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COATING MACHINE

Filed Nov. 30, 1928

FIG. 1.

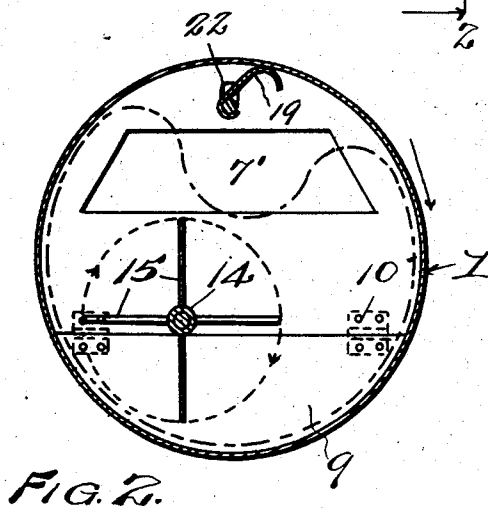
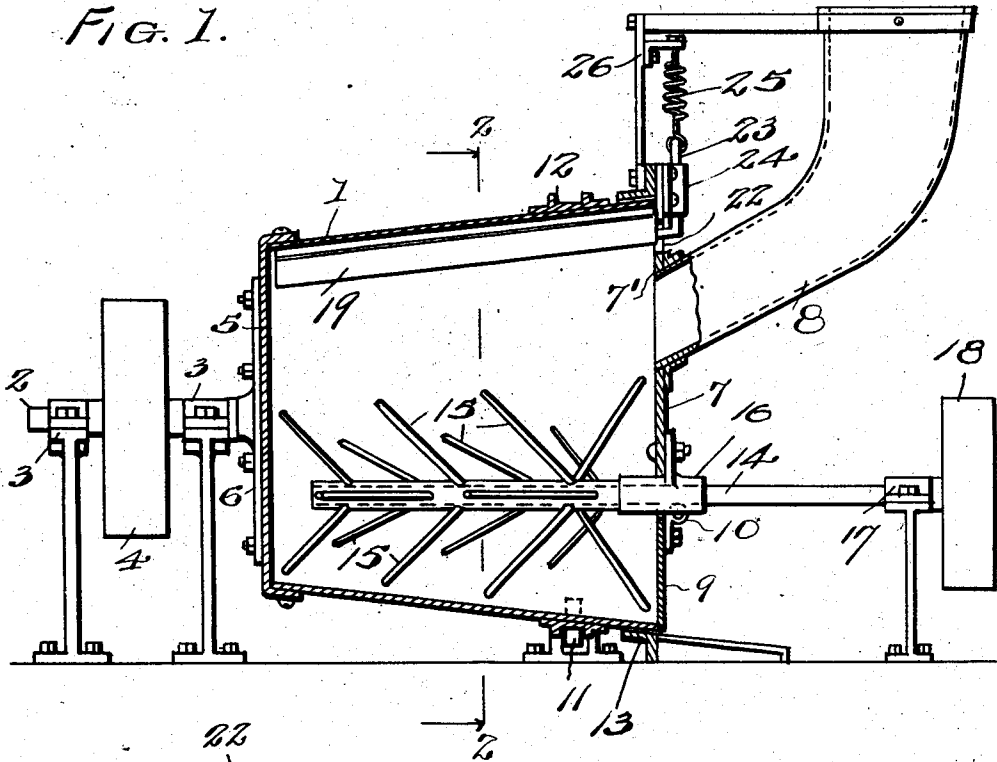


FIG. 2.

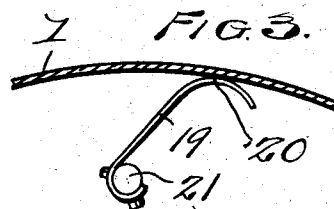


FIG. 3.

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COATING MACHINE

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The present invention relates to improvements in coating machines or mixing machines, which, while applicable for various uses, are designed particularly for applying, by attrition, an adhesive coating or binder to fibrous material, to be used in fashioning rigid, un laminated slabs having cellular body structures, and adapted for commercial and industrial purposes.

10 In the formation of these un laminated slabs, the resilient fibrous material has applied thereto a coating or binder, as by the use of the present coating machine, and then the material with its coating or binder is com-
15 pacted together to form the cellular structure of the un laminated slabs.

The fibrous material used in carrying out my invention may be excelsior, wood fibre, bagasse, marsh grass, or fibers from corn stalks, corn cobs or similar tough, durable, light, resilient or elastic material, and the binder or coating to be applied to the fibrous material, is a plastic cement or binder, such as oxy-chloride of magnesium, silicate of sodium, oxy-sulphate of magnesium, casein
25 glues, asphalt emulsion, hydrated lime, or similar plastic or liquid binder. This binder or plastic cement may be made up of any of the above materials, or other material that
30 will coat, impregnate or partially impregnate the fibers, and this application of the binder is accomplished in the machine of my invention, which agitates, stirs, beats, and commingles the fiber and binder for the pur-
35 pose.

In carrying out my invention various instrumentalities may be employed, and it will be understood that changes and alterations may be made in the form of the invention illustrated in the drawings, and I therefore do not limit myself to the single exemplifica-
40 tion of the invention depicted in the drawings.

Figure 1 is a vertical longitudinal view of a rotary machine for applying the adhesive to the material.

Figure 2 is a diagrammatic view at line 2-2 of Figure 1 showing the rotary drum and rotary agitator and the scraper in the drum, and indicating by dotted lines the

movements of the parts and of the materials within the drum.

Figure 3 is an enlarged detail view of the scraper showing its relation to the wall of the rotary drum.

In carrying out my invention I preferably utilize a tapered or frusto-conical, rotary drum 1, which is provided with an axially aligned, horizontal stud shaft 2 that is jour-
naled in bearings 3, and driven by a pulley 4 through a suitable drive belt. The tapered drum is fashioned with a closed end or head 5 to which the stud shaft is rigidly connected as by bolted flange 6; so that the shaft and drum revolve together. The larger end of the drum is closed by a fixed end plate 7
60 having an opening 7' therein, through which the feed chute 8 furnishes material to be mixed. An outlet gate 9 is hinged at 10 in the end plate 7 near the lower portion of the larger end of the drum, for exit, when opened, for the mixed and coated material.

The larger end of the rotary drum is preferably supported by rollers as 11 journaled in suitable, fixed brackets, and the periphery
75 of the drum has an annular track 12 for the rollers, an annular guard ring 13, forming a stationary shield or guard for the joint of the drum and its end plate.

Within the drum is arranged a rotary fork, stirrer, or agitator, comprising a shaft 14 with tines 15 secured thereto, and the shaft extends parallel with the longitudinal axis of the drum, but offset therefrom, in the lower portion of the drum, eccentric to the
85 center of the drum. The shaft is journaled in bearings as 16 and 17, the former being rigid with the end plate 7, and the latter spaced a suitable distance therefrom as shown.

It will be noted that the free end of each tine projects beyond the inner end or fixed end of an adjoining tine, in such manner that the free ends of the tines are in position to contact with the fiber, catch it, and prevent the fibers gaining access to the shaft 14. The fibers are thus prevented from wrapping themselves around the shaft in such manner as would impair the efficiency of the machine, but are separately and repeatedly tossed
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about within the interior of the drum in the presence of the plastic cement, or binder.

The shaft 14, which passes through the bearing 16 in the end plate, and is also journaled in the bearing 17, is driven by a suitable belt and pulley 18, it being understood that the drum and the rotary fork turn in the same direction, as indicated in Figure 2. The tines of the rotary fork repeatedly toss the fibers about in the drum in the presence of the binder, and the rotation of the drum continuously carries the fibrous mass to the rotary fork. The discharge gate 9 of course remains closed while the material is being fed to the drum and while the drum is revolving and the agitator or fork is turning.

As shown in Figure 2 the fibrous material and binder occupy but a comparatively small space in the drum, while the remainder of the space enables the forks to toss the material about in the drum within the limits indicated by the dot and dash line, the material always coming back to be picked up by the forks.

As the drum rotates and carries the material to the revolving fork, the latter picks up the mass, repeatedly tosses and throws off the fibers, separating them, and causing them to rub one against another, to insure an individual softening of the fibers that permits permeation of the fiber by the binder, and in addition an even distribution of the plastic cement or binder on all parts of the fibers is accomplished, together with a uniform coating of the fibers.

As the mixture of fibers and binder is tossed about in the drum, a small quantity of the plastic cement or binder is evenly and uniformly distributed over the entire area of all of the fibers, the degree of permeation of the fibers by the binder depending upon the length of time for the passage of the material through the rotating drum. The fibrous mixture is picked up by the prongs or tines of the rotary fork, or the mixture may be carried on the inner face of the wall of the rotating drum, dropped therefrom, and again tossed by the tines of the rotary fork, as the coating or binder is applied, by attrition to the fibers.

In this process of mixing the binder and fibers, the fibers, as they are thrown against the inner face of the drum, are inclined to, or have a tendency to, stick to the wall, and the binder or plastic cement is also likely to stick to the wall, necessitating the employment of means for scraping the material from the drum before it can accumulate in sufficient quantity to retard the efficiency of the coating machine. For this purpose a scraper blade or plate 19 is used, having a scraper face 20, curved as shown and having a resilient bearing against the inner face of the drum-wall. The scraper plate or blade is attached to a scraper bar 21 that extends parallel with the wall of the drum and is located in the upper

portion of the drum. One end of the bar projects through the end of the drum, and passes through a slot 22 in the fixed end plate 7, and this projecting end of the bar is turned upwardly, as at 23, and movable in a guide sleeve 24 provided therefor and supported from the ring 13 or other fixed support. The scraper bar is supported and the scraper blade is held in working position with relation to the inner face of the drum wall by resilient means, as for instance a spring 25 which is anchored at one end to the scraper bar and suspended at its other end from a bracket 26.

Thus the scraper blade removes the cement as rapidly as it forms on the inner face of the drum, and the position of the scraper, at an acute angle to the wall it touches, permits some of the fiber to accumulate on the plate, to be afterward dragged between the resiliently pressed edge of the scraper blade and the wall by the revolving drum in order that the accumulated cement may be rubbed into the fibers. These fibers with the cement coating then fall back into the mass of material that is being tossed about by the rotary fork, and the coated fibers finally reach the discharge end of the drum for exit when the gate 9 is opened. The drum is tapered longitudinally as shown to permit the material to be carried toward the discharge end as the drum rotates, until the coated and tangled fibers eventually are discharged through the opening made by the lifting of the gate 9. In treating the materials I use a predetermined amount and proportion of fiber and binder, a sufficient quantity of the latter being employed to coat the fiber without any excess left over, thereby economizing in the use of the binder and avoiding waste of the material. Thus a minimum quantity of the binder is distributed over a maximum (the entire) surface of the fibers as the drum and rotary fork revolve in the same direction but at different speeds.

The feed of the cement or binder into the drum, and also the feeding of the fiber to the drum, may be performed in batches of given weight and volume, or in a continuous stream, timing the rate and proportions of the fiber and binder, and of the discharge to the rate of speed.

Coloring matter in liquid form may be added to the cement, or to the mass in the drum, for the purpose of painting or staining the fibers the desired color, and in some instances non-fibrous materials may also be mixed with the fiber and binder.

I may also introduce short fibers of other material commingled with the plastic binder or liquid binder. Ordinarily in the course of mixing, and discharging the coated fibers, I revolve the drum and beater shaft in the same direction, however, I may oscillate the drum back and forth on its axis, es-

pecially during the time of charging the drum, in order to distribute the fiber uniformly throughout the interior of the drum, and also during the time of discharging, to expedite the discharge of the material from the drum.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. The combination in a coating machine of the non-pugging type with a rotary drum having a feed inlet and a discharge outlet for non-flowing, non-plastic fibrous material and a binder, of means within the drum for bringing into intimate relation the fibrous material and binder, whereby the former is coated by the latter.

2. The combination in a coating machine of the non-pugging type with a rotary drum having a feed inlet and a discharge outlet, of a rotary fork located in the drum eccentric to the axis of the latter, for the purpose described.

3. The combination in a coating machine of the non-pugging type with a rotary drum having a feed inlet and a discharge outlet and means for rotating the drum, of a rotary fork located in the drum eccentric to the axis of the drum, and means for rotating said fork in the same direction as the rotation of the drum, but at a greater speed.

4. The combination in a coating machine of the non-pugging type with a rotary, frusto-conical drum open at one end and provided with a fixed end plate, a feed chute for the drum and an outlet gate for the plate, a rotary shaft disposed eccentrically to the axis of the drum, a fork within the drum rotatable with the eccentric shaft, and means for operating said drum and shaft.

5. The combination in a coating machine of the non-pugging type with a rotary drum having a feed inlet and discharge outlet for non-flowing and non-plastic fibrous material and a binder, of means within the drum for bringing into intimate relation the fibrous material and binder whereby the former is coated with the latter, and means for scraping accumulations of these materials from the inner face of the drum wall.

6. The combination in a coating machine of the non-pugging type with a rotary drum having a feed inlet and a discharge outlet and means for rotating the drum, of a rotary fork located in the drum and means for rotating said fork, and a resiliently supported scraper having a scraping relation to the interior face of the drum to prevent accumulations of material on the inner face of the drum.

7. The combination in a coating machine of the non-pugging type with a rotary, tapered drum having an open end and a fixed end plate therein, and means for rotating the drum, of a rotary fork in the drum eccentric

to the axis of the drum, means for rotating the fork, a scraper bar and scraper thereon, said bar having an exterior end and guide therefor, and means for resiliently supporting said bar.

8. The combination in a coating machine of the non-pugging type with a rotary drum having a feed inlet and discharge outlet and means for rotating the drum, of a rotary shaft journaled eccentric to the longitudinal axis of the drum, and a fork carried by said shaft and comprising a plurality of tines, with the free ends of the tines overlapping the fixed ends of adjoining tines of the fork.

In testimony whereof I affix my signature.

MARTIN T. CHAMBERLAIN.

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