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OPHTHALMIC LENS.

No Drawing.

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This invention relates to improvements in ophthalmic lenses, and has particular reference to a novel and improved commercial ophthalmic lens and to the art or process of producing the same.

At the present time there are many different grades and types of ophthalmic lenses, depending on the manufacturer producing the same, the accuracy and processes of manufacture, and the particular type of lens involved. There are on the market certain ophthalmic lenses of very high grade and type, while at the same time there are also on the market numerous imitations of a much inferior quality. As an ophthalmic lens is a structure designed to be placed on the face and employed for visual purposes, it has always been a problem to so mark or designate the lens that the purchaser could be sure of the grade and quality of product, the name of the manufacturer, or the like, since any such designations if applied to the lens would be either temporary and liable to be removed during the necessary cleaning before delivery of the lens to the patient, or, if attempted to be permanently applied, would be of a visible character tending to interfere with vision or with the appearance of the mounting so as to cause the same to be refused by the purchaser.

It is, therefore, one of the principal objects of the present invention to provide, as a novel article of manufacture, a lens which shall be provided with a permanent mark or designation which will not be removed or impaired by the ordinary cleaning to which lenses are subjected, and yet which will be invisible under ordinary service conditions.

Another object is to provide such a lens having a mark or designation which will remain visible until it is desired to remove the same.

Another object is to provide such a lens having a mark or designation wherein the wiping off or removal of the visible portion of the mark will not affect the invisible portion.

Another object is to provide such a lens having a mark or designation which is normally invisible but which will become visible upon condensation of moisture on the lens.

Another object is to provide such a lens having a mark or designation which is normally invisible but which will become visible upon application thereto of a colloid forming solution.

A further object of the invention is the provision of a novel and improved art or process of producing these designations on the lens.

A still further object is to provide such an improved art or process of the character stated which is composed of a minimum number of operations and the application of which is extremely simple.

Other objects and advantages of the present invention should be readily apparent by reference to the following specifications, and it is understood that we may make any modifications in the structure or steps hereinafter described within the scope of the appended claims without departing from or exceeding the spirit of our invention.

In carrying out our invention we first construct a lens from ordinary crown or flint glass, or a suitable combination of both, surfacing it in the usual manner on either one or both faces, as may be preferred.

After the lens has been finally finished on at least one surface, it is in condition for the carrying out of our process, which consists in applying to the finished surface of the lens, either by pen, brush, rubber stamp, stencil, or other desired manner, suitable designations, such as the trade-mark, name of the manufacturer, or the like. While we have found that several different substances may be employed for this purpose, we would give as an example one which we have found satisfactory, this substance being stannous chloride. This substance, after having been mixed with water to form a solution of the desired consistency, is applied to the lens surface and left there as long as is desired. This mark is visible until it is removed either by washing or otherwise, this removal being very quickly and easily accomplished.

The chemical affinity of the stannous chloride with the lens surface consists in changing the hydroscopic properties of the said surface, or modifying its surface tension. This substance does not eat into or destroy the polish of the surface of the glass, but instead the modification of the surface of the

glass will affect the physical or chemical condition of the surface in such a manner that upon subjecting the same to slight moisture, such as the moisture of the breath when
5 blowing upon the glass the difference in surface will cause the moisture, as is usual, to condense in globules, but the condensed globules on the modified part which has been treated by the stannous chloride will be different as to size from those on the remainder
10 of the lens, with the result that light striking the surface will be differently affected so that the letters, words, or the like, will clearly stand out as distinct from the remainder of the lens, and may be readily preserved
15 so long as the surface moisture endures, but will entirely disappear as the lens surface dries off.

We have found by the production of these
20 lenses that they may be subjected to indefinite washing, wiping, or other cleaning actions, without impairing the visibility of the designation marks. We refer to the use of stannous chloride as particularly desirable
25 in this connection, since we have found this is one of the substances which will tend to add to the glass surface rather than to subtract therefrom. In other words, there is no modification of the surface perceptible in
30 any ordinary manner, yet clearly perceptible under the hygroscopic test, the action being apparently a changing of the glass at these points to a glass having much greater hygroscopic properties.

In addition to stannous chloride and water, we may also include in the solution the following substances, which are not absolutely necessary, but which, when used, tend to make the application of the mark or designation more easily accomplished. These
40 ingredients are, stannic oxide, gum arabic, and sugar. If these three latter substances are used, together with stannous chloride and water, in the following proportions, there will be produced a solution which will
45 give a satisfactory marking of the lens:

Stannous chloride, 40 grams,
Stannic oxide, 40 grams,
Gum arabic, 20 grams,
50 Sugar, one gram,
Water, 100 cubic centimeters.

The above proportions have been given merely for the purpose of illustration, and we do not wish to be limited strictly to them.

55 The ingredients beyond stannous chloride are used for the following reasons: The stannic oxide makes a white stamping ink and is used to make the mark visible before removing it either by washing or otherwise.
60 The gum arabic is used to prevent the solution from running on the stamp, and the separation of the pigment, while the sugar is simply used to help in washing off the visible portion of the mark should it be desired to effect its removal in this way. Any

or all of these latter ingredients will vary according to the manner in which the mark is applied to the glass, and many substitutions may be made for them.

For instance, in lieu of using the three last
70 mentioned ingredients, we may prefer to use, in connection with stannous chloride and water, what is known in the optical art as white rouge, as inert, very fine, white silica. This white rouge mixed with the stannous
75 chloride and water produces a solution which has been tried with very favorable results. It is especially easy to remove the visible part of the mark as it can be rubbed off dry, the white rouge acting as a cleaning
80 agent.

We have also found that the change in surface tension effect of this marking applies not only to moisture, i. e. condensed water but to many things. As an illustration, take
85 a lens surface which has been marked and cleaned off so that the mark is invisible by any optical means. This mark becomes visible in breathing on it and also if treated by other means. If the invisibly marked lens
90 is placed in a dilute silvering solution, it is found that the silver is attracted to the stamped or marked surface in a different manner than to the unstamped or unmarked part, clearly bringing out the marking. If
95 the silver solution is so adjusted that it would deposit very slowly, if at all, on the unmarked part of the glass, we obtain a brilliant deposit in silver on the marked part. This selectivity of the marked part likewise
100 applies to many physico-chemical reactions from colloid forming solutions but the silver described is easy of application and brilliant.

What is claimed is:

105 1. The process of producing an ophthalmic lens consisting of providing a lens blank having a polished refracting surface, and applying to a portion of said surface a solution of stannous chloride, whereby to change
110 said portion of the surface so that it will have a different reaction to vapor.

2. The process of producing an ophthalmic lens consisting of providing a lens blank having a polished refracting surface, and
115 applying to a portion of said surface a solution of stannous chloride whereby to change said portion of the surface so that it will have a different reaction to vapor, and wherein the changed portion will be without
120 refractive effect on the lens surface in the absence of vapor.

3. The process of changing a glass surface so that it will have a different reaction to vapor by applying thereto a solution of
125 stannous chloride.

4. The process of changing a glass surface so that it will have a different reaction to vapor than it originally had by applying thereto a solution of stannous chloride to
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form a visible coating and subsequently removing said visible coating without changing the reaction qualities of said glass.

5 The process of producing an ophthalmic lens consisting of providing a lens blank having a polished refractive surface, applying to a portion of said surface a solution of stannous chloride whereby to provide a visible coating, and subsequently removing
10 said visible coating with the result that that portion of the lens previously covered will have a different reaction to vapor than the rest of the lens.

6. The process of changing a glass surface
15 so that it will have a different reaction to a silver depositing solution by applying thereto a solution of stannous chloride.

7. The process of changing a glass surface so that it will have a different reaction to a
20 colloid forming solution by applying thereto a solution of stannous chloride.

8. An ophthalmic lens having a finished optical surface with a physical deposit
25 thereon having the property of precipitating another deposit of a different material onto the first deposit when the lens is placed in a solution containing the second deposit.

9. An ophthalmic lens having a finished lens surface with an invisible physical deposit thereon, said deposit having the prop- 30 erty of precipitating another visible deposit onto the first invisible deposit when the lens is placed in a solution containing the second visible deposit.

10. The process of forming an invisible
35 mark on a glass surface by the application of stannous chloride thereto, so that the said invisible mark will become visible when placed in a colloid forming solution.

11. The process of treating a glass surface
40 comprising placing a physical deposit on the glass surface and placing the glass surface in a solution containing a material that will deposit from the solution onto the first deposit.
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12. The process of treating a glass surface comprising placing an invisible deposit on the surface of the glass and then immersing the surface of the glass in a solution containing a material that will deposit on the first
50 deposit when so immersed to make the deposit visible.

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