CONVENTION APPLICATION FOR A PATENT

(1) Here insert (in full) Name of Applicant or Applicants, followed by Address(es).

Hereby apply for the grant of a Patent for an invention entitled:

VERNBERA ARRANGEMENT FOR A WINDSCREEN WIPER BLADE RUBBER AND A WINDSCREEN WIPER BLADE ARRANGEMENT INCORPORATING SUCH A VERNBERA ARRANGEMENT,

which is described in the accompanying complete specification. This application is a Convention application and is based on the application numbered 89/01782.6 for a patent or similar protection made in Great Britain on 27th January, 1989.

(4) Here insert Name of basic Country or Countries, and basic date or dates.

Our address for service is WATERMARK PATENT & TRADEMARK ATTORNEYS
290 Burwood Road, Hawthorn, Victoria, Australia.

(5) Signatures of Applicant(s) or Seal of Company and Signatures of its Officers as prescribed by its Articles of Association.

To: THE COMMISSIONER OF PATENTS.
(54) Title
VERTEBRA ARRANGEMENT FOR A WINDSCREEN WIPER BLADE RUBBER AND A WINDSCREEN WIPER BLADE ARRANGEMENT INCORPORATING SUCH A VERTABRA ARRANGEMENT

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(57) Claim

1. A vertebra arrangement for a windscreen wiper blade rubber comprising a pair of flat strips for location in longitudinal grooves in the longitudinal sides of the blade rubber, each strip being provided with an open slot facing sideways of the strip and extending outside the line of the strip at a position to captivate a claw on the blade harness when the strip is located in the blade rubber and at least one strip being being bent or formed round at one end to the side of the strip away from the claw captivating slot so as, in use, to penetrate the material of the blade rubber.

2. A windscreen wiper blade arrangement comprising a harness including a main yoke or lever, pivotal means for attaching the main yoke or lever to a windscreen wiper arm, at least one secondary yoke or lever pivotally connected in the middle region thereof to one end of the main yoke or lever, the free ends of the yokes or levers being provided with claws, a blade rubber carried by the claws of the yokes or levers and a vertebra in the form of two flat strips located in
longitudinal grooves in the blade rubber, wherein each strip is provided with an open slot facing sideways of the strip and extending outside the line of the strip at a position to captivate a claw of the yokes or levers and at least one strip being bent or formed round at one end to the side of the strip away from the claw captivating slot so as to penetrate the material of the blade rubber.
Complete Specification for the invention entitled:

VERTEBRA ARRANGEMENT FOR A WINDSCREEN WIPER BLADE RUBBER AND A WINDSCREEN WIPER BLADE ARRANGEMENT INCORPORATING SUCH A VERTEBRA ARRANGEMENT.

The following statement is a full description of this invention, including the best method of performing it known to:

1. US

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A VERTEBRA ARRANGEMENT FOR A WINDSCREEN WIPER BLADE AND
A WINDSCREEN WIPER BLADE ARRANGEMENT INCORPORATING
SUCH A VERTEBRA ARRANGEMENT

This invention relates to a vertebra arrangement for a
windscreen wiper blade rubber and to a windscreen wiper
blade arrangement incorporating such a vertebra
arrangement.

Modern windscreen wiper blades are usually formed with a
harness comprising a plurality of yokes, the ends of
which, adjacent to the blade rubber, are provided with
claws which hold the blade rubber in place while
allowing relative longitudinal movement between the
rubber and the claws or all but one of the claws so that
the blade, together with the rubber can flex to follow
the curve of the windscreen to which it is to be applied.

The "rubber" is usually made from rubber, either natural
or synthetic and, due to the characteristics of the
material, it is not sufficiently rigid in a transverse
direction to maintain a proper wipe characteristic.
Thus, rigidity is imparted to the rubber by means of a
stiffening member(s) or vertebra(e) which extend
longitudinally for the length of the rubber.

One type of vertebra which is known is the so called
"twin rail" vertebra. This consists of a pair of flat
metal or other strips which seat in longitudinal grooves
in the blade rubber. The problem then remains of
maintaining the vertebra in the blade rubber and also of
preventing the blade rubber from sliding out of the
claws of the blade harness. In the past, moulded rubbers
were used and the requisite location was provided by
appropriate moulding of the rubbers. Thus, for example,
the slots carrying the vertebra were closed at both ends so as to prevent the vertebra from sliding out longitudinally. The assembly of rubber and vertebra was then retained in the harness by the provision of a pocket in the rubber in to which one of the claws of the harness penetrate and are held thereby.

While this has proved to be satisfactory in practice, with the development of technology to reduce production costs, there has been a tendency to change from the relatively expensive moulded rubbers to extruded rubbers. With extruded rubbers, it is not, of course, possible to provide closed end slots so that other means of securing the vertebra in the blade rubber has been found to be necessary. Various proposals have been made for this purpose. For example, it is possible to place an end clip on one or both ends of the rubber and to secure this by providing it with slots by means of which it can be held by the harness claw. However, this solution requires one or two additional parts per blade and thus goes a long way towards taking up the cost saving made by the use of an extruded rubber.

The present invention seeks to provide a vertebra arrangement for a blade rubber and a construction of windscreen wiper blade arrangement in which some or all of the above disadvantages are reduced or substantially obviated.

According to a first aspect of the invention, a vertebra arrangement for a windscreen wiper blade rubber comprises a pair of flat strips for location in longitudinal grooves in the longitudinal sides of the blade rubber, each strip being provided with an open slot facing sideways of the strip and extending outside the line of the strip at a position to captivate a claw
on the blade harness when the strip is located in the blade rubber and at least one strip being being bent or formed round at one end to the side of the strip the claw captivating slot so as, in use, to penetrate the material of the blade rubber.

According to a second aspect of the invention, a windscreen wiper blade arrangement comprises a harness including a main yoke or lever, pivotal means for attaching the main yoke or lever to a windscreen wiper arm, at least one secondary yoke or lever pivotally connected in the middle region thereof to one end of the main yoke or lever, the free ends of the yokes or levers being provided with claws, a blade rubber carried by the claws of the yokes or levers and a vertebra in the form of two flat strips located in longitudinal grooves in the blade rubber, wherein each strip is provided with an open slot facing sideways of the strip and extending outside the line of the strip at a position to captivate a claw of the yokes or levers and at least one strip being being bent or formed round at one end to the side of the strip away from the claw captivating slot so as to penetrate the material of the blade rubber.

Preferably only one of the strips is provided with the bent or formed end and in this case, the strip with the bent or formed end will usually be longer than the other strip.

The bent or formed end may be of reduced dimensions to aid in penetrating the material of the rubber, which rubber may be preformed with a hole to receive the bent or formed end. The bent or formed end may be pointed to assist in penetration of the material of the rubber, and in this event, the preformed hole in the rubber may be omitted.
Where the claw captivating slots are formed towards one end of the strips so as to captivate the end claw of the blade harness, the bent or formed end may be provided either at this end or at the opposite end. Where both strips are provided with bent or formed ends, these may suitably be arranged at opposite ends of the respective strips.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:

15 Figure 1 is a plan view of a pair of strips forming a vertebra arrangement in accordance with a first embodiment of the invention;

Figure 2 is a fragmentary perspective view of a windscreen wiper blade incorporating the vertebra arrangement of figure 1;

Figure 3 is a fragmentary perspective view of the part of the blade shown in figure 2 but taken from the opposite direction;

Figures 4, 5 and 6 are views similar to figure one showing different embodiments of the vertebra arrangement, and

Figure 7 is an enlarged view of one end of a strip showing a special formation of the bent or formed end.

Referring firstly to figure 1, there is shown a vertebra arrangement comprising a pair of flat strips 1 and 3, suitably produced from flattened wire. The major part of each strip 1 and 3 are identical, the two strips being
bowed apart at 5 and having outwardly facing slots 7 therein for the purpose of captivating the claw of a blade harness as will be described in relation to figures 2 and 3. The strip 1 is longer than the strip 3 and has its outer end 9 bent or formed round at 11 to provide a portion 15 extending substantially at right angles to the rest of the strip 1. This portion 15 is intended to penetrate the material of the blade rubber and secure the strip 1 against longitudinal movement relative to the blade rubber. It will be noted that the portion 15 is only half the width of the rest of the strip 1 and extends from the inner edge thereof.

Figures 2 and 3 show the vertebra arrangement in use. In these figures are shown fragments of a blade harness comprising a subsidiary yoke or lever 21 whose free end 23 terminates in a claw 25. The blade rubber carried by the blade harness is shown at 27. As can be seen, the two strips 1 and 3 are located in longitudinal grooves 29 in the blade rubber 27. They are retained in the harness by the fact that the claw 25 of the subsidiary yoke or lever 21 is captivated in the slot 7. The strip 1 is retained in the rubber 27 by the portion 15 extending through an aperture or hole 31 in the blade rubber. This aperture 31 may be preformed or may be produced simply by forcing the portion 15 through the material of the blade rubber 27.

In greater detail, strip 1 is securely located and retained longitudinally in the groove 29 of the blade rubber 27 by virtue of the penetration of the blade rubber 27 by the portion 15 of the strip 1 and transversely by the claws 25 of the blade harness. Because of the captivation of the claw 25 in the slot 7, the strip 1 is also prevented from longitudinal movement with respect to the harness. The remaining claws (not
shown) of the harness are not captivated, allowing the rest of the blade rubber sufficient longitudinal play to be able to follow the curve of a windscreen to which it is applied. The second strip 3 is located in the rubber through the claw 25 which is coupled to the positively located first strip 1.

Figure 4 shows a variation of the vertebra arrangement shown in figure 1 in that the portion 15 is pointed at 33. This pointing of the portion 15 assists the penetration of the material of the blade rubber 27, particularly if its aperture 31 is not preformed.

Figure 5 shows a version of the vertebra arrangement in which the portion 15 is not provided at the same end of the strip 1 as the slots 7 but serves the same purpose. It may well be that this version is more easily fabricated accurately.

Figure 6 shows a vertebra arrangement similar to that shown in figure 1 except that the portion 15 of the strip 1 extends from its outside edge instead of its inside edge. This could reduce the risk of cracking of the material of the strip 1 when bending or forming it.

Figure 7 shows how the portion 15 of the strip 1 can be formed with a twist as well as a bend to provide a larger surface area in the longitudinal direction of the blade rubber 27. To provide a maximum surface, the portion 15 is not of reduced width compared to the remainder of the strip 1 except in the area of the bend 11.

It will be appreciated that various modifications may be made to the above described embodiments without departing from the scope of the invention. For example,
portions 15 could be provided on both strips 1 and 3, one strip having the portion 15 at one end and the other strip having a portion 15 at the other end. If desired, with this construction, the slot 7 could in both cases be positioned near to the portion 15 so that each strip would captivate a different claw and there would be no direct connection between the strips. Both strips could then be identical, doing away with the necessity of fabricating two different strips and, since the portions 15 can extend around the end of the rubber instead of through it, the need to pierce a hole in the rubber.

From the foregoing, it will be seen that the invention provides a vertebra arrangement which, in its described embodiments enables an extruded blade rubber to be secured to a blade harness without the use of additional parts or the need to close in the claws after assembly.
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A vertebra arrangement for a windscreen wiper blade rubber comprising a pair of flat strips for location in longitudinal grooves in the longitudinal sides of the blade rubber, each strip being provided with an open slot facing sideways of the strip and extending outside the line of the strip at a position to captivate a claw on the blade harness when the strip is located in the blade rubber and at least one strip being bent or formed round at one end to the side of the strip away from the claw captivating slot so as, in use, to penetrate the material of the blade rubber.

2. A windscreen wiper blade arrangement comprising a harness including a main yoke or lever, pivotal means for attaching the main yoke or lever to a windscreen wiper arm, at least one secondary yoke or lever pivotally connected in the middle region thereof to one end of the main yoke or lever, the free ends of the yokes or levers being provided with claws, a blade rubber carried by the claws of the yokes or levers and a vertebra in the form of two flat strips located in longitudinal grooves in the blade rubber, wherein each strip is provided with an open slot facing sideways of the strip and extending outside the line of the strip at a position to captivate a claw of the yokes or levers and at least one strip being bent or formed round at one end to the side of the strip away from the claw captivating slot so as to penetrate the material of the blade rubber.

3. An arrangement as claimed in claim 1 or 2, wherein only one of the strips is provided with the bent or formed end.
4. An arrangement as claimed in claim 3, wherein the strip with the bent or formed end is longer than the other strip.

5. An arrangement as claimed in any preceding claim, wherein the rubber is preformed with a hole to receive the bent or formed end of the strip.

6. An arrangement as claimed in any preceding claim, wherein the bent or formed end of the strip is pointed to assist in penetration of the material of the rubber.

7. An arrangement as claimed in any preceding claim, wherein the claw captivating slots are formed towards one end of the strips so as to captivate the end claw of the blade harness.

8. An arrangement as claimed in claim 7, wherein the bent or formed end of the strip is provided at the end adjacent to the claw captivating slot.

9. An arrangement as claimed in claim 7, wherein the bent or formed end of the strip is provided at the end away from the claw captivating slot.

10. An arrangement as claimed in any preceding claim, wherein both strips are provided with bent or formed ends.

11. An arrangement as claimed in claim 10, wherein the bent or formed ends of the strips are arranged at opposite ends of the respective strips.

12. A vertebra arrangement for a windscreen wiper blade rubber substantially as described herein with reference to the drawings.
13. A windscreen wiper blade arrangement substantially as described herein with reference to the drawings.

DATED THIS 25th day of January, 1990

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