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

VORRICHTUNG UND VERFAHREN ZUR ENTFERNUNG EINER AUTOWINDSCHUTZSCHEIBE

DISPOSITIF ET PROCÉDÉ DE RETRAIT DE PARE-BRISE D'UNE VOITURE

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EP 3 708 315 B1

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. A similar apparatus and method is known from EP2540463A1, forming the basis for the preamble of claim 1, 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.

[0002] 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 , Heu-bach (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.

[0003] The aim of our invention is to overcome mentioned drawbacks of earlier patented devices , and is more economic and safe in use.

[0004] Therefore the car windshield removal apparatus according to the invention is characterized in that the working head of the apparatus is executed as an eccentrical 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.

[0005] 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.

[0006] 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 heavy loaded as by known devices in the market.

[0007] 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. The advantage is an optimal saw cutting procedure by using a minimum of energy.

[0008] 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.

[0009] 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.

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

[0010] 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.

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

[0011] 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.

[0012] Figure 1 shows a side view of the car windshield removal apparatus 1 according to a preferred embodiment 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.

[0013] 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.

[0014] In figure 3 a top view is represented of the 12 Volt energizing cable 19 with connectors 20 and 22 .

[0015] 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.

[0016] In the figures 5A-5D the whole method or procedure of windshield removal is shown , wherein the same parts have the same numbering.

[0017] 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.

Claims

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 outer end a winch up wheel (9) for fixing 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 outer bigger flange (2) with three eccentric applied bore holes (11,12,13) , wherein in one bore hole (13) with a ring and over 360 degrees rotatably , an elongated strip (10) is mounted for fixing one end of the sawing and cutting thread (31,25), for executing a sawing and cutting movement of said thread (31) through said adhesive bead (4, 14) and the other end of said sawing and cutting thread (31) is fixed in the remaining bore 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. 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 adhesive bead with an apparatus as in claims 1-8, wherein 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).

Patentansprüche

1. Vorrichtung zum Entfernen von Windschutzscheiben von Autos. Wobei ein Schneidfaden durch den Klebstoffwulst zwischen dem Karosserierahmen und der Windschutzscheibe des Autos gezogen wird, wobei der Arbeitskopf der Vorrichtung eine über 360 Grad dreh- und schwenkbare Einheit ist und auf einer Saugplatte montiert und auf einer Seite der Windschutzscheibe platziert wird, wobei der Schneidfaden zuerst durch den Klebstoffwulst geklemmt wird, **dadurch gekennzeichnet, dass** der Arbeitskopf (30) der Vorrichtung (1) als exzentrisch über 350 Grad dreh- und schwenkbare Vorrichtung (1) ausgeführt und auf der Achse (6) der Saugplatte (7) montiert ist, wobei der Arbeitskopf (30) einen Elektromotor (17) mit einer Antriebsachse (18) mit einem am äußeren Ende angeordneten Aufziehrad (9) für den Schneidfaden (31) enthält, der durch den Klebstoffwulst (4, 14) geklemmt wird und das Ganze zur Windschutzscheibe (5, 15) gerichtet ist, und wobei das Aufziehrad (9) einen zusätzlichen äußeren größeren Flansch (2) mit drei konzentrisch angebrachten Bohrungen (11, 12, 13), wobei in einer Bohrung (13) ringförmig und über 360 Grad drehbar ein Länglicher Streifen (10) gelagert ist, zur Fixierung eines Fadenendes (31) zur Ausführung einer Säge- und Schneidbewegung des Fadens (31) durch den Kleberwulst (4, 14) und das andere Fadenende (31, 25) an den Bohrungen (11, 12) oder einem gehaltenen Handgriff (26) fixierbar ist.

2. Vorrichtung nach Anspruch 1, **wobei** der Elektromotor (17) ein Schrittmotor ist, der über eine Fernbedienung (23) mit Totmannschalter (24) bedient wird.

3. Vorrichtung nach Anspruch 2, **wobei** der Elektromotor oder Schrittmotor (17) mit einem minimalen 12-Volt-Autoanschluss versorgt wird, andernfalls wird eine 24-Volt-Batterie empfohlen.

4. Vorrichtung nach Anspruch 1, **wobei** der Säge- und Schneidfaden (31) über die Bohrungen (11, 12) im Flansch (2) des Aufwickelrades (9) verbunden ist, um den Säge- und Schneidfaden (31) während der Entfernung der Windschutzscheibe (5) aufzuwickeln, wobei der Säge- und Schneidfaden als Schlaufe durch den Klebstoffwulst (4) geklemmt wird.

5. Vorrichtung nach Anspruch 1 und 4, **wobei** der Säge- und Schneidfaden (31) ein Nylonfaden mit einem Durchmesser zwischen 0,8 mm und 1,5 mm, vorzugsweise 1 mm, ist.

6. Vorrichtung nach Anspruch 1 bis 3, **wobei** ein Anschlussloch (21) zur Stromversorgung des Elektromotors oder Schrittmotors (17) in der Nähe der Achse (6) auf der Oberseite des Arbeitskopfes (30) hervorsteht.

7. Vorrichtung nach Anspruch 1, **wobei** der Säge- und Schneidfaden (25) ein Stahlfaden mit einem Durchmesser zwischen 0,8 mm und 1,5 mm, vorzugsweise 1 mm ist und für Rettungseinsätze vorgesehen ist.

8. Vorrichtung nach Anspruch 7, **wobei** der Stahlfaden (25) am Ende mit einem Haltegriff (26) verbunden ist.

9. Verfahren zum Abtrennen einer Windschutzscheibe durch Durchtrennen des Kleberwulstes mit einem gespannten Faden nach Anspruch 1-8, **dadurch gekennzeichnet, dass** ein Säge- und Schneidfaden (31, 25) durch den Kleberwulst (4, 14) zwischen Windschutzscheibe (5, 15) und Karosserierahmen geklemmt wird, wobei die Vorrichtung (1) auf der Innen- und Außenseite der Windschutzscheibe (5, 15) aufgesetzt wird.

10. Verfahren nach Anspruch 9, **wobei** die beiden Enden des Säge- und Schneidfadens (31) mit der Vorrichtung (1) gekoppelt sind und die Vorrichtung während des Betriebs in den beiden oberen Ecken der Windschutzscheibe (5) platziert ist.

11. Verfahren nach Anspruch 9, **wobei** der Säge- und Schneidfaden (25) durch den Kleberaupe (14) geklemmt wird, wobei ein Ende mit der Vorrichtung (1) verbunden wird und das andere Ende an einem gehaltenen Handgriff (26) fixiert wird.

Revendications

1. Appareil pour retirer le pare-brise d'une voiture, dans lequel un fil coupant est tiré à travers le cordon adhésif entre la châssis de l'autocar et le pare-brise de la voiture, dans lequel la tête de travail de l'appareil est une unité rotative et pivotante sur 360 degrés et est montée sur une plaque d'aspiration et placé sur une côté du pare-brise, dans lequel le fil de coupe est d'abord pincé à travers ledit cordon adhésif, **caractérisé en ce que** la tête de travail (30) de l'appareil (1) est réalisée sous la forme d'un appareil (1) rotatif et pivotant de manière excentrique sur 360 degrés, et monté sur l'essieu (6) de la plaque de d'aspiration (7), dans lequel ladite tête de travail (30) contient un moteur électrique (17) avec un axe moteur (18) avec à son extrémité extérieure une roue de treuil (9), pour ledit fil coupant (31), qui est pincé à travers ledit cordon adhésif (4, 14) et le tout est dirigé vers les pare-brise (5, 15) et ladite roue de treuil (9) présente une plus grande bride extérieure supplémentaire (2) avec trois trous de perçage appliqués concentriques (11, 12, 13), dans lequel dans un trou de perçage (13) doté d'un anneau et tournant sur 360 degrés, une bande allongée (10) est montée pour fixer une extrémité dudit filetage (31) pour exécuter un mouvement de sciage et de coupe dudit fil (31) à travers ledit cordon adhésif (4, 14) et l'autre extrémité du fil (31, 25) peut être fixée aux trous de perçage (11, 12) ou à une main tenue (26).

2. Appareil selon la revendication 1, **dans lequel** ledit moteur électrique (17) est un moteur pas à pas, qui est actionné par une unité de télécommande (23) avec un bouton d'homme mort (24).

3. Appareil selon la revendication 1, **dans lequel** ledit moteur électrique ou moteur pas à pas (17) est alimenté avec une connexion de voiture minimale de 12 volts ou sinon une batterie de 24 volts est recommandée.

4. Appareil selon la revendication 1, **dans lequel** ledit fil de sciage et de coupe (31) est relié via les trous de perçage (11, 12) dans la bride (2) de la roue de treuil (9) pour enrouler ledit fil de sciage et de coupe (31), pendant le retrait du pare-brise (5), dans lequel ledit fils de sciage et de coupe, sous forme de boucle, est pincé à travers ledit cordon adhésif (4).

5. Appareil selon la revendication 1 et 4, **dans lequel** ledit fil de sciage et de coupe (31) est un fil de nylon d'un diamètre compris entre 0,8 mm et 1,5 mm, de préférence 1 mm.

6. Appareil selon la revendication 1 à 3, **dans lequel** un trou de connexion (21) pour alimenter ledit moteur électrique ou moteur pas à pas (17) est projeté près de l'axe (6) sur le côté supérieur de la tête de travail (30).

7. Appareil selon la revendication 1, **dans lequel** ledit fil de sciage et de coupe est un fil d'acier d'un diamètre compris entre 0,8 mm et 1,5 mm, de préférence 1 mm et est destiné aux opérations de sauvetage.

8. Appareil selon la revendication 7, **dans lequel** ledit fil d'acier (25) à l'extrémité est relié à une poignée (26).

9. Procédé de retrait du pare-brise en coupant le cordon adhésif avec un fil serré selon les revendications 1 à 8, **caractérisé en ce qu'**un fil de sciage et de coupe (31, 25) est pincé à travers le cordon adhésif (4, 14) entre le pare-brise (5, 15) et le châssis de l'autocar, l'appareil (1) étant placé sur le côté intérieur ou extérieur dudit pare-brise (5, 15).

10. Procédé selon la revendication 8, **dans lequel** les deux extrémités dudit fil de sciage et de coupe (31) sont couplées à l'appareil (1) et pendant le fonctionnement, l'appareil est placé dans les deux coins supérieurs du pare-brise (5).

11. Procédé selon la revendication 9, **dans lequel** ledit fil de sciage et de coupe (25) est pincé à travers le cordon adhésif (14), dans lequel une extrémité est reliée à l'appareil (1) et l'autre extrémité est fixée au niveau d'une poignée tenue (26).

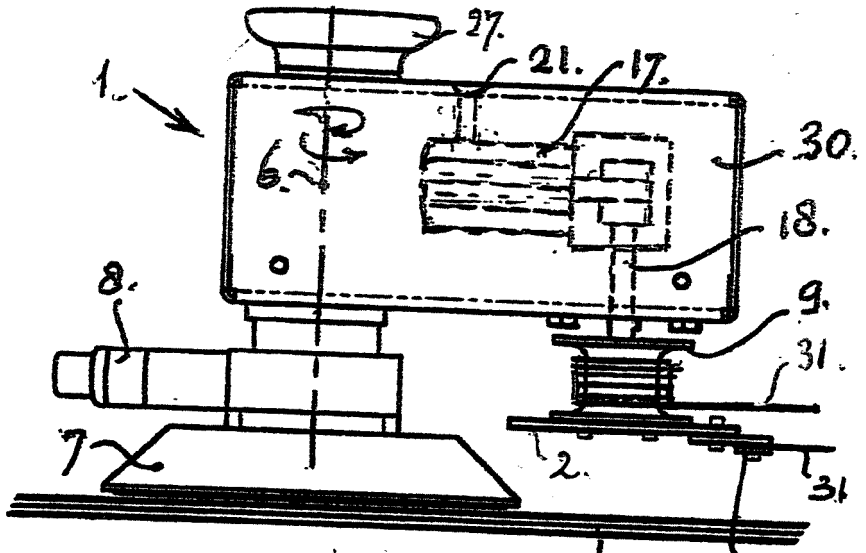


FIG.1.

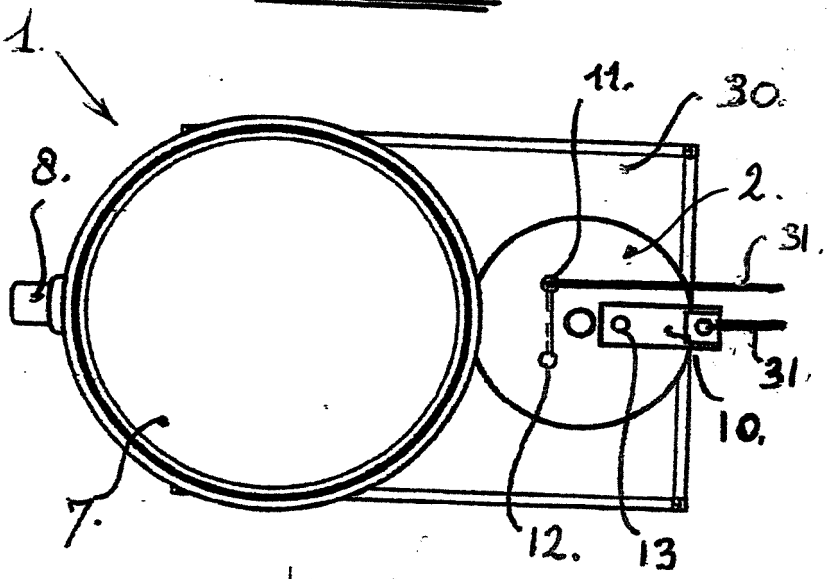


FIG.2

FIG.3.

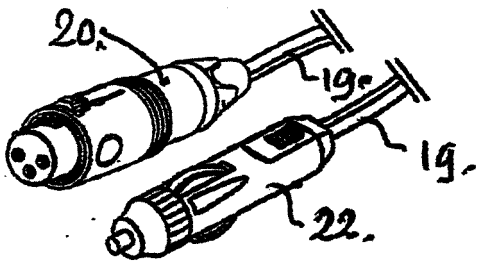
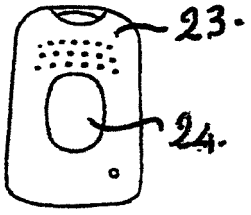


FIG.4.



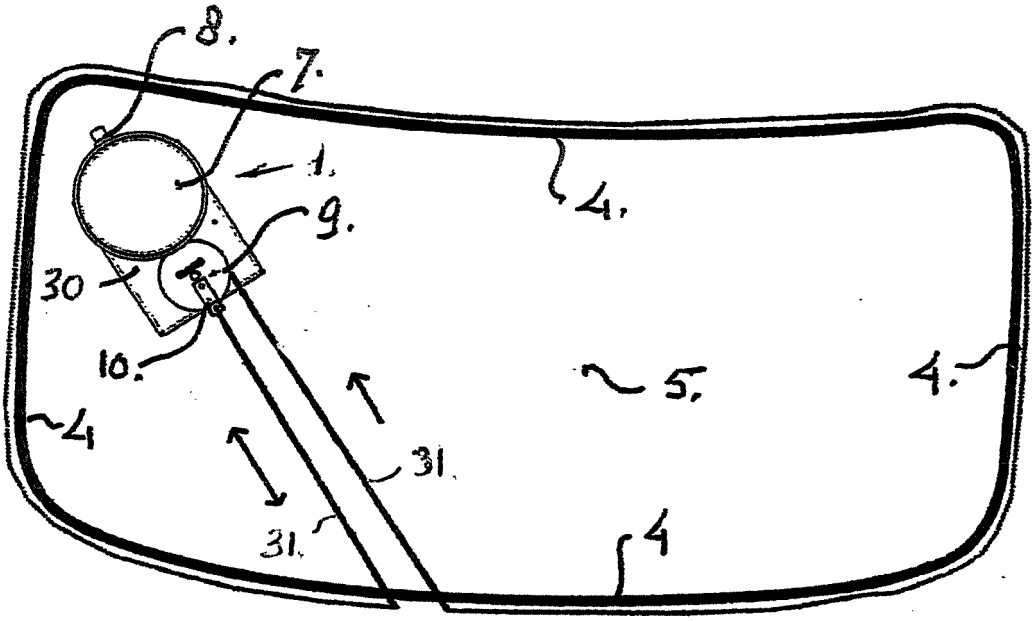


FIG. 5A.

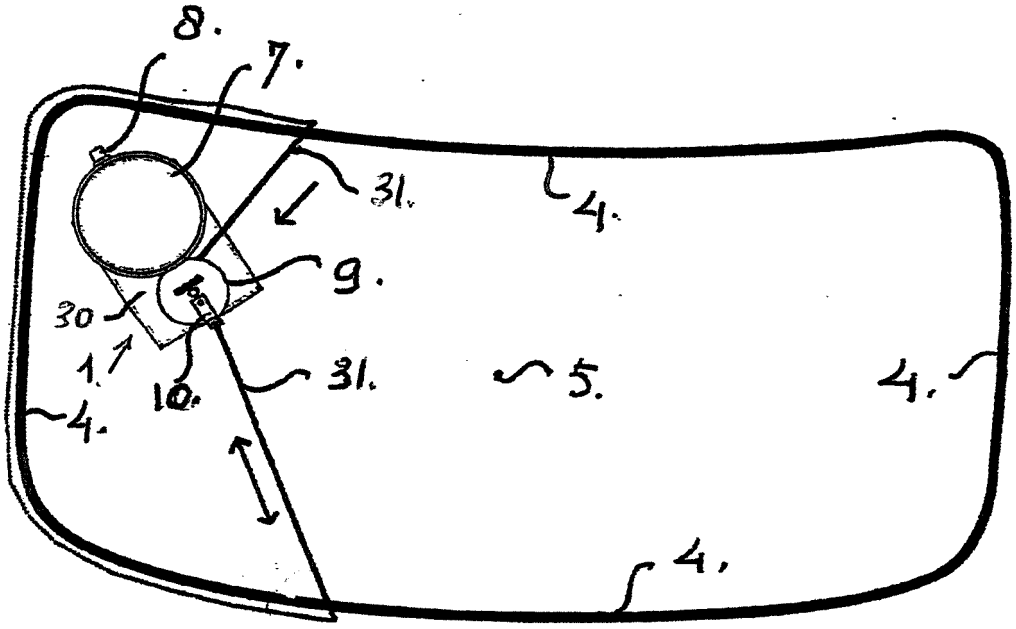


FIG. 5B

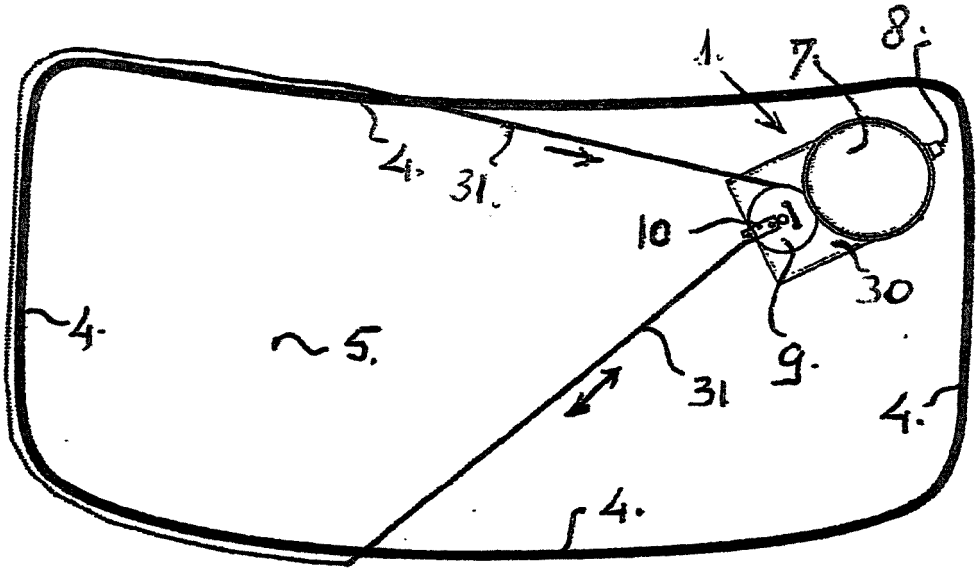


FIG. 5C.

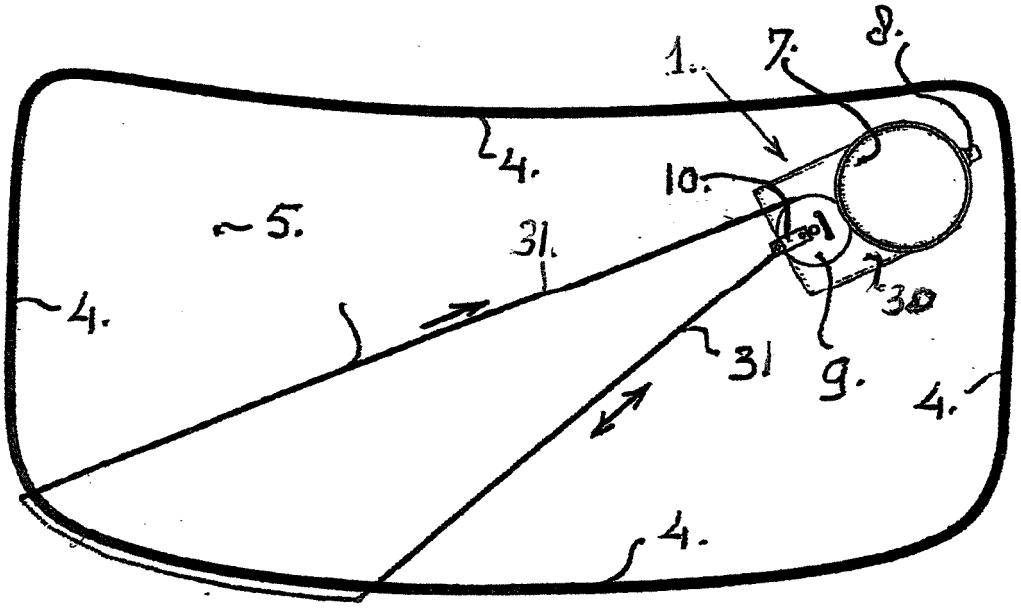


FIG. 5D

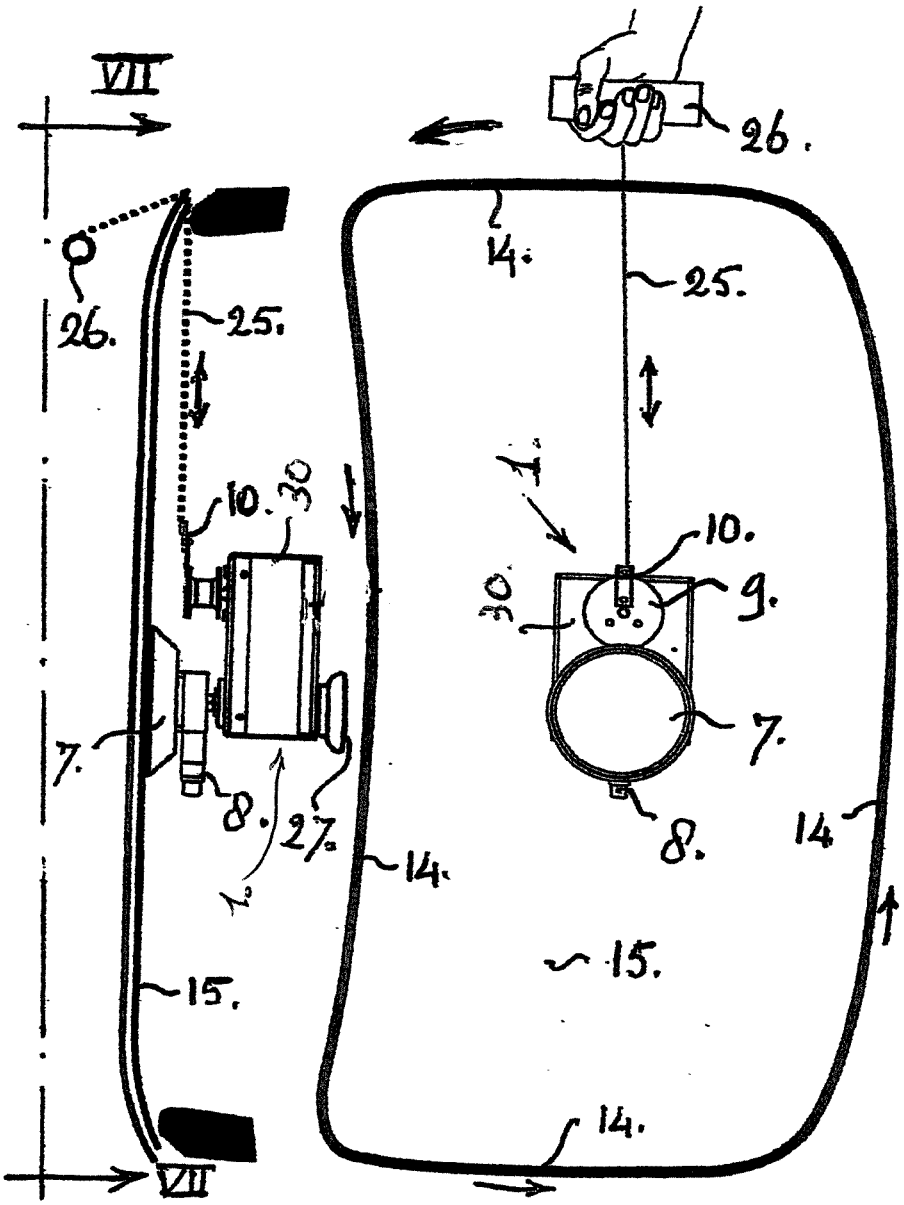


FIG.6

FIG.7

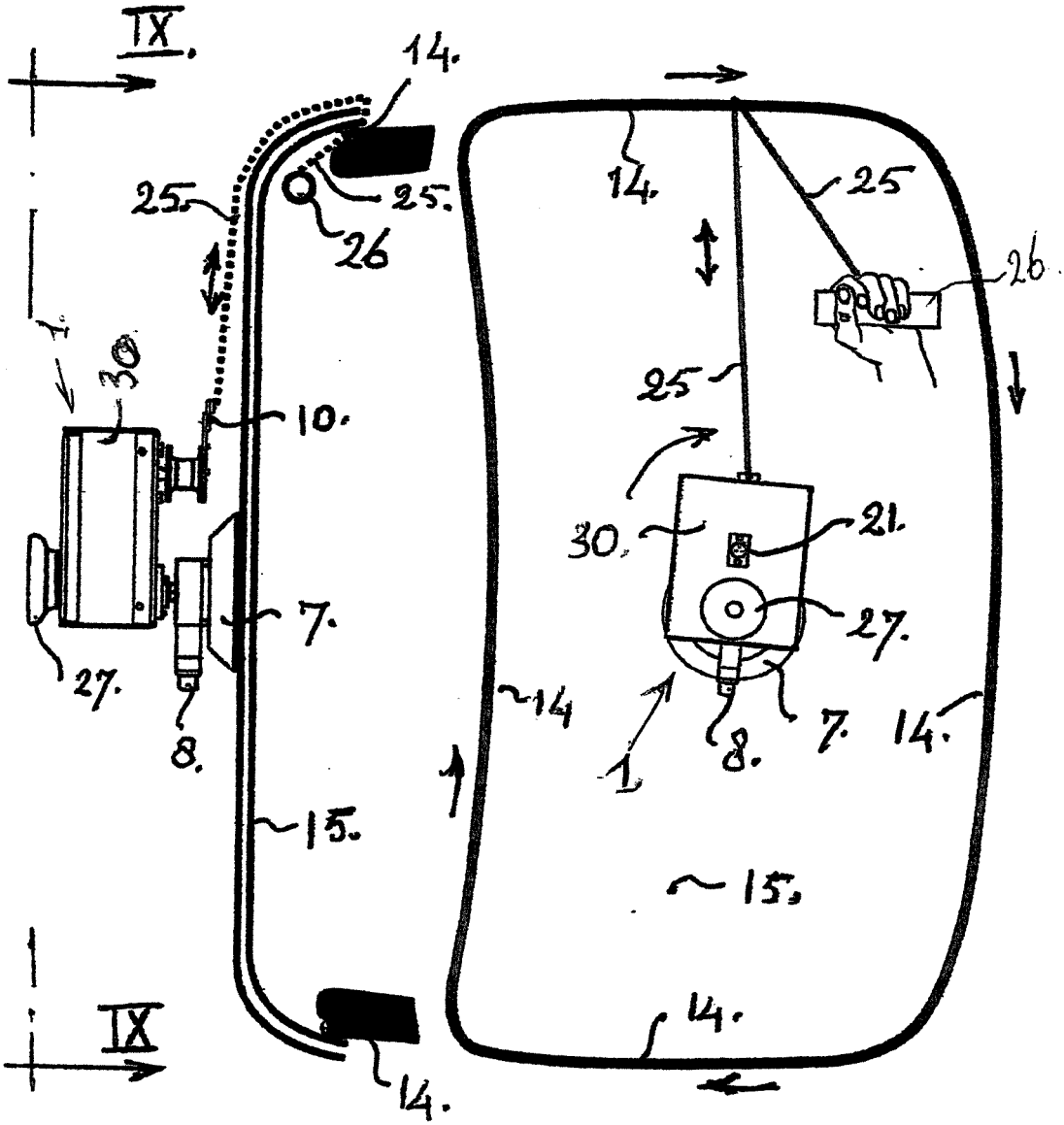

IX
14.
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25.
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7.
27.
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15.
IX
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14.
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30.
21.
27.
14
1
8.
7.
14.
15.
14.

FIG. 8.

FIG. 9.

REFERENCES CITED IN THE DESCRIPTION

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