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(54) IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF MODEL TOYS

(71) We, BRITAINS LIMITED, British Company of Blackhorse Lane, London, E17 5QJ, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following Statement:-

The present invention relates to the manufacture of model toys and in particular to the provision of stands or bases therefor.

According to the invention a method of manufacturing a model toy includes the steps of positioning a base member, having an opening therethrough, in a mould, and injecting a thermoplastics material in a fluid state through said opening and into a mould cavity of the mould, the thermoplastics material subsequently solidifying into a moulding which includes a part located in said opening.

Conveniently the shaping of the opening is such that said part of the moulding located in the opening is keyed therein.

Suitably the base member is in the form of a substantially flat metallic plate (e.g. a die-cast metal plate). Conveniently the opening has a non-uniform cross-section throughout its length. The opening may be tapered, the end opening into said mould cavity being of smaller cross-section than the other end.

The invention has particular utility in the case where the moulding is to be transferred to a different mould to enable at least one portion of the moulding to be over-moulded with thermoplastics material of a different colour (or different colours) in a subsequent over-moulding operation (or subsequent over-moulding operations), the stand or base aiding in the storage and/or handling of the moulding. It should be understood that in this specification the term "over-moulding" means the moulding

of a mouldable material over at least part of the surface of a previously moulded moulding. If it is desired either to perform several (e.g. three or more) over-moulding operations or to mould two or more layers over the original moulding, it is necessary to transfer the over-moulded moulding to at least one further mould. In order to save time, it is possible to perform two or more over-moulding operations simultaneously in a given mould. The original moulding may be formed with spigots onto, and/or recesses into, which thermoplastics material may be injected in subsequent over-moulding operations.

The invention will now be described by way of example and with particular reference to the drawings filed with the provisional specification, in which:-

Figure 1 is an end view of a mould suitable for use in the manufacture of a model toy according to the present invention,

Figure 2 is a plan of part of the mould shown in Figure 1 used in a stage of the manufacture of a model toy according to the present invention,

Figure 3 is another stage in the manufacture of a model toy according to the present invention, and

Figures 4a to 4e show various stages of manufacture of a model toy manufactured according to the present invention.

In Figure 1 there is shown a first mould, generally designated by the reference numeral 1, comprising first and second mould parts 2 and 3, respectively, clamped together by means (not shown). The mould parts 2 and 3 are each provided with a hollow 4 in one of their end walls and a recess 5 (only the recess 5 for mould part 2 can be seen in Figure 2) in their confronting surfaces. The hollows 4 define an

indentation 6 in the end wall 7 of the mould 1 for receiving a machine painted die-cast metal base plate 8 having a tapered aperture 9 therethrough of non-circular cross-section (e.g. square cross-section). The recesses 5 define a mould cavity (not shown) in communication with the indentation 6.

In use a thermoplastics material, e.g. polyethylene, is injected from a nozzle 10 of an injection moulding machine 11 (only partly shown in Figure 2), through the hole 9 and into the mould cavity. On solidification of the thermoplastics material in the mould 1, a moulding 12 (see Figure 4a) is produced having the base plate 8 attached thereto. The moulding 12 is in the form of a partly formed male ballet dancer and has spigots 13, 14 and 15 and a narrow body portion 16 having a hole 17 therethrough for a purpose to be described hereinafter.

Figure 3 shows a second mould comprising two mould parts 18 (only one mould part 18 being shown in Figure 3). In order to simplify the foregoing description, reference numerals have been used in Figure to denote "mould cavities", "ducts", "injection openings", "faces" and "cavities", although such features are not truly formed unless the two mould parts 18 are clamped together in cooperating relationship). The second mould has three mould cavities 19, 20 and 21 each in direct communication, via ducts 22, 23 and 24, respectively, with an injection opening 25 provided in an end face 26 of the mould. A fourth mould cavity 27 is in direct communication, via a duct 28, with an injection opening 29 provided in a side face 30 of the mould. The second mould also includes a cavity 31 surrounding a leg portion 32 of the moulding 12, and a cavity 33 surrounding the base plate 8 and another leg portion 34. Neither of the cavities 31, 33 is in communication with an injection opening. The mould cavity 27 completely surrounds a stud 35 of smaller cross-section than the hole 17 formed in the moulding 12.

The moulding 12 is then transferred to the second mould with the spigots 13, 14 and 15 located in the mould cavities 19, 20 and 21, respectively, and the narrow body portion 16 located in the mould cavity 27. The stud 35 is positioned so as to pass through the hole 17 with a suitable clearance. Thermoplastics material of a different colour (e.g. blue) to the moulding 12 is then injected from a nozzle 36 of an injection moulding machine 37 (only partly shown in Figure 3), through the injection opening 29, along the duct 28 and into the mould cavity 27. In this manner a waistcoat 38 is over-moulded on the moulding 12 (see Figure 4b), which has a hole 50 see Figure 4c therethrough of substantially the same cross-section as the stud 35. Subsequently, or simultaneously with the moulding of the waistcoat 38, flesh-coloured thermoplastics material is injected

from a nozzle 39 of an injection moulding machine 40 (only partly shown in Figure 3), through the injection opening 25, along the ducts 22, 23 and 24, and into the mould cavities 19, 20 and 21, respectively. In this manner two hands 41, 43 and a face 42 are over-moulded on to the moulding 12 (see Figure 4c). When the over-moulded thermoplastics material solidifies, unwanted portions 44, 45, 46 and 47 connected to the hand 41, face 42, hand 43, and waistcoat 38 are left in the ducts 22, 23, 24 and 28, respectively. These unwanted portions are severed at the hands, face and waistcoat, and the resultant moulding is transferred to a third mould (not shown).

In the third mould, silver coloured thermoplastics material is over-moulded on to the waistcoat 38 to provide decoration 48 on the latter (see Figure 4d), and black coloured thermoplastics material is over-moulded on to the head portion to provide hair 49 on the latter (see Figure 4e). The over-moulding of the silver and black colours is performed in a similar manner to that described in relation to Figure 2 and may be performed separately or simultaneously.

The provision of the hole 50 through the waistcoat 38 and body portion 16, enables a part to be decorated at the front of the and at the rear of the waistcoat, the front decoration being isolated on the surface of the waistcoat; the back decoration being in direct communication with the point of injection on the shoulder decoration. The silver coloured thermoplastics material thus flows through the hole 50 and enables the front and rear of the waistcoat to be decorated.

In other embodiments of the invention the base plate 8 may have a non-tapered aperture 9 therethrough. A suitable key between the base plate 8 and the moulding 12 may be provided by having an aperture of other non-uniform cross-section, by allowing part of the moulding 12 to "spread" over the lower surface of the base plate 8 so as to be of greater cross-section than any part of the aperture 9, or by having an aperture of uniform cross-section throughout its length but which follows an indirect path between its two ends. Alternatively, or in addition the two ends of the aperture may be displaced transversely of each other.

WHAT WE CLAIM IS:

1. A method of manufacturing a model toy including the steps of positioning a base member, having an opening therethrough, in a mould, and injecting a thermoplastics material in a fluid state through said opening and into a mould cavity of the mould, the thermoplastics material subsequently solidifying into a moulding which includes a part located in said opening.
2. A method according to claim 1, in which said opening is shaped so that said moulding part located in the opening is keyed therein.
3. A method according to claim 2, in which

- the cross-sectional area of said opening varies throughout its length.
4. A method according to claim 3, in which said opening is tapered throughout its length, the end of the opening which opens into said mould cavity being of smaller cross-section than the opposite end of the opening.
5. A method according to any of claims 2 to 4, in which the base member has a substantially flat ground-engaging surface, the opposite ends of the opening being spaced apart in a direction parallel to the plane containing said ground-engaging surface.
6. A method according to any of claims 2 to 5, in which the opening follows an indirect path between its two ends.
7. A method according to any of the preceding claims, in which said base member is in the form of a substantially flat metallic plate.
8. A method according to any of the preceding claims, in which further thermoplastics material is over-moulded over only part of the surface of the solidified, first-mentioned thermoplastics material in at least one subsequent over-moulding operation.
9. A method according to claim 8, in which the, or at least some of the, said over-moulding operation(s) is or are performed in a further mould.
10. A method according to claim 8 or 9, in which the original moulding, formed from the first-mentioned thermoplastics material, is formed with at least one spigot onto, and/or at least one recess into, which said further thermoplastics material is injected in said subsequent over-moulding operation or operations.
11. A method according to claim 8, 9, or 10 in which said further thermoplastics material is of a different colour or colours to said first-mentioned thermoplastics material.
12. A method of manufacturing a model toy substantially as herein described with reference to, and as illustrated in, Figures 1, 2, 3, 4a, 4b, 4c, 4d and 4e of the drawings filed with the provisional specification.
13. A model toy manufactured by the method claimed in any of claims 1 to 12.
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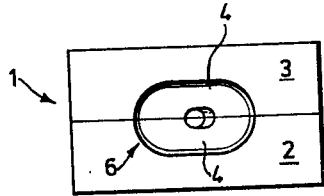


Fig. 1.

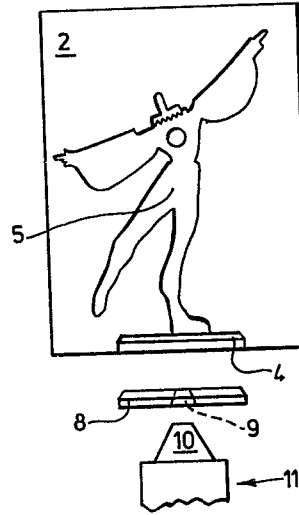


Fig. 2.

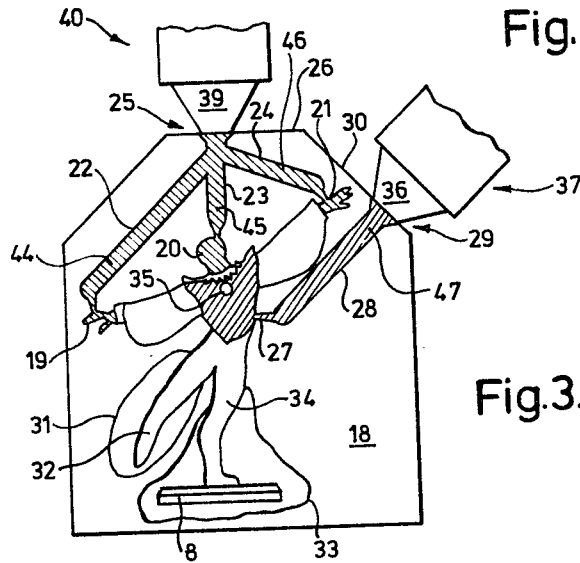


Fig. 3.

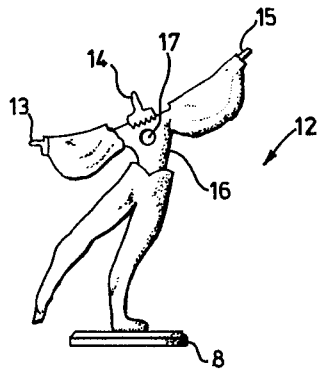


Fig.4a.

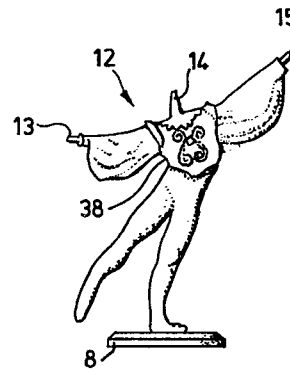


Fig.4b.

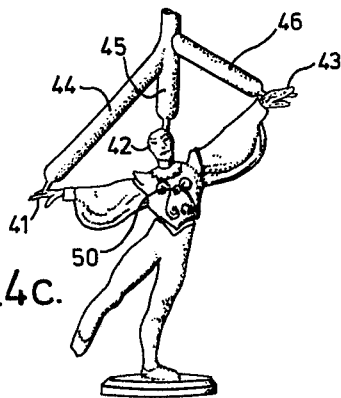


Fig.4c.

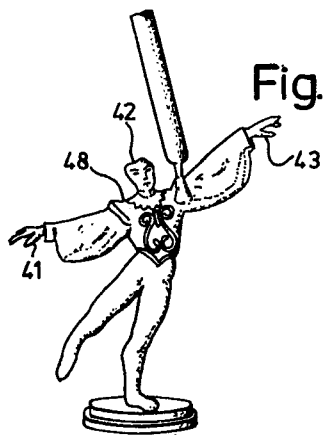


Fig.4d.

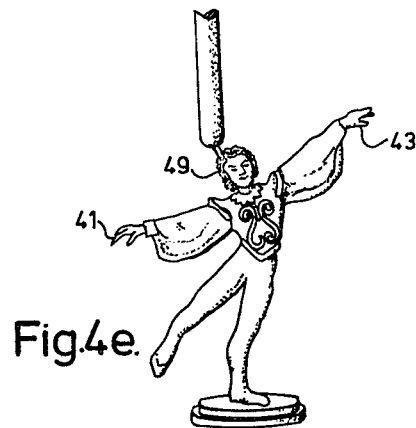


Fig.4e.