

March 5, 1940.

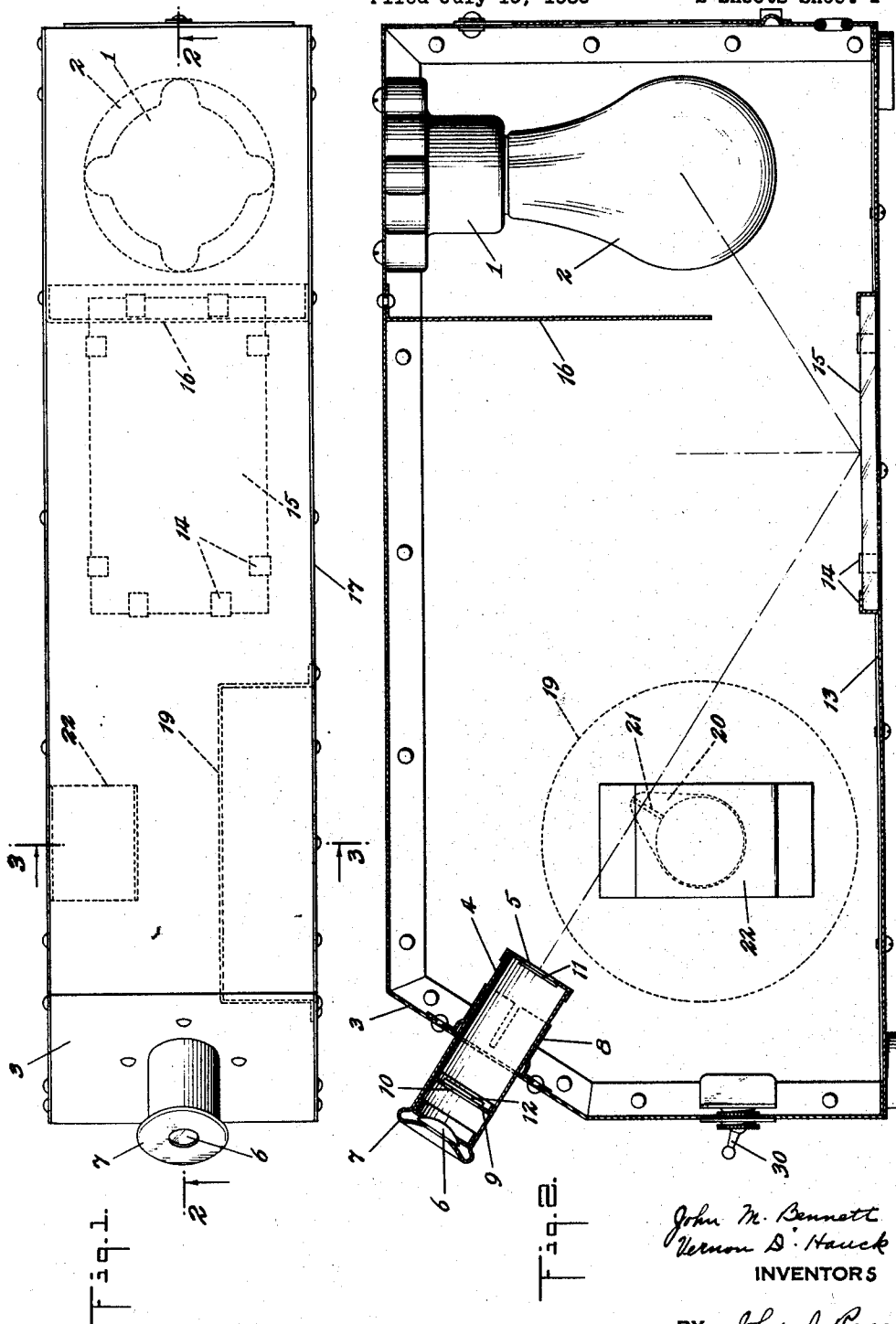
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2,192,860

MARKING METHOD AND APPARATUS

Filed July 19, 1935

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

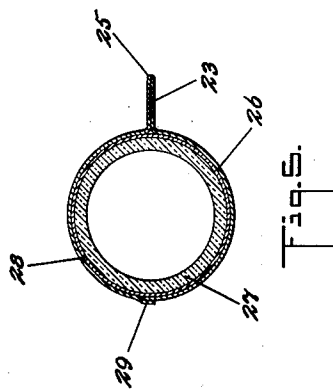


Fig. 5.

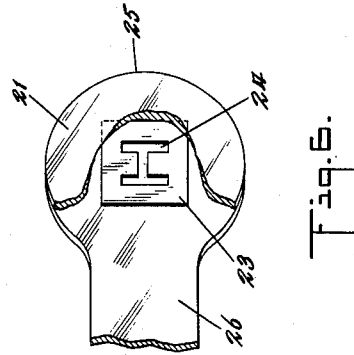


Fig. 6.

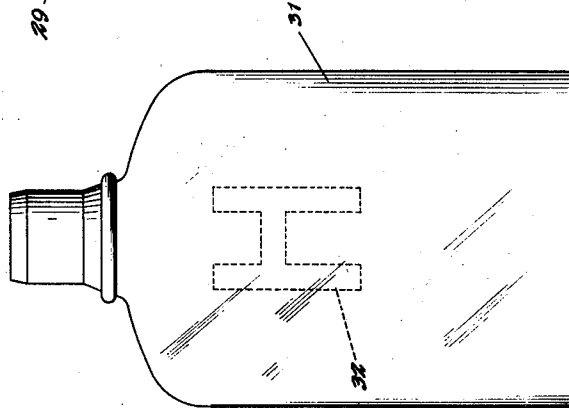


Fig. 4.

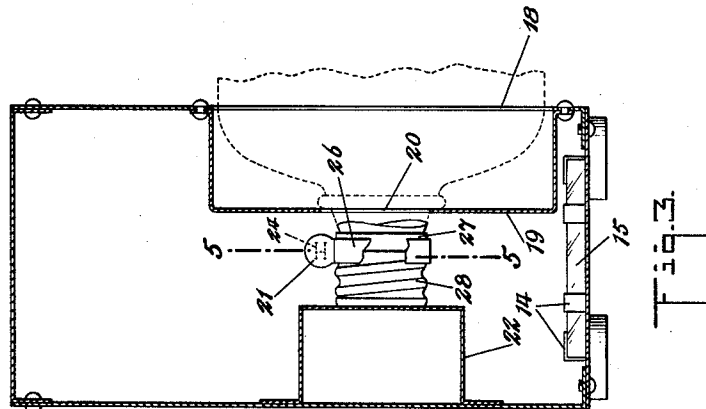


Fig. 3.

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MARKING METHOD AND APPARATUS

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14 Claims. (Cl. 40—2.2)

This invention relates to marking and detecting methods and more particularly to methods and apparatus for detecting normally invisible marks.

5 An object of the invention is to provide a method of applying a normally invisible identifying mark to an article of manufacture whereby the difficulty of counterfeiting may be increased, and the genuineness of an article may be readily
10 ascertained.

Another object is to provide a novel method and apparatus for detecting normally invisible trade-marks, code-marks and the like, in articles of manufacture.

15 Various methods of identifying genuine or original articles of manufacture have been proposed heretofore but most of these prior methods have been open to the objections either that they produce normally visible marks so that imitation is relatively simple, or they are too costly to be
20 applicable to common articles of commerce. For example in the case of bottles and similar cheap glass containers, it is very difficult to impress the mark on the glass without affecting the appearance thereof and without materially increasing
25 the cost thereof. It is a principal object of the invention therefore, to provide a relatively cheap and simple method of trade or code marking articles of glass, Celluloid, mica and the like.

30 A feature of the invention relates to a novel form of label for articles of manufacture.

Another feature relates to a device for testing articles of manufacture having a normally invisible mark to determine the genuineness of such
35 articles.

A further feature relates to the novel organization, arrangement and relative location of parts which go to make up an improved invisible-mark detecting unit.

40 A further feature relates to a novel form of identification tab or label for articles of manufacture which has the property of rotating the plane of polarized light passing therethrough in a predetermined configuration.

45 A still further feature relates to a device for producing and analyzing polarized light throughout a wide angle whereby articles of manufacture having a specially incorporated identifying mark
50 may be rapidly and inexpensively tested.

Other features and advantages not specifically enumerated will be apparent after a consideration of the following detailed descriptions and the appended claims.

55 In the drawings, which are intended for ex-

planatory purposes and not by way of limitation to the particular embodiments disclosed,

Fig. 1 is a top plan view of a device for detecting normally invisible identification marks according to the invention.

Fig. 2 is a sectional view of Fig. 1 taken along the line 2—2 thereof.

Fig. 3 is a sectional view of Fig. 1 taken along the line 3—3 thereof.

Fig. 4 shows an article of manufacture such as
10 a bottle having incorporated therein a normally invisible identification mark according to the invention.

Fig. 5 is a sectional view of part of Fig. 3 taken along the line 5—5 thereof.

Fig. 6 is an enlarged perspective view of part
15 of the identifying label shown in Fig. 3.

In general the invention relates to the provision of a normally invisible identifying mark either in the form of a label, cap, seal, etc., or in the
20 form of a permanent inherent characteristic of the article to be identified. The former is suitable for articles generally while the latter is suitable only to those articles which have a light transmitting portion capable of retaining a substantially permanent set in accordance with the
25 invention. In another aspect of the invention there is provided a device for positioning the article to be identified so that it may be examined through the intermediary of a source of polarized light. Referring more particularly to Figs. 1 to 3
30 there is shown an enclosing box or housing consisting of metal or other suitable non-transparent material. Affixed to the top wall of the box in any convenient manner is a lamp socket 1 to receive any well known type of electric lamp 2.
35 The left hand end wall of the box is provided with an inclined portion 3 in which is adjustably mounted for rotation and sliding movement a viewing tube 4 having an aperture 5 at one end
40 and a plano convex lens 6 at the opposite end, the tube being provided with a suitable eye-piece 7. The tube 4 may be frictionally held in place in a corresponding tubular member 8 fastened to the inclined wall 3 as shown, so that the position of the lens 6 may be adjusted as desired.
45 Fixedly mounted within the tube 4 is an aperture plate 9 having an aperture 10 of substantially the same size as aperture 5 and in alignment therewith. Fastened in any suitable manner across
50 the aperture 5 is a thin plate or disc 11 of selenite, mica for purposes to be described. Similarly there is fastened to the aperture plate 9 an analyzer 12 of any known form for analyzing polarized light. While a Nicol prism may be used
55

for this purpose it is preferred to employ an analyzer of a much greater analyzing angle such for example as a glass or similar transparent plate coated with a film having polarizing properties. For example, metallic films having their particles aligned substantially in the same direction. This film may be applied to the glass in any well known manner, as for example, by vaporization, distillation or the like. The particles may be orientated or aligned in the same direction by subjecting them to a suitable magnetic field during the deposition. By using such an analyzer, it is possible to allow a greater quantity of light to pass therethrough, thus increasing the sensitivity and ease of adjustment of the device.

Fastened to the base 13 by brackets 14 is a plate of black or similar dark glass 15 acting as a polarizing reflector for the light from lamp 2. Preferably the polarizing plate 15 is situated between the lamp 2 and the analyzer 12 so that the light from the lamp is propagated and strikes the reflector 15 at the proper angle. Thus with a black or similar dark glass reflector the light from source 2 may strike the reflector at an incident angle of approximately 57.5 degrees to the vertical. Likewise the plate 15 is positioned so that optical axis of lens 6 is at an angle of approximately 57.5 to the normal to plate 15. It will be understood of course that it is not necessary to have all the light from source 2 strike the plate at an incident angle of 57.5 degrees as long as an appreciable portion of the light does strike at this angle. In accordance with the well known phenomenon of polarization, the light that is reflected from the plate 15 is plane polarized and by rotating the analyzer 12 it is possible to vary the brightness and/or color of the light as viewed through the eye-piece 7. Preferably a light baffle 16 is interposed between the source 2 and the eye-piece so that the direct rays of light from the lamp are obscured.

The front wall 17 is provided with a window or opening 18 to receive the article to be identified and fastened interiorly of the container across the opening 18 is a recessed plate 19 having a window 20 therein to receive the constricted portion of the article. Thus where the article to be identified is a bottle as illustrated in the drawings, the window 20 is of slightly larger diameter than the bottle neck and this window 20 is preferably designed to allow the identification tab 21 to pass therethrough. In as much as the identification tab is relatively small as compared with the bottle it is necessary to provide a stop 22 so that when the bottle neck is inserted through the window 20 the tab 21 is in optical alignment with the lens 6 preferably at right angles to the axis of this lens as shown diagrammatically in Fig. 2.

In accordance with the invention the identification tab is especially constructed so that it has incorporated therein means to rotate the plane of polarized light passing therethrough in a predetermined configuration. This configuration may correspond to a trade-mark, code mark or the like. Thus as indicated in the drawings the tab is constructed so that it rotates the plane of the polarized light passing therethrough, to the configuration of the letter H. It will be understood of course that the tab is so constructed that normally the outline of the identifying mark is invisible, and becomes visible only when viewed through the intermediary of the polarized light beam. We have found that one manner of constructing the tab to achieve these results is as

follows. A thin strip or film 23 of transparent or translucent material such as "Cellophane," Celluloid, mica, glass, etc., is provided with a stencilled or cut-out portion 24 of the desired configuration, and this strip is placed between the folded end 25 of a strip 26 preferably of similar material which is adapted to be wrapped around the neck 27 of the bottle and preferably in overlapping relation with the usual cap or cover 28 so that when this cap or cover is removed from the bottle it is necessary to destroy the tab. The free ends 29 of the strip 26 may be integrally joined in any well known manner.

As stated above the strip 23 is preferably very thin and when placed between the folded end 25, both the strip and the folded end are cemented together under a suitable high pressure. In order to join the opposed surfaces of the strip 23 and the strip 26 together, the pressing operation may be accompanied with heat so that the two strips form in effect a single piece. The pressure however is preferably limited so that the outlines of the stencilled portion 24 are not destroyed. If desired the opposed surfaces of strips 23 and 26 may be provided with a solvent cement to insure the proper cohesion, and if a cement is employed, the heating may be dispensed with. We have found that by this method, the stencilled portion 24 is invisible under ordinary light, and if the strip 23 is of filmy thickness, it is not necessary to employ the same material for the strip 26 so long as both the strips have substantially the same rotational powers on polarized light. It will be understood of course that the invention is not limited to a tab consisting of a stencilled strip fastened to a separate strip, so long as the tab is provided with a region of the desired configuration where the optical thickness is different from the remainder thereof. Thus a single strip of material may be employed having a portion of its surface thickened in any well known manner according to the desired configuration. Likewise, the strip 23 instead of having a stencilled or cut-out configuration, may have its thickness increased in accordance with this configuration, and inserted between the folds of strip 26 as above described. Furthermore, it is not necessary that the strip 23 be covered on both sides, thus it may be attached as by pressure, cement, etc., to any transparent or translucent part of the article to be identified, so long as it is of sufficient thinness that the configuration therein is not visible under ordinary light. The tab such as shown in Figs. 5 and 6 appears simply as a rather thick strip of transparent or translucent material with the identification mark invisible in ordinary light, but when viewed through an analyzer and with polarized light the normally invisible configuration of the mark is revealed.

In order to detect the genuineness of an article such as a bottle having a tab attached thereto as above described, the bottle is inserted through window 18 until the bottle cap engages the stop 22, care being taken that in inserting the bottle the tab passes through the part of the window provided therefor. The lamp 2 is lighted by operating switch 30 and the observer looks through the eye-piece 7. If the tab is a genuine one the plane polarized light reflected from plate 15 after passing through the tab is analyzed by the member 12 and if this latter member is in the right position the identifying mark in the tab will be visible to the observer. If the analyzer 12 is not in the right position the mark will be either invisible or very faintly visible. In order

to increase the visibility of the mark all that is necessary is to rotate the tube 4 and analyzer 12 until the mark shows up. If the tab is not a genuine one, rotation of the tube 4 and the analyzer 12 reveals no mark. In viewing the tab, if it is a genuine one, the configuration of the mark therein usually appears of different color or tint from the color or tint of the background, but is nevertheless completely visible.

The effect of the mica plate 11, mentioned above is to increase the sensitivity of the device so that much smaller differences in optical thickness between the parts of the tab may be detected. The member 11 acts to increase the brilliancy of the colors of the mark and their contrast as compared with the unmarked part of the tab.

As a further precaution against the substitution of false tabs or labels, they may be so designed that the difference in optical thickness between the marked area and the unmarked area, rotates the plane of the polarized light a predetermined amount. In this case the analyzer 12 may be set at a definite position corresponding to this degree of rotation, and if the tab is genuine the mark will be visible, whereas if it is not genuine the mark will be either invisible or substantially so.

Instead of employing the identifying mark in the form of a different optical thickness in a transparent or translucent member, the mark may be produced in the form of a mechanical strain in the body of the article to be identified. With this method of marking the use of separate tabs or labels such as those described above may be obviated and the mark may be impressed directly in the wall or other convenient part of the article to be identified. Thus as indicated in Fig. 4 of the drawings, the bottle 31 has one of its walls provided with a mechanically strained area the strain of which is different from that of the remaining part of the bottle, and has the desired code or trade-mark configuration. Thus as indicated by the dotted lines in Fig. 4 the bottle wall has a strained area 32 in the form of the letter H. Any well known manner of producing this desired localized strain in the body of the glass may be employed. One preferred method of impressing the strain is to heat the glass above its annealing temperature and then cooling the glass locally in the desired configuration by the application of a stamp capable of conducting sufficient heat away from the glass over the configuration area. Preferably this localized cooling is such as bring the temperature of the glass over the configuration area below the annealing temperature. It will be understood that any other method of locally cooling the glass may be employed, so long as there is produced in the glass an area of the desired configuration which has a different strain from the remainder of the glass. Care should of course be taken that during the production of the localized strain no normally visible marks are thereby produced. With this method the identifying mark is not visible under ordinary light but when it is examined through an analyzer such as analyzer 12 (Fig. 2) the strained configuration becomes visible. It will be understood of course that a device similar to that shown in Figs. 1 to 3 may be employed, the device being suitably modified so that the bottle or other article to be inspected may be positioned with the strained area substantially perpendicular to the polarized rays reflected from the plate 15.

While specific apparatus and methods of making the identifying tab or label and impressing the identifying strain on the article have been described, it will be understood that these are merely illustrative and that various modifications may be made therein without departing from the spirit and scope of the invention. By the expression "stenciling" as employed in the claims is meant that the strip or tag has different thickness at different points in accordance with the predetermined configuration, and is intended to include strips which are completely perforated by the stenciling tool as well as strips which are merely compressed by the stenciling tool whereby the stenciled area is of less thickness than the unstenciled area.

What is claimed is:

1. An identifying member for articles comprising a light transmitting member having different optical thickness at different points, the thickness being in accordance with a predetermined identifying configuration whereby a polarized light beam is capable of being rotated to render said configuration visible through an analyzer said configuration being normally invisible except under polarized light.
2. An identifying member for articles comprising a light transmitting member having a portion of its surface treated to rotate the plane of polarization of a polarized light beam to produce a predetermined identifying configuration when examined through an analyzer said configuration being normally invisible except under polarized light.
3. An identifying member for articles comprising a strip of light transmitting material having its surface treated to have different powers of rotating the plane of a polarized light beam to define a predetermined identification mark, said mark being normally invisible except under polarized light, and another strip of light transmitting material bonded to the treated surface of the first-mentioned strip to form in effect a unitary thickness with the entire treated area of the said first strip.
4. An identifying member according to claim 3 in which both of said strips have normally substantially the same power of rotating the plane of polarization of a polarized light beam.
5. An identifying member according to claim 3 in which the first-mentioned strip is of flexible transparent material.
6. An identifying member for articles comprising a strip of light transmitting material having its optical thickness different at different points according to a predetermined identifying configuration, and a pair of light transmitting strips between which the first strip is fastened said configuration being visible through said pair of strips only under polarized light.
7. An identifying member according to claim 6 in which the first mentioned strip is of filmlike thickness.
8. An identifying member according to claim 6 in which the first mentioned strip has its surface stencilled according to said configuration.
9. An identifying member according to claim 6 in which the first mentioned strip is of Cellophane having a stencilled opening therein according to said configuration.
10. The method of making an identifying member for articles comprising treating the surface of a light transmitting member to vary its thickness in accordance with a predetermined identifying configuration, superposing said member on

another light transmitting member, and subjecting both said members to heat and pressure whereby the variations in thickness of the first member are rendered normally invisible except under polarized light.

11. The method of making an identifying member for articles comprising treating the surface of a strip of light transmitting material to vary its thickness in accordance with a predetermined identifying configuration, inserting said strip between two other strips of light transmitting material, and subjecting the three strips to heat and pressure to form a unitary strip wherein the thickness variations of the first strip are normally invisible except under polarized light.

12. The method of making an identifying member for articles which comprises stencilling a strip of light transmitting material in accordance with a predetermined identifying configuration, superposing another strip of light transmitting material on the first strip with a layer of light transparent cement therebetween, and subjecting the strips to pressure to form a unitary

strip wherein the stencilled portion is normally invisible except under polarized light.

13. An identifying device for articles comprising a light transmitting member having a stenciled portion capable of rotating in accordance with a predetermined identifying configuration the plane of polarization of a polarized light beam passing therethrough, said stenciled portion rotating the polarized light beam to a different degree from the unstenciled portion said configuration being invisible except under polarized light.

14. An identifying device for articles comprising a light transmitting member having a portion stenciled in accordance with a predetermined identifying configuration, the stenciled portion having the power of rotating the plane of a polarized light beam passing therethrough, so that when said member is viewed through an analyzer the stenciled portion appears in contrast with the unstenciled portion said configuration being invisible except under polarized light.

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