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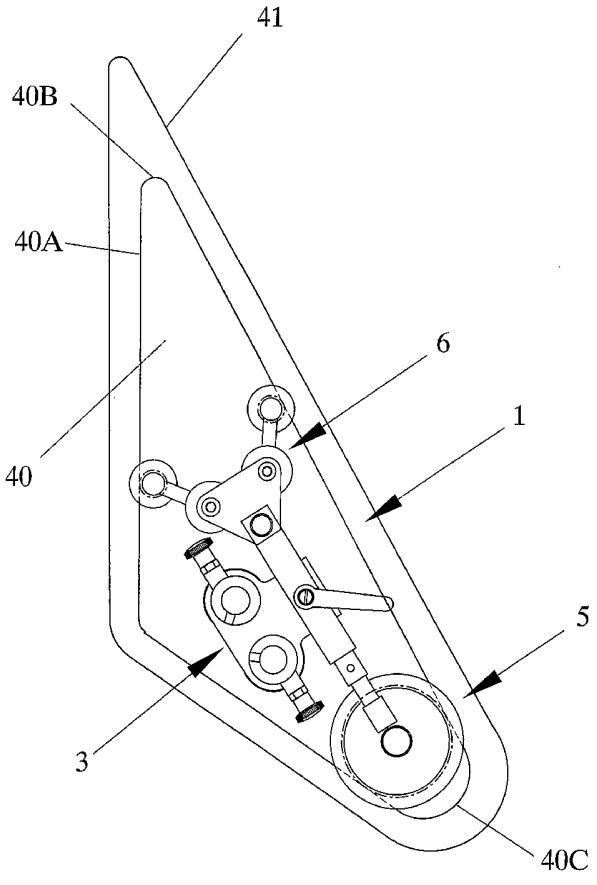
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(54) Title: A METHOD AND A DEVICE FOR REMOVING VEHICLE WINDOWS



(57) Abstract: A method for the non-destructive removal of very small fixed window elements (40) from vehicles uses a cutting wire that is threaded through the adhesive bonding a window element to a vehicle, that is placed in a loop around the perimeter of the window element and that is pulled by means of wire wind-up means (3) of a window element removal device. Said device (1) is fitted to a window element frame (41), is expanded into firm clamping engagement with the window element frame (41) and is locked in said position firmly engaging the window element frame (41). The wire wind-up means (3) are then operated until the wire cuts through the adhesive at the edge of the side window element around the entire perimeter thereof.

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TITLE: A METHOD AND A DEVICE FOR REMOVING VEHICLE WINDOWS

TECHNICAL FIELD

The present invention relates in general to fixed window elements of vehicles. In particular, the invention relates to a method and a device for removing a fixed side window from a vehicle.

BACKGROUND OF THE INVENTION

The removal of fixed vehicle glazing in one piece for replacement or salvage purposes involves penetrating and cutting through the adhesive seal bonding a window element to an associated frame of a vehicle. Throughout the years, various methods for the removal of mainly vehicle windshields and rear windows have been suggested and practiced. Among such known methods are those where a knife or similar tool is used to cut through the adhesive bond and an outward pressure is simultaneously applied to the windshield, see e.g.. US Patent No.6 101 702. Other methods make use of a wire that is threaded through the adhesive bond and that is moved back and forth to cut through the seal all around the perimeter of the windshield, see e.g. US Patent No.4 995 153 and US Patent No 5 622 093. All of the described methods are comparatively time-consuming and cumbersome and involve an apparent risk of damaging both the actual window element and interior or exterior parts of the vehicle.

An improved method for the removal of vehicle windshields is described in my pending U.S. Patent Application No. 326 763. This method is based on the combined use of two separate tools that at spaced locations are secured to the windshield by means of suction cups and that each comprise means for winding up one end of the wire threaded through the adhesive bond of the windshield. Due to the considerable space required for the two separate hand tools and their re-positioning during the cutting operation, this method is specifically designed for the removal of windshields.

Recently, there has been an increased interest in the non-destructive removal of fixed side window elements from vehicles. One of the main reasons for this is that insurance companies are becoming more and more reluctant to pay for the replacement of fixed side windows that are undamaged after an accident but that will have to be removed in order to perform high quality body repair and paint work. In such situations, it has up to the present day been

common practice to crush the window element, with the resulting cleaning and additional cost of a new window element. The only remaining options are to use one of the above described time-consuming, cumbersome and possibly damaging methods employing a knife or a manually operated wire. Additionally, such methods often cause damages also to the actual window element, so that the window element will have to be replaced anyway.

A specific problem in this respect arises for the very small and at present, mostly generally triangular, fixed side windows (sometimes referred to as "quarter lights") that are becoming more and more frequent on modern automobiles. For such small side windows the use of the above mentioned pair of suction cup tools is quite out of the question, since the dimensions of said windows are often such that they would at best allow the application of a single suction cup. Therefore, there is a specific demand for a tool that would permit the efficient removal of such small side window elements from a vehicle frame.

SUMMARY OF THE INVENTION

The invention provides a solution overcoming the above discussed problems experienced with the prior known techniques for removing very small fixed window elements from vehicles.

It is a basic object of the invention to provide an improved method for the effective non-destructive removal of very small fixed side window elements from a vehicle.

It is a further object of the invention to provide an improved device for performing the method of the invention, for the effective non-destructive removal of very small side window elements.

Briefly, the invention provides a method for removing very small fixed vehicle side windows using a cutting wire that is threaded through the window element adhesive, that is placed in a loop around the perimeter of the window element and that is forced to cut through the adhesive around the entire window element by being pulled by means of wire wind-up means of a window element removal device that is fixed relative to the window. According to the invention said device is fitted to a window element frame, is expanded into firm clamping engagement with the window element frame and is locked in said position firmly engaging the window element frame. The wire wind-up means are then operated until the wire cuts through the adhesive at

the edge of the side window element around the entire perimeter thereof. The suggested method permits the use of a very compact device, both with regard to the actual space occupied thereby and with regard to the operation thereof. Therefore, said method provides a unique possibility for secure and effective non-destructive removal of very small fixed side window elements from vehicles.

According to another aspect of the present invention, the invention provides a window element removal device for use in performing the method of the invention, said means having cutting wire wind-up means and spaced attachment means supported by a common handle. According to the invention said attachment means each comprise at least one engagement member for engaging a window element frame and by means for allowing adjustment of the mutual distance between the first and second attachment means and for locking the attachment means in a position engaging said window element frame, to thereby mechanically clamp the device to the frame. The suggested tool is very compact and may be fitted to very small fixed side window elements.

These and further objects of the invention are met by the invention as defined in the appended patent claims.

Advantages offered by the present invention, in addition to those described above, will be readily appreciated upon reading the below detailed description of embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention and further objects, features and advantages thereof will be more fully understood by reference to the following detailed description of embodiments of the invention when read in conjunction with the accompanying drawings, where:

Fig. 1A is a top elevational view of a first embodiment of a device of the invention;

Fig. 1B is a side elevational view of the device illustrated in Fig. 1A;

Fig. 2A is a partially schematic cross section along line A-A through a first attachment means of the device illustrated in Fig. 1A;

Fig. 2B is a partial view from below of the first attachment means of the device illustrated in Fig. 1A;

Fig. 3A is a partial top plan view of a second attachment means of the device illustrated in Fig. 1A;

Fig. 3B is a side view of an engagement member of the second attachment means illustrated in Fig. 3A;

Fig. 4 illustrates the first embodiment of the device of the invention attached to the frame surrounding a small side window element of a vehicle;

Figs. 5A-C illustrate the sequence of operations for removing a small side window element using a device of the present invention;

Fig. 6 illustrates a second embodiment of the device of the invention, attached to the frame surrounding a small side window element of a vehicle;

Fig. 7 illustrates a third embodiment of the device of the invention attached to the frame surrounding a small side window element of a vehicle;

Fig. 8 illustrates a forth embodiment of the device of the invention attached to the frame surrounding a small side window element of a vehicle; and

Fig. 9 illustrates a fifth embodiment of the device of the invention, having a modified adjustment means for expanding the device.

DETAILED DESCRIPTION OF EMBODIMENTS

An exemplary illustrative embodiment of the device or tool 1 according to the invention is illustrated in figs. 1A-B, 2A-B and 3A-3B. The basic design of this tool 1 is based on that of a hand tool that is presently used in the inventors own system "Roll out 2000®" for cutting the sealant/adhesive bonding a vehicle windshield to the vehicle body and thus for removing such a

windshield. In said basic design, the tool 1 has an elongate handle 2 connected to a wire wind-up means 3 and first and second tool attachment means 5, 6 that are supported by each end section 2A, 2B of the handle 2.

In contrast to the above mentioned, known tool the wire wind-up means 3 of the tool 1 of the present invention is preferably provided with two winch mechanisms 7, 8. Said winch mechanisms 7, 8 are supported on a bracket 4 that is attached to the tool 1, generally at a mid-portion of the handle 2. In this embodiment the pair of winch mechanisms 7, 8 are provided side by side, at a distance from each other, along a line being approximately parallel to a centre axis C of the handle 2. Said two winch mechanisms 7, 8 on the tool 1 may be of the same general kind as the single one of the presently used hand tool. More particularly, such a winch mechanism 7, 8 has a roller 9 for receiving and winding up a cutting wire 42 (indicated in fig. 2 and in figs. 5A-C). The wire 42 may be inserted into an eccentrically positioned opening 10 for holding the wire 42 to the roller 9 during winding-up rotation of the roller 9. The winding-up roller 9 is rotatable in a winding-up direction WU (see fig. 5B) and is provided with an internal locking mechanism (not specifically illustrated) that normally prevents rotation of the roller 9 in the opposite direction. Each winch mechanism 7, 8 has a release button 11 for releasing the locking mechanism so that the roller 9 may also be rotated in an opposite direction UW (fig. 5B) to unwind the wire 42.

Furthermore, in the tool 1 of the present invention, the first and second tool attachment means 5, 6 each consist of frame engagement members 12 and 13, 14, respectively, for engaging a receiving frame 41 of a small fixed side window element 40. In other words, here the engagement members 12 - 14 replace the suction cups of the known tool. The mutual distance between the tool attachment means 5, 6 and thereby the overall length L of the tool 1, see specifically fig. 1B, is adjustable, so that the tool 1 is adaptable to the dimensions of the frame 41 of the window element 40 to be removed. The adjustability preferably provides a stepless adjustment of the overall length of the tool, the application of a separating force between the first and second attachment means 5, 6 and the fixing of a mounted tool in the adjusted position, as will be described further below.

In the illustrated embodiment of the invention said adjustability is provided by slidably receiving a rod-like carrier 16 of the first attachment means 5 in a central channel 2C of the handle 2. In

this basic embodiment the separating force is applied simply by forcing apart the first and second attachment means 5, 6 by hand. The adjusted position of the carrier 16 and thereby of the overall length L of the tool 1 is then fixed by means of a locking means 17 consisting of a locking lever 17A, preferably spring biased, that is mounted on the handle 2 and that in an inner end (not shown), extendable into the central bore 2C of the handle, carries a stop means, such as a stop screw or stop pin, that by manipulation of the lever 17A is brought into locking engagement with the carrier 16. Although the details of the locking means 17 are not illustrated in detail, various types of such locking means for fixing a rod in a selected position in a tubular channel, are well known to the man skilled in the art. Likewise, it shall be emphasized that the simple locking means 17 of the exemplifying embodiment is only used for illustrative purposes and that for practical applications the locking means may preferably be integrated in the end section 2A of the handle 2, such as schematically indicated at 17' in fig. 1A.

Specifically, in the illustrated embodiment, and with specific reference to figs. 2A-B, the first tool attachment means 5 comprises the above discussed carrier rod 16 that at an outer free end thereof carries one single, comparatively large engagement member 12 having a general disc shape. Said engagement member 12 has an outer circumferential window frame receiving channel 15 formed at its outer circumference, and in a bottom surface thereof is formed a recess 18 accommodating a further, generally disc shaped wire guide member 19. The wire guide member 19 is provided with an outer circumferential cutting wire guide groove 20 and carries a shaft 21 by means of which it is rotatably and axially displaceably journalled in a sleeve 22 attached to an upper side of the first attachment means 12.

With regard to the axial displacement of the wire guide member 19 it is biased by a compression spring 23 that is positioned around the shaft 21, at a position between the sleeve 22 and an operating knob 24 attached to an upper free end of the shaft 21, so that the guide member is biased into a position where it is accommodated in the recess 18 of the engagement member 12. By pushing the knob 24 the guide member 19 will be displaced from the recess 18 to expose the wire guide groove 20 and to allow the introduction of a cutting wire 42 into said groove 42. By virtue of the biasing of the guide member 19, the cutting wire 42 will then be "trapped" in the groove 20 as the knob is released. Fig 2B illustrates a cutout 26 that is formed at the outer circumference of the recess 18 of the engagement member 12 and that serves to

maintain the wire 42 in the guide member during installation of the tool 1, as will be described further below. Likewise, a layer 25 of relatively soft protective material is preferably glued to the bottom surface of the guide member 19, to avoid that the rotating guide member 19 damages the window element 40 during attachment and operation of the tool 1.

A second attachment means 6, see especially figs 3A-B, is connected to the handle 2 at the opposite end section 2B thereof and consists of a base plate 30 that has a general triangular shape and that is releasably connected to the handle 2 by means of a connector 31. The connector 31 is secured to the base plate 30 at one of its corners and carries a spring biased pin 32 that may be brought into engagement with a bore 37 (schematically indicated in fig. 3A) in the handle 2 end section 2B, to thereby releasably secure the attachment means 6 to the handle 2. In the illustrated embodiment the second attachment means 6 comprises two second engagement members 13, 14 that are secured to the base plate 30 at the respective remaining corners thereof by means of bolts 33. The respective engagement members 13, 14 consist of a body 34 having a circumferential window frame receiving channel 35 formed adjacent a lower free end thereof.

The frame receiving channel 35 is preferably formed with such a width that even with the window frame 41 received therein it will still be able to accommodate also the cutting wire 42 for guiding purposes, as will be described below. Alternatively a separate wire guide groove (not illustrated) is formed in the body 34, above the frame receiving channel 35. The body 34 of the respective engagement member 13, 14 is carried by an arm 36 that at one end is connected to the area of the upper end of the body 34 and that at its other end is secured to the base plate 30 by means of the above mentioned bolt 33. By loosening the bolts 33 the engagement members 13, 14 may be rotated individually, as illustrated in fig. 3A, to a position that fits a specific window element that is to be removed.

Rotation of the respective winding-up roller 9 of the wind-up means 3 is performed by means of a wrench-like handle 43 (see fig. 5B), such as a ratchet wrench or other similar means, engaging a socket 44 provided at an upper end of each roller 9. The two adjacent winch mechanisms 7, 8 of the tool 3 are preferably each rotatable in the same directions WU and UW, respectively, for the winding-up and unwinding of the cutting wire 42. It is perceived by the user to be most

practical to wind up the two wire ends by rotating the associated winches in the same direction and in particular in combination with the use of a ratchet wrench that would otherwise have to be re-adjusted whenever it is moved from one winch to the other.

The operation of the above described device/tool 1 in performing the method of the invention will now be explained with specific reference to figs. 4 and 5A-C. Initially, a cutting wire 42 is inserted through the adhesive normally bonding a fixed vehicle side window element 40 to a schematically indicated receiving frame 41, see especially fig. 4, of a vehicle that is not specifically illustrated. A length of the cutting wire 42 is inserted through the adhesive bonding between a side edge 40A of the window element 40 and the frame 41 by means of a commonly used hollow needle, not illustrated. The length of the wire 42 is adapted to the size of the window element 40, as will be clarified below. In particular, at an insertion point IP, both ends 42A, 42D of the wire 42 are inserted from a first side of the window 40, normally an outside thereof, to a second side of the window 40, which is normally the inside thereof, so that said free ends 42A, 42D are disposed inside the vehicle.

For the best performance, the insertion point IP is chosen to be close to and to one side of the most pointed corner 40B (see fig. 4) of the window element 40 that may be referred to as the "difficult corner" of the window element. The wire end section 42A, 42B on the inside is significantly longer than the other wire end section 42D, 42E on the inside. The portion 42C, 42F of the wire 42 that is on the first side/outside of the window 40 is arranged in a closed loop around the perimeter of the window 40, as will be seen in fig. 5A. The user may pull a bit on both ends on the inside so that the wire 42 is snugly applied around the edge 40A of the window element 1 on the outside thereof, as shown in fig. 5B.

Next, the tool 1 is brought to the vicinity of the window element 40, where the guide member 19 of the first attachment means 5 is displaced from the recess 18 by pushing the knob 24. This will expose the wire guide groove 20 and allow the introduction of the long end section 42A, 42B of the cutting wire 42 into said groove 42. In order to securely maintain the wire section 42A, 42B in the guide member 19 groove 20 during installation of the tool 1, the wire is positioned in the cutout 26 of the engagement member 12, and then the knob is released so that the guide

member is moved back into the recess 18 by virtue of the biasing of the guide member 19 and so that the cutting wire 42 will then be "trapped" in the groove 20.

The tool 1 is now fitted to the window element frame 41 with the first attachment means 5 positioned at a second corner 40C of the window element 40 that is approximately opposite to the "difficult corner 40B. The locking means 17 is released and the first and second attachment means 5 and 6 of the tool 1 are moved apart so that the engagement member 12 of the first attachment means 5 securely engages the window element frame 41 at or in the vicinity of said second corner 40C and that the engagement members 13, 14 of the second attachment means 6 firmly engage side edges of the frame 41 converging towards the first, "difficult corner" 40B of the window element 40. Installation of the tool 1 is then completed by applying an expansion force to firmly clamp the tool 1 to the frame and by finally engaging the locking means 17 again. The first wire end 42A, and specifically its further adjacent inside wire section 42B is now guided around the rotating wire guide member 19, in its associated groove 14. The wire end 42A is attached to the roller 9 of one of the winch mechanisms 7, as described above. In particular, the first wire end 42A is attached to the winch mechanism roller 9 that is most distant from the first attachment means 5 guiding this wire end section 42A, 42B, for reasons to be described further below. Operating the wrench 43 activates the winch mechanism 7, so that the wire is pulled and the tension thereof is increased. As the tension in the wire 42A-42C is further increased, the wire 42 will start cutting through the adhesive between the window element 40 and the frame 41 in a direction towards the "difficult corner" 40B. Depending upon the dimensions of the window element 40 the inside wire section 42B will, during this initial cutting operation be guided by the engagement member 13 of the second attachment means 6 or not.

This initial operation, tensioning the first wire section 42A-C serves an important purpose in addition to the cutting action, since it is used to establish that the wire ends are not crossed at the insertion point IP. In case the wire ends were crossed at the insertion point IP the tensioning of the first wire section 42A-C would inevitably have the effect that the crossed, loose wire section 42D-F would be brought along in the cutting movement of the tensioned wire section. As soon as it has been established that the wire sections are not crossed, the second end 42D of the wire 42 may be attached to its associated winch mechanism 8. At this

stage it is optional whether to complete the operation of the first winch mechanism 7 or to alternatingly operate the two winches 7, 8 until their associated wire sections 42A-C, 42D-F reach a meeting point MP (see fig. 2C), where the two wire section will meet to complete the cutting-loose of the window 40 from the frame 41. Similarly to what was mentioned above, the other inside wire section 42E may, during the corresponding cutting action, be guided by the other engagement member 14 of the second attachment means 6 or not.

In the first case, the wire section 42A-C is wound up on the roller 9 of the first winch mechanism 7 and the cutting point moves from the insertion point IP and all the way up to the meeting point MP, until operation of the second winch mechanism 8 is initiated. In said first case it is not necessary to attach the second, loose wire end 42D during the operation of the first winch 7, since the wire 42 is prevented from sliding along the outer edges of the window 40 by the friction between the adhesive and the wire 42. However, in the latter case, the second end 42D of the wire is attached to the winch mechanism 8 as soon as it has been established that the wire sections do not cross, and the two winch mechanisms are operated alternatingly, until both wire sections 42A-C and 42D-F meet at the meeting point MP.

By arranging the wire ends 42A, 42D so that they are attached to the respective winch mechanism roller 9 being most distant from the associated engagement means 5, 6 and so that the wire ends cross in the area of the winch mechanisms, a favorable cutting angle is maintained during the full cutting operation for both wire sections 42A-C, 15D-F. This means that effective cutting is achieved all around the perimeter of the window 40 without requiring any adjustment of the position of the single tool 1.

The method and device of the present invention are unique in that they permit secure non-destructive removal of very small fixed side windows from vehicles, since the tool is clamped directly to the window element frame and therefore eliminates the need for the relatively large suction cups that may only be secured to a window of certain minimum size.

Figs 6-8 illustrate examples of possible modified arrangements of attachment means by the tool of the invention. Thus, fig. 6 illustrates a tool 101 of the invention secured to a window element frame 141 of a generally diamond shape window element 140. Here, the tool 101 differs from that

of the first embodiment in that the second attachment means 106 comprises a single engagement member 12 that is identical to the one of the first attachment means 5, except that it is non-adjustably secured to the handle 2. This second attachment means 106 likewise engages the window element frame 141 adjacent a sharp "difficult corner" 140B of the diamond shape window element 140.

Fig. 7 illustrates a further embodiment of the tool 201 of the invention that is likewise secured to the diamond shape window element 140 of fig. 6. In this case the second attachment means 206 consists of a modified base plate 230 that in addition to the engagement members 13, 14 of the first embodiment carries a further engagement member 214 that fits directly onto the frame 141 at a corner 140B of the window element 140.

Fig. 8 illustrates yet another embodiment of the inventive tool 301 secured to the window element frame 341 of a window element 340 having the shape of a triangle with two equal sides. In this case the second attachment means 6 corresponds to that of the first embodiment whereas the first attachment means 305 consists of two engagement members 12 that are adjustably attached to a common base 335, which is in turn supported by an adjustable rod-like carrier 16 like that of the first embodiment. The engagement members 12 are thereby adjustable so that they engage the window element frame 341 at the corners of the base of the triangle.

Finally, fig. 9 illustrates an embodiment of the inventive tool 401 where the adjustability of the overall tool length for adaption to a specific window element and the application of the separating force that secures the tool 401 to a window element frame (not illustrated) is achieve by means of a modified adjustment means 417, consisting of a rack 416 that forms the carrier of the first attachment means 405 and that cooperates with a rotatably journalled nut member 417A at the corresponding end section of the handle 402. With such a means a stepless adjustment of the tool length may be performed and a controlled separating force may be applied to secure the tool 401 in position.

The invention has been described in connection with what is presently considered to be the most practical and preferred embodiments, but it is to be understood that the invention is not to be limited to the disclosed embodiments. Thus the invention is not restricted to configurations where

adjustment of the tool length and the application of the tool expanding and clamping force is performed manually or with purely mechanical means, but also covers embodiments where said adjustment and force application is performed by means of pressurized fluid, such as by a pneumatic cylinder provided in or constituting the handle, or by means of an electric motor. In another variant, both of the first and second attachment means may be adjustable in position for adapting the overall length of the device 1. Also, the tool has been disclosed in preferred embodiments where two winches are provided side by side on the handle to provide easy cutting operation. However, this does not preclude the use of a tool having the inventive characteristics but having only one single winch. With such an embodiment, a window element would be removed just as securely, but the operation would more inefficient and time consuming.

The invention is therefore intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.

PATENT CLAIMS

1. A method of removing a fixed side window element (40; 140; 340) from a vehicle, said side window element having a first side and a second side and having an edge area (40A) being bonded to a receiving frame (41; 141; 341) of the vehicle with an adhesive, by means of a device (1; 101; 201; 301; 401) having wire wind-up means (3) for pulling a cutting wire (42) through said adhesive and attachment means (5; 305; 405, 6; 106; 206) for fixing said device relative to the window element, **characterized by**;

- fitting said device (1; 101; 201; 301; 401) to the window element frame (41);
- expanding the device (1; 101; 201; 301; 401) to place the attachment means (5; 305; 405, 6; 106; 206) in firm engagement with the window element frame (41; 141; 341);
- locking the device in said position firmly engaging the window element frame (41; 141; 341); and
- arranging a cutting wire (42) in a loop around the window element (40; 140; 340) and pulling the wire (42) by means of the wire wind-up means (3) until the wire cuts through the adhesive at the edge of the side window element around the entire perimeter thereof.

2. A method according to claim 1, **characterized by**;

- inserting first and second ends (42A, 42D) of the wire (42) from the first side of the side window element (40; 140; 340) through the adhesive to the second side of the side window element to form a loop of the wire on said first side thereof, and applying the loop of the wire along the edge of the side window element between the side window element and the frame (41; 141; 341);
- attaching the first end (42A) of the wire to a first wire wind-up mechanism (7) of the tool (1; 101; 201; 301; 401) secured to the window element frame (41; 141; 341) and pulling the first end of the wire (42) with the first wire wind-up mechanism (7) to tension the wire;
- attaching the second end (42D) of the wire to a second wire wind-up mechanism (8) of said tool; and
- pulling the first and second ends of the wire until the wire cuts through the adhesive at the edge of the side window element (40; 140; 340) around the entire perimeter thereof.

3. A method according to claim 1 or 2, **characterized in** that the tool (1; 101; 201; 301; 401) is maintained in its initial position on the window element frame (41; 141; 341) during the entire process of cutting loose the window element (40; 140; 340) from the frame (41; 141; 341).

4. A method according to claims 2 or 3, **characterized in** that the first and second ends (42A, 42D) of the wire are pulled one at a time by the associated wind-up mechanisms (7, 8) until associated wire sections (42B-C, 42E-F) reach a meeting point (MP) where the wire (42) has cut through the adhesive at the edge (40A) of the side window element (40; 140; 340) around the entire perimeter thereof.

5. A method according to claims 2 or 3, **characterized in** that the first end (42A) of the wire (42) is pulled by its associated wind-up mechanism (7) until a corresponding section (42B,42C) of the wire has cut through the adhesive at the edge (40A) of the side window element (40; 140; 340) up to a meeting point (MP), before the second end (42D) of the wire is pulled by its associated wind-up mechanism (8).

6. A method according to any of claims 2-4, **characterized in** that the first and second ends (42A, 42D) of the wire are alternatingly pulled by the associated wind-up mechanisms (7, 8) until associated wire sections (42B-C, 42E-F) reach a meeting point (MP) where the wire (42) has cut through the adhesive at the edge (40A) of the side window element (40; 140; 340) around the entire perimeter thereof.

7. A device (1; 101; 201; 301; 401) for removing a side window element (40; 140; 340) fixed to a window element frame (41; 141; 341) of a vehicle, having wire wind-up means (3) and spaced first and second attachment means (5; 305; 405, and 6; 106; 206 respectively) that are supported at respective ends (2A and 2B, respectively) of a common handle (2; 402), **characterized in that** said first and second attachment means (5; 305; 405, and 6; 106; 206 respectively) each comprise at least one engagement member (12; and 13, 14; 12; 214 respectively) for engaging the window element frame and by adjustment means (16, 17; 416, 417) for allowing adjustment of the mutual distance between the engagement members of the first and second attachment means and for locking the attachment means in a position engaging said window element frame to thereby mechanically clamp the device to the frame.

8. A device (1; 101; 201; 301; 401) according to claim 7, **characterized in** that the engagement member or members (12) of said first attachment means (5; 305; 405) is/are provided with a circumferential channel (15) for receiving a section of the window element frame (41; 141; 341).

9. A device (1; 101; 201; 301; 401) according to claim 7 or 8, **characterized in** that the engagement member or members (12) of at least said first attachment means (5; 305; 405) is/are provided with a rotating wire guide member (19) having an outer circumferential guide groove (20) for receiving a cutting wire (42).

10. A device (1; 101; 201; 301; 401) according to claim 9, **characterized by** a recess (18) formed in a bottom surface of the engagement member (12), in that the wire guide member (19) is accommodated in said recess and is maintained therein by a biasing force and in that the wire guide member is axially displaceable out from the recess, against the biasing force, to expose said wire guide groove (20).

11. A device (1; 101; 201; 301; 401) according to any of claims 7 - 10, **characterized in** that the engagement member or members (13, 14; 12; 214) of said second attachment means (6; 106; 206) is/are each provided with a circumferential channel (35; 15) for receiving a section of the window element frame (41; 141; 341).

12. A device (1; 101; 201; 301; 401) according to claim 11, **characterized in** that the frame receiving channel (35; 15) of the engagement member or members (13, 14; 12; 214) of said second attachment means (6; 106; 206) has a width sufficient for receiving not only the window element frame (41; 141; 341) but also a cutting wire (42).

13. A device (1; 401) according to any of claims 7-12, specifically intended for side window elements (40) having a generally triangular shape, **characterized in** that the first attachment means (5; 405) comprises one single first engagement member (12) and in that the second attachment means (6) comprises two second engagement members (13, 14).

14. A device (1) according to any of claims 7-13, **characterized by** two wire wind-up mechanisms (7, 8) supported by the handle (2) at a distance from each other.

FIG. 1A

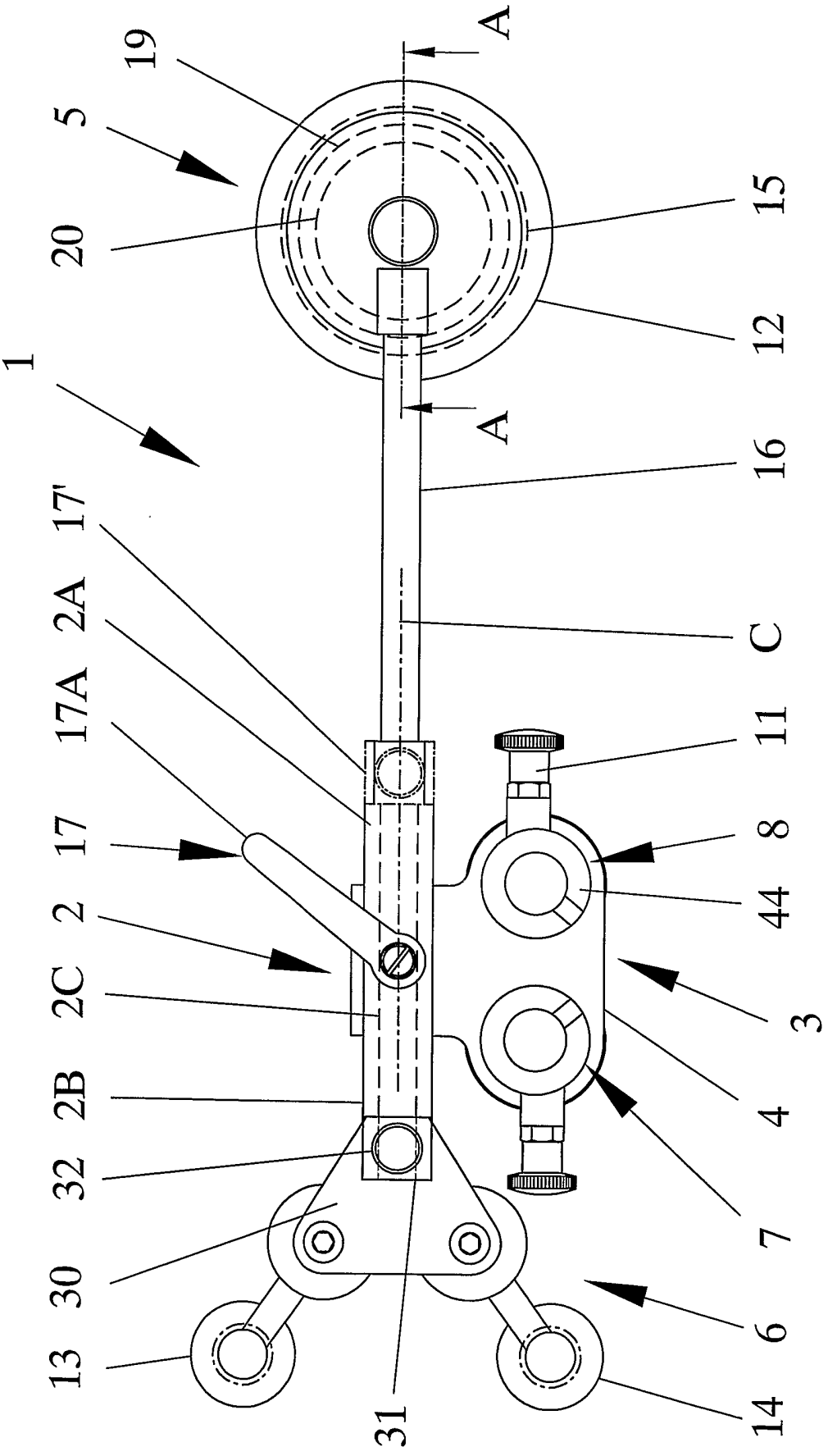


FIG. 1B

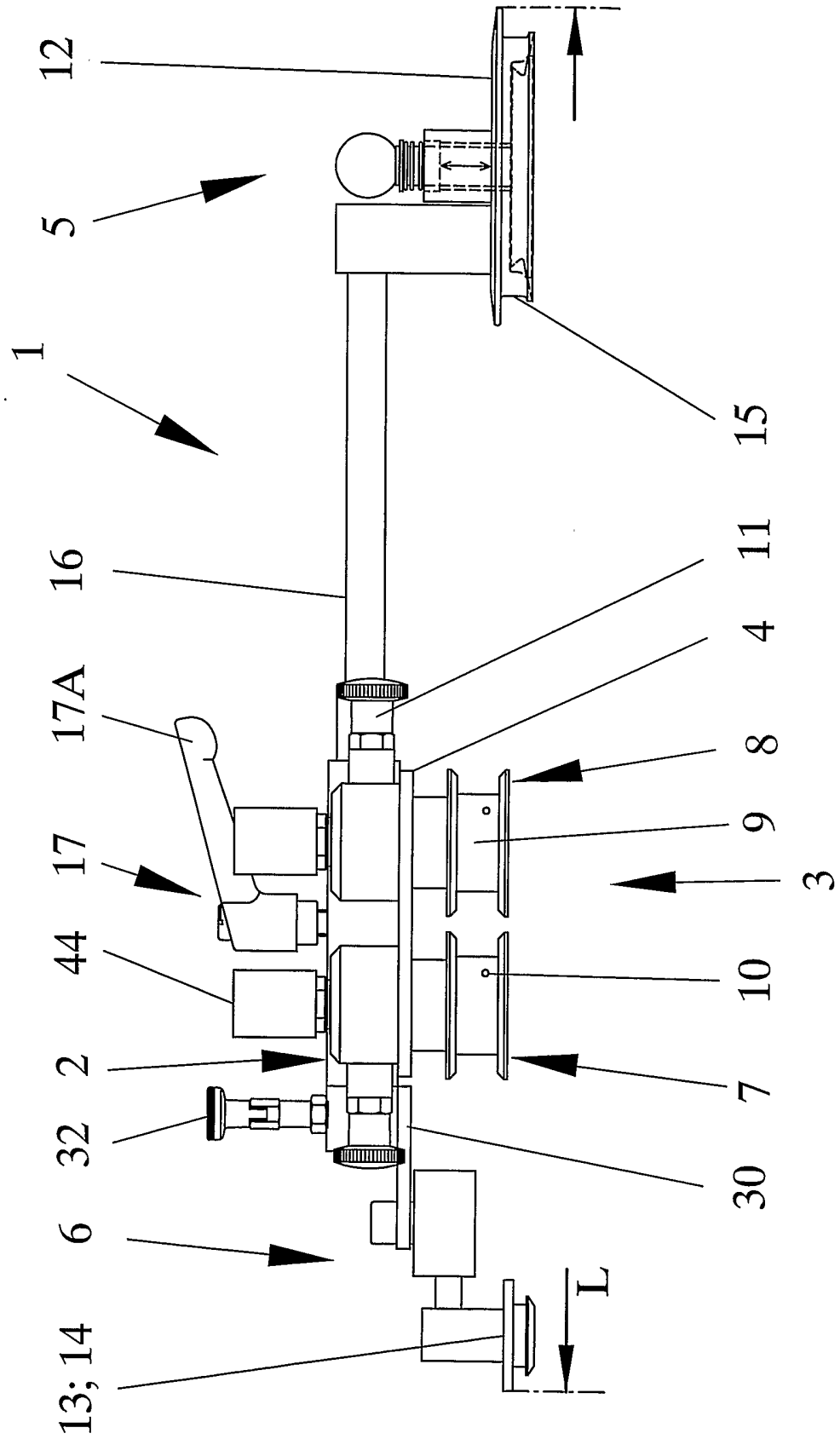


FIG. 2A

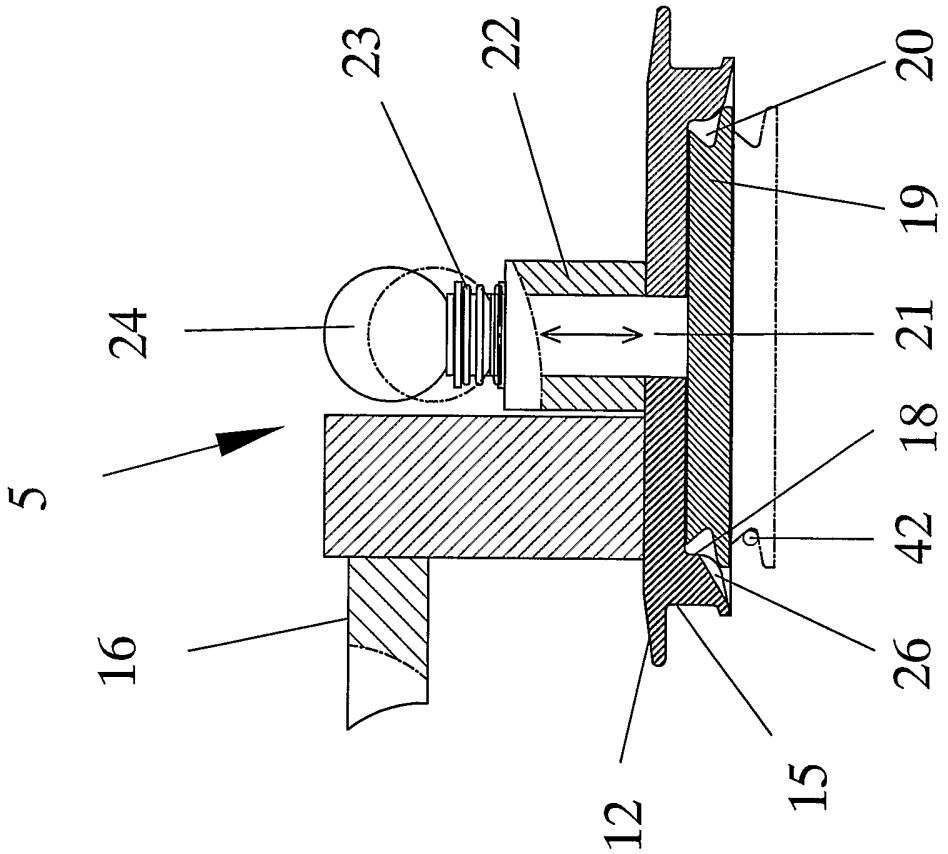


FIG. 2B

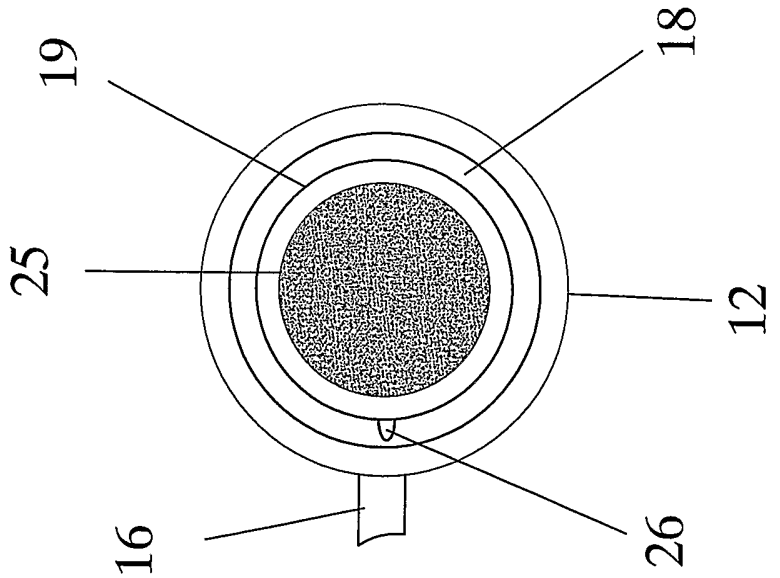
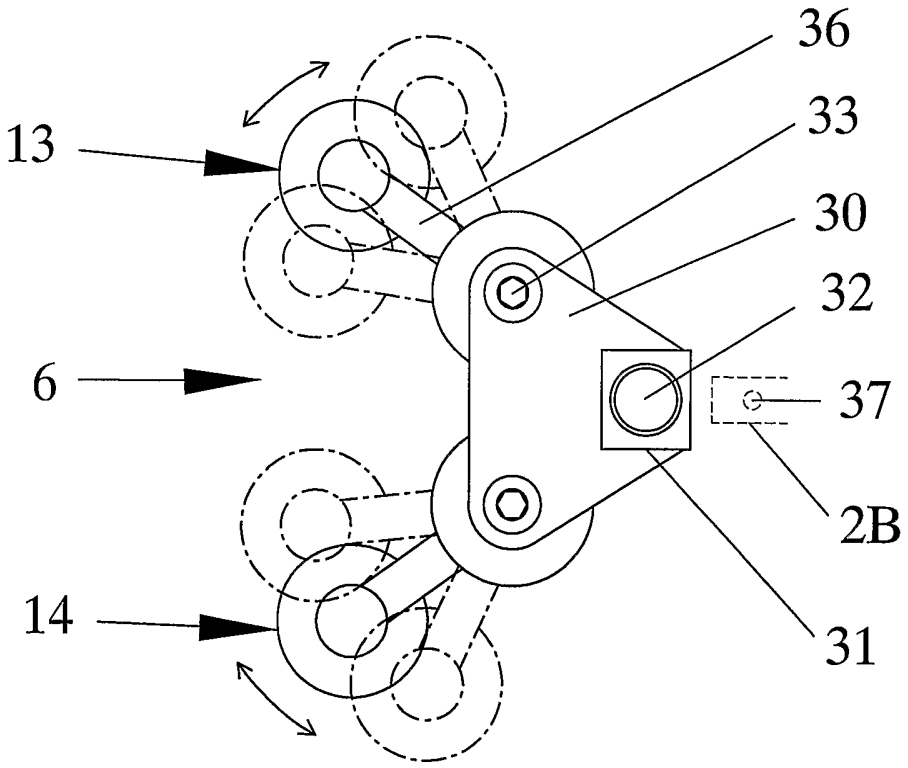


FIG. 3A



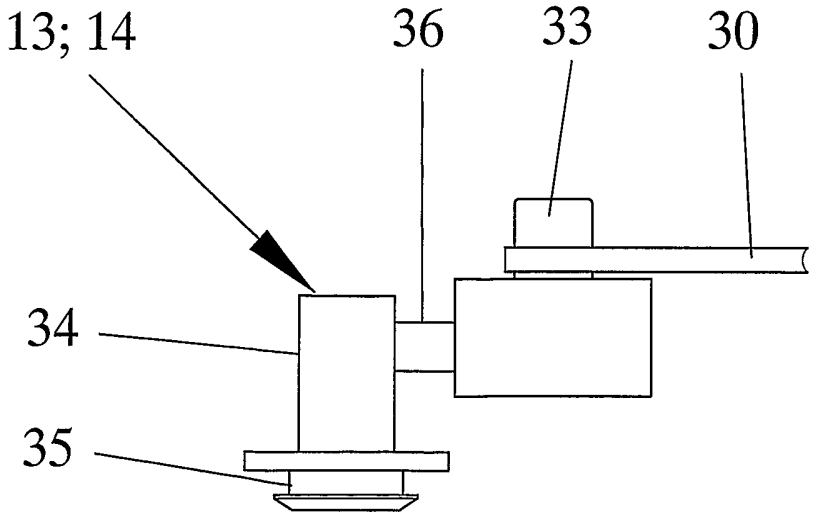
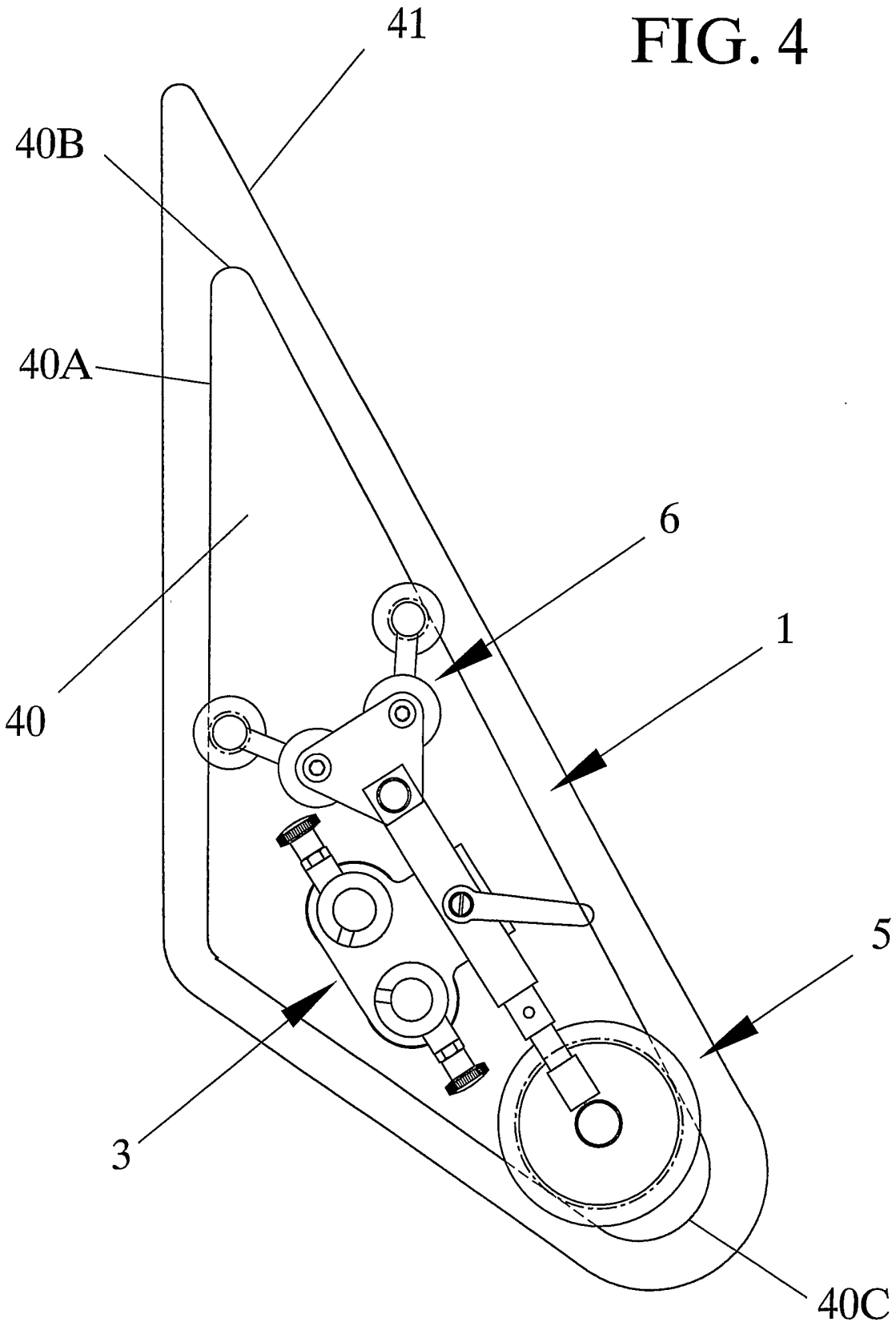


FIG. 3B

FIG. 4



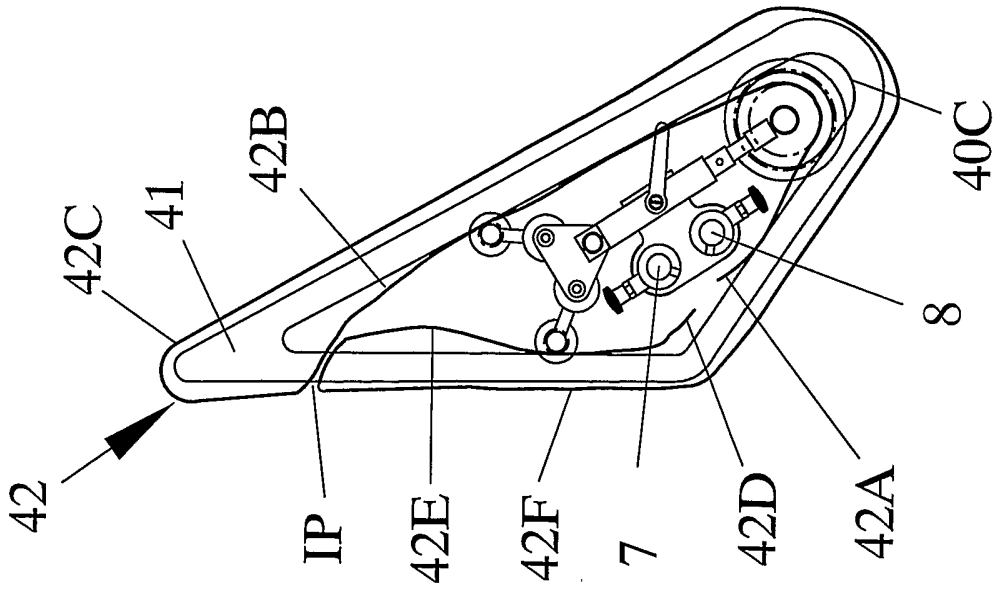


FIG. 5A

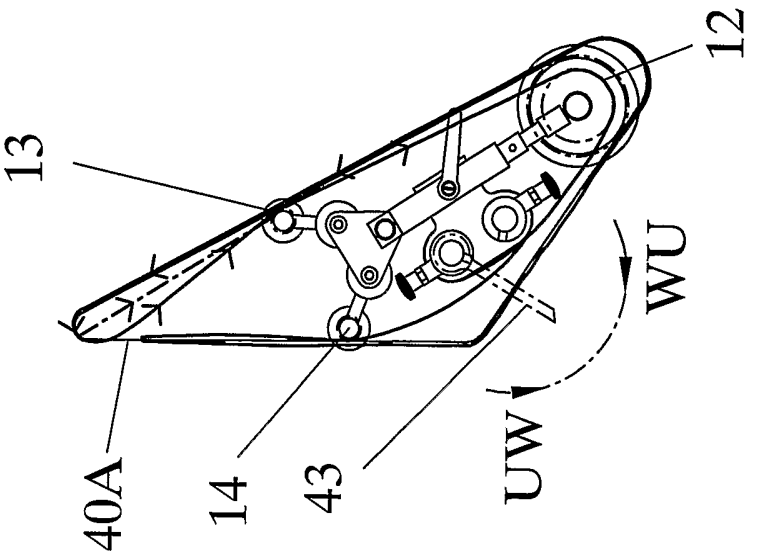


FIG. 5B

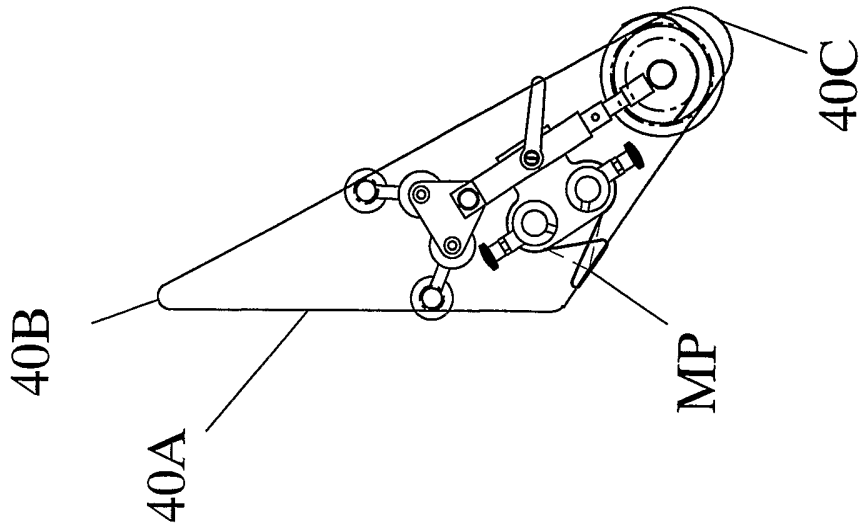


FIG. 5C

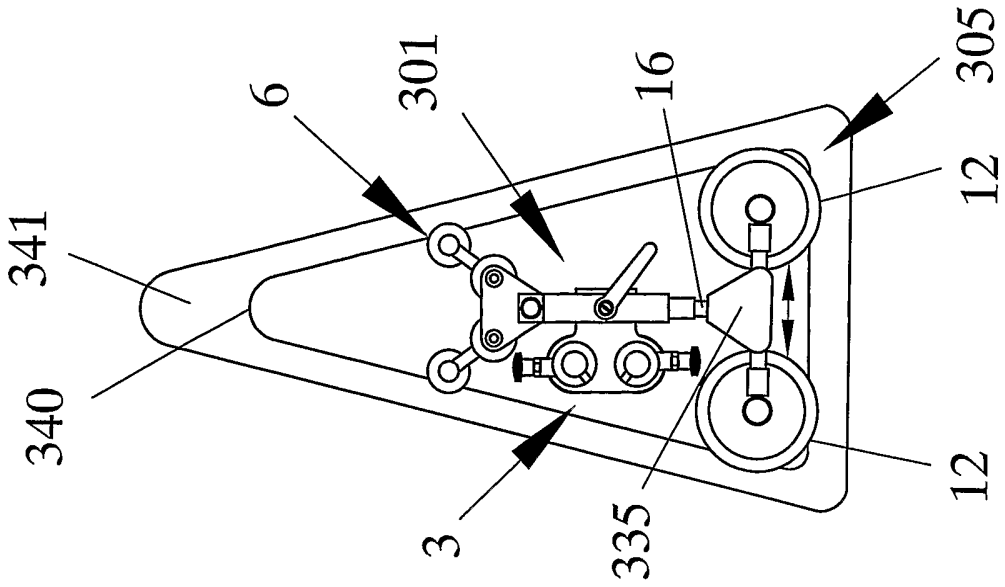


FIG. 8

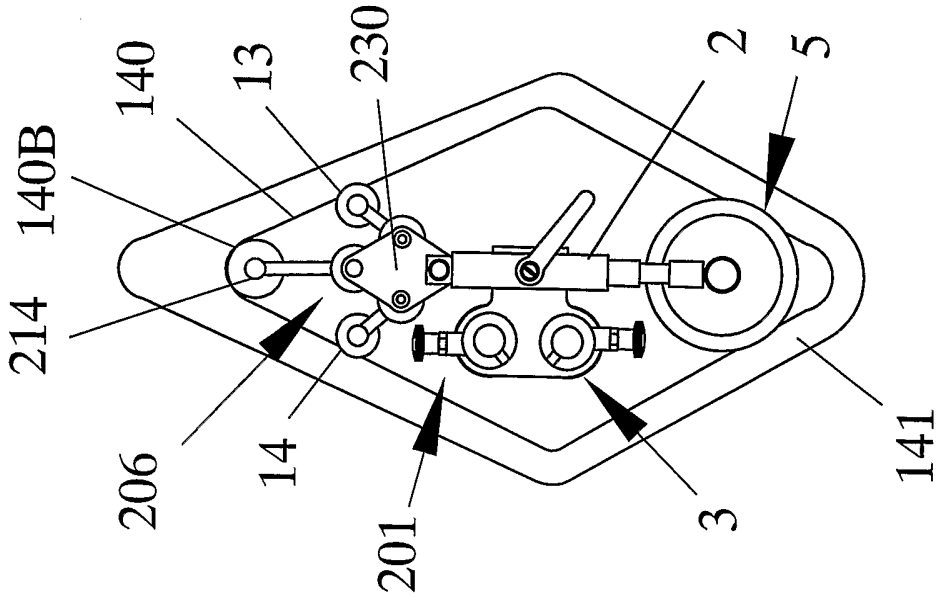


FIG. 7

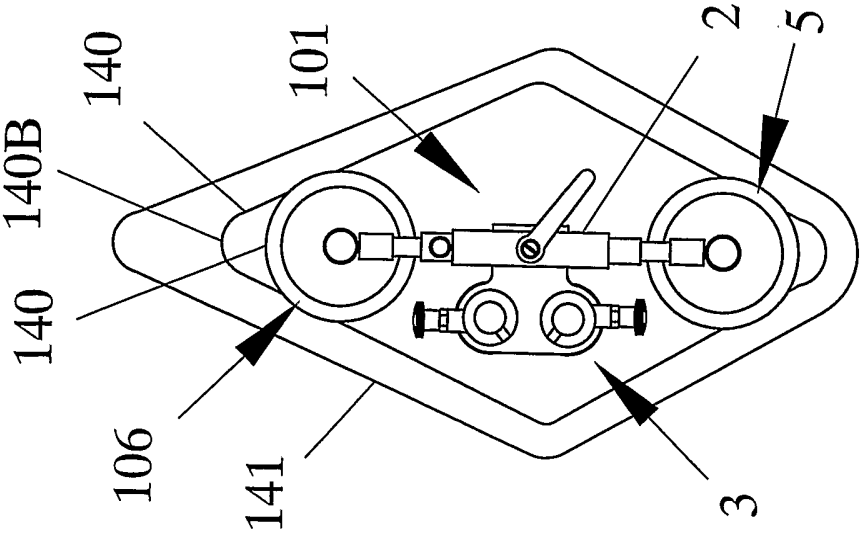
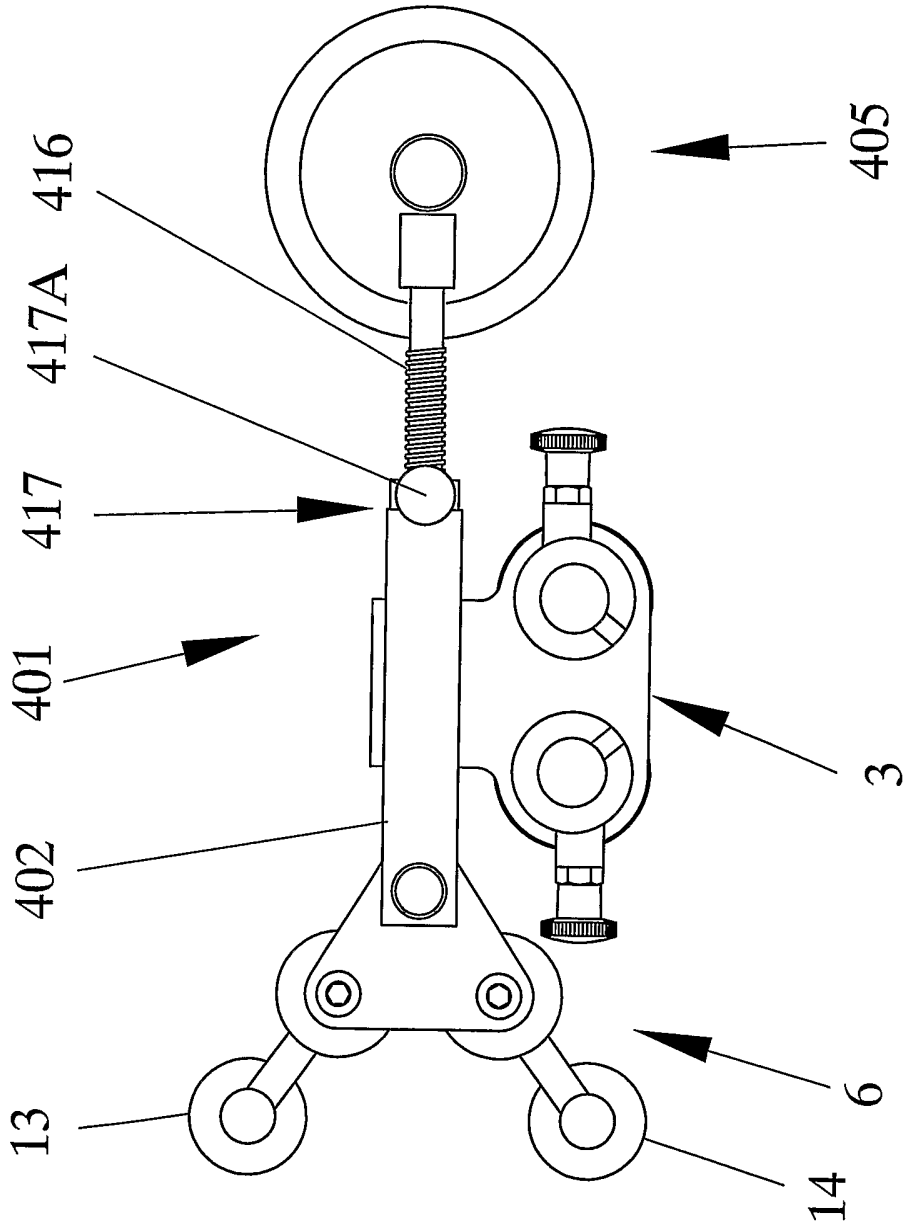


FIG. 6

FIG. 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 2004/000800

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B60J 1/00
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)

IPC7: B60J, B26B, B26D

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, 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.
A	EP 0093283 A2 (AUDI NSU AUTO UNION AG), 9 November 1983 (09.11.1983), figures 1,3	1-14
A	FR 2765130 A3 (EDUARD WILLE GMBH & CO), 31 December 1998 (31.12.1998), figure 1	1-14
A	WO 8607017 A1 (FOLKSAM AUTO AB), 4 December 1986 (04.12.1986), figure 1	1-14
A	WO 9858779 A1 (NÄSSL, WALTER), 30 December 1998 (30.12.1998), figure 1	1-14

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"E" earlier application or patent but published on or after the international filing date
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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
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"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
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
17 August 2004	18 -08- 2004
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Tomas Lund/EK Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

Information on patent family members

03/07/2004

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WO	9858779	A1	30/12/1998	NONE		