May 26, 1936. A. O. BECKMAN 2,041,740

INKING DEVICE

Filed June 8, 1934

Fig. 1.

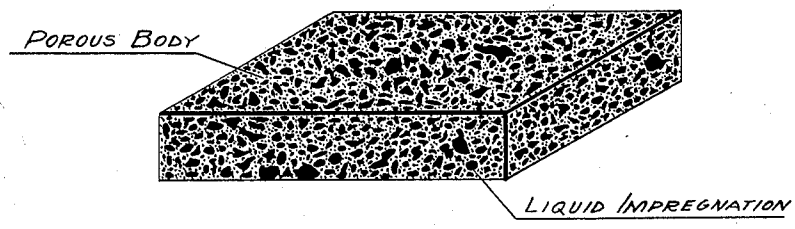


Fig. 2.

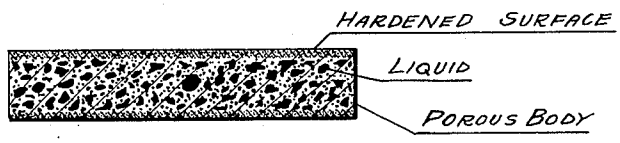
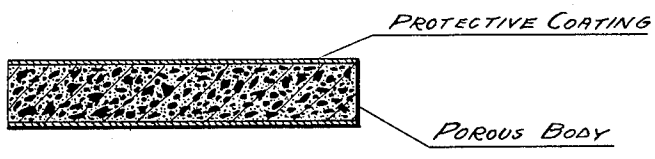


Fig. 3.



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INKING DEVICE

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8 Claims. (Cl. 91—68)

This invention relates to inking devices and to methods of preparing the same.

The inking device of this invention is sometimes incorrectly referred to as solid ink. The term solid ink is not correctly applicable to this device because the liquid inking substance does not solidify but instead is stored, in its liquid state, in the interstices of a porous body soft and friable from which the liquid inking substance is released, as a liquid or semi-liquid, to perform its inking function as the porous body is broken down, as by abrasion. It is one of the principal objects of this invention to provide such an inking device.

As will be readily appreciated, the inking device of this invention has a great variety of uses; a few of which will be stated by way of example. The device may be advantageously used for the purpose of applying and distributing suitable dyes and/or pigments to sheets of fibrous material in the manufacture of transfer or carbon paper; or it may be used as a drawing, sketching, or marking material or device such as pencils, crayons, etc. One of the most important uses for the inking devices of this invention is for the treating of the printing ribbons of various machines such as typewriters, addressing machines, adding machines, and the like.

This invention is particularly adapted for use in the inking devices illustrated and described in United States Letters Patent No. 1,962,309, granted to Hector W. Jewell on June 12, 1934.

For the purpose of description, the use of the inking devices of this invention will be confined to their use in connection with the treatment of printing ribbons. It will be understood that the devices may be used for applying the initial supply of inking substance to such ribbons, or may be used to maintain a new ribbon in substantially its most efficient printing condition, or may be used to recondition ribbons from which nearly all of the inking substance has been used.

It is a further object to provide inking devices applicable to the uses as stated above or for any other uses to which the devices may be advantageously put.

A further object is to predetermine the rate of delivery of the inking substance to the printing ribbon by controlling the hardness of the porous body and thereby its rate of abrasion. It will be understood that, as the porous body wears away, the contacting fabric of the printing ribbon will absorb the released liquid or semiliquid inking substance.

A further object is to make the inking devices of such materials as to be practically unaffected by reasonable temperature changes.

Another object is to disclose and provide a porous form retaining body capable of being saturated with the inking fluid.

These and other objects, uses and advantages of the invention will become apparent to those skilled in this art from the following description of a preferred combination of ingredients, method of preparation, and form and use of the finished product, illustrated in the accompanying drawing, wherein

Figure 1 is a perspective view of an inking device constructed in accordance with my invention;

Fig. 2 is a longitudinal sectional view of a section of an inking device constructed in accordance with my invention and illustrating one modification thereof; and

Fig. 3 is a horizontal sectional view similar to Fig. 2, illustrating a still further modified form of my invention.

I have illustrated in Figs. 1, 2 and 3 an inking device constructed in accordance with my invention, which includes a porous body impregnated with liquid constituting either an inking solvent or an ink solvent and coloring matter, indicated in the drawing by the legend "liquid impregnation."

Porous body

The porous body which forms the liquid absorbing and holding structure of the finished product may be made from a number of different ingredients, of which magnesium carbonate, basic magnesium carbonate, calcium carbonate, clay, diatomaceous earth, or mixtures of these ingredients, may be cited as illustrative. Various binders may be used in addition, such as, for example, gum tragacanth, sodium silicate, etc.

Moulded basic magnesium carbonate has been found to provide a very effective porous body. Magnesium carbonate has a high degree of porosity and blocks formed of this material have been found to have sufficient strength to withstand being cut into the required shapes and to withstand normal handling. At the same time, porous bodies formed of this material are sufficiently soft and friable so as to be capable of wearing away by the moving surface of the printing ribbon against which the device may be lightly pressed, as by the holders shown in the Jewell patent, hereinbefore referred to.

In preparation of the porous bodies from any

of the stated materials, the ingredients from which the porous bodies are to be made may be reduced to a suitable state of division, intimately mixed with a small quantity of binding material, and then a sufficient liquid may be added to produce a plastic, easily molded mass. The mixture may then be moulded or formed into blocks in any suitable manner. The solid ingredients which it is desired to use in making the porous blocks may be made into a slurry and then filtered to form cakes or blocks which, upon drying, can be cut into the desired shapes. When only sufficient water is used to produce a plastic mass, the mass may be extruded into the form of rods which may be cut to the required size. After drying the blocks thus formed, they may be saturated with a suitable liquid.

When the inking devices of this invention are to be used in the holders of the Jewell patent, the magnesium carbonate may be sawed or cut into little blocks of the required shape and size so as to nicely fit therein. These little blocks may then be saturated with the desired ink, pigment, dye, or liquid. It is to be understood, however, that the main block of magnesium carbonate may be saturated before cutting, as in some cases the material may be cut more easily and accurately after saturation.

Saturating the porous bodies

The blocks either before or after being cut to size are saturated with any liquid (indicated on the drawing by the legend "liquid") having the characteristic of being non-volatile at ordinary atmospheric temperatures and non-drying when subjected to exposure to ordinary atmospheric conditions, which liquid may, if desired, contain coloring matter. A few of the suitable non-volatile and non-drying liquids adapted for use in this manner are petroleum oils, such as mineral lubricating oils, spindle oils, corn oil, cotton seed oil, butyl phthalate, etc. To reduce the time required for saturating the blocks, the oils or non-volatile liquids may be warmed or heated. Also, in some cases, alternate applications of vacuum and pressure may be resorted to.

When the finished product is to be used as an inking, color, or pigment, imparting device; then the liquid or semi-liquid mass may be employed as a carrier for a suitable dye or pigment. Liquid-soluble dyes, such as dyes of the aniline type, may be used. Insoluble pigments, such as carbon black and liquid-insoluble dyes in powder form, may also be used; these ingredients being intimately mixed with the liquid carrier prior to saturating the porous bodies. As will be readily appreciated, the quantity of dye or pigment mixed with the saturating liquid may vary greatly to suit different types or compositions of the porous bodies, or to suit different uses of the product.

Controlling the delivery rate of the inking substance to the ribbon

In order to determine the quantity of inking substance which should be fed to the printing ribbon, it is necessary to know the rate at which the inking substance is used up during the normal printing operations for a given length of ribbon. Having carefully determined this value, it is then possible to arrange the inking device to substantially feed the same quantity of inking substance back into the ribbon for this given length of ribbon travel. One way of acquiring this control is to regulate the force or pressure, pressing the device into contact with the ribbon, thereby controlling the rate of wear of the device and thus the quantity of liquid freed for absorption by the ribbon. The preferred method of controlling the wearing rate of the device for a given length of ribbon travel is to maintain the device pressed against the appropriate surface of the printing ribbon under substantially uniform pressure and to form the porous body of the device of a selected degree of hardness and to thereby regulate the amount of wear of the block for each unit of travel of the ribbon; and thus regulating the quantity of liquid available for absorption by this length of ribbon.

One method of controlling the hardness of the porous body is to add a suitable quantity of wax, resin, or bituminous material, to the non-volatile liquid used in saturating the bodies. Carnauba wax, paraffin wax, and various synthetic waxes and resins may be used to advantage.

Another method of regulating the hardness of the porous bodies is by heat treating them. It is possible by heat treating the porous bodies to harden the exterior surfaces of the blocks and to leave the inner portions thereof soft as indicated by the legend "hardened surface" in Fig. 2 of the drawing. Thus, the rate of abrasion, is determined by the relatively thin hard shell. Of course, these blocks may be hardened evenly throughout by a longer process of heat treatment, as is well understood by those having knowledge of this art.

In some instances, porous bodies having slightly greater resistance to abrasion may be formed of calcium carbonate, clay, diatomaceous earth, or mixtures thereof.

The blocks, of course, may be hardened by other methods but the important feature is to harden the blocks to thereby control the rate of wear and thus the quantity of ink substance presented to the ribbon for absorption for each unit of travel thereof which is so proportioned as to be substantially equal the quantity of inking substance withdrawn during the normal printing of the ribbon for a corresponding length thereof; in other words, a balanced feeding of the inking substance.

It is to be understood that the liquid feeding function of the device may be controlled by predetermining the quantity of liquid absorbed by the porous body.

Coating exterior surfaces of devices

In some cases it is desirable to coat the exterior surfaces of the finished blocks to permit the devices to be handled without the liability of the operative's fingers becoming stained.

In some cases the coating may reduce the sliding friction between the block and its holder.

Such a coating may be provided by applying a very light application of a suitable wax or waxy and/or resinous composition to the exterior surfaces of the finished product, or by dusting onto the exterior surfaces of the finished blocks suitable powders, or by metalizing these surfaces as indicated by the legend "protective coating" in Fig. 3 of the drawing.

Use

The inking device of this invention may be used in a suitable holder, several examples of which are illustrated and described in the Jewell patent hereinbefore referred to, by which the printing ribbon of any form of machine may be drawn across a portion of the inking device under predetermined pressure. Thus, as the ribbon is fed

in the usual manner, as is well understood, it will drag across the inking device and cause the engaged portion of the device to wear away slowly and, as the porous body of the device wears away, the inking liquid contained in the interstices thereof will be absorbed by the fabric of the ribbon; thus gradually feeding to the ribbon a minute quantity of the inking substance. When the hardness of the porous body and the pressure of the body against the ribbon are correctly proportioned, the block will wear away just about fast enough to maintain the ribbon fully inked.

When reconditioning a well used ribbon, it may be advisable to pass the ribbon across the inking device a few times to replenish the ink supply therein before starting it in on its normal operation.

Preferably, the device is to be brought into action with a new ribbon and, if properly regulated as to the pressure of the inking device against the ribbon and the hardness of the block, this new ribbon will be maintained nicely inked and type impressions taken through the ribbon will all be of substantially the same color quality throughout the life of the ribbon. Of equal, or more importance, it has been found that the life of such a treated ribbon will be from four to eight times its normal life. It is a common fact that most typewriter ribbons are thrown away before the fabric of the ribbon is worn out.

It will be understood that inking devices of this invention may be used to apply the initial supply of ink to a new ribbon.

In extremely dry climates where the ribbons have a tendency to dry out rapidly before all of the coloring matter has been used from the ribbon, the porous body may be saturated with a liquid having the characteristics of being relatively non-drying when exposed to atmospheric conditions and being substantially non-volatile at ordinary atmospheric temperatures, such liquid being without the coloring matter, in which case the liquid absorbed by the ribbon during its passage across the device will redissolve the coloring matter already present in the ribbon and redistribute it over the ribbon, thus prolonging the useful life of the ribbon.

As will be understood by those skilled in the art, the employment of the inking device in accordance with this invention, whether or not the inking device contains additional coloring matter or pigment, will cause the effective inking material either already present in the ribbon or applied to the ribbon by the inking device, to be evenly distributed over the active surface of the ribbon.

It will be further understood that the inking devices of this invention are capable of many different and varied uses and purposes and that the selection of one of such uses for the purpose of description is not to be construed as giving to that use more importance than the other uses to which these devices may be put.

All of such changes, modifications and adaptations of this invention as come within the scope of the appended claims are embraced hereby.

I claim:

1. In an inking device, a body structure formed of porous, friable material capable of wearing away upon mild abrasion to expose the pores thereof, and a liquid ink solvent carried by the pores of said body structure having the characteristics of being non-volatile and non-drying at ordinary atmospheric temperatures.

2. In an inking device, a body structure formed of porous, friable material capable of wearing away upon mild abrasion to expose the pores thereof, and a liquid ink solvent carried by the pores of said body structure having the characteristic of being non-volatile and non-drying at ordinary atmospheric temperatures, and a coloring substance carried by said solvent.

3. In an inking device, a body structure formed of porous, friable material capable of wearing away upon mild abrasion to expose the pores thereof, said body structure being impregnated with a liquid oil having the characteristic of being non-volatile and non-drying at ordinary atmospheric temperatures.

4. In an inking device, a body structure formed of porous, friable material capable of wearing away upon mild abrasion to expose the pores thereof, said body structure being impregnated with an oil having the characteristic of being non-volatile and non-drying at ordinary atmospheric temperatures, and a coloring material carried in solution by said oil.

5. In an inking device, a formed, friable porous body structure consisting essentially of a substance from the group consisting of magnesium carbonate and basic magnesium carbonate, calcium carbonate and diatomaceous earth impregnated with a liquid ink solvent having the characteristic of being substantially non-volatile and non-drying at ordinary atmospheric temperatures.

6. In an inking device, a formed, friable porous body structure consisting essentially of a substance from the group consisting of magnesium carbonate and basic magnesium carbonate, calcium carbonate and diatomaceous earth impregnated with a liquid ink solvent having the characteristic of being substantially non-volatile and non-drying at ordinary atmospheric temperatures, and containing a coloring substance in solution therein.

7. In an inking device for printing ribbons, a formed block of basic magnesium carbonate impregnated with a liquid ink solvent having the characteristic of being substantially non-volatile and non-drying when exposed to ordinary atmospheric conditions and temperatures.

8. In an inking device for printing ribbons, a formed block of basic magnesium carbonate impregnated with a liquid ink solvent having the characteristic of being substantially non-volatile and non-drying when exposed to ordinary atmospheric conditions and temperatures, and containing a coloring substance.

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