

(12) **UK Patent**

(19) **GB**

(11) **2557968**

(13) **B**

(45) Date of B Publication

**07.10.2020**

(54) Title of the Invention: **Vehicle storage console and method for manufacturing the same**

(51) INT CL: **B29C 49/06** (2006.01) **B29C 49/46** (2006.01)

(21) Application No: **1621749.9**

(22) Date of Filing: **20.12.2016**

(43) Date of A Publication **04.07.2018**

(56) Documents Cited:

<b>WO 2017/064605 A</b>	<b>CN 104960137 A</b>
<b>CN 102476435 A</b>	<b>DE 004334012 A</b>
<b>DE 004333543 A</b>	<b>DE 004209600 A</b>
<b>DE 102005038469 A</b>	<b>FR 002009111 A</b>
<b>KR 030082806 A</b>	<b>US 20040188895 A</b>
<b>JPH0323920</b>	
<b>JPS62255120</b>	
<b>JPH0891103</b>	
<b>JPS5927955</b>	

(58) Field of Search:

As for published application 2557968 A viz:  
INT CL **B29C, B29L, B60R, B65D**  
Other: **WPI, EPODOC**  
updated as appropriate

Additional Fields  
Other: **None**

(72) Inventor(s):  
**Stewart Dowling**  
**Chloe Nunn**

(73) Proprietor(s):  
**Jaguar Land Rover Limited**  
**(Incorporated in the United Kingdom)**  
**Abbey Road, Whitley, Coventry, Warwickshire,**  
**CV3 4LF, United Kingdom**

(74) Agent and/or Address for Service:  
**JAGUAR LAND ROVER**  
**Patents Department W/1/073, Abbey Road, Whitley,**  
**Coventry, Warwickshire, CV3 4LF, United Kingdom**

**GB 2557968 B**

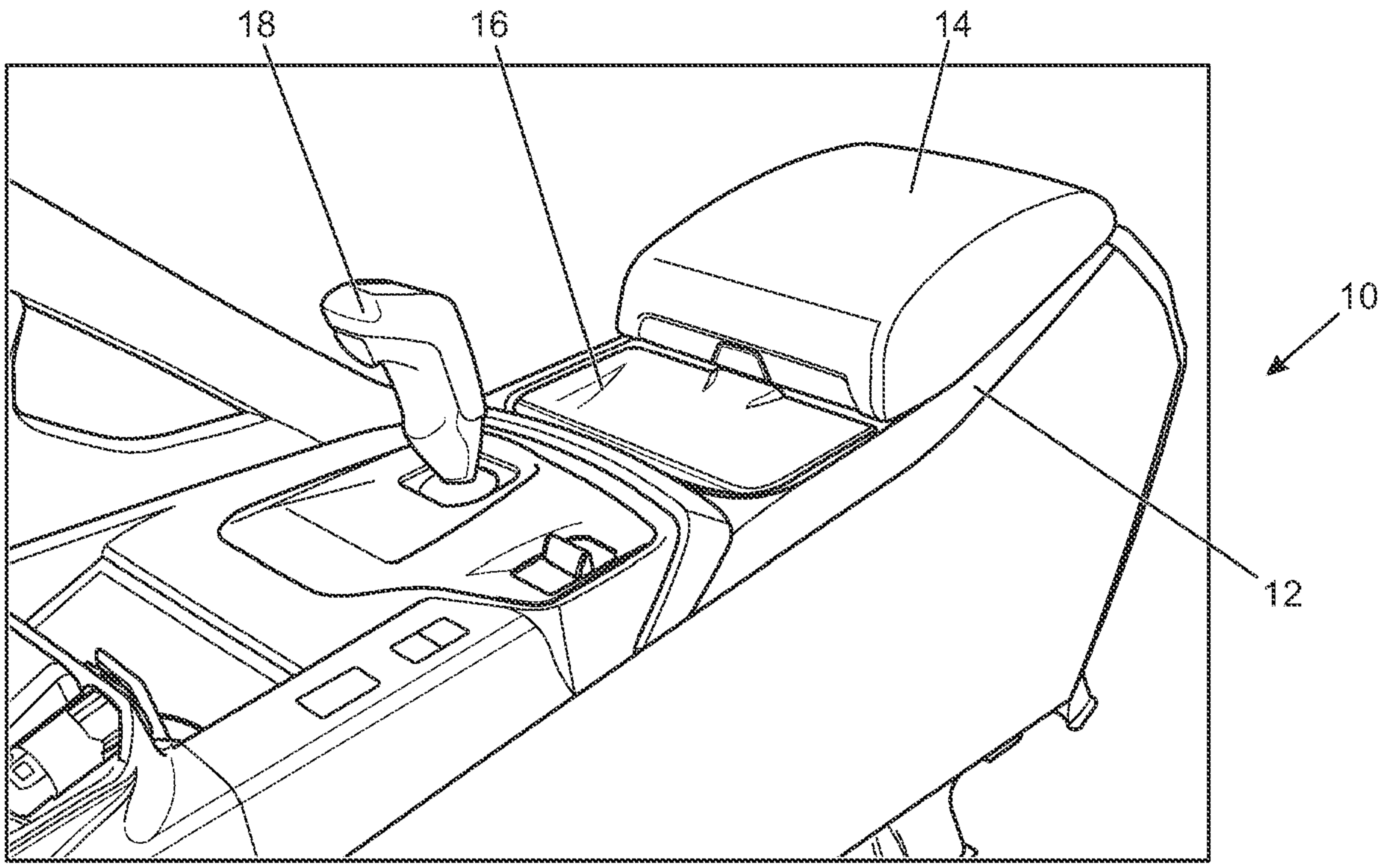


FIGURE 1

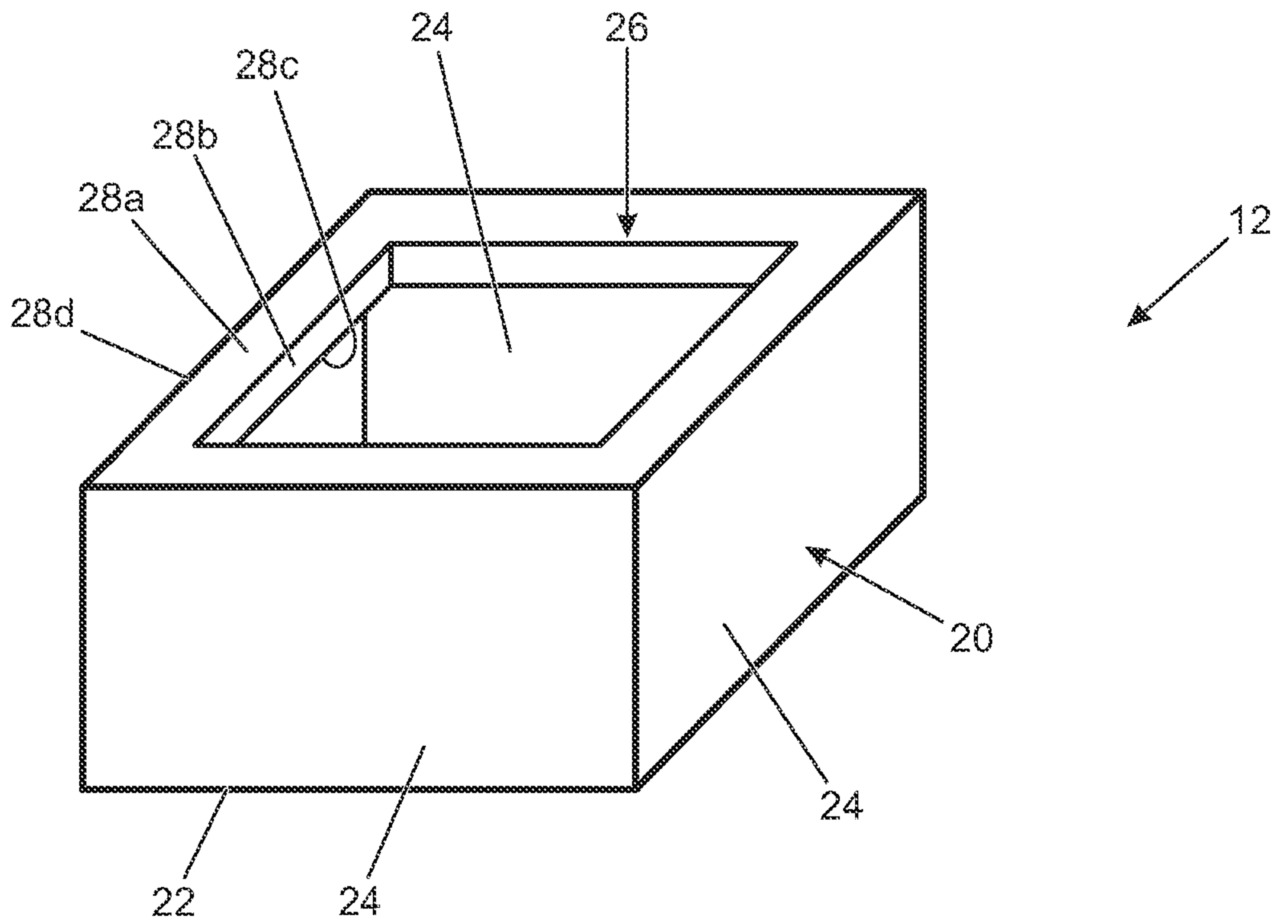


FIGURE 2

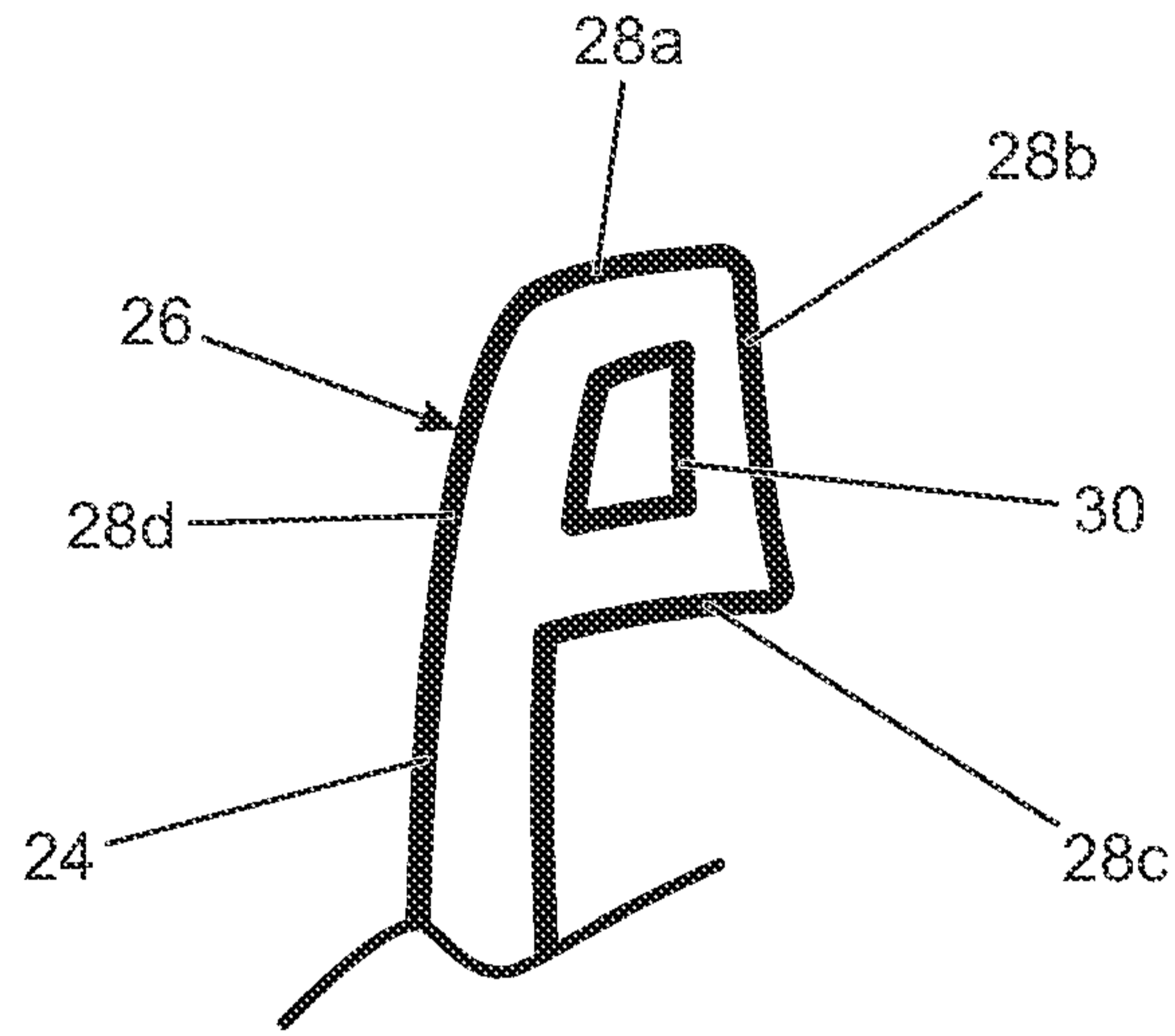


FIGURE 3

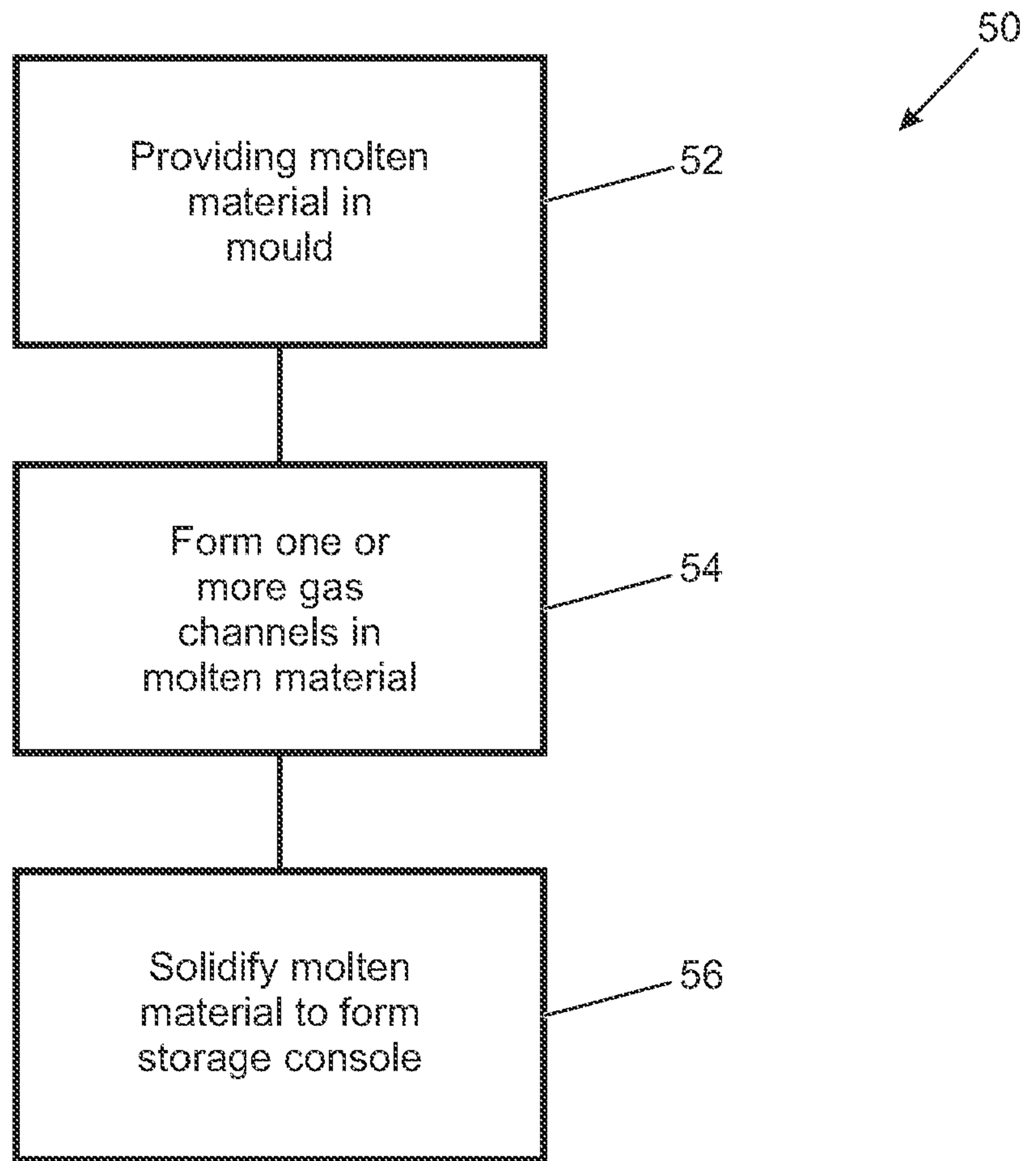


FIGURE 4

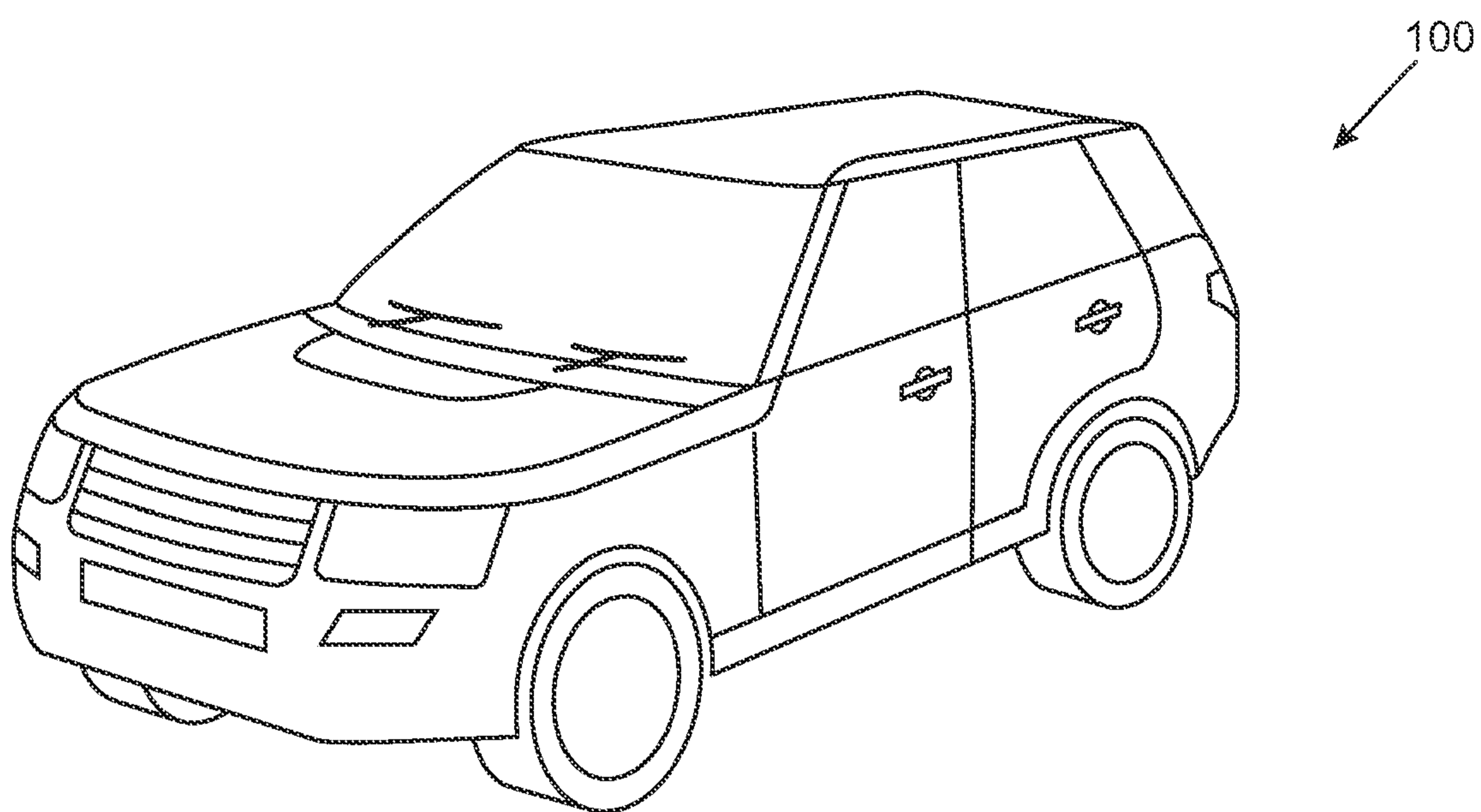


FIGURE 5

07 03 18

# VEHICLE STORAGE CONSOLE AND METHOD FOR MANUFACTURING THE SAME

## TECHNICAL FIELD

5 The present disclosure relates to a vehicle storage console and a method for manufacturing the same. Aspects of the invention relate to a method of manufacturing a vehicle storage console, to a vehicle storage console, to a vehicle centre console assembly, and to a vehicle.

## 10 BACKGROUND

Storage consoles in vehicles often form part of the centre console of the vehicle which generally extends along a centre line of the vehicle and is located between the driver seat and the front passenger seat. Vehicle storage consoles provide a volume within the vehicle for stowing items. On the one hand, there is a desire for the storage console to be large so as to provide a large storage volume. On the other hand, the surrounding features and space requirements around the storage console will determine an upper limit on the size of the storage console.

20 A storage console having thin walls will provide a large inner volume whilst limiting the external dimensions of the storage console. However, a storage console with thin walls may be less structurally rigid and/or reduce the perception of quality of the storage console.

In alternative prior art arrangements, storage consoles are manufactured from several components in an attempt to maximise internal volume for a given external size. However, such multi-component arrangements may suffer from poor finish, include gaps due to manufacturing tolerance issues and/or suffer from poor structural rigidity.

30 It is an object of embodiments of the invention to at least mitigate one or more of the problems of the prior art.

## SUMMARY OF THE INVENTION

35 Aspects and embodiments of the invention relate to a method of manufacturing a vehicle storage console, to a vehicle storage console, to a vehicle centre console assembly, and to a vehicle as claimed in the appended claims.

05 06 20

According to an aspect of the invention, there is provided a method of manufacturing a vehicle storage console comprising:

5 providing molten material in a mould wherein the mould is shaped to form a storage console comprising a body and an overhanging lip portion, the body comprising a base and a plurality of side walls upstanding from the base, and the lip portion forming an overhang relative to the side walls, wherein the lip portion has a quadrilateral cross-sectional shape;

10 introducing a gas into the molten material to form one or more channels in the molten material, wherein the one or more channels are formed in the lip portion; and

solidifying the molten material to form a storage console including the one or more channels.

15 Embodiments of the present invention may advantageously result in less warping of the formed storage console. Additionally or alternatively, the formed storage console may have fewer sink marks that are often associated with prior art moulding processes. Additionally or alternatively, the formed storage console may have improved surface definition due to the molten material being pressed against the mould by the gas. The formed storage console may have improved structural  
20 strength and rigidity whilst using less material than a conventional solid component.

A storage console with sufficient strength, rigidity, and/or aesthetic characteristics may therefore be provided in accordance with embodiments of the present invention, where the storage console may have thinner walls than would otherwise be required.

25

The presence of a lip portion may provide particularly good structural characteristics (e.g. strength and/or rigidity).

In certain embodiments, the lip portion may extend around edges of the side walls.

30

In certain embodiments, the one or more channels may comprise a single channel extending continuously through the lip portion.

35 In certain embodiments, the lip portion may for example, be a square cross-sectional shape. Such arrangements may provide particularly good structural characteristics (e.g. strength and/or rigidity).

The molten material may comprise plastics material. In certain embodiments, the step of providing molten material in the mould may comprise injecting molten material into the mould.

- 5 The gas may be an inert gas, which may be, or includes, nitrogen, for example.

Solidifying the molten material may comprise actively cooling the molten material. Active cooling may advantageously speed up the manufacturing process and/or improve structural or aesthetic qualities of the formed vehicle storage console.

10

In alternative embodiments, solidifying the molten material may comprise allowing the molten material to cool over a predetermined time period.

15

According to another aspect of the invention, there is provided a vehicle storage console comprising a body and an overhanging lip portion extending around a portion of the body, the body comprising a base and a plurality of side walls upstanding from the base, and the lip portion forming an overhang relative to the side walls, wherein the storage console is a singly moulded component and the lip portion includes one or more internal channels running therethrough. The lip portion has a quadrilateral cross-sectional shape.

20

Optionally, the lip portion may extend around edges of the plurality of side walls. In certain embodiments, the one or more internal channels may comprise a single channel extending continuously through the lip portion.

25

The lip portion may for example, be a square cross-sectional shape.

The singly moulded component may be a singly moulded plastics component.

30

According to another aspect of the invention, there is provided a vehicle centre console assembly comprising a vehicle storage console having the features of the vehicle storage console described above.

35

According to another aspect of the invention, there is provided a vehicle comprising a vehicle centre console assembly having the features of the vehicle centre console assembly described above, or a vehicle storage console having the features of the vehicle storage console described above.

Within the scope of this application it is expressly intended that the various aspects, embodiments, examples and alternatives set out in the preceding paragraphs, in the claims and/or in the following description and drawings, and in particular the individual features thereof, may be taken independently or in any combination. That is, all embodiments and/or features of any embodiment can be combined in any way and/or combination, unless such features are incompatible. The applicant reserves the right to change any originally filed claim or file any new claim accordingly, including the right to amend any originally filed claim to depend from and/or incorporate any feature of any other claim although not originally claimed in that manner.

#### BRIEF DESCRIPTION OF THE DRAWINGS

One or more embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a vehicle centre console assembly according to an embodiment of the present invention;

Figure 2 shows a schematic representation of a storage console in accordance with an embodiment of the present invention;

Figure 3 shows a detailed cross-sectional view of a part of a storage console in accordance with an embodiment of the present invention;

Figure 4 shows a method according to an embodiment of the present invention; and

Figure 5 shows a vehicle that may include a vehicle centre console assembly or a storage console in accordance with an embodiment of the present invention.

#### DETAILED DESCRIPTION

Figure 1 shows a vehicle centre console assembly 10 according to an embodiment of the present invention. The vehicle centre console assembly 10 includes a storage console 12, a lid 14 for covering the storage console 12, a cup holder 16 (shown with a cover in place in Figure 1), and a gear selector 18. The vehicle centre console assembly 10 may extend generally along a centre line of a vehicle, such as the



vehicle 100 shown in Figure 5, and may be positioned between the driver seat and the front passenger seat.

Figure 2 schematically shows the storage console 12 according to an embodiment of the present invention. The storage console 12 includes a body 20 and a lip portion 26. In the non-limiting embodiment shown in Figure 2, the body 20 comprises a base 22 and four side walls 24 upstanding from the base 22. The lip portion 26 extends continuously around top edges of the side walls 24. In alternative embodiments, the lip portion 26 may be provided elsewhere. The lip portion 26 forms an overhang (i.e. it extends inwardly) relative to the respective side walls 24. The lip portion 26 has a top surface 28a, an inner side surface 28b, an underside surface 28c, and an outer side surface 28d. In alternative embodiments, the storage console 12 may be otherwise shaped. For example, a different number of side walls 24 may be upstanding from the base 22 and/or the side walls 24 may be arranged differently so as to form a non-cube or non-cuboid shape.

Figure 3 shows a detailed cross-sectional view of a part of the storage console 12 of Figure 2. In particular, in Figure 3, one of the side walls 24 and a portion of the lip portion 26 can be seen in cross section. As shown in Figure 3, the lip portion 26 includes a channel 30 therein. The channel 30 is in the form of a void in the lip portion 26. In the non-limiting embodiment shown in Figure 3, the top surface 28a, inner side surface 28b, underside surface 28c, and outer side surface 28d form a generally quadrilateral (or “box-like”) shape in cross section around the channel 30. More specifically, the lip portion 26 generally forms a square shape in cross section around the channel 30. In alternative embodiments, other shapes (in cross section) may be formed by the lip portion 26 around the channel 30. For example, in certain embodiments, any polygonal shape (in cross section) may be formed by the lip portion 26 around the channel 30. In certain embodiments, the shape formed around the channel 30 (in cross section) may include one or more curves. In certain embodiments, the shape formed around the channel 30 may provide the storage console 12 with greater structural strength and rigidity whilst avoiding the need for overly thick walls which might reduce the volume available for storage within the storage console 12, and additionally require more material to manufacture. The channel 30 would not be capable of being formed using traditional moulding techniques (i.e. where the presence and shape of the channel 30 is determined by the shape of the mould). Consequently, multiple-piece mouldings would be required to realise the shape described above in relation to Figure 3.

In alternative embodiments, the lip portion 26 may include several channels 30 that may or may not be connected to one another. In certain embodiments, each channel 30 may extend along a longitudinal axis that is substantially parallel to a plane of a respective side wall 24. In certain embodiments, the one or more channels 30 may define a continuous channel that extends continuously (i.e. in a closed shape) through the lip portion 26.

In use, in certain embodiments, the storage console 12 may be assembled with other components. For example, one or more inserts or other internal components may be provided in the storage console 12.

The storage console 12 may be formed by gas assisted moulding, in certain embodiments.

Figure 4 shows a method 50 of manufacturing the storage console 12 according to an embodiment of the present invention. The method 50 includes providing 52 molten material in a mould, forming 54 one or more gas channels 30 in the molten material, and solidifying 56 the molten material to form the storage console 12 including the one or more channels 30. The storage console 12 may be formed as a singly moulded component.

Providing 52 molten material in the mould may, in some embodiments, comprise injecting molten material into the mould. The molten material may be a plastics material.

The mould may be full or partially full of molten material when the gas is introduced 54.

Forming 54 the one or more gas channels 30 in the molten material may comprise injecting pressurised gas into the molten material in the mould. The gas may form the one or more channels 30 such that material (which may or may not still be molten) may surround the one or more channels 30. Material surrounding the one or more channels 30 may be in contact with the mould.

The mould may be actively cooled to encourage the solidification 56 of the molten material, and, in particular, the solidification of the molten material that is in contact

with the mould and surrounding the one or more channels 30. Additionally or alternatively, other active cooling means may be provided to accelerate solidification 56 of the molten material. In alternative embodiments, the molten material may be allowed to solidify by allowing the molten material to cool over a predetermined time 5 period following formation of the one or more channels 30.

An exit port in the mould may allow the gas introduced into the mould to exit the mould. The exit port may also permit any molten material that is displaced by the gas to exit the mould. Given that the one or more channels 30 are formed by the 10 introduction of gas, the one or more channels 30 may be termed "gas channels". This is despite the possibility of the gas being evacuated after formation of the one or more channels 30.

In certain embodiments, the gas may be an inert gas. In particular embodiments, the 15 gas may be or include nitrogen.

The methods of the present invention may advantageously result in less warping of the formed storage console 12. Additionally or alternatively, the formed storage console 12 may have fewer sink marks that are often associated with prior art 20 moulding processes. Additionally or alternatively, the formed storage console 12 may have improved surface definition due to the molten material being pressed against the mould by the gas. The formed storage console 12 may have improved structural strength and rigidity whilst using less material than a conventional solid component.

25 A storage console 12 with sufficient strength, rigidity, and/or aesthetic characteristics may therefore be provided in accordance with embodiments of the present invention, where the storage console 12 may have thinner walls than would otherwise be required.

30

The invention is not restricted to the details of any foregoing embodiments. The claims should not be construed to cover merely the foregoing embodiments, but also any embodiments which fall within the scope of the claims.

## CLAIMS

1. A method of manufacturing a vehicle storage console comprising:  
5 providing molten material in a mould, wherein the mould is shaped to form a storage console comprising a body and an overhanging lip portion, the body comprising a base and a plurality of side walls upstanding from the base, and the lip portion forming an overhang relative to the side walls, wherein the lip portion has a quadrilateral cross-sectional shape;  
10 introducing a gas into the molten material to form one or more channels in the molten material, wherein the one or more channels are formed in the lip portion; and  
solidifying the molten material to form a storage console including the one or more channels.
- 15 2. The method of claim 1, wherein the lip portion extends around edges of the side walls.
3. The method of claim 2, wherein the one or more channels comprises a single channel extending continuously through the lip portion.
- 20 4. The method of any preceding claim, wherein the lip portion has a square cross-sectional shape.
5. The method of any preceding claim, wherein the molten material comprises plastics material.
- 25 6. The method of any preceding claim, wherein providing molten material in the mould comprises injecting molten material into the mould.
- 30 7. The method of any preceding claim, wherein the gas is an inert gas.
8. The method of any preceding claim, wherein the gas includes nitrogen.
9. The method of claim 8, wherein the gas is nitrogen.
- 35 10. The method of any preceding claim, wherein solidifying the molten material comprises actively cooling the molten material.

05 06 20

11. The method of any of claims 1 to 9, wherein solidifying the molten material comprises allowing the molten material to cool over a predetermined time period.
- 5 12. A vehicle storage console comprising a body and an overhanging lip portion extending around a portion of the body, the body comprising a base and a plurality of side walls upstanding from the base, and the lip portion forming an overhang relative to the side walls, wherein the vehicle storage console is a singly moulded component and the lip portion includes one or more internal channels running therethrough, wherein the lip portion has a quadrilateral cross-sectional shape.
- 10
13. The vehicle storage console of claim 12, wherein the lip portion extends around edges of the plurality of side walls.
- 15
14. The vehicle storage console of claim 13, wherein the one or more internal channels comprise a single channel extending continuously through the lip portion.
- 20
15. The vehicle storage console of any of claims 12 to 14, wherein the lip portion has a square cross-sectional shape.
16. The vehicle storage console of any of claims 12 to 15, wherein the singly moulded component is a singly moulded plastics component.
- 25
17. A vehicle centre console assembly comprising the vehicle storage console of any of claims 12 to 16.
18. A vehicle comprising the vehicle centre console assembly of claim 17 or the vehicle storage console of any of claims 12 to 16.
- 30