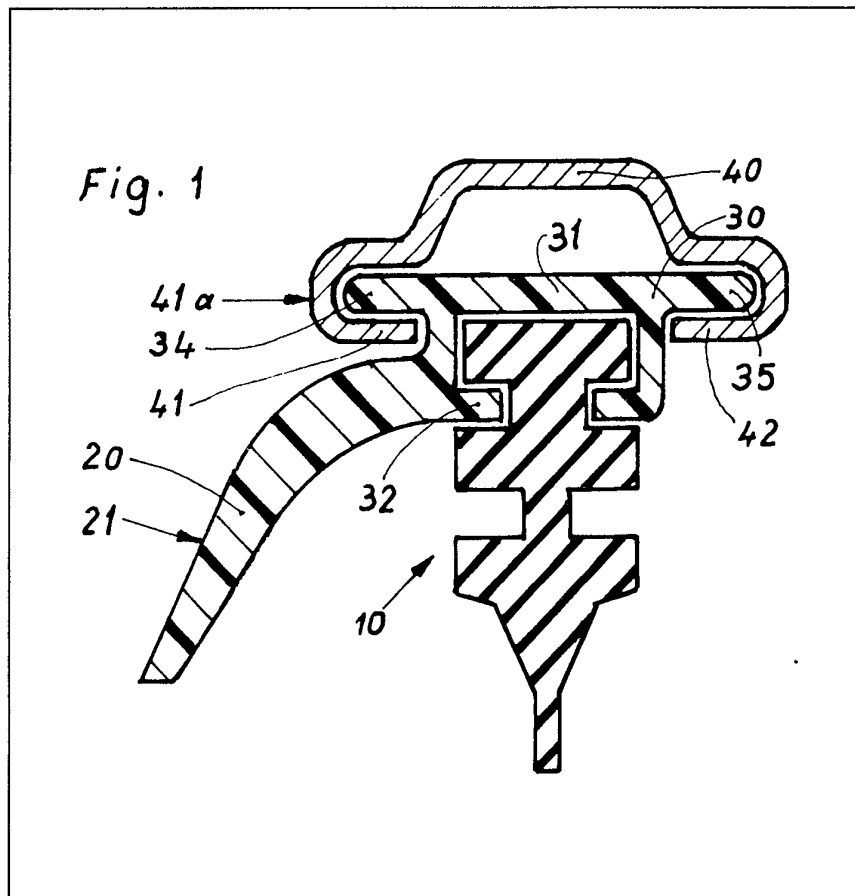


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(54) Wiper blade assembly comprising spoiler

(57) A windscreen wiper blade assembly comprises at least one yoke element 40 for holding a wiper element 10 of rubber-elastic material, which is flexibly stiffened by means of a flexible strip 30 provided with at least one spoiler 20 which is either formed thereon or attached thereto.



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Fig. 1

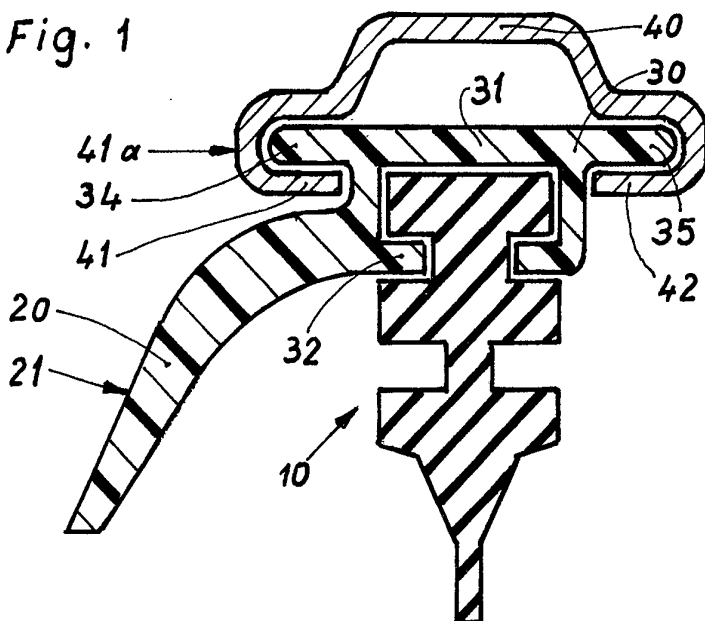


Fig. 2

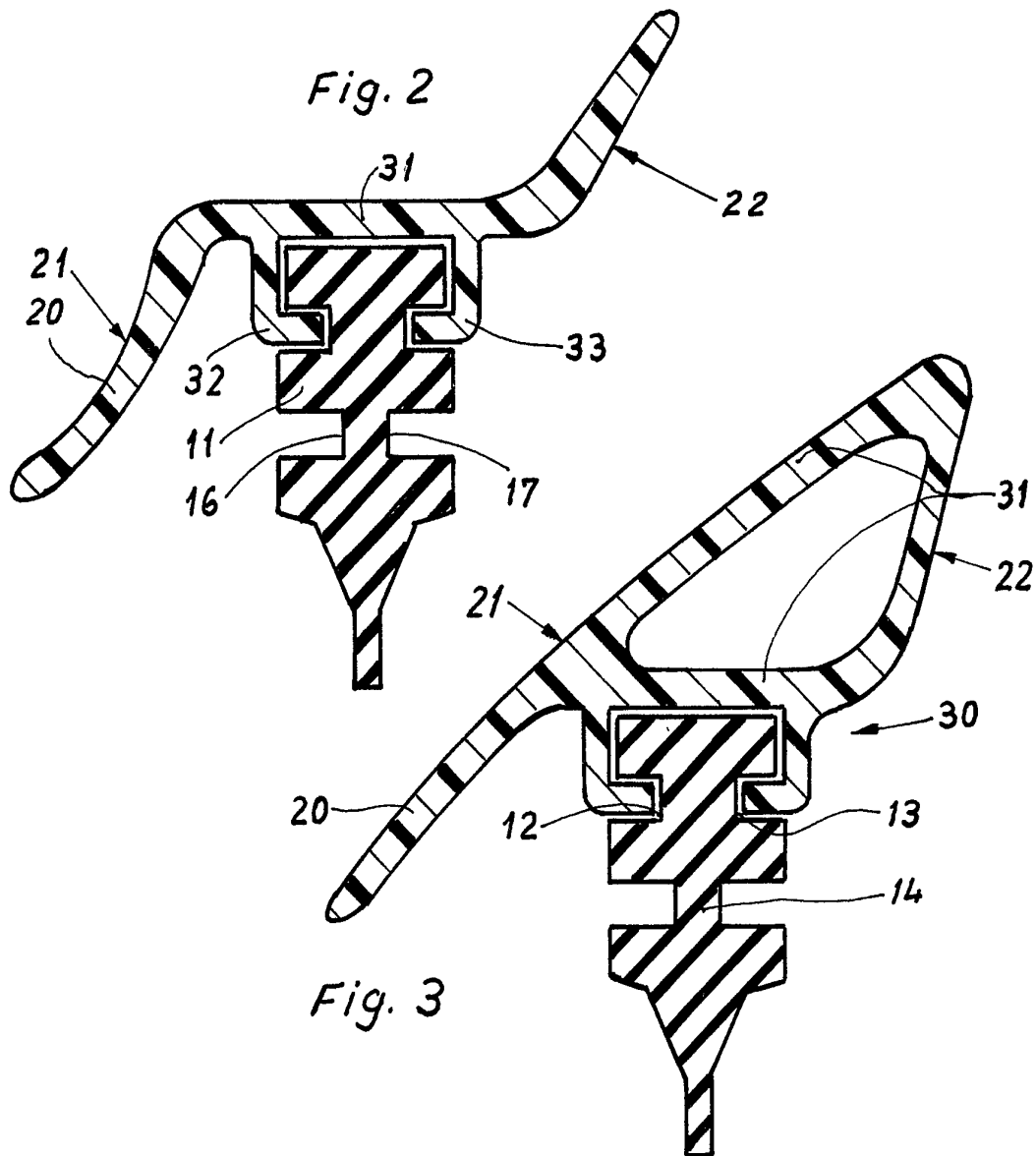


Fig. 3

Fig. 4

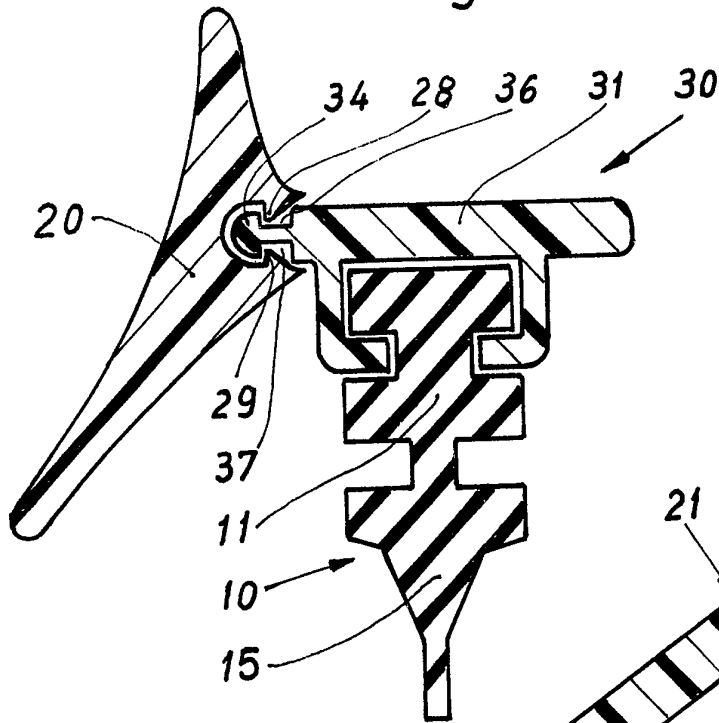


Fig. 6

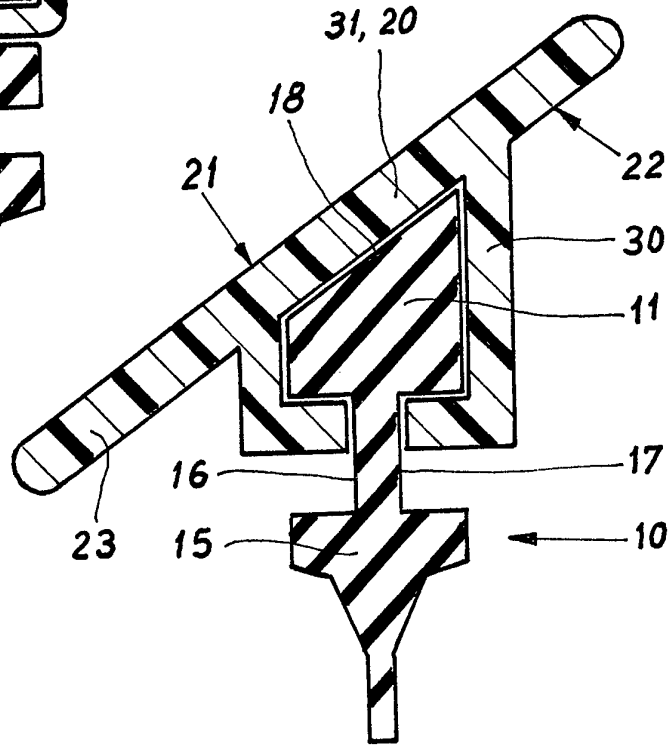
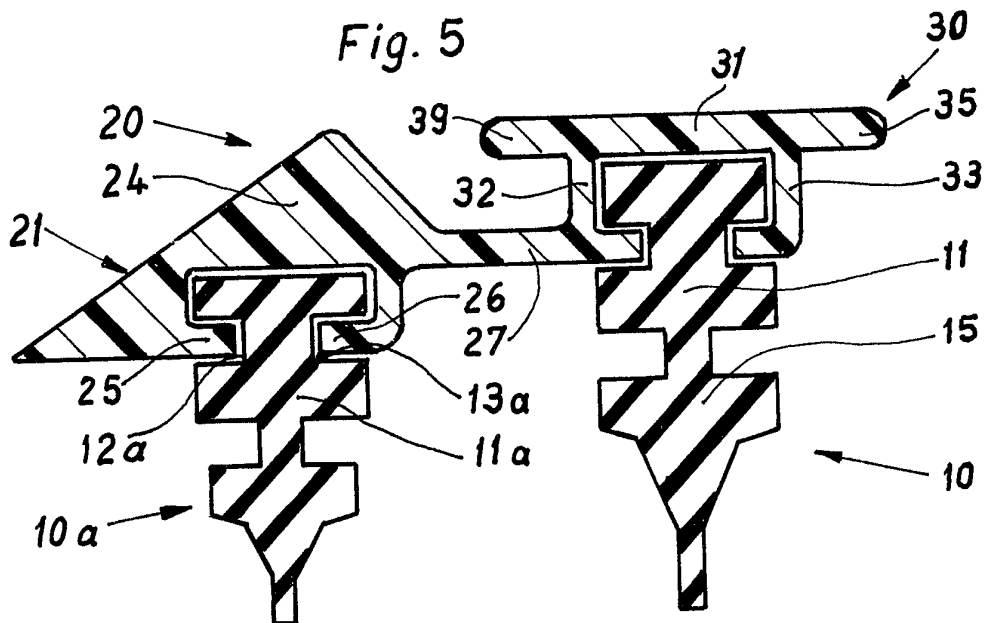


Fig. 5



## SPECIFICATION

**Windscreen wiper installation**

5 This invention concerns a wiper blade for wind-  
screen cleaning installations on vehicles, especially  
on motor vehicles.

As is known the air stream striking the wiper blade  
laterally produces a lifting force at the supporting  
10 structure and at the wiper element which is effective  
in a direction away from the pane to be cleaned.  
Thus the contact pressure of the wiper element on  
the pane is diminished, so that the wiping pattern  
deteriorates and the wiper blade may be lifted at  
15 high vehicle speeds. This is not admissible on  
grounds of security.

Many efforts to solve this problem have become  
known, although no entirely satisfactory solutions  
have been found. The practice shows that spoilers  
20 closely arranged to the windscreen are most effective  
against the attacking air stream. Such an  
arrangement is for example known from the German  
specification OS 2346100. However the embodi-  
ments known from this specification include dis-  
25 advantages. Thus the spoilers to be attached to the  
yoke or to be inserted in it can only be secured  
thereon in a relatively complicated way and,  
moreover, the connecting points are subject to  
considerable wear and do not look very nice. The  
30 other embodiment known from this specification  
including a spoiler formed out of the wiper element  
might not be stable enough to act against the air  
stream in all cases, because of the rubber-elastic  
materials normally used for the production of wiper  
35 elements. Moreover, as far as technology is con-  
cerned, the production of such a wiper element  
might be very difficult and therefore expensive.

It is an object of the invention to create a wiper  
blade whose spoiler can be connected with the wiper  
40 element in a simple way and at any time ensures a  
reliable contact between the wiper element and the  
windscreen.

According to the invention there is provided a  
wiper blade for windscreen cleaning installations on  
45 vehicles, especially on motor vehicles, comprising a  
supporting structure including at least one yoke  
element for holding a wiper element of rubber-  
elastic material, which wiper element is flexibly  
stiffened by a flexible strip extending over almost its  
50 entire length, whereby the wiper element is provided  
with at least one spoiler, and wherein the spoiler is  
formed on or attached on the flexible strip.

With such a spoiler arranged the lifting force  
created by the air stream is on the one hand  
55 deflected from the wiper blade and on the other  
hand transmitted to the wiper element via the  
flexible strip as a contact force. Because also the  
contact pressure created by the wiper arm is trans-  
mitted to the wiper element via the supporting  
60 structure, it is hardly possible any more lift the wiper  
element from the pane unintendedly.

When the spoiler and the flexible strip are  
provided, relative parts are simple and economical

simultaneously serves to stiffen the wiper blade  
flexibly and is used as a spoiler.

It is easily possible to retrofit a wiper blade by  
squeezing a spoiler against its flexible strip or  
70 clipping it on this flexible strip.

If the flexible strip with its back laps over the head  
of the wiper element and engages thereon by means  
of downwardly directed elongations, it is possible to  
form the back of the flexible strip itself as a spoiler  
75 and/or form a spoiler on it or attach it onto it. In this  
case the flexible strip in addition serves to streng-  
then the head of the wiper element.

The spoiler can be forced onto one of the down-  
wardly directed elongations of the flexible strip. The  
80 elongations can either uninterruptedly extend over  
the entire length of the flexible strip or can be  
formed as individual claws. On grounds of stability  
the first solution is to be preferred.

If at least one projection extending along its back  
85 is formed on the flexible strip, the spoiler can be  
attached to this projection.

It is particularly advantageous, when projections  
are formed on the flexible strip to both sides, which  
projections extend over the entire length of the back  
90 of the flexible strip. On the one hand then spoilers  
can be provided on both sides of the wiper element,  
and on the other hand the wiper element can be  
secured to the supporting structure by means of  
these projections. If desired the projections can be  
95 provided with locking points which serve as stops  
for the supporting structure.

When the spoiler extends over the entire length of  
the wiper element, this results in a uniform contact  
pressure between wiper blade and pane when the  
100 laterally striking air stream is well used.

As far as supporting structures are concerned  
which consist of an interlocking yoke system with  
several clawed yokes carrying the wiper element and  
one main yoke articulated to the clawed yokes, the  
105 contact pressure transmitted to the wiper element  
transmitted from the wiper arm via such a support-  
ing structure is not the same in all places. As is  
known the pressure between the working points of  
the clawed yokes is slightly lower than at the  
110 working points of the clawed yokes on the wiper  
element. It can therefore be reasonable to arrange  
spoilers in these places of the wiper element.

When the spoiler is formed on one of the down-  
wardly directed elongations of the flexible strip and  
115 the wiper element is secured to the supporting  
structure via the lateral projections of the back of the  
flexible strip it is reasonable to curve in upward  
direction the area below the lateral projection of the  
spoiler and to make the spoiler surface plane. Then  
120 the supporting structure can be positioned in one  
plane with the spoiler surface on the side exposed to  
the wind, so that the air stream can especially well  
be carried away from the wiper blade. Due to the  
curvature of the spoiler directed towards the back of  
125 the flexible strip the spacing between the supporting  
structure and the spoiler is so small, so that a  
swirling of the air in the gap between supporting  
structure and spoiler is prevented to a far-reaching

which is equipped with a second wiper element arranged in parallel to a first wiper element. By this measure the first wiper element can be completely protected against the air stream appearing.

- 5 It is of a particular advantage, when the second wiper element is lower than the first wiper element. In this case the second wiper element can be connected with the first wiper element through a spoiler, which is formed in one piece on the flexible strip of the first wiper element and laps over the head of the second wiper element. In this case the flexible strip could be designated as a double or twin flexible strip, because it is connected with two wiper elements.
- 10 However it would be also conceivable to secure such a spoiler to the flexible strip of the first wiper element by means of holding clips or similar fastening means and is formed in one piece only with the second wiper element.
- 15 If the spoiler includes moreover a surface ascending relative to the pane to be wiped, which surface is arranged above the head of the second wiper element, it is prevented to a far-reaching extent that the wiper blade can be lifted unintendedly by the air stream, not even at high vehicle speed.

The drawings show diagrammatic sections not true to scale of embodiments according to the invention, in which

- Figure 1* is a wiper element including a spoiler which is formed on a flexible strip,
- Figure 2* is a wiper element whose spoiler is formed on both sides of a flexible strip,
- Figure 3* is a wiper element including a flexible strip whose back is formed as a spoiler,
- Figure 4* is a wiper element whose spoiler is clipped onto a flexible strip,
- Figure 5* is a wiper element including a double or twin flexible strip and
- Figure 6* is a further wiper element including a flexible strip, whose back is formed as a spoiler.

- All rubber wiper elements 10 shown in Figures 1 to 5 include a head 11 having a rectangular cross-section which head is equipped with a longitudinal groove 12, 13 each at approximately half of its height. To the head 11 follows a tilting web 14, through which a wiper lip 15 is connected with the head 11. It is provided that, during a wiper operation, the wiper element 10 touches a pane to be cleaned with the downwardly directed tip of the wiper lip 15.
- 50 The recesses 16, 17 which are necessary for the tilting web 14 and the longitudinal grooves 12, 13 have a rectangular cross-section. On the whole it can be seen from Figures 1 to 5 that the wiper element is developed in a manner known in itself, so that further explanations are not necessary.

- To maintain contact pressure in use the wiper elements are equipped with a spoiler 20, which is formed on or attached to a flexible strip 30. Thereby each flexible strip 30 shown in Figures 1 to 6 consists of a moulded plastics part which with its back 31 laps over the head 11 of a rubber wiper element 10. On both sides of the back 31 of the flexible strip 30 an elongation 22, 23 is formed, which is downwardly

- 13 respectively which is arranged in the head 11 of the wiper element 10. It is provided that the flexible strip and the elongations extend over the entire length of the rubber wiper element on grounds of stability.

- The spoiler 20 shown in Figures 1 to 3 and in Figures 5 to 6 forms an integral part with the flexible strip 30 so that the flexible strip 30 simultaneously strengthens the wiper element 10 and prevents that it is lifted from the pane.

- The spoiler 20 shown in Figures 1 includes a surface 21 which ascends relative to a pane to be cleaned not shown in the drawing, which surface is formed on the downwardly directed elongation 32 of the flexible strip 30. The back 31 of the flexible strip 30 is laterally elongated beyond the head 11 of the wiper element 10 and forms two projections 34, 35, on which the wiper element 10 may be secured to a supporting structure of which a yoke element is shown here, which embraces the projections 34, 35 by means of its claw-shaped ends 41, 42.

- The spoiler 20 is thereby substantially formed as a shovel, which below the lateral projection 34 is curved in upward direction towards this projection 34. The plane part of the shovel forms the actual wind deflector surface 21, which extends approximately as far as to half of the height of the wiper lip 15. The surface 21 is approximately positioned in a plane with the outer surface 41a of the claw 41, which during the wiper operation is exposed to the air stream, so that the laterally flowing air stream can be well deflected via the surface 21 and the supporting structure.

- The wiper element 10 shown in Figure 2 has a spoiler 20 which extends on both sides of its head 11. Thereby the spoiler 20 includes a surface 21 formed on the back 31 of the flexible strip and slightly curved forwards in the direction of the wiper element 10, which surface is to be exposed to the laterally flowing air stream. This air stream exerts a pressure on the spoiler 20 and thus on the flexible strip 30, which transmits the pressure to the wiper element 10 and thus prevents that it is lifted from the pane to be cleaned. As is known part of the air streams beyond the head 11 of the wiper element 10 towards the pane and is swirled there, which could also result in an undesired lifting. In the wiper element 10 shown here this is cured by an upwardly directed wind deflector surface 22 which, in the mounted condition of the wiper blade, points away from the pane. By this measure an air stream appearing behind the wiper element 10 can be deflected.

- However it would also be conceivable to direct the elongation 22 in the downward direction perpendicularly or at an acute angle and to conduct it as far as possible down the pane, so that the air stream appearing behind the wiper blade is carried away from the wiper element 10.

- A similar wiper element to that of Figure 2 is shown in Figure 3. Here in addition the back 31 of the flexible strip 30 is developed as a spoiler 20, so that an especially large wind deflector surface 21 is

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