A bifurcated spine piece for securing squeegee blades against bending in one plane while allowing controlled bending to conform to the surface plane to which the squeegee is to be applied. The squeegee is secured between the bifurcations in a selected compression thereby preventing longitudinal shifting of the squeegee or blade. The spine piece is grippable at both ends by typical claw elements found on wiper blade holder assemblies and the spine piece includes a cam grip surface engageable with the squeegee.

6 Claims, 3 Drawing Figures
The present invention is directed to a new and improved spine piece intended to supplant the twin parallel spine strips of the prior art and to better hold the spine blades in proper working orientation. It is also intended that the new spine element will be particularly useful to provide intermediate blade control as between a spine blade and a squeegee holder, for example, as known in windshield wiper devices seen in automobiles. The present device is also intended to be easily installed for reuse in replacement for worn out blades and to accommodate mounting on a variety of holder structures. The cam surface locations provide means for selectively stiffening of the squeegee by compression at points along the length of the squeegee.

The device of the present invention is especially useful with articulated type hollow or extruded blades such as described in my copending application for U. S. Letters Pat., Ser. No. 5,690. In prior art devices when the squeegee blade becomes worn, it is virtually impossible to replace merely the rubber blade. Instead, spine pieces, blade and holder were so integrated as to require replacement of the entire wiper structure at substantial expense to the user. My extruded blades are intended to be replacements for worn blades of the prior art devices. As in the prior art devices it is desirable to provide spine pieces to hold and properly orient the blade. However, it is not felt necessary that the spine pieces require discarding and the present spine pieces are specifically designed to admit of changing the blade without destruction of the spine pieces.

In combination with the variant depth claw-grip positions the cam surfaces provide for the application of selected compression on the squeegee between the bifurcations.

In U. S. Letters Pat. No. 2,596,063, a windshield wiper blade was described in which a blade having parallel grooves was held in position by two separate parallel spine elements, one in each of the grooves of the blade. These strips were detentably held by means of a channel-like element depending from the wiper holder and snapped into receiving grooves at each end of the spine elements. Subsequent wiper blade designs utilized a variety of separate spine elements and closed stamped spine elements. A modified version of the closed spine form is seen in the U. S. Letters Pat. to Oshei et al., Pat. No. 3,386,123. This unit included a flared portion extending from one end and the flare being accomplished by a thickening of the blade web intermediate the grooves at the clamping end. This allows the wiper holder claw to securely impinge on the detents in the spine ends. U. S. Letters Pat. No. 3,093,856 to Smithsen shows the locking together of two bifurcated elements. The U. S. Letters Patent to Ehrlich Pat. No. 2,741,792 and Chambers Pat. No. 2,847,694 both show simple bifurcated spine ends.

The present invention goes beyond the prior art and has its principal object in providing a bifurcated spine construction which is ramped and closed at one end and selectively compressible against the squeegee in selected positions intermediate the ends thereof.

Another object is to teach the use of cam surfaces along the interior surfaces of the bifurcators whereby stiffening results on gripping compression applied by the bifurcators to intermediate resilient squeegees.

Another object is to provide a spine piece which replaces separate pieces or closed rings as provided with various wiper squeegee blades.

GENERAL DESCRIPTION

In general, the device of the present invention is a flat elongate bifurcated spine piece externally ramped at one end and having selected internal cam surfaces and adjacent external detent means useful for holding and orienting a windshield wiper squeegee positioned intermediate the flanking bifurcations. The closed end of the bifurcated spine piece is externally ramped, increasing in span between the external edges from the closed end toward the middle. This allows a channel-like claw piece with inturmed flanges to be easily run into wedged clamping position on the spine pieces and gripping against the outer edges of the bifurcations. The open end of the bifurcated spine element is provided with outer edge claw notches or detents of variant progressive depth along at least one of the outer edges of one of the bifurcations whereby the claw can selectively apply a desired compressive force as between the bifurcations and compressing therebetween a neck portion of a squeegee or wiper blade. Internally, at least one of the bifurcations is extended toward its opposite bifurcation adjacent the detents so that as compressive pressure is applied by the holding claws or clamp means, the squeegee is firmly gripped and as selected gripping pressure is applied, then the resilient material of the blade is compressed so that a localized stiffening has been accomplished where desired. This feature allows selected stiffening by compression as desired in a particular blade application. In windshields with unusual curvature this selected stiffening changes the movement characteristics of the wiper in motion toward the end of providing optimum performance in any particular blade. Curvature can be applied to the spine pieces as by bowing to create a selected force between holder and glass surface.

IN THE DRAWING

FIG. 1 is a perspective view of a spine piece in accord with the present invention and indicating its position in respect to a squeegee blade and indicating the holder claws at the lock end.

FIG. 2 is a full section view through the structure shown in FIG. 1 and taken on the line II—II of FIG. 1.

FIG. 3 is a section elevation view exposing the spine piece in plan view as it clamps on the squeegee element at the neck thereof and the section is taken on the line III—III of FIG. 2.

SPECIFIC DESCRIPTION

Referring to the drawing and with particular reference to the FIG. 1 thereof the present inventive bifurcated spine piece 11 is seen in operating relation assembled to securely grip the squeegee blade 12 and to be clamped thereupon by the plural claws 13 which are extensions of the wiper holder 14. The closed end 15 of the spindie piece 11 is formed at the end into a ramp 16 on the external edges of the bifurcations 17 adjacent the closed end 15. The ramp 16 allows one of the claws 13 to apply clamping force as between the bifurcations 17 so as to securely hold the blade 12 therebetween in the slots 18 forming the neck 19 between the head 20 and the body 21 of the blade 12. The spine piece 11 is formed from a flat piece of spring steel, and can be bowable to vary in shape as desired in accord with a specific installation to provide a new dimension in control of blade resiliency. As will be appreciated, the cam ramps 22 may be on both bifurcations 17 or one thereof.

In FIG. 2, the claw 13 adjacent the open ends of the bifurcations 17 is seen clamping the bifurcations 17 toward each other and assisted by the resilience in the material of the neck 19 of the blade 12 and by the (FIG. 3) cam-like internal ramp 23 formed in one or more of the bifurcators 17 on the inner facing edges thereof. This arrange-ment forms a resilient cushion against which the claw 13 reacts forcing the bifurcations 17 toward each other and deformably gripping the neck 19 of the wiper blade 12. The consequence of such holding is to resiliently compress the material of the blade and to extrude by deformation in a direction toward the blade tip 23 and upwardly into the head 20. This locally stiffens the blade and changes its resilient character in that region. Accordingly the cam construction as seen in the ramps 23 can be repeated selectively along the length of the blade and at intervals desired in accord with a specific installation to provide a new dimension in control of blade resiliency. As will be appreciated, the cam ramps 22 may be on both bifurcations 17 or one thereof.

As best seen in FIG. 3 the bifurcations 17 may be notched for detenting connection with the claw 13. The detenting notches 24 are of variant successive depth whereby the claw 13 can apply selective compression depending upon the depth of the selected notch 24 and the notches may be on one or both outer edges of the bifurcations 17. This provides, in addition to compression control at the claw 13, a control resisting lon-
of said bifurcated strip and urging said cam projections inwardly toward the other of said bifurcations.

3. In a spine piece for windshield wiper blades as set forth in claim 2 wherein said clamping means includes a plurality of notches at progressively variant depths.

4. A flat spine piece easily flexing in one direction and resisting deformations in a direction normal to said first direction comprising:
a bifurcated spring stock element externally ramped and closed at one end and open at the other end thereof, said bifurcations being in a parallel plane one with the other and each bifurcation having cam projections along the interior surfaces thereof and exterior detent clamping surfaces adjacent each of said cam projections; and
a compression claw selectively detenable in said clamping surfaces whereby said bifurcations are held against separation and said cam surfaces are selectively urged toward closure against the opposite bifurcation.

5. A windshield wiper blade combination comprising: ramp
a bifurcated strip of flat spring stock externally tapered to form a ram external surface at the closed end thereof and at the open end thereof having at least one cam projection from at least one of the bifurcations of said bifurcated strip and adjacent external notches at selective depths;
a squeegee of elongate rubber-like material including a head, a wiper portion and neck portion therebetween, said bifurcated strip resting in said neck portion of said squeegee; and
holder claws, one selectively positioned in clamp relation on said ramp portion of said bifurcated strip and at least one other detenable and selectively engaging said notches and urging said cam extension into deforming relation with said squeegee.

6. The combination as set forth in claim 5 wherein a plurality of holder claws at selected positions along the length of said bifurcated strip each are adjacent cam extensions urged toward closure and said squeegee by said claws.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,659,310 Dated May 2, 1972

Inventor(s)  Ian K. Rosen

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 33, "u." should be ---U.---

Column 2, line 25, delete "a" at end of line.

Column 2, line 45, after "therebetween" change "the" to ---and---

Column 2, line 55, "arrange-ment" should be ---arrangement---

Column 4, line 19, Claim 5, delete "ramp"

Column 4, line 21, Claim 5, "ram" should be ---ramp---

Signed and sealed this 5th day of September 1972.

(SEAL)
Attest;

EDWARD M. FLETCHER, JR. ROBERT GOTTSCALK
Attesting Officer Commissioner of Patents