



- (51) **International Patent Classification:**  
*B60S 1/34* (2006.01) *B60S 1/58* (2006.01)
- (21) **International Application Number:**  
PCT/EP2019/085826
- (22) **International Filing Date:**  
18 December 2019 (18.12.2019)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**  
10 2018 133 288.2  
21 December 2018 (21.12.2018) DE
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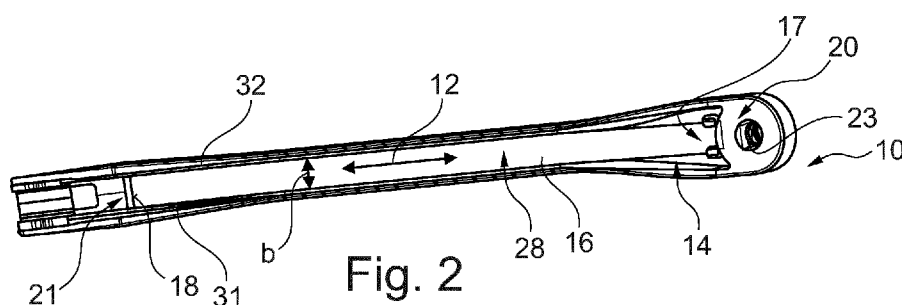
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(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**  
— *of inventorship (Rule 4.17(iv))*

(54) **Title:** WIPER ARM AND METHOD FOR PRODUCING A WIPER ARM



(57) **Abstract:** The invention relates to a wiper arm (10; 10a; 10b) for a window wiper system of a vehicle, especially for a rear wiper system, having a first axial end area (20; 20a) of the wiper arm (10; 10a; 10b) for fixing the wiper arm (10; 10a; 10b) to a drive element, in particular a wiper shaft (22), which is coupled to a drive, and having a second axial end area (21; 21a) of the wiper arm (10; 10a; 10b) for fixing a wiper blade (100) to the wiper arm (10; 10a; 10b) in an exchangeable manner, the wiper arm (10; 10a; 10b) comprising a base body (14; 14a; 14b) made of plastic and being realized as an injection moulded piece, and the wiper arm (10; 10a; 10b) comprising a reinforcing element (16; 16a; 16b), which is made of metal and extends in the longitudinal direction (12) of the wiper arm (10; 10a; 10b), said reinforcing element (16; 16a; 16b) being connected to the base body (14; 14a; 14b) of the wiper arm (10; 10a; 10b).

**Published:**

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

Wiper arm and method for producing a wiper arm

## 5 Prior art

The invention relates to a wiper arm having the features of the preamble of Claim 1. Furthermore, the invention relates to a method for producing a wiper arm according to the invention.

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A wiper arm having the features of the preamble of Claim 1 is known from DE 20 2018 103 589 U1. The wiper arm known in particular for use in the region of a rear wiper system is distinguished in that it consists of a base body made of plastic and a strip-shaped reinforcing element made of metal and being connected to the base body. It is essential here that, in order to form the connection between the base body and the reinforcing element, the base body is formed by insert moulding of the reinforcing element with the plastic of the base body. The base body together with the reinforcing element thereby forms a virtually monolithic or integral component. It is critical here that, depending on the structural configuration, for example because of the different coefficients of thermal expansion of the materials of the insert moulding and of the reinforcing element, it may happen that the connection between the reinforcing element and the plastic of the base body may be released, for example in sections, when considered over the service life of the wiper arm, and therefore the mechanical properties of the wiper arm may vary in respect of the contact pressure force acting on the vehicle window, or else other disadvantageous consequences arise.

30 Disclosure of the invention

- The wiper arm according to the invention for a window wiper system of a vehicle having the features of Claim 1 has the advantage that it always permits at least virtually constant mechanical properties, in particular in respect of a press-on force applied to a vehicle window via a wiper blade
- 5 connected to the wiper arm, as seen over the entire service life or operating duration of the wiper arm. Furthermore, the wiper arm according to the invention enables the latter to be able to be manufactured and fitted relatively simply and adapted particularly simply to different applications.
- 10 For this purpose, the teaching of the invention proposes to form the wiper arm in that the base body and the reinforcing element are realised as separate components, and in that the reinforcing element is connected to the base body via a form- and/or force-fitting connection.
- 15 The invention therefore departs from the route known from the prior art of forming a wiper arm by insert moulding the reinforcing element with the plastic of the base element and instead proposes manufacturing the two components separately from each other and subsequently connecting them to each other by means of a force-fitting and/or form-fitting
- 20 connection. This makes it possible in a particularly simple manner to be able to adapt both the base body made of plastic and the in particular strip-shaped reinforcing element in each case in a particularly simple manner to the respectively required conditions or requirements.
- 25 Advantageous developments of the wiper arm according to the invention are cited in the dependent claims. All of the features disclosed in the claims, the description and/or the figures fall within the scope of the invention.
- 30 In a preferred structural configuration of the connection between the reinforcing element and the base body, it is provided that the connection is

carried out in the area of axial end sections of the reinforcing element. Said end sections of the reinforcing element are conventionally likewise located here in the area of axial end areas of the wiper arm. Owing to the fact that the wiper arm is conventionally more solid or fuller in respect of its  
5 volume or cross section in the axial end areas, there is also more space for or the possibility of providing or forming the desired connection between the base body and the reinforcing element there in a simple manner by suitable mounting elements or the like.

- 10 As already mentioned, it is preferably provided that the reinforcing element is strip-shaped and preferably extends to the two axial end areas of the base body.

With regard to as simple a manufacturing of the reinforcing element as  
15 possible and as constant a flexural strength of the reinforcing element as possible in the longitudinal direction, it can be provided that the cross section of the reinforcing element is constant, as viewed in the longitudinal direction of the reinforcing element, with the possible exception in those areas in which the reinforcing element is connected to the base body. In  
20 particular, a rectangular cross section of the reinforcing element is conceived here, and therefore the reinforcing element can be severed or cut to length from a band-shaped endless material in a very simple manner.

- 25 In order, firstly, to permit as homogeneous an upper side of the wiper arm as possible in the visible region thereof for visual reasons and, secondly, to permit particularly simple installation and accessibility to the reinforcing element, it is provided that the base body has an upper side, and that the reinforcing element extends at a distance and preferably parallel to the  
30 upper side, said reinforcing element forming a visual surface of the wiper arm on the lower side of the wiper arm.

In particular, it is provided in respect of the specific arrangement of the reinforcing element with regard to the cross section of the base body of the wiper arm that, in the area of the reinforcing element, the base body  
5 comprises an at least essentially U-shaped cross section having a base leg and two side legs, and that the reinforcing element is disposed in direct contact to the base leg on the side of the base leg facing towards the side legs.

10 In order to form the form-fitting or force-fitting connection between the reinforcing element and the base body of the wiper arm, it can be provided that the base body comprises at least one mounting element which is realised monolithically with the base body.

15 In a development of the last-made proposal, it is provided that the mounting element penetrates an opening formed in the reinforcing element and is connected to the reinforcing element via a mounting section of the mounting element, preferably formed via a deformation of the mounting element, said deformation being thermal or mechanical in  
20 sections.

Alternatively to the last-made proposal, it can be provided that the mounting element engages over the reinforcing element in sections. In this case, no deformation of the mounting element is required, which can  
25 reduce the outlay on installation or manufacturing.

In a development of the last-made proposal, it can be provided that the reinforcing element has a cutout, in whose area the mounting element can be inserted in a mounting direction extending perpendicular to the plane of  
30 the reinforcing element.

In order to limit or to suppress the movement of the reinforcing element in the longitudinal direction of the base body in a particularly simple manner solely by the structural configuration of the base body, it can be provided that, with an axial end section, the reinforcing element dips into a pocket-shaped accommodation of the base body on the side facing towards the first axial end area of the wiper arm, or is arranged in the accommodation.

In a development of this proposal, it can be provided that the axial end section of the reinforcing element is fixed to the base body via an end cap connected to the base body. In other words, this means that the end cap which conventionally serves to cover the fastening point or the connection between the wiper arm and a wiper shaft at the same time serves to position or fix the reinforcing element in the longitudinal direction.

In an alternative configuration of the fastening between the reinforcing element and the base body, it can be provided that the mounting element is configured by at least one, preferably two pocket-shaped accommodations located at axial end areas of the base body.

In a further configuration of the connection between the base body and the reinforcing element, it is provided that the at least one accommodation in the base body, in longitudinal direction of the base body, has a through-hole near the accommodation with a cross section which corresponds at least to the cross section of the reinforcing element. This permits a purely axial fitting of the reinforcing element in the longitudinal direction of the base body.

In conjunction with the two last-made embodiments, it is of particular advantage if the reinforcing element is configured, in longitudinal direction, as a pre-bent element which deforms the base body in a state connected with the base body in such a way that at least one axial end section of the

reinforcing element is located in a form-fitting manner in the accommodation of the base body in order to limit the axial movement. This takes place in practice by the fact that, for the axial fitting or introduction of the reinforcing element into the area of the accommodations of the base  
5 body, the reinforcing element is transferred during the installation from its deformed state at least in sections again into an extended or flatter state in order to permit or to simplify the axial fitting of the reinforcing element with the base body in the area of the accommodations. As soon as the axial end position of the reinforcing element in the accommodations of the base  
10 body is reached, the force, which is applied for the installation, for deforming the reinforcing element is at least reduced, and therefore, because of the elastic deformation which has previously taken place, the reinforcing element applies a force to the base body of the wiper arm and, in the process, is deformed in such a manner that the axial end sections of  
15 the reinforcing element enter the region of the accommodations and thereby in each case form a longitudinal stop for the movement of the reinforcing element in the longitudinal direction of the main body.

In a further configuration of the invention, it can be provided that the  
20 reinforcing element is fixed on the side facing towards the second axial end area of the wiper arm by means of an adapter element connected to the base body. In particular, it is conceived here that the adapter element covers the reinforcing element in sections and therefore forms a stop in a direction running perpendicularly to the longitudinal extent of the  
25 reinforcing element. At the same time, however, the adapter element can also serve as a longitudinal stop for limiting the longitudinal movement of the reinforcing element in the base body.

The invention also relates to a method for producing a wiper arm  
30 according to the invention described to this extent. The method according to the invention is distinguished in that the base body and the reinforcing

element are produced separately from each other and the reinforcing element is subsequently connected to the base body via a form- and/or force-fitting connection.

- 5 As explained above, it may be expedient here, in order to simplify the installation operation, to straighten an initially plastically deformed or bent reinforcing element by elastic deformation in sections in order to simplify insertion of the reinforcing element into the base body in the longitudinal direction.

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Further advantages, features and details of the invention emerge from the description below of preferred exemplary embodiments and with reference to the drawings.

- 15 Brief description of the drawings

Fig. 1 shows a wiper arm in a perspective illustration,

Fig. 2 shows the wiper arm according to Fig. 1 in a bottom view,

20

Fig. 3 shows a first axial end area of the wiper arm in a partially sectioned illustration,

Fig. 4 shows a perspective partially sectioned illustration of the first axial end area of the wiper arm in an embodiment modified in relation to Fig. 3,

25

Fig. 5  
to

- 30 Fig. 7 each show, in a perspective bottom view, a wiper arm in the second axial end area with differently configured connections

between a reinforcing element and a base body of the wiper arm,

- 5      Fig. 8      shows, in a perspective illustration, the essential components of a wiper arm in a modified embodiment of the wiper arm,
- Fig. 9      shows a first axial end area of the wiper arm according to Fig. 8 before the installation of a reinforcing element,
- 10      Fig. 10      shows a second axial end area of the wiper arm according to Fig. 2 with the reinforcing element fitted, in a longitudinal section,
- 15      Fig. 11      shows the first axial end area of the wiper arm according to Fig. 9 in a sectioned longitudinal illustration in the fitted state of the reinforcing element,
- Fig. 12      shows a simplified perspective bottom view of a modified wiper arm before the installation thereof,
- 20      Fig. 13      shows the wiper arm according to Fig. 12 in a mounted state,
- Fig. 14      shows a sectioned perspective view of the wiper arm according to Fig. 13 in the connecting region to a wiper shaft,
- 25      Fig. 15      shows a detail of the fastening of the reinforcing element of the wiper arm according to Fig. 12 in a perspective view, and
- 30      Fig. 16      shows an axial end area of a base body of the wiper blade according to Fig. 12 in a perspective view.

Identical elements or elements having the same function are provided with the same reference numbers in the figures.

The wiper arm 10 illustrated in Figs 1 and 2 serves in particular as part of  
5 a rear wiper system of a vehicle. The wiper arm 10 comprises a base body 14 which is made of plastic and is elongate or extends in the direction of a longitudinal direction 12 and is realized as an injection moulded piece. The base body 14 is connected to a reinforcing element 16, which is made of metal, in particular of steel. The reinforcing element 16 is preferably strip-  
10 shaped with a width  $b$  which is constant in the longitudinal direction 12, and preferably has a rectangular cross section.

The reinforcing element 16 extends with its two axial end sections 17, 18 as far as the two axial end areas 20, 21 of the base body 14. The first axial  
15 end area 20 of the base body 14 serves to connect the wiper arm 10 to a wiper shaft 22, which can be seen only in Fig. 4, in particular by a fastening element in the form of a fastening nut which connects the wiper arm 10 to the wiper shaft 22 for rotation therewith. For this purpose, the first axial end area 20 has a through-hole 23 for the passage of the wiper  
20 shaft 22. The through-hole 23 (after the installation of the wiper arm 10) is closable together with the wiper shaft 22 by means of a closure cap 24 which can be seen in Figs 1, 3 and 4 and is arranged on the upper side of the wiper arm 10, in particular in a manner known per se by means of a latching connection.

25

As can be seen in particular with reference to Fig. 2, the reinforcing element 16 extends on the lower side of the base body 14 opposite an upper side 26 of the base body 14 and forms (on the lower side) a visible surface 28 of the wiper arm 10.

30

Furthermore, the base body 14 of the wiper arm 10 has an at least substantially U-shaped cross section at least in the two axial end areas 20, 21, but preferably also in a central area 29 arranged between the two axial end areas 20, 21. Said U-shaped cross section is formed by a base leg 30 forming the upper side 26 of the base body 14 and by two side legs 31, 32 bounding the base legs 30. The reinforcing element 16 is therefore accommodated between the two side legs 31, 32.

The second axial end area 21 of the base body 14 is designed to be connected by means of an adapter element 34 which can be seen in Figs 7 and 8 and is provided with a wiper blade 100, which is shown only in Figs 8 and 10. For this purpose, in addition to guide elements for the adapter element 34, the base body 14 in particular has a through-hole 35 which serves for forming a latching connection to the adapter element 34 in a manner known per se.

The (mechanical) connection between the reinforcing element 16 and the base body 14 takes place by means of a force- and/or form-fitting connection 36 which can be formed in various ways.

20

It can be seen in Fig. 3 that the reinforcing element 16 which is arranged at a distance a parallel to the upper side 26 of the base body 14 is arranged in the region of the first axial end area 20 of the base body 14 with its axial end section 17 in a state joined to the base body 14 in an accommodation 38 of the base body 14 in order to form the connection 36. Said accommodation 38 is characterized by an aperture 39, which is formed in the longitudinal direction, in the base body 14. The reinforcing element 16 can be pushed in the longitudinal direction into the base body 16 via the aperture 39. In order to form an axial stop and a pocket-shaped configuration of the accommodation 38, use is made of the closure cap 24

30

which, together with a side wall 41, forms an axial stop for the reinforcing element 16.

Fig. 4 shows a different connection 36 between the base body 14 and the reinforcing element 16. It can be seen here that, in the first axial end area 20 of the base body 14, two mounting elements 42, 43 are integrally formed on the base body 14, said mounting elements in sections covering a pocket-shaped accommodation 44, which runs in the longitudinal direction of the base body 14, for the reinforcing element 16 such that, in the pushed-in state of the reinforcing element 16, the mounting elements 42, 43 form a stop for the reinforcing element 16 in a direction running perpendicularly to the longitudinal direction of the reinforcing element 16, and therefore the reinforcing element 16 is positioned or fixed within the accommodation 44.

Figs 5 and 7 show, in the second axial end area 21 of the base body 14, the connection 36 between the base body 14 and the reinforcing element 16, in which connection the reinforcing element 16 has an aperture in the form of a hole 36 through which a pin 48 arranged integrally on the base body 16 projects. The pin 48 projects over the reinforcing element 16 and forms at least one stop for the reinforcing element 16 in the longitudinal direction thereof. However, the upper side of the pin 48 is preferably deformed, for example, by a thermal deformation operation in such a manner that the pin 48 at the same time holds the reinforcing element 16 within the accommodation 44 in a direction running perpendicularly to the longitudinal direction 12 of the reinforcing element 16 or of the wiper arm 10. This can be seen in particular with reference to Fig. 7. Furthermore, it is shown there that the adapter element 34 when connected to the base body 14 covers the axial end section 18 of the reinforcing element 16 in sections in the axial direction and therefore likewise (additionally) serves

for positioning or fixing the reinforcing element 16 within the accommodation 44.

Fig. 6 illustrates a further embodiment of the connection 36, in which two  
5 mounting elements 52, 53 in the manner of the mounting elements 42, 43  
according to the embodiment of Fig. 4 are provided in the axial end area  
21. It is essential here that said mounting elements 52, 53 interact with  
rectangular notches 54, 55 formed on lateral edge regions of the  
reinforcing element 16. The two notches 54, 55 are first of all brought here  
10 into overlap with the mounting elements 52, 53 such that the reinforcing  
element 16 can be inserted or fitted into the accommodation 44 in an  
installation direction running perpendicularly to the longitudinal direction  
12. The reinforcing element 16 is subsequently displaced in the  
longitudinal direction 12, and therefore the mounting elements 52, 53 pass  
15 out of overlapping with the notches 54, 55 and fix the reinforcing element  
16 within the accommodation 44 perpendicularly to the longitudinal  
direction.

Fig. 8 shows a further wiper arm 10a for a wiper blade 100, which wiper  
20 arm is distinguished in particular by the use of a reinforcing element 16a  
which, firstly, has a cross section which is constant over the length or does  
not have any apertures, notches, etc., and, secondly, is plastically pre-  
bent in the longitudinal direction, which is intended to be clarified by the  
radius  $r$ . Furthermore, it can be seen with reference to Figs 9 and 11 that  
25 an aperture 56 is provided in the first axial end area 20a of the base body  
14a, the cross section of which aperture corresponds at least to the cross  
section of the reinforcing element 16a. A wall 58 running parallel to the  
upper side 57 of the base body 16a is provided laterally below the  
aperture 56, and therefore a pocket-shaped accommodation 60 is formed  
30 in the area between the aperture 56 and the wall 58. When the closure  
cap 24a is removed, the reinforcing element 16a therefore can be

displaced in the direction of the arrow 62 towards the second axial end area 21 of the base body 14a, said end area not being illustrated in Figs 9 and 11. Furthermore, it can be seen in Fig. 10 that a further pocket-shaped accommodation 64 for accommodating the second axial end section 18a of the reinforcing element 16a is provided in the region of the second axial end area 21a of the base body 14a. For the installation of the reinforcing element 16a, the latter is bent back (elastically) from a pre-bent state into an extended state in order to facilitate pushing of the reinforcing element 16a through the aperture 56. The reinforcing element 16a is then pushed into the region of the accommodation 64, i.e. until the reinforcing element 16a has reached its axial end position within the base body 14a. By means of the pre-bent reinforcing element 16a, the latter deforms the base body 14a by elastic reverse deformation after the installation in such a manner that the first axial end section 17a of the reinforcing element 16a enters the accommodation 60 in the first axial end area 20a of the base body 14a. The reinforcing element 16a is thereby positioned and fixed in the base body 14a in both axial directions of the reinforcing element 16a.

The wiper arm 10b illustrated in Figs 12 to 16 differs from the two wiper arms 10, 10a in that its reinforcing element 16b is connected at an axial end section 69 to a fastening component 70. The fastening component 70 is composed of plastic and is designed as an injection-moulded component. The material of the fastening component 70 preferably has a greater strength than the material of the base body 14b, which is illustrated in simplified form in Figs 12 and 13. For example, the fastening component 70 is composed of PA66 or PA6I/6T, while the base body 14b is composed of PBT/PET-GF30. In order to form a clamping pressure between the end section 69 of the strip-shaped reinforcing element 16b and the fastening component 70, the fastening component 70 has a slot 71. Furthermore, the fastening component 70 has a through-hole 72 for the wiper shaft 22, not illustrated, and, on both sides of the through-hole

72, a respective extension 73 which is round in cross section, is guided into a groove-shaped cut out 74 of the base body 14b and permits a pivoting movement of the base body 14b relative to a pivot axis 75, which is defined by the extensions 73. Therefore, the base body 14b can be  
5 pivoted away from the vehicle window into a service position of the wiper arm 10b in order to exchange the wiper blade 100. The service position of the wiper arm 10b is defined by forming a latching connection between the base body 14b and the fastening component 70, said latching connection arising by interaction of two latching pins 76, which are formed on the  
10 fastening component 70, with depressions 77 formed on the base body 14b. The end section 78 of the reinforcing element 16b opposite the one end section 69 is connected to the base body 16b by a form-fitting or clamping connection or by a force-fitting connection via projections 79 formed on the base body 14b. The reinforcing element 16b reaches here  
15 approximately as far as the centre of the base body 16b, as viewed in the axial direction of the wiper arm 10b.

The wiper arm 10, 10a, 10b described to this extent can be modified in diverse ways without departing from the inventive concept.

## List of reference signs

|    |              |                        |
|----|--------------|------------------------|
|    | 10,10a, 10b  | Wiper arm              |
|    | 12           | Longitudinal direction |
| 5  | 14, 14a, 14b | Base body              |
|    | 16, 16a, 16b | Reinforcing element    |
|    | 17, 17a      | Axial end section      |
|    | 18, 18a      | Axial end section      |
|    | 20, 20a      | Axial end area         |
| 10 | 21, 21a      | Axial end area         |
|    | 22           | Wiper shaft            |
|    | 23           | Through-hole           |
|    | 24, 24a      | Closure cap            |
|    | 26           | Upper side             |
| 15 | 28           | Visible surface        |
|    | 29           | Central region         |
|    | 30           | Base leg               |
|    | 31           | Side leg               |
|    | 32           | Side leg               |
| 20 | 34           | Adapter element        |
|    | 35           | Through-hole           |
|    | 36           | Connection             |
|    | 38           | Accommodation          |
|    | 39           | Aperture               |
| 25 | 41           | Side wall              |
|    | 42           | Mounting element       |
|    | 43           | Mounting element       |
|    | 44           | Accommodation          |
|    | 48           | Pin                    |
| 30 | 52           | Mounting element       |
|    | 53           | Mounting element       |

|    |     |                     |
|----|-----|---------------------|
|    | 54  | Notch               |
|    | 55  | Notch               |
|    | 56  | Aperture            |
|    | 57  | Upper side          |
| 5  | 58  | Wall                |
|    | 60  | Accommodation       |
|    | 62  | Arrow               |
|    | 64  | Accommodation       |
|    | 69  | End section         |
| 10 | 70  | Fastening component |
|    | 71  | Slot                |
|    | 72  | Through-hole        |
|    | 73  | Extension           |
|    | 74  | Cut out             |
| 15 | 75  | Pivot axis          |
|    | 76  | Latching pin        |
|    | 77  | Depression          |
|    | 78  | End section         |
|    | 79  | Projection          |
| 20 |     |                     |
|    | 100 | Wiper blade         |
|    |     |                     |
|    | a   | Distance            |
|    | b   | Width               |
| 25 | r   | Radius              |

## Claims

1. Wiper arm (10; 10a; 10b) for a window wiper system of a vehicle, especially for a rear wiper system, having a first axial end area (20; 20a) of the wiper arm (10; 10a; 10b) for fixing the wiper arm (10; 10a; 10b) to a drive element, in particular a wiper shaft (22), which is coupled to a drive, and having a second axial end area (21; 21a) of the wiper arm (10; 10a; 10b) for fixing a wiper blade (100) to the wiper arm (10; 10a; 10b) in an exchangeable manner, the wiper arm (10; 10a; 10b) comprising a base body (14; 14a; 14b) made of plastic and being realized as an injection moulded piece, and the wiper arm (10; 10a; 10b) comprising a reinforcing element (16; 16a; 16b), which is made of metal and extends in the longitudinal direction (12) of the wiper arm (10; 10a; 10b), said reinforcing element (16; 16a; 16b) being connected to the base body (14; 14a; 14b) of the wiper arm (10; 10a; 10b),
- characterized in that
- the base body (14; 14a; 14b) and the reinforcing element (16; 16a; 16b) are realized as separate components and in that the reinforcing element (16; 16a; 16b) is connected to the base body (14; 14a; 14b) via a form- and/or force-fitting connection (36).
2. Wiper arm according to Claim 1, characterized in that the connection (36) between the reinforcing element (16; 16a; 16b) and the base body (14; 14a; 14b) is carried out in the area of axial end sections (17; 17a, 18; 18a; 69, 78) of the reinforcing element (16; 16a; 16b).

3. Wiper arm according to Claim 1 or 2,  
characterized in that  
the reinforcing element (16; 16a; 16b) is strip-shaped and  
preferably extends to the two axial end areas (20; 20a, 21; 21a) of  
5 the base body (14; 14a).
4. Wiper arm according to any of the Claims 1 to 3,  
characterized in that  
the cross section of the reinforcing element (16; 16a; 16b) is  
10 constant in the longitudinal direction of the reinforcing element (16;  
16a; 16b), with the possible exception in those areas in which the  
reinforcing element (16; 16a; 16b) is connected to the base body  
(14; 14a; 14b).
- 15 5. Wiper arm according to any of the Claims 1 to 4,  
characterized in that  
the base body (14; 14a; 14b) has an upper side (26) and in that the  
reinforcing element (16; 16a; 16b) extends at a distance (a) and  
preferably parallel to the upper side (26), the reinforcing element  
20 (16; 16a; 16b) forming a visual surface (28) of the wiper arm (10;  
10a; 10b).
6. Wiper arm according to any of the Claims 1 to 5,  
characterized in that  
25 in the area of the reinforcing element (16; 16a; 16b), the base body  
(14; 14a; 14b) comprises at least partially an at least essentially U-  
shaped cross section having a base leg (30) and two side legs (31,  
32) and in that the reinforcing element (16; 16a; 16b) is disposed in  
direct contact to the base leg (30) on the side facing towards the  
30 side legs (31, 32).

7. Wiper arm according to any of the Claims 1 to 6,  
characterized in that  
the base body (14; 14b) comprises at least one mounting element  
(42, 43; 48; 52, 53; 79) which serves for fixing the reinforcing  
5 element (16; 16b) and is realized monolithically with the base body  
(14; 14b).
8. Wiper arm according to any of Claims 1 to 6,  
characterized  
10 in that the reinforcing element (16b) is connected at an end section  
(69) to the base body (14b) by means of a fastening component  
(70).
9. Wiper arm according to Claim 8,  
15 characterized  
in that the fastening component (70) is composed of plastic and has  
a slot (71) for the preferably clamping accommodation of the end  
section (69) of the reinforcing element (16b), and a through-hole  
(72) for the wiper shaft (22).  
20
10. Wiper arm according to Claim 7,  
characterized in that  
the mounting element (48) penetrates an opening (35) formed in the  
reinforcing element (16) and is connected to the reinforcing element  
25 (16) via a mounting section of the mounting element (48), preferably  
formed via a deformation of the mounting element (48), said  
deformation being thermal or mechanical in sections.
11. Wiper arm according to any of Claims 7 to 9,  
30 characterized in that

the mounting element (42, 43; 52, 53; 79) engages over the reinforcing element (16; 16b) in sections.

12. Wiper arm according to Claim 11,  
5 characterized in that  
the reinforcing element (16) has a cutout (54, 55), in whose area  
the mounting element (52, 53) can be inserted in a mounting  
direction extending perpendicular to the plane of the reinforcing  
element (16).  
10
13. Wiper arm according to any of the Claims 1 to 7 or 10 to 12,  
characterized in that  
with an axial end section (17; 17a), the reinforcing element (16;  
16a) dips into a pocket-shaped accommodation (38; 60) of the base  
15 body (14; 14a) on the side facing towards the first axial end area  
(20; 20a) of the wiper arm (10; 10a).
14. Wiper arm according to Claim 13,  
characterized in that  
20 the axial end section (17; 17a) of the reinforcing element (16; 16a)  
is fixed to the base body (14; 14a) via an end cap (24; 24a)  
connected to the base body (14; 14a).
15. Wiper arm according to Claim 7,  
25 characterized in that  
the mounting element is configured by at least one, preferably two  
pocket-shaped accommodations (60, 64) located at axial end areas  
(20a; 21a) of the base body (14a).
- 30 16. Wiper arm according to Claim 15,  
characterized in that

the at least one accommodation (60), in longitudinal direction of the base body (14a), has a through-hole (56) near the accommodation (60) with a cross-section which corresponds at least to the cross-section of the reinforcing element (16a).

5

17. Wiper arm according to Claim 15 or 16,  
characterized in that

the reinforcing element (16a) is configured, in longitudinal direction, as a pre-bent element which deforms the base body (14a) in a state connected with the base body (14a) in such a way that at least one axial end section (17a) of the reinforcing element (16a) is located in a formfitting manner in the accommodation (60) of the base body (14a) in order to limit the axial movement.

- 15 18. Wiper arm according to any of the Claims 1 to 17,  
characterized in that

the reinforcing element (16) is fixed on the side facing towards the second axial end area (21) of the wiper arm (10) by means of an adapter element (34) connected to the base body (14).

20

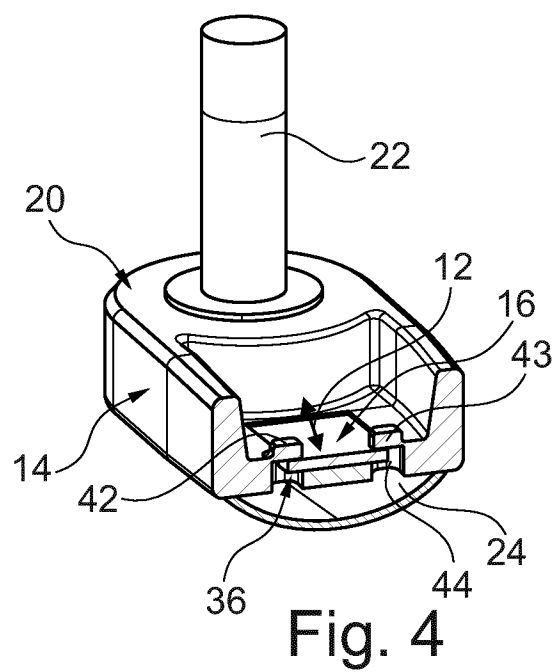
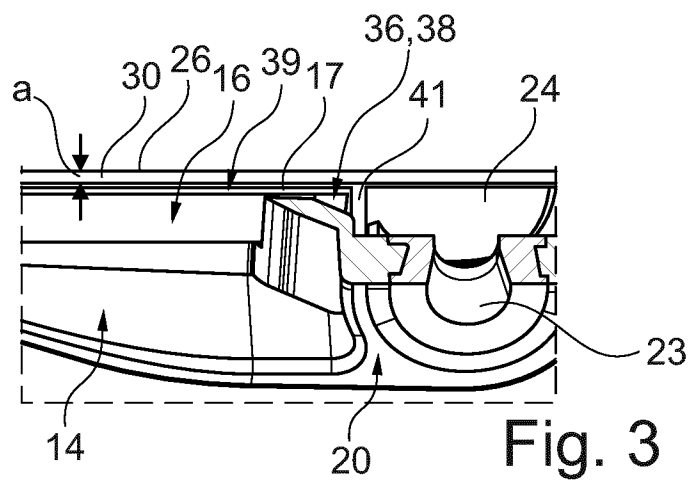
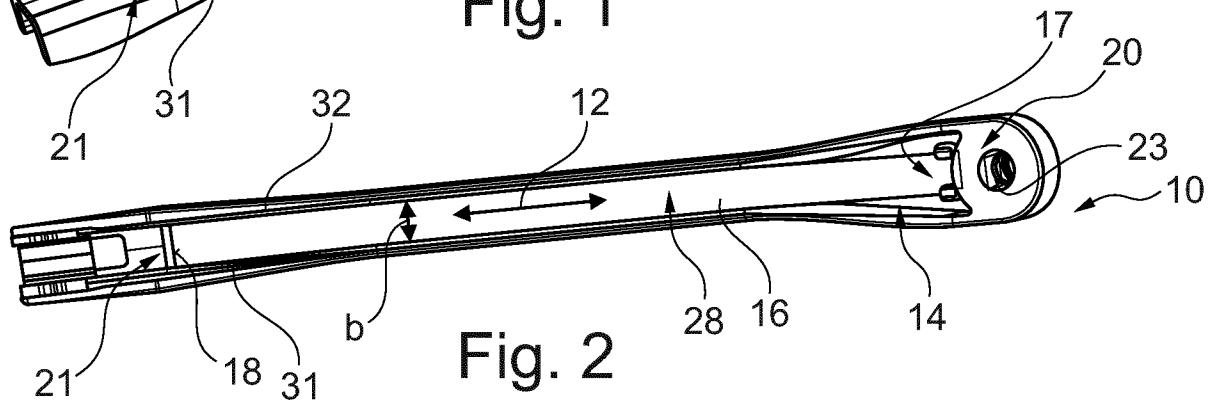
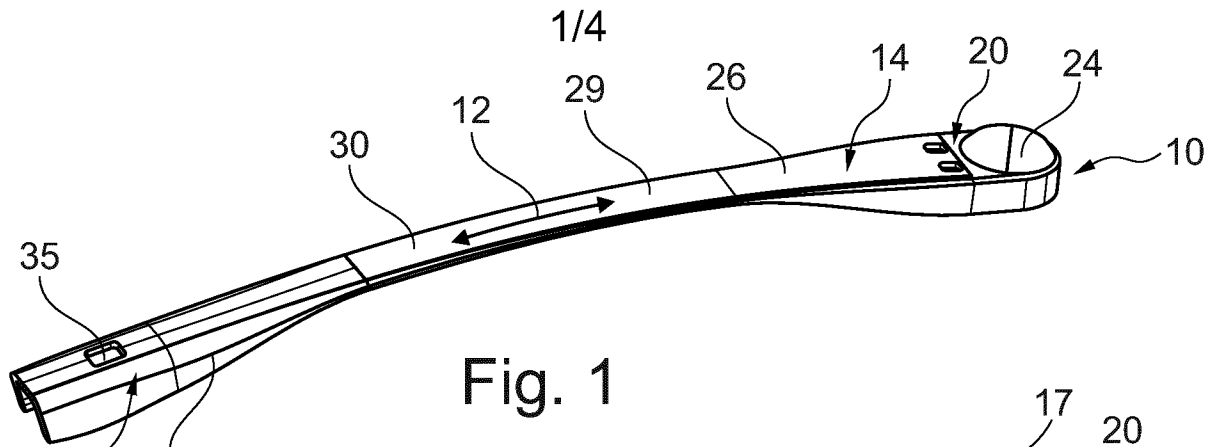
19. Wiper arm according to any of the Claims 1 to 18,  
characterized in that

the reinforcing element (16; 16a; 16b) is curved in its longitudinal direction, preferably having a constant curve.

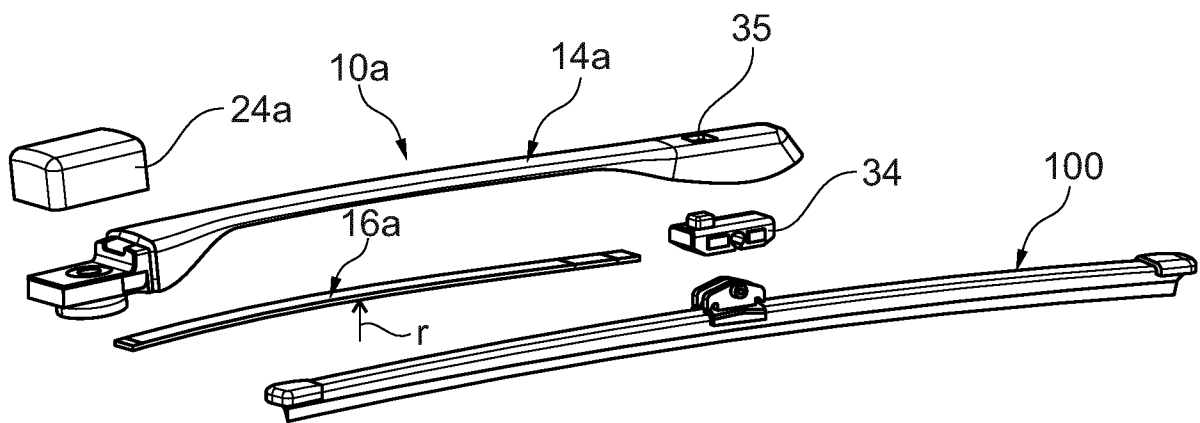
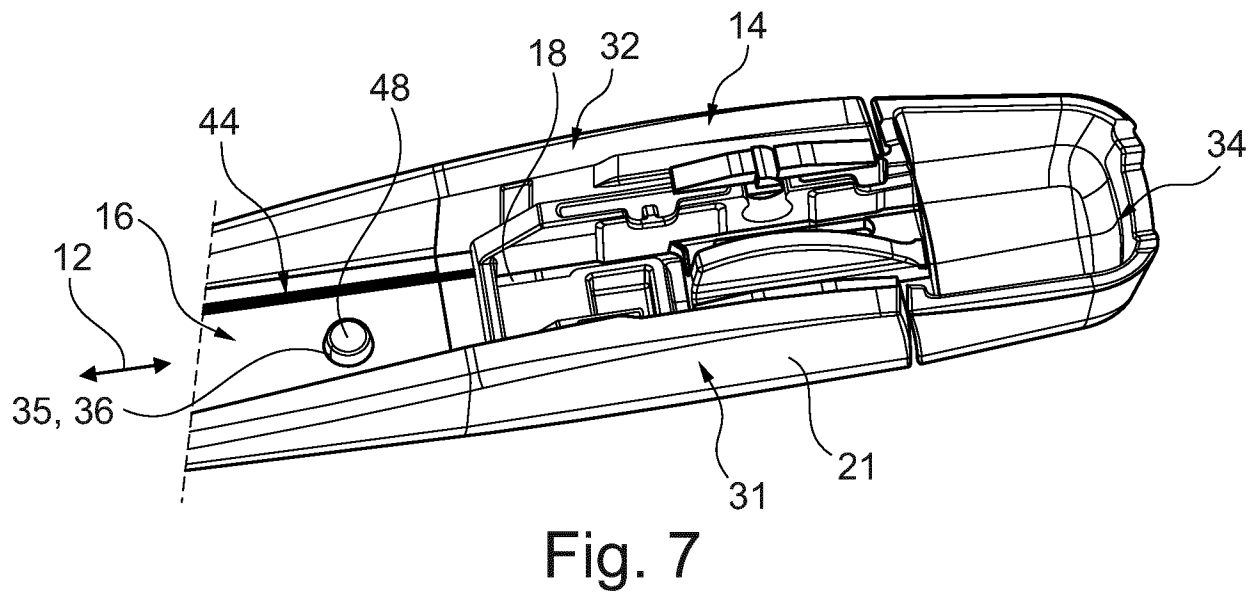
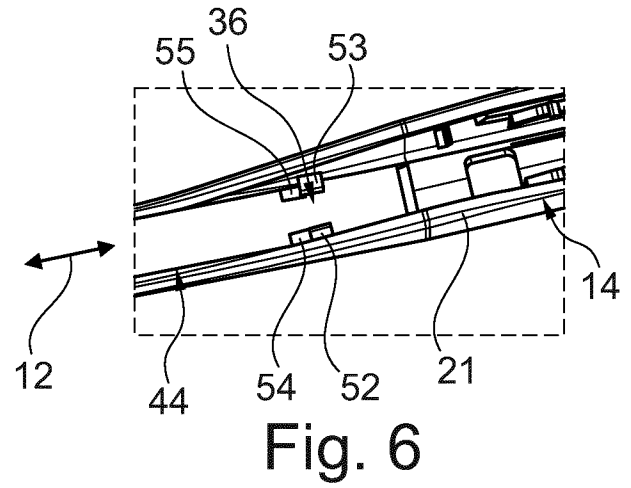
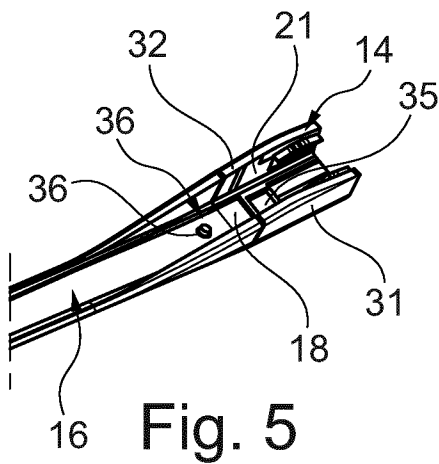
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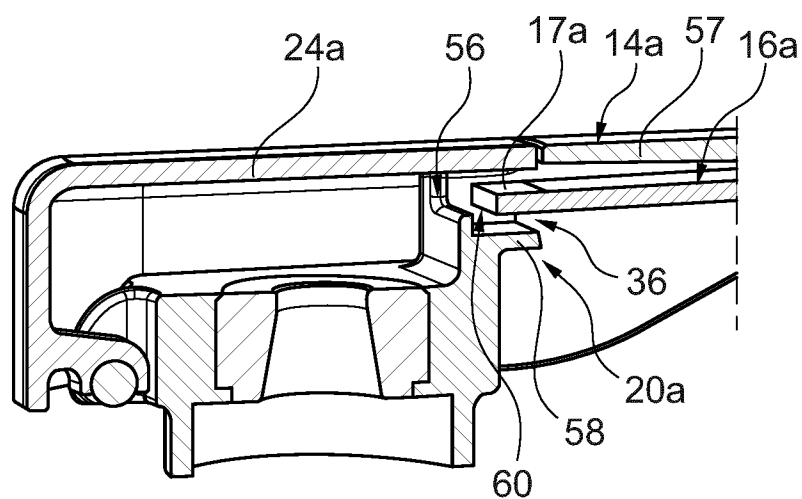
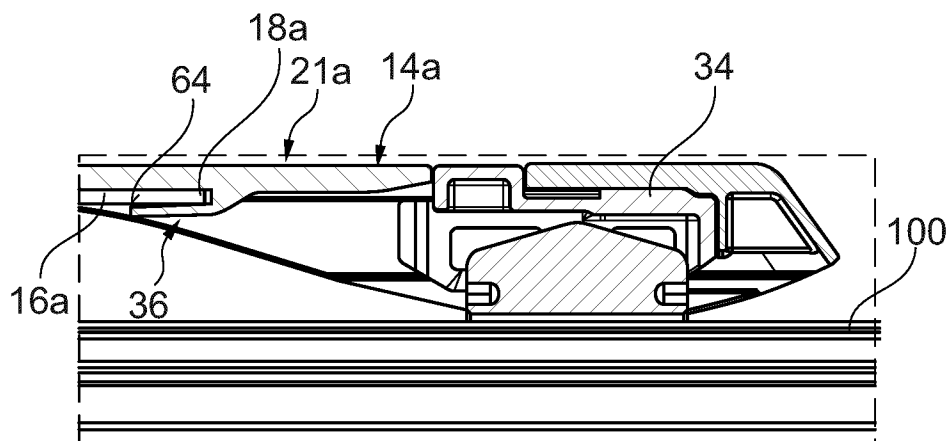
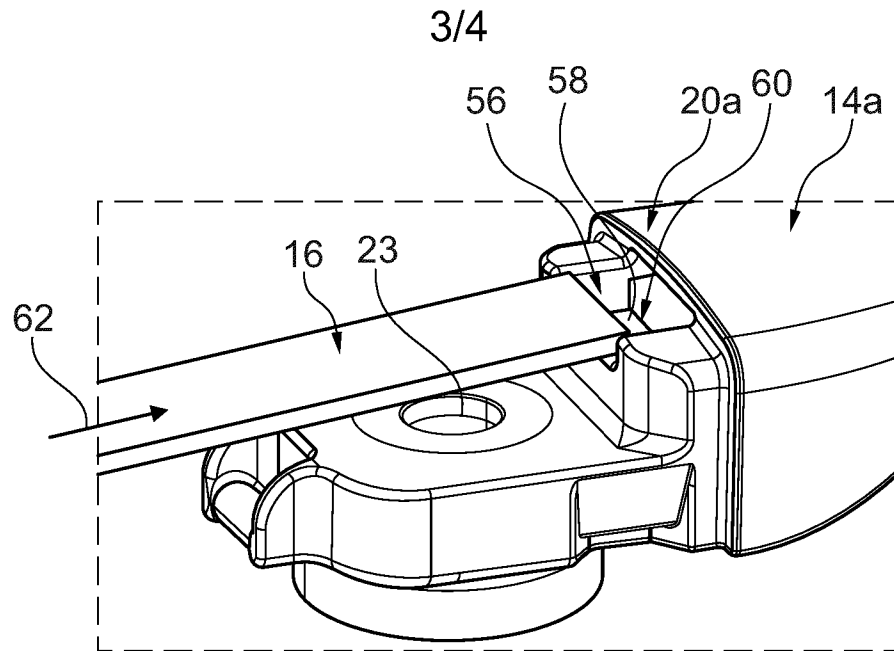
20. Method for producing a wiper arm (10; 10a; 10b) realized according to any of the Claims 1 to 19,  
characterized in that

the base body (14; 14a; 14b) and the reinforcing element (16; 16a; 16b) are produced separately from each other and the reinforcing element (16; 16a; 16b) is subsequently connected to the base body (14; 14a; 14b) via a form- and/or force-fitting connection (36).



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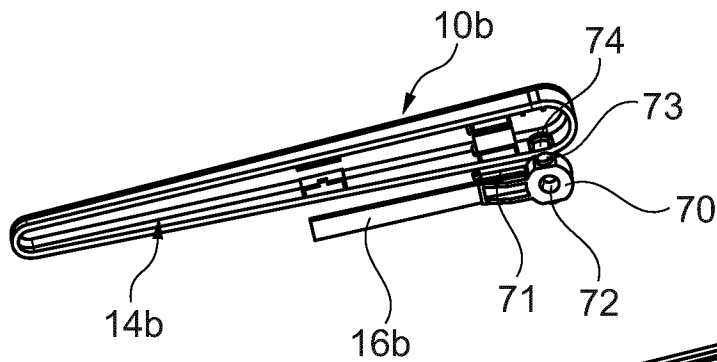


Fig. 12

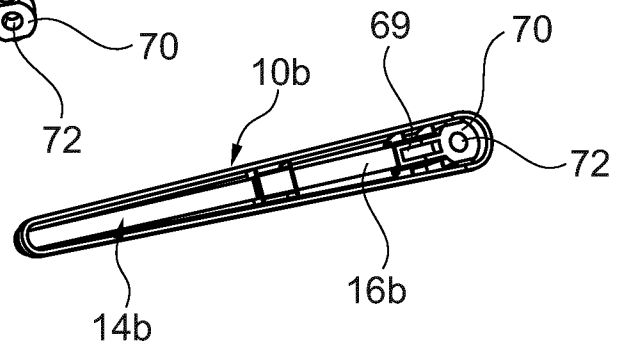


Fig. 13

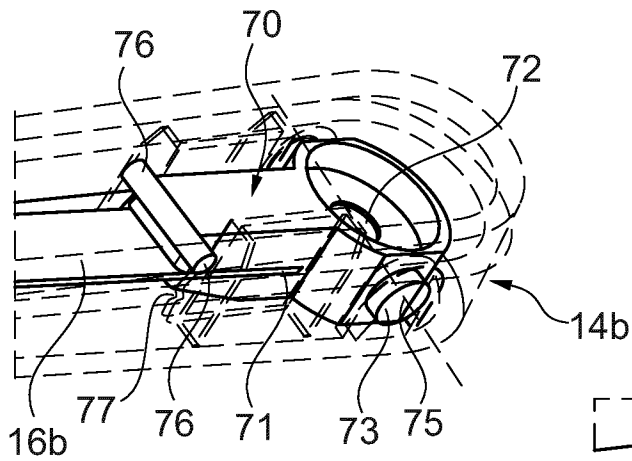


Fig. 14

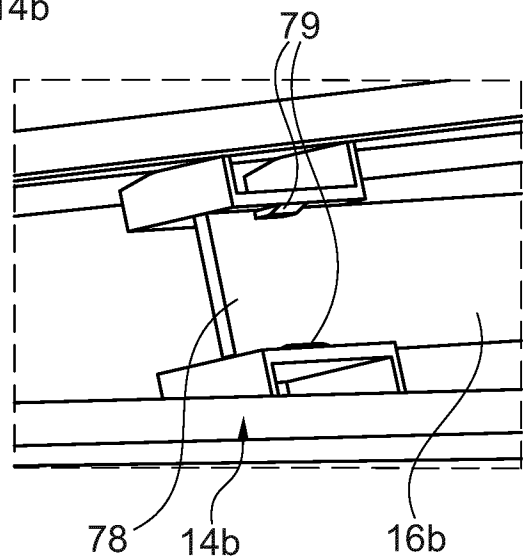


Fig. 15

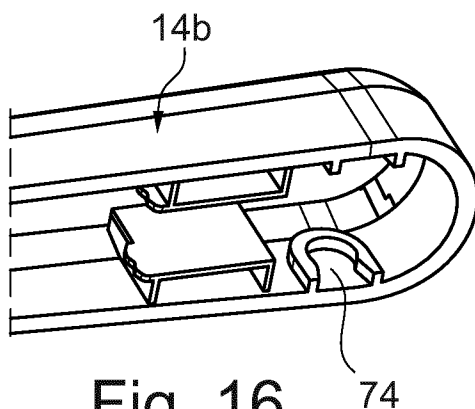


Fig. 16

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2019/085826

A. CLASSIFICATION OF SUBJECT MATTER  
INV. B60S1/34 B60S1/58  
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
B60S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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| X         | WO 2017/140343 A1 (FEDERAL-MOGUL S A [BE])<br>24 August 2017 (2017-08-24)<br>page 10, lines 11-26; claim 12; figures<br>7,8<br>page 8, line 31 - page 9, line 23; figures<br>4,5<br><br>-----<br>-/-- | 1-9,13,<br>14,18-20           |



Further documents are listed in the continuation of Box C.



See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

8 April 2020

Date of mailing of the international search report

30/04/2020

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2  
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Authorized officer

Blandin, Béatrice

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2019/085826

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                                  |                          |
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International application No

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