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Gerhardt

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[54] **APPARATUS FOR SPREADING COMMINUTED PARTLY CEMENTITIOUS MATERIAL ON A MOVING SUPPORT**

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[52] **U.S. Cl.** **425/84,** 425/83, 425/224

[51] **Int. Cl.** **B28b 5/00**

[58] **Field of Search** 425/224, 223, 363, 84, 425/83, 209, 92, 101, 201

[56] **References Cited**

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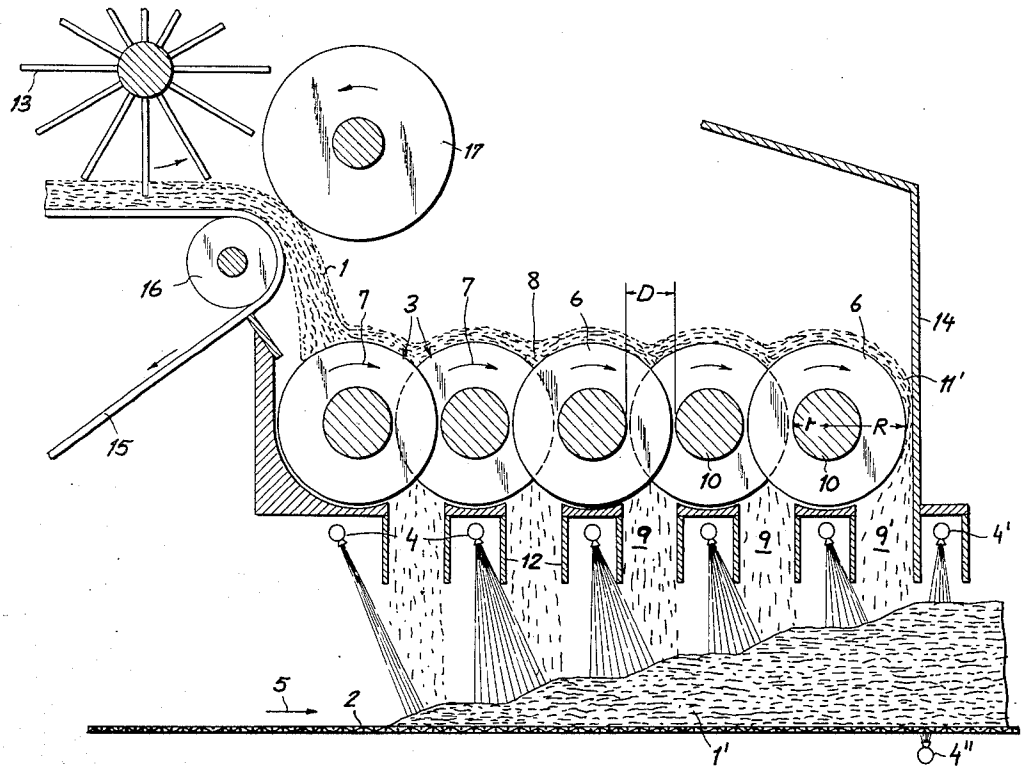
[57] **ABSTRACT**

A mass of comminuted partly cementitious material, such as a mixture of asbestos fibers and gypsum, is distributed over a limited area of a continuously moving conveyor surface by being deposited on an array of parallel rollers with interdigitated disks forming narrow slots in the intervening gaps, the particles of the mass dropping through these spaces onto the conveyor to form a pile. Jets of water from nozzles disposed underneath each roller irrigate the mixture as it descends.

6 Claims, 3 Drawing Figures



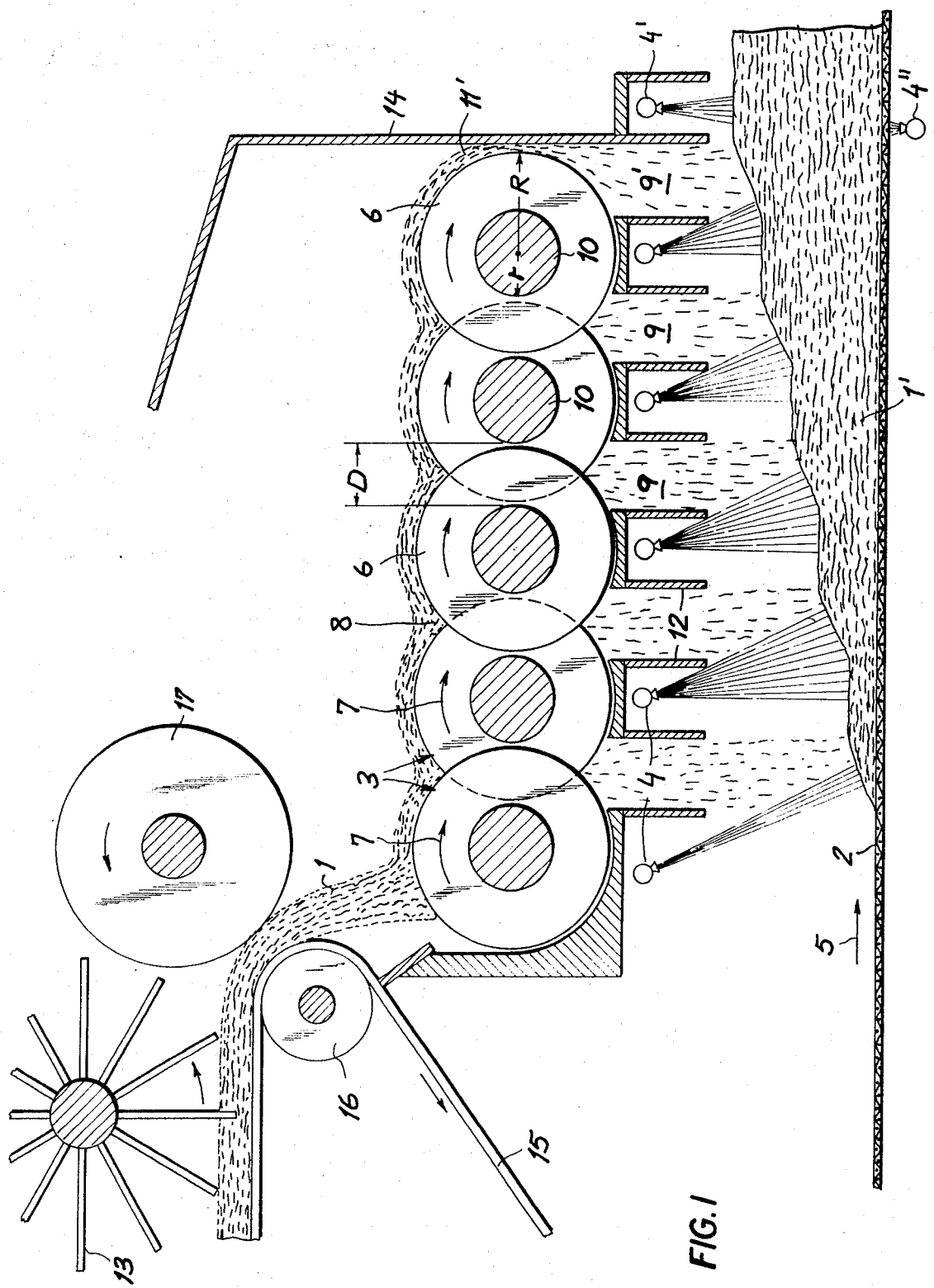


FIG. 1

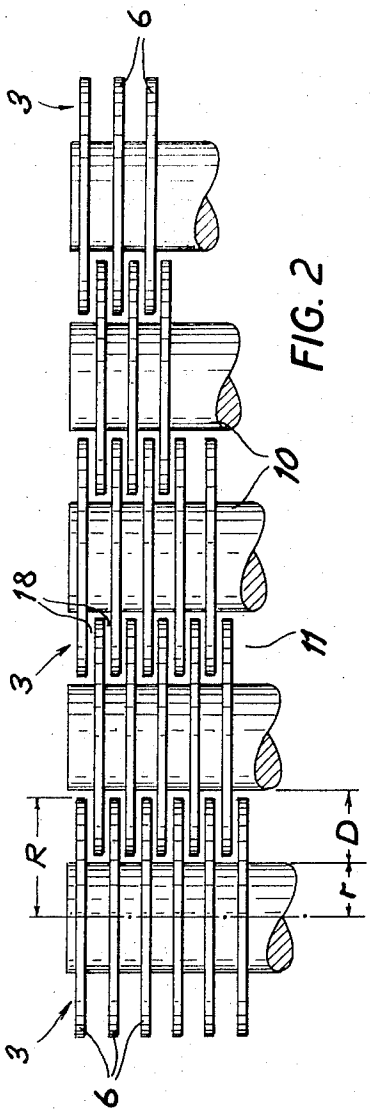


FIG. 2

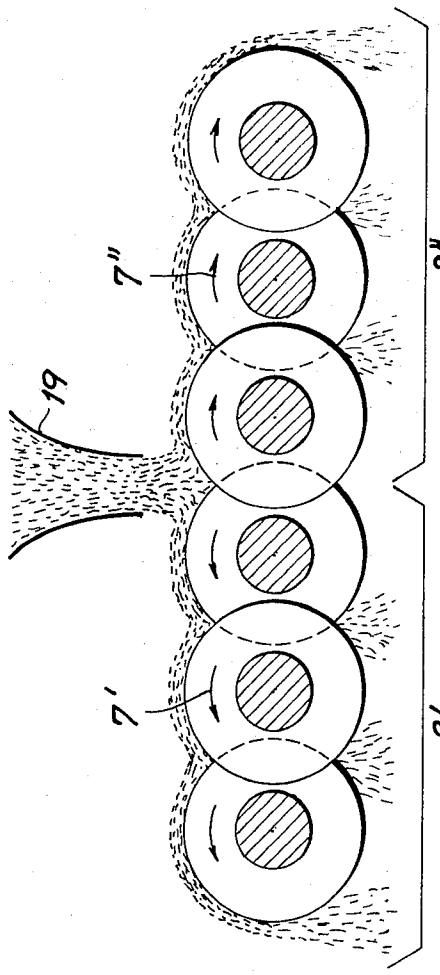


FIG. 3

APPARATUS FOR SPREADING COMMINUTED PARTLY CEMENTITIOUS MATERIAL ON A MOVING SUPPORT

FIELD OF THE INVENTION

My present invention relates to an apparatus for spreading comminuted partly cementitious material, such as a mixture of asbestos fibers and gypsum, on a continuously moving conveyor surface designed to support a pile of such material in a wetted state from which it may harden into a solid layer adapted to be subdivided into boards of asbestos-cement or the like. Such boards may be used, for example, as substrates in making laminated plates of the type described in commonly owned application Ser. No. 143,569 filed May 14, 1971 by H. Kober, now U.S. Pat. No. 3,753,827. The mixture may also include fine-grained aggregate of the type conventionally used in concrete.

BACKGROUND OF THE INVENTION

Conventional equipment for continuously loading a moving conveyor with such a wetted mixture includes rollers for premixing the fibers and particles of hydraulic binder (e.g., gypsum or cement) and for distributing the result onto the conveyor surface to form a pile which is irrigated by one or more spray nozzles and which is flattened by a leveling roller or a doctor blade; additional spray means may be provided upstream and downstream of the distributor to wet the supporting surface as well as the exiting layer. The conveyor providing the supporting surface subsequently passes through a pressing station in which the comminuted mass is compacted and excess water is expelled, e.g., through perforations in the conveyor which for this purpose may be designed as a wire grid or the like.

In order to produce a substantially uniform mixture, this mode of distribution requires considerably more water than would be needed purely for the activation of the hydraulic binder. Aside from the need for draining all this excess water, the temporary presence of so much liquid in the layer impairs its cohesiveness and increases the risk of crack formations in the finished product.

OBJECT OF THE INVENTION

The object of my present invention, therefore, is to provide an improved distributor of this nature whose output is more homogeneous, both before and after setting, and which operates with reduced quantities of water.

SUMMARY OF THE INVENTION

I realize this object, in accordance with my present invention, by providing an array of juxtaposed rollers with parallel horizontal axes above the supporting surface, each roller including a cylindrical hub on which a multiplicity of annular fins are axially spaced; the fins of adjacent rollers are interdigitated so as to subdivide the gaps between the hubs into narrow slots. The comminuted partly cementitious material (fibers plus hydraulic binder) is continuously deposited on these rollers by suitable feed means, the rollers being codirectionally rotated so that the interdigitated fins move in opposite directions to retard the descent of the deposited material through the slots defined thereby. The descending flows of this material are irrigated, before reaching the surface of the continuously moving conveyor, by spray means disposed underneath the rollers, preferably in alignment with the roller hubs. Advantageously, for most effective moistening of the descending particles, the flow paths of these particles are bracketed by upstream and downstream nozzles so inclined as to train respective jets of water upon these flows in the downstream direction whereby the water streams follow the particles as they pile up on the conveyor.

The flow rate of the particles through the gaps around the several roller hubs can be regulated by varying the speed of rotation; this rate also depends on the hub spacing, i.e., on the radial width of the fins (and therefore on the slot length) which should be dimensioned in conformity with the length of the fiber fragments forming part of the mixture. The overall depth of the resulting layer depends, of course, on the number of roller stages used.

BRIEF DESCRIPTION OF THE DRAWING

The above and other features of my invention will now be described in detail with reference to the accompanying drawing in which:

FIG. 1 is a side-elevational view of a distributing apparatus according to my invention, shown partly in section;

FIG. 2 is a fragmentary top view of a roller assembly forming part of the apparatus of FIG. 1; and

FIG. 3 is a side-elevational view of a modified roller assembly.

SPECIFIC DESCRIPTION

The apparatus shown in the drawing comprises a frame **14** on which, in a manner not further illustrated, the upper run of an endless conveyor belt **2** moves unidirectionally as indicated by an arrow **5.** Another endless band **15,** led about a deflecting roller **16** which is driven by a nonillustrated motor, coacts with a mixing roller **13** and a dosing roller **17** to feed a partly cementitious mixture **1** of filamentary material (e.g., asbestos fibers), hydraulic binder (e.g., gypsum) and possibly a fine-grained filler to a distributor comprising an array of horizontal rollers **3** with coplanar axes spacedly overlying the conveyor surface. Each roller **3** includes a hub **10** and a multiplicity of axially spaced annular fins **6** which may be constituted by disks interleaved with sections of the hub, the radius R of each disk exceeding the radius *r* of the hub by a distance D which is just slightly less than the width of the gap **11** between adjacent hubs **10.** Radii *r* and R are the same for all rollers, as is the axial separation of the disks, yet the disks of adjacent rollers are relatively staggered and interdigitated to subdivide each gap **11** into a multiplicity of narrow slots **18.**

The rollers **3** are codirectionally rotated, with the aid of drive means symbolized by arrows **7,** and jointly define a generally horizontal receiving surface with troughs **8** representing the entrances to the gaps **11.** The mixture **1** arriving at the first roller (at the extreme left of FIG. **1**) is spread out by the rotating rollers over this receiving surface and partly enters the several gaps **11** through which its particles descend in a multiplicity of separate flows **9** to form a pile **1'** on belt **2.** Any residue carried onto the periphery of the final roller (at the extreme right in FIG. **1**) enters a gap **11'** between that roller and an end wall of frame **14** to descend in a flow **9'.** The several flow paths or chutes are bounded by

vertical baffles **12** and may also contain additional guide means, not shown, directing the descent of the particles.

Nozzles **4**, shielded by the baffles **12** from the flow paths **9** just below the rollers **3**, train respective jets of water upon the continuously reforming pile **1'** at an angle designed to irrigate the descending particles just before they reach the conveyor surface. A further nozzle **4'** outside frame **14** moistens the upper surface of the outgoing layer while a nozzle **4''** spreads its underside from below through the interstices of the wire grid or the like constituting the belt **2**.

The binder particles and the fibers making up the mixture **1** need not be blended in advance but may be separately supplied to the throat of the feeding station represented by rollers **16** and **17**.

As illustrated in FIG. **3**, the distributor may include two sets of rollers **3'**, **3''** rotating in opposite directions (arrows **7'** and **7''**), with the mixture **1** centrally supplied thereto via a hopper **19**.

With either type of roller arrangement, the mixture could also be spread directly over the entire receiving surface of the array by a feeder discharging the mixture in a broad stream.

I claim:

1. An apparatus for converting a mass of comminuted partly cementitious material into a moistened continuous layer, comprising:

a conveyor with a horizontal supporting surface;

an array of juxtaposed rollers with parallel horizontal axes above said supporting surface, each roller including a cylindrical hub and a multiplicity of axially spaced annular fins on said hub, the fins of adjacent rollers being interdigitated with formation of narrow slots in the gaps between the hubs thereof;

drive means for codirectionally rotating said rollers and simultaneously moving said conveyor;

feed means for continuously depositing comminuted cementitious material on said rollers for distribution into a plurality of flows descending in a free fall through said gaps to said supporting surface;

flow-guiding means underneath said rollers for confining the descending material to the vicinity of said gaps; and

spray means underneath said rollers for irrigating the descending flows of said cementitious material.

2. An apparatus as defined in claim **1** wherein the diameters of said fins are the same for all said rollers, their axes being disposed on a common horizontal plane.

3. An apparatus as defined in claim **1** wherein said feed means opens from above onto the outermost roller of said array on the upstream side of said conveyor.

4. An apparatus as defined in claim **1** wherein said spray means includes a row of nozzles respectively aligned with the hubs of said rollers, each of said flows descending between an upstream nozzle and a downstream nozzle.

5. An apparatus as defined in claim **4** wherein at least some of said nozzles are inclined to train respective jets of water upon said flows in the downstream direction.

6. An apparatus as defined in claim **4** wherein said flow-guiding means comprises a set of substantially vertical baffles terminating with substantial clearance above said supporting surface, said nozzles being disposed between pairs of said baffles.

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