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(54) **Title**: WIPER BLADE FOR THE CLEANING OF VEHICLE WINDOWS

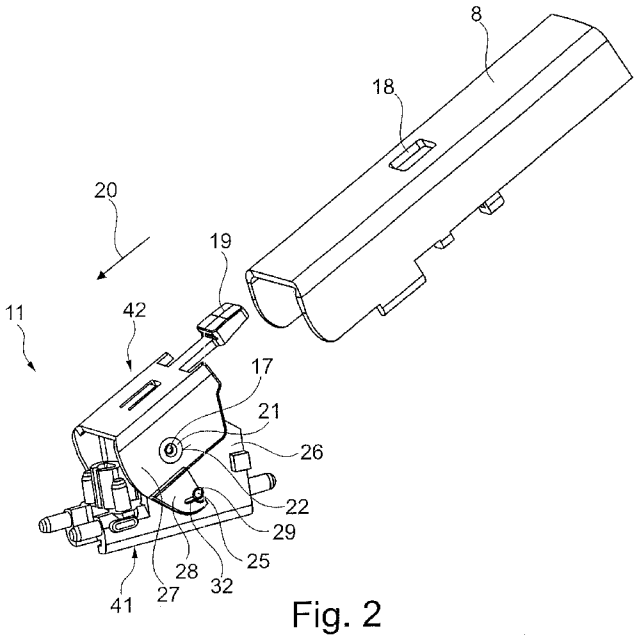

Fig. 2

(57) **Abstract**: The invention relates to a wiper blade (10; 10a) for the cleaning of vehicle windows, with a wiper blade body (30) extending in the longitudinal direction of the wiper blade, with at least one wiper rubber (16), forming at least one wiper lip, on the wiper blade body (30), with at least one wiper blade adapter (11) on the wiper blade body (30) for a mechanical connection of the wiper blade (10; 10a) with a wiper arm (1) having a wiper arm adapter (8), wherein the wiper blade adapter (11) has an adapter part (41; 41a) on the wiper blade side and an adapter part (42; 42a) on the wiper arm side, which are arranged pivotably with respect to each other in a rotation axis (17). According to the invention, provision is made that the wiper blade body (30) in a servicing- or respectively installation position is able to be arrested, in particular is able to be locked, in a pivoted position to the wiper arm (1) with respect to the operating position of the wiper blade body (30).

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WIPER BLADE FOR THE CLEANING OF VEHICLE WINDOWS

PRIOR ART

The invention relates to a wiper blade for the cleaning of vehicle windows in accordance with the introductory clause of Claim 1.

Such a wiper blade is known from DE 10 2008 021 457 A1 of the applicant. It has a wiper arm adapter, constructed on a wiper arm, said wiper arm adapter being able to be connected with a wiper blade adapter arranged on the wiper blade. The wiper blade is pivotably mounted here on the wiper arm, in order to always achieve a good or respectively uniform contact force of the wiper rubber on the vehicle window, for example in the case of curved vehicle windows. To exchange the wiper blade, it is necessary to firstly pivot the wiper arm in its wiper arm joint, so that the wiper blade is disposed at a distance from the vehicle window. The connection which is constructed as a detent connection between the wiper arm adapter and the wiper blade adapter is then released, so that a new wiper blade can be fastened on the wiper arm. Often, it is additionally necessary for example to check or clean the wiper lip on a wiper blade, even if the wiper blade is to remain on the wiper arm or respectively is not to be exchanged. Here, as when changing the wiper blade, the wiper blade is freely movable as a result of its pivotable mounting on the wiper arm and must be held securely if applicable by hand by an operator, in order to be able to carry out the necessary work.

DISCLOSURE OF THE INVENTION

Proceeding from the presented prior art, the invention is based on the problem of further developing a wiper blade for the cleaning of vehicle windows in accordance with the

introductory clause of Claim 1 such that the handling is facilitated for an operator in particular in the servicing or respectively installation work which has been mentioned. This problem is solved in a wiper blade for the cleaning of vehicle windows with the features of Claim 1. The invention is based here on the idea of arresting, in particular locking, the wiper blade for the servicing or respectively installation work in a pivoted position with respect to the operating position of the wiper blade - in which it is in abutment with the vehicle window. This means that with the wiper arm pivoted from the operating position, the wiper blade is able to be secured in an additional position which is pivoted with respect to the wiper arm and in this position is arranged rigidly to the wiper arm. This makes it possible to be able to carry out work on the wiper blade without having to hold the wiper blade securely with one hand to do this. Therefore, if applicable the wiper arm can be held by the hand which is now free, in order to avoid a pivoting back of the wiper arm into its operating position. Such a servicing or respectively installation position of the wiper blade can now also be used in order to improve the accessibility to particular components, for example of hydraulic hose connections on the wiper blade adapter or on the wiper arm adapter, so that these can be checked and/or released/connected in a relatively simple manner.

Advantageous further developments of the wiper blade according to the invention for the cleaning of vehicle windows are indicated in the subclaims. All combinations of at least two of features disclosed in the claims, the description and/or the figures fall within the scope of the invention.

In a preferred embodiment of the invention, provision is made that the arrestable or securable position is formed by a detent connection constructed between the adapter part on the wiper blade side and the adapter part on the wiper arm

side. A detent connection has the advantage here that it can be produced and released again manually, i.e. without an additional tool.

It is particularly preferred here if the detent elements of the detent connection are arranged spaced apart from each other in an operating position of the wiper blade. Thereby, during the normal operation of the wiper arrangement, any wear or any additional friction caused by the detent elements is ruled out.

In a first structural design of the detent elements, which makes particularly high retention forces possible, provision is made that the one detent element is constructed as a detent pin, that the other detent element is constructed as a mounting opening cooperating with the detent pin in the servicing or respectively installation position, and that the mounting opening is constructed on a fin-like element.

The installation force necessary for the locking or respectively releasing can be adapted here via the geometry of the mounting opening, when the detent pin has a circular cross-section and the mounting opening has a cross-section in the shape of a partial circle, wherein the diameter of the detent pin is adapted to the shape of the cross-sectional area of the mounting opening, and wherein the angle range of the cross-sectional area enclosed by the mounting opening is more than 180°. Here, the detent forces become all the greater, the greater the said angle range of the cross-sectional area of the mounting opening.

In an alternative structural embodiment of the detent elements, it is proposed that the one detent element is constructed as a detent cam arranged on an extension, and that the other detent element is constructed as a recess, cooperating with the detent cam, on a projection.

So as not to increase the size of the adapter part on the wiper blade side and of the adapter part on the wiper arm side, in particular in their width, provision is additionally made in a particularly preferred configuration that respectively two of the detent elements are arranged on the adapter part on the wiper blade side and on the adapter part on the wiper arm side, that the adapter part on the wiper arm side has a U-shaped cross-section with two lateral leg surfaces, and that the one detent elements are arranged in the plane of the leg surfaces and the other detent elements are arranged on side walls.

Further advantages, features and details of the invention will emerge from the following description of preferred example embodiments and with the aid of the drawings.

These show in:

Fig. 1 a wiper blade according to the invention fastened to a wiper arm, in perspective view,

Fig. 2 a wiper arm adapter and the wiper blade adapter in a servicing or respectively installation position, in perspective view,

Fig. 3 to Fig. 6 the arrangement of wiper blade adapter and wiper arm adapter during various positions, respectively in side view,

Fig. 7 a modified wiper blade adapter on a wiper arm adapter in side view during the operating position and

Fig. 8 the arrangement according to Fig. 7 in a servicing or respectively installation position, likewise in side view.

Identical components or respectively components having an identical function are provided with the same reference numbers in the figures.

In the figures, a wiper blade 10 according to the invention is illustrated for the cleaning of vehicle windows, in particular a windscreen of a road vehicle. The wiper blade 10 is fastened exchangeably at the one end 2 of a wiper arm 1. The wiper arm 1 consists in a known manner of a bearing element 3, able to be fastened to a wiper shaft of a windscreen wiper drive, and of a wiper rod 5 articulatedly connected with the bearing element 3 via a wiper arm joint 4, at the wiper arm end of which, facing away from the bearing element 3, the wiper blade 10 is fastened by means of a wiper blade adapter 11. The wiper blade adapter 11 cooperates here with a wiper arm adapter 8 arranged at the end 2 of the wiper arm 1.

The wiper blade 10 has two wiper blade sections 12, 13, constructed of approximately equal length in the example embodiment, as parts of a wiper blade body 30, between which the wiper blade adapter 11 is arranged. In the longitudinal direction of the two wiper blade sections 12, 13, spray ducts (not illustrated) can be constructed, arranged parallel to each other, which communicate with the jet- or spray openings, likewise not able to be seen in the figures, via which a washing fluid can be applied onto the vehicle window. The supply of the jet- or spray openings with the washing fluid takes place on the vehicle side via a supply line 15 guided in the wiper arm 1.

The two wiper blade sections 12, 13 have on their underside a mounting groove for a wiper rubber 16 forming a wiper lip.

The wiper blade adapter 11 consists of an adapter part 41 on the wiper blade side and of an adapter part 42, U-shaped in cross-section, on the wiper arm side, which are mounted pivotably with respect to each other in a rotation axis 17. The pivotable arrangement between the adapter part 42 on the wiper arm side and the adapter part 41 on the wiper blade side takes place via studs 21 formed on the adapter part 41 on the wiper blade side on side walls 26, which studs engage into corresponding openings 22 of the adapter part 42 on the wiper arm side. By the pivotable mounting of the wiper blade 10 to the wiper arm 1 via the wiper blade adapter 11, in particular a mobility of the wiper blade 10 on the vehicle window is made possible, which makes possible a uniform contact pressure of the wiper rubber 16 during the cleaning of the vehicle window.

As can be seen in particular from viewing Fig. 1 and 2 together, the wiper arm adapter 8 has a substantially U-shaped cross-sectional form and has on its upper side a recess 18 which is rectangular in the example embodiment, which cooperates with a detent hook 19 arranged on the adapter part 42 on the wiper arm side. In the operating position of the wiper blade 11, the detent hook 19 is arranged or respectively locked in the recess 18, so that by a mounting of the wiper blade adapter 11 in the wiper arm adapter 8, the wiper blade 10 is securely anchored in the wiper arm adapter 8 and hence in the wiper arm 1. To release or respectively exchange the wiper blade 10, the detent hook 19 must be pressed manually out from its recess 18, and the wiper blade 10 or respectively the wiper blade adapter 11 must be moved in the direction of the arrow 20, in order to release the wiper blade adapter 11 from the wiper arm adapter 8.

In order to make possible a defined, rigid arrangement between the wiper arm 1 and the wiper blade 10 or respectively the wiper blade adapter 30 for servicing or respectively assembly work, in particular when the wiper

rod 5 in the bearing element 3 is pivoted away from the vehicle window, the wiper blade 10 is especially constructed.

For this, firstly reference is to be made to Fig. 2 to 6, in which a first possible structural embodiment of the invention is illustrated. It can be seen that on the adapter part 41 of the wiper blade adapter 11 on the wiper blade side, at a distance from the studs 21 and hence from the rotation axis 17, respectively a detent pin 25, circular in cross-section, is integrally formed on the two side walls 26, arranged parallel to each other, of the adapter part 41, consisting of plastic, on the wiper blade side. On the two leg surfaces 27 of the adapter part 42, which likewise consists of plastic, on the wiper arm side, respectively a plate-shaped fin 28 is integrally formed, on the side of which, facing the detent pin 25, a claw-like mounting opening 29 is constructed. The mounting opening 29 has a partially circular cross-sectional area 31 here, wherein the angle range of the cross-sectional area 31, enclosed by the mounting opening 29, is more than 180° and the cross-section or respectively the diameter of the cross-sectional area 31 is adapted to the diameter or respectively the shape of the detent pin 25. In addition, a weakening section in the form of a slit 32 proceeds from the base of the cross-sectional area 31.

In Fig. 3 and 4, various positions during the normal operating position of the wiper blade 10 or respectively of the wiper blade body 30 during cleaning of the vehicle window are illustrated. In particular, it can be seen here that the wiper blade 10 is pivotably mounted in the wiper arm 1 or respectively in the wiper arm adapter 8. In order to pivot the wiper blade 10 or respectively the wiper blade body 30 into a servicing- or respectively installation position, in which the detent pins 25 cooperate with the mounting openings 29, the wiper blade 10 is pivoted in

accordance with Fig. 5 and 6 in the wiper blade adapter 8 until the mounting openings 29 come into engagement with the detent pins 25. Through the fact that the angle range of the cross-sectional area 31 enclosed by the mounting opening 29 is more than 180° and in particular through the slit 32 the mounting opening 29 permits an elastic deformation of the fin 28 in the region of the opening for the detent pin 25, the wiper blade 10 or respectively the detent pins 25 can be brought into the detent position illustrated in Fig. 6, in which the detent pins 25 are held in a form-fitting manner in the mounting openings 29, whereby the wiper blade 10 is positioned rigidly and pivoted to the wiper arm 1 or respectively to the wiper arm adapter 8, in order to be able to carry out the necessary servicing- or respectively assembly work. To release the detent connection between the two adapter parts 41, 42, the wiper blade 10 must be pivoted again in the direction of an operating position, whereby the detent pins 25 emerge from the mounting openings 29 after overcoming the retention force.

A modified wiper blade 10a is illustrated in Fig. 7 and 8. Here, on the adapter part 41a on the wiper blade side on the side walls 26 an extension 34 is respectively integrally formed, which has a detent cam 35 as part of the detent connection at its free end. The detent cam 35 cooperates with a recess 36 of a projection 37 integrally formed on the adapter part 42a on the wiper arm side. Here, on pivoting of the adapter part 42a on the wiper arm side, the detent cam 35 is arranged in the path of movement of the projection 37. The projection 37 or respectively the extension 34 are constructed or respectively arranged so as to be elastic, so that on coming into contact of detent cam 35 and projection 37, the corresponding elements spring away and subsequently assume the detent connection.

The wiper blade 10, 10a which has been described so far can be altered or respectively modified in a variety of ways, without departing from the idea of the invention. In particular, other forms and arrangements of detent elements are also conceivable. It is merely essential to the invention that the wiper blade 10, 10a is able to be secured or respectively locked for a servicing- or respectively installation position to the wiper arm 1.

LIST OF REFERENCE NUMBERS

1	wiper arm
2	end
3	bearing element
4	wiper arm joint
5	wiper rod
8	wiper arm adapter
10, 10a	wiper blade
11	wiper blade adapter
12	wiper blade section
13	wiper blade section
15	supply line
16	wiper rubber
17	rotation axis
18	recess
19	detent hook
20	arrow
21	stud
22	opening
25	detent pin
26	side wall
27	leg surface
28	fin
29	mounting opening
30	wiper blade body
31	cross-sectional area
32	slit
34	extension
35	detent cam
36	recess
37	projection
41, 41a	adapter part on the wiper blade side
42, 42a	adapter part on the wiper arm side

CLAIMS

1. Wiper blade (10; 10a) for the cleaning of vehicle windows, with a wiper blade body (30) extending in the longitudinal direction of the wiper blade, with at least one wiper rubber (16), forming at least one wiper lip, on the wiper blade body (30), with at least one wiper blade adapter (11) on the wiper blade body (30) for a mechanical connection of the wiper blade (10; 10a) with a wiper arm (1) having a wiper arm adapter (8), wherein the wiper blade adapter (11) has an adapter part (41; 41a) on the wiper blade side and an adapter part (42; 42a) on the wiper arm side, which are arranged pivotably with respect to each other in a rotation axis (17),

characterized in that

the wiper blade body (30) in a servicing- or respectively installation position is able to be arrested, in particular is able to be locked, in a pivoted position to the wiper arm (1) with respect to the operating position of the wiper blade body (30).

2. Wiper blade according to Claim 1,
characterized in that
the arrestable position is formed by a detent connection constructed between the adapter part (41; 41a) on the wiper blade side and the adapter part (42; 42a) on the wiper arm side.

3. Wiper blade according to Claim 2,
characterized in that
the detent connection is formed by respectively at least one detent element (25, 29; 35, 36) constructed on the adapter part (41; 41a) on the wiper blade side

and on the adapter part (42; 42a) on the wiper arm side.

4. Wiper blade according to Claim 3, characterized in that the detent elements (25, 29; 35, 36) are arranged at a distance from the rotation axis (17) and come into operative connection on pivoting of the adapter part (41) on the wiper blade side relative to the adapter part (42) on the wiper arm side.

5. Wiper blade according to Claim 4, characterized in that the detent elements (25, 29; 35, 36) are arranged spaced apart from each other in the operating position or respectively wiping position of the wiper blade (10; 10a).

6. Wiper blade according to one of Claims 3 to 5, characterized in that the one detent element is constructed as detent pin (25), that the other detent element is constructed as a mounting opening (29) cooperating with the detent pin (25) in the servicing- or respectively installation position, and that the mounting opening (29) is constructed on a fin-like element (28).

7. Wiper blade according to Claim 6, characterized in that the detent pin (25) is constructed so as to be circular in cross-section and the mounting opening (29) has a partially circular cross-sectional area (31), that the diameter of the detent pin (25) is adapted to the shape of the cross-sectional area (31), and that the angle range of the cross-sectional area (31) enclosed by the mounting opening (29) is more than 180°.

8. Wiper blade according to one of Claims 3 to 5, characterized in that the one detent element is constructed as a detent cam (35) arranged on an extension (34), and that the other detent element is constructed as a recess (36), cooperating with the detent cam (35), on a projection (37).

9. Wiper blade according to Claim 8, characterized in that the extension (34) or respectively the projection (37) is arranged or constructed so as to be elastically deformable to form the detent connection.

10. Wiper blade according to one of Claims 3 to 9, characterized in that respectively two of the detent elements (25, 29; 35, 36) are arranged on the adapter part (41; 41a) on the wiper blade side and on the adapter part (42; 42a) on the wiper arm side, that the adapter part (42; 42a) on the wiper arm side has a U-shaped cross-section with two lateral leg surfaces (27), and that the one detent elements (29; 36) are arranged in the plane of the leg surfaces (27) and the other detent elements (25; 35) are arranged on side walls (26).

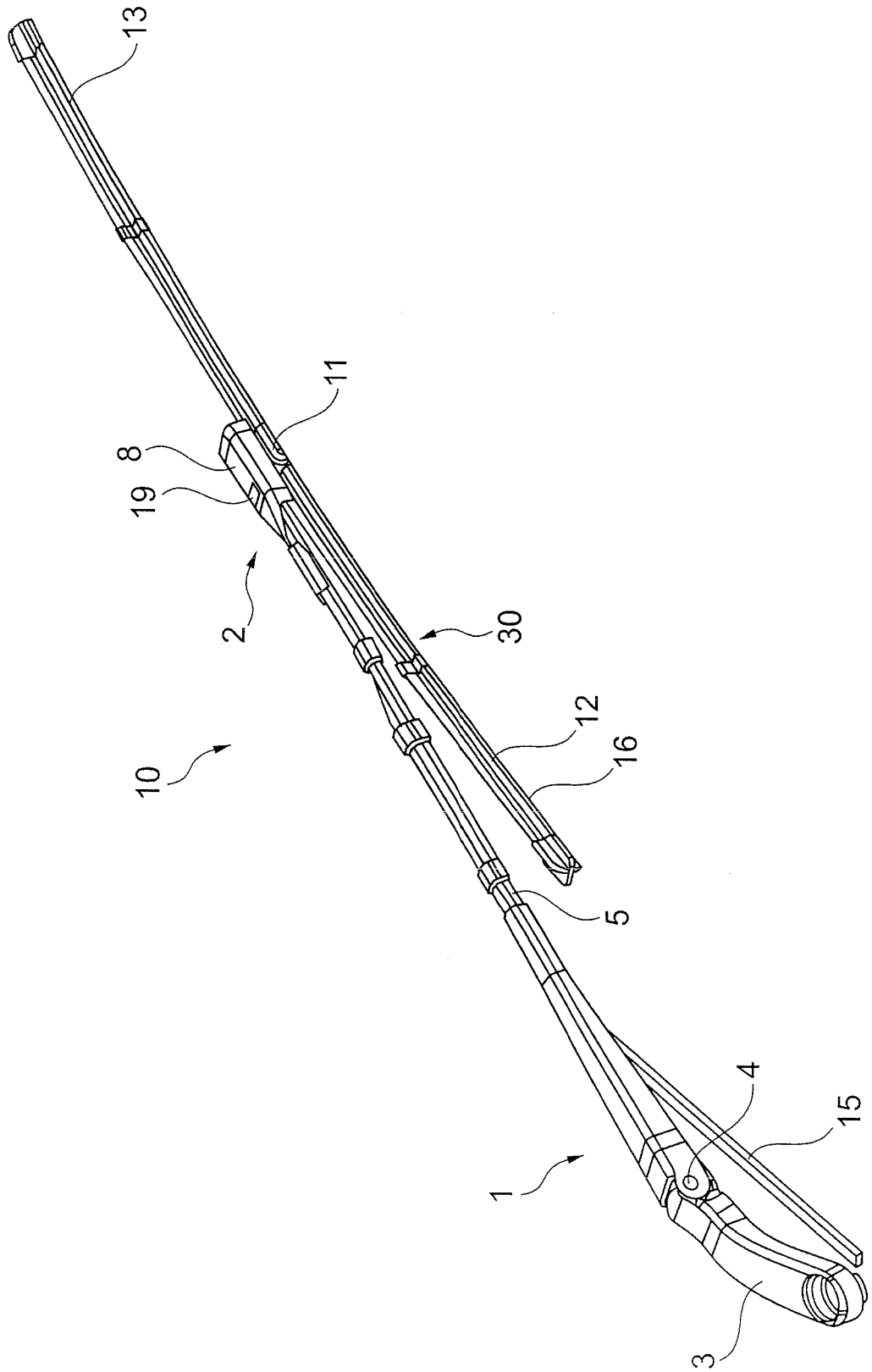

Fig. 1

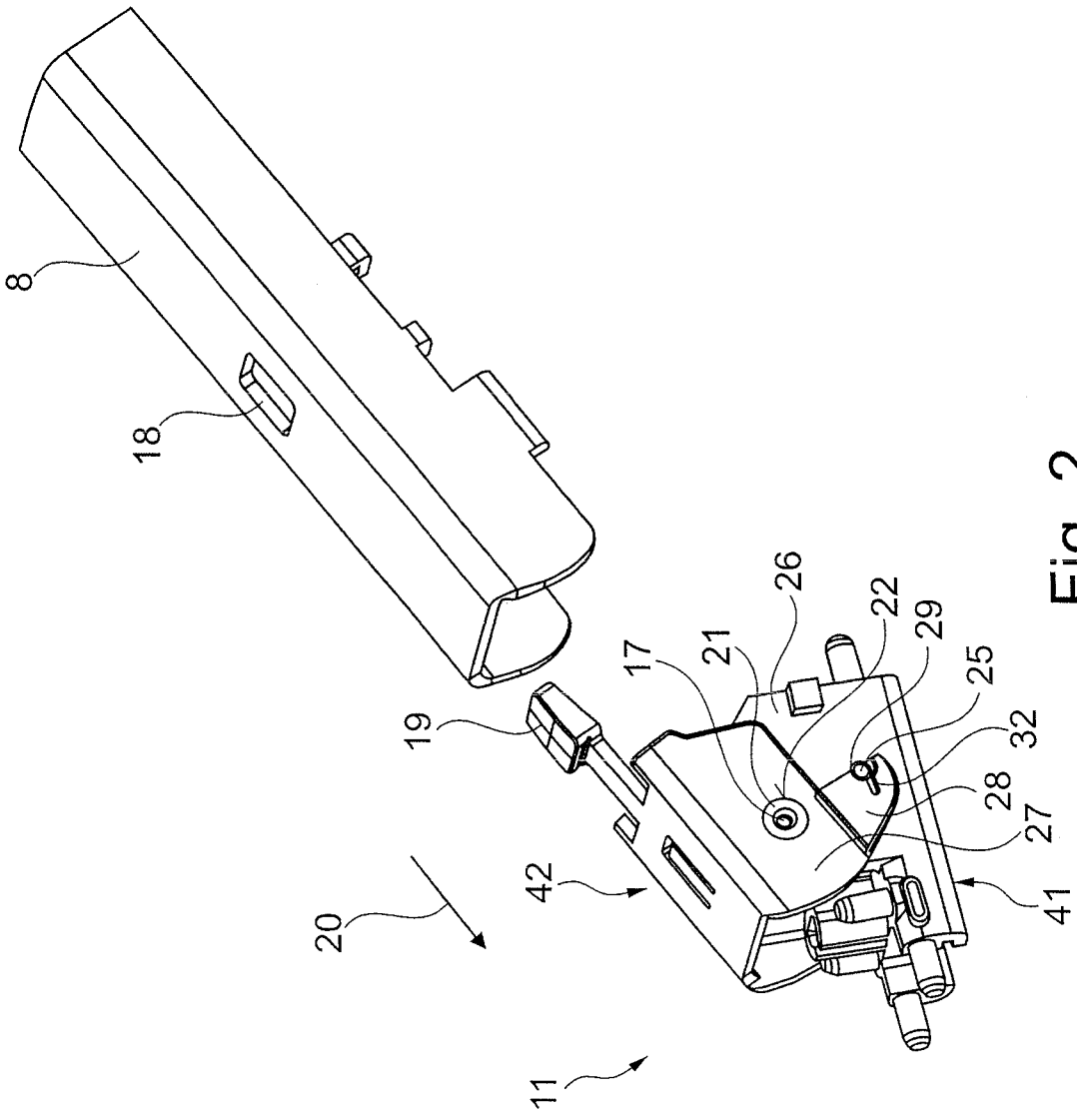

Fig. 2

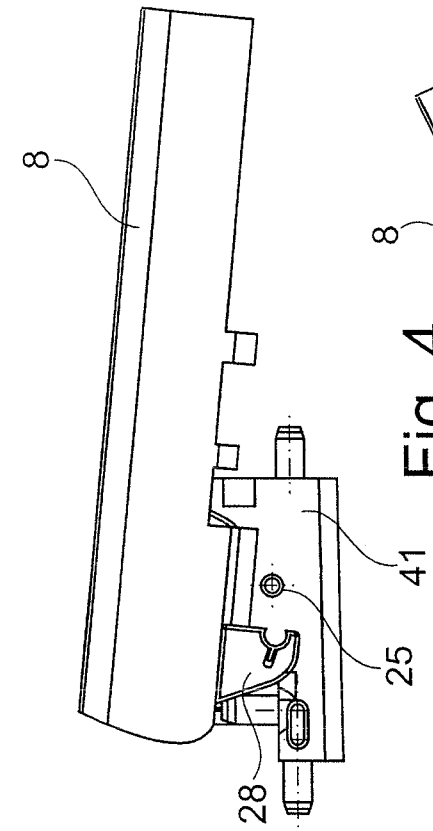

Fig. 4

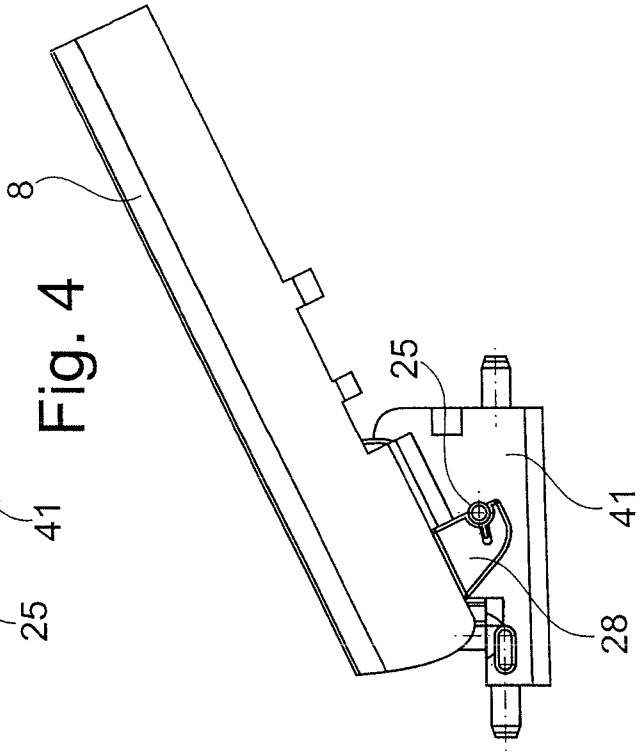

Fig. 6

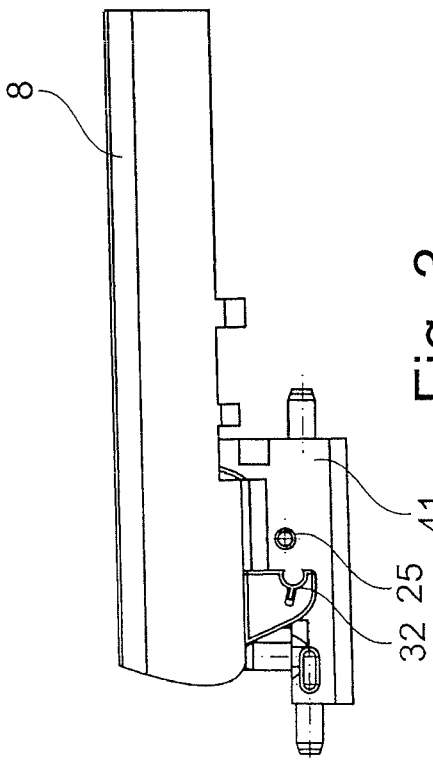

Fig. 3

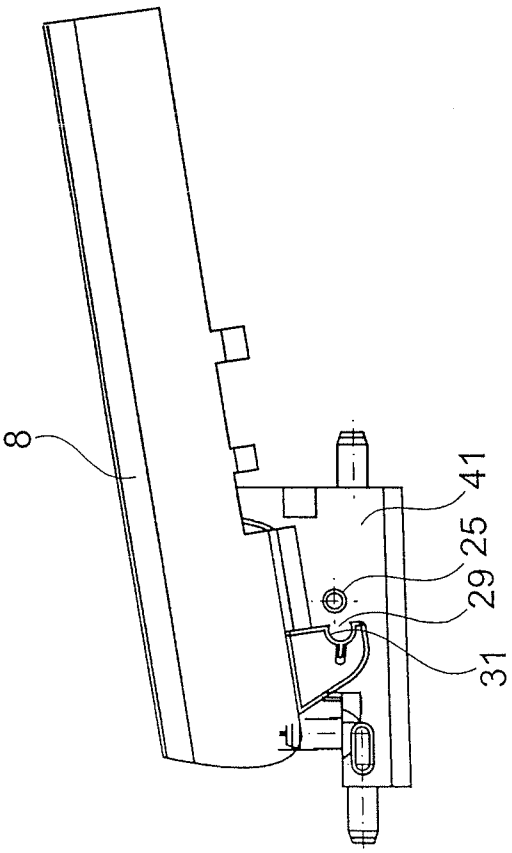

Fig. 5

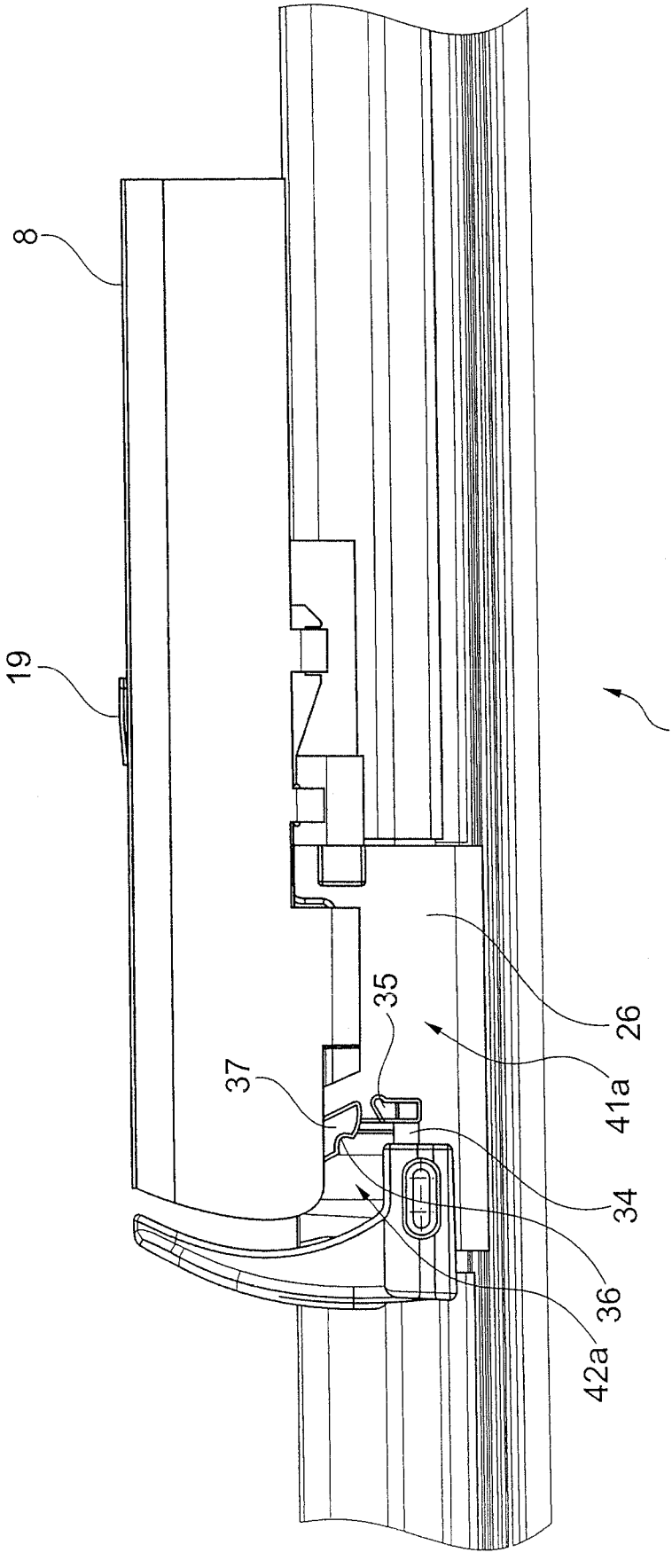

Fig. 7

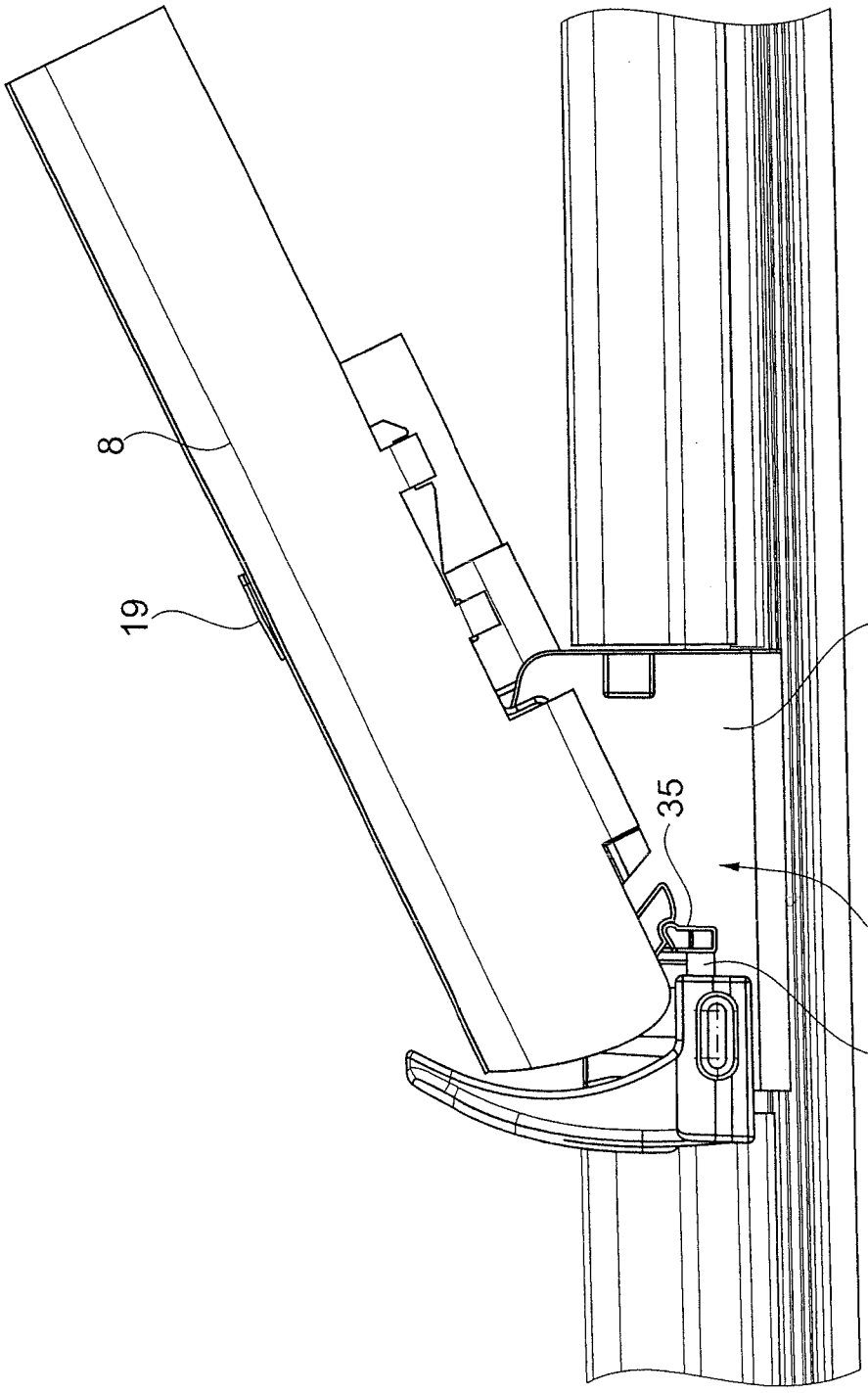

Fig. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/066868

A. CLASSIFICATION OF SUBJECT MATTER
INV. B60S1/38 B60S1/40
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 practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 6 658 690 B1 (WESTERMANN KLAUS-JUERGEN [DE] ET AL) 9 December 2003 (2003-12-09)	1-5
A	column 2, line 36 - column 5, line 18; figures	6-10
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A	FR 2 914 603 A1 (VALEO SYSTEMES ESSUYAGE [FR]) 10 October 2008 (2008-10-10) page 5, line 25 - page 11, line 6; figures	1-6,10

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
6 December 2011	19/12/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Sangiorgi, Massimo

1

Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 6 449 797 B1 (DE BLOCK PETER [BE]) 17 September 2002 (2002-09-17) column 3, line 48 - column 6, line 49; figures	1-10
A	US 2008/201892 A1 (FUJIWARA MASARU [JP] ET AL) 28 August 2008 (2008-08-28) paragraph [0036] - paragraph [0089]; figures	1-10

INTERNATIONAL SEARCH REPORT

Information on patent family members

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