Oct. 29, 1940. D. C. DRILL 2,219,384

APPARATUS FOR MANUFACTURE OF MINERAL WOOL

Filed Sept. 30, 1937

Fig. 1.

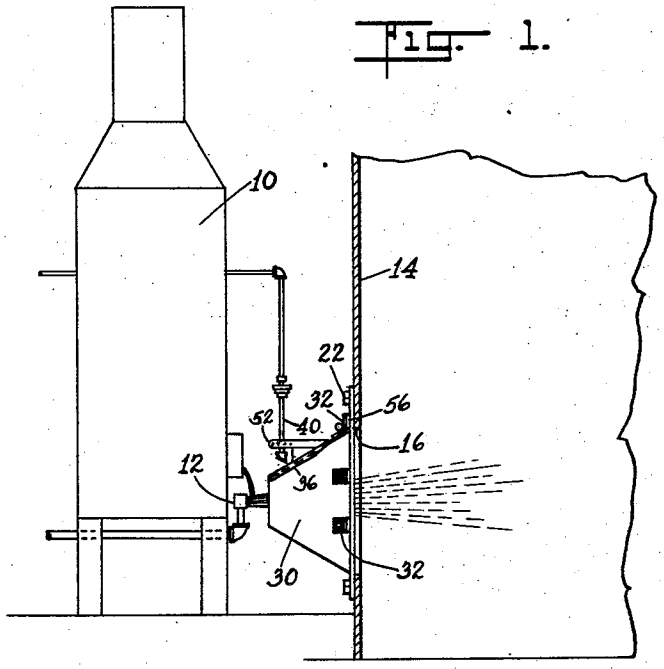


Fig. 2.

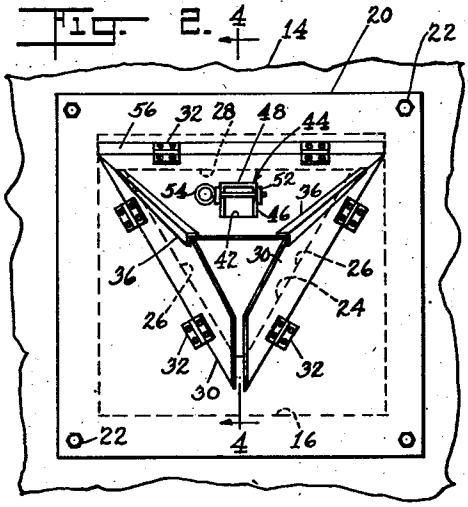


Fig. 3.

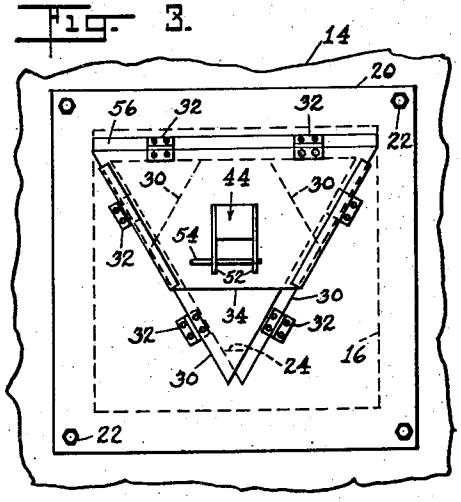
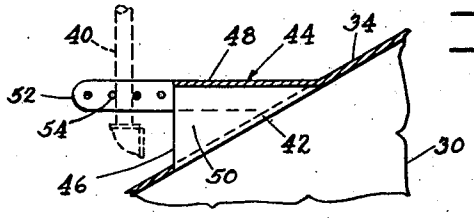


Fig. 4.



Daniel C. Drill
INVENTOR

BY Carlton C. Davis
ATTORNEY

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APPARATUS FOR MANUFACTURE OF MINERAL WOOL

Daniel C. Drill, Wabash, Ind., assignor to American Rock Wool Corporation, Wabash, Ind., a corporation of Indiana

Application September 30, 1937, Serial No. 166,702

1 Claim. (Cl. 220—30)

This invention relates generally to apparatus for the manufacture of mineral wool and more particularly to an entrance structure for a receiving chamber into which the mineral wool fibers are blown.

In the manufacture of mineral wool, the raw materials such as slag or rock are melted in a furnace and flow therefrom in a molten stream. A jet of gaseous fluid, such as air or steam, is directed on the stream of molten materials and disintegrates the molten stream into mineral wool fibers which are blown through an entrance opening in a mineral wool blow or settling chamber and settle in the chamber. This blow chamber may be of any suitable conventional construction and, like other conventional blow chambers, is adapted to withstand moisture at high temperatures under pressure, and is provided with a ventilator or other suitable opening through which the steam or gasses which are injected into the blow chamber with the powerful incandescent blast of fiber formation may pass out of the chamber.

The blow chamber for receiving the fibers and the entrance opening therein are positioned in front of the furnace, so that the jet of steam or gaseous fluid which disintegrates the molten stream into fibers also blows the fibers into the chamber.

The blow chamber and the opening therein are necessarily positioned a considerable distance from the furnace in order to provide the necessary room for workmen operating the furnace and making repairs when the furnace is not in operation, as well as for general maintenance of the apparatus.

The positioning of the furnace and the opening in the blow chamber a considerable distance apart has several disadvantages, however, the principal one of which is, that when the molten stream is disintegrated into the particles which elongate into mineral fibers during their passage into the chamber, these particles scatter as they travel toward the chamber, and a large proportion of the particles strikes the exterior wall of the chamber which prevents the conversion of the particles into fibers. This condition greatly impairs the efficiency of the apparatus. If the opening in the chamber is made large enough for receiving all of the particles which are directed toward the chamber, then a large proportion of the mineral wool fibers floating in suspension in the chamber will be driven out of the opening from the chamber as the result of a back draft created by the pressure of the gases within the chamber.

An object of this invention is to provide an improved and novel structure at the entrance opening of a blow chamber, which will prevent particles formed by the action of a blast of steam or other gaseous fluid on a stream of molten materials from being scattered outside of the chamber.

A further object of the present invention is to provide an improved and novel structure positioned at the entrance opening of a receiving chamber spaced a considerable distance from a furnace, which extends toward the furnace, and is adapted for receiving the particles resulting from the disintegrating effect of a jet of gaseous fluid on a molten stream, at a position adjacent to the point of contact of the jet of gas with he molten stream.

Another object of the invention is to provide an improved and novel structure at the entrance opening of a receiving chamber comprising part of an apparatus for making mineral wool, which substantially prevents mineral wool fibers floating in the receiving chamber from being discharged through said opening.

A further object is to provide an improved and novel structure at the entrance opening of a receiving chamber, and positioned between the receiving chamber and a melting furnace, for receiving the particles resulting from the disintegrating effect of a jet of gaseous fluid on a molten stream flowing from the furnace, which is collapsible for closing the entrance opening to the blow chamber, and, when collapsed, for providing sufficient space between the furnace and the blow chamber whereby repairs or maintenance operations may be made on the furnace or receiving chamber.

Other objects and advantages will be apparent from the following description.

In the drawing illustrating the invention:

Figure 1 is a composite view showing a side elevation of the furnace for providing the molten stream from which the mineral fibers are formed, a vertical sectional view of the chamber for receiving the mineral fibers, and a side elevation of the structure embodying the present invention as associated with the furnace and chamber;

Figure 2 is a front elevation of the structure embodying the present invention;

Figure 3 is a front elevational view similar to Figure 2 showing the structure embodying the present invention in a collapsed or folded position; and

Figure 4 is an enlarged sectional detail view taken along the line 4—4 of Figure 2.

In the embodiment selected to illustrate the invention as shown in Figure 1, a furnace or cupola 10 is provided for melting the raw materials, such as slag or rock, from which the mineral fibers are formed. The molten materials flow from the furnace in a molten stream against which a jet of gaseous fluid, such as air or steam under pressure, is directed from a nozzle 12 for disintegrating the molten stream into fibers. The nozzle 12 may be provided with a V-shaped opening from which the steam emits so that the cross-sectional contour of the resulting stream of fibers is generally triangular in shape.

A chamber 14 for receiving the fibers is positioned in front of the furnace 10 in spaced relationship therewith, and is provided with an entrance opening 16 therein through which the fibers are blown into the chamber.

As shown in Figure 2, an anchor plate 20 is positioned on the exterior of the chamber 14 over the opening 16 and is fixedly connected with the chamber 14 in any suitable manner, such as by bolts 22. The anchor plate 20 is provided with an opening 24 therein which is generally triangular in shape and is in communication with the opening 16 in the blow chamber whereby the disintegrated particles from the molten stream may pass therethrough for entering the chamber.

The opening 24 has substantially equal sides with a vertex thereof in a lowermost position, and the adjacent sides 26 of the vertex angle diverge upwardly substantially equidistant from the perpendicular axis of the angle, the side 28 opposite the angle being disposed in a substantially horizontal plane.

A pair of side plate members or doors 30 is swingably or hingedly connected with the anchor plate 20 by any suitable means such as hinges 32. The doors are oppositely positioned adjacent the edges 26 of the opening 24 and are generally triangular in shape with truncated outer end portions.

A top plate member or door 34 is also hingedly connected with the anchor plate 20 adjacent the top edge 28 of the opening 24 by hinges 32, and is of the same general shape as the side plate members 30.

The plate members 30 and 34 may be positioned for extending outwardly from the anchor plate 20, the base edges of the plate members being positioned adjacent the anchor plate 20 and the side edges thereof converging toward the outer ends of the plate members. The convergent sides of the top plate member 32 are provided with angle bars 36 which have one flange fixedly connected with the top plate member and the other flange extending downwardly therefrom.

When the plate members 30 and 34 extend outwardly from the anchor plate 20, the top plate member 34 is supported by the side plate members 32 on the top edges thereof, and the side plate members are retained in their supporting positions by the downwardly extending flanges of the angle bars 36 fixedly connected with the top plate member, which engage the side plate members.

It will be noted from the foregoing description that the plate members 30 and 34 provide a pyramidal shaped funnel structure having a triangularly shaped opening therein which is positioned for receiving the stream of particles resulting from the disintegration of the molten stream, before the particles become scattered. The opening 24 may be sufficiently large and the plate members 30 and 34 so inclined that the scattering of the particles will not be interfered with to any appreciable extent after the particles have entered the funnel shaped structure.

It will be noted that the lower edges of the side members 30 are disposed in spaced apart positions for providing an elongated opening in the bottom of the funnel structure when the side members are extending outwardly from the anchor plate 20. This opening provides for the removal of any accumulations of mineral fibers or other materials which may be deposited in the funnel structure and impair the efficiency thereof, without interrupting the continuous operation of the furnace or the disintegration of the molten stream flowing therefrom.

In the manufacture of mineral wool products it is often desirable to apply an adhesive substance or a waterproofing substance to the mineral wool fibers. The application of these substances to the fibers may be accomplished by providing a pipe 40 through which the substances may flow, and which terminates above the stream of particles entering the chamber. A gaseous fluid such as air or steam under pressure may also flow through the pipe 40 for directing a jet of the fluid carrying the waterproofing or adhesive substances in a finely divided state on the mineral fibers.

As shown in Figures 2 and 4, the top plate member 34 may be provided with an opening 42 therein through which the finely divided adhesive or waterproofing substances may be injected for distribution on the fibers. A housing 44 is connected with the top plate member 34 over the opening 42 and comprises spaced side portions 46 and a top portion 48 for providing a passageway 50 in communication with the opening 42, and having an inlet opening for receiving the waterproofing or binding substances, whereby said substances may pass through the passageway for application to the fibers.

The pipe 40 may be adjustably and definitely positioned relatively to the entrance opening of the passageway 50 by a pair of spaced and outwardly extending arms 52 connected with the side portions 46 of the housing 44. The arms 52 are provided with a plurality of aligned openings therein for receiving pins 54 which engage the pipe for retaining the pipe in the desired position.

Two furnaces or cupolas may be employed with a single blow chamber, one furnace being positioned above the other, and the chamber provided with an opening 16, and a funnel structure associated therewith, for each furnace.

When only one furnace is in operation it is desirable that the opening 16 of the chamber associated with the other furnace be closed in order to prevent the mineral wool in the chamber resulting from the furnace in operation from being expelled through the opening.

In order to close or collapse the plate members 30 and 34 for closing the opening 16 in the chamber 14, the top plate member 34 is first lifted for moving the downwardly extending flanges of the angle bars 36 out of engagement with the side plate members 30. The side plate members 30 may then be swung upwardly and disposed in overlying relationship, after which the top plate member 34 may be swung downwardly over the side plate members. The relationship of the several plate members in their closed positions is illustrated in Figure 3. It will be noted that the

top plate member 34 serves to retain the side plate members in their closed positions.

As shown in Figures 1, 2, and 3, the hinges 32 for connecting the top plate member 34 with the anchor plate 20 are mounted on a spacing bar 56 which in turn is connected with the anchor plate 20. The spacing bar 56 serves to properly position the hinges connected with the top plate member 34 from the anchor plate 20 in order that the top plate member 34 may be disposed in a more intimate overlying relationship with the side plate members 30. The hinges 32 for supporting the side plate members 30 may also be mounted on similar spacing elements in order that they may be more intimately disposed in their closed positions, if so desired.

From the foregoing description it will be seen that an improved and novel structure is provided which accomplishes the objects hereinbefore set forth.

Modifications and changes may be made without departing from the spirit of the invention, and it is intended that this invention shall be limited only by the scope of the appended claim.

I claim:

An entrance structure for a chamber having an opening therein comprising a pair of side door members and a top door member positioned about the opening and hingedly connected to the chamber, said door members being disposable in superimposed relationship for covering the opening, and swingable to positions extending outwardly from the chamber for providing a truncated pyramidal structure, and means cooperant with the door members for retaining the same in the outwardly extending positions, said top door member having an opening therein, a hood portion connected with the door and extending over the opening, and means connected with the hood portion for adjustably positioning a pipe relatively to the opening in the top door member.

DANIEL C. DRILL.