受験番号：28IPM014

問１

[0003]

SUMMARY OF THE INVENTION

However, air resistance cannot be ignored even for an object with a smooth surface. For the transporting objects mentioned above, air resistance adversely affects their fuel efficiency, acceleration, maximum speed, and stability. In particular, the fuel efficiency issue is directly related to environment issues such as the energy resource issue, pollution, acid rain, and global warming, and becoming increasingly larger with the recent increase in traffic energy. In addition, objects that fly at ultrahigh speed have the issue of heating by friction with air (aerodynamic heating). For example, a space shuttle reaches a speed of 7.6 km per second when reentering the atmosphere, and thus the surface temperature increases partially to as high as 1400°C or more due to the frictional heating. Thus, it is significantly challenging to develop heat resisting materials and heat insulating structures for these objects, and the development of an innovative technology for improving the durability is also an urgent issue.

[0004]

The present invention is intended to solve the stated issues, and provide an innovative structure with reduced fluid resistance on the object surface that leads to a revolutionary technology. The technology can reduce the fluid resistance on the object surface compared with the smooth surface based on a new theory of hydromechanics, thus improving the fuel efficiency, the acceleration, the maximum speed, and the stability of all transporting objects. In particular, the technology contributes to global grappling with saving energy and solving the environment issues. For objects that fly at ultrahigh speed, the technology can reduce frictional heating and various parasite drags to improve the durability and reduce the costs of heat resisting materials and heat insulating structures.

問２

Then, each bell-like core 1 was placed in position within the cavity of a mold for a final hollow molded product, as shown in Fig. 2.

The mold includes three mold parts: a mold A denoted by 20 in Fig. 2, a mold B denoted by 30, and a mold C denoted by 40. The mold A has projections 22 and 23, the mold B has projections 32 and 33, and the mold C has a projection 41.

More specifically, the core 1 has an upper projection 11 in contact with the projection 22 of the mold A and the projection 32 of the mold B. The core 1 also has a through-hole 12 in contact with the projection 23 of the mold A and the projection 33 of the mold B, and these projections are separated from the interior wall of the core 1. The core 1 also has a recess 13 in which the projection 41 of the mold C is received. As a result, the core 1 is placed in position with the mold cavity.

Around each core 1 placed in the mold, each outer shell resin (B) 5 is injected via an injection hole 21 illustrated in Fig. 2 at the injection molding temperature (320°C). The resin is subjected to injection molding and then cooled, resulting in a molded article integrated with the core.

Good: No cracks visually confirmed on the outer shell resin (the core not deformed, a molded article integrated with the core obtained)
Not good: Cracks visually confirmed on the outer shell resin (the core slightly deformed during the injection molding of the resin (B))
Poor: Significant cracks visually confirmed on the outer shell resin (the core significantly deformed during the injection molding of resin (B))

翻訳コメント
「○」は Good、 「△」は Not good、「×」は Poor と訳しました。

問 3

1. A simplified zoom lens mechanism including a lens barrel containing a fixed lens groups at both ends and two movable lens groups between the fixed lens groups along an optical axis L, one of the movable lens groups being configured for zooming to change a shooting magnification of a subject, another of the movable lens groups being configured for focusing, the two movable lens groups in the lens barrel being each movable along the optical axis L, the zoom lens mechanism comprising:

a driving shaft 5 and a driven shaft 6 provided about the optical axis L and in parallel with the optical axis L;

a driving body 8 integrated with a frame of the focusing movable lens group 4 and provided on the driving shaft 5 in a slidable manner; and

a driven body 9 integrated with a frame of the zooming movable lens group 3 and provided on the driven shaft 6 in a slidable manner,

wherein the driving body 8 on the driving shaft 5 is capable of driving the

driven body 9 on the driven shaft 6, whereby the zooming movable lens group 3 and the focusing movable lens group 4 are movable along the optical axis L.