opneemkanaal (4e) om zo een geïnjecteerd thermisch polymeer (TI) op te
 30 nemen en is ook voorzien van een uitlaatstromingskanaal (4f) voor het verdelen van een geïnjecteerd polymeer (TI) en vervolgens voor het ontwikkelen van een uniek injectiepunt (PI) in het constructiekanaal (CE), welke vorm in een "Y" een centrale stang (LC) vormt waaruit identieke zijarmen (RL) voortkomen om zo een uit één stuk

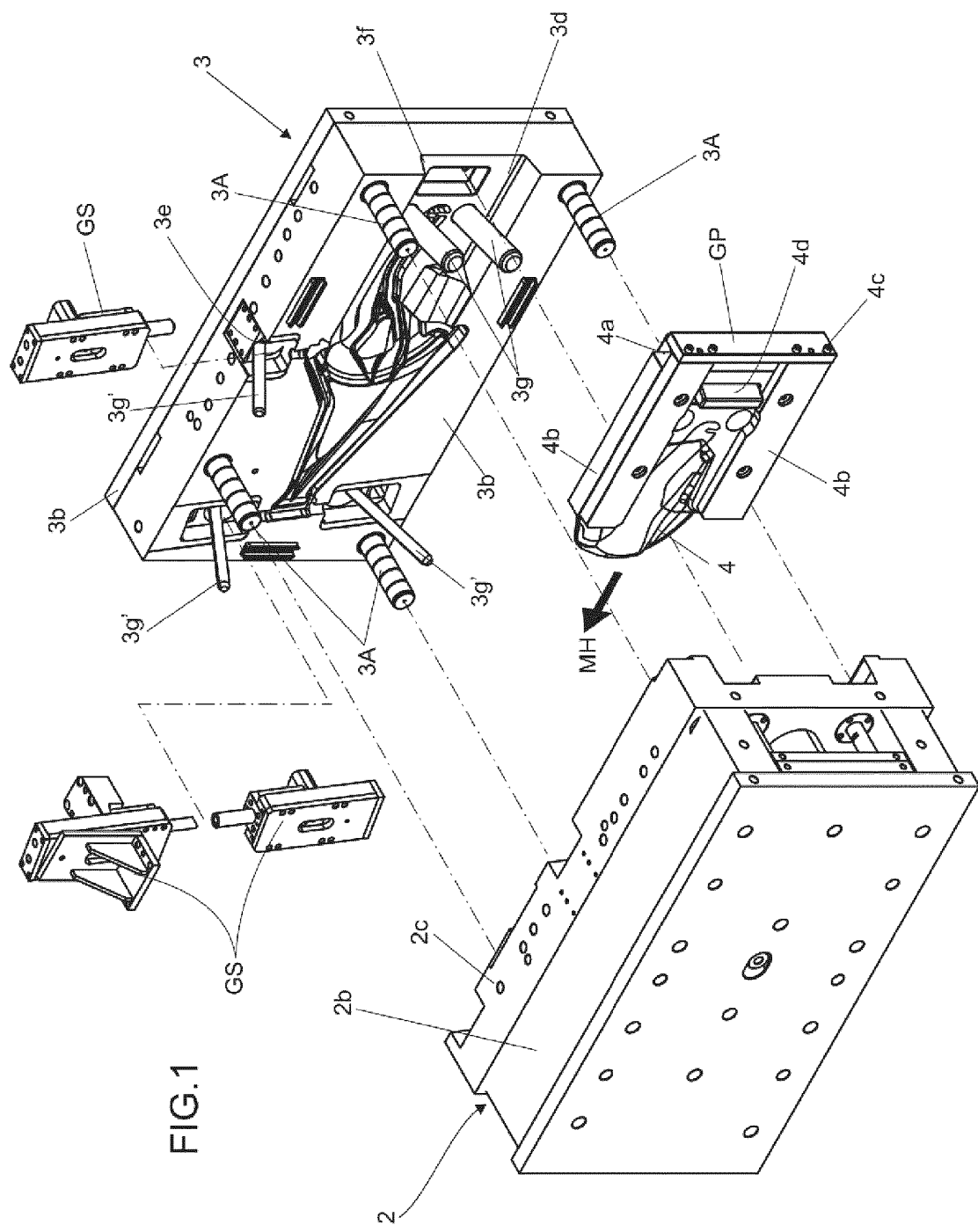
bestaand fietsframe (QB) te verkrijgen; een middengedeelte tussen armen (RL) in de boven- en onderholten wordt uitgelijnd met de centrale kast (GP) terwijl de secundaire kasten (GS) worden gemonteerd in de toppen van constructiekanaal (CE).

5 3. Injectieproces voor het verkrijgen van een fietsframe overeenkomstig conclusie 1, met het kenmerk, dat het proces voor het verkrijgen (PO) van een recyclebaar polymeer fietsframe (QB) bestaat uit de volgende stappen:

- a) opname van de gerecyclede materialen zoals PET-flessen;
- b) malen van de flessen om zo een poeder te worden;
- 10 c) verwerken van het poeder tot polymeer korrels vermengd met toevoegsels om zo bescherming tegen slechte weersomstandigheden te bieden;
- d) injectie van een thermische kunststof in de vernieuwde vorm;
- e) verkrijgen van een fietsframe.

15 4. Recyclebaar polymeer fietsframe overeenkomstig de voorgaande conclusies, met het kenmerk, dat het fietsframe gewoonlijk “Y”-vormig is en is gevormd uit één stuk zodat een centrale stang (6) ontstaat waaruit identieke zijarmen (6a) voortkomen en twee buisvormige toppen (6b) vormen; één buisvormige horizontale top (6b’) waarin een tandwielas (EP) is gemonteerd en een andere buisvormige top-as waarin de

20 stuurstang-as (EG) is gemonteerd; eindranden van elke arm zijn voorzien van een haakvorm (G) waarin een achterwiel-draagas (EX) grijpt.



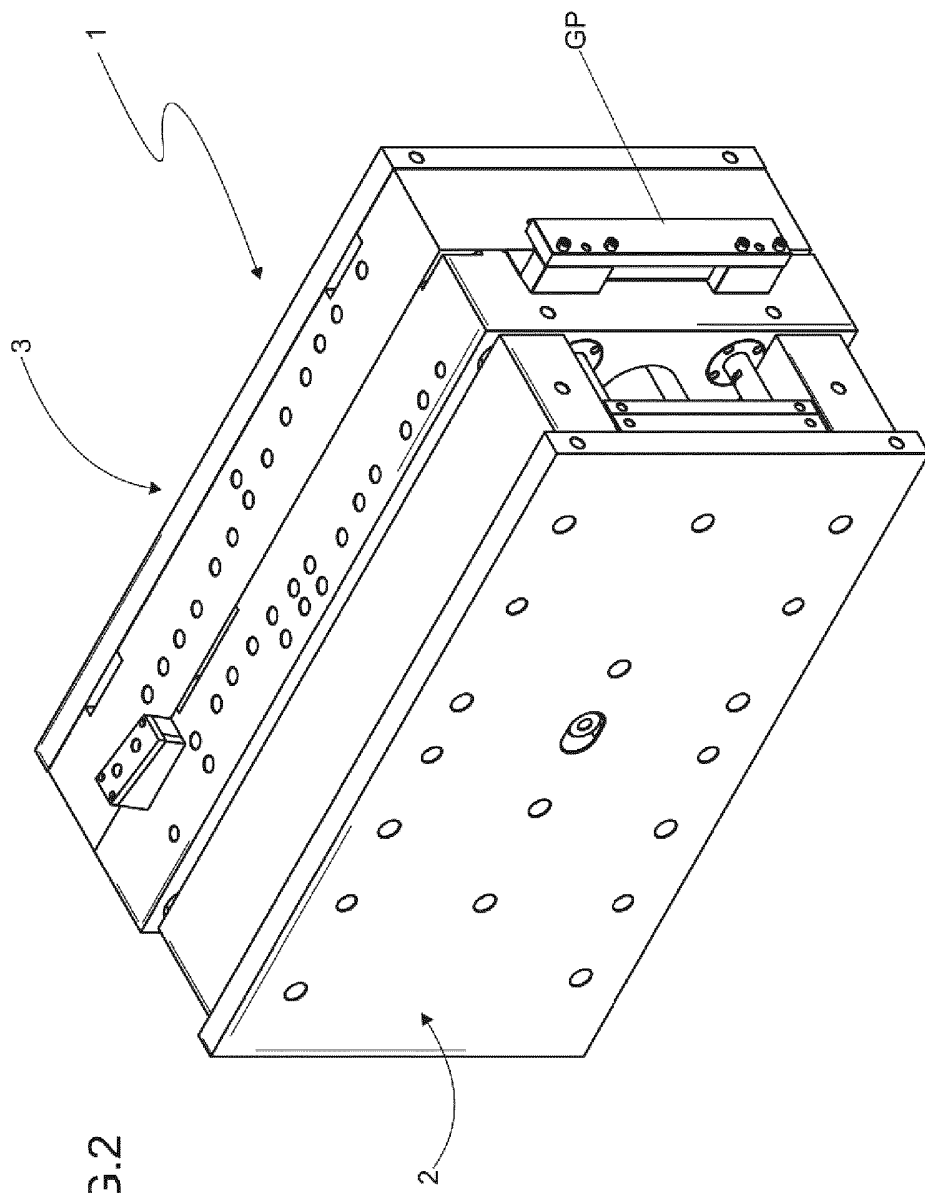


FIG.2

FIG.3

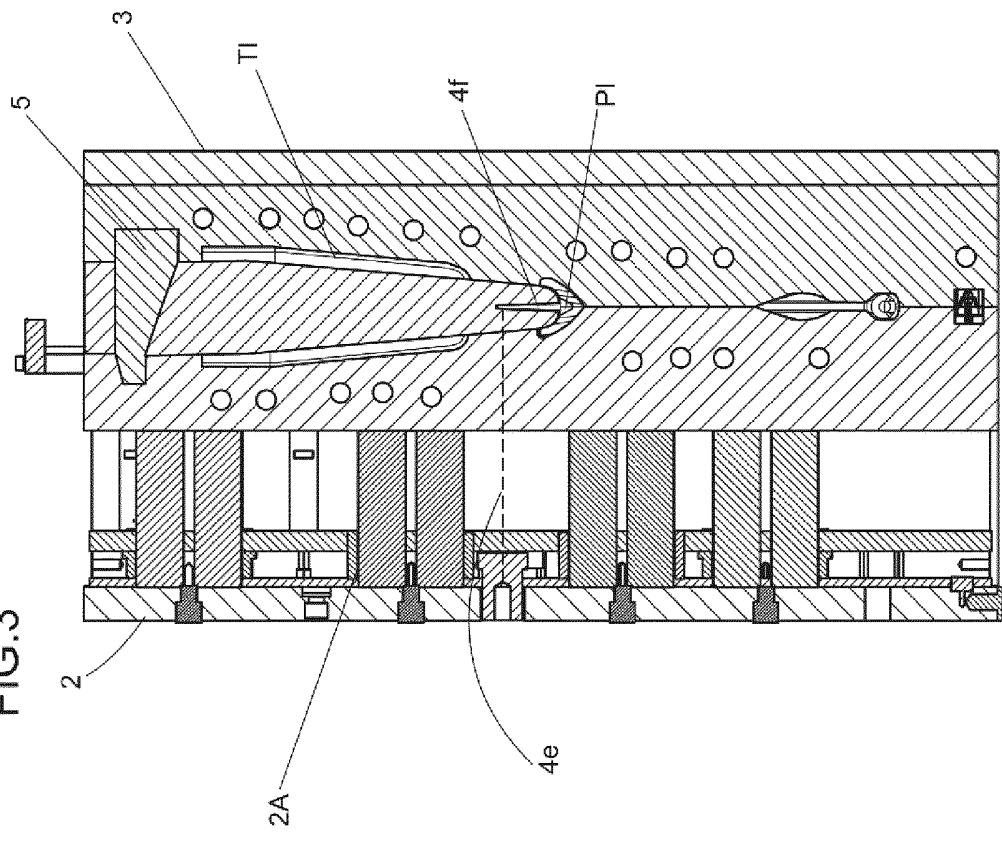


FIG.4

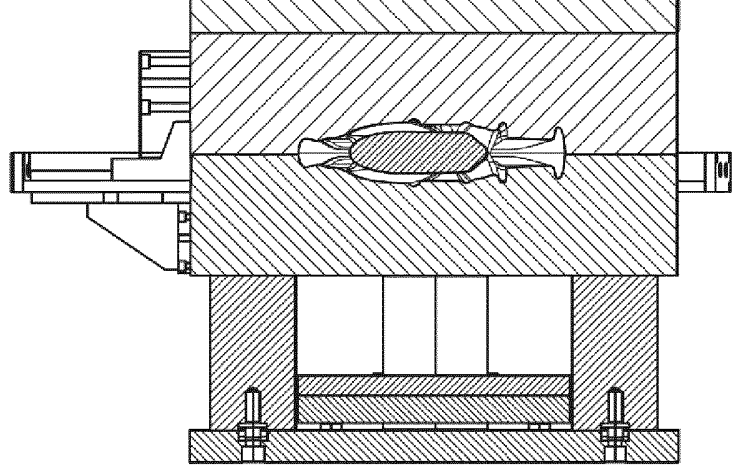


FIG.6

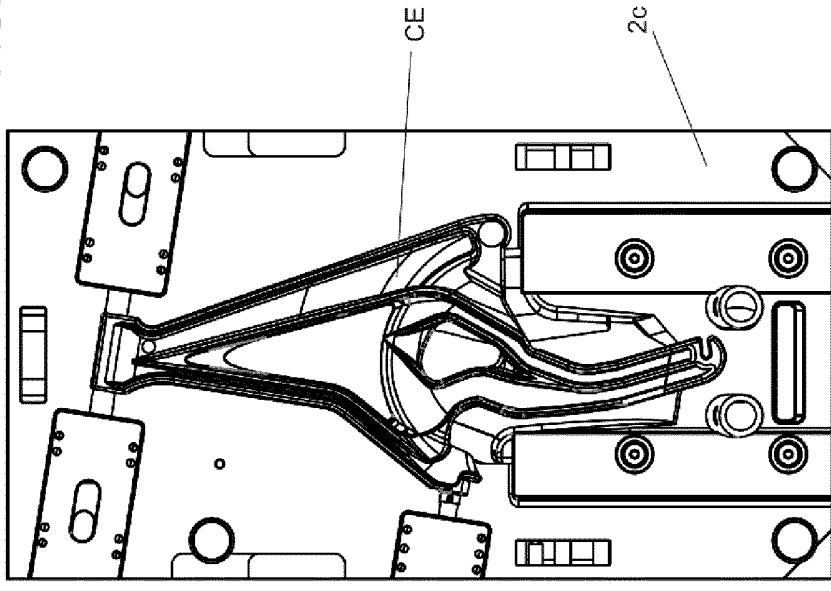
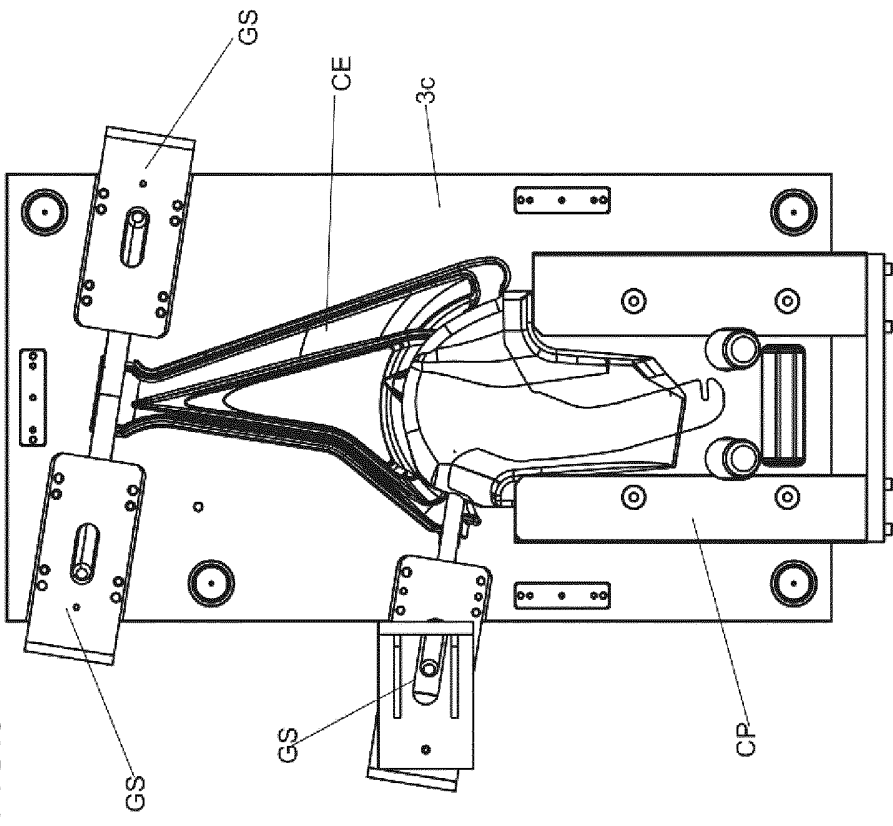


FIG.5



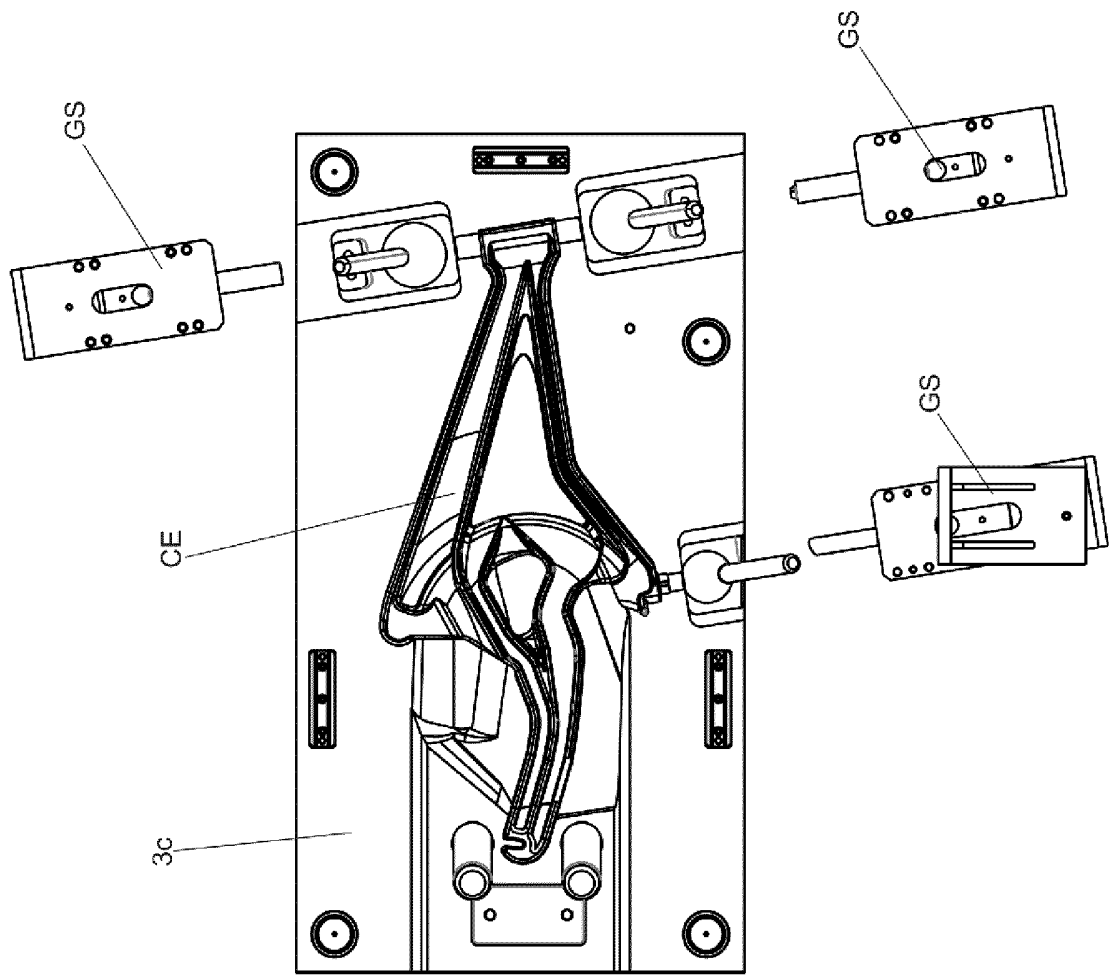


FIG. 7

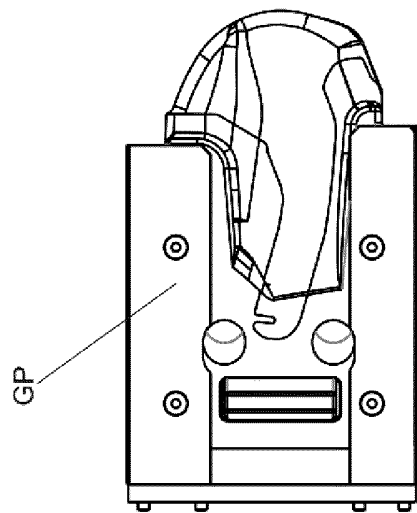


FIG.8

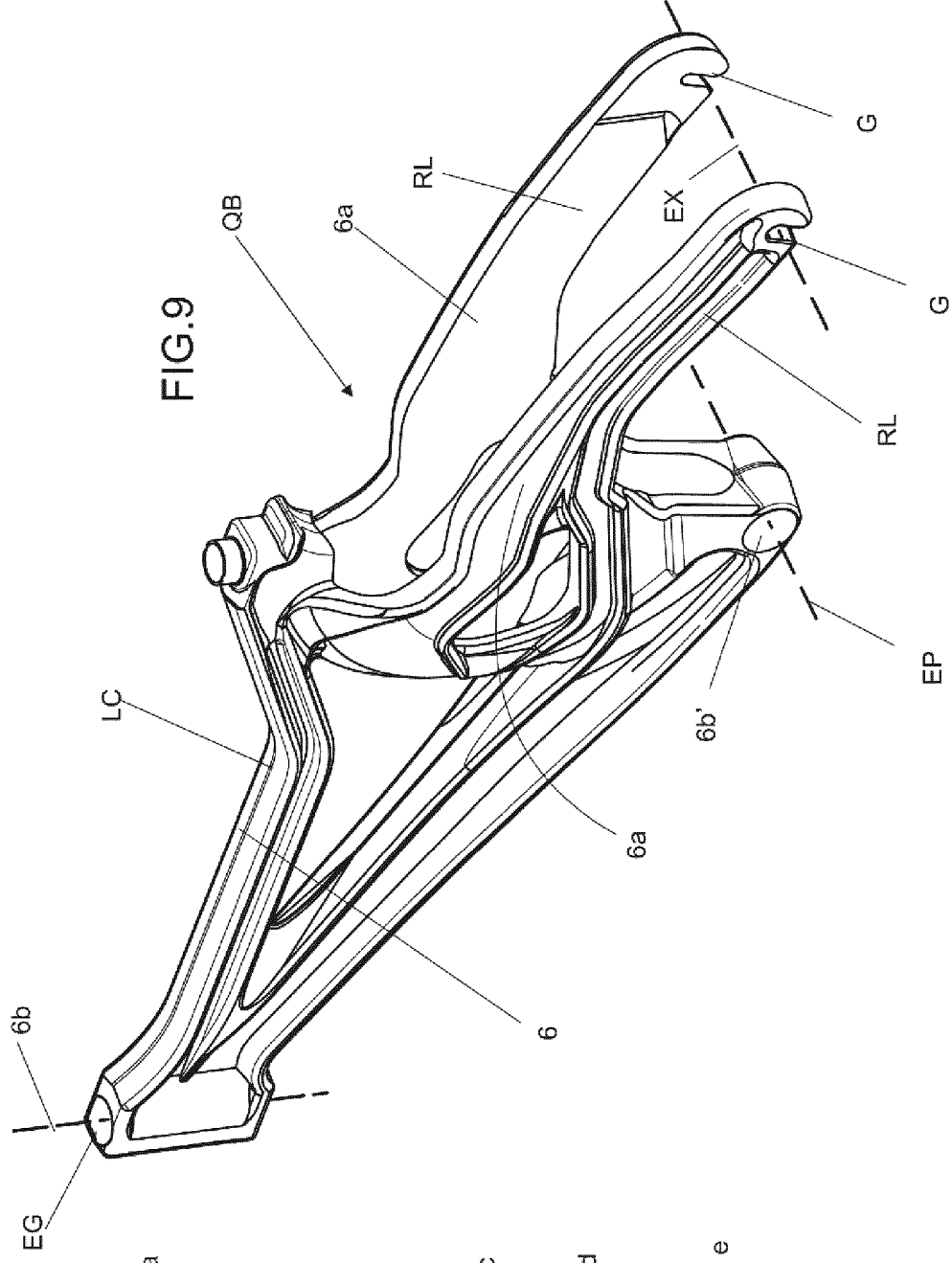
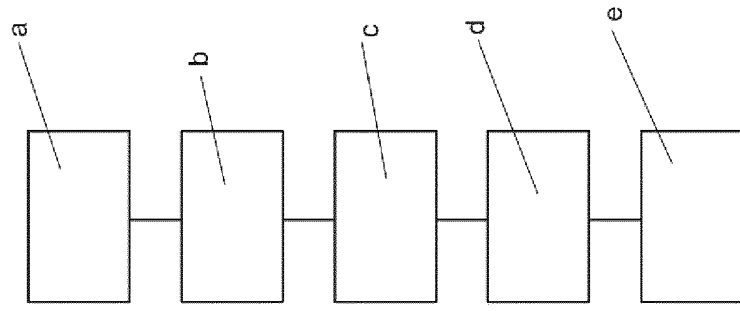


FIG.9



ONDERZOEKSRAPPORT

BETREFFENDE HET RESULTAAT VAN HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK

RELEVANTE LITERATUUR			
Categorie ¹	Literatuur met, voor zover nodig, aanduiding van speciaal van belang zijnde tekstgedeelten of figuren.	Van belang voor conclusie(s) nr.	Classificatie (IPC)
X	US 5 456 481 A (ALLSOP JAMES D [US] ET AL) 10 oktober 1995 (1995-10-10)	4	INV. B29C45/33 B62K19/16
Y	* kolom 12, regels 7-9; figuren 21,22 * * zin 60, alinea 12 - zin 64 * * kolom 11, regel 30 - regel 53 * -----	1,3	
X	US 5 533 742 A (PEART STEPHEN [US]) 9 juli 1996 (1996-07-09)	4	
Y	* kolom 1, regel 33; conclusie 1; figuren 2,3 * * kolom 2, regel 56 - regel 57 * -----	1,3	
X	US 2003/141694 A1 (DE OLIVEIRA JOAQUIM MATIAS [BR]) 31 juli 2003 (2003-07-31)	4	
Y	* alinea's [0001], [0016]; conclusie 2; figuren 2-4 * -----	1,3	Onderzochte gebieden van de techniek B29C B62K
X	US 6 086 081 A (HUANG WAN TZU [TW]) 11 juli 2000 (2000-07-11)	4	
Y	* kolom 2, regel 2 - regels 6,14-17,42-45; figuren 2-4 * -----	1	
Y	EP 1 084 812 A2 (VIV ENGINEERING INC [JP]) 21 maart 2001 (2001-03-21)	1	
A	* figuren 1,2,4 * -----	2	
Y	US 4 765 585 A (WIEDER KLAUS A [US]) 23 augustus 1988 (1988-08-23)	1	
A	* figuur 1, * -----	2	
		-/--	
Indien gewijzigde conclusies zijn ingediend, heeft dit rapport betrekking op de conclusies ingediend op:			
Plaats van onderzoek: München		Datum waarop het onderzoek werd voltooid: 27 november 2012	Bevoegd ambtenaar: Mans, Peter
¹ CATEGORIE VAN DE VERMELDE LITERATUUR			
X: de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur Y: de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht A: niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft O: niet-schriftelijke stand van de techniek P: tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur T: na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding E: eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven D: in de octrooiaanvraag vermeld L: om andere redenen vermelde literatuur &: lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie			

RELEVANTE LITERATUUR		
Categorie ¹	Literatuur met, voor zover nodig, aanduiding van speciaal van belang zijnde tekstgedeelten of figuren.	Van belang voor conclusie(s) nr.
Y	WO 03/102456 A1 (PHILMAC PTY LTD [AU]; CHELCHOWSKI DAVID [AU]; PUCKETT GEOFFREY B [AU]) 11 december 2003 (2003-12-11)	1
A	* figuur 4 *	2
Y	US 4 515 342 A (BOSKOVIC BORISLAV [US]) 7 mei 1985 (1985-05-07)	1
A	* figuren 1,2 *	2
Y	US 5 234 329 A (VANDENBERG LEO A [US]) 10 augustus 1993 (1993-08-10)	1
A	* figuren 4,5 *	2
Y	WO 2005/095084 A1 (DME CO [US]) 13 oktober 2005 (2005-10-13)	1
A	* figuren 1,2 *	3
Y	WO 01/32393 A1 (DME CO [US]) 10 mei 2001 (2001-05-10)	1
A	* figuren 1,2 *	2
Y	DE 35 26 637 C1 (CORONET KUNSTSTOFFWERK GMBH) 11 december 1986 (1986-12-11)	1
A	* figuren 1-3,9-11 *	2
Y	US 4 588 095 A (MEHRA RAVINDER C [US]) 13 mei 1986 (1986-05-13)	3
A	* figuren 1,7-9 *	1,2
Y	US 2005/035571 A1 (HUCK KEITH ALLEN [US]) 17 februari 2005 (2005-02-17)	3
	* alinea [0038]; figuur 1 *	
E	US 2012/098232 A1 (CALABRESSE MUZZI JUAN CARLOS [BR]) 26 april 2012 (2012-04-26)	3,4
	* alinea [0046]; figuren 1-4 *	
	* alinea [0040], [0047] *	
X,P	US 2011/133427 A1 (BASHAN TSAFRIR [IL] ET AL) 9 juni 2011 (2011-06-09)	3,4
	* alinea [0025], [0026], [0028]; conclusie 17 *	

2

EOB FORM 02.83 (P0414C)

CATEGORIE VAN DE VERMELDE LITERATUUR

X: de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur
Y: de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht
A: niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft
O: niet-schriftelijke stand van de techniek
P: tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

T: na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding
E: eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven
D: in de octrooiaanvraag vermeld
L: om andere redenen vermelde literatuur
&: lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

**AANHANGSEL BEHORENDE BIJ HET RAPPORT BETREFFENDE
HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK,
UITGEVOERD IN DE OCTROOIAANVRAGE NR.**

NO 138154
NL 2008187

Het aanhangsel bevat een opgave van elders gepubliceerde octrooiaanvragen of octrooien (zogenaamde leden van dezelfde octrooifamilie), die overeenkomen met octrooischriften genoemd in het rapport.

De opgave is samengesteld aan de hand van gegevens uit het computerbestand van het Europees Octrooibureau per
De juistheid en volledigheid van deze opgave wordt noch door het Europees Octrooibureau, noch door het Bureau voor de Industriële eigendom gegarandeerd; de gegevens worden verstrekt voor informatiedoeleinden.

27-11-2012

In het rapport genoemd octrooigeschrift		Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
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**AANHANGSEL BEHORENDE BIJ HET RAPPORT BETREFFENDE
HET ONDERZOEK NAAR DE STAND VAN DE TECHNIEK,
UITGEVOERD IN DE OCTROOIAANVRAGE NR.**

NO 138154
NL 2008187

Het aanhangsel bevat een opgave van elders gepubliceerde octrooiaanvragen of octrooien (zogenaamde leden van dezelfde octroofamilie), die overeenkomen met octrooischriften genoemd in het rapport.
De opgave is samengesteld aan de hand van gegevens uit het computerbestand van het Europees Octrooibureau per
De juistheid en volledigheid van deze opgave wordt noch door het Europees Octrooibureau, noch door het Bureau voor de Industriële eigendom gegarandeerd; de gegevens worden verstrekt voor informatiedoeleinden.

27-11-2012

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Agentschap NL
Ministerie van Economische Zaken,
Landbouw en Innovatie

SCHRIFTELIJKE OPINIE

DOSSIER NUMMER NO138154	INDIENINGSDATUM 26.01.2012	VOORRANGSDATUM 31.01.2011	AANVRAAGNUMMER NL2008187
CLASSIFICATIE INV. B29C45/33 B62K19/16			
AANVRAGER Muzzi			

Deze schriftelijke opinie bevat een toelichting op de volgende onderdelen:

- ☒ Onderdeel I Basis van de schriftelijke opinie
- ☐ Onderdeel II Voorrang
- ☐ Onderdeel III Vaststelling nieuwheid, inventiviteit en industriële toepasbaarheid niet mogelijk
- ☐ Onderdeel IV De aanvraag heeft betrekking op meer dan één uitvinding
- ☒ Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid
- ☐ Onderdeel VI Andere geciteerde documenten
- ☐ Onderdeel VII Overige gebreken
- ☐ Onderdeel VIII Overige opmerkingen

	DE BEVOEGDE AMBTENAAR Mans, Peter
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SCHRIFTELIJKE OPINIE

Aanvraag nr.:

NL2008187

Onderdeel I Basis van de Schriftelijke Opinie

1. Deze schriftelijke opinie is opgesteld op basis van de meest recente conclusies ingediend voor aanvang van het onderzoek.
2. Met betrekking tot **nucleotide en/of aminozuur sequenties** die genoemd worden in de aanvraag en relevant zijn voor de uitvinding zoals beschreven in de conclusies, is dit onderzoek gedaan op basis van:
 - a. type materiaal:
 - ☐ sequentie opsomming
 - ☐ tabel met betrekking tot de sequentie lijst
 - b. vorm van het materiaal:
 - ☐ op papier
 - ☐ in elektronische vorm
 - c. moment van indiening/aanlevering:
 - ☐ opgenomen in de aanvraag zoals ingediend
 - ☐ samen met de aanvraag elektronisch ingediend
 - ☐ later aangeleverd voor het onderzoek
3. ☐ In geval er meer dan één versie of kopie van een sequentie opsomming of tabel met betrekking op een sequentie is ingediend of aangeleverd, zijn de benodigde verklaringen ingediend dat de informatie in de latere of additionele kopieën identiek is aan de aanvraag zoals ingediend of niet meer informatie bevatten dan de aanvraag zoals oorspronkelijk werd ingediend.
4. Overige opmerkingen:

SCHRIFTELIJKE OPINIE

Aanvraag nr.:
NL2008187

Onderdeel V Gemotiveerde verklaring ten aanzien van nieuwheid, inventiviteit en industriële toepasbaarheid

1. Verklaring

Nieuwheid	Ja: Conclusies 1-3 Nee: Conclusies 4
Inventiviteit	Ja: Conclusies 2 Nee: Conclusies 1, 3, 4
Industriële toepasbaarheid	Ja: Conclusies 1-4 Nee: Conclusies

2. Citaties en toelichting:

Zie aparte bladzijde

Re Item V

Reasoned statement with regard to clarity, novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 STATE OF THE ART

Reference is made to the following documents:

- D1 US 5 456 481 A (ALLSOP JAMES D [US] ET AL) 10 oktober 1995
- D2 US 5 533 742 A (PEART STEPHEN [US]) 9 juli 1996 (1996-07-09)
- D3 US 2003/141694 A1 (DE OLIVEIRA JOAQUIM MATIAS [BR]) 31 juli 2003
- D4 US 6 086 081 A (HUANG WAN TZU [TW]) 11 juli 2000 (2000-07-11)
- D5 EP 1 084 812 A2 (VIV ENGINEERING INC [JP]) 21 maart 2001
- D6 US 4 765 585 A (WIEDER KLAUS A [US]) 23 augustus 1988
- D7 WO 03/102456 A1 (PHILMAC PTY LTD [AU]; CHELCHOWSKI DAVID [AU]; PUCKETT GEOFFREY B [AU]) 11 december 2003 (2003-12-11)
- D8 US 4 515 342 A (BOSKOVIC BORISLAV [US]) 7 mei 1985 (1985-05-07)
- D9 US 5 234 329 A (VANDENBERG LEO A [US]) 10 augustus 1993
- D10 WO 2005/095084 A1 (DME CO [US]) 13 oktober 2005 (2005-10-13)
- D11 WO 01/32393 A1 (DME CO [US]) 10 mei 2001 (2001-05-10)
- D12 DE 35 26 637 C1 (CORONET KUNSTSTOFFWERK GMBH) 11 dec 1986
- D13 US 4 588 095 A (MEHRA RAVINDER C [US]) 13 mei 1986 (1986-05-13)
- D14 US 2005/035571 A1 (HUCK KEITH ALLEN [US]) 17 februari 2005
- D15 US 2012/098232 A1 (CALABRESSE MUZZI JUAN CARLOS [BR]) 26 april 2012 (2012-04-26)
- D16 US 2011/133427 A1 (BASHAN TSAFRIR [IL] ET AL) 9 juni 2011

2 CLARITY

The claims 1 to 4 lack clarity.

- Claims 1 and 2 are not clear because these claims relate to a method claim as well as an apparatus claim.
- If claims 1 and 2 are read as a method claim, they are unclear since the method is only defined by features which belong into the category of an apparatus claim.
- Claim 3 is not clear since it refers back to a bicycle frame, which is not subject of claims 1 and 2, which related to a method or an apparatus respectively.
- In addition the method of claim 3 is missing essential/ special technical features, i.e. steps between step d) and e).
- Claim 4 is not clear since it refers back to a bicycle frame, which is not subject of claims 1, 2 and 3, which related to a method and/or an apparatus respectively.

3 Novelty and inventiveness

Despite the above stated objection under clarity and as far as the application is understood from the description and the drawings, the following opinion is given for

3.1 Independent claim 1

The following opinion is given for independent claim 1 if read as an apparatus claim.

Note : Documents D1 to D4 and D15 disclose implicitly the mold of claim 1, because all these documents deal with the claimed product to be obtained, i.e. a single-piece bicycle frame with a Y-frame shape manufactured in an injection moulding process.

Because the frame has a Y-shape, i.e. has an undercut, it can only be manufactured with a mould having a core, which is removable with the injection moulded frame, see D1, column 12, lines 60 to 67.

Bearing this objective in mind, the skilled person is looking for an injection mold able to produce a Y-shaped product.

Documents D8 to D12 disclose such a mold with a transversely retractable core. Document D5 discloses this type of mold for a U-shaped product with an additional side-tube connection, while documents D6 and D7 disclose this for a full-hollow straight product.

In documents D5 to D11 the core is /the cores are retracted at the same time while the movable mold part is opened using one diagonal cam pin or several respectively.

In document D12 the core is retracted transversally after the mold has been opened, thus no complicated cam pin has to be used but only a retracting cylinder (13) mounted to the outside of one mould plate (8), see figures 8 to 11.

D13 discloses in one mold both solutions to retract transversely a core from an undercut product.

3.1.1

In particular D8 discloses in figures 1 and 2 - as well as D9 in figures 4 and 5 respectively -, a mold from which a single-piece product with an undercut having a Y-shape can be obtained.

In D8, figures 1 and 2, the mold (10) is made of two complementary parts, namely: one stationary part (12) and one movable part (14),

the movable part is provided with sliding columns (i.e. aligning pins, not shown) which slide in guiding lower portions (i.e. receiving slots, not shown) provided in the stationary part;

both stationary part and movable part are provided with base plates (not indexed) meant to have respective cavity bearing plates (not indexed, parts fixed to 12 and 14) assembled thereof which jointly forming a structural channel (i.e. the cavity, not indexed) meant to receive an injected thermal polymer - and thus subsequently obtaining a molded product (22),

a longitudinal bed (i.e. main depression slot, for slide 16) is provided in the cavity bearing plate of the stationary part meant to have the main central drawer (i.e. the slider 16 plus the core 18) assembled thereof ,

said longitudinal bed is provided with peripheral tracks (guiding grooves, 59, dotted line, see figure 5 and 9), so that the main central drawer slides therethrough and further is provided with drawing pins (24) positioned in an angle that allows the main drawer to move on horizontally, and

The mold of the application differs from the mold in D8 (or D9 respectively) only in that the cavity is designed to obtaining a single-piece bicycle frame. Due to the fact that it is a bicycle frame, the mold has two additional side beds (i.e. small depression slot) which are also provided with drawing pins for the secondary drawers, which are the cores for the cylinders of the later to be assembled fork rod and saddle bar respectively.

A mold of this type with more than one drawer is disclosed in documents D5 to D7.

To use the concept of these type of molds (i.e. for products with undercuts, wherein the cores slide horizontally to the opening direction) for the production of the already existing single-piece bicycle frame with a Y-frame shape, manufactured in a injection moulding process, can not be regarded as involving an inventive step for the skilled person in the art.

3.1.2

Starting from D5, the same can be stated: the mold is made of two complementary parts, namely:

one stationary part (20) and one movable part (21), while one which is provided with four sliding columns (i.e. aligning pins, not indexed in Figure 2) with four guiding lower portions (i.e. receiving slots, not indexed) provided in the stationary part;

both stationary part (20) and movable part (21) are provided with base plates (not indexed) meant to have respective cavity bearing plates (20,21) and () assembled thereof which jointly forming a structural channel (i.e. the cavity 22) meant to receive an injected thermal polymer - and thus subsequently obtaining a molded product (1);

a longitudinal bed (i.e. main depression slot, 23) is provided in the cavity bearing plate of the movable part meant to have the main central drawer (i.e. slide 26 plus core 27) assembled thereof and side beds (i.e. small depression slot, 25, 24) meant to have the secondary drawers (i.e. mandrels, 33, 31) assembled thereof, and

said longitudinal bed is provided with peripheral tracks (guiding grooves, dotted lines in figure 2), so that the main drawer (26) slides therethrough and further is provided with drawing pins (38) positioned in an angle that allows the main drawer to move on horizontally, and

the side beds (i.e. small depression slot, 25, 24) are also provided with drawing pins (40,39) for the secondary drawers (i.e. mandrels, 33, 31).

The mold of the application differs from the mold of D5 only in that the cavity is not a Y-shaped tube, but designed to obtaining a Y-shaped, full-body, single-piece bicycle frame. Thus one of the side beds and its drawer is positioned at a different place due to the shape of the cavity, i.e. the bicycle frame. The function of the slides to release an undercut is the same.

Due to the fact that it is a bicycle frame, the two side beds with its respective secondary drawers are designed to create the cores for the cylinders of the later to be assembled fork rod and saddle bar respectively.

Again, to use the concept of this type of molds (i.e. for injection moulding of products with undercuts, wherein the cores slide horizontally to the opening direction) for the production of the already existing single-piece, not hollow bicycle frame with a Y-frame shape - manufactured in a injection moulding process - can not be regarded as involving an inventive step for the skilled person in the art.

3.2 Dependent claim 2 is new and inventive

Dependent claim 2 does contain features which, in combination with the features of independent claim 2, meet the requirements of an inventive step.

The documents D5 in figure 2, D8 in figure 5 and D12 in figures 8 to 11 discloses that the main drawer (i.e. the removable undercut forming core) of the application is in the shape of an oblong piece with side edges (not indexed) which are surrounded by straight frame strips (dotted lines)

D12 discloses that the bottom lower edge of the main drawer (11) is provided with a cut (not indexed) to engage a wedge (22) provided in the cavity bearing plate (8) of the stationary part.

None of the documents disclose that the main drawer is provided with a receiving channel so as to receive an injected thermoplastic polymer and also provided with an outlet flowing channel to distribute the injected polymer and subsequently to develop an unique injection point in the structural channel (i.e. the cavity) which is shape into a "Y" and makes up a central bar from whereof identical side arms are originated so as to obtain a one-piece bicycle frame;

a central portion amongst arms in the upper and lower cavities is aligned with said central drawer whilst the secondary drawers are assembled in the vertices of the structural channel.

To inject the material through the core to achieve a uniform melt distribution with equally long flow ways and as few merge lines as possible, is not disclosed in the prior art.

3.3 Independent claim 3 is not inventive.

3.3.1 With respect to document D15 the following statement is given:

Document D15 discloses in paragraph [46] an injection process for obtaining a bicycle frame, wherein said process for obtaining a recyclable polymer bicycle frame, made from recycled PET, comprises the steps of:

- a) Reception, i.e providing of recycled PET material,
[optional: such as from PET bottles];
- d) Injection of a thermal plastic (i.e. the recycled thermoplastic material) into a mold;
- e) Obtaining a bicycle frame, made from a recyclable/recycled PET polymer.

The application differs from the cited prior art only in the steps of the preparation of the material to be injected, i.e.

- b) Grinding the PET - provided in the shape of bottles - so as to become powder;
- c) Processing the powder into polymeric granules while mixing additives so as to impart protection against bad weather conditions;

To blend / modify the polymeric material with additives - either colors (D14, D15), blow agent (D2), fibers (D1), high impact polymers/additives, various fillers or any kind of specific additive (D14) - is known to the man skilled in the art, see documents D1, D2, D14 or D15.

The feature that the injection moulding material is made from recycled PET - which is derived from bottles - can be regarded as a known option for the skilled person in the field of recycling of plastic material.

Thus the subject-matter of claim 3 is considered as not involving an inventive step.

3.3.2 With respect to the Document D16, paragraph [25] as well as D1 to D4, the following statement is given:

These documents disclose an injection process for obtaining a single-piece bicycle frame, wherein said process for obtaining a recyclable polymer bicycle frame comprises the steps of:

- d) Injection of a thermal plastic (i.e. a thermoplastic material) into a mold; and
- e) Obtaining a bicycle frame, made from a recyclable PET polymer.

The application differs from the cited prior art only in the steps of the preparation of the material to be injected, i.e.

- a) Reception of the recycled materials, (i.e. providing used (i.e recycled) PET material
[optional: such as from PET bottles];
- b) Grinding the PET - provided in the shape of bottles - so as to become powder;

c) Processing the powder into polymeric granules while mixing additives so as to impart protection against bad weather conditions;

The subject-matter of claim 3 is considered as not involving an inventive step, because :

1. More or less any polymer is recyclable, in particular the disclosed polymers of the documents D1 to D4 and D16 from which the single piece bicycle frame is made.
2. The feature that the injection moulding material is made from recycled PET which is derived from bottles scrap can be regarded as a known option for the skilled person in the field of recycling of plastic material.
3. With respect to the documents D1 to D4 and in view of D14, the choice of PET as an injection moulding material can be regarded as a design option of the skilled person, either to achieve a crystal clear frame and/or to get cheap injection material from scrapped bottles or for its specific material properties, see D2 using "foamed structural plastic, fiber-reinforced structural plastic, amorphous polyether-imide, amorphous polyamid-imide" or adding blowing agent (column 3, lines 14 to 27), using "synthetic resins" in general (D3, paragraph [01]) or the different material used and suggested in D13, column, 10, lines 28 to 33.
4. To blend / modify the polymeric (PET) material with additives - either colors (D14), blow agent (D2), fibers (D1), high impact polymers/additives, various fillers or any kind of specific additive (D14) - is known to the man skilled in the art, see documents D1, D2 or D14.

Thus the subject-matter of claim 3 is considered as not involving an inventive step for the skilled person in the art.

Note:

The injection molding of a single-piece bicycle frame in one mold, as claimed in claims 1 and 2, has nothing in common with the preparation, i.e. the blending of injection moulding material with bad weather resistant additives.

3.4 Independent claim 4 is neither new nor inventive

Document D2 discloses a recyclable polymer bicycle frame which is a usually "Y" shaped and formed of a single piece thus making up a central bar whereof identical side arms are originated and form two tubular vertices;

- one tubular horizontal vertex, into which a sprocket wheel axle can be assembled and an other tubular vertex axle into which a handlebar axle can be assembled; the end edge of each arm is provided with a hook shape into which a rear wheel supporting axle can be engaged.

D15 discloses this features as well. Thus claim 4 is not new.

Document D1, D3 and D4 disclose a bicycle frame, made from a recyclable polymer, with most of the features of claim 4,

The application differs only in that the the end edge of each arm is provided with a hook shape into which a rear wheel supporting axle can be engaged.

This feature is commonly known (see D2) and has no special technical effect and thus it can only be regarded as a simple design option for the skilled person. Hence claim 4 does not involve an inventive step.

4 Industrial applicability

The present application does meet the criteria of industrial applicability