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MANUFACTURE OF HYDRAULIC CEMENT PRODUCTS

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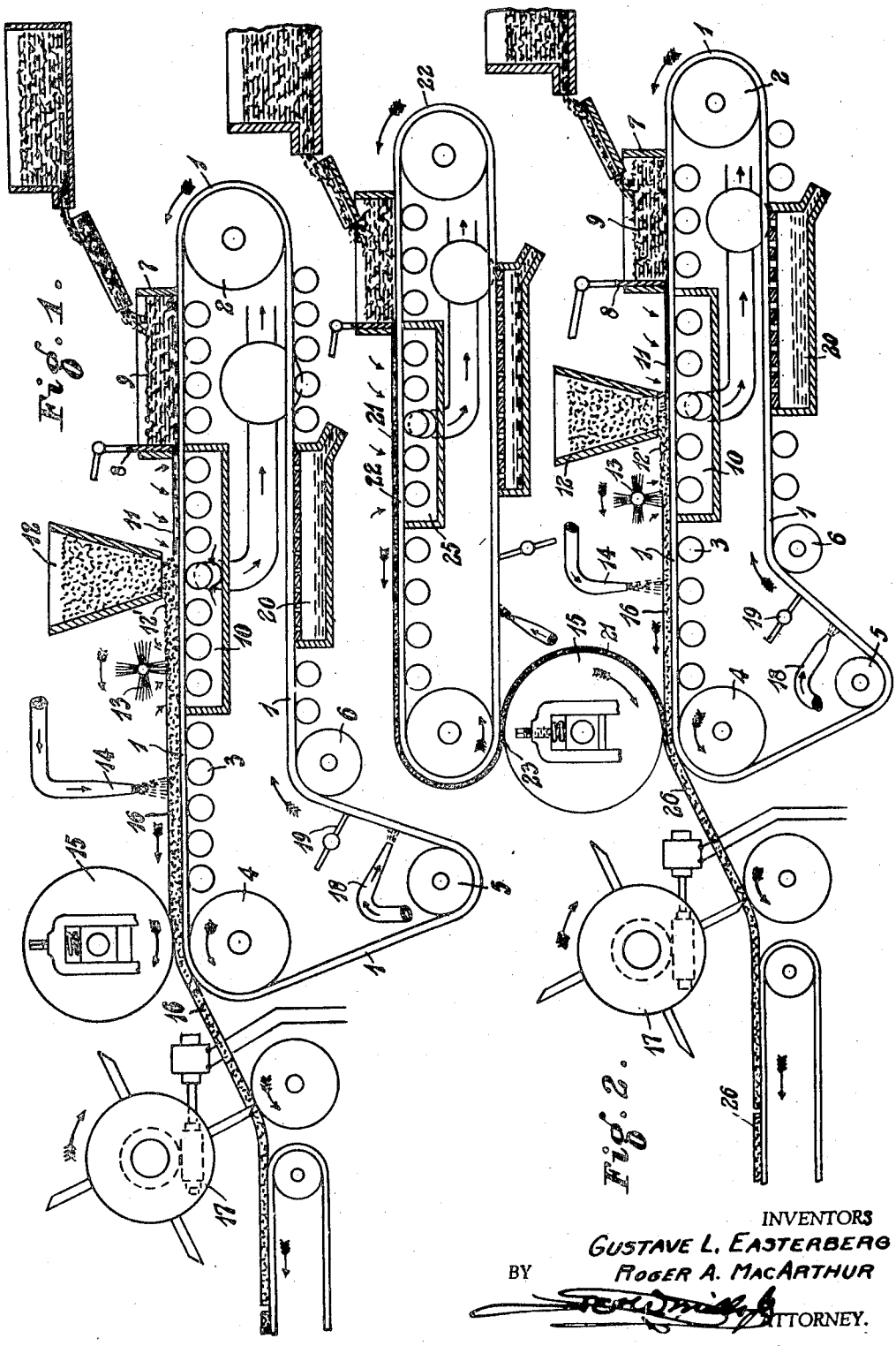


Fig. 1.

Fig. 2.

INVENTORS
GUSTAVE L. EASTERBERG
ROGER A. MACARTHUR
BY
ATTORNEY.

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MANUFACTURE OF HYDRAULIC CEMENT PRODUCTS

Gustave L. Easterberg, Pleasant Ridge, and Roger A. MacArthur, Wyoming, Ohio, assignors to The Philip Carey Manufacturing Company, a corporation of Ohio

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2 Claims. (Cl. 92—39)

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This invention relates to hydraulic cement products, and particularly relates to cement-asbestos products, such as shingles, sidings, and corrugated and flat lumber, comprising mixtures of Portland cement and asbestos fibers, with or without the addition of other fibers and fillers.

Most of the cement-asbestos products of commerce are made on wet machines, which are modifications of the types used for making paper, such as the Fourdrinier and cylinder machine. These machines form a water-laid paste of Portland cement and asbestos fibers and wrap it on an accumulator roll, said paste having been partially dewatered on a felt or cylinder or both. The accumulated sheets are cut from the accumulator roll when the thickness thereof is sufficient. In the usual practice of the art, the sheets must be accumulated for an average of about one minute. The process is an intermittent one, and the sheets produced thereby are handled in units. The formed sheets are ordinarily wet-trimmed to the approximate size of the shapes made therefrom, and are pressed in platen presses to compact them. The handling of these sheets is expensive, but even more expensive is the time taken to wrap a sheet on the accumulator roll.

The Norton process of fabricating cement-asbestos sheets is, on the other hand, a continuous process, and the rate of production far exceeds that of the wet machine process. In the practice of this process, a dry or slightly moistened mixture of Portland cement and asbestos fiber is placed on a travelling endless belt by suitable means and in the full required thickness, and is dampened with water sprays and is lightly rolled for compaction, following which the sheet is pressed, indurated and cut to size.

The sheet of the Norton process is economical, being made in full thickness continuously, but suffers a serious drawback, in that the asbestos fibers are not properly oriented to give the maximum reinforcement to the sheet structure. The wet machine processes largely orient the asbestos fiber in the direction of travel of the felt, and the sheets made thereon, when cured, or indurated, are strong and not brittle. In the practice of the Norton process, it is necessary to add a greater proportion of more expensive asbestos fiber to achieve reasonable strength and, regardless of the amount of fiber added within reason, the cured product is excessively brittle. Excessive brittleness can not be tolerated in cement-asbestos products because of resultant unavoidable damage to the product in handling, application and service.

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We have found that both transverse strength and brittleness of cement-asbestos products are largely determined by the characteristics of the surfaces of said products. A cement-asbestos shingle, for example, made by the Norton process is very brittle as compared with a similar unit made on a wet machine. We have found that a shingle can be made with wet-laid surface portions having the fibers therein oriented or lying parallel to the surface and with the interior portion of the shingle oriented or not is not brittle. The invention relates to cement-asbestos or other hydraulic cement sheets, having linear fibers therein, with the fibers in one portion oriented. The fibers in the other portions of the sheet may or may not be oriented.

For a better understanding of the invention, reference may be made to the accompanying drawings, in which:

Fig. 1 is a schematic view of a portion of a machine embodying the invention; and

Fig. 2 is a schematic view of a modified form.

Conveyor 1 is a felt capable of absorbing water and travels continuously over the rolls 2, 3, 4, 5 and 6 in the direction indicated by the arrow. The box 7, with a gate 8 is kept supplied with a thin slurry 9 of cement-asbestos. The suction box 10 operates to withdraw some water from the sheet 11, water-laid from the slurry, in the felt and aids in fixing the asbestos fibers oriented in the direction of felt travel. The hopper 12 contains a dry or slightly moistened mixture of Portland cement and asbestos fibers with or without other ingredients as fillers, etc., and is provided with a means for introducing the required thickness of said dry or slightly moistened mixture layer 12' on the partially dewatered slurry from box 7. A rake, bar or brush 13 levels the overlay 12' of cement-asbestos and the water spray 14 moistens it so that when compacted under the roll 15, the composite sheet 16 is thoroughly dampened throughout its thickness, part of the water coming from the spray 14, and part from the wet laid layer 11. The moisture content is made more uniform through the sheet by being introduced both above and below the dry or slightly moist overlay mixture. The compacted composite sheet is thus sufficiently increased and reenforced in strength by reason of the wet-laid sheet 11 so as not to be brittle, and handling is thus easier.

This composite sheet can be roll-pressed by the method disclosed in our copending application, Serial No. 349,634, the oriented fibers of sheet 11 giving the entire sheet substantial tensile strength not present with the sheet of the Norton

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process in which no part is wet laid and the fibers therein are not oriented longitudinally of the surface. A flying knife 17 may be used to cut the compacted sheet 16 if desired. The cleaning water for the felt 18, the whipper 19 and the drying box 20 are standard in the art and are shown merely as illustrative.

In another modification of this novel process, a wet-laid sheet is placed on the other surface of the sheet 16 opposite to layer 11, as shown in Fig. 2. In this modification, an additional wet laid sheet 21 is made on a felt 22 and is picked off the felt at the point 23 by the compacting roll 15 and superposed on sheet 16 opposite to layer 11. This sheet is dewatered by the suction box or boxes 25. The pressure of the roll 15 against the material fed over roll 4 on the felt conveyor functions to combine the sheet 21 with the combination sheet 16. This sheet 21 is made similar to the wet-laid sheet 11 of Fig. 1 and is applied to 12' opposite to layer 11. The composite sheet 26 of Fig. 2 possesses the predominating characteristics of a wet-laid sheet and may be handled as such, and is particularly adapted to roll-pressing as disclosed in our above mentioned copending application.

We have found that the indurated product of Fig. 2 has substantially the same physical properties and freedom from brittleness as a sheet made by a wet machine, and as stated above is much cheaper to produce as a result of being made continuously.

While the modifications of Figs. 1 and 2 are given as illustrative, minor changes may be made without departing from the spirit of this invention. For example, a cylinder machine may be used instead of the Fourdrinier machine shown in Figs. 1 and 2 to make one or both of the sheets 11 and 21, or a suitable high capacity suction filter such as an Oliver filter may be used to form thicker sheets.

We claim:

1. A continuous method of making hydraulic cement products comprising forming a plurality of water-laid sheets of hydraulic cement, having linear fibers therein which are oriented longitudinally of the surface of said sheets, interposing a non-water-laid hydraulic cement-asbestos layer between the wet water-laid sheets, and compressing the juxtaposed structure against an absorbent resilient support to remove the water and integrate the juxtaposed sheets by continuously feeding the juxtaposed structure between press rolls.

2. A continuous method of making hydraulic cement products comprising forming a plurality of water-laid sheets of hydraulic cement, having linear fibers therein which are oriented longitudinally of the surface of said sheets, interposing a non-water-laid hydraulic cement layer between the wet water-laid sheets, and compressing the juxtaposed structure against an absorbent resilient support to remove the water and integrate the juxtaposed sheets by continuously feeding the juxtaposed structure between press rolls.

GUSTAVE L. EASTERBERG.
ROGER A. MacARTHUR.

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