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(54) ELECTRIC SWITCH COMPRISING LIGHTING DEVICE

(71) We, SWF-SPEZIALFABRIK FUR AUTOZUBEHOR GUSTAV RAU G.m.b.H., a joint stock company organised under the Laws of Germany, of Stuttgarter Strasse-119 712 Bietigheim, Bissingen, 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:

This invention concerns an electric switch comprising a window and a lighting device, especially but not exclusively for automotive vehicles.

A switch is known in which a light transmitting rod is located in the switch housing and is displaceable with respect to a lamp and is coupled with the switch operating member. In the rest position only a highly transparent front surface of the light transmitting rod is lit by the lamp, so that the window is lit only weakly. In the operating position on the other hand a much larger axial portion of the light transmitting rod is lit and in this area is provided with a coloured coating, so that the indicator window is illuminated in an intensive colour. Because of the necessary light transmitting rod this solution is expensive and besides has the disadvantage that also in the rest position, due to reflection in the light transmitting rod and in the areas of the coloured edges the indicating illumination seems to be coloured and thus does not sufficiently differ from the operating illumination.

In a switch of the above-mentioned type it is known to use a two-armed lever serving as a cover, whereby the two arms in turn are brought in front of a light exit in a cap shielding the filament lamp. The one arm of the lever is made of opaque material. In the rest position it is located in front of the light exit at a spacing, so that stray light can reach the indicator window. The other arm of the

lever is formed by a coloured light-transmissive plate, so that in the operating position the indicator window is illuminated intensively and coloured. The light channel of this type is thus covered by the coloured plate or by the opaque lever arm. The manufacture of this cover means of two different plastic materials is very costly and expensive. Because the coloured plate is part of the adjustable cover means, the complete cover has to be kept in stock for switches with different colour effects. In this switch, besides, the light is deviated to an indicator window through additional plastic light transmitting means, whereby the switch becomes considerably more expensive.

The invention aims to simplify the design of a switch and reduce its production costs and to improve the distinguishability of the visual indicating and operating illuminations.

According to the present invention there is provided an electric switch comprising a switch operating member, an indicator window, a lighting device arranged to light the window via a light channel in the switch, the channel including a coloured light-transmissive plate in a first partial region and a light subduing layer in a second optically parallel partial region, and a light shutter movable by the switch operating member to open and close the first partial region so that in the rest position of the switch light at the window appears subdued whereas in the operating position the light at the window is more intense and coloured.

It is possible to produce the shutter including all bearing and guide parts in one piece of light tight, preferably back plastic material. The coloured plate can be separate from this movable shutter, so that into one and the same switch only the appropriate coloured plates have to be inserted in order to achieve different colour effects for

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switches intended for different functions.

The coloured plate is preferably located behind the covered means in the direction of light, so that no light can be transmitted to the other partial region of the light channel by reflection at the sidewalls of the switch housing.

In a preferred embodiment a reflective surface is placed in the light channel picking up the light beams of both partial regions and directing them to an indicator window at the side of the switch operating member, whereby in front of said reflective surface the coloured plate is located, which is apertured in the partial region of the light channel not being covered by the shutter. Thereby additional light transmitting means made of plastic material can be saved, without the function being made worse.

Further simplifications of the design are possible if the reflective surface is formed by the contact plate made of a material which is covered white and the light subduing layer is formed by a web of the contact plate. Thus no additional parts are necessary, when the contact plate is developed accordingly.

Preferably the coloured plate is arranged at an angle to the reflective surface and it is engaged between the edge between the reflective surface and the web neighbored to it on the one hand and on the other hand latches which are one-piece-injection-moulded on the contact plate at a spacing from the reflective surface.

In order that the invention can be clearly understood reference will now be made to the accompanying drawing in which Figures 1 and 2 show a section through a switch in its rest position and in its operating position respectively.

In a switch housing 10 of black plastics material is located a toggle switch built up in conventional manner and comprising a switch operating member 11. At the side of the switch the switch housing 10 has a recess 12 holding an indicator window 13, which is made of white light-transmissive material and can have an imprinted switch symbol. On the back the switch is covered by a contact plate 14 which is made of material which is covered white. The contact plate 14 is engaged with the switch housing by means of locking connections 15. Said contact plate is provided with contacts 16 as well as with a lamp holder 17 for a filament lamp 18, the coiled filament of which is marked 19.

The contact plate 14 has a backwall which is inclined at about 45° with respect to the indicator window, said backwall providing a reflective surface 20. At an angle to said reflective surface a coloured plate 21 is arranged, which has an opening 22 leaving at its sides two small webs which are not to be seen in the transverse sections. A web 23 formed in one piece with the contact plate

14 and being normal to the indicator window 13 is adjacent to the reflective surface 20, said web forming an intensely light-subduing layer. The lamp is covered by a cap 26 formed in one piece with the switch housing 10. Between said web 23 and a portion 24 of the switch housing 10 a light exit 25 is formed, by which the light of the filament lamp 18, can be transmitted to the reflective surface 20.

A slide 30 serves as a cover means for the light exit 25, which is controllable by the switch operating member 11. A spring 32 is guided on a guide pin 31 of the contact plate 14, said spring pressing the slide with a stop pin 33 against an operating rib 34 on the switch operating member 11. In the switching position shown in Figure 1 a laterally projecting wing 35 of the slide 30 covers the light exit 25 light tight. In the operating position according to Figure 2 this wing 35 is, however, located at the side of the portion 24 on the switch housing 10, so that the light exit 25 is opened.

As can be clearly seen from Figure 1 and 2 the light channel is divided into two partial regions A and B. The limits of one partial region B are indicated by two light beams 40 and 41, which, originating from the coiled filament 19, touch the edges of the light exit 25. The limits of the partial region A are indicated by the light beam 40 and light beam 42. The light beams in partial region A, even after reflection at the reflective surface 20, do not run through the coloured part of the plate 21, but through the recess 22. This is shown in Figure 1.

In the rest position according to Figure 1 the light beams can come to the reflective surface 20 only through the web 23, whereby the largest part of the light is absorbed at the web 23. The beams penetrating the web are reflected at the reflective surface 20 and directly or by means of further reflections conducted to the indicator window 13. Thereby the coloured portion of the plate 21 is not reached by the light beams, so that the indicator window 13 is only very weakly illuminated as required.

In the operating position according to Figure 2 this partial region A of the light channel is not altered. Because, however, the light exit 25 is released, the light beams of the partial region B become additionally effective. These light beams are partly reflected at the colour plate 21. Another part of the rays penetrates through said colour plate 21 and after reflection at the reflective surface 20 by means of the coloured plate 21 it is deviated towards the indicator window 13. Thereby a substantially smaller part of light is absorbed, so that the indicator window is illuminated intensively coloured. In the operating position thus the indicator window is illuminated

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jointly by the part of light serving as visual indicating illumination and by the part of light of the operating illumination.

5 The coloured plate 21 could directly be fastened on the reflective surface 20. The embodiment shown in the drawings may, however, be assembled easier. In this embodiment the coloured plate with its web-like studs is engaged at the edge of the recess 22
10 between the corner 50 and latches 51 injection-moulded on the contact plate 14, whereby during the assembly it is slightly bent towards the surface 20.

15 The switch according to the invention distinguishes by especially small technical resources and assembly expenses. Nevertheless the operating illumination is clearly to be distinguished from the indicating illumination, also when the ambient light is very
20 bright.

WHAT WE CLAIM IS:

1. An electric switch comprising a switch operating member, an indicator window, a lighting device arranged to light the
25 window via a light channel in the switch, the channel including a coloured light-transmissive plate in a first partial region and a light subduing layer in a second optically parallel partial region, and a light
30 shutter movable by the switch operating member to open and close the first partial region so that in the rest position of the switch the light at the window appears subdued whereas in the operating position
35 the light at the window is more intense and coloured.

2. Electric switch according to claim 1, wherein the coloured plate is located behind the shutter in the direction of the light.

40 3. Electric switch according to claim 2, comprising in the light channel, a reflective surface picking up the light beams of both partial regions and directing them to the indicator window, the coloured plate being
45 located in front of the reflective surface and being apertured in the second partial region of the light channel.

4. Electric switch according to claim 3, wherein the reflective surface is part of a
50 contact plate made of a material which is covered white.

5. Electric switch according to claim 4 wherein the light subduing layer is formed by a web of the contact plate.

55 6. Electric switch according to claim 3, 4 or 5 wherein the coloured plate is arranged at an angle to the reflective surface and is engaged between a corner of the reflective surface and the web neighboured to it on the
60 one hand, and, on the other hand latches spaced from the reflective surface and one-piece-injection-moulded on the contact plate.

65 7. An electric switch substantially as hereinbefore described with reference to

and as illustrated in the accompanying drawing.

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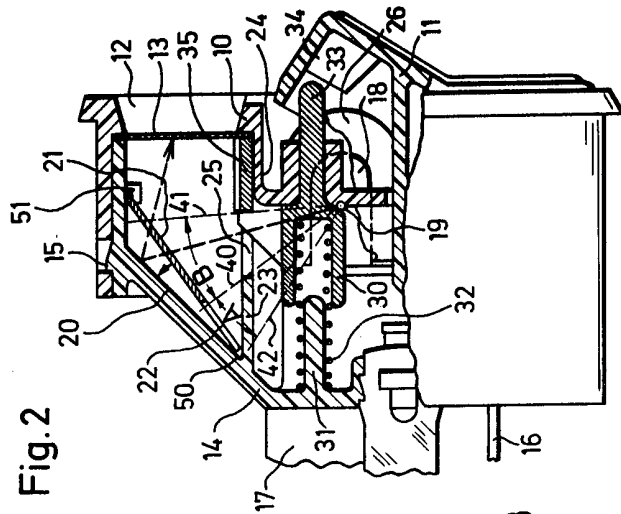


Fig. 2

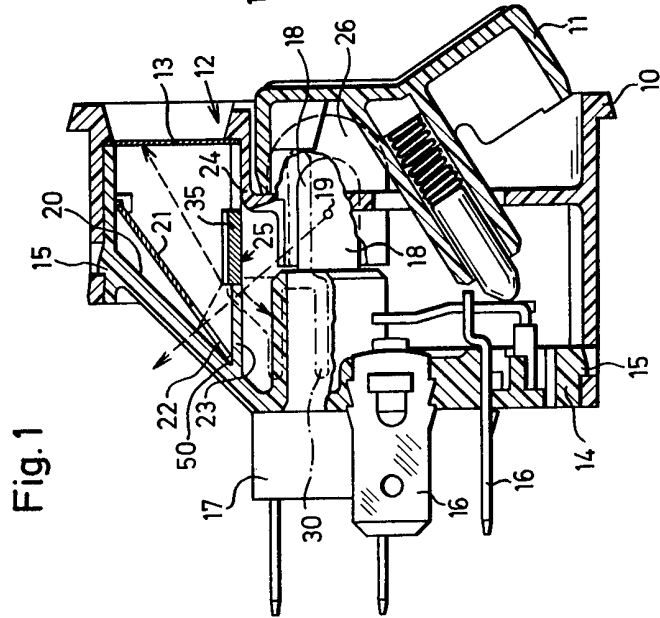


Fig. 1