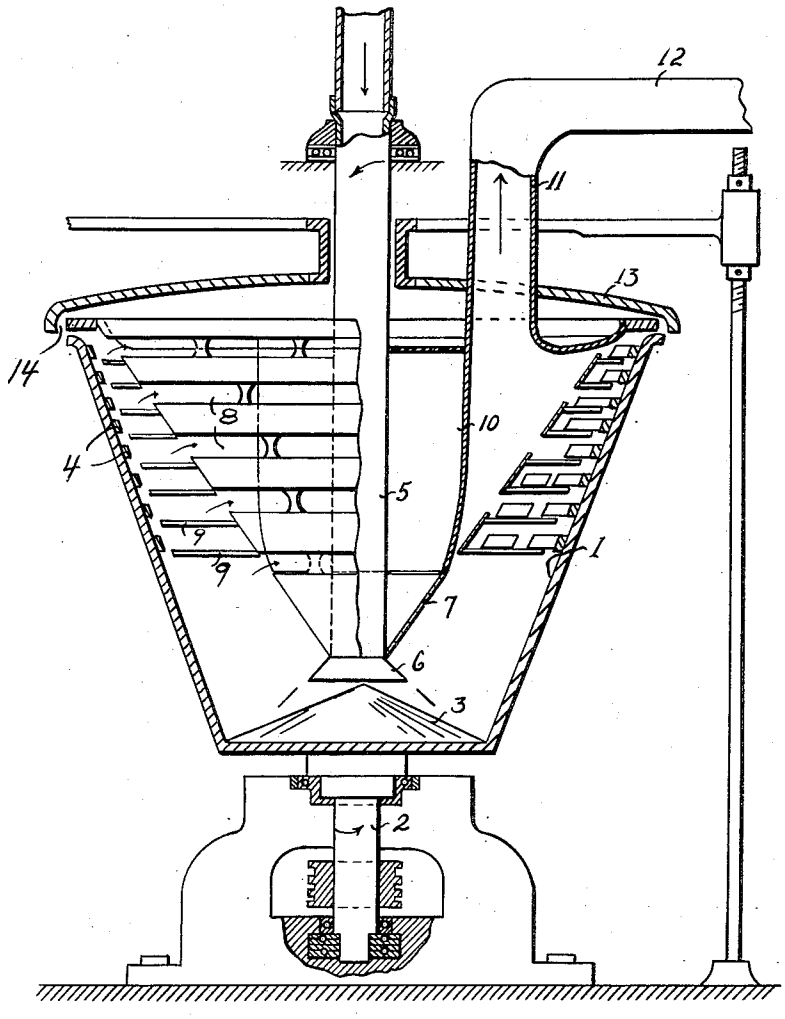
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MACHINES FOR TREATING ASBESTOS AND SIMILAR FIBERS

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MACHINES FOR TREATING ASBESTOS AND SIMILAR FIBERS

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Most present machines used for the treatment of fibers comprise as a rule simple horizontal rotating cylinders within which rotates contrawise an axis or smaller cylinder provided with blades which agitate chunks or flankes of fibers placed within said first cylinder, thereby disrupting said chunks and loosening the fibers which are then led away from the machine by an air current which is introduced at an upper corner of the outer cylinder and leaves by another.

The present invention provides an improved machine which gives much better results because it is based on three fundamental principles, not yet used concurrently, for the object aimed at by the present invention. These principles are the following: the automatic selection of the fibers to be treated by having recourse to centrifugal force, the differential action of the beater members, with a view to an adequate treatment of the selected fibers, and a similarly differential suction designed to promote the selective removal of treated fibers.

Before dealing with the object proper of the invention it is considered worth while to submit certain comments on the structure and nature of asbestos fibers, since the treatment of same is the primary object of the present invention.

Asbestos fibers, which constitute the reinforcement of the material commonly known as asbestos-cement (or of other similar materials) exercise the same function as the steel bars used in reinforced concrete, although the final resistance of the former final product is due rather to the adherence of the cement to the fibers than to the tensile strength of the latter (20,000 kg./cm.^{2}), said adherence increasing—for the same quantity of fibers used—with the surfaces offered by said fibers to the adherence of the cement particles.

This will be made clearer if we recall that cement comprises particles having a size of the order of 70μ and that asbestos fibers have diameters ranging from 10 to 15μ; on the other hand, it should also be recalled that treated asbestos, as it comes from the mines, comes in bunches or chunks of fibers which may have 1–2 cm. in diameter, such chunks comprising hundreds of small elementary fibers or silvers.

Certain industries, such as the making of asbestos-cement products, for instance, are obviously interested in a treatment which without destroying the fibers results in the dismembering of said chunks or bundles or, better still, in the separation of the constituent fibers, in order that, for a given weight, the number of fibers may be increased, thereby increasing the desired adherence between cement and asbestos, for example.

The present conventional machines do not satisfactorily solve this problem of the complete dismembering of the fiber chunks, as well known, especially so since the treatment operation cannot be carried too far without the risk of rendering useless, by their destruction and comminution, the fibers which may have been thrown into the machine already in a reasonable state of separation.

The machine herein claimed avoids this grave drawback of destroying the fibers which may arrive reasonably separated within said machine and provides a better and more rational treatment of the bunches, which are subjected to a reiterated, and more violent action—aiming at their dismembering—than fibers already reasonably separated.

The object of the present invention is exemplified in the attached drawing wherein the only figure illustrates in vertical cross section the machine for treating fibers, provided by the present invention.

The drawing shows that said machine comprises a receptacle 1, having the shape of a truncated cone and mounted on a vertical axis 2 which may be rotated in any appropriate manner. The bottom of said receptacle should preferably have a central conical part 3.

On the inside of the walls of cone 1 there are provided staggered projections 4 which lie along horizontal, vertical and/or oblique rows. From over the shaft of the receptacle 1 up to a point a little above the internal cone 3 there descends a vertical tube 5 for the introduction of the asbestos and adjacent the lower flanged rim 6 of said ube 5 is attached a sheet metal cone 7 conveniently attached to tube 5 and having preferably a greater center angle than the receptacle 1, as clearly shown in the drawing.

This internal conical skirt 7 presents all along its perimeter horizontal slots or orifices 8, preferably in staggered formation, which reach up to the upper rim of same, and beater members 9 made of steel bars. Within said skirt 7, at a certain point of same, there is provided a hopper 10 ending at the top in one or more suction tubes 11 connected with the discharge conduit 12.

The machine is completed by a fixed cover 13 having an opening 14 for the exit of litter such as stones which may have entered the machine in mixture with the asbestos.

The drawing shows that only receptacle 1 is rotatable, tube 5 and the internal perforated skirt 7 being thus fixed; however the assembly of the tube 5 with the skirt 7 may obviously rotate, preferably in the opposite sense as regards receptacle 1; this will require very simple alterations, such as the absence or reduction of the attachment members between the perforated skirt 7 and tube 5, and a lack of engagement between hopper 10 and said skirt 7.

The operation of the machine is very simple and efficient, as described below.

After the machine is put in operation, the material to be treated is introduced vertically therein—same being, for instance, asbestos fibers and chunks of same—through the vertical tube 5, said fibers and bundles thus falling on top of lower cone 3 which gives them a rotational movement.

Under the action of centrifugal force said chunks of fiber tend to rise along the inclined wall 1, this tendency being proportional to the volume of said chunks and thus to their weight and specific gravity. During this rise said fiber chunks impinge upon the successive staggered projections 4, until they are satisfactorily dismembered by such successive impacts and by the shocks received from their engagement with beaters 9, the violence of the latter obviously increasing from bottom to top in view of the increase of the centrifugal force.

The separated and isolated fibers, being lighter, begin thus to whirl within the machine and when they come near the collecting hopper 10 they are sucked in by the air current, passing through the orifices or slots 8 of the internal skirt 7, to be thus removed from the apparatus along tube 11.

Since the number of projections increases upwards, and

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so does the peripheral speed of the fiber chunks, the chunks that may have escaped the action of the lower projections are bound to be subject to even greater impacts, thus ensuring final disruption of said chunks. On the other hand, the fibers already released, since they are whirled within the receptacle and end by passing through said slots **8**, do not suffer any excessive damage or comminution, as is the case with present conventional machines. Stones and other heavy matter, which cannot be reduced in size or sucked by hopper **10**, finally reach upper opening **14** through which they are at last expelled from the machine.

It will thus be seen that this novel machine executes a truly differential treatment on the fibers, said treatment being obtained by means of an adequate arrangement of the projections **4**, of said beaters **9** and of said slots **8**.

Thus, the fibers are only sucked in by the hopper **10**, when they are indeed ready for use, and a final product is thus obtained completely exempt from chunks of fibers yet to be dismembered. Regulation of the machine can be carried out by varying the rotational speed of the external receptacle **1** and/or of the internal skirt **7**, or by varying the amount of air sucked along tube **11**. The operation of the machine may also be regulated by closing some of the suction orifices **8**, by removal of some of the beater members **9** and finally by substituting a cone with a different central angle for the internal cone **7**.

As a new embodiment or different use, the machine provided by the present invention may also be built without the internal projections **4** and the beaters **9**, having instead, two or more suction hoppers at different heights or elevations, in order to be of use in the separation of fibers having different weights or specific gravities, the necessary modifications being easily understandable.

We claim:

1. Improvements in machines for treating fibers, especially asbestos fibers, by the joint action of impacts and centrifugal force, comprising a rotating receptacle having the shape of a truncated cone mounted on a vertical axis with its larger base turned upwards; an internal metal perforated hollow conical skirt mounted coaxially with respect to said receptacle, the walls of said skirt and receptacle converging upwardly towards each other and having relative movement therebetween; delivery means for introducing material to be treated centrally to the bottom of said receptacle; and suction-operated collection means communicating with the interior of said skirt for withdrawing treated material therefrom.

2. Improvements in machines for treating fibers, according to claim 1, wherein the bottom of said receptacle is of upwardly pointed conical formation and in which said delivery means comprises a downwardly opening duct coaxial with said receptacle for discharging said material to be treated upon the apex of said conical bottom.

3. Improvements in machines for treating fibers, according to claim 1, wherein said internal skirt is provided with outwardly projecting beater bars.

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