June 8, 1943. R. FOSTER ET AL 2,321,476

TRAFFIC MARKER

Filed Feb. 9, 1940

Fig. 1.

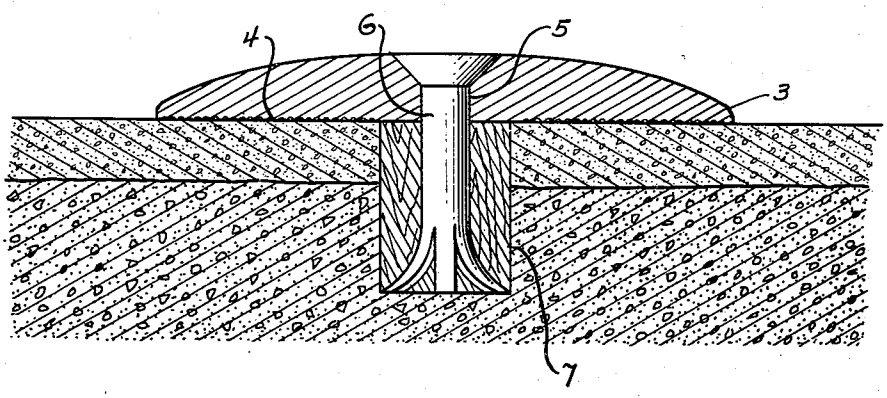
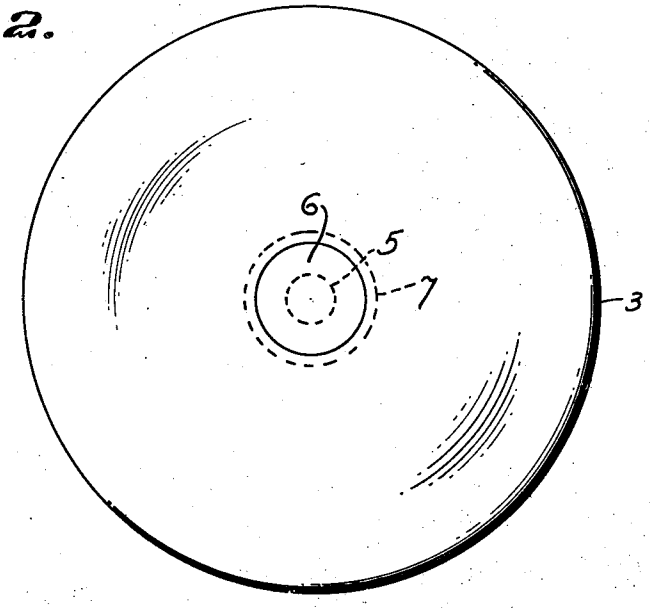


Fig. 2.



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Patented June 8, 1943

2,321,476

UNITED STATES PATENT OFFICE

2,321,476

TRAFFIC MARKER

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Application February 9, 1940, Serial No. 318,088

16 Claims. (Cl. 88—79)

This invention relates to markers such as are employed for indicating traffic lanes, safety zones, and the like.

The marking of traffic lanes, etc., is at the present time accomplished by painted lines, by inserts made from ceramic materials, cement, metal markers, etc. Paint, ceramic materials, cement, etc., have the defect that they are partially porous, and for that reason are subject to rapid discoloration and wear and as such provide poor visibility. They are also costly due to maintenance charges and the necessity for frequent replacement. Metal markers will stand wear and tear, but their cost is fairly high, and their visibility is so poor that their use is considerably limited.

The object of the present invention is generally to improve and simplify the construction and operation of the art of traffic marking; to provide a marker which possesses a high degree of visibility and which will retain substantially the same degree of visibility as wear takes place; to provide a marker which is cheap to manufacture and install; to provide a marker composed of a thermo-plastic material which compares in strength and ability to resist the wear and pounding of traffic with metal markers; and further, to provide a marker which presents a dense non-porous body throughout, and which is water- and moisture-repellant.

The marker is shown by way of illustration in the accompanying drawing, in which—

Fig. 1 is a central vertical section of the marker, showing the manner in which it is applied and secured to a pavement; and

Fig. 2 is a plan view.

The purpose of the present invention is to provide a traffic or surface marker which is made from a plastic material of a cellulose base, as this material in actual practice has proven to have superior qualities such as great wear and impact resistance and, particularly, better visibility under all weather conditions, when comparison is made with other markers such as painted stripes and markers made from metal, ceramic materials, cement, glass, etc.

The main base of the plastic, or the binding or cementing material employed is one of the organic derivatives of cellulose. Examples of organic derivatives of cellulose are organic esters of cellulose such as cellulose acetate, cellulose formate, cellulose propionate, cellulose butyrate, or cellulose ethers such as ethyl cellulose, methyl cellulose, or benzyl cellulose. These organic derivatives are soluble in a number of different solvents, but as acetone is the one employed, reference will be made to that particular solvent.

To produce a batch of the plastic material, or the composition employed in the manufacture of the marker, the following ingredients are used:

	Pounds
Cellulose acetate	100
Dibutyl phthalate	2
Di-methyl phthalate	25
Zinc oxide	25
Stearic acid	½
Bleached sulphite wood fiber	25

This batch will require from 150 to 200 lbs. of acetone as a solvent. The cellulose acetate employed is the high viscosity type, and serves as the binding or cementing agent of the final product. The dibutyl phthalate serves two purposes, that of a water proofing agent and also that of a plasticizer. The di-methyl phthalate serves as a plasticizer. The zinc oxide serves two, purposes, first that of a color or pigment agent, and secondly, that of a filler. The stearic acid functions as a lubricant as will hereinafter be described, and also as a water-repellant, and the bleached sulphite wood fiber as a coloring agent, a filler and binder.

The plastic or material is produced as follows: 100 lbs. of cellulose acetate is placed in any suitable container and to it is added 150 to 200 lbs. of the solvent, to-wit, acetone. This is thoroughly stirred until the cellulose acetate is dissolved, or has been converted into a liquid state. The two plasticizers, the zinc oxide and the stearic acid, will then be added and also stirred, and finally the bleached sulphite wood fiber is added and thoroughly mixed; the resultant mass will be of a dough-like consistency and will look like a baker's bread dough, only it will be almost snow-white, due to the zinc oxide and the sulphite wood fiber which it contains. The dough-like mixture is now rolled into sheets of any suitable thickness, depending upon the thickness of the product to be obtained. If street markers are to be manufactured, the dough will be rolled into sheets of approximately one inch thickness.

It will then be placed under a blanking die to cut out circular discs or biscuits which are set aside to be dried, or, in other words, to permit the acetone or solvent to be volatilized or evaporated. The biscuits, when completely dry, are now ready for the pressing dies, and the biscuits are preferably pre-heated before being placed in the dies to remove substantially all traces of the acetone. The dies are heated at

a temperature of substantially 380° F., and a pressure of approximately 2000 lbs. to the square inch is applied. The combined action of heat and pressure cause the material to become sufficiently plastic to completely fill the mold and to permit the plastic to assume the shape required. The mold is then quickly cooled by circulating water through it, after which the completed articles are removed, the mold being heated by first circulating steam therethrough.

It was previously stated that the stearic acid added to the composition functions as a lubricant. By this we mean that without the stearic acid the composition tends to adhere to the surfaces of the mold, but when stearic acid is employed, it lubricates the surface so that the completed article may be readily removed. Further, it serves as a water and moisture repellant when the marker is exposed to rain and moisture.

The shape of the finished marker may be varied to suit different requirements; for instance, it may be made square or rectangular, etc., or round as shown in Figs. 1 and 2. When it is made round, it is approximately one-half inch in thickness near the center and tapers towards the peripheral edge to a thickness of about one-quarter inch. The peripheral edge is rounded as at 3 and the bottom surface is flat as shown at 4 to present a substantial footing or supporting surface. A central hole 5 is provided to receive an anchoring bolt or pin 6, which is driven into a wooden or like plug 7 placed in the pavement. When installing in cement or concrete pavements, the pin 6 is driven into the plug previously placed in a hole drilled in the cement. It has been found that by coating the surface of the pavement or the bottom surface of the marker with a thick bituminous or viscous tar before installation of the marker, that a very firm, secure and permanent attachment of the marker to the pavement is obtained.

While the marker is thickest near the center and tapers toward the peripheral edge, it should be understood that this is not a straight taper but that a gradually rounded or convex surface is provided. This is important as a raised and convex reflecting surface is thereby formed which reflects efficiently in all directions, making the marker clearly visible from all angles of vision. This, together with the fact that the zinc oxide filler and the bleached sulphite wood fiber contained, produces a marker which presents an intense white surface, further adds reflection and hence visibility; and as the marker is composed of the same material throughout its body, the same intense white color is maintained as wear takes place.

The material forming the marker is a dense, non-porous material. The dibutyl phthalate and stearic acid contained impregnate the entire body of the marker and renders the marker decidedly repellent to water and other liquid substances; hence they prevent dirty water, moisture, road tar, oil drippings from vehicles, and the like, from entering and discoloring the body of the marker, as the surface of the marker is so greasy that nothing will adhere. The material is readily polished, and, as the buffing action of passing motor vehicles tends to polish the surface, the marker is maintained in that condition as wear progresses.

The markers will stand the hardest wear and pounding action of the hardest traffic almost indefinitely, having a resistance to such wear approximately the same as metal markers; and when compared to painted surfaces, they will outlast such surfaces many, many times, and still they will maintain a superior degree of visibility throughout their life. The binding action of the wood fiber is very important; for instance, where heat is encountered it materially strengthens the body of the marker and prevents cold flow of the material.

Due to the comparatively high temperature and pressure under which the markers are formed, they withstand all temperatures encountered on pavements during high summer temperatures, and as such, will not soften or cold flow. Furthermore, they do not tend to embed themselves in asphalt pavements as readily as metal markers, as they are slightly resilient and reflect the sun rays, thereby remaining cooler than metal markers under similar temperature conditions. The high pressure and temperature under which the markers are formed causes the cellulose acetate and the water repelling agents to completely impregnate and fill the cellular structure of the wood fiber, thereby increasing the density of the body and positively preventing entrance of moisture, this being of particular importance where freezing temperatures are encountered, for the simple reason that if moisture should enter it would freeze and render the markers brittle and breakable.

While the majority of markers will be white in color, other color pigments may be employed, for instance, yellow and red for the purpose of marking non-parking or time-limit parking zones, etc., and while the invention has been more or less specifically described for purposes of illustration, this and other changes may be resorted to within the scope of the appended claims.

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. A dense substantially non-porous, wear-resistant, water-repellent pavement marker capable of retaining its shape under wide temperature variations, the essential constituents of the marker being a plasticized organic derivative of cellulose, and a filler having high reflecting properties, the former being present in a predominating quantity.

2. A dense substantially non-porous, wear-resistant, water-repellent pavement marker capable of retaining its shape under wide temperature variations, the essential constituents of the marker being a plasticized organic derivative of cellulose and a filler having reflecting properties and imparting a white color to said marker, the organic derivative of cellulose being present in a predominant quantity.

3. A dense substantially non-porous, wear-resistant, water-repellent pavement marker capable of retaining its shape under wide temperature variations, the essential constituents of the marker being a plasticized organic derivative of cellulose, a filler including a cellulosic constituent acting as a binder, said filler imparting visibility to the marker, said organic cellulose derivative being present in a predominating quantity.

4. A dense substantially non-porous, molded wear-resistant, water repellent pavement marker, capable of retaining its shape under varying temperature changes, the essential constituents being an organic derivative of cellulose, an inert inorganic filler, and a cellulosic filler having a cellular structure, said fillers imparting visibility to the marker, the organic derivative of cellulose being present in a predominating quantity.

5. A molded dense substantially non-porous,

water-repellent pavement marker, capable of retaining its shape under varying temperature changes, the essential constituents being an organic derivative of cellulose, an inert inorganic filler, and a filler of bleached wood fiber, said fillers imparting visibility to the marker, the organic derivative of cellulose being present in a predominating quantity.

6. A dense molded substantially non-porous, wear-resistant, water-repellent pavement marker, capable of retaining its shape under varying temperature changes, the essential constituents being an organic derivative of cellulose, an inert inorganic filler, and a cellulosic filler having a cellular structure, said fillers imparting visibility to the marker, the organic derivative of cellulose being present in a predominating quantity, and a water repellent agent.

7. A dense molded substantially non-porous, wear-resistant, water-repellent marker capable of retaining its shape under varying temperature changes, the essential constituents of which are a plasticized organic derivative of cellulose, a filler of zinc oxide, and a cellular cellulosic filler, said fillers imparting visibility to the marker, the organic derivative of cellulose being present in a predominating quantity.

8. A dense, molded, substantially non-porous, wear-resistant, water repellent, marker capable of retaining its shape under varying temperature changes, the essential constituents of which are a plasticized organic derivative of cellulose, a filler of zinc oxide, and a filler of bleached wood pulp, said fillers imparting visibility to the marker, the organic derivative of cellulose being present in a predominating quantity.

9. A dense molded, substantially non-porous, wear-resistant, water repellent pavement marker, capable of retaining its shape under varying temperature changes, the essential constituents being an ester of cellulose, an inert inorganic filler, and a cellulosic filler having a cellular structure, said fillers imparting visibility to the marker, the ester of cellulose being present in a predominating quantity.

10. A dense molded, substantially non-porous, wear-resistant water-repellent pavement marker, capable of retaining its shape under varying temperatures changes the essential constituents of which are an ester of cellulose, an inert inorganic filler, and a filler of bleached wood fiber, said fillers imparting visibility to the marker, the ester of cellulose being present in a predominating quantity.

11. The method of preparing a dense, molded marker comprising forming a plasticized mixture of an organic derivative of cellulose with an inert inorganic filler, a secondary cellulosic filler, said fillers being capable of imparting a high degree of visibility to the marker, the organic derivative being present in a predominating proportion, and a solvent for the organic cellulose derivative; drying said mixture and removing the volatile solvent; and subjecting said substantially dry mixture to heat and pressure.

12. The method of preparing a dense, molded marker comprising forming a plasticized mixture of an organic derivative of cellulose with an inert inorganic filler, a secondary cellulosic filler, said fillers being capable of imparting a high degree of visibility to the marker, the organic derivative being present in a predominating proportion, a solvent for the organic cellulose derivative, and a small proportion of a lubricant, the latter functioning to lubricate the molded surface and facilitate the removal of the molded article from the mold, and to confer water-resisting properties on the marker; drying said mixture, and removing the solvent therefrom, and molding the mixture under heat and pressure to produce a dense wear-resistant marker.

13. The method of providing a pavement with a permanent marker, comprising forming a plasticized mixture of an organic derivative of cellulose with an inert inorganic filler, a secondary cellulosic filler, said fillers being capable of imparting a high degree of visibility to the marker, the organic derivative being present in a predominating proportion, a solvent for the organic cellulose derivative, drying said mixture and removing the volatile solvent, subjecting said substantially dry mixture to heat and pressure to produce a dense molded, wear-resistant marker, coating the pavement with adhesive material to assist in permanent attachment of the marker to the pavement, and permanently attaching the marker to the pavement.

14. The method of preparing a dense, molded marker comprising forming a plasticized mixture of an organic derivative of cellulose with an inert inorganic filler, a secondary cellulosic filler, said fillers being capable of imparting a high degree of visibility to the marker, the organic derivative being present in a predominating proportion, a solvent for the organic cellulose derivative, and a small proportion of a lubricant, the latter functioning to lubricate the molded surface and facilitate the removal of the molded article from the mold, and to confer water-resisting properties on the marker; forming the reaction mass into sheets, forming discs from said sheets, drying said discs, and molding the resulting discs under heat and pressure to produce a dense wear-resistant marker.

15. The method of preparing a dense molded marker comprising forming a plasticized mixture of cellulose acetate dissolved in a solvent therefor with a filler, the latter imparting visibility to the marker, the cellulose acetate being present in a predominating proportion, a small proportion of a lubricant, the latter functioning to lubricate the molded surface and facilitate the removal of the molded marker from its mold, and to confer water-resisting properties on the marker; forming the reaction mass into sheets, forming discs from said sheets, drying said discs, and molding the resulting discs under heat and pressure to produce a dense wear-resistant marker.

16. A dense wear-resistant pavement marker capable of retaining its shape under varying temperature changes, the essential constituents of said marker being a plasticized organic derivative of cellulose and a filler having reflecting properties, the organic derivative of cellulose being present in a predominating quantity, said marker being repellent to water and to tar and road drippings by virtue of a greasy surface whereby said constituents are prevented from entering and discoloring the predetermined visible color of the marker, the marker surface substantially retaining its original polish by the buffering action of vehicles passing over said marker.

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