UNITED STATES PATENT OFFICE.

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INK.

SPECIFICATION forming part of Letters Patent No. 483,447, dated September 27, 1892.

Application filed February 19, 1892. Serial No. 422,119. (No specimens.) Patented in England January 2, 1892, No. 93; in France January 6, 1892, No. 218,495, and in Belgium January 7, 1892, No. 97,830.

To all whom it may concern:

Be it known that I, CHARLES M. HIGGINS, a citizen of the United States, residing in Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Inks, (for which I have obtained Letters Patent of Great Britain, dated January 2, 1892, No. 93; of France, dated January 6, 1892, No. 218,495, and of Belgium, dated January 7, 1892, No. 97,830,) of which the following is a specification.

My invention applies more especially to inks for type-writing or other manual or automatic printing-machines, either for saturating the ink-ribbons, or for use on the inking-pads, rollers or other inking devices, and also for use with rubber hand-stamps or for all similar or analogous uses where a long-lasting or non-drying ink is required.

The problem of my invention is to provide an ink having a true oily vehicle, yet holding in perfect solution a dense coloring-matter soluble in water, such as the aniline colors, so that such ink when used on the inking device, whether pad, ribbon, or roller, will be practically non-drying thereon and not susceptible to atmospheric moisture and yet when printed on the paper will not smut on contact with the fingers, as is the case with the glycerine inks, and, notwithstanding these moisture-resisting qualities, will yet give a good press-copy when subjected to the copying-press.

To this end my invention consists, essentially, in the combination of carbolic acid or an equivalent phenol with some fixed or nearly fixed oil or fat, preferably castor-oil or oil of cassia, or both, as hereinafter fully set forth.

I have discovered that castor-oil is a peculiar exception among the fixed oils in having no action whatever upon soft or hard rubber, whereas all the other fixed vegetable or animal oils attack it vigorously. I have also discovered that oil of cassia or cinnamon-bark is a like exception among the essential oils in having no perceptible action on rubber, whereas the other spice-oils—such as that of cloves, allspice, and even cinnamon-leaf—attack the rubber energetically. Carbolic acid and its substitute, creosote, while readily soluble in and mixable with oils and fats, has, I find, likewise no action upon rubber and is a great solvent for the aniline colors, and hence when added to a fixed oil it greatly promotes the solution of the coloring-matter in such oil, which without it would hold little or none of the coloring-matter, whereas the fixed oil, on the other hand, completely counteracts or neutralizes the highly-volatile character of the carbolic acid and prevents it from drying up and causing the ink to harden, as would soon occur if carbolic acid or a strictly-volatile oil alone constituted the vehicle and solvent of the ink.

The carbolic acid or creosote has another very important function in this compound besides increasing the solution of the coloring-matter in the vehicle—viz., that of greatly improving the copying qualities of the ink, as an ink composed of coloring-matter dissolved in carbolic acid and a fixed or nearly fixed oil will give a very quick and strong press-copy and yet will not be susceptible to atmospheric moisture when on the inking device, nor will it be subject to smutting or offsetting when printed, as is the case with glycerine inks. On the contrary, my improved ink appears to dry or set immediately by absortion in the paper when printed, yet is entirely non-drying in a mass or film on the printing device, which are the most important qualities heretofore sought for in this class of inks.

The oil of cassia and the other spice-oils, while technically volatile, as is well known, are the least volatile of the series and may be regarded as practically fixed for the reason that in a mass or film they do not dry and are all great solvents for aniline colors, as set forth in my former United States Patent, No. 437,781, of October 7, 1890. An ink made, however, with a spice-oil alone would not give as good or as quick a press-copy as one made with the addition of carbolic acid or creosote, which is the main feature of my present improvement. Furthermore, an ink made with spice-oil and carbolic acid as the sole vehicles would be quite expensive, whereas by the addition of castor-oil the vehicle is greatly cheapened without its solvent power being much, if any, impaired, and its non-drying quality is improved, which is another

important feature of my present invention. Hence for all purposes where a very dense solution of coloring-matter is not required I prefer to use a large proportion of castor-oil with a small proportion of carbolic acid and oil of cassia, which mixture is particularly adapted for rubber stamps, as none of these ingredients has any action on rubber and yet forms a comparatively-cheap vehicle and solvent, fully as cheap and efficient as the generally-used glycerine, and at the same time far superior to it in being waterproof and non-smutting, which is a quality which has been very much desired in stamping-inks. Where a much stronger solution is required—such as in copying-inks for type-writers or similar uses—only a small proportion of the castor-oil may be used and a larger proportion of the oil of cassia or other highly-solvent oil with the carbolic acid or creosote, or for this purpose the castor-oil may be omitted altogether and any fixed or nearly fixed and solvent oil or fat may be used in connection with the carbolic acid, preferably oil of cassia or some other of the spice-oils. I therefore do not confine myself to any fixed proportion of the coloring-matter, the fixed oil, and the carbolic acid or creosote, as these may vary considerably, according to the different purposes required, and hence I will give several practical yet varying formulas for different purposes. For example, for an ink for rubber or other stamps I take, say, four fluid ounces of castor-oil and add to this one fluid ounce each of carbolic acid and oil of cassia, and when these are thoroughly mixed together I dissolve in the same one ounce, avoirdupois, of methyl-violet, green crystals, or other coloring-matter, according to the color desired. This vehicle will dissolve most of the aniline colors cold, assisted by simple stirring or agitation; but it may be heated, if desired, to make the solution quicker. Where a stronger solution is desired—such as for type-writing ink—the proportions may be varied as follows: four ounces of castor-oil, two ounces of oil of cassia, two ounces of carbolic acid, and two to four ounces of methyl-violet or other aniline color, according to the density of solution required. Where very strong colored solutions are desired, it will be best to mix the carbolic acid and the oil of cassia or its equivalent together and then add and dissolve the aniline color therein, and when the solution is complete then slowly add and stir in the castor-oil, which will combine and mix perfectly, whereas almost any other of the fixed oils would precipitate the color.

I prefer to use the carbolic acid in the pure or crystal form, which will readily melt and dissolve in the oils; but other phenols may be used, and if creosote is used as a substitute I prefer to use the true pure white quality, free from water, which will readily mix with the oils without any separation or deposit. Creosote will give nearly the same effect as the carbolic acid; but I prefer to use the crystalline carbolic acid.

My improved ink may also be used as a copyable printing-ink for use in ordinary presswork, and also for coloring leather or other fabrics, or any similar purposes for which it may be found suitable.

I am aware that it has been proposed to combine dilute carbolic acid with printers' ink; but an ink made of this material is not an equivalent for my ink, as a drying-oil is an essential feature in printers' ink, while in my compound a non-drying oil is used. Another important difference is that I use pure or crystal carbolic acid, while what is known as "dilute" acid, such as has been heretofore used, would not mix with my solvent oils at all.

In the following claims where I use the words "carbolic acid" I mean to be understood as referring to any equivalent therefor, such as creosote, and by the addition of the word "pure" before carbolic acid I mean to be understood as referring to carbolic acid in an undiluted state.

What I claim as my invention is—

1. A printing or stamping ink composed of a substantially-fixed oil or fat combined with pure carbolic acid and a coloring-matter, substantially as herein set forth.

2. A printing or stamping ink composed of pure carbolic acid combined with a fixed or nearly fixed oil and an aniline color dissolved therein, substantially as herein set forth.

3. A printing or stamping ink composed of carbolic acid, castor-oil, and a coloring-matter, substantially as herein specified.

4. A vehicle for oily inks, consisting of castor-oil, an essential oil, and carbolic acid, substantially as herein set forth.

5. A vehicle for oily inks, consisting of castor-oil, oil of cassia, and carbolic acid, substantially as herein specified.

6. A printing or stamping ink composed of castor-oil, oil of cassia, carbolic acid, and an aniline color dissolved therein, substantially as herein set forth.

Dated this 30th day of December, 1891.

CHAS. M. HIGGINS.

Witnesses:

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