

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2003/0014828 A1**

Edner-Walter et al.

(43) **Pub. Date: Jan. 23, 2003**

(54) **WIPER BLADE FOR CLEANING MOTOR VEHICLE WINDOWS**

Publication Classification

(76) Inventors: **Bruno Edner-Walter**, Heilbronn (DE);
Oliver Lenzen, Sachsenheim (DE);
Michael Grandel, Bietigheim-Bissingen (DE); **Oliver Blumenstock**, Untergruppenbach (DE)

(51) **Int. Cl.⁷** **B60S 1/38**; B60S 1/04
(52) **U.S. Cl.** **15/250.201**; 15/250.43; 15/250.361

(57) **ABSTRACT**

The invention relates to a wiper blade for a wiper system for wiping motor vehicle windows. The inventive wiper blade comprises a wiper blade rubber squeegee, which has a wiping lip that faces the window, a rear part that faces away from the window, and a tilting connecting element that joins the wiping lip to the rear part. The wiper blade also comprises a strip-like elastic supporting element, or at least one spring rail, which stabilizes the wiper blade rubber squeegee. Said supporting element can be joined to a wiper arm which can be transversally driven with regard to the longitudinal extension of the wiper blade and which can be tensioned against the window. The wiper blade is additionally provided with a casing or covering which surrounds, at least in sections, the rear part and the supporting element or the at least one spring rail. The invention is characterized in that the casing is provided with a streamlined form, surrounds the rear part, and when viewed in a direction parallel to the window and of the longitudinal extension of the wiper blade, covers the tilting connecting element or in that the covering is held on the at least one spring rail.

Correspondence Address:

Andrew R Basile
Young & Basile
Suite 624
3001 West Big Beaver Road
Troy, MI 48084 (US)

(21) Appl. No.: **10/203,997**

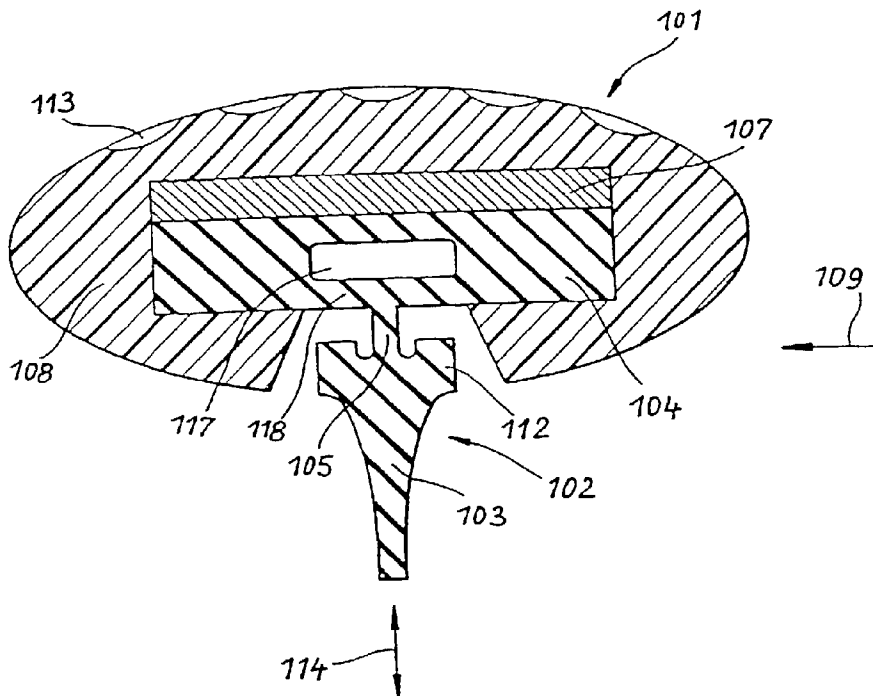
(22) PCT Filed: **Feb. 20, 2001**

(86) PCT No.: **PCT/EP01/01888**

(30) **Foreign Application Priority Data**

Feb. 21, 2000 (DE)..... 100 07 809.5

Feb. 21, 2000 (DE)..... 100 07 800.1



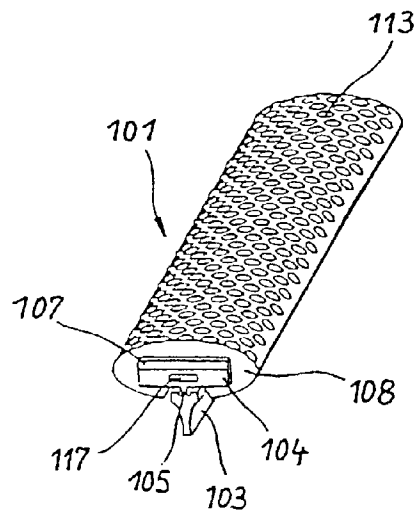
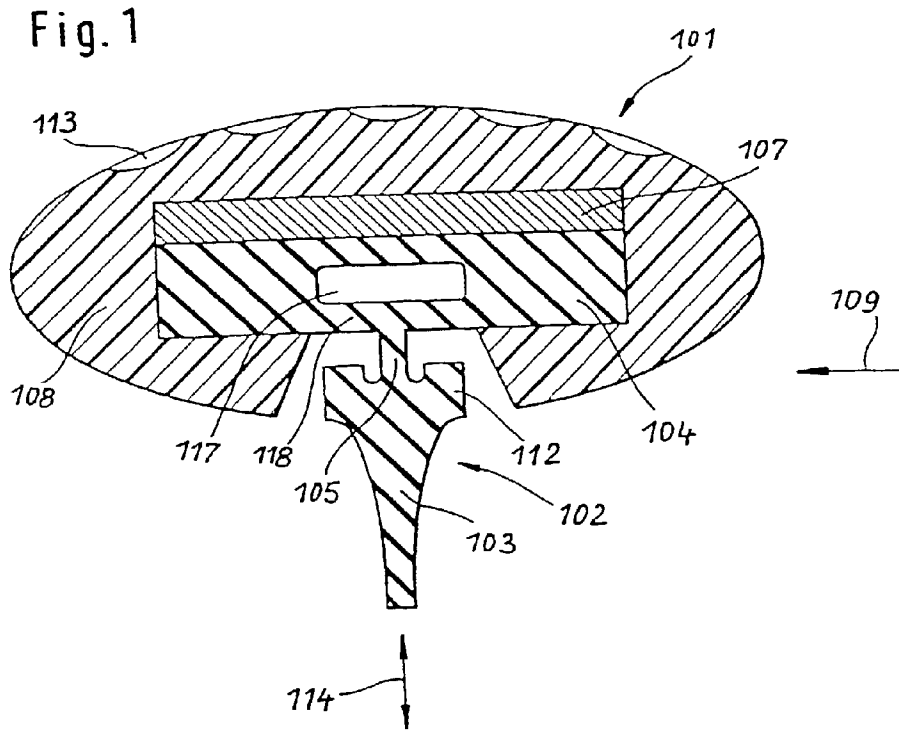


Fig. 2

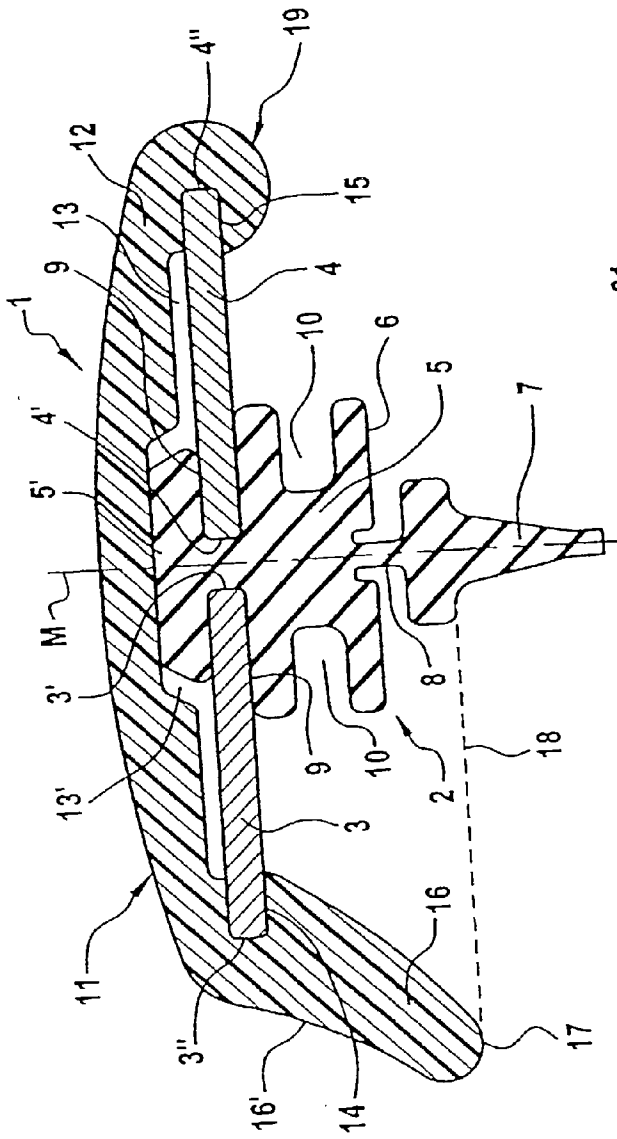


Fig. 3

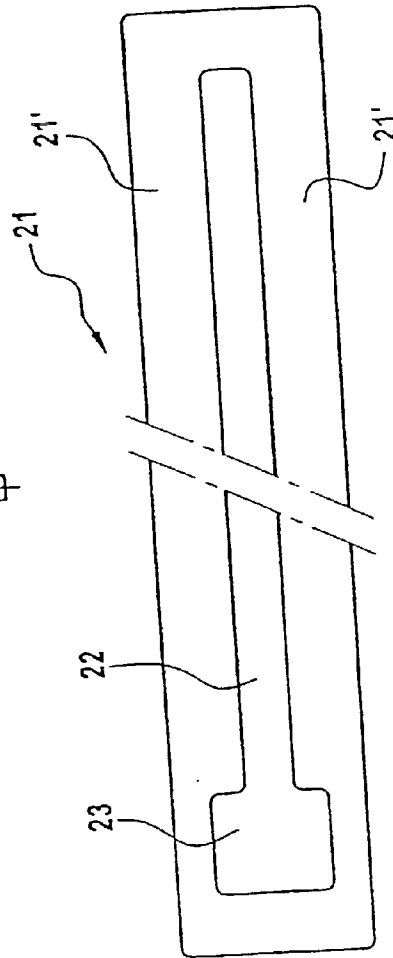
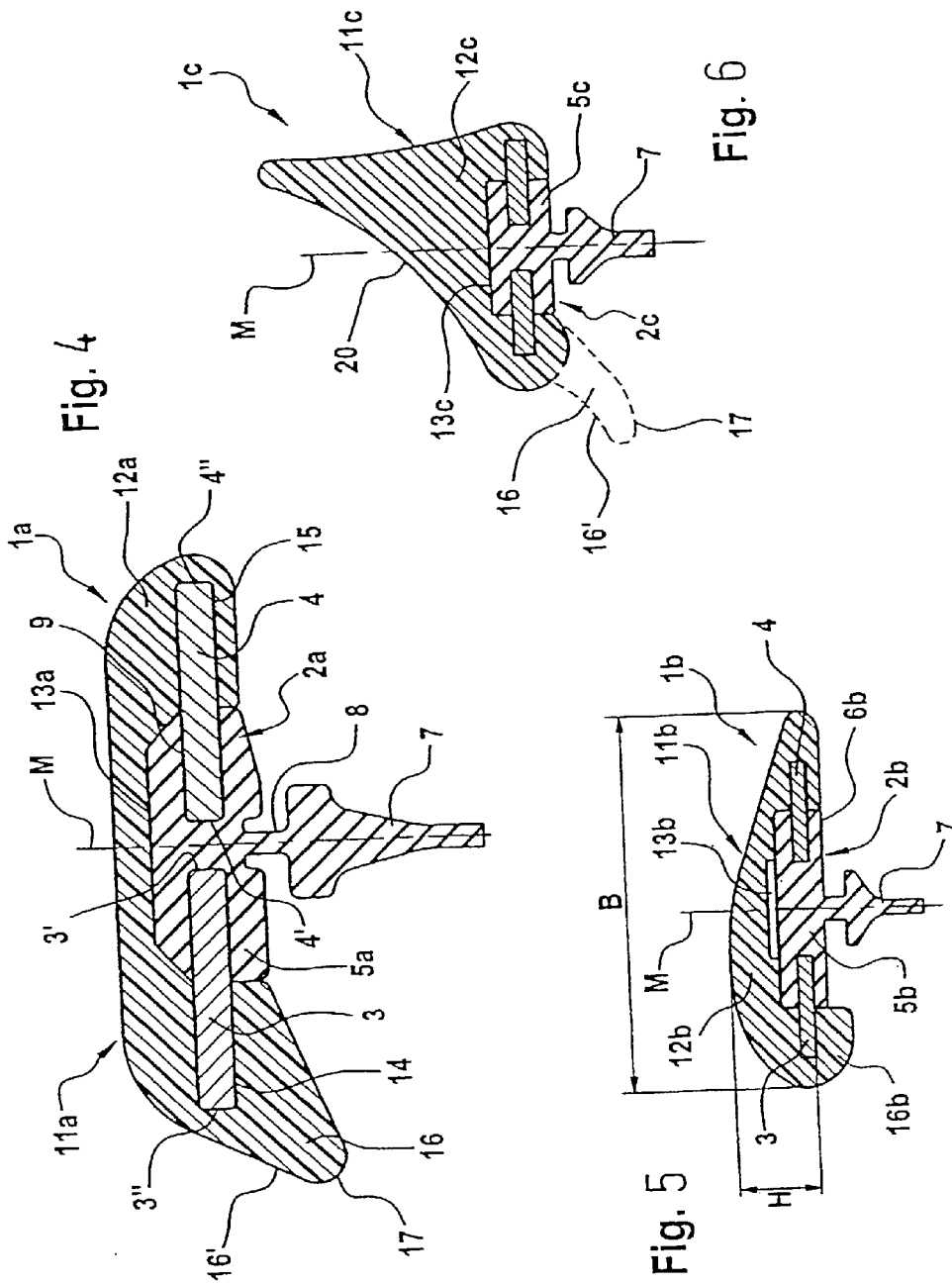


Fig. 7



WIPER BLADE FOR CLEANING MOTOR VEHICLE WINDOWS

[0001] The invention relates to a wiper blade in accordance with the preamble of claim 1 or 17.

[0002] Wiper blades are known from DE 299 03 123 U1 which have a resilient insert with a tube-like elastomer sheath, into which a wiper rubber is inserted. With wiper blades of this type the supporting element is supposed to ensure the most even distribution possible of the contact pressure on the windshield emanating from the wiper arm over the entire area swept by the wiper blade. The supporting element is advantageously pre-curved in a suitable way to achieve the necessary even contact pressure of the wiper blade against the windshield. A supporting element of this type replaces the costly bow design with two splines located in the wiper body, such as is the practice with traditional wiper blades and is known, for example, from DE 15 053 97 A1.

[0003] The generic, known wiper blades do, however, have the disadvantage that their construction is costly. In addition to the supporting element, a wiper blade of this type furnishes transverse bars disposed perpendicularly to the supporting element, recesses located in the supporting element and locating grooves in the wiper rubber to receive the casing which surrounds the supporting element at least in sections. Such a construction results in an overall height which cannot be ignored and is accompanied by great disadvantages during operation. For example, the side of the wiper blade facing the air stream offers a fairly large target for the air stream striking the wiper blade. Furthermore, a substantial vacuum builds up on the back side of the wiper blade facing away from the air stream. It is true that the wiper blade constantly changes its position with respect to the oncoming air stream, generally carrying out a oscillating motion during operation, but even then one longitudinal side of the wiper blade is always facing the air stream more or less directly. Because of the air stream affecting the wiper blade, the wiper blade's contact pressure is reduced to such an extent that the wiper blade tends to lift off and flutter, rendering proper wiper performance impossible. Increasing the wiper blade's contact pressure against the glass can mitigate this problem at high speeds, but at low speeds, when the attempt of the wiper blade to lift is reduced, friction between the wiper blade and the glass is increased, resulting in undesirable noise and unacceptably high loading of the drive components and of the wiper rubber.

[0004] Wiper blades are known from DE 197 36 369 A1 of a type which essentially consist of a wiper body and at least one spline connected to this wiper body. These wiper blades, often described as "flat wiper blades", have the disadvantage that the protruding splines generate extremely irritating noises, caused particularly by the air stream, and also represent a hazardous source of injuries.

[0005] The object of the invention is to demonstrate a wiper blade which, while retaining the basic advantages of a known wiper blade, has improved properties.

[0006] This object is achieved under the invention in the case of a wiper blade having the properties of the preamble of claim 1, by giving an aerodynamic shape to the casing which completely surrounds the supporting element and the back part in the longitudinal extension of the wiper blade

and covers the hinge when viewed parallel to the glass along the longitudinal extension of the wiper blade.

[0007] A wiper blade of this type has the specific advantage that it can be designed to be extremely shallow and creates only a very small target for the air stream. Since the supporting element, the back part and in particular the hinge are covered by the casing, a very small target is offered to the oncoming flow of air impinging on the wiper blade approximately parallel to the glass.

[0008] A further advantage of the invention is that because of the simple construction of the wiper blade under the invention, the wiper blade has a very low overall weight and is easily to assemble.

[0009] In one advantageous embodiment of the invention the casing also covers the part of the wiper lip facing away from the glass. The wiper blade can thereby be made even shallower and even more favorable wiper blade air flow characteristics can be achieved for the wiper blade.

[0010] In one embodiment of the invention advantageous provision can be made for the casing to have a largely elliptical cross section. Just such an elliptic cross section demonstrates relative low aerodynamic drag. Additionally, the wiper body under the invention can be designed to be very shallow by means of an elliptical cross section.

[0011] In an especially preferred embodiment of the invention the casing has a surface texture at least in sections to reduce aerodynamic drag. This too helps to achieve even better wiping characteristics for the wiper blade under the invention.

[0012] It is specifically conceivable that the surface texturing has spherical segment-shaped dimples. Just such dimples result in a favorable turbulent boundary layer on the surface of the casing based on the golf ball effect and additionally reduce the drag of the wiper blade against which the air stream is flowing. Furthermore, positive visual effects can be achieved with a surface textured in this way, appealing particularly to the person viewing the wiper blade.

[0013] In another embodiment of the invention, the casing has a turbulence generator on the windward side. Such a turbulence generator is furnished to create a turbulent boundary layer which has positive effects on the wiping characteristics of the wiper blade from the invention.

[0014] In a further embodiment of the invention, the wiper body with the hinge is disposed flexibly in a direction running orthogonally to the glass. As a result of such an arrangement the wiper blade's contact pressure is distributed evenly over the wiper blade and the wiping characteristics of the wiper blade are improved.

[0015] In another further improvement of the invention the back part for the flexible arrangement of the wiper lip has a membrane area. A membrane area positioned in this way suggests itself because the back part is positioned immediately above the wiper lip and the hinge.

[0016] What can additionally be achieved by the presence of the membrane area in the area between the hinge and the side of the back part facing away from the hinge is that the flexible motion of the wiper lip introduced via the hinge can be positively influenced.

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