Aug. 21, 1951 H. G. MACDONALD 2,565,036

WOOD FILLING AND FINISHING APPARATUS

Filed Sept. 29, 1949

FIG. 1.

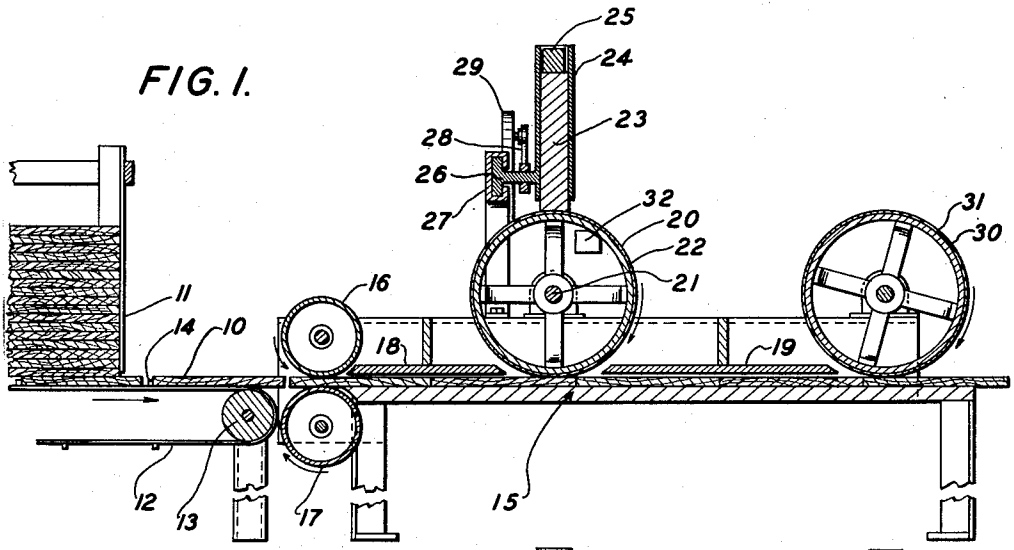
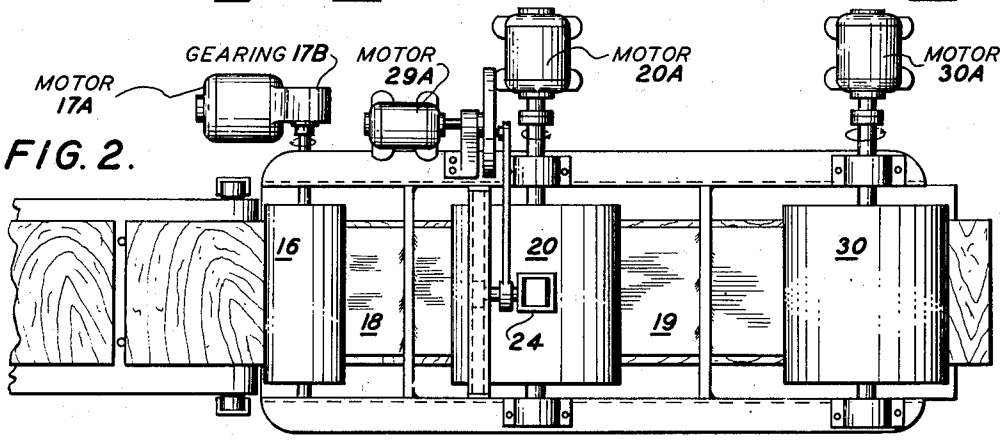
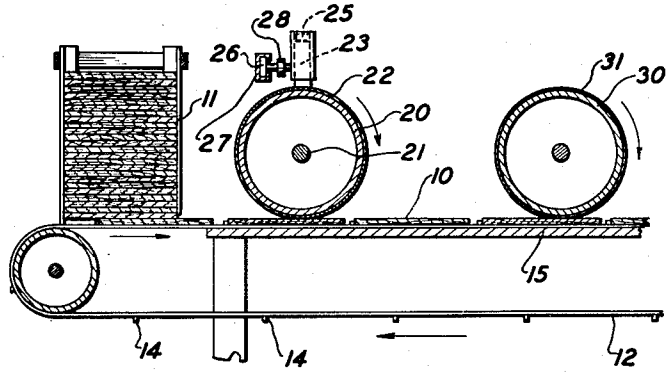


FIG. 2.





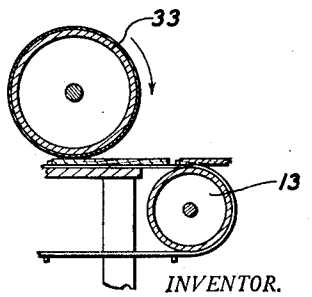


FIG. 3.

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WOOD FILLING AND FINISHING APPARATUS

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6 Claims. (Cl. 91—48)

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This invention relates to a method of and an apparatus for forcing a filler such as wax or resin, into wood. It finds application in the prefinishing of parquet flooring, sheets of plywood, or any wood member in which the grain has not been filled.

Parquet flooring blocks generally are prefinished by a long series of time consuming and expensive steps. Several different methods are employed commercially to prepare the blocks for market. Usually the block is first coated with a sealer. Next the open grain of the wood is filled with a commercial filler of silica powder and oil. After an extended drying period, the block is coated with shellac or other resinous finish, or possibly with a plastic coat. Another drying period ensues, after which still another coat may be applied. The second coat necessitates another delay for drying. Then possibly as a final step, a coat of wax is applied. Frequently, to hasten the process, ovens or fans or lamps are utilized to shorten the drying periods. Such multi-step operations are expensive. They raise the cost of prefinished flooring and other materials to which they are applied.

Through the application of my invention, parquet flooring blocks, plywood, ordinary boards, and in fact any wood member may be pre-finished in a single rapid operation. Moreover, the quality of the finished product frequently is improved, in that a deeper penetration of the wood with the filler and a more uniform polish or gloss are obtained, the net result being a more durable and satisfactory finish.

Briefly, my method of filling the surface of a wood member with a fusible solid comprises the steps of applying the solid in substantially fused condition to a curved surface, rotating the coated curved surface against the surface of the wood to be coated and simultaneously pressing the two surfaces together, whereby the solid is transferred to the wood surface. In my preferred operation, heat generated by the friction of wood and curved surface heats the latter, and the solid filler is pressed against the curved surface and melted or at least softened to produce the film.

Generally speaking, the apparatus of my invention is a counter-rotating drum which bears upon the wood member and which forces a filler such as wax or resin into the surface of the wood, the filler being applied as a molten or semi-molten film to the drum. The drum not only forces the filler into the grain of the wood but in addition, polishes the surface to a substantial degree. If it is desired to have a finished product

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with a high gloss, a polishing roller may be disposed to turn counter to the wood following the application of the filler. To obtain a product with a maximum gloss, a polishing roller having a surface with a high coefficient of friction with respect to the wood member should be employed, e. g. steel wool.

Satisfactory results are obtained by merely applying the waxy or resinous filler in accordance with my invention. However, I prefer to pretreat the wood with a liquid, such as a lacquer containing a polymerizable resin, prior to introducing the wax. This lacquer is painted on and allowed to dry. It hardens the wood and emphasizes grain and natural color.

In a presently preferred form, the apparatus of the invention comprises a table, means for moving a wood member to be treated over the table, a drum rotatably mounted above the table to bear on the surface of the member and generate heat by friction between the drum and the member and means for holding a fusible filler such as wax against the drum so that the heat developed in the drum will melt or soften it and produce a film on the drum to be transferred to the surface of the wood. The table is not essential. Any member, such as another drum, which supports the wood under the pressure of the applicator drum, will suffice. Furthermore, it is not necessary that the wood member move beneath the drum. For instance, the wood member could travel along an overhead track with the applicator drum bearing upon the under surface of the wood member.

These and other aspects of my invention will be understood more thoroughly in the light of the following detailed description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a longitudinal elevation, partly in section, of one form of the apparatus of the invention, particularly adapted to the pre-finishing of parquet flooring blocks;

Fig. 2 is a plan view of the apparatus of Fig. 1; and

Fig. 3 is a longitudinal elevation, partly in section, of a modified form of the apparatus of Figs. 1 and 2.

Referring to Figs. 1 and 2, rectangular parquet flooring blocks 10 resting as a stack in a rack 11 are pulled one by one from the bottom of the stack onto a conventional endless belt feeder 12 driven by a roller 13. The belt feeder has transverse lugs 14 spaced from each other by slightly more than the length of the blocks, so that the blocks drop between them onto the belt and are

pushed along by the lugs. The blocks pass, one after another with their edges abutting, onto and along a table 15, the blocks being moved along the table by a pair of drive rolls 16, 17 one above the line of travel of the blocks, the other below. The lower roll is driven clockwise and the upper counterclockwise (as viewed in Fig. 1) by conventional means, such as a motor 17A and gearing 17B. The two rolls grip the blocks and force them to travel as a train along the table.

The train of blocks moving along the table is prevented from buckling upward by horizontal guide plates 18, 19 disposed just above the blocks along the path of travel, but with sufficient clearance to permit easy movement.

An applicator drum 20 is disposed above the table between the guide plates with its shaft 21 perpendicular to the direction of travel of the blocks and parallel to the axis of the drive rolls. The shaft is rigidly mounted with respect to the table and spaced above it by a distance which assures that the drum will exert substantial pressure on the blocks as they pass underneath it. The drum is driven counter to the direction of travel of the blocks (clockwise as viewed in Fig. 1) by conventional means such as a motor 20A. The applicator drum has a covering 22 (such as 00 sandpaper which has been worn down substantially) with a high coefficient of friction with respect to the blocks and such that it will not stretch substantially so as to free itself from the drum.

A stick 23 of hard wax having a softening point of about 190° F., is mounted vertically in a holder 24 directly above the drum so that its lower end bears against the drum cover. The stick is free to slide downward in the holder as it is consumed, and the downward movement is furthered by a weight 25 which rides in the holder on top of the stick. The holder is attached to a slider 26 which is moved back and forth in a track 27 (having a T-shaped groove in which the slider fits) parallel to the shaft of the drum, this movement being attained by a wrist pin 28 attached to the holder and at its other end to a crank mechanism 29. The axis of rotation of the crank is perpendicular to the direction of movement of the slider, and the throw of the crank is such that the stick is oscillated across the full length of the drum or at least across that portion of the length which comes in contact with the blocks. The crank is positively driven by conventional means, such as a motor 29A.

A polishing drum 30 is mounted above the table parallel to the applicator drum but beyond the second guide plate. It too bears upon the train of blocks forcibly and is rotated counter to the blocks by conventional driving means such as a motor 30A. A cover 31 of polishing material, such as steel wool, is placed on the polishing drum.

Heat is generated by the friction between the surface of the applicator drum and that of the block train. Part of this heat is stored in the applicator drum itself so that the temperature of its cover, as the latter comes in contact with the wax stick, is sufficient to melt the latter slowly and thus cause it to spread as a film on the cover. This film is carried downward and squeezed into the blocks of the train as they pass under the applicator drum, thus filling their surfaces.

Ordinarily, the heat generated and stored in the applicator drum will be sufficient to melt the wax and apply it to the drum in a film of adequate thickness for proper filling of the wood. If however, the melting point of the wax is very high, or the friction between drum and block train insufficient, or the speed of travel of the block train very fast, it may be desirable to supply additional heat to the drum, for example with an auxiliary electrical heater 32 disposed on the inside of the drum in good heat conductive relationship therewith.

In order that the wax be melted to as large a degree as possible by the heat of friction developed at the contact of applicator drum and block train, the drum itself should be of material having a relatively high specific heat, say iron or copper, and of sufficient mass to afford adequate heat storage.

The apparatus of Fig. 3 is in general similar to that of Fig. 1, like parts being designated by like reference characters. In the apparatus of Fig. 3, however, the conveyor belt 12 extends along the table and carries the block train under the treatment drums. Consequently, the drive rolls are omitted. Because the blocks of the train are held apart by the lugs 14 on the conveyor belt, there is substantially no tendency for the blocks to buckle upward. Hence the guide plates are omitted. The only other difference between the apparatus of Figs. 1 and 2 and that of Fig. 3 is the addition of another polishing roller 33 which like the first is positively driven counter to the direction of movement of the block train.

If desired, the table in the apparatus of Figs. 1 and 2 and that of Fig. 3 may be replaced by a train of idler rollers of relatively small diameter and spaced close together. These rollers are rotatable on axes perpendicular to the direction of travel of the block train and support the train without requiring so much power to move the train of blocks under the series of rollers.

In some operations, it may be desirable to provide another applicator drum or drums to give a heavier coat of wax or resin. A brush or series of brushes may be substituted for or used with the polishing rollers described previously.

I claim:

1. In apparatus for filling a wood surface with a fusible solid, the combination which comprises a support, means for moving a wood member the surface of which is to be filled over the support, a drum rotatably mounted adjacent the support to bear on the surface and generate heat by friction between the surface of the wood and that of the drum, means for power driving the drum counter to the movement of the wood member on the support, and means for holding the fusible solid against the drum so that the heat developed in the drum will melt the solid and produce a film on the drum to be transferred to the surface of the wood.

2. In apparatus for filling a wood surface with a fusible solid, the combination which comprises a table, means for moving a wood member the surface of which is to be filled along the table, a drum rotatably mounted above the table to bear on the surface and generate heat by friction between the wood and the drum, means for power driving the drum counter to the direction of movement of the wood member, means for holding the fusible solid against the drum so that the heat developed in the drum will melt the solid and produce a film on the drum to be transferred to the surface of the wood, and means for oscillating the fusible solid along but in contact with the drum.

3. In apparatus for filling a wood surface with a fusible solid, the combination which comprises a table, means for moving a wood member the surface of which is to be filled over the table, a drum rotatably mounted above the table to bear on said surface and generate heat by friction between the surface of the wood and that of the drum, means for power driving the drum counter to the direction of movement of the wood, means for holding the fusible solid against the drum so that the heat developed in the drum will melt the solid and produce a film on the drum to be transferred to the surface of the wood, and a polishing roller spaced beyond the drum in the direction of travel of the wood member in a position to bear upon the wood member.

4. Apparatus according to claim 3 provided with means for driving the polishing roller counter to the direction of travel of the wood member.

5. In apparatus for filling a wood surface with a fusible solid, the combination which comprises means for moving in one direction a wood member

the surface of which is to be filled, an endless revolvable member movable against the surface of the wood counter to its direction of movement to generate heat and having substantial capacity for storing the heat thus generated, means for holding a fusible solid against the member so that the heat stored in the member will melt the solid and produce a film thereon, and means for pressing the endless member carrying the film against the wood.

6. Apparatus according to claim 5 in which the endless member is a drum.

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