

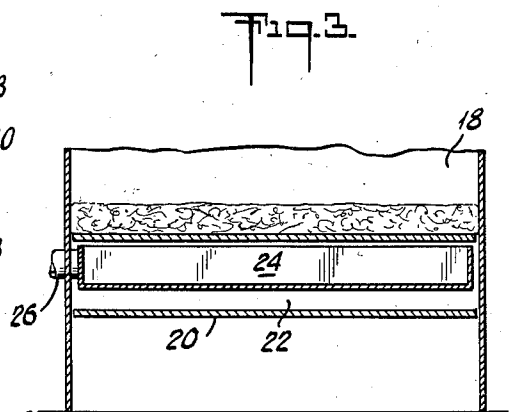
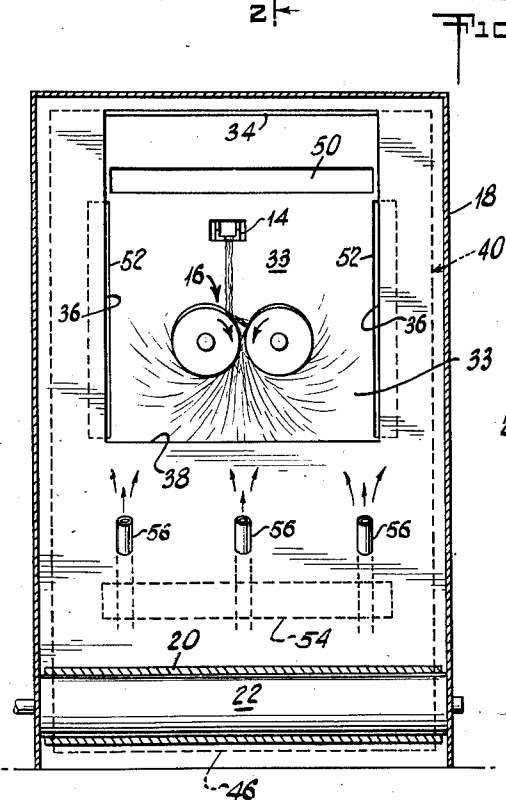
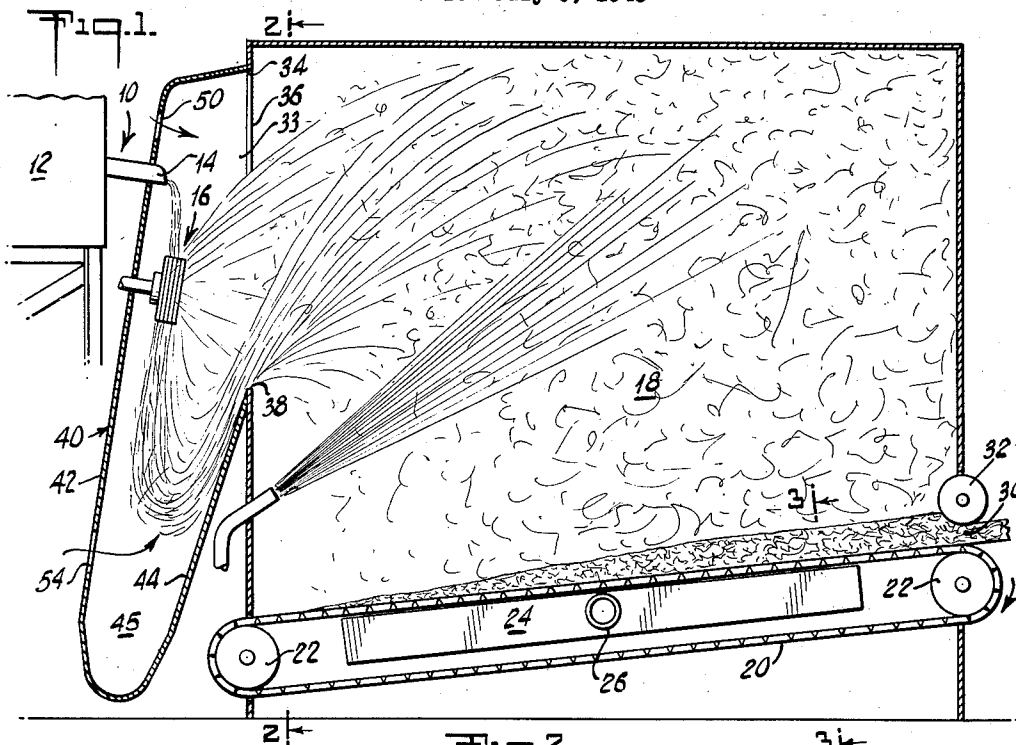
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H. STEELE

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APPARATUS FOR FIBER COLLECTION

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INVENTOR
HARMON STEELE.
BY *Virgil C. Kline*
ATTORNEY

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APPARATUS FOR FIBER COLLECTION

Harmon Steele, Somerville, N. J., assignor to
 Johns-Manville Corporation, New York, N. Y.,
 a corporation of New York

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1 Claim. (Cl. 19—156)

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The present invention relates to the production of blankets or felts of artificial fibers and is particularly concerned with the production of such articles from mineral wool fibers. The term "mineral wool fibers" is employed in a sense to include fibers formed from rock, slag, glass, mixtures thereof and like fusible raw materials, and the invention will be specifically described in such connection. However, it will be appreciated that the invention may be employed with fibers of other materials.

Heretofore mineral wool has been made in a number of ways including the conventional method of disintegrating a molten raw material into a multiplicity of fibers by the action of a high pressure steam jet, conveying the fibers into a collection chamber in the gaseous blast set up by the steam jets, and collecting the fibers on a conveyor forming the floor of the chamber. More recently it has been proposed to fiberize the molten material by spinners or rotors rotated at high speed. In this case the fibers are discharged tangentially of the rotors and their collection in the form of a felted layer has presented serious problems.

In the co-pending application of John E. Coleman, S. N. 37,268, filed of even date herewith, now Patent No. 2,561,843, there is described and claimed a method and apparatus for solving these problems. In the operations disclosed a collection chamber is used, the chamber having an entrance opening opposite the fiberizing rotors. Air-streams are set up substantially surrounding the fiberizing means to confine the fibers and carry them through the entrance opening into the collection chamber.

It has been found that, due particularly to the character of the airstreams, difficulty is encountered in securing a substantially uniform distribution of the fibers on the floor of the collection chamber, as is desired for certain products. The principal object of the invention is the provision of a method and apparatus for securing such uniform fiber distribution. More particularly an object of the instant invention is the provision of an apparatus and method for intercepting the airstreams to set up a condition of air turbulence within the chamber from which the fibers are collected.

The invention is employed in conjunction with the apparatus previously briefly described including a collection chamber having an entrance opening through which the fibers are carried directly as they are formed by airstreams which substantially surround the fiberizer and direct

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the fibers through the entrance opening. The airstreams may be induced by withdrawing air through the floor of the collection chamber. In accordance with the instant invention one or more auxiliary gaseous blasts or drafts are directed into the collection chamber to cause the turbulent condition previously mentioned and from which the fibers settle to the collection chamber floor with substantially uniform distribution.

My invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description of a preferred embodiment of the invention which is to follow and to the accompanying drawings in which:

Fig. 1 is a longitudinal sectional view taken through an apparatus embodying the instant invention:

Fig. 2 is a sectional view, taken on the line 2—2 of Fig. 1; and,

Fig. 3 is a sectional view, taken on the line 3—3 of Fig. 1.

Referring now to the drawings, there is shown an apparatus including fiberizing means indicated generally at 10 and which may include a melting furnace 12 of any suitable type, such as the cupola illustrated. The furnace includes a discharge trough 14, through which a stream of molten slag, rock, glass or other fiber forming material is drawn from the furnace and discharged in position to be contacted by a rotor fiberizing device indicated generally at 16. The latter is of the type including, preferably, a plurality of rotors supported to have their peripheral edges in position to be contacted by the molten material discharged from the trough 14. When the rotors are rotated at high speed fibers are drawn from the material carried thereby under the influence of the centrifugal forces set up. The particular construction of the fiberizing device may vary but typical constructions are shown in patent to Powell, #2,428,810, issued October 14, 1947, and in the co-pending application of Edward R. Powell, Serial No. 742,064, filed April 17, 1947, now abandoned.

A fiber collection chamber 18 is located adjacent and forwardly of the fiberizing device 16. Collection chamber 18, which is relatively airtight except for the openings to be described, includes a bottom wall comprising a conveyor 20 supported on members 22 and adapted to be driven in the direction indicated by the arrow (see Fig. 1) by any suitable means (not shown). A suction box 24 is located intermediate the up-

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per and lower reaches of the conveyor with its open side adjacent the upper reach. The suction box may be connected to any suitable air-exhausting device (not shown) as by means of duct 26.

The forward wall of the collection chamber is provided with an exit port 30 through which the accumulated fibers are delivered by the conveyor to any suitable re-handling apparatus. Port 30 is preferably defined in part by a roll 32 adapted to compress and consolidate the fibrous mass to some extent.

The rear wall of the collection chamber (see particularly Fig. 2) includes an entrance opening 33 defined by a top edge 34, side edges 36 and threshold 38.

Surrounding entrance 33 and the fiberizing device is a housing indicated generally at 40, the housing including a rear wall 42 lying behind the fiberizing device 16 and extending upwardly and forwardly to join the rear wall of the collection chamber, and downwardly and rearwardly to a point remote from the fiberizer. Also extending downwardly and preferably rearwardly from threshold 38 is a front wall 44. Walls 42 and 44 form pocket 45 in which suitable means may be located to remove unfiberized particles and shot collected in the pocket. The sides of the housing are enclosed by side walls of any suitable type.

Rear wall 42 is provided with openings to receive the shaft and other elements of fiberizing device 16, and also to receive trough 14 to permit these elements to extend into the interior of the housing. The rear wall is also provided with air inlet openings adapted to co-act with suction device 24 to set up airstreams surrounding the fiberizing device, and of a character to control the movement of the fibers formed by the fiberizing device and to carry them into the collecting chamber. These air inlets include an upper inlet 50 comprising a relatively narrow slit extending substantially horizontally above the fiberizing device and side inlets comprising slots 52 on opposite sides of the fiberizing device and a lower air inlet 54 remote from the rotors and preferably adjacent the lower edge of pocket 45. Air inlet 54 comprises a horizontally extending slit of preferably greater width than the other inlets to permit the entry of a greater quantity of air. It will be appreciated that, although continuous slits are shown, this is not essential and that any or all of the inlets may be made of a series of slits or openings of other shapes, if desired.

The above described apparatus is illustrated and claimed in the said co-pending application of John E. Coleman. In operation the fibers formed by rotation of the rotors are diverted from their normal paths substantially tangentially to the rotors and are directed into the collection chamber. This re-direction of the fibers is caused by airstreams entering the air inlets 50, 52 and 54 and flowing past the rotor means into the collection chamber, the airstreams being set up by withdrawal of air from the chamber into suction box 24. The air currents, in effect, create aeriform walls which divert the fibers from their original paths. As shown in Fig. 1, upon entry into the collection chamber the fiber-laden airstreams may be said to flow in a well-defined arcuate path forwardly and upwardly and then downwardly in the chamber.

In accordance with the instant invention means are provided to break up the relatively clearly de-

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fined airstreams and create a turbulent condition within the collection chamber. The means for this purpose may take different forms but, in a preferred embodiment, includes a series of nozzles 56 located in the rear wall of the collection chamber and preferably substantially below threshold 38. Where a plurality of nozzles are used as shown, these are distributed across the width of the collection chamber (see Fig. 2). The nozzles are connected to suitable supplies of a gaseous medium under pressure, whereby relatively high initial velocities of the gaseous jets are obtained. For example, these auxiliary blasts may be saturated steam or compressed air. The nozzles are preferably pointed forwardly and upwardly to direct the jets, as illustrated particularly in Fig. 1.

The jets of air streaming from the nozzles 56 are so positioned and directed that the gaseous blast they emit travels in the same general direction of movement as that taken initially by the fiber-carrying airstreams upon their introduction into the collection chamber, and they may be said to intercept said fiber-laden airstreams at a region of their established arcuate path at which the flow has taken a downward course. It will be noted that this occurs at a region removed from the entrance opening by a substantial angle of arc and that the interception of the arcuate path by the auxiliary blast occurs on a chord of the arc.

In carrying out the fiber collecting operations with the above described apparatus, the fiber carrying airstreams moving in a well-defined arcuate path are broken up by the auxiliary blasts during their travel through the collection chamber and a turbulent condition is achieved substantially throughout the collection chamber. As the gaseous medium is withdrawn through the conveyor and into suction box 24, the fibers are deposited relatively uniformly to obtain a felt or blanket of approximately uniform thickness transversely of the collection chamber, as illustrated particularly in Fig. 3. The felted layer is carried from the chamber on the continuously moving conveyor and may thereafter be subjected to any suitable operations required to convert it into a final product.

It will be appreciated that, where a modified product is desired, a treating material may be sprayed into the suspension of fibers at any suitable point and, due to the turbulent air conditions, will become substantially uniformly distributed among the fibers and be deposited in such distributed relationship in the felted layer.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to but that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claim.

What I claim is:

In a fiber-collection apparatus including a collection chamber having an entrance opening in a wall thereof and means for introducing airstreams carrying fibers into said collection chamber through said opening and upwardly and forwardly in said chamber to establish a flow therein a well-defined arcuate path, the improvement comprising means for intercepting and disrupting said airstream and for causing a condition of turbulence within said chamber, said last-named means including a plurality of nozzles positioned in the wall of the chamber having

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the entrance opening and located below said opening and distributed across the width of said collection chamber, said plurality of nozzles being pointed forwardly and upwardly to direct a gaseous blast in the same general direction of movement as that taken initially by the fiber-carrying airstreams upon their introduction into the chamber, but so as to intercept said airstreams at a region of their established arcuate path at which the flow has taken a downward course, thereby disrupting said well-defined flow and creating turbulence within the chamber, and achieving a relatively uniform distribution of the fibers settling in the chamber, and means for supplying a gas under pressure to said nozzles. 15

HARMON STEELE.

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