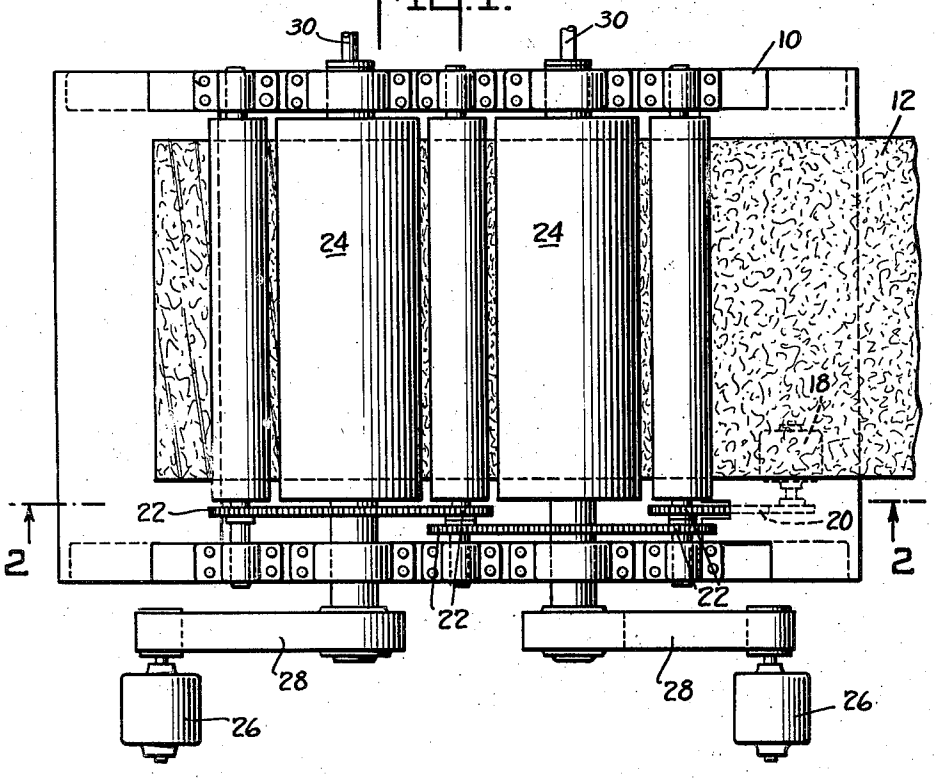
May 24, 1938. W. H. MASON 2,118,763

BURNISHING OF FIBERBOARDS

Filed Dec. 24, 1936

Fig. 1.



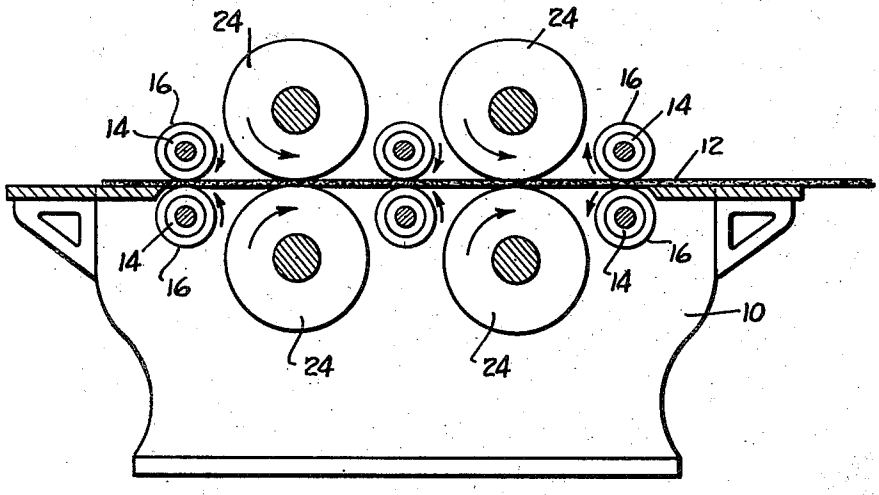


Fig. 2.

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BURNISHING OF FIBERBOARDS

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Application December 24, 1936, Serial No. 117,467

1 Claim. (Cl. 92—68)

My invention relates to production of a smooth polished surface on fiber boards, and particularly has for its object to provide a burnishing treatment whereby the surfaces of fiber boards are given an attractive smooth finish and the pores thereof closed or substantially closed.

Sanding machine treatment has heretofore been resorted to for making the surface portion of fiber boards or sheets smoother and more nearly plane by abrasive action of sandpaper, with removal thereby of a considerable part of the material of the boards or sheets. However, such sanding treatment not only reduces the thickness of the boards, but it leaves the surface of an insulation board, for example, very open and porous, and such a sanded surface requires considerable preliminary sizing in order to take paint and like finish coatings without excessive absorption. If the sanded surface be left unpainted, it takes up dirt and dust and becomes unattractive and discolored.

With my invention, sanding or other abrasion with accompanying removal of a considerable portion of the material at the surface of the board and opening up of its pores is avoided. Instead of the board being abraded by means of a rough frictional medium, such as sandpaper, I polish or burnish the board by means of a smooth frictional device, as, for example, by means of smooth metal rolls which serve to even and smoothen and densify the surface and seal the pores at the surface without removal of any substantial portion of the material and to impart a high glossy, closed surface finish.

The preferred mode of burnishing consists in feeding or travelling the board along as by means of several pairs of feed rolls which may run comparatively slowly, and preferably have a gripping surface such as a surface of rubber, for example, while also passing the boards between pairs of burnishing rolls. The burnishing rolls are preferably of greater diameter than the feed rolls and preferably operated at higher surface speeds than the feed rolls, and preferably run in a direction opposite to that of the feed rolls, and make lighter contact with the work than do the feed rolls. With this arrangement the board travels along at the rate of travel of the surface of the feed rolls, but the surfaces of the burnishing rolls travel much faster than the board and the frictional slippage of the smooth surfaced heating rollers against the board surfaces will produce an effective smoothing, densifying and burnishing effect. One desirable arrangement consists in providing three pairs of feed rolls spaced apart with two pairs of larger diameter burnishing rolls in the spaces between the feed rolls, but various other arrangements may be used, and only one surface or both surfaces may be burnished.

In the accompanying drawing I have illustrated a feeding and burnishing apparatus which can be used to carry out my invention. In said drawing,

Fig. 1 is a plan view, and

Fig. 2 is a sectional side view of such apparatus on line 2—2 of Fig. 1.

In these views, reference character 10 designates a machine frame with a table top, and 12 designates a fiber board taken for burnishing treatment. Such board may be, for example, 4 feet wide by 12 feet long.

The pairs of feeding rolls 14, 14 are shown spaced apart and preferably provided with gripping surfaces 16, 16. Feed rolls 14, 14 are all driven at the same speed and in the same direction as by means of a motor 18, sprocket chains 20, and sprocket wheels 22.

Two pairs of burnishing rolls 24, 24 are shown, located in the spaces between the feed rolls. Driving means shown for the burnishing rolls 24, 24, consist of motors 26 and belts 28. As shown by arrows on Fig. 2, the burnishing rolls 24 are preferably driven in a direction opposite to the drive of feed rolls 14. The burnishing rolls do not need to be interconnected, as they may be driven at different speeds from one another, if desired. Burnishing rolls 24 are preferably steam heated and means for steam supply are represented at 30. When burnishing means are used in pairs as shown, both surfaces of the board are burnished. Any desired or usual means (not shown) can be used for applying pressure to the feed and burnishing rolls, but the pressure should be adapted for the particular board so as to avoid crushing of the board. When only one side of the board is to be burnished, the burnishing rolls applied to such surface are run at high surface speed, as 500 ft. per minute; while the rolls applied to the opposite, preferably under, surface are run at a lower surface speed of, say, 65 ft. per minute.

The boards may be subjected to the burnishing treatment only once or twice or may be run through several times, as may be desired. When the burnishing rolls are heated by steam, their steam-heated surfaces, together with the heat generated by the rapid travel of the burnishing roll surfaces in contact with the surface of the board, produce an ironing effect and the heat

is of assistance in polishing, smoothing and evening up the surface of the fiber boards. A burnishing roll temperature of about 200° C., for example, can be used to good advantage, but wide variations in roll temperature are permissible. A good well finished smooth job can be made, the appearance is much more attractive than sanded surfaces, for example, and original markings, such as markings of felts or wire mesh produced in the manufacture of the board can be smoothed out and practically obliterated without removal of board materia.

Before the board is run through the rolls, the surface or surfaces to be burnished are preferably moistened as by spraying with a very fine spray of water, for example, 1% of water upon the weight of the board, or the surface of the board may be moistened to a similar extent in other ways, as by means of a roll surfaced with felt or the like running in contact with the board and with a drip feed or the like of water to keep the roll moist, or by exposure to exhaust steam or the like. Such moistening treatment is of material assistance in the ready production of smooth burnished surfaces. Sealers or fillers may likewise be applied to the surface and burnished in, and make the board more impermeable to oil, water, etc.

Fiber boards treated as described take on a glossy smooth burnished appearance and, when used without paint or other like surface coatings, do not readily take up dirt and get discolored, but remain permanently attractive. If surface coatings such as paint or the like should be applied to the boards or sheets so treated, little or no preliminary sizing is required preparatory to the painting operation.

One mode of measurement of the effect of such finishing with such hot burnishing and smoothing rolls consists in standing the sheets at a predetermined angle, preferably at 45°, that is, half-way between the horizontal and vertical, dropping uniform-sized drops of linseed oil thereon, and measuring the distance which a drop of oil runs down before it is absorbed by the board.

In the case of one fiber board of about .7 sp. gr. made from raw ligno-cellulose fiber of pine wood, the distances of run on the front of the board before and after the burnishing treatment were as 32 to 90, or almost 200% increase. The back of this board, which had screen mesh markings thereon produced in manufacture, showed distances of run before and after burnishing treatment in the proportion of 34 to 90 when so tested with uniform drops of linseed oil. When painting such a burnished board, the paint can be applied directly and preliminary sizing or the like dispensed with.

In another test, a vacuum cup was applied to the boards, and the pressure reduction below atmospheric pressure which is required to balance leakage through the boards was determined as a measure of the air infiltration. Using the same boards as already referred to, having about .7 sp. gr., such skin or vacuum tests were made at each surface. On the front surface which was originally tolerably smooth and plane, the skin tests before and after burnishing were as 102 to 413, or an increase when burnished of over 300%. The back surface of this board, which had been made against a wire mesh screen, contained wire mesh markings. The vacuum skin test showings on this back surface before and after burnishing were as 37 to 524, or an increase after burnishing of over 1300%.

While a wood-fiber board of about .7 sp. gr. and having wire mesh marks on the back has been referred to above, this is only in order to afford an understanding of desirable embodiments of the invention, and the invention is not limited to treatment of such a board, but is applicable with good results to all sorts of fiber boards, such as boards ranging from the more porous insulating boards having a specific gravity of about .3 to harder and denser boards with a specific gravity of approximately 1 or higher. The boards taken for the burnishing treatment may be made in a press, or merely dried without pressure in a hot air drier or like apparatus, and they may be of substantially uniform nature throughout their thickness or may have relatively denser surface portions with intervening relatively more porous interior parts, or be made in various other ways. Good examples of sheet or board products for use in accordance with this invention can be made in accordance with my Patents 1,663,503, 1,663,504, 1,663,505, and 1,663,506, granted on March 20, 1928.

It will be seen that by my invention unexpectedly great improvement in important surface qualities of fiber boards is obtained and the fields of use for the boards are greatly extended, and these and other results obtained at minimum cost.

I claim:

The method of treating fiber boards of ligno-cellulose material which consists in travelling the boards in one direction and simultaneously subjecting the moving boards to the action of a pair of opposed, smooth surfaced and highly heated rollers in contact with the surfaces of the boards, said rollers revolving in a direction opposite that of the board travel and at a much higher rate of speed, whereby the frictional slippage of the heated rollers against the surface of the moving boards will impart a smooth, glossy, closed surface of increased density to said ligno-cellulose boards while retaining substantially all of the original materials of which the boards are made.

WILLIAM H. MASON.