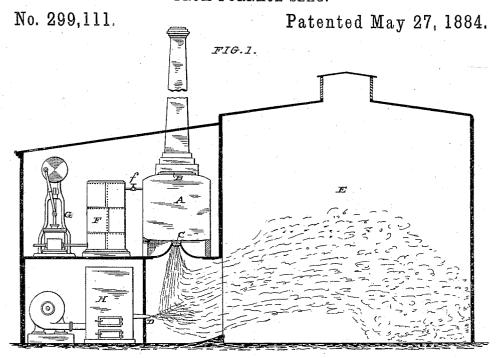
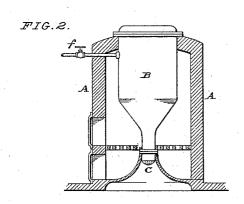
(No Model.)

R. BURNS.

PROCESS OF AND APPARATUS FOR FORMING MINERAL FIBER OR WOOL FROM FURNACE SLAG.





ATTEST:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

ROBERT BURNS, OF CHICAGO, ILLINOIS.

PROCESS OF AND APPARATUS FOR FORMING MINERAL FIBER OR WOOL FROM FURNACE-SLAG.

SPECIFICATION forming part of Letters Patent No. 299,111, dated May 27, 1884.

Application filed October 25, 1883. (No model.)

To all whom it may concern:

Be it known that I, Robert Burns, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improved Process of and Apparatus for Forming Mineral Fiber or Wool from Furnace-Slag, &c.; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable those skilled in the art to which my invention appertains to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

specification.

My invention has for its objects to produce a fibrous or filamentary material from the molten slag or scoria of iron, glass, or other furnaces in a more perfect manner and of a more uniform texture and quality than has been accomplished with the processes heretofore employed, and also to produce a fiber of any required degree of toughness or friability; and my improvement consists in the employment of means, substantially as hereinafter described, for forcing the molten slag under a heavy pressure through a finely-perforated die or head, the filamentary or fibrous matter thus formed being carried away to a suitable receiving chamber and cooled in its transit by means of a current or blast of air of the proper force and temperature, as will hereinafter more fully appear.

In the drawings, Figure 1 is a general view illustrating my preferred arrangement of parts 35 for carrying out my invention. Fig. 2 is a vertical section of the slag-holding receiver,

furnace, &c.

In the processes heretofore employed in the conversion of the molten slag or scoria of iron 40 or other furnaces into a fibrous or filamentary body that is known to the arts as "mineral wool" or "slag cotton," difficulties have been met which seriously interfered with the attainment of perfect results. Among the 45 most serious difficulties were, first, the irregular and varying thickness of the fiber produced, owing to irregular cooling and variation of the impelling force used for drawing out the fibers; second, the formation of a heavier 50 residue of bead-like particles, the separation

of which from the attenuated fiber could only be attained in a very imperfect manner and with great difficulty. These difficulties are almost entirely overcome and a very superior quality of fiber produced by my improved 55 mode of manufacture, which consists in forcing the melted slag or scoria by means of a heavy pressure through a finely perforated This pressure may be effected in any well-known manner either by means of an end- 60 less screw, a reciprocating plunger, or a heavy aeriform pressure, as found most suitable or convenient. I have found a heavy pressure of air to be the most convenient and easilymanipulated means, and therefore illustrate 65 such means in the accompanying drawings to illustrate the practical working of my invention.

The construction illustrated in the accompanying drawings consists of a furnace, A, 70 inclosing a closed vessel or tank, B, that receives the molten slag or scoria and retains it in the proper fluid or molten condition. From the tank or receptacle B the molten slag is forced by a heavy pressure and with a high 75 velocity through the minutely-perforated die or head C in the form of fine attenuated fibers or filaments, which are cooled by a blast or draft of air of the proper temperature from pipe D. The blast of air may also be em- 80 ployed to carry the fiber into the receiving or settling chamber E, as indicated in Fig. 1. The heavy air pressure required is furnished from an air-storage chamber or accumulator, F, the supply of which is retained at the re- 85 quired pressure by means of a suitable forcepump, G.

f is a valve controlling the communication between the accumulator F and the slag tank B, so as to control and regulate the operation 90

of the parts.

Other equivalent means to that above described for forcing the melted slag through the perforated head C may be employed without departing from the spirit of my invention. Among such means may be mentioned the employment of a reciprocating plunger or an endless screw arranged within a suitably-shaped easing or receptacle containing the molten slag and provided with the fiber-forming head C. 100

H is a hot-blast stove of any suitable construction for heating to the desired temperature the air-blast employed to cool and convey the mineral fiber into the settling-chamber E.

By the improved process above described I am enabled to produce a mineral fiber of a very uniform texture and quality, prevent the formation of slag-globules or other particles throughout the mass of fiber; and, what is of much greater moment, produce a fiber of any required degree of toughness or fragility by a simple change in the temperature of the blast of air used to cool and carry the fiber into the settling-chamber E, the blast acting to cool or temper the fiber to a greater or less degree according to the temperature that has been imparted to it.

Having thus fully described my said inven-20 tion, what I claim as new, and desire to secure

by Letters Patent, is—

1. The process herein described of forming mineral fiber, consisting in forcing molten slag or scoria under a heavy pressure through a perforated head, substantially as described.

2. The process herein described of forming mineral fiber, consisting in forcing molten slag or scoria under a heavy pressure through a perforated head, so as to form slender filaments or fibers, and means for supplying a blast of air to cool and convey the fiber into a proper receiving or settling chamber, substantially as described.

3. The process herein described of forming

mineral fiber, consisting in forcing molten slag 35 or scoria under a heavy pressure through a perforated head, so as to form slender filaments or fibers, and means for supplying a blast of air of the required temperature, so as to produce a fiber of the required toughness or fraquility, substantially as described.

4. In an apparatus for making mineral fiber, the combination of furnace A, slag-tank B, perforated head C, and accumulator F, as described, and for the purpose set forth.

scribed, and for the purpose set forth.

5. In an apparatus for making mineral fiber, the combination of the furnace A, slag-tank B, perforated head C, accumulator F, and valve f, controlling communication between the accumulator and the slag-tank, as described, and 50 for the purpose set forth.

6. In an apparatus for making mineral fiber, the combination of the furnace A, slag-tank B, perforated head C, accumulator F, and blastpipe D, as described, and for the purpose set 55

forth.

7. In an apparatus for making mineral fiber, the combination of the furnace A, slag-tank B, perforated head C, accumulator F, blast-pipe D, and hot-blast stove H, substantially as described, and for the purpose set forth.

In testimony whereof witness my hand this 12th day of August, 1883, at Chicago, Cook

county, Illinois.

ROBERT BURNS.

In presence of— H. D. SMALLEY, A. CAMPBELL.