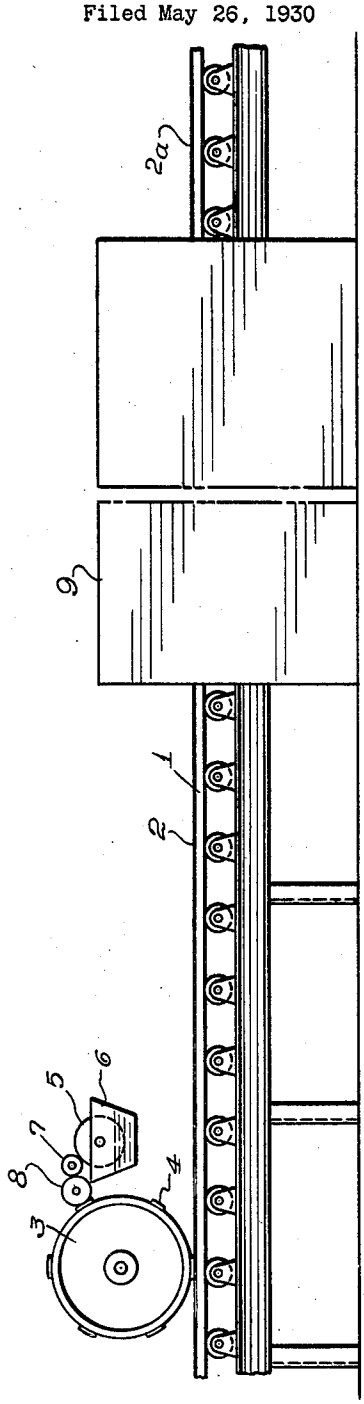
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CHEMICAL PRINTING

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CHEMICAL PRINTING

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This invention relates to a method of and reagent for printing, and has reference more particularly to a chemical printing reagent adapted to be applied to the paper cover sheet of a plasterboard.

In the manufacture of plasterboard, or other sheet materials, it is customary to form the board of a cementitious material, such as gypsum, covered on both surfaces with sheets of paper, usually made of pulped newspaper. Plasterboards of this nature are manufactured on a belt conveyor in continuous sheets which are later cut into the desired lengths. It is customary to imprint trade-marks, patent numbers and other advertising indicia on the surface of the plasterboard in a continuous strip or band down the upper face of the board as it is being manufactured. This printing on the board surfaces has been heretofore accomplished by means of a pair of printing wheels, one wheel to apply a printing solution on the board, and the second wheel to apply a developing solution to the board to produce the desired color on the indicia previously printed on the board by the first wheel. One difficulty of this double printing process is that it is rather difficult to operate and requires extra labor because of the great care required to keep the two solutions uniform, and to produce an impression which is uniform in quality at all times. Another difficulty of this type of printing is that the imprint with the double printing method is difficult to eradicate when it is desired to sell imperfect board as cut down seconds after removal of the trade-mark.

An object of this invention, therefore, is to produce a printing method wherein a single printing solution is used for producing the imprint said solution reacting with the paper to bring out the final color.

Another object of the invention is to produce a method of chemical printing which will employ a reagent which is not harmful to the health of workmen.

A still further object of the invention is to produce a method of printing plasterboard in which the printing can be later eradicated completely without difficulty; also to improve methods of and reagents for printing in other respects hereinafter specified and claimed. Reference is to be had to the accompanying drawing forming a part of this specification, in which the figure shows a side elevation diagrammatically of a form of apparatus suitable for carrying out my improved method.

In my improved printing method, I have taken advantage of the fact that the cover sheet of paper used on plasterboard usually contains impurities from the waste paper of which it is composed, these impurities being reducing in chemical reaction. The reagent which I find most effective for the purpose of printing is a dilute solution of potassium permanganate. This solution is applied by a roller or other suitable means, to the raised letters on the periphery of a wheel which presses against the upper surface of the plasterboard as it is being manufactured. A 5% solution of potassium permanganate is used for plasterboard having a light colored paper sheet on the supper surface, and a 10% solution is used for plasterboard having a darker colored paper so that the imprint will show a greater contrast of color. The solution is applied to the paper before the boards pass through the dryer so that the reducing reaction is hastened due to the heat of the dryer. The oxidizing potassium permanganate and the reducing impurities and cellulose itself contained in the paper cover sheets react to form a fine brown coloration due to the production of manganese dioxide from the potassium permanganate by the reducing action. The paper cover sheets are usually provided with a sizing which also is reducing in chemical reaction and aids in reducing the potassium permanganate to the manganese dioxide.

The manganese dioxide resulting from the imprinting of the potassium permanganate is easy to eradicate in case it is desired to sell imperfect sheets of plasterboard as seconds, in which case it is desirable to remove the trade-mark which is only applied to first quality board. In this case, the imprinted indicia is treated with a dilute solution of hydrochloric acid which converts the man-

ganese dioxide to manganese chloride, the latter being invisible in the paper. Silver nitrate and dilute sulphuric acid may be also used for the imprinting of the trade-mark, but the reduction products produced by these two last reagents are not easy to eradicate from the paper cover sheet.

In the drawing, 1 indicates a plasterboard having a cementitious core material surrounded on all sides by paper cover sheets including an upper cover sheet 2. After the plasterboard is formed into a flat sheet and allowed to set to solid condition, the advertising indicia or other characters to be printed upon the cover sheet 2 are applied by means of a printing wheel 3, having printing dies 4. A solution roller 5 rotates partially immersed in a solution of potassium permanganate contained in a vessel 6. An idler roller 7 contacts with the surface of roller 5, and also contacts with a roller 8, which engages with the surface of the printing dies 4, so as to moisten the printing dies with the solution of potassium permanganate. When the printed characters of potassium permanganate solution are first printed on the paper cover sheet 2, they have the characteristic purple color. After printing, the plasterboard passes through a drying chamber 9 where the board is subjected to high temperatures for the purpose of drying it thoroughly. This high temperature, together with the action of the paper cover sheet and its chemical sizing materials, reduces the potassium permanganate to manganese dioxide so that the cover sheet 2*a* emerging from the drying chamber 9 has a brown printed color largely composed of the manganese dioxide.

I would state in conclusion that while the illustrated examples constitute a practical embodiment of my invention, I do not wish to limit myself precisely to these details, since manifestly, the same may be considerably varied without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. The method of imprinting on paper sheets, which comprises printing with a dilute solution of potassium permanganate to said sheets, and drying said imprint by the application of heat to produce a brown coloration of manganese dioxide, said manganese dioxide being capable of eradication by the application of a dilute solution of hydrochloric acid.

2. The method of imprinting advertising indicia on a continuously moving strip of plasterboard having paper cover sheets, which comprises printing with a dilute solution of potassium permanganate on a paper cover sheet of said board, heating said board to reduce the potassium permanganate to the brown coloration of manganese dioxide, and permitting said board to cool.

3. A method of imprinting advertising indicia on a paper sheet, which comprises printing with a 5–10% solution of potassium permanganate to said paper sheets, heating said paper sheets to reduce the potassium permanganate to a brown coloration of manganese dioxide, and permitting said paper sheets to cool.

4. The method of treating the paper cover sheets of plasterboards, which comprises printing with a dilute solution of potassium permanganate to said cover sheets, heating said cover sheets to reduce the potassium permanganate to a brown coloration of manganese dioxide, and treating the manganese dioxide imprint with a dilute solution of hydrochloric acid to eradicate said imprint.

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