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(54) Toy.

(57) ABSTRACT: Described herein is a method for producing a toy, in particular a toy car. According to a preferred embodiment, said method envisages implementing a process of injection moulding that envisages a first step of forming the base body (40) of the toy car, and, then, a second step of forming the wheels (60), which is carried out directly on the base body formed previously. The toy car obtained is characterized in that it presents a connection that cannot be separated between the wheels and the base body. (Figure 2) 93378

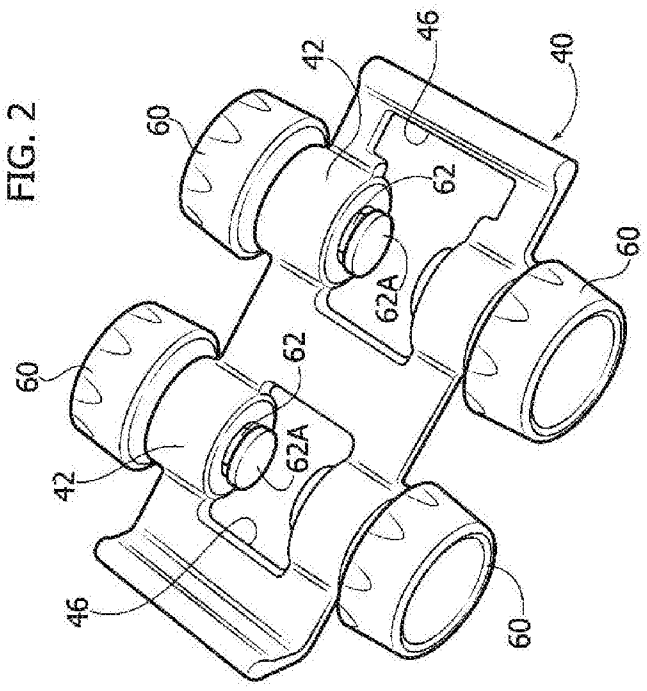


FIG. 2

Toy

Field of the invention

The present invention relates to the field of toys and in particular toys made of plastic material obtained via injection moulding. In this context, the present invention concentrates on toys that are provided with wheels for their movement, such as for example toy cars.

In the above field, the present invention proposes a new method of production of a toy and a new innovative solution of toy.

Prior art

A typical example of toy cars or vehicles is described in the document No. EP 0074765. This is made up of a limited number of components, which are a base body, a bodywork, and a series of wheels mounted on the base body. The base body is made of a single piece of plastic material that incorporates the four shafts on which the wheels of the toy vehicle are mounted. The shafts in question have widened ends, via which the wheels are slotted thereon.

It should now be noted that in the technical field in question there is a constant need to find new solutions that enable one or more of the following targets to be achieved:

- simplifying the constructional solutions and the production processes; and

- finding new original solutions that will stimulate the interest of the child.

Object and summary of the invention

The object of the present invention is hence to improve the known solution referred to above so that one or more of the aforementioned targets may be achieved.

Specifically, the present invention regards a method according to Claim 1 and a toy according to Claim 7 and Claim 12.

The claims form an integral part of the technical teaching provided herein in relation to the invention.

Brief description of the drawings and detailed description of the invention

Further characteristics and advantages of the invention will emerge clearly from the ensuing description with reference to the annexed drawings, which are provided purely by way of non-limiting example and in which:

- Figure 1 illustrates an example of toy obtained via the method described herein;

- Figure 2 illustrates the bottom part of the toy of Figure 1;

- Figures 3A and 3B are schematic illustrations of the method described herein;

- Figures 4A and 4B are schematic illustrations of the toy of Figure 1, in which the wheels of the toy are once again in two respective different positions;

- Figures 5A and 5B illustrate the same concept as the one schematically represented in Figures 4A and 4B but with a further example of toy;

- Figures 6A and 6B are schematic illustrations of the method described herein for providing the toy of Figures 5A and 5B;

- Figures 7A, 7B, and 7C illustrate a method for producing a toy according to the known art;

- Figure 8 illustrates a toy obtained with the method represented in Figures 7A, 7B, and 7C; and

- Figure 9 illustrates a further example of toy obtained via the method described herein.

In the ensuing description, various specific details are illustrated aimed at enabling an in-depth understanding of the embodiments. The embodiments may be provided without one or more of the specific details, or with other methods, components, or materials, etc. In other cases, known structures, materials, or operations are not illustrated or described in detail so that various aspects of the embodiment will not be obscured.

The references used herein are provided merely for convenience and hence do not define the sphere of protection or the scope of the embodiments.

As mentioned above, the present invention relates in general to toys that are provided with wheels and that are made of plastic material.

The use of plastic materials for producing toys is nowadays widespread owing to a series of advantages that these materials guarantee, amongst which i) the fact that the objects can be produced in a wide range of configurations and ii) the fact that the materials are relatively easy and inexpensive to process and treat.

Figure 8 illustrates a known solution of toy car. This comprises a supporting body 3, a bodywork 1, and wheels 2 rotatably mounted on the supporting body 3. Like the known solution discussed above with reference to the document No. EP 0074765, the supporting body 3 incorporates in itself shafts 31 with widened ends, on which the wheels 2 are slotted.

The supporting body 3 and the wheels 2 are made of plastic material and, in particular, are both obtained via a process of injection moulding.

In this connection, Figures 7A-C illustrate schematically a method for the production and assembly of

these two components. This method envisages two different processes of injection moulding, a first for formation of the supporting body 3, which envisages the use of a first mould 101(Figure 7A), and a second for formation of the wheels 2, which envisages the use of a second mould 103 (Figure 7B). The components in question, once formed within the respective moulds, are removed and connected together in a subsequent step (Figure 7C). The latter operation is commonly performed manually.

The present invention proposes a new method of production that improves the solution referred to above.

In what follows, the method described herein will be illustrated with reference to a process for producing a toy car, but it is clear that the same principles may be used for providing, in general, toys of different types.

Now, with reference to Figure 1, this illustrates a toy car that is constituted by a supporting body 40, a bodywork 30, and wheels 60 rotatably mounted on the supporting body 40.

The supporting body 40 and the wheels 60 are produced according to the method described herein.

In general, this method envisages implementing a process of injection moulding that envisages a first step of forming one of the two components, i.e., either the supporting body or else the wheels, and then, a second step of forming the other component, i.e., the wheels or the supporting body, which is formed directly on the component previously produced.

The method uses, in particular, a moulding assembly that is prearranged for assuming two different configurations: a first configuration in which a cavity or a plurality of cavities is defined for enabling injection

moulding of the first component, for example the supporting body, and a second configuration in which a cavity or a plurality of cavities is defined for enabling injection moulding of the second component, i.e., the set of wheels, with reference once again to the above example.

Once again with reference to the above example for ease of illustration, in the second configuration of the moulding assembly, the supporting body that has been formed in the previous step continues to remain within the moulding assembly and itself comes to delimit, with its specific portions, the cavities of the moulding assembly for moulding of the wheels.

The wheels are hence moulded directly on the supporting body and at the end of the process come to be mounted thereon in such a way that they are free to turn.

As will be seen in what follows, the aforesaid portions of the supporting body that come to delimit and define the cavities for forming the wheels in the moulding assembly may have a preferred conical or frustoconical shape, for the advantages that will be discussed in what follows.

Preferred embodiments of the method described herein will be illustrated hereinafter.

With reference to the embodiment illustrated in Figures 3A and 3B, this envisages the use of a moulding assembly 20, which comprises a fixed block 22 and two different formations of mobile blocks 23, 24, 25 and 23′, 24′, 25′, which are prearranged for alternatively coupling to and operating with the block 22. Through these mobile blocks, the moulding assembly is prearranged for assuming a first configuration that is defined by the block 22 and by the blocks 23, 24, 25, and a second configuration that is

defined by the block 22 and by the blocks 23', 24', and 25'.

With reference to the first configuration illustrated in Figure 3A, here the moulding assembly defines a cavity 300 for moulding the supporting body 40 of the toy. One or more runners - not illustrated - made in the fixed block 22, feed into the cavity 300 the molten plastic material that will come to form the component. Figure 3A illustrates the supporting body 40 already formed in the cavity 300.

In the second configuration illustrated in Figure 3B, the moulding assembly 20 continues to enclose the supporting body formed, defining therewith a set of cavities 400 for moulding the wheels 60. As may be seen in this figure, the cavities in question are delimited both by the moulding surfaces of the various blocks and directly by individual portions of the supporting body itself. The wheels 60 are formed within the cavities 400 directly on these portions of the supporting body.

For a clearer understanding of the above aspects, the reader is now referred to Figures 2 and 4A, which illustrate in detail the parts of the toy car obtained via the method described herein.

With reference to Figure 2, the supporting body 40 has four annular portions 42 provided with internal holes 42' (Figure 4B), received within which are corresponding pins 62 that are made of a single piece with the individual wheels 60. The pins 62 have widened ends 62A and project out of the annular portions 42, within openings 46 made in the support 40. The internal holes 42' are smaller than the widened ends of the pins 62, at least in their sections facing the widened ends 62A, so that the wheels are constrained and cannot be removed from the portions 42.

It may now be noted that the internal holes 42' correspond to the aforementioned portions of the supporting body that are designed to delimit the cavities 400 for moulding the wheels 60. In particular, as may be clearly seen in Figure 3B, these holes are prearranged for delimiting the cavities 400 together with the corresponding forming surfaces of the blocks 22, 23', 24', 25', which identify the second configuration of the moulding assembly. The aforementioned runners made in the fixed block 22 are designed to feed the molten plastic material also into the cavities 400 themselves. Figure 3B illustrates the wheels 60, and their pins 62, already formed in the respective cavities 400.

With reference to Figure 4A, it may again be noted that the internal holes 42' have a conical or frustoconical shape for at least part of their extension. The pins 62 are directly obtained within these holes and hence have a conical shape that is perfectly complementary. These conical portions of the holes 42' and of the pins 62 are designated by the reference numbers 42'C and 62C, respectively. Furthermore, the pins 62 are formed so as to traverse the holes 42' and project from the portions 42, positioning their ends 62A at a given distance from the latter.

In various preferred embodiments, the plastic material used is different for the supporting body and for the wheels. In particular, it is preferable to use two materials that have a low chemico-physical affinity in order to prevent any adherence between the two materials. Clearly, it is preferable for the material used for formation of the supporting body to have a melting point higher than that of the material of the wheels, so as to

prevent localized melting of this body in its portions 42'C, when these come to delimit the cavities 400 for forming the wheels during the second step of the moulding process. In various preferred embodiments, the supporting body is made of nylon, whereas the wheels are made of polyethylene.

At the end of the second moulding step, the moulding assembly is opened, and the ensemble already assembled, constituted by the supporting body 40 and by the wheels 60 can be taken out.

It should now be noted that the wheels 60 are perfectly free to turn, even though they have been moulded directly on the supporting body.

This is guaranteed by the aforementioned conical portions 42'C and 62C, which come to constitute the interface of the rotatable coupling between the wheels 60 and the supporting body 40.

In fact, with reference to Figures 4A and 4B, it may be noted that, as soon as the supporting body 40 and the wheels 60 are removed from the moulding assembly, the wheels 60 do not remain in the condition illustrated in Figures 3B and 4A but tend instead to move by gravity towards the outside, until their widened end 62A comes to bear upon the annular portion 42. This movement is favoured, precisely, by the conical portions 42'C and 62C.

In this new position, between the pin 62 of the wheels and the hole 42' of the portions 42 a gap 80 is created, which sets the wheels in a condition of being freely rotatable with respect to the supporting body. The axis of rotation of the wheels will correspond approximately to the geometrical axis of the conical portions 42'C and 62C.

It should now be noted that it is possible to envisage different variants of the embodiment illustrated above.

In the first place, it is possible to reverse the moulding steps described and hence envisage first moulding of the individual wheels and then moulding of the supporting body, once again in a condition where the second step is directly carried out on the components already formed in the first step. To do this, it is sufficient to envisage a different conformation of the blocks of the moulding assembly and, in particular, of their forming surfaces.

Furthermore, also the specific configuration of the toy and of its parts obtained with the method described herein may differ from the one illustrated above.

In this connection, Figures 5A-5B represent an alternative toy solution, in which the so-called male-female configuration of the coupling between the wheels and the supporting body is completely reversed with respect to the one illustrated in Figure 2.

The supporting body of the solution illustrated in the above figures has in fact shafts 162 - and not annular portions 42 as in the solution illustrated previously - and the wheels 60' have, instead, a central hub 142 coupled to the aforesaid shaft - and not pins 62.

Apart from the above differences, in this solution the general principles illustrated are reproduced in a way altogether corresponding to what has been described above.

In this connection, Figures 6A and 6B represent the method and the means used for producing the supporting body and the wheels in this variant embodiment.

In a way altogether corresponding to what has been described above, the moulding assembly 20' used is also in

this case constituted by different blocks and is prearranged through these for assuming two configurations, a first one - illustrated in Figure 6A - in which it defines a cavity 300' for moulding the supporting body, and a second one - illustrated in Figure 6B, in which it defines a set of cavities 400' for moulding the wheels.

The cavities 400' are delimited by the outer surfaces of the shafts 162 previously formed of the supporting body, and moulding of the wheels is made directly on these shafts. In particular, the hubs 142 of the wheels 60' are formed on these shafts.

Like the holes 42' and the pins 62 of the solution illustrated in Figure 2, the shafts 162 have a conical shape for at least part of their extension, and the hubs 142 will hence envisage internal holes of a perfectly complementary shape. The shafts 162 have, moreover, widened ends 162A, just as the pins 62 of the solution of Figure 2. The conical surfaces of the shafts and of the hubs are designated in the figures by the reference numbers 162C and 142'C, respectively.

Furthermore, in a way similar to what has been described above with reference to Figures 4A and 4B, after the supporting body and the wheels 60' are removed from the moulding assembly 20', the wheels move for gravity towards the outside of the shafts 162, as far as into contact with their corresponding widened ends 162A, thus creating the gaps 80', which set the wheels 60' in the condition of being free to turn (Figures 5A and 5B) with respect to the shafts.

In the light of the foregoing, the advantages of the solution described herein will now emerge clearly.

In the first place, as compared to the known solution mentioned at the start, the method described herein clearly presents the advantage of being able to produce the supporting body and the wheels in a single moulding process, eliminating the step of assembly between the supporting body and the wheels that is necessary in the known process.

Concentrating, then, on the toy that is obtained via the method described herein, it may be noted that it is characterized by a coupling between the wheels and the supporting body that practically cannot be separated, thanks to the widened ends 62A and 162A that are provided for constraining the wheels to the supporting body.

In this connection, in various preferred embodiments, as in the one illustrated, the aforementioned widened ends have a circular section that identifies a diameter at least 20% larger than the diameter of the smaller section of the holes within which the corresponding pins or shafts are received.

Thanks to the above characteristics, the risk of a child possibly detaching the wheels from the supporting body is completely eliminated, and hence there is the guarantee that the child will not be exposed to any risks associated to handling of small parts.

Finally, it should be noted that thanks to the method described herein, the production of toys provided with mobile wheels is considerably simplified, so that it becomes possible to produce in an industrial context and at contained costs, a wide range of original solutions in the production of toys. In this connection, Figure 9 illustrates an example of toy that is characterized in that it envisages a long series of wheels mounted on a single

main body. In the light of what has been said above, this toy may be formed and obtained directly with the process of injection moulding provided in the method described herein.

Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary, even significantly, with respect to what has been illustrated herein purely by way of non-limiting example, without thereby departing from the scope of the invention, as is defined by the annexed claims.

BL-5025

REVENDICATIONS

1. Procédé de production d'un jouet, en particulier d'une voiture miniature, dans lequel ledit jouet comprend :

- un corps support (42 ; 162) ;

- un certain nombre de roues (60 ; 60') montées rotatives sur ledit corps support (42 ; 162), autour d'axes de rotation respectifs ;

ledit procédé étant caractérisé en ce qu'il prévoit les étapes suivantes :

- apport d'un ensemble de moulage (20 ; 20') pour mettre en œuvre un processus de moulage par injection ;

- mise dudit ensemble de moulage (20 ; 20') dans une première configuration dans laquelle une première cavité de moulage ou une pluralité de cavités de moulage (300 ; 300') est définie pour former ledit corps support (42 ; 162) ou ledit nombre de roues (60 ; 60') ;

- exécution du moulage par injection dudit corps support (42 ; 162) ou dudit nombre de roues (60 ; 60') à l'intérieur de ladite première cavité ou desdites cavités de moulage (300 ; 300'), avec un premier matériau plastique ;

- mise dudit ensemble de moulage (20 ; 20') dans une deuxième configuration définie dans laquelle se trouve(nt) des deuxièmes cavités de moulage ou une deuxième cavité de moulage (400 ; 400') pour produire ledit nombre de roues (60 ; 60') ou ledit corps support (42 ; 162) sur ledit corps support (42 ; 162) ou ledit nombre de roues (60 ; 60') ;

- exécution du moulage par injection dudit nombre de roues (60 ; 60') ou dudit corps support (42 ; 162) sur ledit corps support (42 ; 162) ou sur ledit nombre de roues (60 ; 60'), dans lesdites deuxièmes cavités de moulage ou ladite deuxième cavité de moulage (400 ; 400'), avec un deuxième matériau plastique.

2. Procédé selon la revendication 1, dans lequel ladite/lesdites première(s) cavité ou cavités de moulage (300 ; 300') est/sont configurée(s)

pour créer dans ledit corps support (42 ; 162) ou dans ledit nombre de roues (60 ; 60') des premières surfaces (42'C ; 142'C) pour couplage auxdites roues (60 ; 60') ou audit corps support (42 ; 162), autour desdits axes de rotation, dans lequel

ladite/lesdites deuxième(s) cavités ou cavité de moulage (400 ; 400') est/sont délimitée(s) par lesdites premières surfaces de couplage (42'C ; 142'C), et dans lequel

le moulage par injection desdites roues (60 ; 60') ou dudit corps support (42 ; 162) détermine la création dans celles-ci/celui-ci de deuxièmes surfaces (62C ; 162C) contre lesdites premières surfaces de couplage (42'C ; 142'C) pour couplage dudit nombre de roues ou dudit corps support audit corps support ou auxdites roues.

3. Procédé selon la revendication 2, dans lequel lesdites premières et deuxièmes surfaces (62C ; 162C ; 42'C ; 142'C) ont une forme conique ou frustoconique qui se développe autour desdits axes de rotation.

4. Procédé selon la revendication 2 ou 3, qui prévoit la formation d'une partie annulaire (42) ou d'un moyeu (142) dans ledit corps support (42) ou dans ledit nombre de roues (60'), respectivement, qui ont des surfaces intérieures conçues pour constituer lesdites premières ou deuxièmes surfaces de couplage (42'C ; 142'C) ; et

qui prévoit la formation d'une tige (62) ou d'un arbre (162) dans ledit nombre de roues (60) ou dans ledit corps support, respectivement, qui définissent des surfaces extérieures conçues pour constituer lesdites deuxièmes ou premières surfaces de couplage (62C ; 162C).

5. Procédé selon la revendication 4, dans lequel ladite tige (62) et ladite partie annulaire (42), ou ledit arbre (162) et ledit moyeu (142) sont formés selon une configuration où ladite tige ou ledit arbre traverse ladite partie annulaire (42) ou ledit moyeu (142), respectivement, et se projette avec une extrémité

élargie (62A, 162A) qui est positionnée à une distance donnée de ladite partie annulaire (42) ou dudit moyeu (142), respectivement.

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel ledit deuxième matériau est différent dudit premier matériau, et dans lequel ledit premier matériau est caractérisé par un point de fusion supérieur à celui dudit deuxième matériau.

7. Jouet obtenu par un procédé de moulage par injection, caractérisé en ce qu'il comprend :

- un corps support (42 ; 162) ;
- un certain nombre de roues (60 ; 60') montées rotatives sur ledit corps support (42 ; 162), autour d'axes de rotation respectifs ;

dans lequel ledit corps (42 ; 162) est obtenu par moulage par injection d'un premier matériau plastique, et ledit nombre de roues (60 ; 60') est obtenu par moulage par injection d'un deuxième matériau plastique ;

dans lequel l'étape de moulage dudit nombre de roues (60 ; 60') ou dudit corps support (42 ; 162) est mise en œuvre sur ledit corps support ou ledit nombre de roues qui a déjà été formé ;

et dans lequel ledit corps support (42 ; 162) ou ledit nombre de roues (60 ; 60') prévoit des premières surfaces (42'C ; 142'C) pour couplage rotatif auxdites roues ou audit corps support, autour desdits axes de rotation, et dans lequel ledit nombre de roues ou ledit corps support prévoit des deuxièmes surfaces (62C ; 162C) qui sont obtenues par moulage par injection sur lesdites premières surfaces et engagent lesdites premières surfaces pour couplage rotatif audit corps support (42 ; 162) ou audit nombre de roues (60 ; 60').

8. Jouet selon la revendication 7, dans lequel lesdites premières et deuxièmes surfaces (62C ; 162C ; 42'C ; 142'C) ont une forme conique ou frustoconique qui se développe autour desdits axes de rotation.

9. Jouet selon l'une quelconque de la revendication 7 ou de la revendication 8, qui a dans ledit corps support (42 ; 162) ou dans ledit nombre de roues (60 ; 60') une partie annulaire (42) ou un moyeu (142), respectivement, qui a des surfaces intérieures conçues pour constituer lesdites premières ou deuxièmes surfaces de couplage (42'C ; 142'C), et
qui a, dans ledit nombre de roues (60 ; 60') ou dans ledit corps support (42 ; 162) une tige (62) ou un arbre (162), respectivement, qui définit des surfaces extérieures conçues pour constituer lesdites deuxièmes ou premières surfaces de couplage (62C ; 162C).

10. Jouet selon la revendication 9, dans lequel ladite tige ou ledit arbre traverse ladite partie annulaire (42) ou ledit moyeu (142), respectivement, et se projette avec une extrémité élargie (62A, 162A) qui est positionnée à une distance donnée de ladite partie annulaire (42) ou dudit moyeu (142), de telle manière que lesdites roues sont mobiles à l'écart dudit corps support, le long desdits axes de rotation, jusqu'à ce que lesdites extrémités élargies viennent en contact avec ladite partie annulaire (42) ou ledit moyeu (142).

11. Jouet selon l'une quelconque des revendications 7 à 10, dans lequel ledit deuxième matériau est différent dudit premier matériau, et dans lequel ledit premier matériau est caractérisé par un point de fusion supérieur à celui dudit deuxième matériau.

12. Jouet du type comprenant :
- un corps support (42 ; 162) ; et
- un certain nombre de roues (60 ; 60') montées rotatives sur ledit corps support, autour d'axes de rotation respectifs ;
dans lequel ledit corps support (42 ; 162) comprend des premières surfaces (42'C ; 142'C) pour couplage dudit corps support auxdites roues (60 ; 60') ;
dans lequel ledit nombre de roues (60 ; 60') comprend des deuxièmes surfaces (62C ; 162C) pour couplage desdites roues audit corps support ;

dans lequel lesdites premières et deuxièmes surfaces (62C ; 162C ; 42'C ; 142'C) sont en contact direct les unes avec les autres et sont mobiles les unes par rapport aux autres autour desdits axes de rotation ;
et dans lequel lesdites premières et deuxièmes surfaces (62C ; 162C ; 42'C ; 142'C) ont une forme conique ou frustoconique qui se développe autour desdits axes de rotation.

13. Jouet selon la revendication 12, qui a dans ledit corps support (42 ; 162) ou dans ledit nombre de roues (60 ; 60'), une partie annulaire (42) ou un moyeu (142), respectivement, qui ont des surfaces intérieures conçues pour constituer lesdites premières ou deuxièmes surfaces de couplage (42'C ; 142'C), respectivement, et
qui a, dans ledit nombre de roues (60 ; 60') ou dans ledit corps support (42 ; 162), une tige (62) ou un arbre (162), respectivement, qui définissent des surfaces extérieures conçues pour constituer lesdites deuxièmes ou premières surfaces de couplage (62C ; 162C), respectivement.

14. Jouet selon la revendication 13, dans lequel ladite tige ou ledit arbre traverse ladite partie annulaire (42) ou ledit moyeu (142), respectivement, et se projette avec une extrémité élargie (62A, 162A) qui est positionnée à une distance donnée de ladite partie annulaire (42) ou dudit moyeu (142), de telle manière que lesdites roues sont mobiles à l'écart dudit corps support, le long desdits axes de rotation, jusqu'à ce que lesdites extrémités élargies viennent en contact avec ladite partie annulaire (42) ou ledit moyeu (142).

FIG. 2

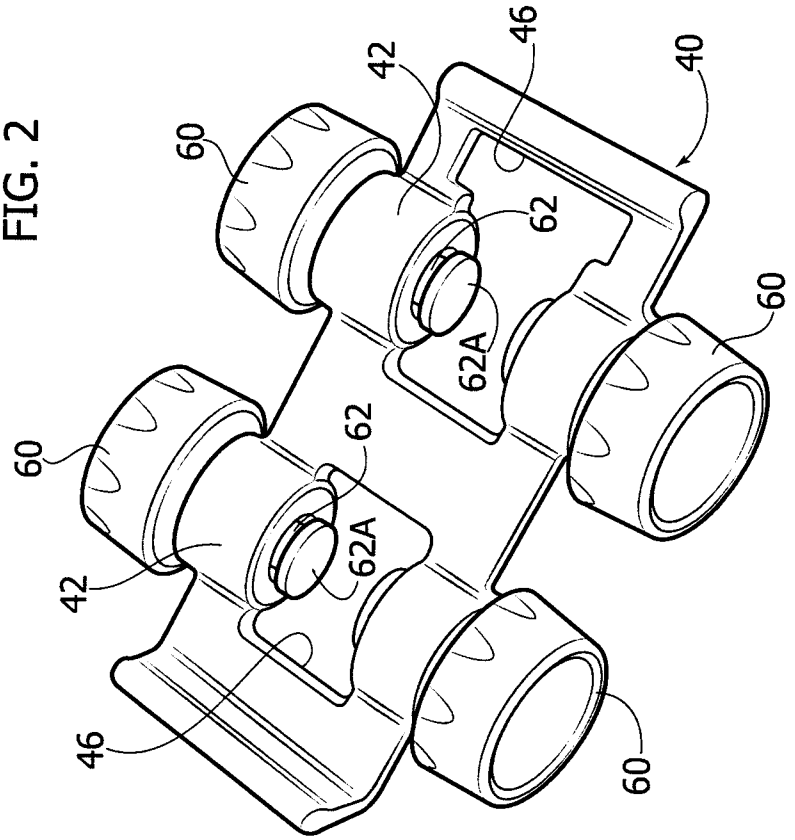
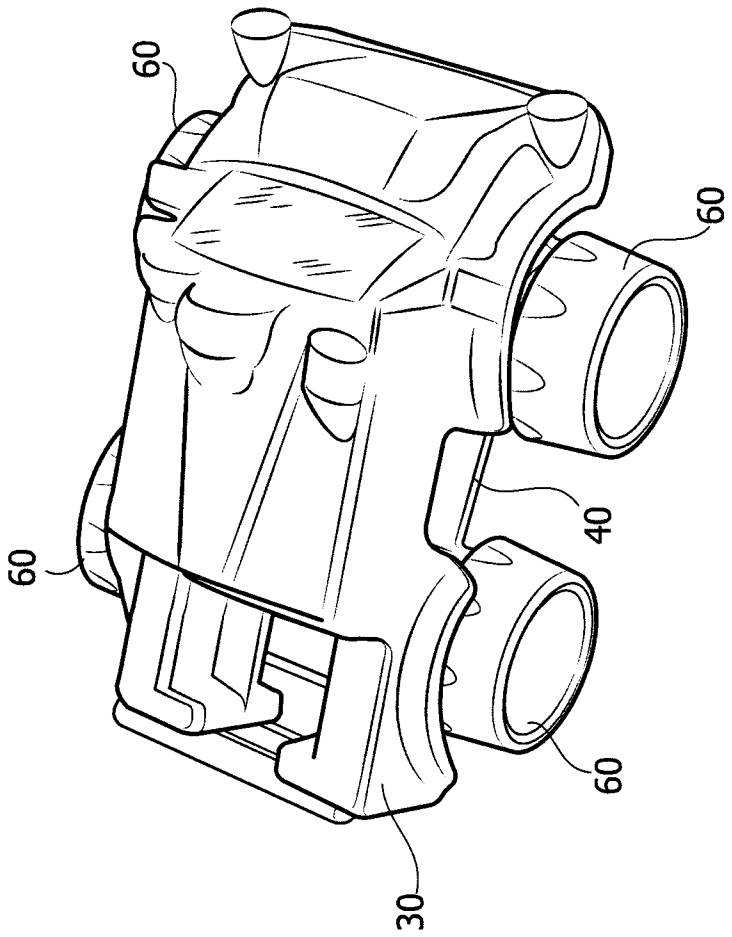


FIG. 1



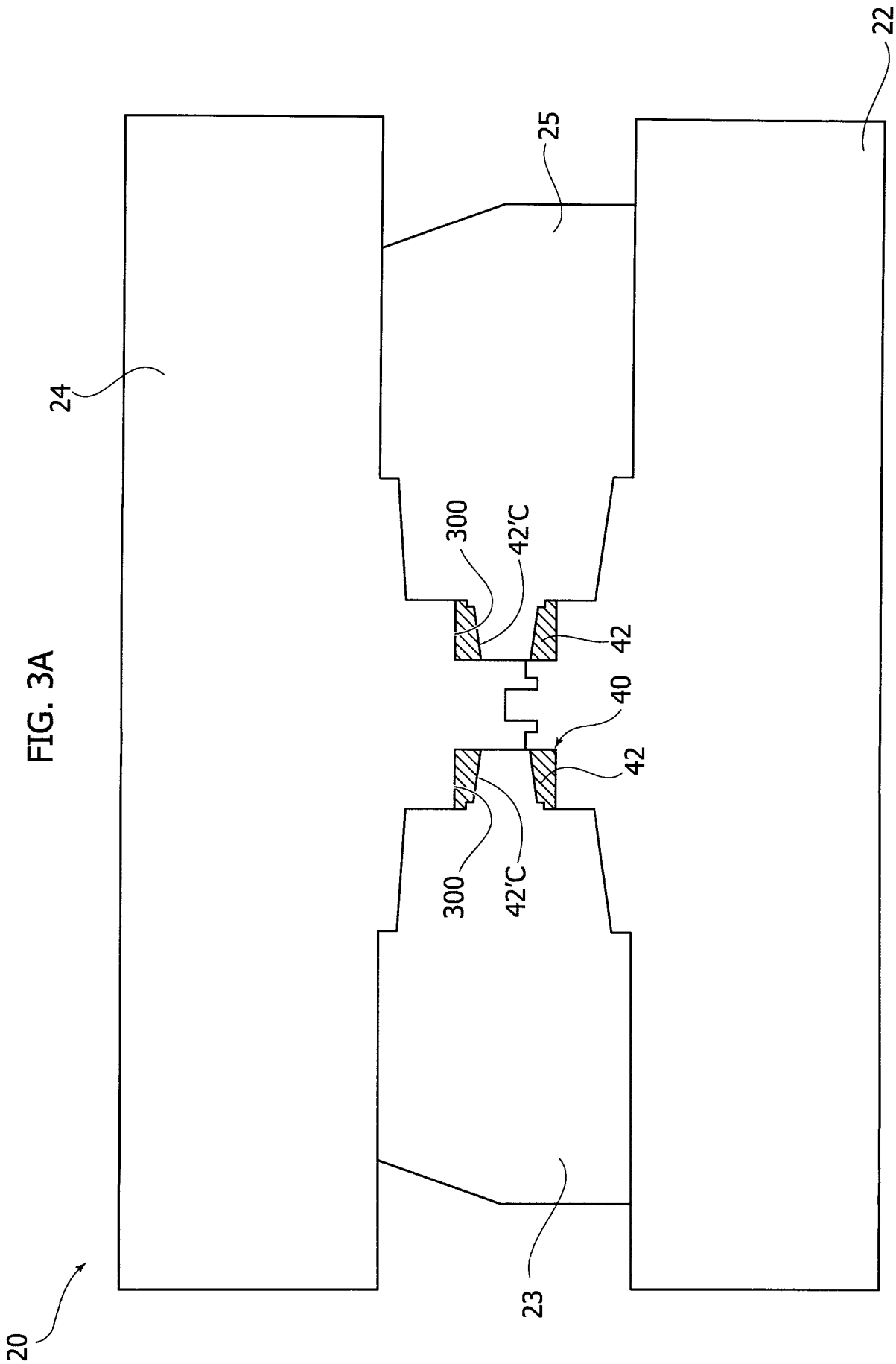


FIG. 3A

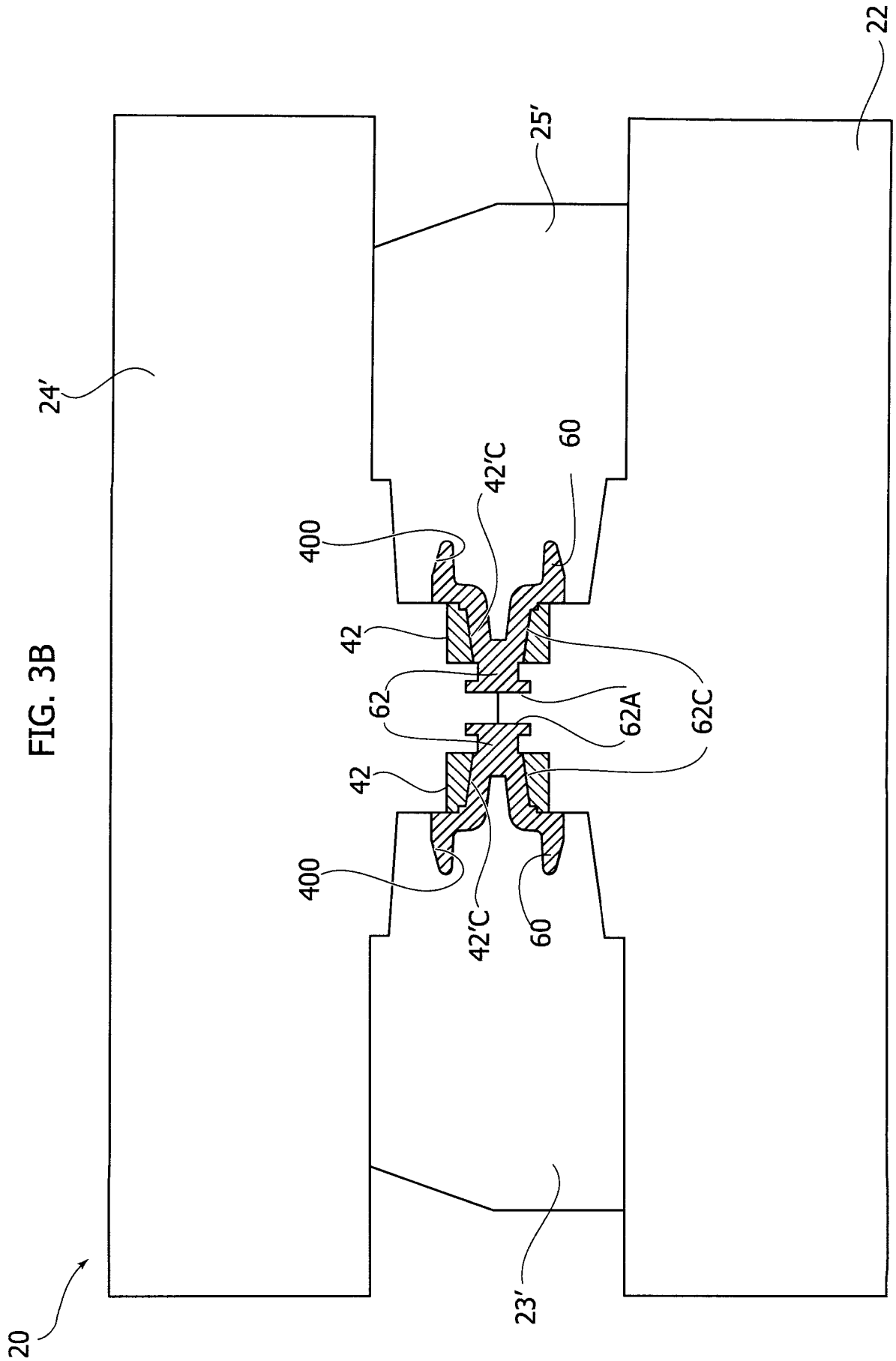


FIG. 3B

FIG. 4B

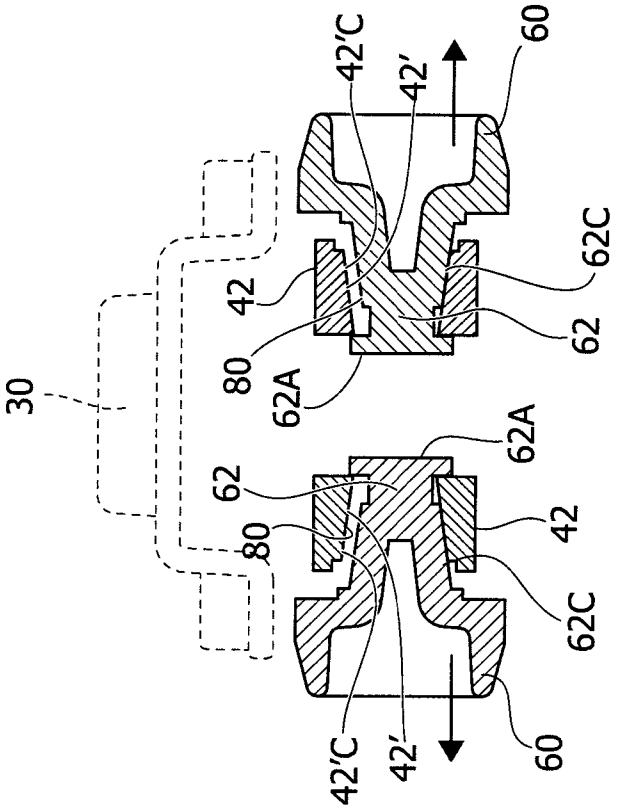

30
42'C
42'
60
62C
42
62
80
62A
62
62A
42
80
62C
42'C
42'
60

FIG. 4A

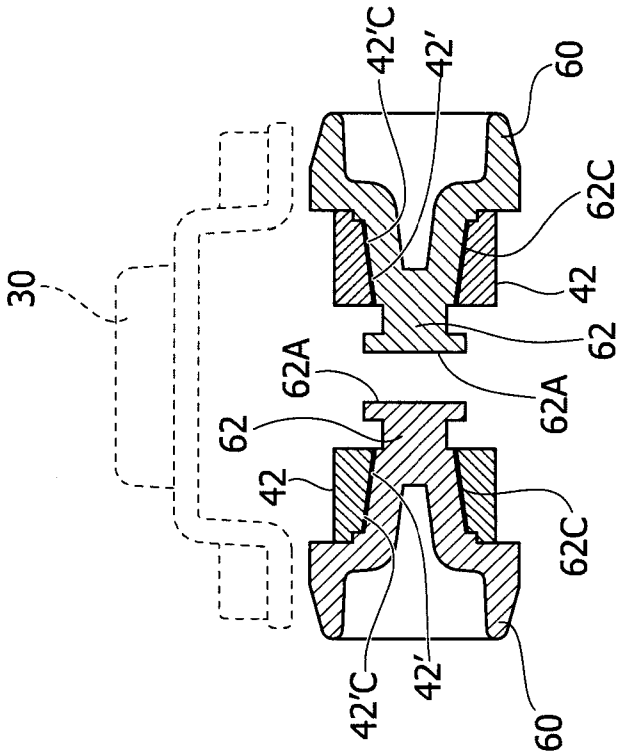

30
42'C
42'
60
62C
42
62
62A
62A
62
42
62C
42'C
42'
60

FIG. 5B

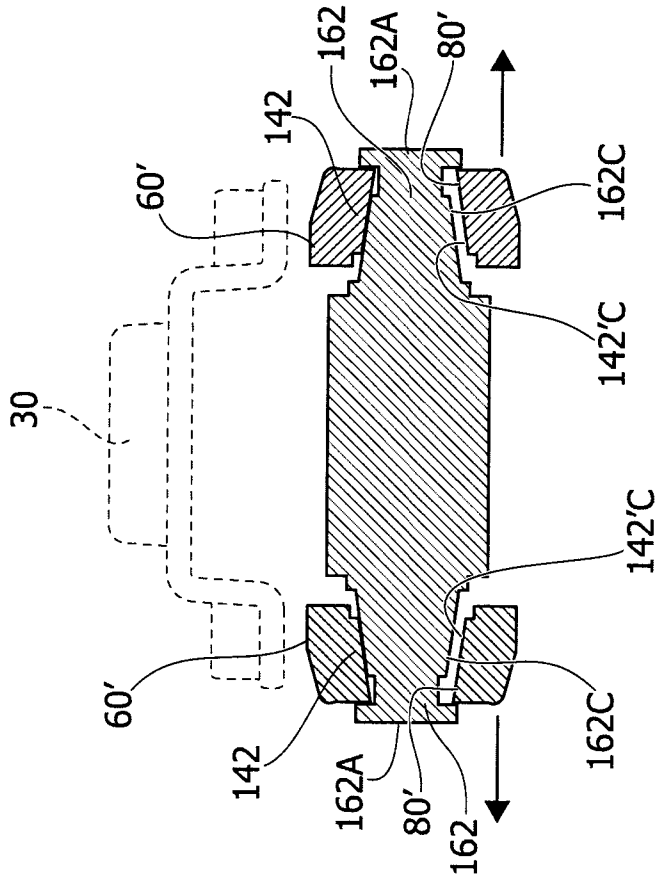
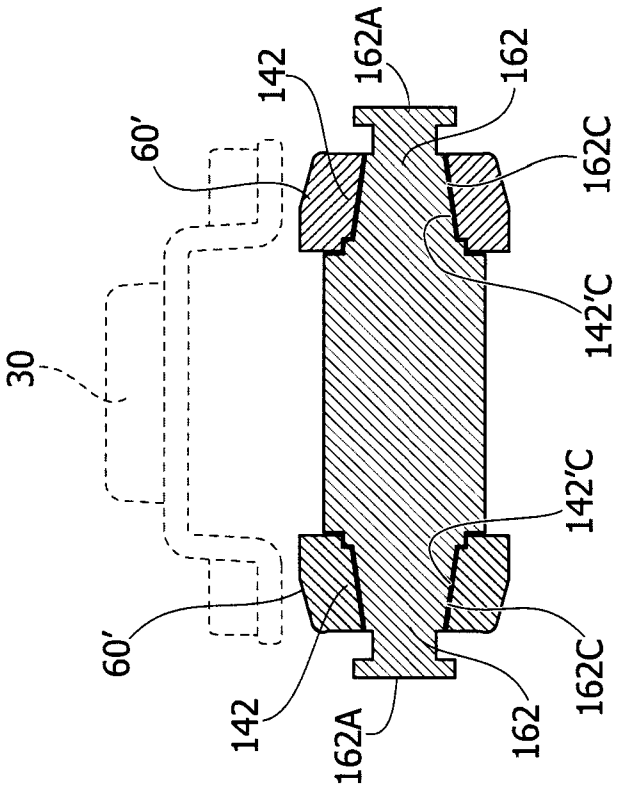

162
162A
80'
142
60'
162C
142'C
30
142'C
60'
142
162A
80'
162
162C

FIG. 5A


142
162A
162
60'
162C
142'C
30
142'C
60'
142
162A
162
162C

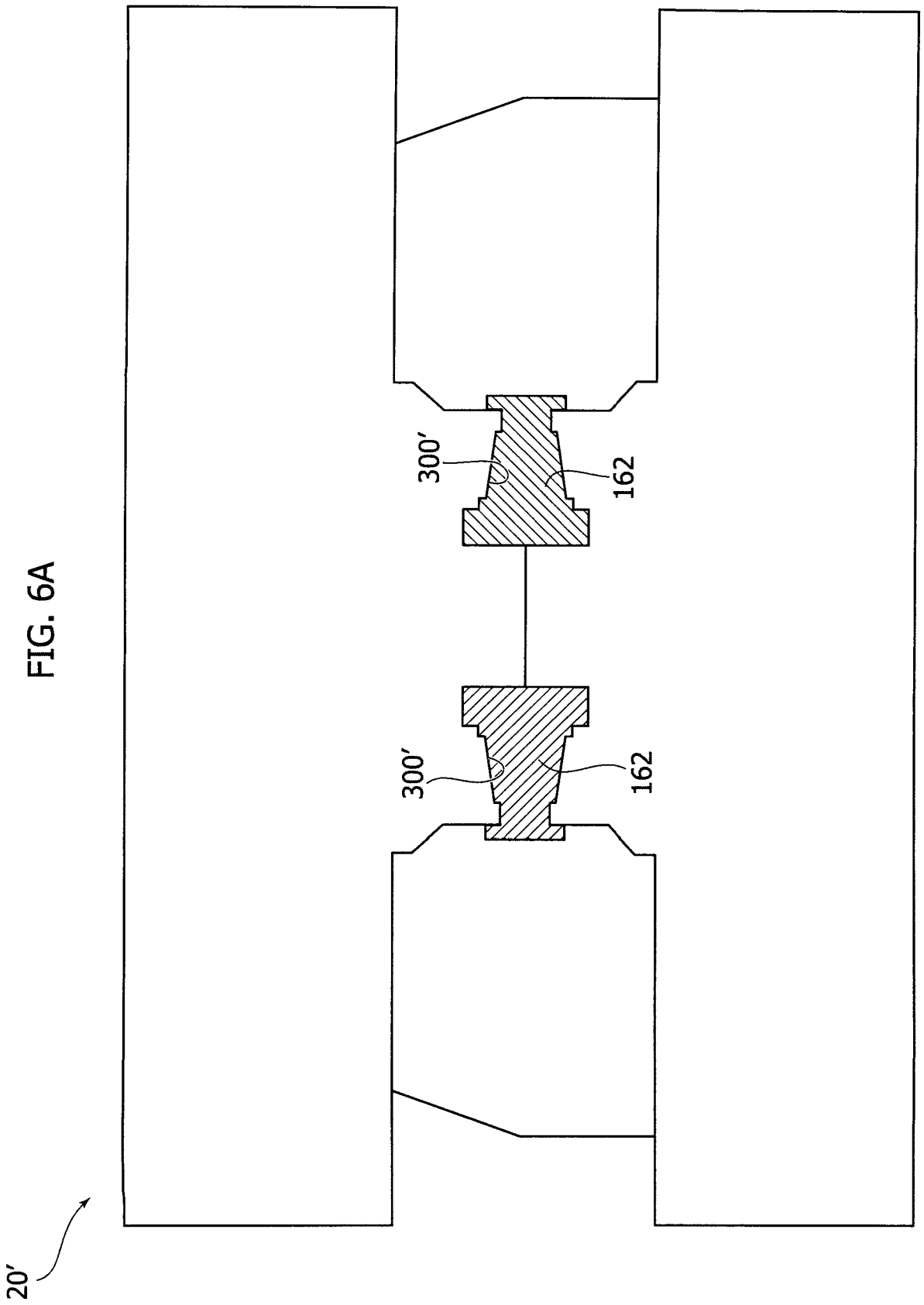


FIG. 6A

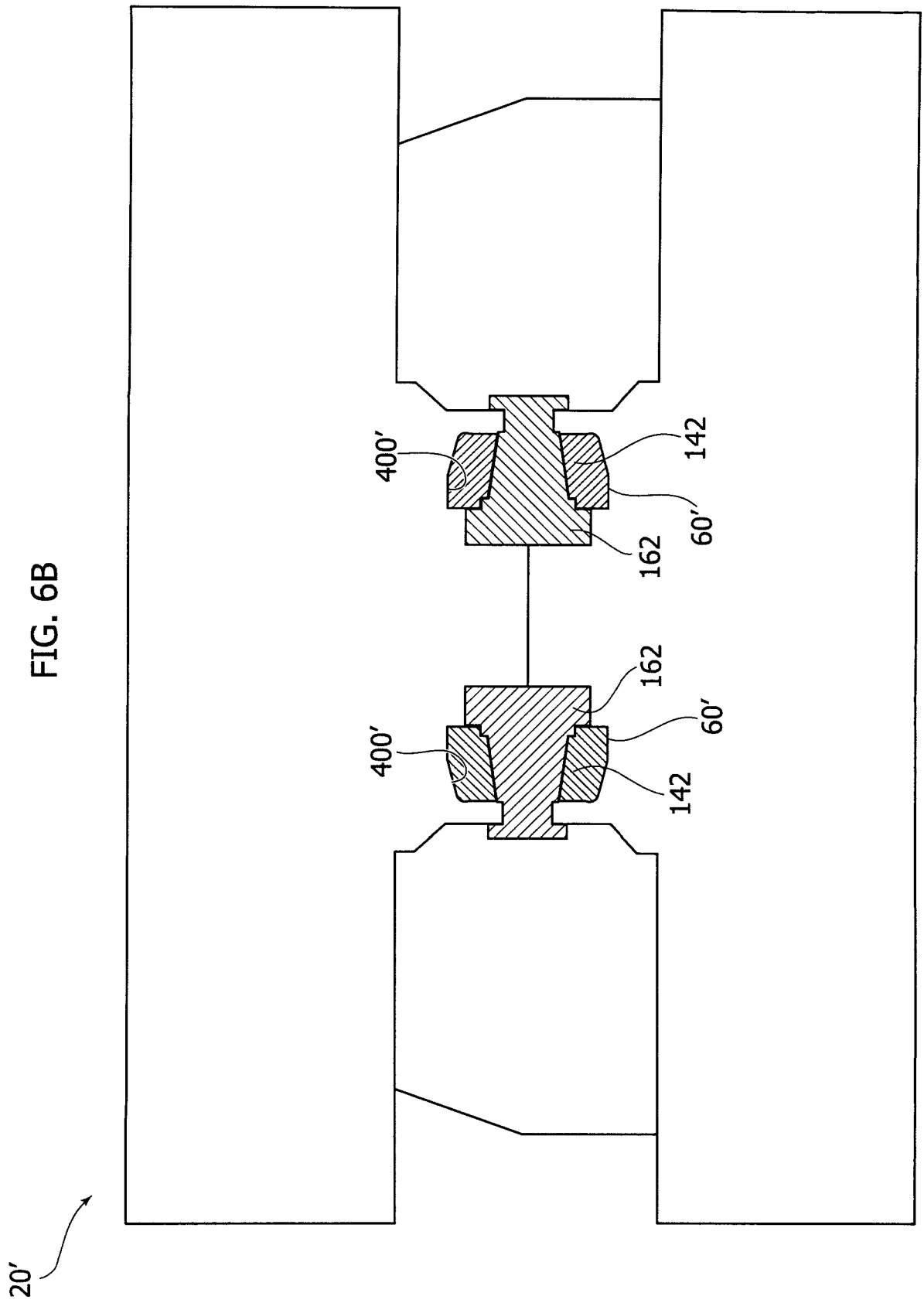


FIG. 6B

FIG. 7A

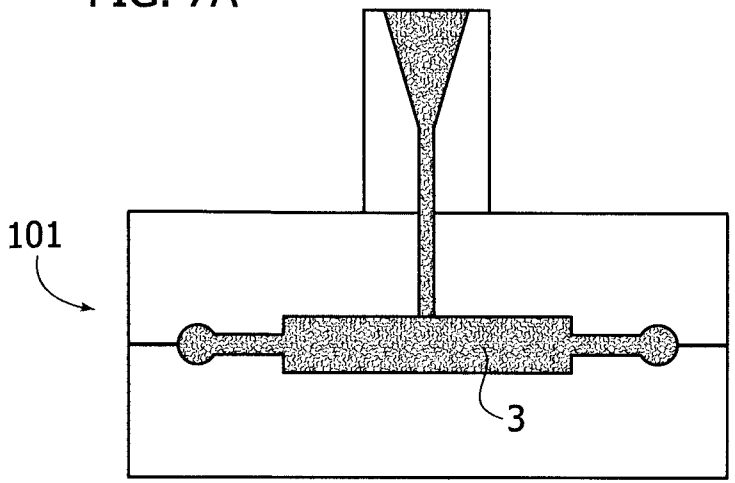


FIG. 7B

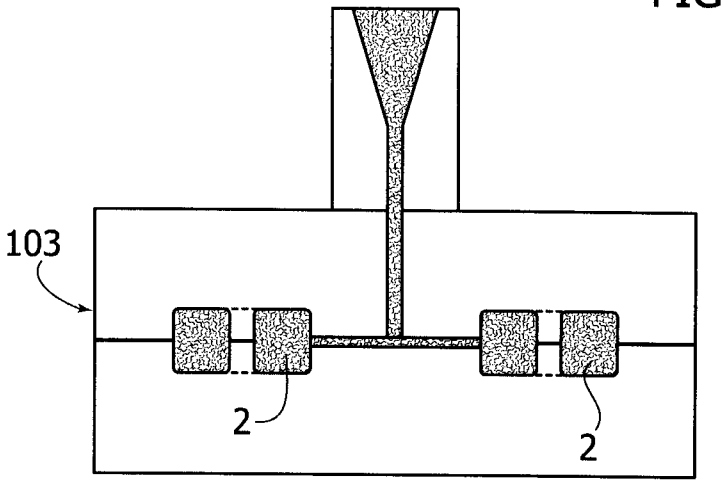


FIG. 7C

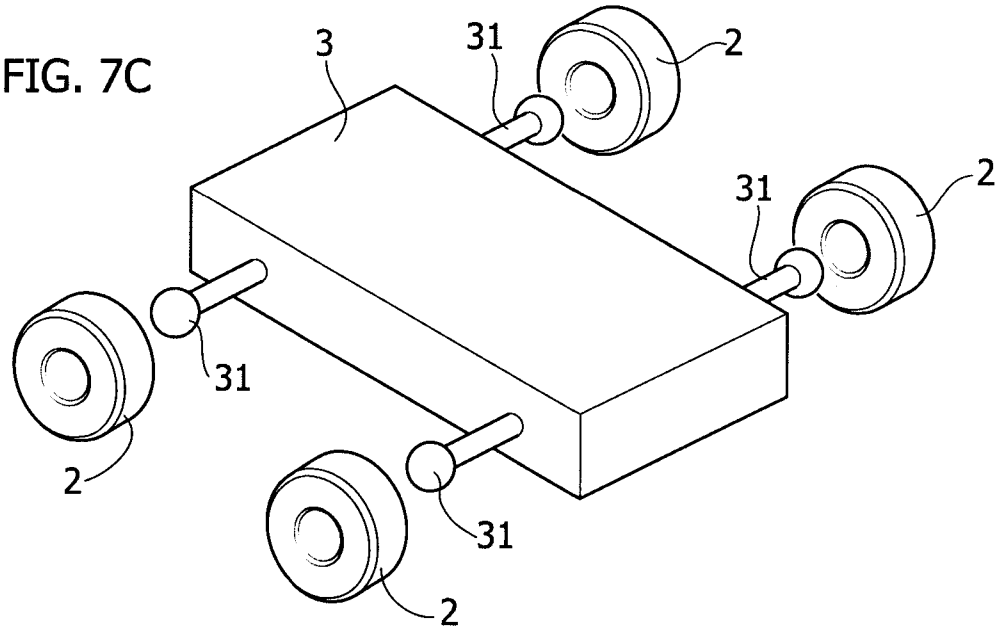


FIG. 8

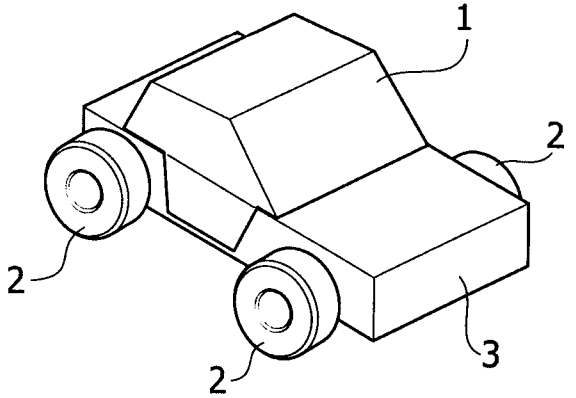
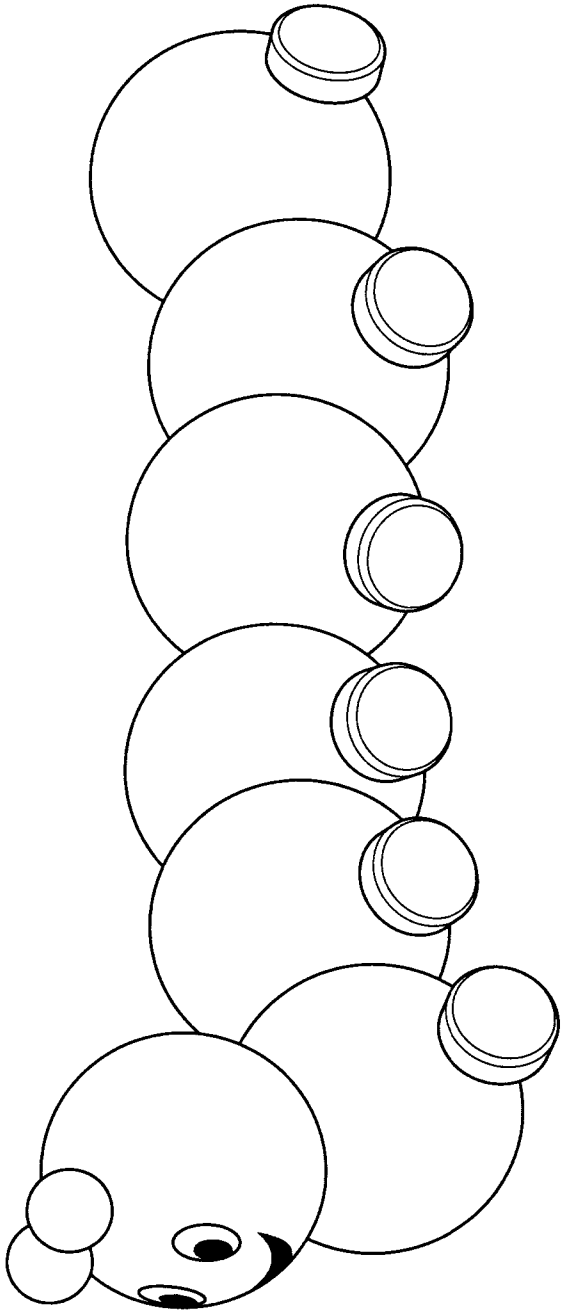


FIG. 9



ABSTRACT

Described herein is a method for producing a toy, in particular a toy car.

According to a preferred embodiment, said method envisages implementing a process of injection moulding that envisages a first step of forming the base body (40) of the toy car, and, then, a second step of forming the wheels (60), which is carried out directly on the base body formed previously.

The toy car obtained is characterized in that it presents a connection that cannot be separated between the wheels and the base body.

(Figure 2)

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

National Application Number

LO 1542
LU 93378

SEARCH REPORT

in accordance with Article 35.1 a)
of the Luxembourg law on patents
dated 20 July 1992

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
	LACK OF UNITY OF INVENTION see sheet B		INV. A63H17/26
Y,D	EP 0 074 765 A1 (NEWEY GOODMAN LTD [GB]) 23 March 1983 (1983-03-23) * page 7, line 12 - page 12, line 25; figures *	1-11	
Y	DE 20 2005 015711 U1 (MATTEL INC [US]) 12 January 2006 (2006-01-12) * paragraph [0018]; figures *	1-11	
A	EP 2 281 673 A1 (CASONE SPA [IT]) 9 February 2011 (2011-02-09) * paragraph [0011]; figures *	1-11	
A	EP 2 900 345 A1 (LEGO AS [DK]) 5 August 2015 (2015-08-05) * paragraph [0021] - paragraph [0046]; figures *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC) A63H B29C

The present search report has been drawn up for all claims

Date of completion of the search	Examiner
31 August 2017	Lucas, Peter

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C09)

LACK OF UNITY OF INVENTION
SHEET B

Application Number
LO 1542
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The Search Division considers that the present patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-11

Method of producing a toy and a toy obtained by said method. Said toy comprising
-a supporting a body (42; 162)
- a number of wheels (60; 60') rotatably mounted on said supporting body, about respective axes of rotation;
Said method being characterized in that it envisages the following steps:
- providing a moulding assembly (20; 20') for carrying out a process of injection moulding;
- setting said moulding assembly (20, 20') in a first configuration in which a first moulding cavity or plurality of moulding cavities 1300; 300') is defined for forming said supporting body (42; 162) or said number of wheels (60; 60');
- carrying out injection moulding of said supporting body (42; 162) or of said number of wheels (60; 60'), within said first moulding cavity or cavities (300; 300'), via a first plastic material;
- setting said moulding assembly (20; 20') in a second configuration, defined in which are/is second moulding cavities or a second moulding cavity (400; 400') for producing said number of wheels (60; 60') or said supporting body (42; 162) on said supporting body (42; 162) or said number of wheels (60; 60');
- carrying out injection moulding of said number of wheels (60; 60') or of said supporting body (42; 162) on said supporting body (42; 162) or on said number of wheels (60; 60'), within said second moulding cavities or said second moulding cavity (400; 400'), via a second plastic material.
Solving the problem of simplifying the production/assembly process by co-moulding the wheels and the supporting body.

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2. claims: 12-14

A toy of the type comprising:
- a supporting a body (42; 162)
- a number of wheels (60; 60') rotatably mounted on said supporting body, about respective axes of rotation; wherein said supporting body (42; 162) comprises first surfaces (42'C; 142'C) for coupling of said supporting body to said wheels (60; 60');
wherein said number of wheels (60; 60') comprise second surfaces (62C; 162C) for coupling of said wheels to said supporting body;
wherein said first and second surfaces (62C; 162C; 42'C; 142'C) are in direct contact with one another and are mobile with respect to one another about said axes of rotation;
and wherein said first and second surfaces (62C; 162C;

LACK OF UNITY OF INVENTION
SHEET B

Application Number
LO 1542
LU 93378

The Search Division considers that the present patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

42'C; 142'C) have a conical or frustoconical shape that develops about said axes of rotation.
Solving the problem of making the wheels rotate more easily by having conical coupling surfaces.

The search has been limited to the first subject.

ANNEX TO THE SEARCH REPORT ON LUXEMBOURG PATENT APPLICATION NO.

LO 1542
LU 93378

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-08-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0074765 A1	23-03-1983	EP 0074765 A1	23-03-1983
		ES 8306444 A1	01-09-1983
		GB 2105206 A	23-03-1983
		JP S5873380 A	02-05-1983
DE 202005015711 U1	12-01-2006	NONE	
EP 2281673 A1	09-02-2011	AT 537954 T	15-01-2012
		EP 2281673 A1	09-02-2011
		IT 1395152 B1	05-09-2012
EP 2900345 A1	05-08-2015	CA 2885166 A1	03-04-2014
		CN 104755143 A	01-07-2015
		DK 2900345 T3	30-01-2017
		EP 2900345 A1	05-08-2015
		ES 2608379 T3	10-04-2017
		HK 1208001 A1	19-02-2016
		JP 2015530168 A	15-10-2015
		KR 20150052341 A	13-05-2015
		US 2015265935 A1	24-09-2015
		WO 2014049126 A1	03-04-2014

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Économie

WRITTEN OPINION

File No.	Filing date *(day/month/year)*	Priority date *(day/month/year)*	Application No.
LO1542	16.12.2016		LU93378

International Patent Classification (IPC)
INV. A63H17/26

Applicant
Magic Production Group (M.P.G.) S.A.

This report contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☐ Box No. VIII Certain observations on the application

	Examiner
Form LU237A (Cover Sheet) (January 2007)	Lucas, Peter

Application No.
LU93378

WRITTEN OPINION

Box No. I Basis of the opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material:

   ☐ a sequence listing

   ☐ table(s) related to the sequence listing

   b. format of material:

   ☐ on paper

   ☐ in electronic form

   c. time of filing/furnishing:

   ☐ contained in the application as filed.

   ☐ filed together with the application in electronic form.

   ☐ furnished subsequently.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

Application No.
LU93378

WRITTEN OPINION

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step, or to be industrially applicable have not been examined in respect of

☐ the entire application

☒ claims Nos. 12-14

because:

☐ the said application, or the said claims Nos. relate to the following subject matter which does not require a search *(specify)*:

☐ the claims, the description or the drawings or said claims Nos. are so unclear that no meaningful opinion could be formed *(specify)*:

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed *(specify)*:

☒ no search report has been established for the whole application or for said claims Nos. 12-14

☐ a meaningful opinion could not be formed as the sequence listing was either not available, or was not furnished in the international format (WIPO ST25).

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; or such tables were not available in electronic form compliant with he international norm (WIPO ST.25).

☒ See Supplemental Box for further details

Box No. IV Lack of unity of invention

1. The requirement of unity of invention is not complied with for the following reasons:

   see separate sheet

2. This opinion has been established in respect of the following parts of the application:

   ☐ all parts.

   ☒ the parts relating to claims Nos. (see Search Report)

Application No.
LU93378

WRITTEN OPINION

Box No. V Reasoned statement with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes:	Claims	1-11
	No:	Claims	
Inventive step	Yes:	Claims	
	No:	Claims	1-11
Industrial applicability	Yes:	Claims	1-11
	No:	Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the application

The following defects in the form or contents of the application have been noted:

see separate sheet

Re Item III

Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1 Claims 12-14 were not searched due to lack of unity, see Item IV.

Re Item IV

Lack of unity of invention

1 a) Claims 1-11

Method of producing a toy and a toy obtained by said method.

Said toy comprising

-a supporting a body (42; 162)

- a number of wheels (60; 60') rotatably mounted on said supporting body, about respective axes of rotation;

Said method being characterized in that it envisages the following steps:

- providing a moulding assembly (20; 20') for carrying out a process of injection moulding;

- setting said moulding assembly (20, 20') in a first configuration in which a first moulding cavity or plurality of moulding cavities 1300; 300') is defined for forming said supporting body (42; 162) or said number of wheels (60; 60');

- carrying out injection moulding of said supporting body (42; 162) or of said number of wheels (60; 60'), within said first moulding cavity or cavities (300; 300'), via a first plastic material;

- setting said moulding assembly (20; 20') in a second configuration, defined in which are/is second moulding cavities or a second moulding cavity (400; 400') for producing said number of wheels (60; 60') or said supporting body (42; 162) on said supporting body (42; 162) or said number of wheels (60; 60');

- carrying out injection moulding of said number of wheels (60; 60') or of said supporting body (42; 162) on said supporting body (42; 162) or on said number of wheels (60; 60'), within said second moulding cavities or said second moulding cavity (400; 400'), via a second plastic material.

Solving the problem of simplifying the production/assembly process by co-moulding the wheels and the supporting body.

b) Claims 12-14

A toy of the type comprising:

- a supporting a body (42; 162)

- a number of wheels (60; 60') rotatably mounted on said supporting body, about respective axes of rotation; wherein said supporting body (42; 162) comprises first

surfaces (42'C; 142'C) for coupling of said supporting body to said wheels (60; 60');

wherein said number of wheels (60; 60') comprise second surfaces (62C; 162C) for coupling of said wheels to said supporting body;

wherein said first and second surfaces (62C; 162C; 42'C; 142'C) are in direct contact with one another and are mobile with respect to one another about said axes of rotation;

and wherein said first and second surfaces (62C; 162C;

42'C; 142'C) have a conical or frustoconical shape that develops about said axes of rotation.

Solving the problem of making the wheels rotate more easily by having conical coupling surfaces.

2 The common concept which can be defined by the common features between the two groups are:

A toy comprising a supporting body and a number wheels rotatably mounted on said supporting body, about respective axes of rotation, Such a toy is, however, known from document D1 (see especially the figures), wherefore common concept is not new nor inventive.

The lack of unity is underlined by the fact that the two groups solve two different problems.

Re Item V

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

1 Reference is made to the following documents:

D1 EP 0 074 765 A1 (NEWEY GOODMAN LTD [GB]) 23 March 1983 (1983-03-23)

D2 DE 20 2005 015711 U1 (MATTEL INC [US]) 12 January 2006 (2006-01-12)

2 The present application does not meet the criteria of patentability, because the subject-matter of claim 1 does not involve an inventive step.

D1 is regarded as being the prior art closest to the subject-matter of claim 1, and discloses:

A toy comprising a supporting body (1)(the reference signs refer to D1) and a number wheels (2,22,25) rotatably mounted on said supporting body, about respective axes of rotation (19,21,24).

The subject-matter of claim 1 therefore differs from this known method in that the wheels and the supporting body are produced by co-moulding, as defined in the claim.

The subject-matter of claim 1 is therefore new.

The problem to be solved by the present invention may therefore be regarded as how to simplify the production/assembly process of the toy.

The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step, since it is well known in the field of injection moulded toys to co-mould two parts in order to simplify the production/assembly process of the toy, see document D2 (paragraph [0018]; figures). The skilled person would therefore adapt the solution from D2 and thereby arrive at the subject-matter of claim 1.

Consequently the subject-matter of claim 1 does not involve an inventive step in view of a combination of documents D1 and D2.

3 The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding independent claim 7, relating to the toy obtained according to the process of claim 1, which therefore is also considered not inventive.

4 Dependent claims 2-6 and 8-11 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of inventive step, as the features specified there are normal constructional features in the filed of producing injection moulded toys.

Re Item VII

Certain defects in the application

1 The independent claim should have been properly cast in the two part form, with those features which in combination are part of the closest prior art D1 being placed in the preamble.

2 Reference signs in parentheses should have been inserted in the claims to increase their intelligibility.

3 The relevant background art disclosed in D1 and D2 is not mentioned in the description, nor are these documents identified therein.