March 10, 1942. W. W. PARTEE 2,276,253

WOOD FINISHING

Filed Oct. 5, 1938 2 Sheets-Sheet 1

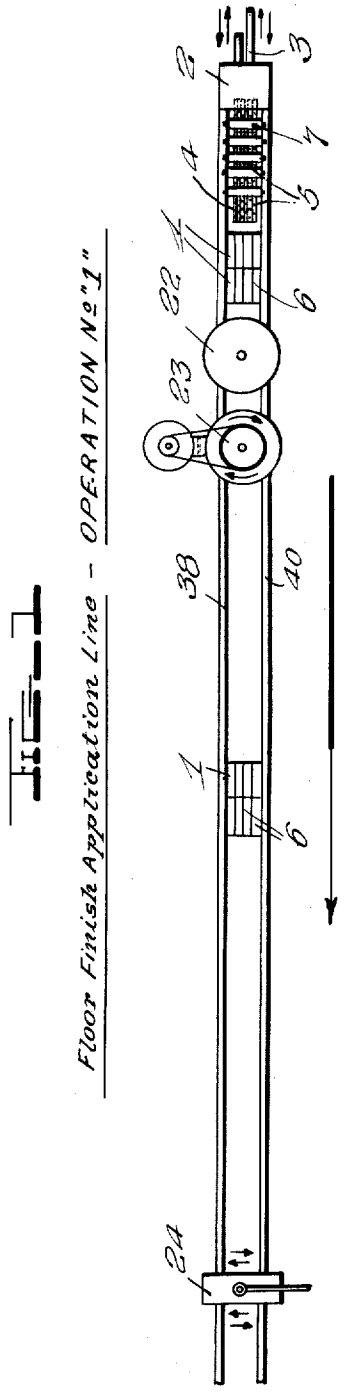


Fig. 1

Floor Finish Application Line - OPERATION No. 1

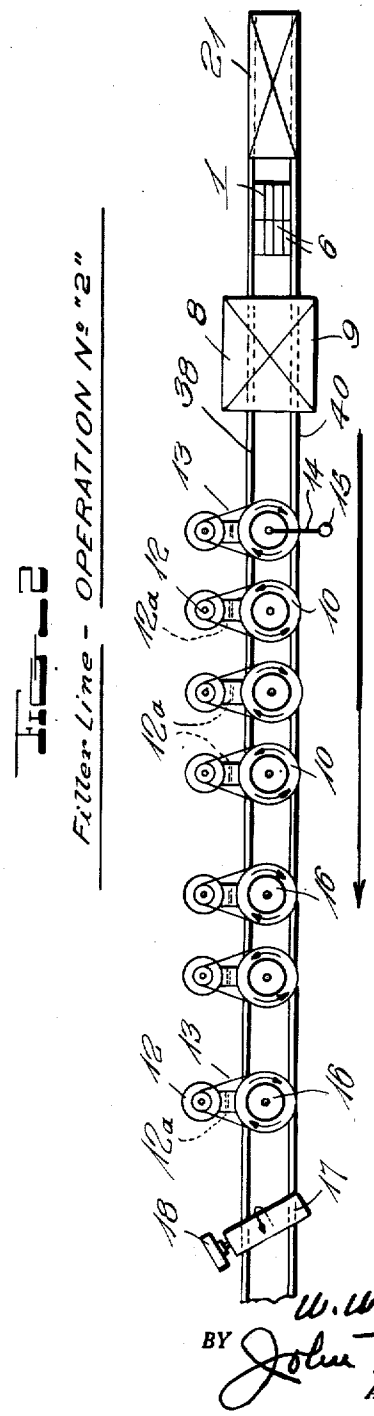


Fig. 2

Filler Line - OPERATION No. 2

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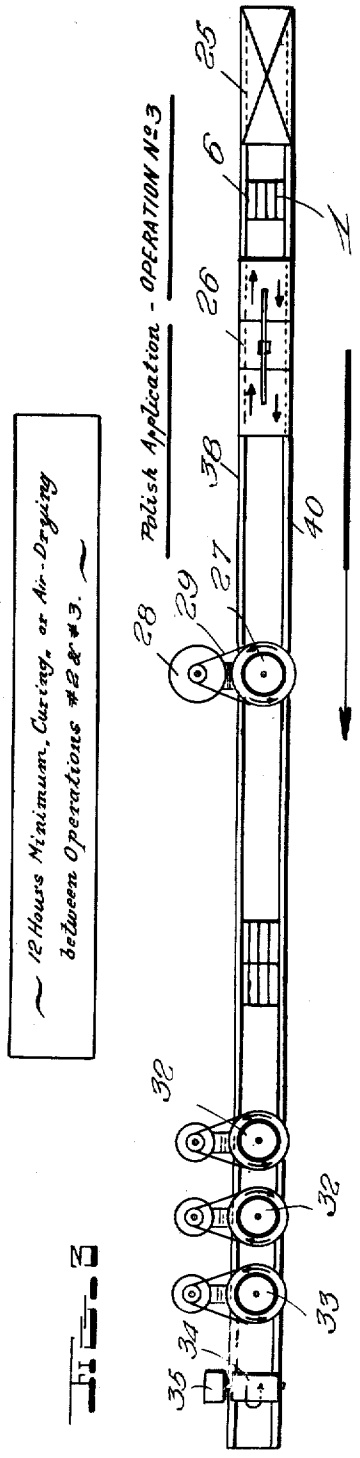


FIG. 3

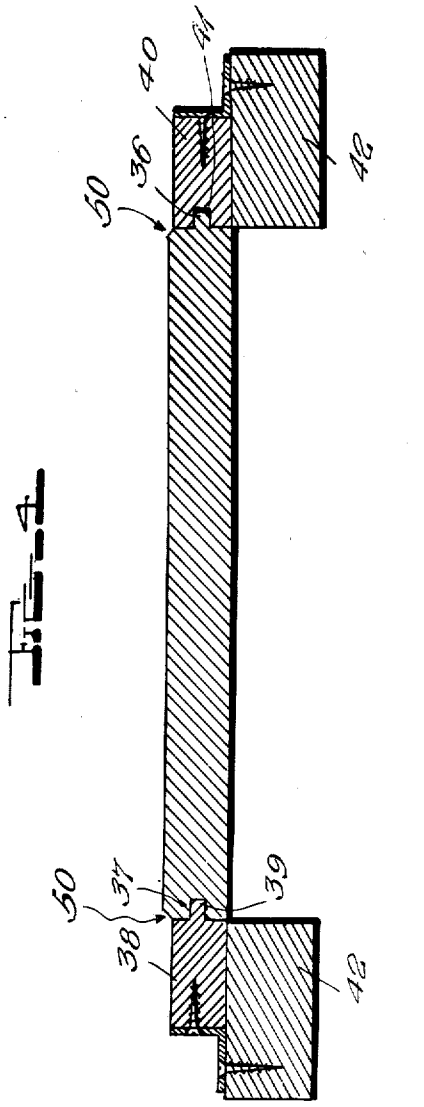


FIG. 4

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UNITED STATES PATENT OFFICE

2,276,253

WOOD FINISHING

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Application October 5, 1938, Serial No. 233,504

6 Claims. (Cl. 91—13)

My invention relates to the manufacture of factory finished wood floor blocks of the type such as is shown in the patent to Robert G. Bruce, No. 1,808,592, granted June 2, 1931.

One of the objects of the invention is to produce a wood-floor block or the like that has a finish that deeply penetrates the wood, as differentiated from wood finishes that merely lie on the surface of the wood, and that is tough and elastic, not readily scratched, of good lustre, and more durable than prior finishes.

Another object of the invention is to have the finishing operation as mechanical as possible, reducing the necessity of hand labor in producing the finished blocks.

A further object is to provide such a sequence of operations so that the finish on the block will be attractive in appearance and durable in use.

Other objects will appear as the description proceeds.

Referring to the drawings for a more complete disclosure of the invention,

Figure 1 is a plan view of the machine for applying the floor finishing composition.

Figure 2 is a plan view of the machine for applying the customary floor filler to the blocks.

Figure 3 is a plan view of the machine for polishing or waxing the surface of the blocks after the floor finishing composition and filler have been applied thereto and rubbed in.

Figure 4 is a transverse elevation showing the arrangement of the block as it travels on the tracks.

Referring particularly to Figure 1, the entire length of the finish application line is about two hundred feet. The blocks 1, made up of a plurality of slats as shown in Patent #1,808,623, are piled up in the hopper 2, which has reciprocating rocker arms 3 for pushing the bottom block in the hopper onto the link belt 4, provided with spaced studs 5. The blocks are placed into the hopper by the operator, so that the component strips 6 will be parallel to the line of travel of the blocks through the machine. The blocks travel at the rate of about twenty feet per minute, which means that when finishing 9-inch blocks, 27 of these blocks will be pushed out of the hoppers on to the studded link belt, per minute.

Above the link belt are highly polished steel pressure rollers 7, which bear down on the top surface of the blocks while they are being pushed forward by the studded link belt. The studded link belt grabs by friction the bottom of the block and starts it traveling in the line. It is the positive movement forward of the blocks by the link belt that keeps the entire line of blocks traveling from one end of the line to the other. A friction clutch is provided, so that if the line jams, the link belt stops.

As the blocks move forward at a uniform rate, they pass below a cylindrical container, 22, which provides a slow stream of a floor finishing composition that falls on to the face of the block at a predetermined uniform rate of flow, thereby supplying the same quantity to each block. A satisfactory composition for this purpose is such as is disclosed in the patent to Frank H. Lyons, No. 2,066,296, dated December 29, 1938, except for the paraffin wax element which it has been found should be practically eliminated, and which has the properties of rapidly penetrating the wood when it is applied.

After the floor finish composition has been applied, the blocks pass under a spreader 23, that is provided with canton flannel which distributes the floor finish evenly over the face of the block. The blocks now move forward to a reciprocating wiper 24, the distance between the spreader 23, and the wiper 24 being approximately one hundred and sixty-five feet of free travel, which permits about eight minutes time for the floor finish to penetrate or soak deeply into the wood. The wiper is absorbent and soft, and removes and absorbs the excess finish from the wet spots and transfers them to the dry spots. The wiper 24 is provided with a flannel surface, and moves transversely of the line of block travel and removes the circular marking left by the spreader 23. From the end of the track, the blocks are stacked, and after about one hour, are transferred to the filler line.

At the time the blocks are started through the filler application line the finish has not dried. It has merely had an initial setting. This fact is important, because by applying the filler before the finish has dried and while it has merely set initially, I secure a blending and combination of finish and filler in the surface and subsurface of the wood; these two elements combining homogeneously. This is of particular importance where color is used in both the finish and the filler. With the blending and combining of finish and filler as described both of these materials dry as a unit in the later operations as hereinafter described.

Referring now to the filler application line, as shown in Figure 2, the beginning of the line will be provided with the same type of hopper, feed mechanism and studded link belt identical to that of operation #1, such assemblage being dia-

grammatically indicated at 21. This line is about two hundred feet long and the blocks travel at the same rate as in the finish application line.

As the blocks move forward, they enter the covered hood 8, which is fully open on the side 9 so that the operator can apply the filler composition by a compressed air spray outfit to the face of the blocks. This is the usual silex wood filler thinned out with naphtha. By spraying the filler on the face of the block, a uniform coat of filler is produced. Since a small amount of an oil soluble dye, is added to both the finish composition and the filler when it is desired to color the blocks, applying the filler by any contact method results in streaking. Spraying does not disturb the already applied finish, as would be the case if the filler was rubbed on.

The surface of the blocks having been sprayed with the filler composition, will advance to the revolving brushes 10, forcing the filler thoroughly into the pores and other small openings in the face of the wood blocks. In the normal operation of the filler line, it will take about 2½ minutes after the block leaves the hood 8, until it arrives up to the revolving brushes 10, and this will be sufficient time to permit partial evaporation of the volatile vehicle in the filler, producing a dulling of the surface.

The four revolving brushes 10 rotate on a vertical axis and are driven by the vertically mounted motors 12 through belts 13. The face of the brushes is provided with bristles, which force the filler thoroughly into the pores and other small opening in the face of the blocks. The brushes may be provided with an arm 14, and a weight 15 on the end thereof for giving the necessary pressure downward of the brush, while it is operating on the surface of the wood. The brushes can be swung up on the pivots 12*a* to change the brushes as required.

The blocks now proceed to the next series of bristle brushes 16, which are driven by similar motors 12 and belts 13, and will be spaced, as indicated in the drawings.

These brushes serve to remove any surplus filler that may be adhering to the blocks. The distance of travel of the blocks between revolving brushes 10 and brushes 16 provide a few minutes lapse of time to permit some further drying of the filler. The excess filler is more readily removed in such dryer form.

The line of blocks now proceeds to a cylindrical machine 17, set at an angle of about 30 degrees with the track, and provided with bristle brushes to remove the circular markings left by the preceding operation and also to remove any excess filler from the upper edges of the block. This machine 17 rotates on a horizontal axis and is driven by a motor 18. The machine 17 revolves against the line of travel of the blocks.

As the blocks pass from the end of the filler line, they slide onto a table and they are transferred from there to portable drying racks for twelve hours drying in front of a blower fan which finally dries and sets the finish and the filler.

Referring now to operation #3, as disclosed in Figure 3, the finishing composition and filler having sufficiently dried in and on the blocks, they are now to be subjected to a waxing and polishing operation. The blocks are started in on the line by the use of a hopper feed mechanism and a studded link belt identical to those of operations #1 and #2, the same being diagrammatically illustrated and indicated by reference numeral 25. This line of operation is about two hundred feet long and the blocks travel at the same rate as in operation Nos. 1 and 2. The blocks are subjected first to machines 26 that are provided with steel wool surfaces to clean and prepare the surface for the final application of the polishing composition and also to finely smooth the surface.

These machines have a reciprocating motion lengthwise of the line of operation. Steel wool operates somewhat as very fine sandpaper, the previous operation of this type being similar to coarse or medium work, this final operation being fine in character. Just after leaving the reciprocating buffers 26, a polishing composition is applied by the operator with soft cheese cloth, applying the composition so that an even coat is applied to the face of the block. After the polishing composition has been applied to the block by hand, the blocks move forward to the spreader 27, taking a period of time of about three minutes for this movement. The blocks then pass under the buffer 27, rotating on a vertical axis and driven by the vertically mounted motor 28 through the belt 29. The face of these buffers is provided with fiber bristle and this operation serves to distribute the polishing composition evenly over the surface of the block, and burnish and polish the surface. All the buffers in this line operate at quite a high rate of speed and the frictional contact produces heat which is necessary in drying and polishing. Between this operation and the next operation, a period of about five minutes occurs during which time the solvents in the polish dry out to an extent and provide a more solid base for the next polishing operation. The blocks then pass under the buffers 32, rotating on a vertical axis as heretofore described, the first two of this series of buffers being provided with fiber bristle and the third one, 33, being provided with a carpet pad for polishing the surface. These three brushes are all provided with weighted arms as in the other buffers and this battery of three buffers serve to give a high lustre to the block surface. After leaving this series of buffers, the blocks then pass under the carpet pad buffer 34, rotating on a horizontal axis and driven by the motor 35 and revolving against the line of travel of the blocks. This buffer removes circular markings left by the buffers 32 and 33.

The blocks then pass off of the end of the track, which is the end of the process, and are packed into cartons for storage or shipment as they leave the track.

Since the wood blocks, as disclosed in the aforesaid Robert G. Bruce patent, are provided with tongues on two adjacent sides and grooves on two adjacent sides, there is a tongue 36 on one side and a groove 37 on the other. Accordingly the tracks 38 and 40 will be provided with a tongue 39 and groove 41 cooperating respectively with the groove 37 and tongue 36 on the block. The tracks 38 and 40 which are of the same construction and arrangement in all three of the operating lines will be supported on the frame work 42.

In feeding the blocks through any of the units of the machine, there is an advantage in feeling them lengthwise of the slats, as there is no compression of the wood that would otherwise cause the blocks to buckle. There is also an advantage in the bevel edge 50 on the blocks as compared with non beveled edge. When the face edges of the blocks are not beveled the upper surfaces do not match evenly, producing pro-

jecting edges, in which surplus filler or finish will catch and is not readily removed by the wipers or brushes.

It will be noted that the feeding instrumentalities are applied to the lower side of the block supported by tracks on their edges, but they are not applied to the face of the block which would cause the finished face to become damaged.

It is important that the finish be applied before the filler. Both may have coloring matter therein, such as an oil soluble aniline dye and it is desirable to get the color in as deep as possible. If the filler is applied first, a proper penetration of the finish is not secured. When using color, the same shade of color is in the filler as is in the finish.

The machine for operating on the wood block is comparable to a continuous strip of floor, movable relative to the stationary instrumentalities operating on the floor as distinguished from moving instrumentalities operating on a stationary floor.

The character of the feed is such that the wood strips and blocks are rigidly held while being fed through the machine and operated on. Just prior to applying the finishing composition, the block to be finished is put through a sander. The sander used is a three drum oscillating type which gives to the face of the block, a sanding, first with coarse sand paper, then medium and finally, fine sandpaper. No time is lost after sanding, in putting the blocks through the floor finish application line, because if there was delay even for a short period of time, the grain of the wood might raise, producing an uneven surface. The immediate application of the finish prevents grain raising. The final completely finished surface will be no smoother than the initial sanded surface.

In order that the finished surface shall be uniform it is important that the finishing operations be carried out under uniform conditions of air temperature, humidity and circulation. The inability to control these conditions when finishing floors in the field is responsible for most of the variation in the results obtained.

The temperatures of the air affects the solid and solvent content of all the materials used in the finishing operations. It affects the penetration of the floor finish, its viscosity, time of setting, drying and the like. Accordingly, the temperature of the work room is maintained preferably at 70–75 degrees F. and the materials employed are adjusted to that temperature in order to secure the best results. By varying the amount and character of solvents and amount and character of solids, other room temperatures might be employed.

Since the amount of moisture in the air, affects the drying and setting of materials and especially the rate of evaporation of the solvents used, a relative humidity of 35–40% is preferred. This corresponds with the best humidity conditions from the standpoint of health.

With the constant evaporation of solvents in the work room, it is necessary to provide for the withdrawal of the solvent laden air and the replacement with fresh air, otherwise, the temperature and humidity control would not be completely effective.

I claim:

1. A machine for applying filler to the surface of a line of wood flooring units, means for applying the filler to the surface of the units, a brush of sufficient weight for giving the necessary pressure for forcing the filler into the surface of the units while it is operating, a brush for removing the surplus filler, means for supporting said brushes, a steel wool buffer for removing the markings left by the aforesaid brushes, and means for feeding an unbroken line of units past said instrumentalities.

2. An apparatus for finishing wood flooring units comprising guideways for supporting and guiding a series of units, means for applying a finishing composition to the face of the units, means for applying a filler composition to the face of the units and means for moving a succession of units in said guideways past the aforesaid means in the order stated.

3. An apparatus for finishing the surface of an unbroken line of wood flooring units, means for continuously moving a succession of units through the apparatus at a uniform rate, means for applying a liquid composition to the surface of the units at a uniform rate of flow, a spreader for distributing the composition on the face of the units, a wiper for removing the excess composition from the surface of the units, the distance between the spreader and wiper being sufficient to permit most of the composition to penetrate the wood deeply.

4. An apparatus for finishing the surface of a line of wood flooring units, means for continuously moving an unbroken horizontal line of units through the apparatus, means for applying a finishing composition to the upper surface of the units, a rotary spreader for distributing the composition evenly over the face of the units and wiping it into the surface pores, a wiper for removing the markings left by the spreader and the excess composition on the face of the units, means for supporting the spreader and wiper the distance between the spreader and wiper being sufficient to permit most of the composition to deeply penetrate the wood.

5. An apparatus for polishing wood flooring units comprising guideways for supporting and guiding a series of units, means for continuously moving a succession of units in said guideway through the apparatus, means for cleaning and smoothing the face of the units, means for distributing a polishing composition over the face of the units and polishing the surface, means for buffing the surface to give it a high lustre, the distance between the distributing and buffing means being sufficient to permit a substantial drying of the polishing composition.

6. An apparatus for finishing wood flooring comprising guideways for supporting and guiding the flooring, means for applying finishing and filler compositions to the face of the flooring, means for applying polishing composition to the face of the flooring and means for successively moving pieces of flooring in said guideways past the aforesaid means in the order stated.

WATKINS WEBBER PARTEE.