PATENT SPECIFICATION (11) 1597004

1597004

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(54) A WASHER UNIT FOR VEHICLE LAMP COVER PLATES

(71) We, ROBERT BOSCH G.m.b.H., a German company, of Postfach 50, 7 Stuttgart 1, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention concerns a washer unit for cleaning vehicle lamp cover plates.

A washer unit is already known having washer nozzles, for directing a stream of fluid at vehicle lamp cover plates to be cleaned, in each of whose nozzle bodies washing fluid flows through washing fluid ducts present in a vortex body disposed in the nozzle duct. The washing fluid ducts in the vortex body are regularly distributed so that from the washer nozzle there emerges a spray stream over whose cross-section the drops of fluid are equally distributed. Such a spray stream seems, in fact, to be well suited for even cleaning of the plate but actual practice shows that this is not the case when the plates are markedly convex, lie at very oblique angles and/or the distance between the nozzle and the plate exceeds a certain value. Taking into account the spatial position of the plate relative to the direction of travel, as well as the convexity of the plate, and the special flow conditions in the region of the plate. the plate, in fact, does not become dirty evenly, so that it is unevenly cleaned by this known washer unit, which means that the washer unit must still be actuated even after certain parts of the plate are already clean. Furthermore the stream of fluid may also be deflected if it has to travel too great a distance.

Accordingly the present invention provides a washer unit for a vehicle lamp cover plate, the unit having at least one spray nozzle and delivery means for supplying washing fluid to the spray nozzle via a supply line, which nozzle has a nozzle body penetrated by a nozzle passageway in communication with the fluid supply line and leading to a spray outlet in the nozzle body, a vortex body being disposed in the nozzle passageway and having a least two ducts which are arranged to receive washing fluid from the supply line and which extend obliquely to the axis of the nozzle passageway and have outlet openings on an end face of the vortex body remote from the supply line, the vortex body having a further washing fluid duct lying along the axis of the nozzle passageway, the outlet openings of the obliquely extending ducts being spaced apart from one another and non-uniformly distributed on the end face, whereby the spray emerging from the spray outlet has a fluid distribution which is non-uniform in a transverse cross-section.

An advantage of this unit is that the non-uniform distribution of the fluid in the spray stream may be adapted to requirements, whereby an even cleaning of the lamp cover plate can be achieved even when it is not evenly dirty. Furthermore a partial contraction of the stream may be produced to enable better directional stability to be achieved so that even those areas of the lamp cover plate which are far from the nozzle may be effectively washed. Moreover such a washer unit may be operated in an economical manner as unrequired washing fluid need no longer be directed at areas of the lamp cover plate which are already clean, and with a limited supply of washing fluid this can be of considerable importance.

The invention is described further, by way of example, with reference to the accompanying drawings in which:—

Fig. 1 shows a basic representation of the washer unit in accordance with the invention,

Fig. 2 is a longitudinal section through the nozzle body of a spray nozzle, belonging to the washer unit, wherein a vortex body is inserted in the nozzle body,

Fig. 3 is a plan view of the vortex body according to Fig. 2, seen in the direction of the arrow III, and

Fig. 4 is a plan view of a differently embodied vortex body.

A washer unit 10 for cover plates 11 of vehicle lamps 12, shown in Fig. 1, has a reserve container 13 for the washing fluid and a delivery device, constructed as a lift and delivery pump 14, which is connected to the reserve container 13 by way of a suction line 15. The pump 14 is provided on the pressure side with a pressure line 16 which is divided into branch lines 17 and 18, to each of which a washer nozzle 19 and 20 is connected. The openings of the washer nozzles 19 and 20 are each directed onto the cover plate 11 of the vehicle lamps 12.

Each of the washer nozzles 19 and 20 has a nozzle body 25 (Fig. 2), which is pierced by a nozzle passageway 26 in a longitudinal direction. The branch lines 17 and 18 of the washer unit 10 are connected to the nozzle passageways 26. Each nozzle passageway 26 has, in the vicinity of the nozzle outlet 27, a constriction 28, which widens out into the nozzle outlet 27. A vortex body 30 is disposed in the nozzle passageway in the direction of flow (arrow 29) of the washing fluid in advance of the constriction 28, being located in the nozzle passageway 26 in a manner similar to that of a plug. The vortex body 30 has three spiral grooves 32 (Fig. 3) in its outer surface 31 which form ducts, in conjunction with the surrounding wall of body 25, for the washing fluid. The ducts 32 in the present embodiment run in a screw-like or helical manner, so that a vortex flow is imparted to the streams of washing fluid before they combine and emerge from the nozzle outlet 27 through the constriction 28. As a modification of the embodiment shown, the ducts 32 may also traverse the vortex body 30 in a straight line and thus not in a screw-like manner, but they must extend obliquely with reference to the axis of the nozzle passageway. It is thereby completely immaterial whether or not all ducts 32 have the same angle of skew in relation to the axis of the nozzle passageway 26. For instance it is possible to have a plurality of ducts within the same vortex body, some of which run in a screw-like manner while others extend in a straight line. As can be seen from Fig. 3, the vortex body 30 has the outlet openings 33 of the ducts 32 on its front face 31', remote from the fluid supply branch lines 17 and 18. The openings 33 are unevenly disposed and this causes the stream of fluid 34, emerging from the nozzle outlet 27, to have a fluid distribution which is non-uniform in a transverse cross-section. The ducts 32, which are open at their edge to the surface of the vortex body 30, are disposed in such a manner that their openings 33, measured around the outer region of face 31', are spaced unevenly around a pitch circle about the longitudinal axis of the nozzle passageway 26. As can be further seen from Fig. 3, a further duct 35 is disposed in the centre of the pitch circle on which the openings 33 of the ducts 32 are located, and its axis coincides with the axis of the nozzle passageway 26.

As is shown by Fig. 4, the outlet openings 133 and 134 tof the ducts 32 can alternatively be disposed so as to be grouped together, whereby two openings 133 and 134 are located nearby to each other. In this case it also holds that the openings 133 and 134 of the ducts 32, located on the pitch circle, are spaced at different distances from each adjacent opening, when measured around the pitch circle of the openings. Furthermore, in this embodiment as well, the opening of a further duct 135 is disposed in the centre of the pitch circle on which the openings 133 and 134 are located. As is further shown by Fig. 4, the cross-section of the ducts can thereby be of different sizes.

When the vortex body 30 is built into the nozzle body 25 in the position, shown in Fig. 2, the wall of the nozzle passageway 26 forms the outer limitation of the ducts 32.

WHAT WE CLAIM IS:—

1. A washer unit for a vehicle lamp cover plate, the unit having at least one spray nozzle and delivery means for supplying washing fluid to the spray nozzle via a supply line, which nozzle has a nozzle body penetrated by a nozzle passageway in communication with the fluid supply line and leading to a spray outlet in the nozzle body, a vortex body being disposed in the nozzle passageway and having at least two ducts which are arranged to receive washing fluid from the supply line and which extent obliquely to the axis of the nozzle passageway and have outlet openings on an end face of the vortex body remote from the supply line, the vortex body having a further washing fluid duct lying along the axis of the nozzle passageway, the outlet openings of the obliquely extending ducts being spaced apart from one another and non-uniformly distributed on the end face, whereby the spray emerging from the spray outlet has a fluid distribution which is non-uniform in a transverse cross-section.

2. A washer unit as claimed in claim 1, in which the obliquity of the washing fluid ducts relative to the axis of the nozzle passageway is not the same for each duct.

3. A washer unit as claimed in claim 1 or 2, in which the obliquely-extending washing fluid ducts each open along one side onto the outer surface of the vortex body.

4. A washer unit as claimed in any of claims 1 to 3, in which the ducts have differing cross-sections.

5. A washer unit as claimed in any of claims 1 to 4, in which the vortex body has three obliquely-extending washing fluid ducts of which two have their outlet openings substantially diametrically opposite one another with respect to the axis of the nozzle passageway.

6. A washer unit constructed substantially as herein particularly described with reference to and as illustrated in Figs. 1 to 3 or Figs. 1 to 3 as modified by Fig. 4 of the accompanying drawings.

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1597004 COMPLETE SPECIFICATION
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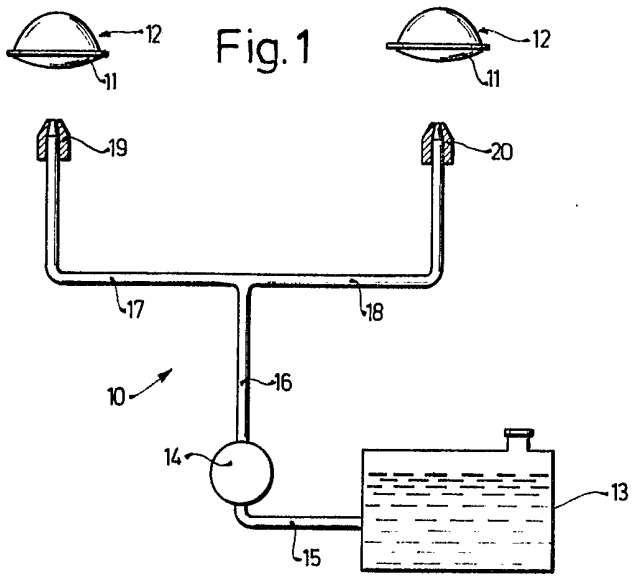


Fig. 1

Fig. 2

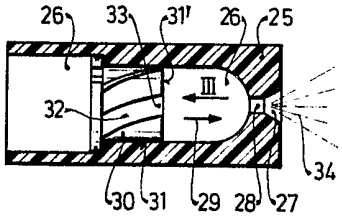


Fig. 3

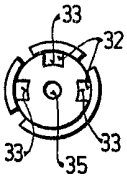
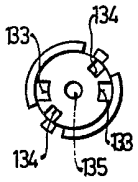


Fig. 4



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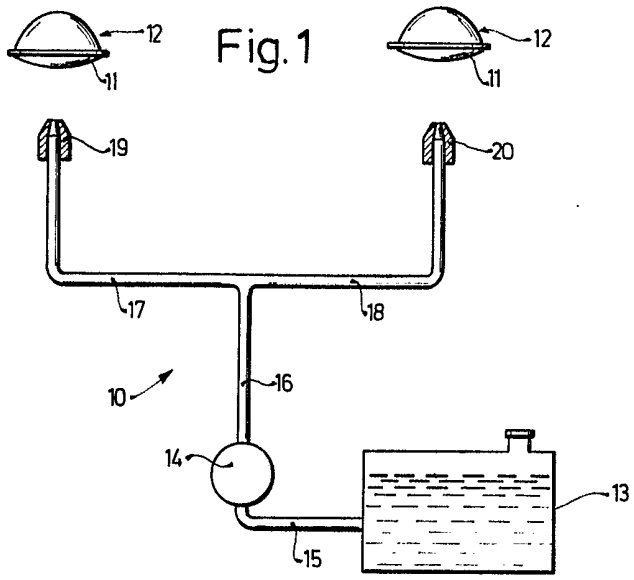

Fig. 1

Fig. 2

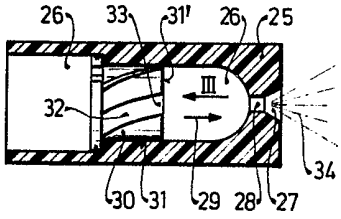

Fig. 3

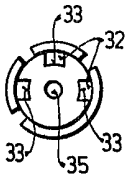

Fig. 4

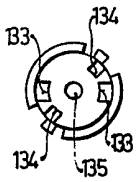

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Fig. 1

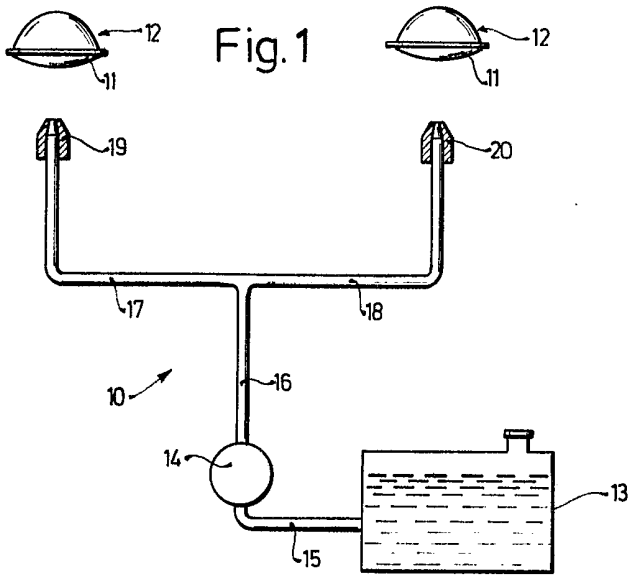

Fig. 2

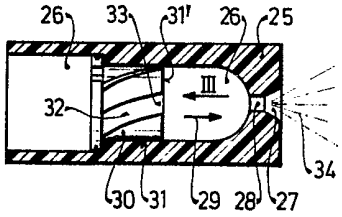

Fig. 3

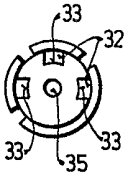

Fig. 4

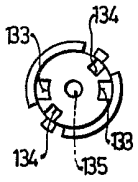

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Fig. 1

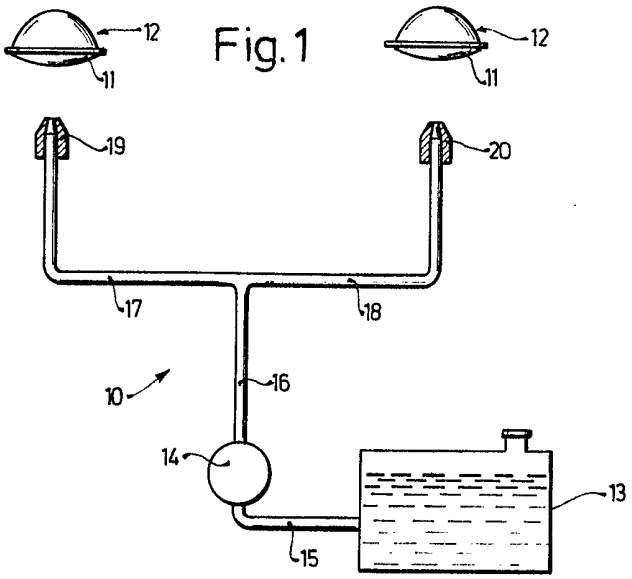

Fig. 2

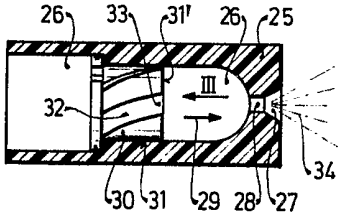

Fig. 3

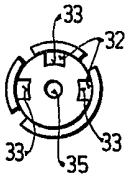

Fig. 4