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Fujimori

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[54] TRANSPARENT INSTRUMENT COVER HAVING ANTI-REFLECTION COATING ON SELECTED PORTIONS THEREOF

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** ..... **58/91,** 58/127 R, 350/165
[51] **Int. Cl.** **G04b 39/00,** G02b 5/28
[58] **Field of Search** 58/91, 127; 350/1, 350/163–166

[56] **References Cited**

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Attorney—Alex Friedman et al.

[57] **ABSTRACT**

Visibility of indicia on an instrument face and particularly on a watch face is increased by the use of an anti-reflection coating on those portions of the transparent cover through which the indicia are normally viewed. The absence of an anti-reflection coating on the remaining portions of the transparent instrument cover results in reflection resembling that from a transparent cover , portions of which are cut at an angle.

2 Claims, 5 Drawing Figures

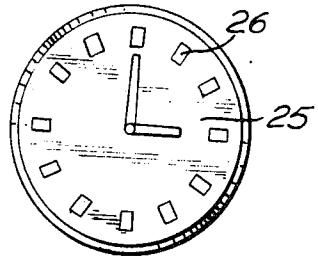


FIG. 1
PRIOR ART

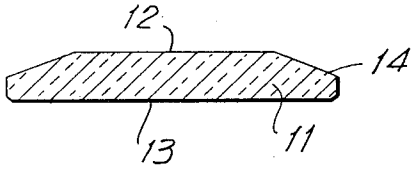


FIG. 2

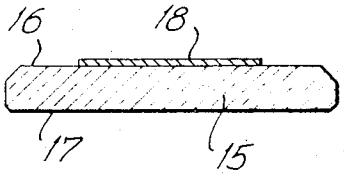


FIG. 3

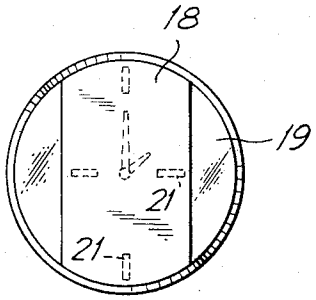


FIG. 4

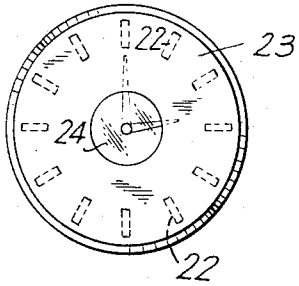
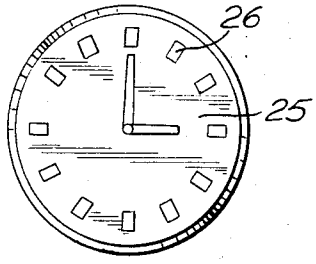


FIG. 5



TRANSPARENT INSTRUMENT COVER HAVING ANTI-REFLECTION COATING ON SELECTED PORTIONS THEREOF

BACKGROUND OF THE INVENTION

In a conventional transparent instrument cover, to be referred to hereinafter as a watch glass, part of the surface may be cut at an angle to the remainder, the objective being to give rise to reflection of incident light thereon and to cause sparkle, generally considered to be attractive. A variety of designs are used in which different portions of the glass are cut at different angles.

However, where the glass is inorganic or of sapphire, processing is difficult due to the hardness of the glass so that the procedure of grinding and polishing is lengthy and the cost involved is high. Moreover, refraction resulting from the angular cuts makes it difficult to read the dial beneath the watch glass.

SUMMARY OF THE INVENTION

An anti-reflection coating is applied only to selected portions of the surface of the watch glass, the portions being so selected as to avoid unwanted reflection from those areas through which the indicia on the dial beneath are read. Light is reflected normally from those portions of the watch glass not covered by an anti-reflection coating; the differences in reflection from the coated and uncoated portions of the glass give an effect which is quite similar to that of a watch glass cut at a variety of angles. In addition, the effect is achieved without refraction normally present in a conventional watch glass, so that the indicia are readily read.

The anti-reflection coating, preferably is of MgF_2 which is well known and which is deposited by vacuum deposition.

Accordingly, an object of the present invention is to provide an improved watch glass through which the indicia can be readily read while providing the appearance of a watch glass having faces cut at an angle to each other.

Another object of the present invention is to provide an improved watch glass through which the indicia can be read without refraction.

A further object of the invention is to provide an improved watch glass which gives the effect of having faces cut at an angle to each other, said effect being procured at lower cost than is the case with angle-cut watch glasses.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The invention accordingly comprises an article of manufacture possessing the features, properties, and the relation of elements which will be exemplified in the article hereinafter described, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a vertical section through a conventional watch glass;

FIG. 2 is a vertical section through a watch glass coated in accordance with the present invention;

FIG. 3 is a plan view of the watch glass of FIG. 2;

FIG. 4 is a plan view of another embodiment of the present invention; and

FIG. 5 is a plan view of a further embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A conventional watch glass generally indicated by the reference numeral **11** generally has two parallel faces **12** and **13** as well as a face **14** cut at an angle to face **12.** One effect of this arrangement is that the reflections of light incident on the watch glass to the viewer differ for different parts of the watch glass. Consequently, parts of the watch glass seem to sparkle, this generally being considered an attractive phenomenon. However, this type of watch glass suffers from the fact that indicia including the hands of the watch appear to be bent when viewed in part through face **12** and in part through face **14** so that reading of the dial beneath the glass is difficult. Moreover, cutting of the face **14** is expensive, involving as it does time-consuming polishing and grinding as well as special machinery to carry out these processes.

The attractive effect consisting of different reflections from different parts of the watch glass can be obtained by the arrangement shown in FIG. **2** where watch glass **15** has parallel faces **16** and **17,** one of which, in this case **16,** has thereon an anti-reflection coating **18.** It will be noted that coating **18** covers only a portion of surface **16** so that uncoated portions of surface **16** reflect light normally, the difference between the reflections from the coated and uncoated portions of surface **16** providing the effect obtained from the angle-cut surface **14** of the prior art. In addition, the undesirable refraction which renders reading of the indicia difficult is absent.

The watch glass of FIG. **2** is shown in plan in FIG. **3,** where as before, the coated portion is indicated by the reference numeral **18** and the uncoated portion is indicated by the numeral **19.**

FIG. **3** also shows the appearance of indicia **21** beneath the coating **18.** The arrangement of the indicia in this case is such that none of the indicia lie below the uncoated portion **19.**

The elimination of the angular cut face **14** is particularly advantageous in the arrangement shown in FIG. **4** where indicia **22** are close to the edge of the glass. In this case, coated portion **23** is in the form of an annulus, and uncoated portion **24** is in the form of a circle within the annulus **23.**

The difference in reflectivity between the coated and uncoated sections can be enhanced by coating the opposite face of the glass, in this case, the inner face. The purpose is to eliminate the essentially uniform reflectance from the second surface, which is usually about 4 percent of the total incident light falling thereon.

As aforenoted, the preferred coating is a magnesium fluoride coating applied by vacuum deposition. The technique of using suitable masks in order to control the regions coated and uncoated is too well known to need comment.

The number of designs in which the anti-reflection coating can be applied is essentially without limit. As another example the anti-reflection coating could be applied only over indicia, or conversely it could be applied everywhere but immediately over indicia. FIG. **5** shows a watch glass **25** which is coated with an anti-

reflection coating **26** immediately over indicia on the dial of a watch. As is evident, the shape and size of each island of coating should be such that the indicium immediately beneath can be conveniently read from a position approximately that immediately above the watch glass. With such an island of coating over each of the indicia, the visibility of the indicia is unaffected by the angle at which light strikes the watch glass.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above article without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. A flat transparent instrument watch glass for use over a dial having spaced indicia thereon and providing improved visibility of said indicia thereunder and enhanced appearance, comprising an adherent antireflection coating on one surface of said watch glass, said coating being divided into separate and distinct portions with a portion immediately over each of said indicia, each portion of said coating being substantially the same size as the indicium directly below said portion, thereby making said indicia visible regardless of the angle of light incident thereon while permitting reflection of incident light from uncoated portions of said watch glass.

2. A flat transparent instrument watch glass as defined in claim **1**, wherein the other surface of said watch glass is completely covered with an antireflection coating.

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