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WINDSHIELD CLEANER

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Fig. 4.

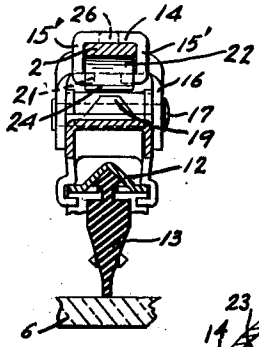


Fig. 3.

Fig. 1.

Fig. 2.

Fig. 5.

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WINDSHIELD CLEANER

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9 Claims. (Cl. 15—250)

This invention relates generally to the window cleaner art, and more particularly to a new and useful attaching clip for releasably securing a wiper blade to an actuating arm.

Considerable difficulty has been encountered in attempting to provide a window cleaner arrangement which will satisfactorily wipe a curved window surface such as the curved windshield encountered on most present day vehicles. For example, as the blade is oscillated across a curved window surface it must accommodate the same and conform thereto and as a result it is often necessary for certain portions of the blade such as the outer or upper end thereof to in effect reach around portions of relatively extreme curvature into receding side portions. While the use of various spring-backed pressure-distributing lever arrangements assist in enabling such relatively extreme blade movement, it is highly desirable that the entire blade be enabled to rock about a transverse axis and thus vary its longitudinal inclination relative to the actuating arm. This is also true with respect to inclined substantially flat windshields.

Furthermore, because the windshield inclination often varies in different vehicles it is highly desirable that the blade be enabled to rock about a transverse axis whereby to vary its longitudinal inclination relative to the actuating arm and thus accommodate differently inclined windshields and automatically adjust itself for best wiping performance with whatever windshield it may be used.

Prior art windshield wipers are generally deficient in the foregoing respects. For example, while many of them utilize an attaching clip arrangement which would otherwise permit a limited bodily rocking of the blade about a transverse axis, as a practical matter in many instances such rocking action is virtually precluded by reason of a twisting action produced on the blade by lateral drag forces thereon as the blade is oscillated across the window surface. This is particularly true, for example, in such prior art arrangements as those wherein the actuating arm has a curved terminal end which is spring-biased into nested relation against a curved wall part on the attaching clip housing, or wherein the actuating arm is provided with depending wall parts carrying a transverse pin which fits loosely within the blade superstructure. The aforesaid blade twisting action is apt to occur with such prior art attaching clip arrangements and binds the parts together such as to prevent the desired blade rocking action. A further disadvantage of many prior art attaching clip arrangements intended, theoretically at least, to enable such blade rocking movement about a transverse axis resides in the looseness of the pivotal connection thereof which permits considerable annoying and distracting blade chatter as the blade is oscillated across a window surface. Also, many prior art clip arrangements do not securely lock the blade to its drive arm. Still further disadvantages of such prior art attaching clip arrangements are to be found, for example, in the nature of their releasable connection to the actuating arm which render such arrangements complex, impractical, or otherwise not entirely satisfactory.

Accordingly, it is a primary object of this invention to provide a practical wiper blade attaching clip which will enable the blade to vary its longitudinal inclination and thus better conform to surfaces of different inclination and of varying curvature.

Another object of this invention is to provide a wiper blade attaching clip which will permit any necessary rocking of the blade to vary its longitudinal inclination with respect to an actuating arm without hindrance by reason of a blade twisting action.

A further object of this invention is to provide, in combination with a blade permitting lateral rocking of the wiping edge, an attaching clip arrangement enabling longitudinal rocking of the blade relative to the actuating arm.

In addition, it is an object of this invention to provide an attaching clip as aforesaid which will positively lock a blade to an actuating arm.

It is also an object of this invention to provide a practical wiper blade attaching clip having the aforesaid characteristics and which is relatively simple and inexpensive in construction and durable and reliable in operation.

A wiper blade attaching clip according to this invention is characterized in one respect by an arm receiving clip member pivotally connected to the blade on an axis substantially transverse thereto in a manner such as to enable longitudinal rocking of the blade about such transverse axis without hindrance by reason of any twisting action and such as to avoid blade chatter by reason of lateral rocking and the like at the point of such pivotal connection.

An attaching clip according to this invention is characterized in another respect in being adapted to receive in manually releasable interlocking engagement therewith the terminal end of an actuating arm, the interlocking engagement therebetween being reinforced by the reaction of the arm-pressed blade against a window surface to preclude accidental disengagement.

The foregoing and other objects and advantages of this invention will become clearly apparent from the ensuing detailed description taken together with the accompanying drawing forming a part thereof wherein:

Fig. 1 is a view in side elevation of a wiper blade incorporating an attaching clip according to this invention;

Fig. 2 is a fragmentary plan view of the blade of Fig. 1;

Fig. 3 is a fragmentary sectional view taken about on line III—III of Fig. 2;

Fig. 4 is a transverse sectional view taken about on line IV—IV of Fig. 1; and

Fig. 5 is a plan view of a spring member for biasing the actuating arm and attaching clip into manually releasable interlocking engagement.

Referring now to the drawings, an attaching clip according to the instant invention is illustrated in combination with a windshield cleaner arrangement including a conventional rockshaft **1** and a two-part actuating arm having an outer end **2** and an inner end **3** which receives the outer end of rockshaft **1** for being oscillated thereby, ends **2** and **3** being pivotally connected as at **4**. A conventional biasing spring arrangement **5** is provided for urging the outer arm end **2** towards the surface of the window **6** in a known manner.

A wiper blade, generally designated **7**, is releasably secured to the terminal end of the arm by the attaching clip generally designated **8**. Blade **7**, which may be basically any of various known types adapted for either curved or flat windshields and slightly modified to accommodate the attaching clip of the instant invention, is

preferably adapted for use on curved window surfaces. Thus, there is illustrated herein a wiper having a pressure distributing superstructure comprising a rigid center yoke 9 having levers 10 and 11 backed by springs 10' and 11' pivoted thereto and extending outwardly from opposite ends thereof, said levers and the opposite ends of said yoke being connected to a blade body unit including a resilient backing 12 which is secured to the flexible blade body 13, such an arrangement being more fully disclosed in pending application Serial No. 339,148, now abandoned. It is to be understood that the instant invention is not limited to such a blade but may be used with any of various different types of blades adapted to receive the attaching clip now to be described.

Attaching clip 8 comprises a member of inverted generally channel shape having a top wall part 14 and side wall parts 15 depending therefrom. Adjacent one end thereof said side wall parts 15 are enlarged, as at 15' to provide spaced apart ears 16 suitably apertured to receive a transverse pivot pin 17 such as, for example, a rivet. Yoke 9 is formed adjacent its longitudinal mid point, as by stamping, to provide a pair of upstanding ears 18 correspondingly apertured to receive pin 17, together with a triangular bridge portion 19 adapted to just bridge pin 17, and ears 16 straddle ears 18 and yoke 9.

Thus, in assembled relation as clearly illustrated in the drawings, pin 17 extends through the aligned apertures in ears 16 and 18 and beneath bridge portion 19, being secured in place therein, whereby attaching clip 8 is relatively tightly pivotally connected to yoke 9 in a manner permitting free longitudinal rocking of blade 7 about a transverse axis defined by pivot pin 17 and essentially precluding by reason of the relatively tight pivotal connection any other motion of yoke 9 relative to attaching clip 8 whereby to avoid chatter, binding, or other undesired play therebetween. It will be appreciated that said apertures and pin 17 are of such size and ears 16 and 18 are so spaced as to permit essentially only the aforesaid rocking action. The adjacent end of top wall part 14 comprises a downturned stop portion 20 serving to limit such longitudinal rocking of blade 7 relative to clip 8 in one direction.

A particular feature of an attaching clip according to the instant invention resides in the means provided thereby for interlocking engagement with an actuating arm such as to permit the aforesaid longitudinal rocking of the blade while ensuring that the same will not accidentally become disconnected from the arm. To this end, adjacent the end of clip 8 remote from pin 17, side wall parts 15 are extended downwardly and then inwardly to provide flange portions 21 for receiving and retaining in the clip housing portion provided thereby a spring member 22 and the terminal end 2 of the arm.

Spring member 22 is preferably a leaf formed at its inner end to provide a laterally enlarged locking flange portion 23 inclined upwardly from the main body portion of spring member 22, and is curved downwardly at its opposite end, as at 24. Flange portion 23 engages recessed areas 15'' in side wall parts 15 adjacent the enlarged side wall parts 15' to ensure against displacement of spring member 22 from clip 8 and also to cause the main body portion of spring member 22 adjacent curved end 24 to be urged against top wall part 14 adjacent the outer end thereof with spring member 22 bearing against flange portions 21 at a point adjacent flange portion 23, as clearly illustrated in Fig. 3. Thus, spring member 22 is formed so that upon locking flange portion 23 engaging in the recesses of side wall parts 15, the spring member is caused to bear against top wall part 14 adjacent the outer end thereof. Also, top wall part 14 is apertured, as at 25, to receive therein a shoulder-forming dimple 26 on the terminal end 2 of the arm, aperture 25 being spaced inwardly from the outer end of top wall part 14. The top wall 14 and the depending side walls 15 cooperate with the bottom-forming spring member 22 to form an arm receiving socket which has an internal shoulder adjacent an entranceway at its outer end, while at its inner end the converging walls provide a torque-resisting seat for the extremity of the arm to hold the arm and socket against relative twisting.

When connecting the blade to the arm, the terminal arm end 2 is fitted into clip 8 between top wall part 14 and spring member 22, camming against the curved end portion 24 thereof to displace spring member 22 against its own spring action. By pressing terminal arm end 2 and clip 8 to pivot the same in opposite directions with the extreme end of arm end 2 pivoting on top wall part 14 of clip 8, dimple 26 is enabled to enter the clip and slides along top wall part 14 thereof until it slips into aperture 25 under the bias of spring member 22, at which point the arm and the attaching clip are completely assembled and are retained in closely nested relation by reason of the bias of spring member 22. The arm end has a contact surface portion which extends in the clip to a point adjacent flange portion 23 of the spring member 22 and contacts the surface thereof, and the clearance between flange portion 23 and top wall part 14 is equal to or slightly less than the thickness of the arm end, whereby to provide a tight connection and, when such clearance is slightly less than the arm end thickness, increase the spring pressure against the arm.

In this way, the clip and the arm are securely interlocked in a very simple, efficient and practical manner, and in order to disconnect the arm from the clip it is necessary to pivot clip 8 and arm end 2 in opposite directions, with the extreme outer end of the arm again bearing against top wall part 14, whereupon dimple 26 will be displaced from aperture 25 and the arm can be withdrawn from the clip. It will be noted that this disassembling action is exactly the opposite of the action which occurs between the arm and the clip by reason of the arm spring pressure being transmitted through the clip to the blade and when the blade is lifted from the windshield as for cleaning purposes. In other words, the interlocking engagement between the arm end and the attaching clip is reinforced by the pressures occurring under normal conditions of use whereby the same are secured against accidental disconnection while at the same time they can be manually disconnected by a relatively simple operation when desired.

Therefore, it is seen that the instant invention fully accomplishes its intended objects and provides a unique attaching clip arrangement which enables longitudinal rocking of the blade relative to the arm and which securely locks the blade to the arm, all in a relatively simple, inexpensive, durable and extremely practical manner. While but one embodiment of this invention has been disclosed herein, it will be appreciated that this invention is not necessarily limited to the details thereof and it is intended that this invention be limited solely by the scope of the appended claims.

Having completely described this invention in a preferred embodiment thereof, together with its mode of operation, what is claimed as new is:

1. A wiper assembly comprising, a wiper blade, an actuating arm having a shouldered terminal end portion, an elongate integral clip member, means pivotally connecting said clip member adjacent one end thereof to said wiper blade along a transverse axis, the opposite end portion of said clip member being in the form of an elongate housing opening through the other end of said clip and adapted to slidably receive therein said actuating arm terminal end portion, said housing having means providing a shoulder adapted for engagement with the shouldered arm end, and an elongate flat spring having an inner bearing portion joined by a pivot edge to a relatively longer main body portion that extends toward the open end of said housing and underlies the housing shoulder to press the shouldered terminal end upwardly into interlocking engagement therewith, said actuating

arm terminal end portion extending beyond its shoulder and engaging the bearing portion of the spring to rock the spring on its pivot edge and thereby increase the upward resilient urge of the main body portion upon the arm to maintain the interlock.

2. An attaching clip for securing a wiper blade to an actuating arm having a terminal portion with a shoulder, comprising an elongate clip member, said clip member comprising a housing including a relatively flat longitudinally extending upper guide wall and spaced side walls for slidably receiving therealong said terminal portion, means connecting said clip member to said wiper blade, said guide wall being provided with a shoulder for engaging said terminal portion shoulder, and spring means within said housing, said spring means including an upwardly and inwardly extending terminal portion and an adjoining outwardly and upwardly extending body portion, means for rockably securing said spring means in said housing at substantially the junction of said spring portions, said spring portions normally being associated with said upper guide wall for engaging said arm terminal portion when inserted in said clip member to urge said shoulders into seating engagement, and the terminal portion of said arm beyond its shoulder being of sufficient length to engage the inwardly extending terminal portion of said spring means to bias said spring means on its rockable means to cause its outwardly and upwardly extending body portion to apply additional upward pressure for holding said shoulders in their interlocked position.

3. An attaching clip for securing a wiper blade to an actuating arm having a terminal portion with a shoulder, comprising an elongate clip member, said clip member comprising a housing including a relatively flat longitudinally extending upper wall and spaced side walls for slidably receiving therealong said terminal portion, means connecting said clip member to said wiper blade, a spring member arranged between the spaced side walls to provide a resilient track for the terminal portion, said spring member being provided with a downwardly extending outer end portion arranged to guide said terminal portion in telescoping alignment with the housing, said arm terminal portion and said spring portion being arranged to resiliently interlock the arm terminal portion to said housing wherein the shoulder of said terminal portion will flex the spring portion during the endwise movement of the terminal portion during the process of connecting the parts together, said spring portion acting to maintain the interlock, and means for releasing said interlock by the application of pressure on the outer end portion of said spring.

4. An attaching clip for securing a wiper blade to an actuating arm having a terminal portion with a shoulder, comprising an elongate clip member, said clip member comprising a housing including a relatively flat longitudinally extending upper guide wall and spaced side walls for slidably receiving therealong said terminal portion, means connecting said clip member to the wiper blade, said guide wall being provided with a shoulder for engaging said terminal portion shoulder, and spring means within said housing, said spring means including an upwardly and inwardly extending terminal anchor portion and an adjoining outwardly and upwardly extending body portion, said terminal anchor portion interlocking with said side walls for securing the spring means in place within the housing, said spring portions normally being associated with said upper guide wall for engaging said arm terminal portion when inserted in said clip member to urge said shoulders into seating engagement, said terminal anchor portion being inclined upwardly toward the upper guide wall for engagement by said arm terminal portion to deflect the latter against said upper guide wall to facilitate the engagement of said shoulders.

5. An attaching clip according to claim 4, wherein the outer end of the outwardly and upwardly extending body portion is rolled away from the upper guide wall to facilitate insertion of the arm terminal portion in the housing.

6. An attaching clip according to claim 4, wherein said terminal anchor portion extends from opposite sides and is anchored in recesses in the side walls of the housing, said side walls having depending parts inturned beneath said spring means to hold the terminal anchor portion in the side wall recesses.

7. An attaching clip for securing a wiper blade to an actuating arm having a terminal portion with a shoulder, comprising an elongate clip member, said clip member comprising a housing including a relatively flat longitudinally extending upper wall and spaced side walls for slidably receiving therealong said terminal portion, means connecting said clip member to said wiper blade, and spring means within said housing, an internal shoulder accessible from within the housing, said spring means being in the form of a substantially flat spring leaf extending lengthwise within the housing beneath the shouldered terminal portion, the outer end portion of the spring leaf acting to yieldably hold the shoulders interengaged and the inner end portion of said spring leaf being upturned toward the upper wall to position the arm terminal portion for shoulder engagement and to confine the arm terminal portion against said upper wall as a point of fulcrum support about which the arm terminal portion may be swung against the urge of said spring means to disengage its shoulder from the internal shoulder.

8. An attaching clip assembly for securing a wiper blade unit to an actuating arm, which arm has a terminal portion with a shoulder and a generally flat contact surface, said clip assembly having a shoulder for engagement with the shoulder of the arm, said clip assembly including a housing having a longitudinally extending upper wall and spaced depending side walls for slidably receiving therebetween the terminal portion of the arm, said side walls each being formed at its bottom edge with a supporting portion, and a spring member having a portion forming a contact wall for said clip assembly, said spring member having a substantially flat transverse portion at its inner end which extends lengthwise between said side walls and engages and is supported by said supporting portions of said side walls, the inner end portion of said clip assembly having top and bottom inner wall faces spaced to provide a restricted area for snugly receiving and gripping therebetween the extremity of the arm with the contact surface of the arm seating on the adjacent flat portion of said contact wall, whereby rotational movement of the blade unit about the longitudinal axis of the arm is prevented, said spring which forms the contact wall of said clip assembly having its outer portion free for flexing movement with respect to the upper wall of said clip assembly to facilitate the disengagement of said shoulders and separation of the arm from the clip assembly, and means for pivotally connecting the outer end of said clip assembly to a wiper blade unit.

9. The structure of claim 8 characterized in that the supporting portions of each of said side walls are inturned about the bottom face of said spring member and the spring member further is provided with laterally extending ears which engage portions of the side walls to prevent longitudinal displacement of same.

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