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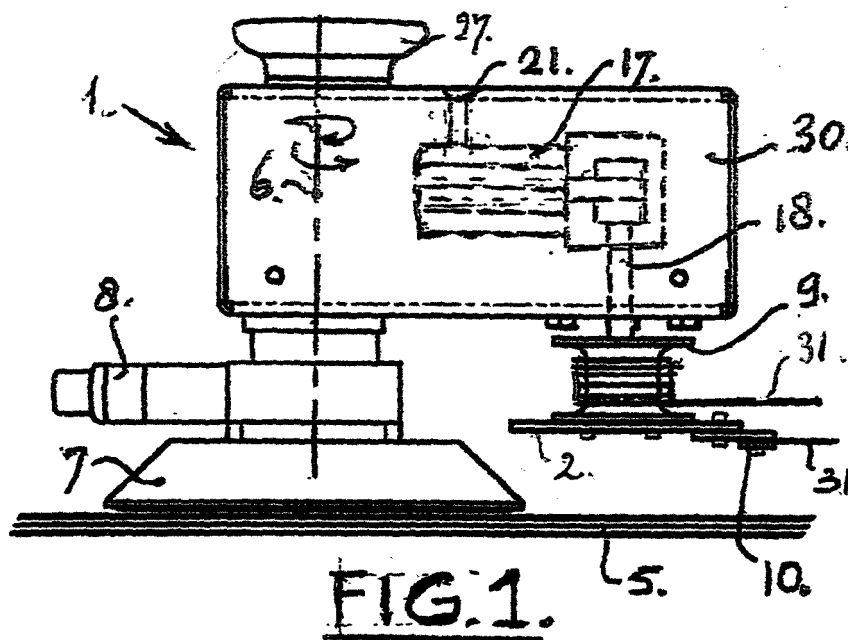
Remarks:

Amended claims in accordance with Rule 137(2)
EPC.

(54) **CAR WINDSHIELD REMOVAL APPARATUS AND METHOD**

(57) A very effective and safe in use car windshield removal apparatus (5,15) is presented by constructing a 360 degrees rotating and swivelling working head (30), which draws a thread (31,25) sawing and cutting through the adhesive bead (4,14) between windshield and car

frame. Furthermore a time sparing and economical method with the apparatus (1) is obtained. Also this apparatus (1) is very useful in saving operations by removing windshields and minimize car or truck damage.



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Description

[0001] The invention relates to an apparatus and method for car windshield removal, wherein a cutting thread is drawn through the adhesive bead between the coach frame and windshield of the car, wherein the working head of the apparatus is an over 360 degrees rotating swivel unit mounted on a suction plate and placed on the inner - or outer side of the windshield, wherein the cutting thread is pinched first through said adhesive bead.

[0002] A similar apparatus and method is known from EP2540463A1, title: "Vorrichtung und Verfahren zum Durchtrennen des Klebewulstes von eingeklebten Scheiben", inventor Josif Robert Horvath in British Columbia (CA), Priority filing 27.06.2011, US 201161501336 P. This invention concerns an apparatus, which is placed with a centrically swivel part around the perpendicular axle of a suction plate. As sketched in the figures, a suction plate is fixed on the inner side of the windshield of the car. One end of the cutting thread is fixed on an axle of the swivel part, which axle can be rotated to winch up said thread with an external screwing machine. The other end of said thread, being a plastic thread, is fixed to a steady anchorage point on the outside of the windshield. So the thread is pinched through the adhesive bead. An important drawback is that the apparatus with his suction plate has to be placed in all the four corners at the inside of the windshield. Another drawback is the extra fixed anchorage point on the outside of the windshield. Placing the apparatus on the inside in all corners of the windshield gives a very long, only cutting thread at the inside of the car, which is also extra dangerous for the mechanic during removing the windshield, which is a very serious problem. Furthermore the drive of the apparatus with a battery drilling machine is mostly not strong enough to rotate the winch up axle of the apparatus. Another drawback is that the whole cutting procedure takes a lot of time and is therefore very expensive and not economic in use.

[0003] Another similar apparatus or device and method is known from US 2012/0227896A1, titled: "Device and method for cutting through the adhesive bead of panes", filed 05.03.2012, inventor Joachim Clabunde, Heubach (DE). This patent describes a swivelling device, which rotates around the axle of a suction plate placed in the centre on the inner side of the windshield. The cutting thread is pinched through the adhesive bead and one end is coupled to the device and via a four times to replace guide roller (26) around the windshield fixed to the axle of the windshield wiper (18). Also this device and method has some serious drawbacks, namely the energizing of the electromotor of the device takes place with a cable to a voltage source and disturbs the cutting procedure. Furthermore the axle of the windshield wiper is not strong enough for fastening the cutting thread. The whole procedure of cutting by four times replacing said guide roller is time consuming and dangerous for the mechanic and not economic in use.

[0004] The aim of our invention is to overcome mentioned drawbacks of earlier patented devices, and is more economic and safe in use.

[0005] Therefore the car windshield removal apparatus according to the invention is characterized in that the working head of the apparatus is executed as an eccentric over 360 degrees swivelling rotatable unit and is mounted on the axle of the suction plate at the windshield, wherein a cutting thread is pinched through said adaptive bead of the windshield and fixed to said working head, wherein said working head contains an electromotor with a driving axle with at the outer end a winch up wheel for said cutting thread and is directed towards the windshield and said winch up wheel has an extra outer flange with three concentric applied bore holes, wherein in one bore hole with a distant ring and over 360 degrees rotatable mounted an elongated strip for fixing one end of said cutting thread for executing a sawing movement of said cutting thread through the adhesive bead of the windshield and said other end is fixed to said working head or a handgrip. The advantage is a very fast, economic and particularly safe removal procedure of the windshield of a car. Especially the sawing and cutting movement of the thread through the adhesive bead is very efficient.

[0006] Furthermore the apparatus according to the invention is further improved, wherein the electromotor is a stepping motor, which is operated by a remote control unit with a dead man's button and said electromotor or stepping motor is energized with minimal 12 Volt car connection or otherwise a 24 Volt battery is recommended.

[0007] The advantages are a very safe and a precise adjustable cutting procedure can be executed. Also the body muscles (arm muscles) of the mechanic are not heavily loaded as by known devices in the market.

[0008] Furthermore the apparatus according to the invention is further improved, wherein said cutting thread is connected through the two bore holes in the flange with the wind up wheel for winding up operation of the sawing and cutting thread through the adhesive bead.

[0009] The advantage is an optimal saw cutting procedure by using a minimum of energy.

[0010] Moreover the method of windshield removing according to the invention is characterized in that the cutting thread is connected through the bore holes in the flange with the winch up wheel for winding up said sawing and cutting thread during windshield removal through said adhesive bead. The advantage is an optimal sawing and cutting procedure through the adhesive bead to remove a damaged windshield of a motor car.

[0011] Furthermore the method of windshield removal according to the invention is characterized in that by executing a sawing and cutting thread pinched through the adhesive bead between windshield and coach frame, wherein the car windshield removal apparatus is placed on the inner- or outer side of said windshield and both ends of said sawing and cutting thread are fixed at the working head of the apparatus being the elongated

strip and the winding up wheel, wherein further the thread is laid around the windshield, wherein the thread on the side of the apparatus further can be led extra around a guide roller (not shown) for getting sharp cutting edges and can be placed in both upper corners of the windshield.

[0012] The advantages are a very fast and safe apparatus and method for windshield removing, which can further be improved with mentioned guide roller.

[0013] A further improvement of the method according to the invention for saving persons in cars executed by the fire brigade is characterized in that said sawing and cutting thread is pinched once through the adhesive bead, wherein one end of the thread is connected with the end of the elongated strip of the working head of the apparatus and during operation the other end of the thread is fixed to a held handgrip and tensioned by a rescue person.

[0014] The advantage is an effective and fast removal of the windshield to save lives with a minimal car damage.

[0015] The embodiment of the present invention will now be described by way of example, with reference to the accompanying drawing with figures and shows:

Figure 1 a side view of the car windshield removal apparatus according to the invention and placed upon said windshield;

Figure 2 a bottom view in perspective of the apparatus of figure 1;

Figure 3 a top view in perspective of the ends of energize cable;

Figure 4 a top view of the remote control module;

Figure 5A-5D a view of the apparatus and method for removal of the car windshield;

Figure 6 a vertical side view of the sawing cutting apparatus and method through the adhesive bead of the windshield from a lorry or truck or a usual car and the rescue operation executed by for instance a person of the saving Fire Brigade;

Figure 7 a front view of the car windshield removal apparatus of figure 6 placed on the inner side of said windshield in action;

Figure 8 idem as figure 6, but now the car windshield apparatus is placed on the outer side of said windshield;

Figure 9 idem as figure 7, but a placing of the apparatus as in figure 8.

[0016] Figure 1 shows a side view of the car windshield removal apparatus 1 according to a preferred embodi-

ment of the invention. The removal apparatus 1 has a working head 30 and eccentric rotatably placed on the axle 6 of the suction plate 7 with the adjusting button 8 for causing under pressure. The working head 30 can also rotate and swivel around said axle 6. The suction plate 7 is fixed to the car windshield 5. The mechanic or skilled craftsman can hold the apparatus 1 with the knob 27. The electromotor 17 is energized through a cable connection hole 21. The working head 30 containing an electromotor 17 with a driving axle 18 with at the end a winch up wheel 9 for fixing the sawing and cutting thread 31 and is directed to the windshield 5. The winch up wheel 9 has an extra mounted outer flange 2 with three concentric applied bore holes 11, 12, 13, wherein in bore hole 13 an over 360 degrees rotatable elongated strip 10 is mounted for fixing at the end one end of the sawing and cutting thread 31 and the other end of the thread 31 is fixed in the bore holes 11, 12. The thread 31 is pinched through the adhesive bead 4 and put around said adhesive bead 4. See figures 5A - 5D. In the figures 6, 7, 8 and 9 the adhesive bead is indicated with 14 and the sawing and cutting thread with 25, because it is another material.

[0017] In figure 2 is represented a bottom view of figure 1 with the same numbering for the same parts. Because of the elongated strip 10 a very important sawing and cutting movement through the adhesive beads 4, 14 of the thread is obtained.

[0018] In figure 3 a top view is represented of the 12 Volt energizing cable 19 with connectors 20 and 22.

[0019] In figure 4 is represented a top view of the remote control module 23 with dead man's button 24 for safety reason for the mechanic.

[0020] In the figures 5A-5D the whole method or procedure of windshield removal is shown, wherein the same parts have the same numbering.

[0021] In the figures 6, 7, 8 and 9 the windshield 15 removal takes place with the characteristic apparatus 1 on the inner - or outer side of the windshield 15 for rescue operations. The sawing and cutting movement of a steel thread 25 through the adhesive bead 14 will be clear. In this case the other end of the thread is fixed to a held hand grasp 26.

[0022] However it is obvious that modifications and/or additions can be made to the afore described car windshield removal apparatus and method, but these modifications shall remain within the field and scope of the invention.

Claims

1. Apparatus for car windshield removal, wherein a cutting thread is drawn through the adhesive bead between the coach frame and windshield of the car, wherein the working head of the apparatus is an over 360 degrees rotating and swivelling unit is and mounted on a suction plate and placed on a side of

the windshield , wherein the cutting thread is pinched first through said adhesive bead, **characterized in that** the working head (30) of the apparatus (1) is executed as an eccentrically over 360 degrees rotating and swivelling apparatus (1) and mounted on the axle (6) of the suction plate (7) , wherein said working head (30) contains an electromotor (17) with a driving axle (18) with at the outer end of it a winch up wheel (9) for said cutting thread (31), which is pinched through said adhesive bead (4,14) and the whole is directed to the windshield (5, 15) and said winch up wheel (9) has an extra outer bigger flange (2) with three concentric applied bore holes (11, 12, 13), wherein in one bore hole (13) with a ring an over 360 degrees rotatably an elongated strip (10) is mounted for fixing one end of said thread (31) for executing a sawing and cutting movement of said thread (31) through said adhesive bead (4, 14) and the other end of the thread (31, 25) can be fixed to the bore holes (11,12) or a held hand grasp (26).

2. Apparatus as in claim 1 , **wherein** said electromotor (17) is a stepping motor, which is operated by a remote control unit (23) with a dead man's button (24).
3. Apparatus as in claim 2 , **wherein** said electromotor or stepping motor (17) is energized with minimal 12 Volt car connection or otherwise a 24 Volt battery is recommended.
4. Apparatus as in claim 1 , **wherein** said sawing and cutting thread (31) is connected via the bore holes (11,12) in the flange (2) of the winch up wheel (9) for winding up said sawing and cutting thread (31) during windshield (5) removal, wherein said sawing and cutting thread as a loop is pinched through said adhesive bead (4).
5. Apparatus as in claim 1 and 4 , **wherein** said sawing and cutting thread (31) is a nylon thread with a diameter between 0,8 mm and 1,5 mm , preferably 1 mm.
6. Apparatus as in claim 1-3 , **wherein** a connecting hole (21) for energizing said electromotor or stepping motor (17) is projected near the axle (6) on the upper side of working head (30).
7. Apparatus as in claim 1 , **wherein** said sawing and cutting thread (25) is a steel thread with a diameter between 0,8 mm and 1,5 mm , preferably 1 mm and is intended for rescue operations.
8. Apparatus as in claim 7 , **wherein** said steel thread (25) at the end is connected with a held hand grasp (26).
9. Method of windshield removing by cutting the adhe-

sive bead with a tightened thread as in claim 1-8 , **characterized in that** a sawing and cutting thread (31,25) is pinched through the adhesive bead (4,14) between windshield (5,15) and the coach frame , wherein the apparatus (1) is placed on the inner- or outer side of said windshield (5,15).

10. Method as in claim 9 , **wherein** the two ends of said sawing and cutting thread (31) are coupled with the apparatus (1) and during operation the apparatus is placed in both upper corners of the windshield (5) .
11. Method as in claim 9 , **wherein** said sawing and cutting thread (25) is pinched through the adhesive bead (14), wherein one end is connected with the apparatus (1) and the other end is fixed at a held hand grasp (26).

Amended claims in accordance with Rule 137(2) EPC.

1. Apparatus for car windshield removal, wherein the apparatus has the structure of an over 360 degrees rotatably working swivel head on the perpendicular axle of a suction plate, which is applied on the inner- or outer side of said windshield, wherein said swivel head has a wind up medium for hauling in a cutting thread or wire, which is cutting through the adhesive bead between the coach frame and the windshield edge, **characterized in that** said working swivel head (30) of the apparatus (1) is executed eccentrically rotating around said perpendicular axle (6) of said suction plate (7), wherein in said working swivel head (30) an electromotor (17) with a driving axle (18) is installed with at the end a winch up wheel (9) for fixing now a sawing and cutting thread (31,25) and said winch up wheel (9) is directed to the windshield (5,15) , wherein said winch up wheel (9) has an extra mounted outer flange (2) with three applied eccentric bore holes (11,12,13), wherein in bore hole (13) an rotatable elongated strip (10) is mounted with at his end one fixing of the now sawing and cutting thread (31,25) , wherein in normal removal conditions the other end of said sawing and cutting thread (31) is fixed in the remaining holes (11,12) of said outer flange (2) or at a held hand grip (26).
2. Apparatus as in claim 1 , **wherein** said electromotor (17) is a stepping motor, which is operated by a remote control unit (23) with a dead man's button (24).
3. Apparatus as in claim 2 , **wherein** said electromotor or stepping motor (17) is energized with minimal 12 Volt car connection or otherwise a 24 Volt battery is recommended.
4. Apparatus as in claim 1 , **wherein** said sawing and

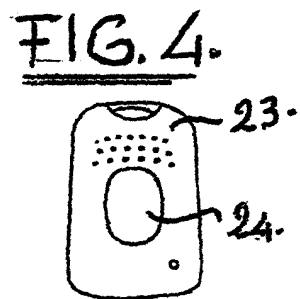
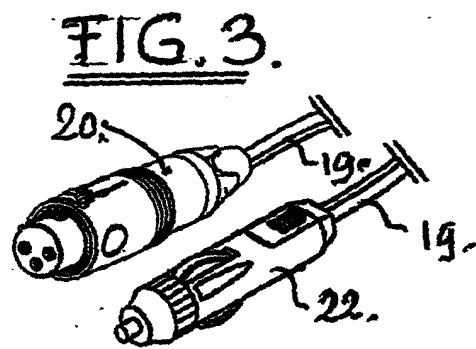
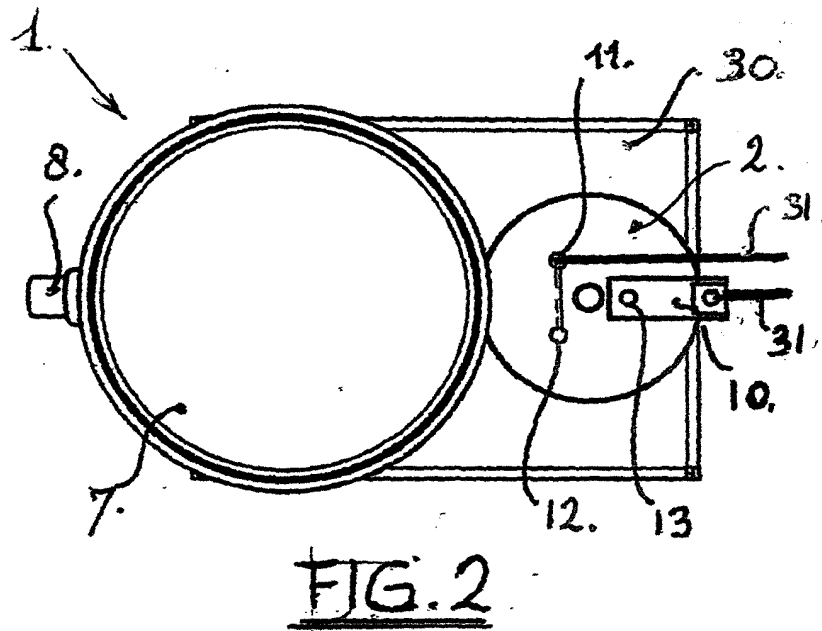
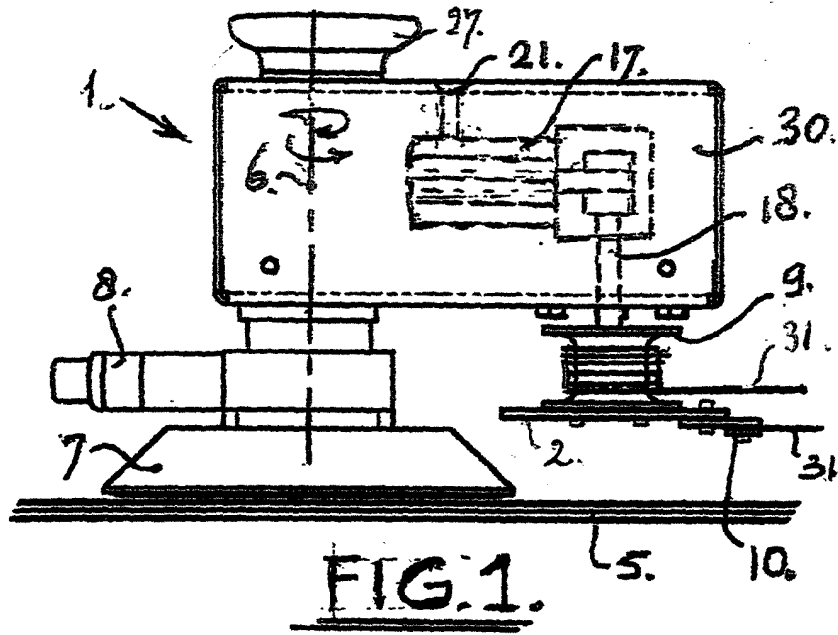
cutting thread (31) is connected via the bore holes (11,12) in the flange (2) of the winch up wheel (9) for winding up said sawing and cutting thread (31) during windshield (5) removal, wherein said sawing and cutting thread as a loop is pinched through said adhesive bead (4). 5

5. Apparatus as in claim 1 and 4 , **wherein** said sawing and cutting thread (31) is a nylon thread with a diameter between 0,8 mm and 1,5 mm , preferably 1 mm. 10
6. Apparatus as in claim 1-3 , **wherein** a connecting hole (21) for energizing said electromotor or stepping motor (17) is projected near the axle (6) on the upper side of working head (30). 15
7. Apparatus as in claim 1 , **wherein** said sawing and cutting thread (25) is a steel thread with a diameter between 0,8 mm and 1,5 mm , preferably 1 mm and is intended for rescue operations. 20
8. Apparatus as in claim 7 , **wherein** said steel thread (25) at the end is connected with a held hand grasp (26). 25
9. Method of windshield removing by cutting the adhesive bead with a tightened thread as in claim 1-8, **characterized in that** a sawing and cutting thread (31,25) is pinched through the adhesive bead (4,14) 30 between windshield (5,15) and the coach frame , wherein the apparatus (1) is placed on the inner- or outer side of said windshield (5,15).
10. Method as in claim 9, **wherein** the two ends of said sawing and cutting thread (31) are coupled with the apparatus (1) and during operation the apparatus is placed in both upper corners of the windshield (5). 35
11. Method as in claim 9, **wherein** said sawing and cutting thread (25) is pinched through the adhesive bead (14), wherein one end is connected with the apparatus (1) and the other end is fixed at a held hand grasp (26). 40

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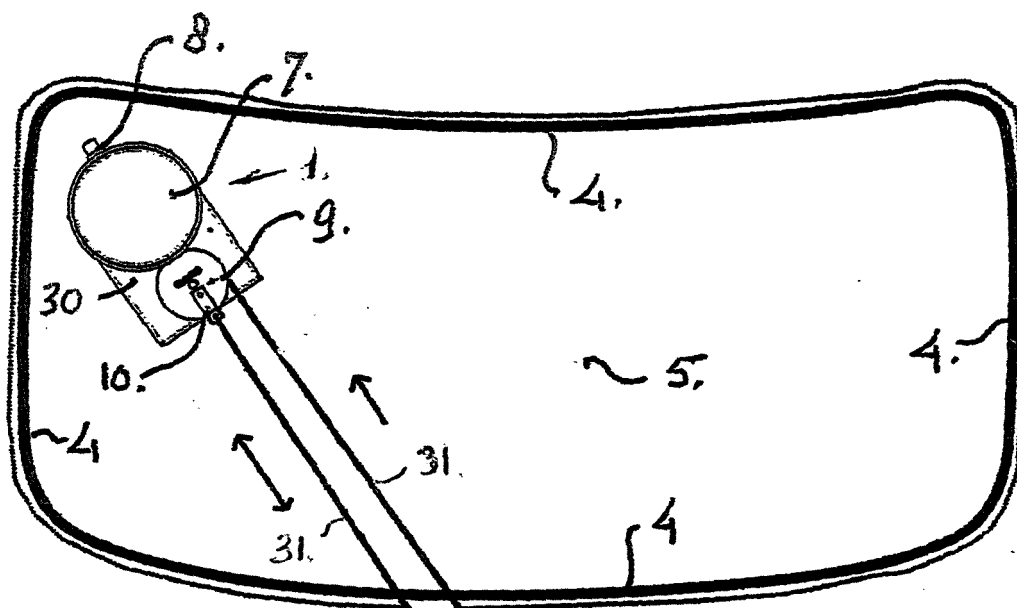


FIG. 5A.

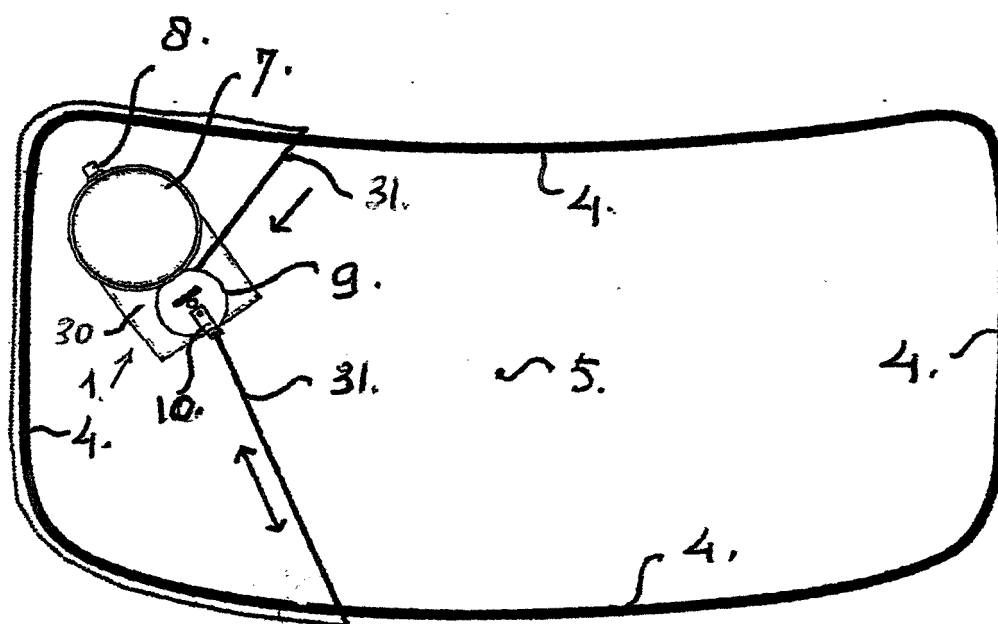


FIG. 5B

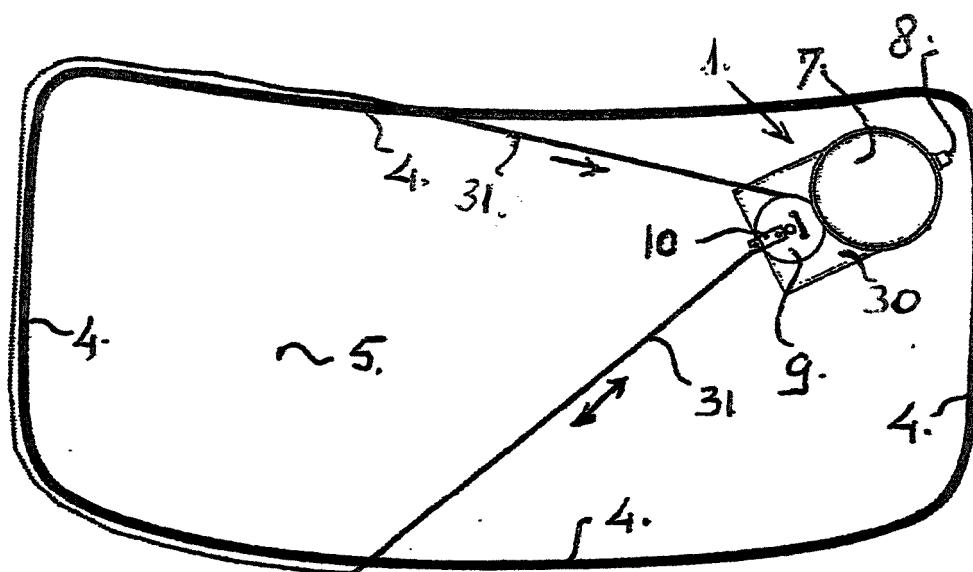


FIG. 5C.

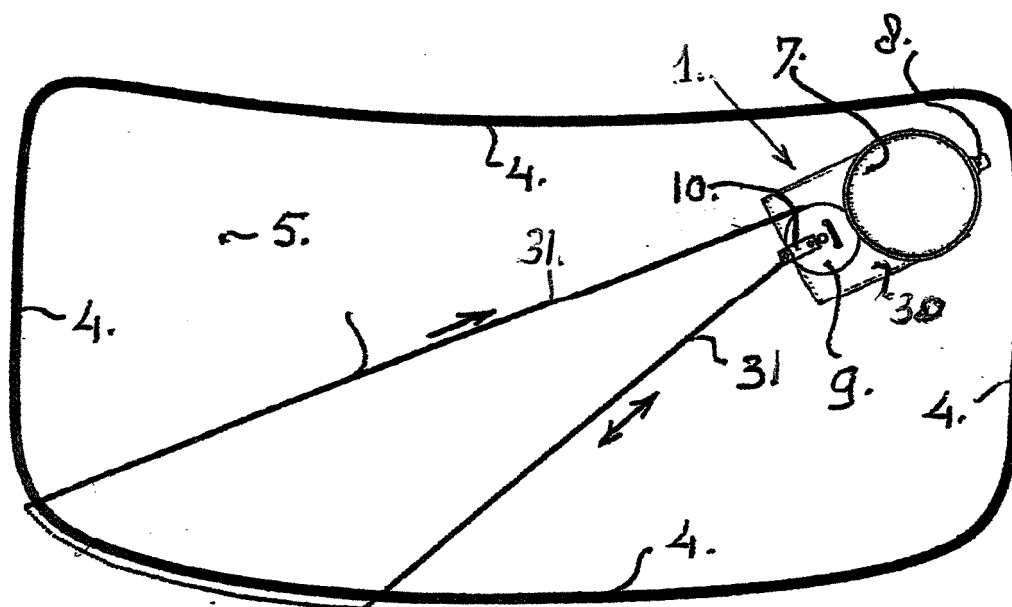
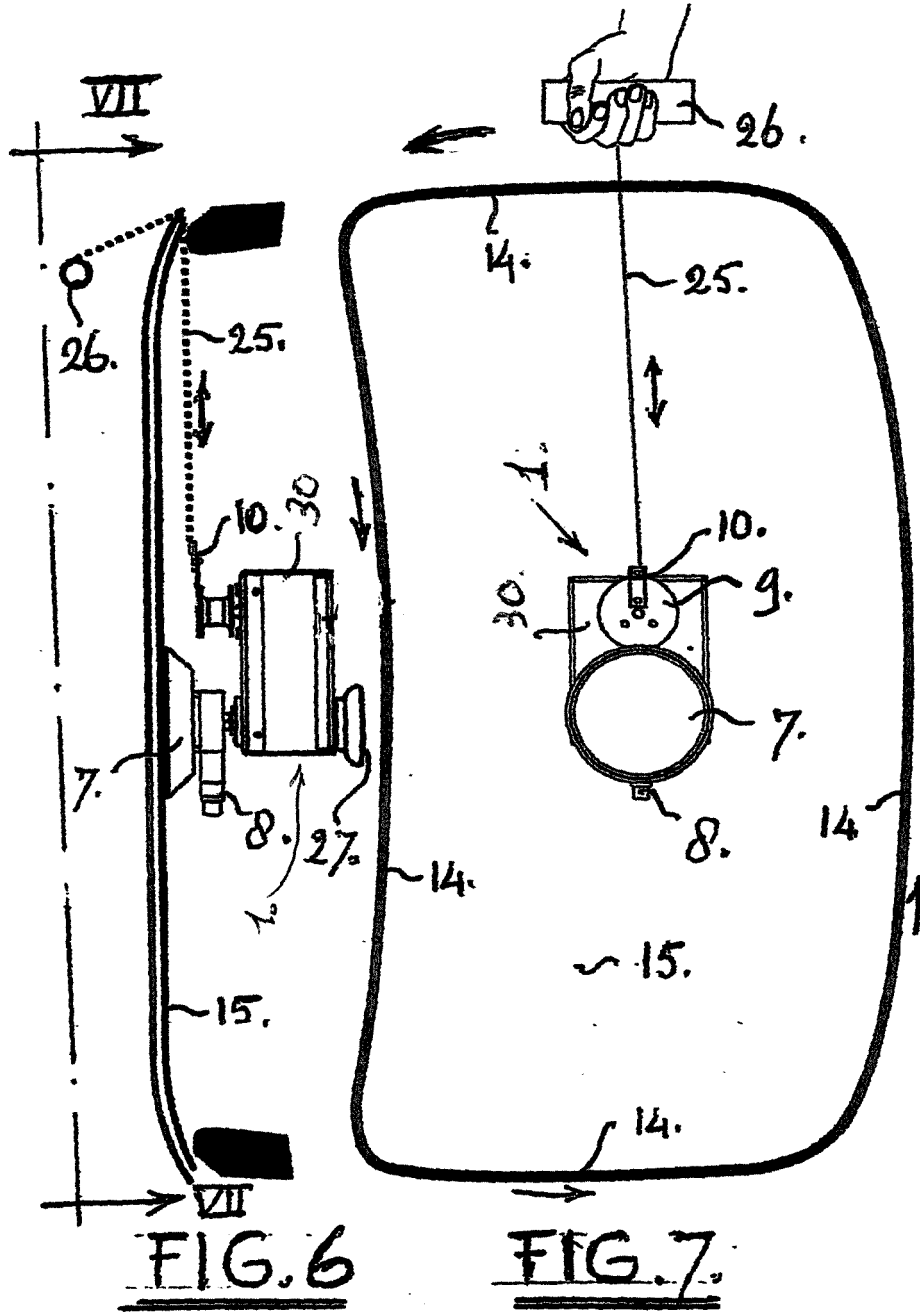


FIG. 5D



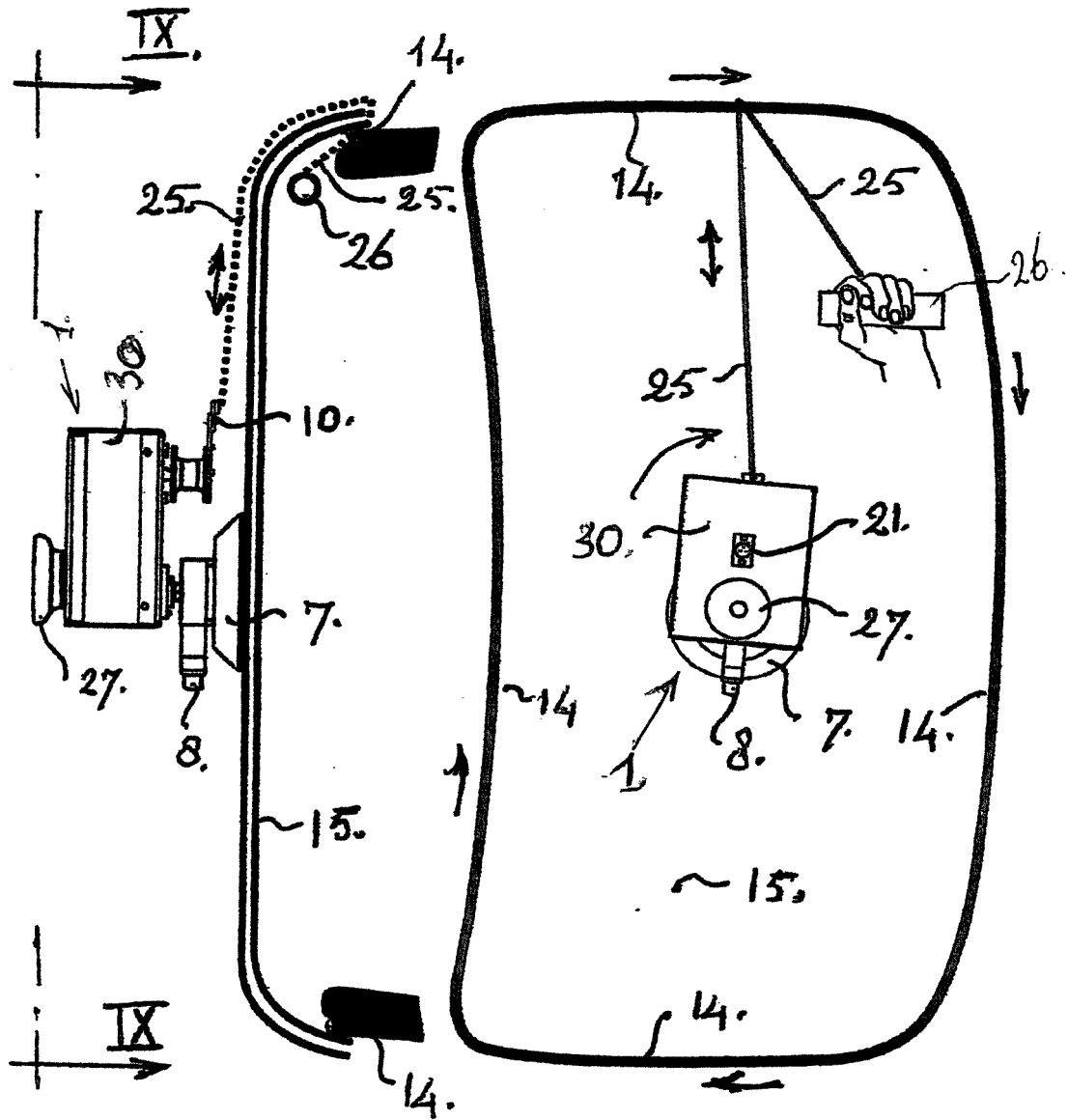


FIG. 8.

FIG. 9.



EUROPEAN SEARCH REPORT

Application Number
EP 19 07 5005

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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			TECHNICAL FIELDS SEARCHED (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 September 2019	Examiner Maier, Michael
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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09-09-2019

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