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MARKING INK

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1 Claim. (Cl. 106—22)

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This invention relates to a new and improved marking ink, and more particularly to a marking ink which is especially adapted for use in stamp pads, numbering machines and other devices in which the ink is held by an absorbent pad or other absorbent or porous carrier.

Various types of inks have heretofore been employed for use in stamp pads, numbering machines and the like, but such inks in general have had various disadvantages, among which are that they tend to gum the numbering machine or other stamping device to which the ink is applied and also tend to dry out. These prior inks fall into two general classes, hydrophilic and hydrophobic. The hydrophobic inks are exemplified by an oily vehicle into which pigments have been ground and in which they are intended to remain in suspension. Such inks have a tendency to settle out when not in use, and when in use in a pad or the like they do not spread freely throughout the pad, since the particles of color are filtered out by the fibrous medium usually employed. This results in short life and caking of the pad; also, the oily vehicle has a tendency to gum and restrict the free flow of the ink in the pad, and the pigment tends to fill the type.

In the other type of ink, namely, the hydrophilic type, glycerin or glycols have been employed as solvents for the dyestuffs, usually in combination with water. In any event, these solvents, being hygroscopic, absorb atmospheric moisture and produce variable results, depending upon the humidity of the ambient atmosphere. It is a common complaint with this type of ink that the pads are either too wet or too dry, and produce impressions that are either illegible due to insufficient ink or blurred due to excessive moisture.

Among the objects of the present invention are to obviate the disadvantages of the marking inks heretofore employed, and to produce a marking ink which may be used with stamp pads, ticker pads and other kinds of inking devices, which will not dry in the pad or other carrier, or cause caking, type filling or gumming, or deteriorate on standing over long periods of time; and in which the pad or other carrier need not be rejuvenated over long periods of time, and which is adapted to re-ink without removing the pad from its apparatus or holder; which will print uniformly regardless of weather conditions, and print on various different types of surfaces with clear, full characters; and with which a greater number of different dyes or other coloring agents may be employed, thereby to give a greater number of desired color effects, without impairing the foregoing desirable characteristics of the ink.

In the ink of the present invention a partially substituted ester of a polyhydroxy compound is employed as the vehicle. The advantage of partial esterification is that the resulting solvent,

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while prepared from a hydrophilic material reacted with a hydrophobic material, retains the desirable qualities of both original reagents, and so possesses good solvent properties for dyestuffs as well as elimination of the usual hygroscopicity of the hydrophilic materials. In this ink it is preferable to employ a dye that is completely soluble in the vehicle, which eliminates all tendency of settling out of color and at the same time permits even distribution of ink in the pad or other carrier during use, thereby increasing the useful life of the ink pad or carrier. The vehicle does not gum or dry out or absorb atmospheric moisture and thus retains the desired viscosity and printing qualities over long periods of time, thereby obviating the necessity of frequent inking.

It will be appreciated that where stamp pads are used, particularly in numbering machines employed to number messages or characters in telegraph and telephone systems, the necessity of having to re-ink these pads at frequent intervals by maintenance men involves a very considerable cost, and notwithstanding frequent inspections and re-inking of these pads, there has always been the likelihood that the pads will fail to ink the type properly, either due to unusual traffic conditions which may impose severe loads on the pads or due to changing atmospheric conditions in different localities throughout which the communication circuits may extend. Moreover, with the glycerin type of inks heretofore employed, the fibers of the pads are softened by atmospheric moisture and become matted, thus soon destroying the usefulness of the pad itself, and with the oily ink heretofore employed, the pads soon become gummed and the pad loses its desired resiliency. Both of these disadvantages are obviated by the present invention, and the pads may be expected to have a useful life of at least several years, even in constant service, and re-inking of the pads is simplified, since they do not have to be removed from their machines or holders, but may be rejuvenated by merely applying some of this ink to any part of the pad, whereupon the ink uniformly distributes itself throughout the pad.

The class of solvents for the ink of the invention comprises the partial esters of polyhydroxy alcohols, and specifically polyhydroxy alcohols such as glycols, glycerin, mannitol, sorbitol and others which have been partly esterified with organic acids, preferably fatty acids such as oleic, linoleic, lauric, propionic, ricinoleic, and others. While it is desirable to leave on the molecule some free hydroxyls to impart solubility for dyestuffs, an excess thereof tends to produce hygroscopicity, and the removal of these excess hydroxyls by attaching negative radicals of the fatty acid type eliminates or sharply reduces hygroscopicity with-

out substantially impairing the solubility for dyestuffs.

A formula which has proved particularly satisfactory for use with stamp pads, such as employed with hand stamps and numbering machines, comprises glyceryl mono-ricinoleate, with approximately 6% by weight of a suitable dye such as Rhodamine B base dissolved in it, the resultant ink having a bluish-red color. The dye or other coloring agent employed, however, may be violet, green, blue, orange or other desired color, the important consideration in this respect being that the dye is one which dissolves properly in the solvent employed. Various of such dyes suitable for the purpose are well-known in the art. For example, and by way of illustration only, these dyes may comprise Methyl Violet, Pontacyl Brilliant Green, Aniline Blue or a paste color such as an Induline Blue dye on a naphthenic acid base, and a mixture of Auramine and Rhodamine B base to produce orange. The particular proportions of the dyes may be varied within wide limits, depending upon the particular vehicle employed, the desired color and the requirements of service. For example, in the use of printer-reperforators, in which the incoming telegraph signals are punched in a tape and the corresponding characters also are printed on the tape, it has been found desirable to use a relatively small amount of dye and thereby obviate any tendency of the ink to smear as it passes through the telegraph apparatus. On the other hand, where ink is applied to a tape or web for projection on a screen, it is desirable to use a greater amount of dye, for example, 18% to 20% or more relative to the vehicle, such as glyceryl mono-ricinoleate, so that the printed characters are quite opaque and provide the desired tone contrast.

For certain types of service and for certain types of fibrous pads, a fairly viscous ink will give the best results, and for such purposes the above-mentioned glyceryl mono-ricinoleate is especially suitable. For other types of service and other styles of fibrous pads, a less viscous ink is preferable, and for this purpose diethylene glycol mono-ricinoleate is preferable, its printing qualities being equally as good as glyceryl mono-ricinoleate.

For certain purposes where other variations in physical properties are desired, partial esters of other glycols and of other polyhydroxy compounds may be used, for example, mannitol or sorbitol, where the other ester group is preferably a fatty acid radical such as oleate, linoleate, laurate, etc., although other organic acids may be employed. The method of partially esterifyifying the above-named compounds, although a comparatively recent development, is well-known in the chemical art. It will be obvious to those skilled in the art that the viscosity range of the inks thus produced is quite wide, but notwithstanding this wide range of viscosity the above-mentioned desirable qualities of the ink are retained in service for long periods of time. For certain purposes where it may be desired to have an increase in hydrophobic character, a di- or tri-substituted ester may be employed with excellent results. In the case of any of the inks in accordance with the instant invention, it will be found that the ink pad or roller will deliver

or transfer to the printing type an adequate supply of ink regardless of whether the pad or roller has been freshly inked or is approaching the point at which the same should be re-inked; this characteristic of the ink is sharply in contrast to that of prior inks in which good results are obtainable only after the pad or roller has been freshly inked.

Inks embodying the present invention have been employed in field service, particularly for numbering machines and stamp pads in telegraph systems, for a substantial period of time and have demonstrated the improved characteristics of the inks. For example, a number of the inking pads have been used concurrently on different numbering machines for a period of over six months in continuous service, and during this time the reports prove that the ink is free from the usual disadvantages of the prior inks, which disadvantages included the settling out of color, gumming of the machines, filling of type, and presence of excessive oil or pigment, and the stamps invariably produced clear-cut figures. In fact, these stamp pads are still in use and to date have not required re-inking or other attention, and there is no noteworthy difference in the condition of the ink pads themselves, and this has been found true both in the case of the felt pads employed in numbering machines as well as the cotton or cotton-mixed pads employed with hand stamp pads.

Also, ticker ink rollers impregnated with ink in accordance with the instant invention have proved satisfactory for tickers, over a substantial period of time in field service, and as in the case of the numbering machines and stamp pads the same desirable printing quality was uniformly obtained. The foregoing is in contrast to the ink formerly used in service by certain telegraph companies and others, which was the best obtainable at that time, but which nevertheless required frequent re-inking and considerable attention, and in many instances required frequent replacement of the pads.

While the ink in accordance with the instant invention has been described in connection with numbering machines, stamp pads, ticker ink rollers and the like, it will be obvious that its uses and advantages are not limited thereto but may be employed in connection with various other types of ink carriers, such as typewriter ribbons and the like, and the advantages of the instant ink will be present in these various other carriers and uses to which the ink may be put.

I claim:

A fluid marking ink consisting substantially entirely of glyceryl mono-ricinoleate and a dye dissolved in said partial ester.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,160,511	Neidich	May 30, 1939
2,144,104	Cochran	Jan. 17, 1939
2,165,522	Taylor et al.	July 11, 1939
2,202,066	Platt	May 28, 1940
1,958,700	Harris	May 15, 1934