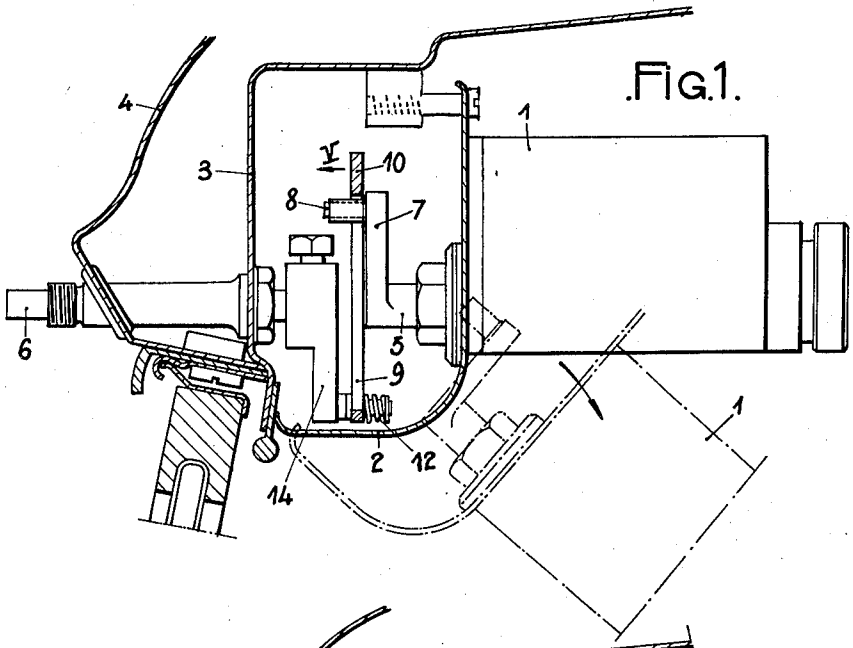
Sept. 6, 1938. G. R. WERNERT ET AL 2,129,542

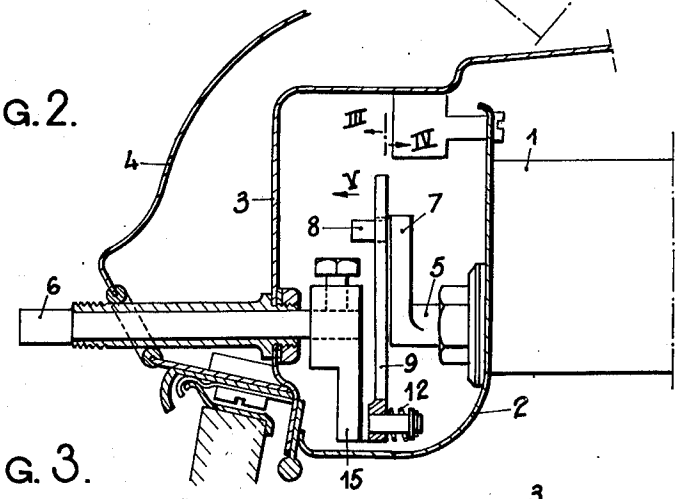
WINDSHIELD CLEANER

Filed Nov. 6, 1933 3 Sheets-Sheet 1

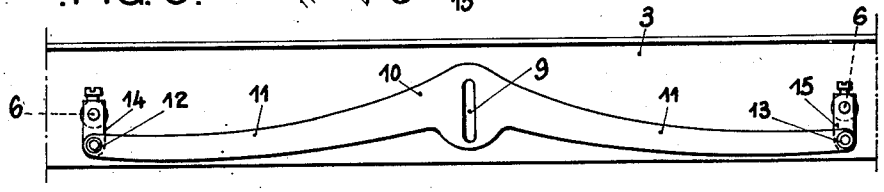
.FIG.1.



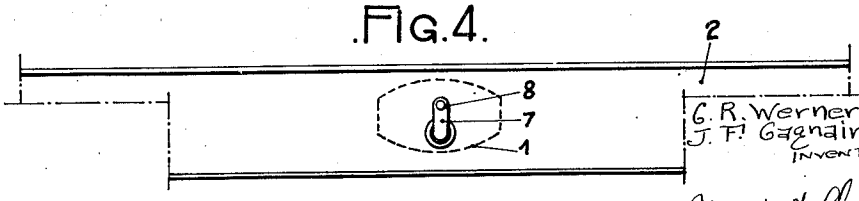
.FIG.2.



.FIG.3.



.FIG.4.



G. R. Wernert
J. F. Gagnaire
INVENTORS

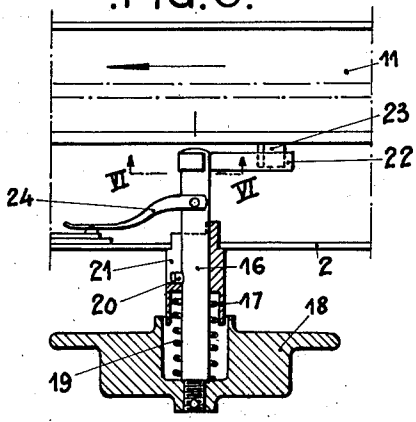
By: Marks & Clerk
Attys.

Sept. 6, 1938. G. R. WERNERT ET AL 2,129,542

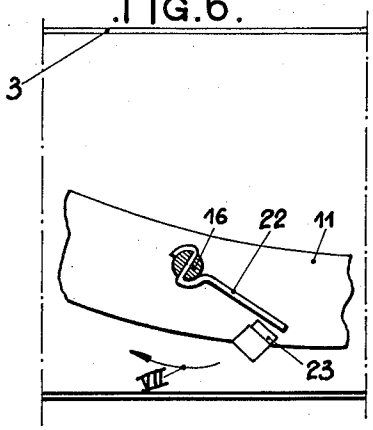
WINDSHIELD CLEANER

Filed Nov. 6, 1933 3 Sheets-Sheet 2

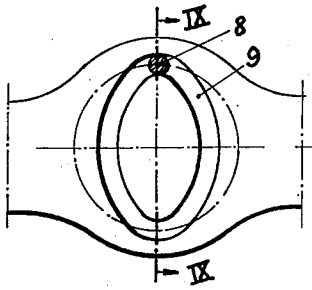
.Fig.5.



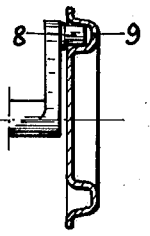
.Fig.6.



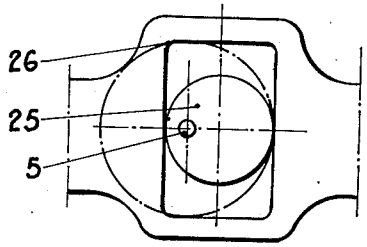
.Fig.8.



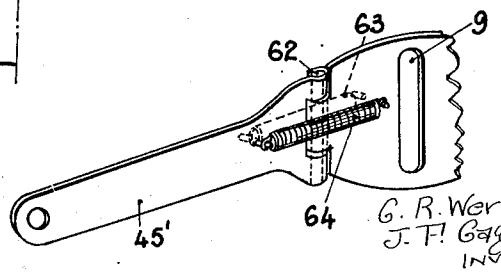
.Fig.9.



.Fig.7.



.Fig.20.



G. R. Wernert
J. F. Gagnaire
INVENTORS

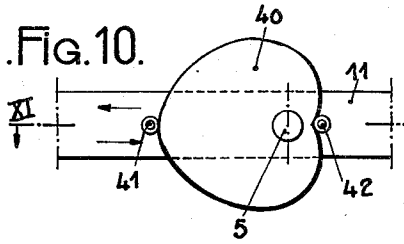
By: Marks & Clerk
Attys.

Sept. 6, 1938. G. R. WERNERT ET AL 2,129,542

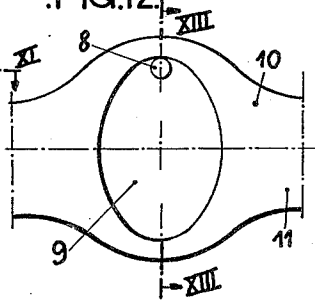
WINDSHIELD CLEANER

Filed Nov. 6, 1933 3 Sheets-Sheet 3

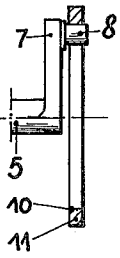
.Fig.10.



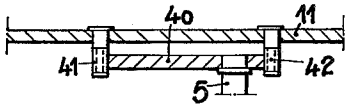
.Fig.12.



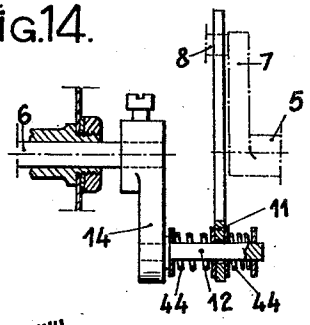
.Fig.13.



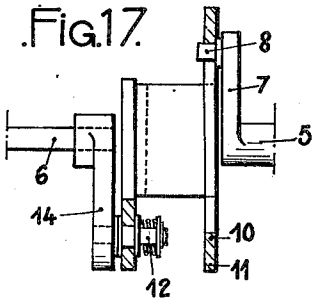
.Fig.11.



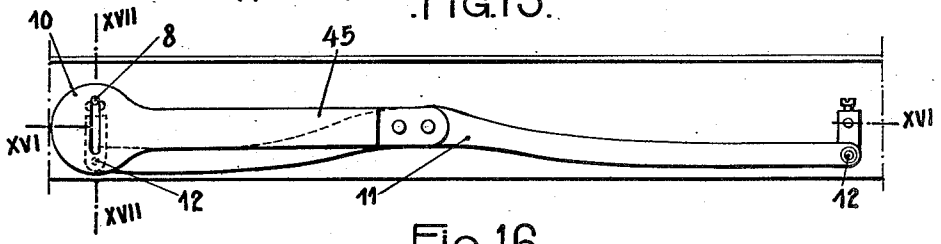
.Fig.14.



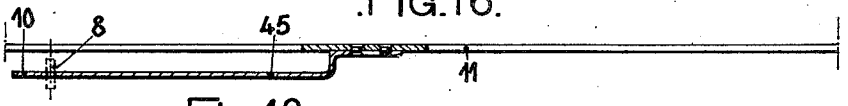
.Fig.17.



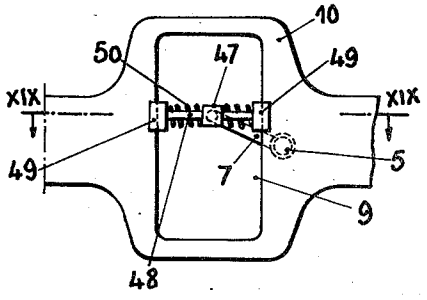
.Fig.15.



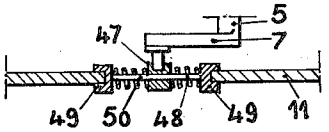
.Fig.16.



.Fig.18.



.Fig.19.



G. R. Wernert
J. F. Gagnaire
INVENTORS

By: Marks & Clark
Attys.

Patented Sept. 6, 1938 2,129,542

UNITED STATES PATENT OFFICE

2,129,542

WINDSHIELD CLEANER

Georges René Wernert and Jean François Gagnaire, Lyon, France, assignors to Trico Products Corporation, Buffalo, N. Y.

Application November 6, 1933, Serial No. 696,900
In France November 7, 1932

13 Claims. (Cl. 15—255)

Windshield cleaners are already known in which the bearing of the wiper-carrying spindle is independent from the casing of the motor, the wiper-carrying spindle being for instance carried by an angularly movable windshield, whilst the casing of the motor is carried by a fixed cross member; in these windshield cleaners, the movement is imparted from the motor to the wiper-carrying spindle through a resilient crank, the crank pin of which extends into a radial groove provided on a disc mounted on the wiper-carrying spindle.

In devices already known of this kind, the motor is provided with a rocking shaft. It is however to be noted that the arrangement above defined could have allowed the use of a motor having a rotary shaft, if the wiper-carrying spindle had been placed no longer in alignment with the driving shaft, but outside the circumference described by the crank pin of the crank.

However, this arrangement has not been carried into practice, notwithstanding the considerable advantage it presented in avoiding the use, within the motor, of a power-transmitting device transforming the circular movement into a rocking movement. The reason for which this arrangement has not been carried into practice consists in the fact that the power transmiting device thus carried out is of the so-called "rapid return" type, that is to say one half of the rocking movement takes place quicker than the other half, and so much the more rapidly as the rocking point is nearer the circumference described by the crank pin. Now, for obvious reasons of cumbersomeness, it is this latter condition which is always carried into practice.

Consequently, the new idea which would have consisted in utilizing the already known power-transmitting device for transforming at the same time the continuous circular movement into a rocking movement would not practically have been utilizable. In fact, the motor supplies constant power, whereas the resistant power would have been much greater during the rapid return of the windshield cleaner. It would have been necessary to use a more powerful motor, this causing a great number of inconveniences, both concerning the cost price and the cumbersomeness.

The present invention remedies all these inconveniences in an extremely simple manner, as it utilizes a power-transmitting device of the type described with a rotary motor without there being however any difference in the two rocking movements, which exactly take place at the same speed. This new and surprising technical effect is obtained without adjunction of any special member, and moreover, if desired the wiper-carrying spindles can be at the same level, or at a different level.

The invention is applicable to windshield cleaners having two wipers connected together by a link, and it is characterized by the fact that the groove in which enters the crank pin of the rotary motor is formed on this coupling link or on a member secured on the latter.

In fact, in this way, the groove receives a movement of translation, so as to always remain parallel to itself. Everything therefore takes place as if its axis of angular oscillation was extended to the infinite, and in these conditions, the two half-oscillations of reverse direction exactly take place with the same law of movement.

The accompanying drawings illustrate, by way of example, some forms of carrying the invention into practice.

Fig. 1 is a sectional elevation of the front of a closed motor car body, showing the arrangement of the motor of the windshield cleaner, and that of the movement transforming and transmitting device according to the invention, within the closed cavity now usual in this type of car body.

Fig. 2 is a sectional view similar to the preceding one, the section being made at one of the wiper-carrying shafts.

Fig. 3 is a rear view, according to the arrow III of Fig. 2 and on a smaller scale, the inner plain moulding of the car body being removed.

Fig. 4 is a front view, on a smaller scale, according to the arrow IV of Fig. 2, the plain moulding of the car body being removed as well as all the mechanisms it supports.

Fig. 5 is a sectional plan view of a detail.

Fig. 6 is a sectional view made according to line VI—VI of Fig. 5.

Fig. 7 is an elevation of a modification.

Fig. 8 is an elevation of another modification, and Fig. 9 is a sectional side view thereof, made according to line IX—IX of Fig. 8.

Fig. 10 is an elevation of another form of construction, Fig. 11 being a sectional view thereof made according to line XI—XI of Fig. 10.

Fig. 12 is an elevation of a modification, Fig. 13 being a sectional view thereof, according to line XIII—XIII of Fig. 12.

Fig. 14 is a cross section of another modification in which the connecting rod between the wipers is rigid but resiliently mounted.

Fig. 15 is an elevation of a modification, Fig. 16 being a section thereof, according to line XVI—XVI of Fig. 15.

Fig. 17 is a section, on an enlarged scale, made according to line XVII—XVII of Fig. 15.

Fig. 18 is an elevation of another form of construction, Fig. 19 being a section thereof, according to line XIX—XIX of Fig. 18.

Fig. 20 is a perspective view of a detail of another form of construction.

In the example illustrated in Figs. 1 to 6, the motor of the windshield cleaner is indicated at 1 and is secured on the inner plain moulding 2 of the car body, which is movable relatively to the cross member 3, the latter being rigid with the front 4 of the car body. In this manner, the entire power-transmitting mechanism, between the shaft 5 of the motor and the shafts 6 on which the windshield wipers are mounted, is arranged within the cavity or chamber formed by the plain moulding 2 and the cross member 3.

In a form of construction of the device according to the invention, the driving shaft 5 terminates in a crank 7, the crank pin 8 of which enters a groove 9 provided in a plate 10 which, in some of the examples illustrated, is made in one piece with the connecting rod 11 connecting the crank pins 12 and 13 of the cranks 14 and 15 fast on the shafts 6 of the windshield wipers. The crank pins 14 and 15 and the connecting rod 11 constitute a four-bar motion.

It will be seen that the rotation of the shaft 5 is transformed into a reciprocating oscillation of the connecting rod 11 and, consequently, of the crank pins 14 and 15 and shafts 6. It will also be seen that both half oscillations are exactly similar, as stated in the preamble.

If the shaft 5 is not located parallel to the plane of the pivots 6, this will not prevent the connecting rod 11 being reciprocally actuated by the end of the crank pin 8 which will enter more or less deeply, during its displacement, within the slot 9.

It will obviously be understood that the installation of the movable wall 2 carrying the motor 1 will be effected with the greatest ease. In fact, the pivots 6 of the windshield wipers, provided with their crank pins, being permanently fitted in the front 4 of the car body, and the connecting rod 11 being secured on the crank pins 12 and 13 of the cranks, the movable wall 2 will then only have to be fastened on its securing device. As soon as the motor is started, the crank pin 8, which will have pushed back the plate 10, will come opposite the slot 9, into which the plate 10, resuming its original position, will cause it to enter by resiliency, and, from this moment, the motor will drive the wipers.

It will also be understood that when it is desired, for any reason whatever, to remove the motor 1, for lubrication for instance, it suffices to remove the wall 2 without touching the wipers permanently secured on the pivots 6, which latter are invariably secured in the part 4 of the car body.

Preferably, the connecting rod 11 is constituted by a metal plate sufficiently thin in order to be easily flexible. In these conditions, a thrust exerted in the direction of the arrow V on the median portion of the connecting rod 11 distorts the latter so that the groove 9 releases from the crank pin 8. In these conditions, the motor 1 no longer drives the connecting rod 11, but, as soon as the thrust or pressure is relieved, the plate 10 presses upon the end of the crank pin 8. If the shaft 5 rotates, said crank pin 8 will automatically come opposite the groove 9 and the engagement will take place. For ensuring this thrust, use can be made, for instance, of the devices illustrated in Figs. 5 and 6. A rod 16 is guided in a fixed socket 17, and terminates in an operating knob 18. A spring 19 always tends to retract the rod 16. This rod 16 is provided with a claw 20 entering a groove 21 formed in the fixed socket 17. The rod 16 terminates in a lever 22 adapted to come in engagement with an abutment 23 provided on the connecting rod 11.

In these conditions, if the knob 18 is pressed upon in antagonism to the spring 19, the end of the rod 16 presses against the connecting rod 11 so as to release the groove 9 from the crank pin 8, as explained; at this moment, the claw 20 comes out from the groove 21 and the knob 18 can be caused to rotate so that the lever 22, coming in contact with the abutment 23, causes the connecting rod 11 to move, as shown by the arrow VII, until the wipers are placed outside the zone of sight of the driver.

Preferably, the rod 16 actuates at the same time as the switch (diagrammatically illustrated by the tongue 24), so that by pushing the knob 18 inwardly, the motor is stopped at the same time as the groove 9 is released from the crank pin 8.

If the knob 18 is now caused to rotate in reverse direction, the claw 20 again enters the groove 21 and the spring 19 restores the rod 16 to its initial position. The connecting rod 11 and the plate 10, press upon the end of the crank pin 8. The switch 24 closes again the circuit of the motor which starts to rotate. The crank pin 8 again enters the groove 9 and the windshield cleaner starts to operate.

By eliminating the finger 22, it is possible to ensure only cutting off of the current and release of the driving crank pin, thus freeing the wipers, the setting in motion of which can even be effected by hand, in case of current failure for instance, by a crank, removable or not, acting on the crank pin 15.

It is obvious that the groove 9 can have any possible shape and be constituted by a simple slot, as in the case of Figs. 1 to 6, or by an embossed channel, as in the case of Figs. 8 and 9, in which the groove 9 has the shape of a closed curve.

In the modification shown in Fig. 7, the crank pin 8 is replaced by an eccentric 25, and the groove 9 by a frame 26. The operation is obviously exactly the same as previously.

Figs. 10 and 11 illustrate a constructional modification in which the driving shaft 5 is provided with a heart-shaped cam 40 movable between two rollers 41 and 42 mounted on the conecting rod 11.

Figs. 12 and 13 illustrate another form of construction in which the aperture 9, provided in the plate 10 rigid with the connecting rod, has a definite shape function of the law of the movement it is desired to impart to the wipers.

In some cases, the connecting rod 11 can be rigid and, in order to allow its disengagement, and consequently its transverse displacement in translation, this connecting rod 11 is mounted on the crank pins 12 of the wipers between springs 44, as illustrated in Fig. 14.

For the actuation of two wipers, with a motor not arranged in the axis of the motor car, but preferably opposite one of the wipers, as shown in Figs. 15, 16 and 17, the plate 10 is connected to the connecting rod 11 by a strip 45 which can be resiliently distortable in order to allow the disengagement as previously indicated.

Figs. 18 and 19 illustrate another form of construction in which the crank pin 8 is fitted into a

member 47 slidably mounted on a rod 48 provided, at its ends, with slide-blocks 49 guided by the sides of the aperture 9, springs 50 being interposed between the slide-blocks 49 and the member 47.

Fig. 20 illustrates a modification of the form of construction of Figs. 15 and 16 and in which the plate, provided with the groove 9, is mounted on the arm 45' through the medium of a joint 62. This plate is held in position by means of springs 63 and 64 arranged as illustrated. These springs are sufficient for avoiding any oscillation of the jointed plate during the operation, but it can be angularly moved about its joint 62 through the clutching or unclutching action.

The bar 45' is mounted on the connecting rod 11. This connecting rod 11 might be composed of several elements connected together by a joint of the type illustrated in Fig. 20.

What we claim as our invention and desire to secure by Letters Patent is:

1. In a windshield cleaner of the type having multiple wipers, independent wiper shafts, bearings independent from each other for supporting the said shafts, a crank secured on each of said shafts, a link connecting the said cranks and provided with a slot, a motor including a casing independent of the wiper shafts, a shaft always rotating in the same direction, and a crank pin on the shaft and engaging in the slot in the link for transmitting a reciprocating movement to the link.

2. A windshield cleaner according to claim 1, in which the connecting link is movable axially of the wiper shafts, and means for moving said link axially of the wiper shafts for uncoupling the link from the crank pin.

3. In a windshield cleaner, two wiper shafts, cranks fast on these shafts, a link connecting the cranks and provided with abutment surfaces, a motor including a casing independent of the wiper shafts, a shaft always rotating in the same direction, and a driving member fast on the shaft of the motor and cooperating with the abutment surfaces of said link for imparting a reciprocating movement to the latter.

4. A windshield cleaner as claimed in claim 3, in which the link is resilient, a member mounted parallel to the motor shaft and manually slidable to contact the resilient link and to move the same axially of the motor shaft in order to disengage the driving member from the abutment surfaces on the link.

5. A windshield cleaner as claimed in claim 3, wherein the abutment surfaces are in the form of a closed oblong annular groove, and wherein the driving member on the motor is in the form of a crank pin.

6. In a windshield cleaner, two wiper shafts, cranks fastened on these shafts, a link connecting the cranks and provided with abutment surfaces, a rotatably mounted driving member cooperating with the abutment surfaces of the links for imparting to the latter a reciprocating movement, and means for moving the link axially of the driving member to disengage the link from said driving member.

7. In a windshield cleaner as claimed in claim 6, said means including a thrust member adapted to act on said link at right angles to its reciprocating movement for disengaging this link and the driving member.

8. A windshield cleaner according to claim 1, in which the connecting link is movable axially of the wiper shafts, a slidable and rotatably mounted rod axially of the shaft to effect uncoupling of the link from the crank pin, an abutment on the link, an arm projecting from the inner end of the rod and engageable with the abutment so that when the rod is moved inwardly and rotated the link will be disconnected from the crank pin and the wiper carrying shafts will be moved to a position in which the wipers will be out of the line of sight of the driver of the vehicle.

9. A windshield cleaner according to claim 1, in which the connecting link is movable axially of the wiper shafts, a slidable and rotatably mounted rod axially of the shaft to effect uncoupling of the link from the crank pin, an abutment on the link, an arm projecting from the inner end of the rod and engageable with the abutment so that when the rod is moved inwardly and rotated the link will be disconnected from the crank pin and the wiper carrying shafts will be moved to a position in which the wipers will be out of line of sight of the driver of the vehicle and a motor circuit controlling member carried by the rod for stopping the motor upon the inward sliding of the rod.

10. A windshield cleaner for motor vehicles the combination with an enclosing portion of the vehicle body, an inner plain moulding movable relative to the lower inner side of the enclosing portion and cooperating with the latter to form a housing when closed, wiper shafts journalled in the enclosing portion, cranks fastened on the shafts, a link in the housing for connecting the cranks and provided with a slot, a casing including a motor mounted on the inner moulding, a shaft extending from the motor casing into the housing and always rotating in the same direction, a crank pin on the end of the shaft for engaging the slot in the link to effect the reciprocating movement of the latter.

11. A motor vehicle body construction having a windshield with a framing body structure, said structure being provided with a chamber and a removable cover panel closing the chamber, a wiper shaft journaled in a wall of the chamber, a drive for operating the shaft, said drive being mounted on the panel for movement to and from a chamber closing position, and transmission means disposed within the chamber and operatively connecting the drive to the wiper shaft, said transmission means embodying separably interlockable driving and driven parts, the driven part being connected to the shaft and the driving part connected to said drive, the interlock between the driving and driven parts being made and broken upon placement and displacement, respectively, of the panel.

12. A motor vehicle body construction having a windshield with a framing body structure, said structure being provided with a chamber and a removable cover panel closing the chamber, a wiper shaft journaled in a wall of the chamber, a drive for operating the shaft, said drive being mounted on the panel for movement to and from a chamber closing position, transmission means disposed within the chamber and operatively connecting the drive to the wiper shaft, said transmission means embodying separable driving and driven parts, the driven part being connected to the shaft and the driving part connected to said drive, and means yieldably mounting one of said parts for bodily movement when out of proper registry with the companion part during the closing movement of said cover panel.

13. A motor vehicle body construction having a windshield with a framing body structure,

said structure being provided with a chamber and a cover panel closing the chamber and removable to give access thereto, spaced windshield wipers, shafts supporting the wipers and journaled in a wall of the chamber, means operatively connecting the shafts for synchronous movement, said means including a link provided with abutment surfaces, a drive for the link, said drive being mounted upon said cover panel and embodying a crank part operatively and detachably engaged with the abutment surfaces for driving the link, and means supporting the link for yielding movement toward and from the path of said crank part to permit yielding of the link during the movement of the cover panel to a chamber closing position when the link is out of operative alignment with the crank part.

GEORGES RENÉ WERNERT.
JEAN FRANÇOIS GAGNAIRE.