June 7, 1932. J. C. McCARTHY 1,862,189

METHOD AND APPARATUS FOR DECORATING FLEXIBLE SURFACE COVERING MATERIAL

Filed Sept. 25, 1928 2 Sheets-Sheet 1

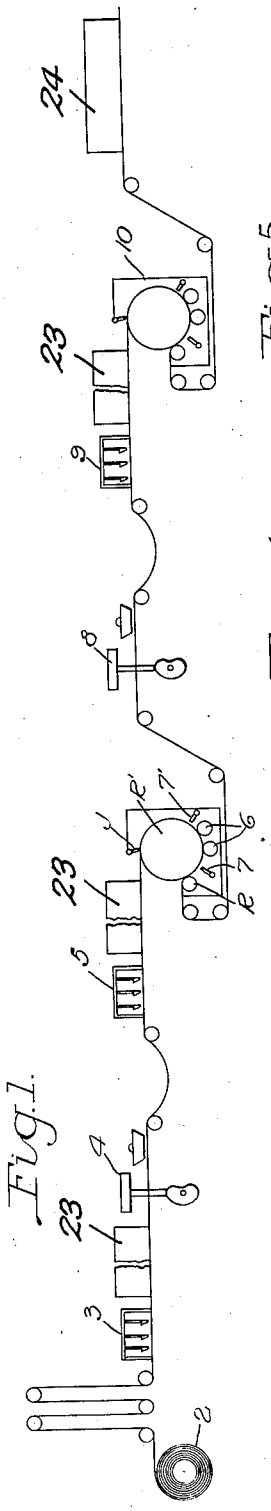


Fig. 1.

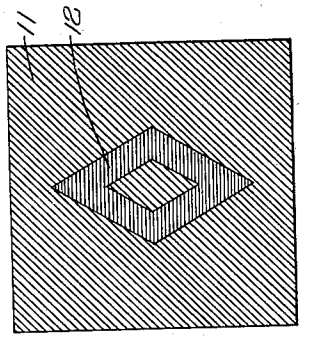


Fig. 5.

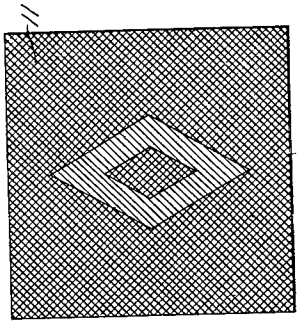


Fig. 4.

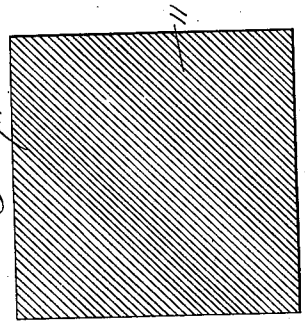


Fig. 3.

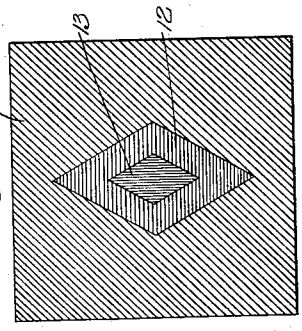


Fig. 2.

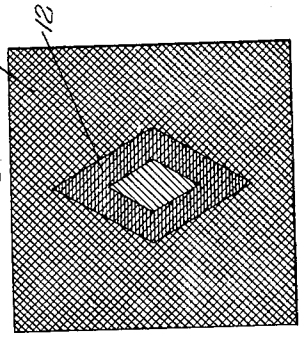


Fig. 6.

INVENTOR

J. Clarence McCarthy

by his attorneys

Byrnes, Stubbs & Kimmel

June 7, 1932. J C. McCARTHY 1,862,189

METHOD AND APPARATUS FOR DECORATING FLEXIBLE SURFACE COVERING MATERIAL

Filed Sept. 25, 1928 2 Sheets-Sheet 2

Fig. 8.

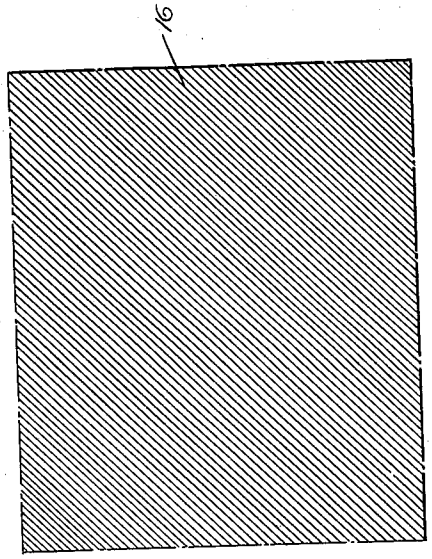


Fig. 10.

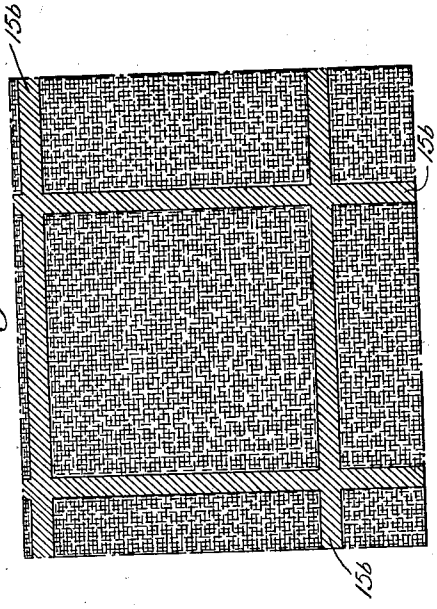


Fig. 7.

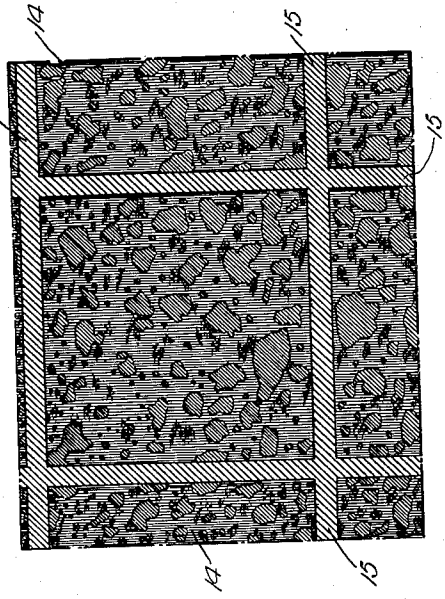
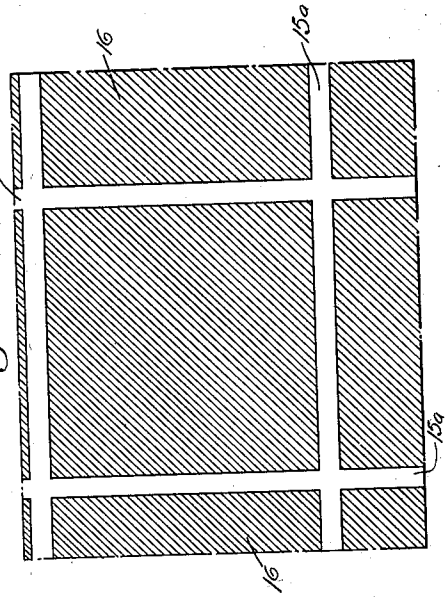


Fig. 9.



INVENTOR

J. Clarence McCarthy
by his attorneys
Byrnes, Stettins & Parmelee

Patented June 7, 1932

1,862,189

UNITED STATES PATENT OFFICE

J CLARENCE McCARTHY, OF LANCASTER, PENNSYLVANIA, ASSIGNOR TO ARMSTRONG CORK COMPANY, OF LANCASTER, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA

METHOD AND APPARATUS FOR DECORATING FLEXIBLE SURFACE COVERING MATERIAL

Application filed September 25, 1928. Serial No. 308,207.

This invention relates to the decoration of hard surface covering materials, such as linoleum and felt base floor coverings and the like.

Various attempts have been made to decorate surface covering materials with rapidly drying paint, such as nitro-cellulose lacquers, but prior to the present invention no commercially satisfactory method or type of decoration has been developed. It has been proposed to use nitro-cellulose lacquers with ordinary block printing machines, but due to the rapid evaporation of the solvents, the printing blocks quickly become choked with the lacquer, and the process cannot be carried out commercially. It has also been proposed to use a stencil, but it is rather difficult to effect stencilling in a continuous process for at least two reasons. Not only does the stencil become gummed with the partially dried lacquer, which can only be removed with difficulty to prevent smearing, but it is almost impossible in any continuous system to obtain proper registration with any previously applied design.

According to the present invention, the decoration is effected by first applying a masking material over the surface to be decorated. The masking material is preferably of such nature that it will not dry and can be easily washed off, and has the purpose of preventing the lacquer from adhering to the surface to be decorated.

This material may be put on in the form of a design and the whole surface to be decorated, including the portions covered with the non-drying material, is sprayed with a quick drying decorative coating, such as lacquer. The lacquer dries, but adheres only to that part of the surface which has not been treated with the masking material. The material is then scrubbed with water to remove the masking material, and as the result of this procedure, a design is left on the surface to be decorated which is in the reverse of that in which the non-drying material is applied.

My invention may be readily understood by reference to the accompanying drawings, in which

Figure 1 is a schematic view showing an apparatus arranged to carry out the method;

Figure 2 is a plan view of a piece of material decorated in accordance with the present invention;

Figure 3 shows the first step in producing the design of Figure 2;

Figure 4 shows the second step in producing the design of Figure 2;

Figure 5 shows a still further step in producing this design; and

Figure 6 shows the next to the last step;

Figure 7 is a view similar to Figure 2, showing a modified type of decoration;

Figure 8 shows the first step in producing the design of Figure 7; and

Figures 9 and 10 represent successive steps in producing the design of Figure 7.

In carrying out my invention, I take a plain linoleum or felt base material, or other goods to be decorated. This plain linoleum or other goods may be of a color desired in the finished design, or it may have a coating of paint or lacquer applied thereover in a color or colors which are to appear in the finished design. A masking material is laid on the surface of the goods or on the base coat of the surface. This masking material is applied by a suitable printing mechanism in a design which is in the reverse of that which is to appear in the finished goods. The masking material has a solvent which is not miscible to any great extent with the solvents of the decorating material which is subsequently applied.

After the masking material has been applied, the final decorative coating is sprayed all over the goods, covering both the ground coat and the masking material, and is then allowed to set. The sprayed coat may consist of one color or of intermingled colors from different spray guns. The whole area is then scrubbed with a selective solvent for the masking material. The masking material hereinafter described is preferably one which can be removed with water.

After the scrubbing operation, which removes the masking material, the goods is dried and given a coating of clear lacquer. Where the masking material has been removed, the base color will be exposed. This

is in contrast with the final decorative coating, whereby a pattern of definite outline is produced in the sprayed surface. It is possible to repeat the masking operation a number of times in order to get different color designs.

Referring to Figure 1, 2 designates a long strip or roll of material which is to be decorated. The material preferably leaves an unrolling stand, constituting a source of supply, in such manner as to provide a series of loops or festoons as indicated in the drawings, from which it passes beneath a suitable means 3 for applying a base coating thereto. An advantage of this is that it permits of joining the trailing end of one piece of material to the leading end of a new roll of material without interrupting the operation. I have indicated the means 3 as comprising spray guns or air brushes for spraying either a plain color or spattered or spotted colors over the entire surface of the goods. The base coat may be omitted if the material has previously had an all-over coating applied thereto, or if the material is inherently ornamental, as for instance a jaspe material or a plain color linoleum. The material next passes under a printing mechanism which may be of the rotary or reciprocating block type, and which is designated 4 in Figure 1. The printing mechanism 4 applies a masking material to the surface of the goods. The masking material is applied in accordance with the design on the surface of the printing unit, and the applying operation is preferably repeated to insure a sufficient body or layer of the masking material to insure good coverage and prevent possibility of any lacquer adhering to the masked portions.

The material after being printed upon with the masking material next passes a means for applying an all-over coating of laquer or other quick drying decorative material thereto. This mechanism, designated 5, is preferably comprised of a battery of spray guns, all of which may be automatically controlled.

After having the lacquer applied thereto, the material is preferably so handled as to insure proper drying of the lacquer before any subsequent operations are performed thereon. I prefer to employ refrigerated water jets J which play on the material at a point intermediate the application of the lacquer and the subsequently operating devices. The lacquer, having dried, is struck by the refrigerated water jets which act to embrittle the lacquer sufficiently to permit of the scrubbing device removing that part of the lacquer over the masking material in such fashion as to get a clear, sharp line of demarcation. The drying prior to the action of the refrigerated jets is effected in exhaust chambers 23 and 24. These chambers are also desirable for carrying off the lacquer fumes, and are particularly important because of the presence of oxygen in the air employed, which oxygen would be conducive to the creation of an explosive atmosphere were no such exhaust means provided. The material with the dried end hardened lacquer then passes through a brushing and rinsing unit preferably comprising cleaning or scrubbing brushes 6 and one or more rinsing jets 7, all located within a suitable hood or other enclosing casing. There is also preferably provided a series of jets 7′ in advance of the brushes 6 to insure a sufficient supply of water to the brushes. After having been scrubbed and rinsed, the material preferably passes over a rubber squeegee roll R which cooperates with the roll R′ around which the material passes during the refrigerating, scrubbing and rinsing operations.

The cooling of the lacquer is desirable in that it hardens it and makes it less susceptible to scratching during the scrubbing process by means of which the masking material is removed.

The operation may be stopped at this point, or it may be repeated by printing the goods again with masking material by a unit 8, again applying lacquer or other decorative coating material with spray guns 9 and again scrubbing the material with a brushing unit 10. This operation may be repeated as long as different specific colors are to be applied at definite points in the pattern. Thereafter, the material is dried in any desired manner and delivered to a suitable series of roll-up stands or the like preparatory to subsequent handling operations.

One type of decoration which can be secured by carrying out the present invention is conventionally illustrated in Figure 2. In this figure, 11 designates a piece of goods having a base color or coating over the surface thereof and which for the purpose of illustration may be brown. At 12 is a pattern of sharp outline which may be blue, and within the pattern 12 is a pattern element 13, also of sharp outline, which is red.

In producing the pattern shown in Figure 2, an all-over base coat of brown is first applied to the material, as shown in Figure 3. After the all-over base coat has been applied, the mask is laid over the entire surface of the goods except the area covered by the pattern 12, to which the masking material is not applied. This masking is done by the printing mechanism 4, shown in Figure 1. The material is then sprayed with a decorative material and scrubbed. The decorative material adheres to the surface defined by the pattern 12 which was not covered with the masking material, but does not adhere to the remaining area of the goods. For the example given, the decorative coating which is applied at this step is blue. The masking material in addition to being applied to the

surface of the goods around the pattern 12 is also applied to the area defined by the pattern 13.

After the scrubbing operation, the material is again printed with the masking material and this time only the area of the pattern 13 is left uncovered. After the masking material has been laid on the second time, the material is sprayed again, this time with a red decorative coating material and the goods is again scrubbed. With the last spraying, the color red will adhere only to the surface 13, the remainder of the area having been masked. In Fig. 6 the goods is represented as having the entire surface except the pattern 13 covered with the masking material.

It will thus be seen that the invention provides for the production of mechanically rigid patterns in different colors by the use of spray guns or other means for flowing a quick drying coating material, such as nitrocellulose lacquer, onto the surface to be decorated. It will be understood in the example given that the order in which the various colors are applied may be reversed and that the base coating may be red while the brown coat may be the color last applied.

In Figure 7 I have illustrated another type of decoration which can be secured by my method. In this figure, the goods has a tile-like pattern wherein 14 designates the tiles or tesserræ and 15 designates the interliner or joint between the tile. The tiles themselves have a spotted appearance simulating a burned tile. The mortar joint 15 is dark brown in color, while the tiles have a mixture of red and yellow with speckles of brown thereover.

To secure this effect, the material is first given a base coat of dark brown, which is the color of the joint or interliner 15. This is shown in Figure 8, wherein the piece of material 16 has an all-over plain color. Next the masking material is applied to the portions 15^a shown in Figure 9 corresponding to the joint or interliner between the tiles, while the remainder of the goods is free of the masking material. The goods is then sprayed all over with a coating of cream or yellow color. Next it is passed under a battery of spray guns or air brushes adjusted to spit rather than spray, and the color red is spattered over the yellow surface. The goods then passes another battery of spray guns also adjusted to spatter paint on to the surface thereof, these latter guns being adjusted to spatter larger drops of paint than the preceding battery. Instead of successive batteries of spray guns for spattering the red and brown, there may be a single battery of guns, some of which spatter one color while the others spatter the other color.

After the goods have been sprayed in this way, they are scrubbed. The masking material is removed by the scrubbing from over the areas 15^a leaving the brown base coat exposed to produce the joint effect between the tile areas as shown in Figure 7.

Figure 10 represents the step in the process after the coat of yellow or cream has been applied but before the spots of red and yellow have been sprayed on to the goods. The area covered by the masking material is shown by the lines 15^b in this figure.

If the scrubbing is effected before the drops of red and brown paint have become thoroughly dried, the paint is smeared to a slight extent, thereby producing an antiquated or burned tile effect which is absolutely free of any mechanical rigidity.

The masking material may be applied in design in any convenient manner, but it is preferable to use ordinary printing machines, such as those commonly used in the floor and wall covering industries. A masking material which is well suited for application to the usual sawn or peg-block used on block printing machines in the application of oil paints to floor coverings is disclosed in a co-pending application of H. R. Woerner, filed May 7, 1929, Serial No. 345,248 comprised substantially of 60 parts whiting, 40 parts glycerine, and two or three parts of soap solution, which contains 24 parts of anhydrous soap and 76 parts of water. Instead of whiting, the material may contain some other filler which will not become sticky, such, for instance, as clay, barytes, lithopone or ochre.

The purpose of the filler is to give the material body, that is, increase its viscosity and facilitate its application to the material in definite areas and quantities. The glycerine may be replaced by any other high boiling, slow or non-drying liquid that is not miscible with the decorative coating employed. For example, ethylene glycol may be used where the coating material is a nitrocellulose lacquer, so that all or part of the glycerine may be replaced by ethylene glycol or water, although the latter does not have as good physical characteristics for convenient use in continuous operations.

This particular masking material is especially desirable because it is water soluble and will not dry or run and will not permit the lacquer to adhere to those portions to which it is applied. Furthermore, it can be applied with ordinary printing apparatus, such as a peg block or a sawn block and will spread just enough to cover the spaces between the pegs of the block. At the same time, it will not spread enough to prevent sharp outlines from being secured in the pattern.

In some cases, the base coat need not be used. If, for instance, a granite linoleum or a jaspe linoleum or a plain color linoleum is being decorated, the base coat need not be applied, and the masking material is ap-

plied directly to the surface of the linoleum. After the subsequent spraying and scrubbing, the linoleum itself will show through where the masking material has been applied. Attractive combinations can thus be worked out between the applied pattern and the natural color and texture of the surface covering material. For instance, in Figure 7 the pattern could be reproduced on a granite linoleum wherein the base coat would be omitted entirely and the interlinear 15 in the completed pattern would be the uncovered surface of the linoleum.

The invention lends itself to the production of a great many different pattern effects, and enables these effects to be secured with quick drying nitro-cellulose lacquers and paints and similar quick drying decorative coating materials.

While I have illustrated certain particular decorative effects, which can be secured in carrying out the invention, it will be understood that the invention is not limited to securing the particular effects shown. The invention is especially applicable to the continuous treatment of sheet material, although it can be successfully used with small units of material.

For example, the invention may be utilized in decorating cork tiles and the like. The inherent nature of the material used as the decoration is such as to produce quick drying, thereby permitting the operation to be completed without any smearing. It is also such that the decorated material does not require stoving.

The use of spray guns in combination with the masking material is of particular advantage because the decoration is most effectively carried out where the decorative material is applied by some means which will not disturb the masking material. The spray guns do not contact with the surface of the material and therefore do not disturb the masking material so that the outline of the pattern can be effectively maintained.

It will be noted that intermediate the printing mechanism 4 and the spray mechanism 5, the material is indicated as providing a loop L. As shown in Figure 1, the first spraying at 3 is accomplished intermittently and on intermittently moving material, which intermittent movement is necessitated by the provision of the printing head 4. However, the material moves continuously under the spray guns 5 and provision must be made for effecting such movements without tearing the material. The loop provides in effect a reserve supply of material which is supplied intermittently and drawn from continuously without interfering with the proper operation of the units on either side thereof. Of course, if desired, a loop might be provided on each side of the printing head 4 and the action of the spray guns 3 made continuous.

It will be apparent to those skilled in the art that other changes in the construction, arrangement and control of the various parts may be made without departing from the spirit of my invention, the drawings indicating diagrammatically certain operations and mechanisms in accordance with one embodiment of the invention.

I claim as my invention:

1. The method of decorating long strips of surface covering material with a quick drying decorative coating which comprises the steps of progressively printing the goods to be decorated with a masking material of a character adaptable for application by printing blocks, thereafter spraying the entire surface of the goods with a quick drying decorative coating, and thereafter progressively scrubbing the goods to remove substantially all of the masking material.

2. The method of decorating flexible surface covering material which comprises applying a masking material over a portion only of the area of the goods which material can be removed with water and which is not miscible with the solvents of the decorative coating composition, thereafter covering the entire surface of the goods with a quick drying coating composition, and subsequently scrubbing the surface of the goods to remove the masking material, such scrubbing being effected before the quick drying coating composition has become completely set, whereby such composition will be slightly distorted while the goods are being scrubbed.

3. The method of continuously decorating strips of flexible covering material which comprises continuously printing on a moving strip of goods with a masking composition of a character suitable for application by printing, thereafter continuously spraying the entire area of the goods, and thereafter scrubbing the material to remove the masking composition.

4. The method defined in claim 3 wherein a base coat is applied to the goods before the masking material is printed thereon.

5. Apparatus for decorating floor covering material comprising a printing mechanism for applying masking material, an air brush succeeding the printing unit, a scrubbing unit succeeding the air brush, and means whereby the material is guided successively through said units.

6. Apparatus for continuously decorating strips of floor covering material comprising a printing unit adapted to apply a masking material to a portion of the area of the goods, an air brush unit succeeding the printing unit and in spaced relation thereto, a scrubbing unit following the air brush unit and means whereby the material is guided successively through said units.

7. Apparatus for continuously decorating strips of floor covering material comprising

a printing unit adapted to apply a masking material to a portion of the area of the goods, an air brush unit succeeding the printing unit and in spaced relation thereto, a scrubbing unit following the air brush unit, said apparatus having a base coat applying unit in advance of the printing unit, and means whereby the material is guided successively through said units.

8. The method of decorating a hard surface covering material which comprises applying masking material to a portion of the surface of the goods, applying a coating of quick drying decorative material to the goods, cooling the material, and thereafter scrubbing.

9. Apparatus for decorating flexible hard surface covering material comprising means for applying a masking material, means for thereafter applying a quick drying decorative material, jets for directing a cooling fluid against the decorative material, and scrubbing means beyond the jets.

10. The method of decorating flexible surface covering material which comprises applying a masking material over a portion only of the area of the goods, thereafter covering the entire surface of the goods with a coating in a solvent, the masking material being substantially non-miscible with said solvent, and before the coating composition has been completely set scrubbing the surface of the goods.

11. The method of decorating flexible surface covering material which comprises applying a masking material over a portion only of the area of the goods, thereafter applying sprays of coating material, different colors being applied by different sprays, whereby a vari-colored coating is applied, and thereafter scrubbing the goods to remove the masking material.

12. The method of decorating flexible surface covering material which comprises passing the goods under a printing block, applying to the printing block a masking material of a character which will lie smoothly thereon, pressing the printing block at intervals against the goods so as to form masked portions thereon, applying a decorative material, and scrubbing the goods.

13. The method of decorating flexible surface covering material which comprises passing the goods under a printing block, applying to the printing block a masking material of a character which will lie smoothly thereon, pressing the printing block at intervals against the goods so as to form masked portions thereon, applying a decorative material, and scrubbing the goods with a material which acts as a solvent for the masking material but not for the decorating material.

14. The method of decorating flexible surface covering material which comprises applying a masking material to a portion only of the surface of the goods to be decorated, applying a decorative paint or the like in a solvent which is substantially non-miscible with the masking material, and thereafter applying a material which is a solvent for the masking material but not for the paint or the like.

15. The method of decorating flexible surface coverings which comprises applying a masking material to a covering having an all-over base color, then applying a fine spray of color to the goods, then speckling the sprayed surface, and thereafter scrubbing the goods to remove the masking material.

16. The method of decorating flexible surface covering material which comprises applying a masking material to a portion only of the surface of the goods, thereafter speckling the goods by applying discrete paint spots thereto, and then removing the masking material.

In testimony whereof I have hereunto set my hand.

J. CLARENCE McCARTHY.