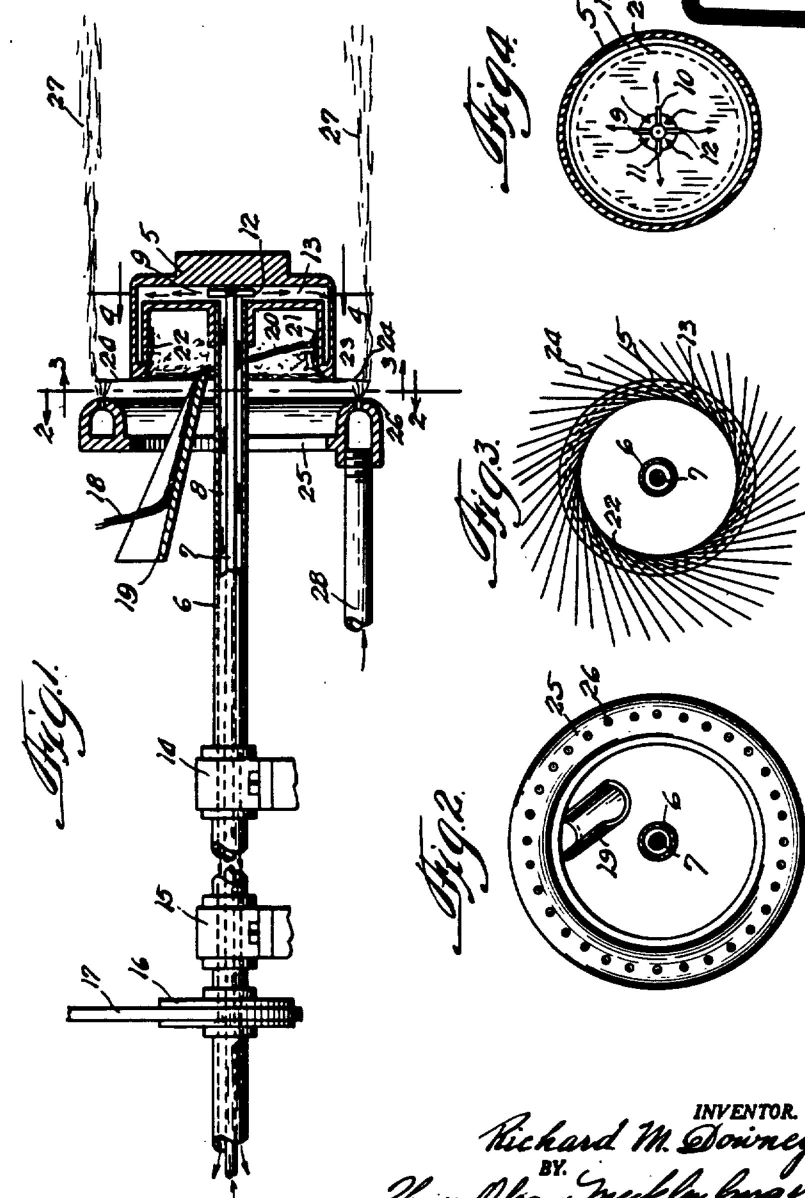
March 4, 1952 R. M. DOWNEY 2,587,710

APPARATUS AND PROCESS FOR MAKING MINERAL WOOL

Filed Nov. 1, 1951



INVENTOR.
Richard M. Downey
BY
Thiess, Olson & Mecklenburger
Attys.

Patented Mar. 4, 1952 2,587,710

UNITED STATES PATENT OFFICE

2,587,710

APPARATUS AND PROCESS FOR MAKING MINERAL WOOL

Richard M. Downey, North Judson, Ind., assignor to United States Gypsum Company, Chicago, Ill., a corporation of Illinois

Application November 1, 1951, Serial No. 254,373

5 Claims. (Cl. 18—2.4)

1

The present invention relates to an improved apparatus and process for making mineral wool and the like.

The present process is of the type in which a stream of molten mineral matter is distributed in the form of streams flung tangentially from a rotating rotor, these streams then being intercepted by an annular blast of gaseous liquid where the melt has sufficient momentum imparted to it to become attenuated into fibers.

In processes of this type the control of the temperature and of the viscosity of the molten material is of considerable importance, because the fineness of the fibers and their length is dependent thereon.

Accordingly it is one of the objects of the present invention to provide an apparatus in which the control of these quantities is facile and certain.

It is a further object of the invention to provide an improved method for making mineral wool.

The apparatus employed for carrying out the present invention is in many respects very similar to that disclosed in my copending application Serial No. 194,180, filed November 4, 1950, in that I use the same type of rotor and steam nozzle, with the exception that I now provide means for controlling the temperature of the rotor and therefore also of the molten material which is brought into contact therewith.

In the drawings:

Fig. 1 is a side elevational view, partly in section, of the apparatus;

Fig. 2 is a vertical section along the line 2—2 of Fig. 1;

Fig. 3 is a vertical section through the apparatus along the line 3—3 of Fig. 1; and

Fig. 4 is a vertical section through the rotor along the line 4—4 of Fig. 1.

The apparatus consists primarily of a rotor 5 which is mounted upon a hollow shaft 6, said shaft housing a central pipe 7 which is stationary relative to the shaft. This pipe communicates through the branches 9, 10, 11 and 12, with the hollow space 13, which is provided in the walls of the rotor for the purpose of permitting the passage of a suitable coolant such as a liquid or gas therethrough, it being understood that the coolant will pass into and out of the hollow space, and leave through the annular space 8 remaining in the shaft 6. The coolant may be water, steam, a suitable heat-resistant oil, or a compound such as diphenyl. The means for effecting the introduction of the coolant into the

2

pipe or shaft are well known and hence require no description. The shaft is mounted upon suitable bearings 14 and 15, and a pulley 16 and belt 17 serve as a means for rotating the shaft and hence also the rotor.

Molten material 18, which may for example be melted slag, is allowed to flow through the chute 19, to form a freely falling stream 20 which is allowed to fall upon the interior wall 21 of the rotor where it will form a rapidly rotating annulus or ring 22. This ring works its way over the edges or rim 23 of the rotor, as a result of which there will be tangentially discharged a great multitude of streams 24 of the molten material. A blow nozzle 25, provided with openings 26 arranged in the form of a circle somewhat larger in diameter than that of the rotor 5, is arranged so as to blow a gaseous fluid, such as steam, against the streams 24 whereby their direction is suddenly and violently changed, with the result that the little streams of material will become attenuated into fibers 27, which may be received in a collecting chamber (not shown). The steam for this purpose may be provided through the pipe 28. It is to be understood that air or other gas may be used instead of steam.

Example

It has been found that the melted slag usually has a temperature which is somewhat too high for effective conversion into fibers of the desired length and thickness. Thus a typical slag used for the present purposes may have a composition as follows:

	Per cent
SiO_2	42.2
Al_2O_3	13.5
CaO	38.5
MgO	7.6
M_2O	.9

in which M represents an alkali such as sodium.

As the slag comes from the cupola it may have a temperature as high as say about 2800° F. and a viscosity of about 3.7 poises. There will be a slight cooling of the slag as a result of its running through the trough 19, but it was found that it would normally have a temperature of about 2600° F. and a viscosity of about 7.4 poises where it leaves the end of the trough and falls onto the side 21 of the rotor.

Sufficient water or other cooling medium is passed through the interior hollow walls of the rotor, namely the space 13, to reduce the temperature of the slag in the annulus to about