

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

0 287 724
A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 87303574.5

(51) Int. Cl.4: A45B 25/18

(22) Date of filing: 23.04.87

(43) Date of publication of application:
26.10.88 Bulletin 88/43(64) Designated Contracting States:
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(54) Reflective umbrella.

(57) A reflective umbrella provided with an umbrella cloth woven with reflective threads (10, 22) which are coated with a reflective material. The reflective threads are made by slitting a thin plastic film coated with the reflective material which consists of a mixture of fine glass beads and a binder, and are woven with conventional fibres (20, 21) over the entire area of the umbrella cloth or into desire patterns in a certain part on the outer side and inner side of the umbrella cloth, to reflect light from all angles irrespective of how the umbrella is held, so as to alert on coming motorists from all sides.

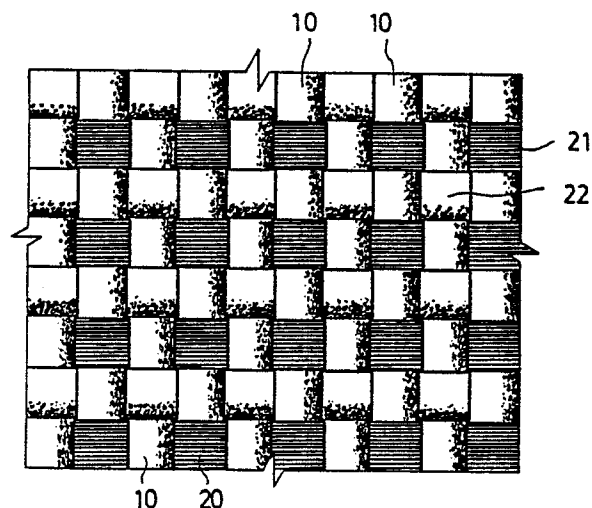


FIG. 2

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REFLECTIVE UMBRELLA

Conventional umbrellas are generally of dark colour. They are not easily noticed by motorists at night, particularly in rainy weather, and the user may risk injury from a traffic accident when using a dark coloured umbrella on a rainy night. In order to alert motorists at night several types of umbrellas with warning signs visible at night are now commercially available. However, they are relatively expensive, and practically ineffective.

The first type is an umbrella equipped with battery powered lights. The umbrella of this type requires electrical wiring and an appropriate mounting of batteries and lights, and the batteries and lights require frequent replacement, therefore such an umbrella is not only expensive but also impractical.

The second type is an umbrella with a reflective tape or cloth sewn or bonded onto the umbrella cloth. The umbrella of this type requires additional material and labour in manufacturing, thus incurring additional costs, and the umbrella tends to be relatively bulky when folded because of the material added to the umbrella cloth.

The third type is an umbrella having an umbrella cloth marked with a reflective paint. The umbrella of this type is relatively inexpensive, but the reflective paint tends to fade quickly and the mark is therefore not durable.

In view of the aforementioned disadvantages of conventional umbrellas with warning signs for alerting motorists at night, the present invention offers a newly improved umbrella with a reflective design that is durable, relatively inexpensive, and visible at night from all angles.

The umbrella of this invention has an umbrella cloth made of a woven fabric which contains reflective threads mixed with conventional fibres woven either through the entire umbrella cloth or into a desired pattern or patterns to reflect light from various directions, so as to be visible by motorists from all angles.

The reflective threads are made from a synthetic resin film such as polyester film having a thickness of $12\ \mu$ to $80\ \mu$, which is coated with a reflective material consisting of fine glass beads and an appropriate binder; the synthetic resin film with the reflective coating is slit by a micro slit into fine threads or strips. The reflective coating may be applied either on one side or on both sides of the film, so that the reflective strips may be single-sided or double-sided. With single-sided strips the reflective strips are so arranged that the reflective side of every other neighbouring strip is reversed from top side to bottom side when woven into the fabric to be used as an umbrella cloth.

With the double-sided strips the strips are so arranged that the reflective coatings always face the top and bottom side of the fabric. Therefore, the reflective side or sides of the reflective threads are exposed at both of the outer side and the inner side of the umbrella cloth.

The reflective strips can be woven into various patterns and are capable of reflecting light from either side of the fabric. Thus an umbrella being made of an umbrella cloth made of the above fabric is also capable of reflecting light from either the outside or the inside of the umbrella. Even with the umbrella tilted at a certain angle, it is still capable of reflecting light, and thus being visible, from all angles.

Therefore, it is the primary object of this invention to provide a reflective umbrella that is capable of reflecting light from all angles and thus being visible from all angles at night.

Another object of this invention is to provide a reflective umbrella which is relatively inexpensive and yet durable.

Other objects and advantageous features of the reflective umbrella of this invention will become more fully apparent from the following detailed description in conjunction with the accompanying drawings, in which:

Fig. 1 is an enlarged plan view of a first example of the reflective fabric, which is woven with the wefts consisting of conventional fibres and the warps consisting of the reflective strips;

Fig. 2 is an enlarged plan view of a second example of the reflective fabric, which is woven with warps consisting of the reflective strips and the wefts consisting of the mixture of conventional fibres and the reflective strips arranged one after each other;

Fig. 3 is a perspective view of an umbrella made of a cloth having reflective patterns woven with the reflective strips mixed with conventional fibres; and

Fig. 4 is a perspective view of a person using an umbrella made of a cloth having a reflective stripe formed by reflective strips woven with conventional fibres, showing the reflective stripe on both sides of the umbrella.

The reflective umbrella of this invention is made of a cloth that is woven with reflective strips mixed with conventional fibers, which may be synthetic fibres such as nylon or polyester, or natural fibres such as cotton. The reflective strips are made by slitting a polyester film having a thickness of $12\ \mu$ to $80\ \mu$ into fine threads or strips having a width of 0.25 mm to 1.0 mm; the polyester film having at least one surface coated with reflective

material which consists of fine glass beads having a size approximately $50\text{ }\mu$, mixed with a binder consisting of polyurethane resin or acrylic resin to form a reflective layer 0.08 mm to 0.40 mm thick.

As shown in Fig. 1, the reflective strips, having the reflective coating on one side or two opposite sides, are arranged as warps, or vertical threads 10, and woven with conventional fibres as wefts, or horizontal threads 20, to become a reflective fabric or reflective cloth. When the reflective strips have a reflective coating on one side only, the reflective strips are so arranged that every other one is turned front side back. So that even with the one-sided reflective strips, the reflective cloth is reflective on both sides.

The reflective cloth can also be made as shown in Fig. 2, that is with the warps 10 consisting of the reflective strips to be woven with wefts consisting of conventional fibres 21 mixed with the reflective strips 22 arranged side by side with each other. The reflective cloth made in this manner gives a relatively greater reflection than the first one of Fig. 1.

A first embodiment of the reflective umbrella of this invention, not shown, is made of the reflective cloth of Fig. 1 or Fig. 2. Because the entire area of both sides of the cloth is reflective, the umbrella is reflective from all angles irrespective of the direction from which the umbrella is approached.

The reflective strips can also be woven into desired patterns by special weaving techniques, as shown in Fig. 3, or simply woven to form a stripe, as shown in Fig. 4, so as to serve the dual purposes of a warning sign and a decorative pattern. In either case, the pattern or stripe is formed on both the outer side and the inner side of the umbrella cloth, therefore the pattern or stripe reflects light from all angles irrespective of how the umbrella is held when in use, and the risk of being unnoticed by motorists is minimized.

Claims

1. A reflective umbrella, comprising an umbrella cloth with reflective threads woven with conventional fibres, said reflective threads having a reflective coating exposed at both the outer side and the inner side of said umbrella cloth.

2. A reflective umbrella of claim 1, wherein said reflective threads are reflective strips made by slitting a thin plastic film coated with a reflective material.

3. A reflective umbrella of claim 2, wherein said thin plastic film is a polyester film having a thickness of $12\text{ }\mu$ to $80\text{ }\mu$ and said strip has a width of 0.25 mm to 1.0 mm.

4. A reflective umbrella of claim 2, wherein said reflective material is a mixture of fine glass beads having a size of about $50\text{ }\mu$, and a binder, said reflective material being coated onto said thin plastic film to form a reflective layer having a thickness of 0.08 mm to 0.40 mm.

5. A reflective umbrella of claim 4, wherein said reflective layer is formed on one side of said thin plastic film and said reflective strips made from said thin plastic film are used as warps of said umbrella cloth, with the coated side of every other one of said reflective strips being reversed.

6. A reflective umbrella of claim 4, wherein said reflective layer is formed on both sides of said thin plastic film.

7. A reflective umbrella of claim 5 or 6, wherein said reflective strips are woven over the entire area of said umbrella cloth.

8. A reflective umbrella of claim 5 or 6, wherein said reflective strips are woven in a limited area of said umbrella cloth.

9. A reflective umbrella of claim 8, wherein said limited area is a stripe.

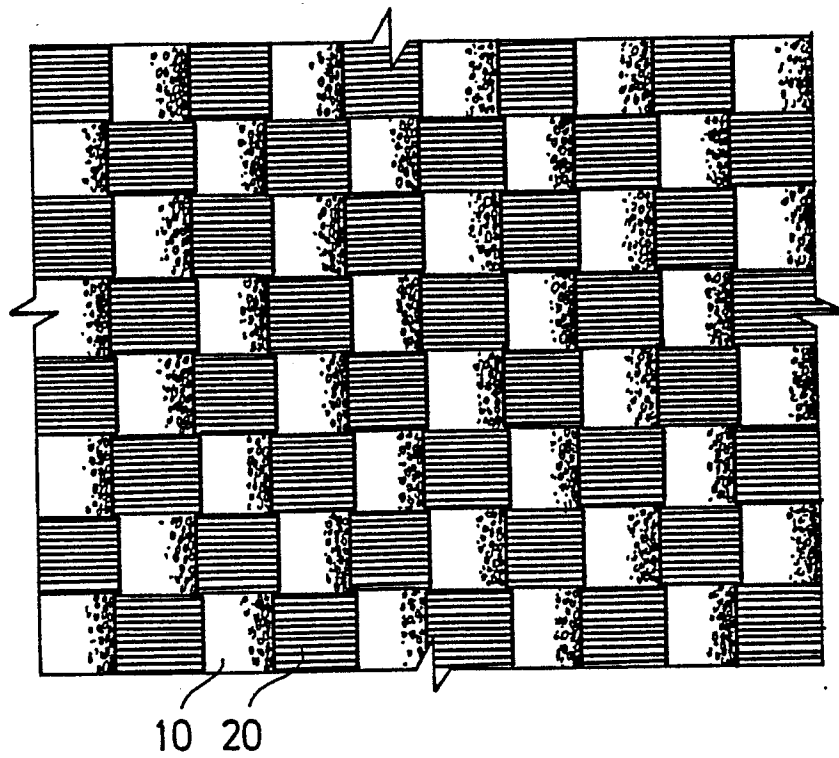


FIG. 1

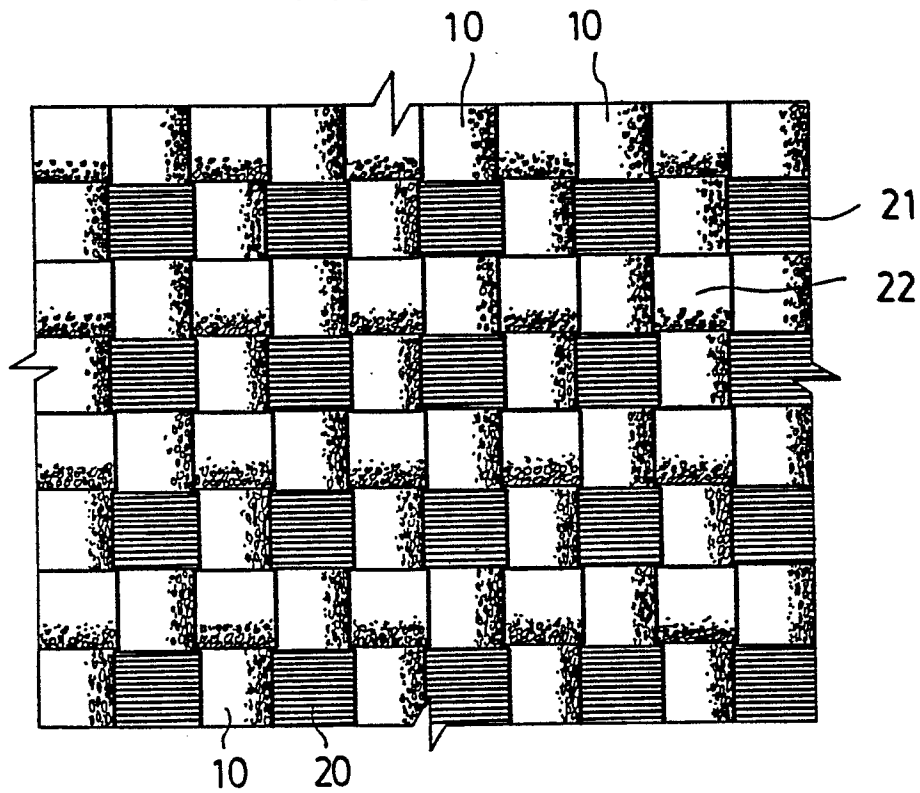


FIG. 2



FIG. 3

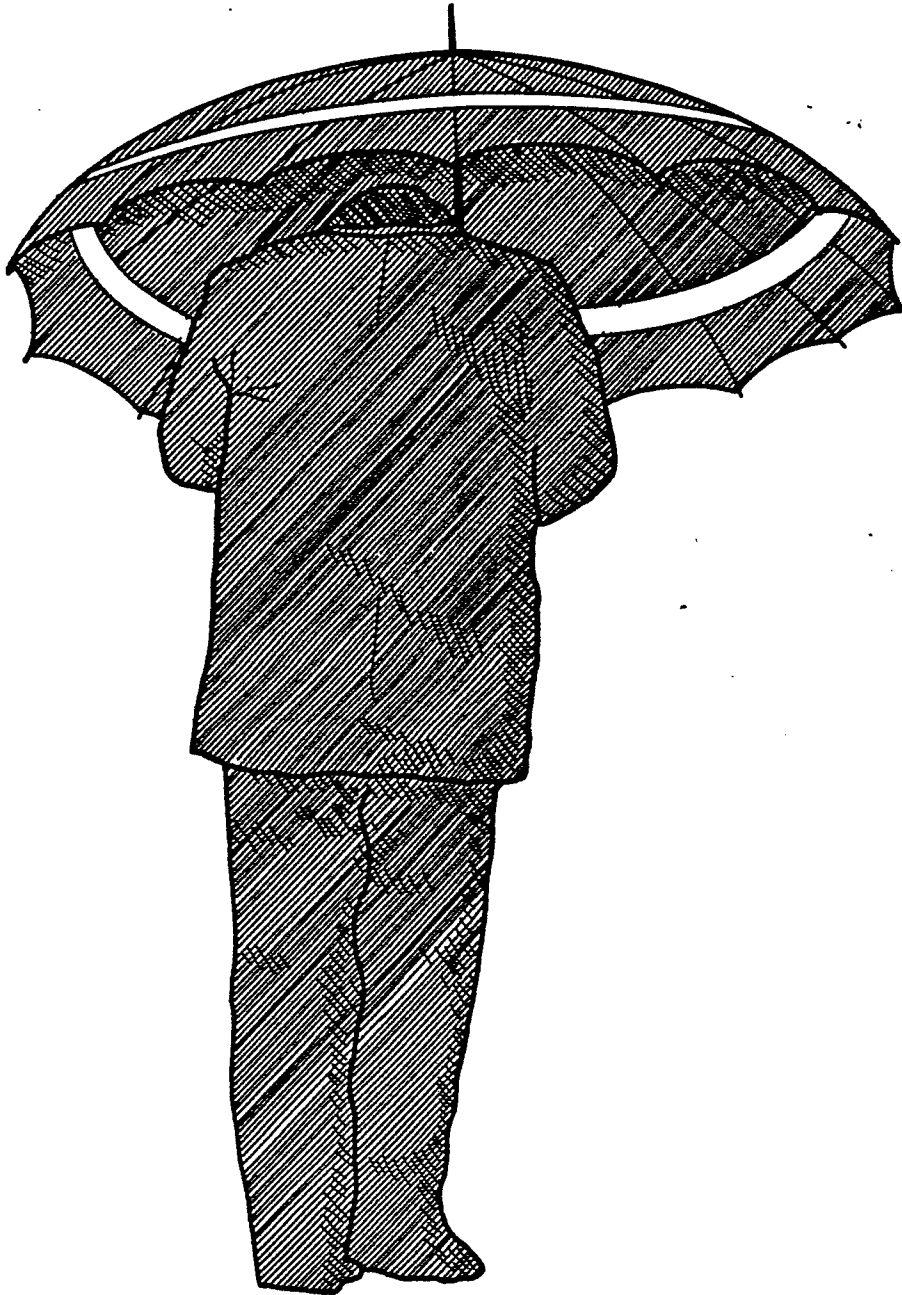


FIG. 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
A	US-A-3 498 306 (EDELKING) * Column 1, line 60 - column 2, line 53; figures 1-3 *	1,8	A 45 B 25/18
A	US-A-2 312 089 (GOBEILLE) * Page 1, right-hand column, line 7 - page 2, left-hand column, line 64; figures 1,2,4 *	1	
A	FR-A-1 510 069 (DALLE) * Whole document *	1,2	
A	AU-B- 554 958 (M. RUSSELL) * Page 4, lines 1-24; page 6, line 21 - page 7, line 26; figures 1,2 *	1	
A	DE-A-2 737 687 (I.W.S.) * Claims 1,4-6 *	1-3	
A	CH-A- 628 584 (KILCHER)		
A	FR-A-1 263 062 (HOECHST)		
A	CH-A- 626 794 (DESBAILLET)		
A	DE-U-7 908 298 (BOSCHERT)		
A	DE-U-8 416 806 (NEUSER)		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 08-12-1987	Examiner SIGWALT C.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			