

**Title: Drive system for opening, respectively closing
a door or the like**

Description

The invention relates to a drive system for opening,
5 respectively closing a leaf of a door, of a window or the
like, having a housing, a closing spring disposed in the
housing, which spring acts upon a piston being, via a
toothing, in an operative connection with a closing shaft
supported in the housing.

10 Such drive system is known from DE 198 22 498 A1.
However, this known drive system needs to be improved,
particularly with regard to the materials used for
manufacturing the individual components.

Therefore, it is an object of the present invention to
15 improve a drive system of the above mentioned type with
regard to the manufacturing costs thereof.

For a drive system, having the above mentioned
characteristics, this is realized in that substantially the
piston and the housing are formed from the plastic material
20 polyoxymethylene (POM).

This plastic material, by virtue of its characteristics, is
particularly suitable as a material for the piston and the

housing, as polyoxymethylene (POM) is very stiff and rigid and presents a high resilience, a high heat deflection temperature, a high resistance to abrasion, an advantageous sliding performance and little wear.

- 5 Moreover, polyoxymethylene (POM) is being recognized as safe with regard to health and compatible with different hydraulic dampening media.

Advantageous further developments of the object of patent claim 1 are contained in the dependent claims.

- 10 The piston and the housing are preferably manufactured through injection moulding, as this manufacturing procedure guarantees that the parts can be manufactured in a large number of pieces in an accurate, precise and cost effective manner.

- 15 With the intention to achieve the best wear-free cooperation between the toothing at the piston and the pinion of the closer shaft, according to an inventive further development, it is provided that the toothing of the piston is embedded in the piston in form of an inlay made from
20 metal, preferably steel, and is preferably injection-moulded with plastic material.

According to one advantageous embodiment, the bearing shells of the closer shaft are likewise manufactured from the plastic material polyoxymethylene (POM).

These bearing shells are, according to an inventive further development, friction-set into the housing and/or ultrasonically sealed, such that a perfect seat of the closer shaft in the housing can be guaranteed.

- 5 An aperture, closed by means of an end cap, for the accommodation of the closing spring and the piston, is provided within the housing. According to one preferred embodiment, this end cap consists of the plastic material polyoxymethylene (POM).
- 10 According to one advantageous further development, the above mentioned embodiment presents the advantage that the end cap can be friction-set into the housing and/or it can be sealed with the latter, preferably by means of ultrasound.
- 15 If, according to a preferred embodiment, hydraulic control bores are provided in the housing, the exits thereof out of the housing being closed by means of friction-set and/or ultrasonically sealed or glued caps, made from the plastic material polyoxymethylene (POM), the control bores in the
- 20 housing can be manufactured directly during manufacturing of the housing.

Further characteristics and advantages of the invention will become obvious from the following description of one preferred embodiment example.

The single Figure shows a longitudinal section through a drive system for opening, respectively closing a leaf of a door, of a window or the like.

The function of such drive system is generally known and
5 will therefore not be explained in detail hereinafter.

The drive system presents a tubular housing 1, which includes a unilaterally open aperture extending in the longitudinal direction of the housing 1. A closing spring 2, acting upon a displaceable piston 3, is supported in this
10 aperture. The piston 3 and the housing 1 are made from the plastic material polyoxymethylene (POM) and are preferably manufactured through injection moulding.

Furthermore, a closer shaft 4 is supported within the housing 1 transversally with regard to the longitudinal
15 extension thereof, through bearing shells 5. These bearing shells 5 consist of the plastic material polyoxymethylene (POM) and are friction-set into the housing 1 and/or sealed to it, for example by means of ultrasound.

The piston 3 is provided with a toothing (not illustrated),
20 which meshes with a pinion 6 provided at the closer shaft 4. This results in a displacement of the piston 3 in the longitudinal direction of the housing 1, which causes a rotary motion of the closer shaft 4.

The toothing at the piston 3 is preferably formed as an inlay made from metal, for example steel. During manufacturing of the piston 3 this inlay is injection-moulded with plastic material.

- 5 The unilaterally open aperture extending in the longitudinal direction of the housing 1 is closed with an end cap 7 at the open end thereof. This end cap 7 consists of the plastic material polyoxymethylene (POM) and is preferably friction-set into the housing 1 and/or sealed to the latter, preferably
10 by ultrasound.

For dampening the movement of the piston 3 within the housing 1, hydraulic control bores (non-illustrated here) are moulded into the housing 1 during the manufacturing procedure thereof. The exits of these control bores out of
15 the housing 1 can be closed by means of friction-set, and/or ultrasonically sealed or glued caps, which consist of the plastic material polyoxymethylene (POM).

The above description of the embodiment example of the present invention serves for illustrative purposes only and
20 is not intended to limit the invention. Various changes and modifications are possible within the range of the invention without leaving the scope of the invention or the equivalents thereof.

References

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| | 1 | housing |
| | 2 | closing spring |
| | 3 | piston |
| 5 | 4 | closer shaft |
| | 5 | bearing shell |
| | 6 | pinion |
| | 7 | end cap |

Patent claims

1. A drive system for opening, respectively closing a leaf of a door, of a window or the like, having a housing, a closing spring disposed in the housing, which spring acts upon a piston being, via a tothing, in an operative connection with a closer shaft supported in the housing, characterized in that the piston (3) and the housing (1) consist of the plastic material polyoxymethylene (POM).
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- 10 2. A drive system according to claim 1, characterized in that the piston (3) and the housing (1) are manufactured through injection moulding.
- 15 3. A drive system according to any of the preceding claims, characterized in that the tothing of the piston (3) is inserted into the piston (3) as an inlay made from metal, preferably steel, and is preferably injection-moulded with the plastic material.
- 20 4. A drive system according to any of the preceding claims, characterized in that the closer shaft (4) is supported in bearing shells (5) and in that the

bearing shells (5) consist of the plastic material polyoxymethylene (POM).

5. A drive system according to any of the preceding claims, characterized in that the bearing shells (5), made from the plastic material polyoxymethylene (POM), are friction-set into the housing (1) and/or sealed to the latter, preferably by ultrasound.
6. A drive system according to any of the preceding claims, characterized in that the housing (1) is provided with an aperture for the accommodation of the closing spring (2) and the piston (3), which aperture is closed with an end cap (7), and in that the end cap (7) consists of the plastic material polyoxymethylene (POM).
7. A drive system according to any of the preceding claims, characterized in that the end cap (7) is friction-set into the housing (1) and/or sealed to the latter, preferably by ultrasound.
8. A drive system according to any of the preceding claims, characterized in that hydraulic control bores are provided in the housing (1), the exits thereof out of the housing (1) being closed by means of friction-set and/or ultrasonically sealed

or glued caps consisting of the plastic material polyoxymethylene (POM).