May 8, 1945. H. T. COSS 2,375,284

METHOD OF MAKING MINERAL WOOL PRODUCT

Filed Jan. 28, 1942

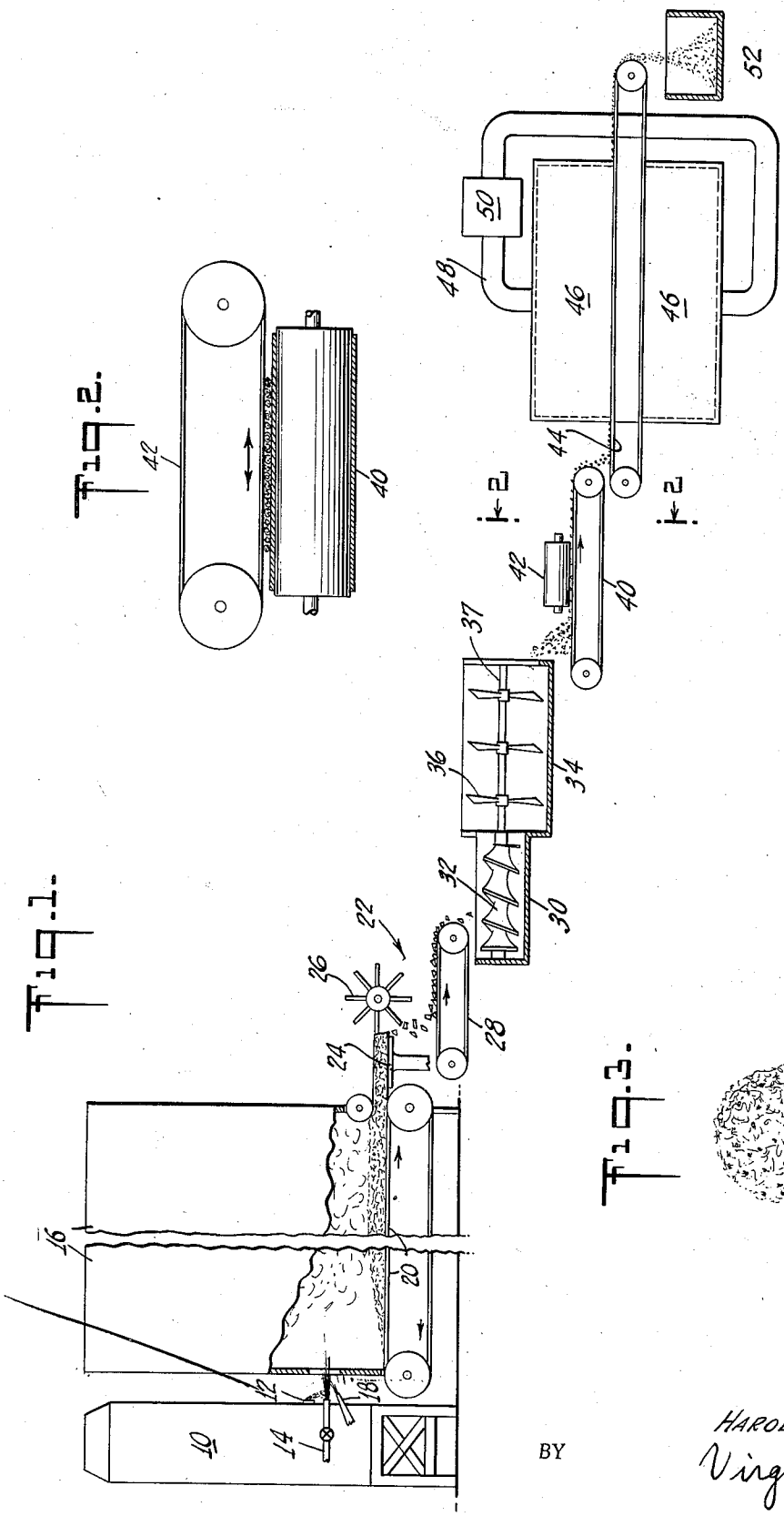



Fig. 1.

Fig. 2.

Fig. 3.

INVENTOR.
HAROLD T. COSS.
BY Virgil C. Kline
ATTORNEY

Patented May 8, 1945 2,375,284

# UNITED STATES PATENT OFFICE

2,375,284

## METHOD OF MAKING MINERAL WOOL PRODUCTS

Harold T. Coss, Somerville, N. J., assignor to Johns-Manville Corporation, New York, N. Y., a corporation of New York

Application January 28, 1942, Serial No. 428,558

8 Claims. (Cl. 154—28)

The instant invention relates to improvements in mineral wool products of the type known in the art as "nodulated" or "granulated" wool and to a method of making the same. It will be understood that the term "mineral wool" is employed herein in a generic sense to denote fibres formed from rock, slag, glass, and other conventional raw materials and mixtures thereof.

Conventionally, nodulated wool is formed by subdividing a mass of mineral wool fibres into a plurality of small fibre bunches or granules. The nodulated wool, in some instances, has been treated with a suitable waterproofing or dust-laying agent, either after formation or by spraying the agent onto the fibres immediately after they are formed and before they settle onto the floor of the blow chamber or the like in which they are collected. Nodulated mineral wool of this type is conventionally employed as insulating material in confined spaces; for example, between the studs in wall constructions, between floor joists, and the like.

A principal object of the instant invention is the provision of mineral wool nodules having properties of resilience and waterproofness to an extent not heretofore obtainable.

Another object of the invention is the provision of nodulated mineral wool which, in addition to having the above referred to properties, exhibits dustproofness and lightness of packing.

A further object of the invention is the provision of a method of forming nodulated mineral wool having the characteristics of that referred to above.

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 thereof which is to follow and to the accompanying drawing, in which:

Fig. 1 is a diagrammatic, elevational view of an apparatus for carrying out the method of the instant invention;

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

Fig. 3 is a diagrammatic, sectional view of the product of the instant invention.

Referring now to the drawing, there is diagrammatically shown an apparatus suitable for carrying out the method of the invention. As will be understood, conventional portions of the apparatus are not shown in detail and may take different forms. Generally speaking, the apparatus comprises a melting furnace 10, which may be a cupola, as illustrated, or a tank furnace, or the like. A raw mineral wool forming material of suitable or conventional composition, such as slag, rock, or mixtures thereof, is melted in the furnace 10 and issues from an orifice 12 and falls in front of a steam jet or the like 14, which shreds the stream into a great multiplicity of fibres which are carried by the force of the steam jet and in gaseous suspension into a blow chamber 16 located adjacent the melting furnace.

In accordance with the instant invention, a binder is forced into the suspension of fibres by any conventional means for this purpose, the binder jet being illustrated at 18. For the purposes of the instant invention, the binder is preferably of a thermosetting type, such as a commercial phenol formaldehyde, lignin-furfural, glyptol, or like resin. Also, drying oils may be used as the binder, such, for example, as boiled linseed oil, perilla oil, or oiticica oil. The binder may be included in proportions, say, between 0.5 and 5 per cent. by weight of the wool.

The fibres and the binder particles settle in intermingled relationship on the floor of the blow chamber, which may suitably comprise moving conveyor 20, to form a felted layer thereon. The felted layer is carried from the blow chamber by the conveyor and as it leaves the blow chamber is subjected to the action of a nodulating device 22, diagrammatically illustrated for purposes of example as comprising a stationary rack 24 and a paddle rack 26. The latter is rotated by any suitable means, not shown, to divide the layer of mineral wool between the stationary and movable blades into small nodules or aggregates. The nodules may be discharged onto a conveyor 28, which, in turn, carries the granules to a hopper 30 from whence they are conveyed by screw conveyor or the like 32 into a shot cleaning drum or tumbling device 34 comprising a wire cage, either mounted for rotation by any suitable means (not shown) or having rotating paddles or the like 36 mounted therein. The paddles 36 and conveyor 32 are carried by a shaft 37 that may be driven from any source of power, not shown. It will be understood that the particular nodulating and shot cleaning devices and accessories shown are merely for the purpose of illustration and that any suitable or conventional apparatus for this purpose may be substituted without departing from the scope of the invention.

Positioned to receive the nodules discharged from drum 34 and to convey them in the direction indicated by the arrow is a conveyor 40. Conveyor 40 is formed of a suitable material to provide a substantially continuous flat surface,

a material, such, for example, as heavy canvas or the like. Supported above the belt 40 and at an angle thereto, preferably at a right angle to belt 40, is a second belt 42 formed of similar material and with its lower reach adjacent the upper reach of belt 40. Belt 42 is driven in a reciprocating manner, as indicated by the arrow particularly in Fig. 2, the travel of the belt being sufficient to rotate the nodules laterally of belt 40 at the same time that they are being carried forward by the latter belt. It will be understood that the extent of movement of the belt 42 is insufficient to carry the nodules off the lateral edges of belt 40. The drives for the belts 40 and 42 have not been shown as they may be of any suitable or conventional type. The rolling of the granules between belts 40 and 42 serves to reduce them to a more coherent and globular form. However, the rolling step may be omitted if desired.

The nodules are discharged from belt 40 onto a conveyor 44 comprising wire screen or other foraminous material and are carried thereby through a heat treating chamber or oven 46 to set the binder. Oven 46 includes ducts 48 connected to a stove or other heating means 50, whereby hot air is circulated through the oven and the conveyor belt 44 and the material carried thereby. The finished nodules are then discharged from belt 44 into any suitable receiving means, as diagrammatically illustrated at 52.

Due to the presence of the binder permeating the individual nodules, the nodules exhibit a substantial resilience, water and dustproofness, and high covering power. At the same time they are free from mold and rot.

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 will suggest themselves to one skilled in the art, all falling within the scope of the invention as defined in the subjoined claims.

What I claim is:

1. The method of making nodulated mineral wool comprising forming a felted layer of mineral wool fibres with a binder substantially uniformly disseminated therethrough, dividing said layer into a multiplicity of nodules, and treating said nodules to set said binder.

2. The method of making nodulated mineral wool comprising forming a felted layer of mineral wool fibres with a thermosetting binder substantialy uniformly disseminated therethrough, dividing said layer into nodules, and heating said nodules to set said binder.

3. The method of making nodulated mineral wool comprising forming a felted layer of mineral wool fibres with a drying oil binder substantially uniformly disseminated therethrough, dividing said layer into nodules, and heating said nodules to set said binder.

4. The method of making nodulated mineral wool comprising forming a felted layer of mineral wool fibres with a thermosetting, resinous binder substantially uniformly disseminated therethrough, dividing said layer into nodules, and heating said nodules to set said binder.

5. The method of making nodulated mineral wool comprising forming a felted layer of mineral wool fibres with a binder substantially uniformly disseminated therethrough, dividing said layer into a multiplicity of nodules, tumbling said nodules to remove unfiberized particles therefrom, and subjecting said nodules to a treatment to set said binder.

6. The method of making nodulated mineral wool comprising forming a felted layer of mineral wool fibres with a binder substantially uniformly disseminated therethrough, dividing said layer into a multiplicity of nodules, rolling said nodules between coacting surfaces, and subjecting said nodules to a treatment to set said binder.

7. The method of making nodulated mineral wool comprising forming a felted layer of mineral wool fibres with a thermosetting binder substantialy uniformly disseminated therethrough, dividing said layer into a multiplicity of nodules, treating said nodules to remove a substantial proportion of the unfiberized particles therefrom, rolling said nodules between coacting surfaces, and subjecting said nodules to heat treatment to set said binder.

8. The method of making nodulated mineral wool comprising forming a felted layer of mineral wool fibres with a binder including a heat-setting, resinous material substantially uniformly disseminated therethrough, dividing said layer into nodules, rolling said nodules to form them into substantially globular shape, and subjecting said nodules to heat to set said binder.

HAROLD T. COSS.