Jan. 26, 1943. J. M. FALLON ET AL 2,309,178

IDENTIFICATION TICKET AND METHOD OF PRODUCING SAME

Filed Feb. 21, 1941

FIG. 1

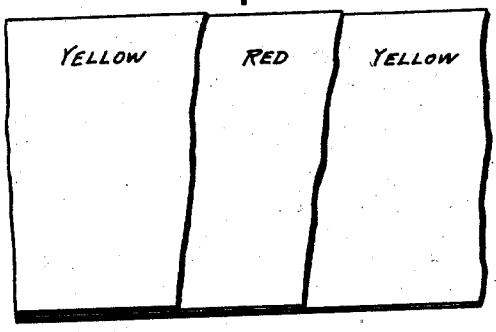


FIG. 2

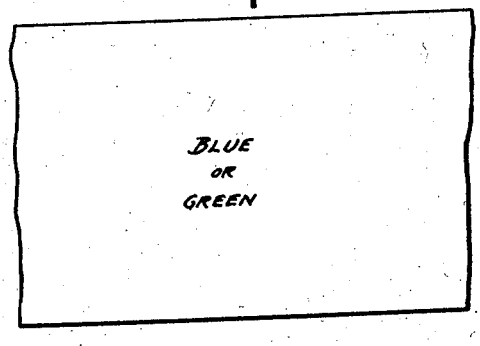


FIG. 3

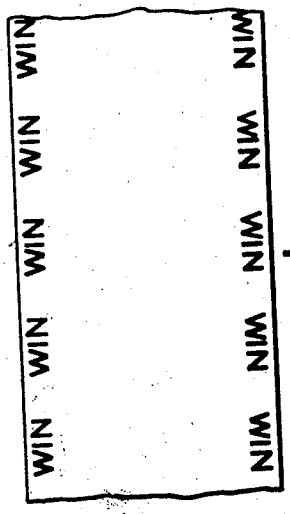


FIG. 4

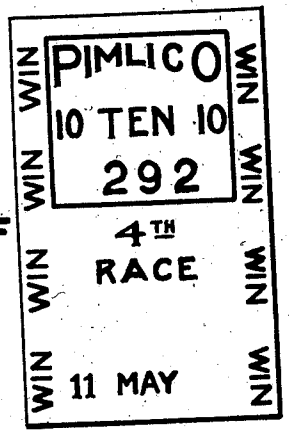


FIG. 5

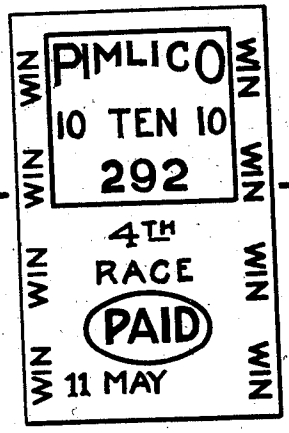
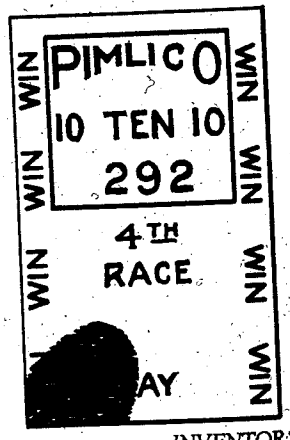


FIG. 6



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2,309,178

IDENTIFICATION TICKET AND METHOD OF PRODUCING SAME

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Application February 21, 1941, Serial No. 379,918

7 Claims. (Cl. 283—8)

This invention pertains to an identification ticket, and more particularly to the paper stock therefor, including the method of producing the same. Such tickets are commonly used for admissions, receipts and as legalized mutual race betting tickets.

The object of the invention is to produce a ticket or paper stock therefor of a character which may be readily identified for the purpose of detecting counterfeits and preventing erasures and the changing of values or identifying marks printed thereon.

Another feature of the invention is to produce a paper stock from which the ticket is cut which may be printed in an automatic machine as it is delivered therefrom by chemical reaction developed from the interior of the paper stock as distinguished from surface printing by ink.

The use of a coloring dye in the production of paper having reactive chemical characteristics is well known in the art and has been applied to so-called "safety paper," as outlined in an article appearing on page 61 of the September 6, 1928, issue of the "Paper Trade Journal," a publication of New York, New York.

It is the purpose of this invention to utilize such coloring dye in a manner to provide a paper stock from which such tickets may be produced to largely overcome, or greatly minimize, the problem of identification and alteration.

In the use of identification tickets, particularly mutual tickets at race tracks, substantial losses are encountered through counterfeiting of pay tickets or the alteration of non-pay tickets to pay tickets by application of eradicating fluids, scratching and the like. Many attempts have been made to produce a paper stock to avoid or minimize such losses, such as mottling paper surfaces, embodying threads or placing thereon ever-changing identification marks such as will indicate to the pay teller that a ticket presented is counterfeit or has been altered.

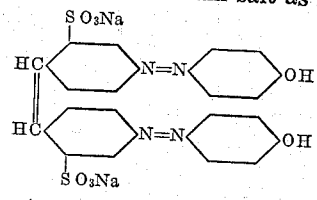
The invention herein set forth not only provides a ready means of identifying the paper stock to distinguish the ticket from those of counterfeit stock but, so far as is known, eliminates any possibility of altering the printed matter. This is accomplished by developing a paper stock of the character and in the manner hereinafter more particularly set forth and described wherein a dye, either neutral or of any color, will chemically react through a surface coloring upon the application of a suitable agent, and wherein the surface coloring is applied thereover in such manner as not to resist erasures.

The full nature of the invention will be understood from the accompanying drawing, the following description and claims:

Fig. 1 is a perspective view of a section of stock in the form of a strip greatly exaggerated as to thickness and with successive layers peeled off to illustrate the body of the stock. Fig. 2 is a plan view of a portion of the finished stock after the surface coloring has been applied and ready for printing. Fig. 3 is a plan view showing a section of the printed stock. Fig. 4 is a plan view of a ticket having the identifying indicia applied thereto. Fig. 5 is the same as Fig. 4 showing the same ticket after having been identified and accepted for redemption through application of a stamp. Fig. 6 is a modified form of Fig. 5 showing another method of identification for acceptance and redemption through a fingermark.

The paper stock as illustrated in Fig. 1 is developed in the usual manner on a paper making machine, preferably of three layers of two or more colors. As illustrated herein, and for example, the outer layers are colored yellow and the inner layer is colored red. Obviously other colors may be employed. Thus, as in the usual practice in producing ticket stock, a red coloring dye may be applied to the stock carried over the intermediate rolls and the yellow dye to the stock carried over the rolls on opposite sides thereof.

In this instance, the yellow dye, or any other desirable color, is of a character which is reactive to an alkaline solution to change its color, the paper fibres of the outer layer being impregnated therewith. A satisfactory dye for this purpose may be prepared by coupling one molecule of tetrazotized diamino stilbene disulfonic acid to two molecules of phenol. The chemical structure is believed to be that listed in the Color Index as No. 364 and the form in which this is marketed is believed to be the disodium salt as follows:



Upon treatment with alkali the change in hue to red is believed to result from replacement of the hydrogen of the hydroxyl groups with the alkali metal. Treatment with caustic soda, for example, will probably replace both these hydrogens with sodium.

This dye is reactive to an alkaline solution of

a pH greater than 10, in that upon such solution being applied, the color of the dye will be changed thereby. For example, the above described dye will so react as to become a reddish pink color.

After the stock is thus developed and built up with the impregnated dyes, it is sized and passed through coloring rolls for applying a different surface coloring to the dye impregnated outer layers. Such surface coloring may be green, blue, or any other suitable color as shown in Fig. 2. Before applying the surface coloring, it is important that the stock be sufficiently sized to prevent any material penetration thereof. This results in the surface coloring being destroyed upon the lightest application of erasure or scratching. Such surface coloring is preferably selected so as to react by a change in color upon application of any of the known ink eradicating solutions.

The stock when thus prepared is ready for trimming, printing and rolling into suitable rolls for use in ticket vending or totalizing machines, or cutting to ticket size, printing and vending in the usual manner.

Fig. 3 shows a section of a strip of stock wound in a roll after being partially printed for use in an automatic ticket printing and vending machine.

Fig. 4 illustrates the final printed and cut ticket with the identifying indicia thereon. This indicia, as shown in Fig. 4, may be applied by the application of surface ink in the usual manner of printing. But, preferably, and to prevent erasures and alterations of the identifying indicia the printing may be effected by the mere application of an alkaline solution upon the printing type. Such type application of the alkaline solution has the effect of changing the color of the reactive dye such that it will show through the surface coloring and in this case develop a printed identifying indicia comprising the discolored and impregnated dye, as distinguished from mere surface printing. The result is that such identifying indicia cannot be removed by erasure from the surface of the ticket for alteration thereof as is the case with surface applied ink.

A ticket of this character further has the major advantage of convenient identification for acceptance and redemption.

As shown in Fig. 5, upon the ticket being redeemed a stamp illustrated therein as embodying the word "Paid" may be applied with the alkaline solution thereon obtained from first applying the stamp to the usual so-called ink pad which is impregnated with the solution instead of ink. Upon thus applying the stamp the change in color through the chemical reaction of the dye as above referred to will promptly appear. This will be evidence that the ticket to be redeemed is not a counterfeit.

As suggested in Fig. 6, the redeemer of the ticket need not use a stamp but may moisten his fingers with the alkaline solution conveniently arranged in a sponge so that when he grasps the corner of the ticket for redemption, the ticket will change color and show his fingerprint. This is illustrated in the lower left-hand corner of the ticket illustrated in Fig. 6.

Summarizing the advantages and uses of identification tickets and paper stock therefor made in accordance with this method, the chemical reacting dye with which the outer layers of the stock are impregnated, and the surface coloring may serve three functions. The ticket may be readily identified from a counterfeit ticket by the application of the alkaline solution in any convenient manner (Figs. 5 and 6) to effect a chemical change in color. Secondly, the surface coloring will be removed by mechanical erasure, and will chemically react to the known ink eradicator solutions to the end that any attempt to alter the indicia by mechanical erasure or the use of a solution for eradicating the identifying indicia to permit alteration thereof, will immediately show up through non-removable discoloration. Thirdly, it enables the use of a printing liquid containing an alkaline solution, as distinguished from the conventional oil base inks, for use in automatic ticket printing and vending machines. Such alkaline ink, in effect develops its coloring from the die impregnated stock, forestalling any attempt at surface erasure.

Said advantages mentioned will make it difficult, if not impossible, to either substitute a counterfeit ticket or effect alterations in the legitimate ticket.

The invention claimed is:

1. An identifying ticket including paper stock impregnated with a coloring dye chemically reactive to a color changing agent and a superficial surface coloring applied over the exposed surface of the dye impregnated stock without penetration, said superficial surface coloring being of a different color than the impregnated coloring dye and through which a color changing effect may appear upon application thereto of a color changing agent through the medium of its reaction to said impregnated coloring dye.

2. An identifying ticket including a paper stock impregnated with a coloring dye chemically reactive to a color changing agent, and a superficial surface coloring dye of a different color than that of the impregnated dye extending over the effective surface of the stock, said surface coloring dye being reactive to an ink eradicating agent and the surface of the stock covered thereby being sufficiently sized to prevent undue penetration by said surface coloring through which said color changing agent may react on the impregnated dye.

3. An identifying ticket including a paper stock impregnated with a coloring dye chemically reactive to a color-changing agent, a superficial surface coloring dye of a different color than that of the impregnated dye extending over the effective surface of the stock, said surface coloring dye being reactive to an ink eradicating agent and the surface of the stock covered thereby being sufficiently sized to prevent undue penetration by said surface coloring through which said color-changing agent may react on the impregnated dye, and identifying indicia printed on said stock through application of said color-changing agent over the surface coloring.

4. The method of producing an identifying negotiable paper ticket consisting in impregnating the paper stock with a dye reactive to a color changing agent, sizing said stock, applying a surface coloring thereover different from the color of said dye, said sizing being sufficient to prevent undue penetration of surface coloring, and applying said agent to the surface coloring of the ticket to effect an identifying color change therethrough upon said ticket being negotiated.

5. The method of producing an identifying ticket consisting in forming a paper stock, applying a coloring dye to said stock while being formed for impregnation thereof, said coloring dye being chemically reactive to a color-changing

agent, sizing the exposed and effective surface of said stock and applying a superficial surface coloring dye thereover, said sizing being sufficient to prevent undue penetration of the stock by said surface coloring dye.

6. The method of producing an identifying ticket consisting in forming a paper stock, applying a coloring dye to said stock while being formed for impregnation thereof, said coloring dye being chemically reactive to a color-changing agent, sizing the exposed and effective surface of said stock and applying a superficial surface coloring dye thereover, said sizing being sufficient to prevent undue penetration of the stock by said surface coloring dye, said surface coloring dye being reactive to an ink eradicating agent, and printing on said effective surface identifying indicia through application over the surface coloring dye of a color-changing agent reactive to the impregnated dye.

7. The method of producing an identifying negotiable paper ticket consisting in impregnating the paper stock while being formed with a dye comprising one molecule of tetrazotized diamino stilbene disulfonic acid coupled with two molecules of phenol, sizing the paper stock, applying a surface coating of a different color from the dye, said sizing being sufficient to prevent undue penetration of said surface coating and applying an alkali solution to the colored surface of the ticket to effect an identifying color change through chemical reaction with said dye upon said ticket being negotiated.

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