March 26, 1940. L. S. VELLO 2,194,727

PRODUCTION OF FIBERS FROM GLASS, SLAG, AND THE LIKE MELTABLE MATERIALS

Filed Aug. 10, 1937 2 Sheets-Sheet 1

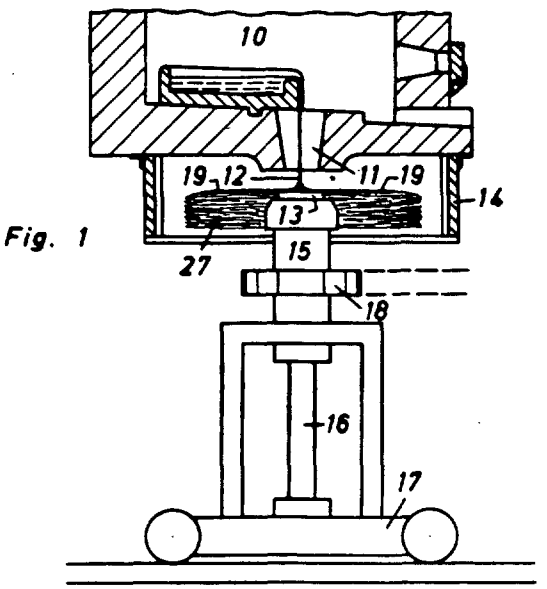


Fig. 1

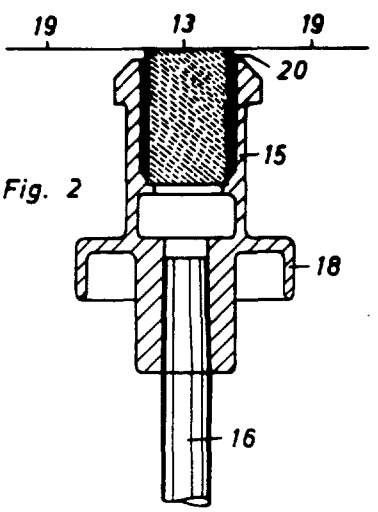
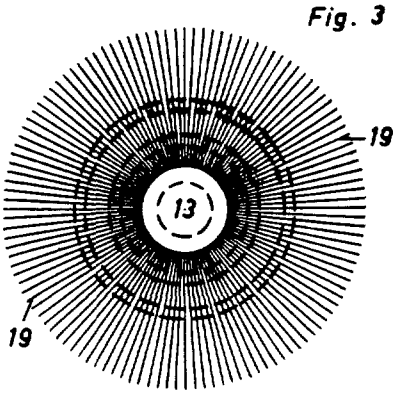


Fig. 2

Fig. 3



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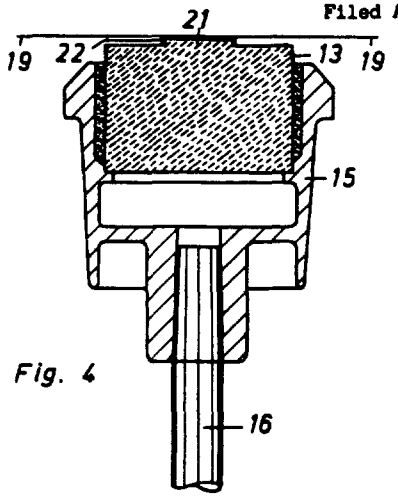


Fig. 4

Fig. 5

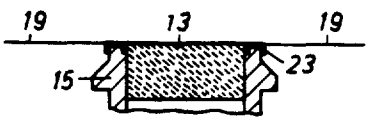
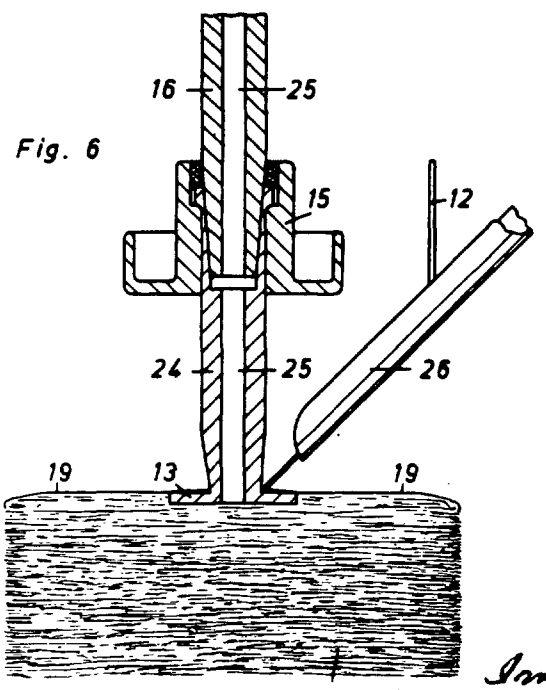


Fig. 6



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UNITED STATES PATENT OFFICE

2,194,727

PRODUCTION OF FIBERS FROM GLASS, SLAG, AND THE LIKE MELTABLE MATERIALS

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7 Claims. (Cl. 83—91)

This invention relates to that kind of producing fibers from glass, slag and the like meltable materials, according to which the hot molten mass is flown in a preferably continuous thin stream from the outlet of a suitable tank, such as a melting furnace, onto the surface of a rapidly rotating disc from which it is thrown off by centrifugal action in the form of fine fibers or filaments.

The invention has for its object to so improve this known method as to allow the production of fibers of greater fineness than could hitherto be produced with this method.

To this end, the present invention essentially consists in subjecting the mass thrown off the disc in a divided state to a further sub-division of still finer grade, which is attained by causing the individual mass particles to pass from the disc surface proper to a surface contiguous with and constituting an enlargement of the former and surrounding it like an aureola, this surface being formed by a multiplicity of substantially radial linear members along which the divided mass is caused to travel and be further subdivided so as to be converted into fibers of the greatest fineness.

For carrying this improved method into effect the centrifuging disc is provided at its periphery with a multiplicity of thin metal rods or wires extending substantially radially from the disc and lying flush with the top surface of the latter.

The said rods or wires preferably consist of platinum, chromium-nickel-steel or another metal or metal alloy having a high heat resistance. They are made of great fineness, having for example a thickness of only one tenth of a millimeter. The wires are attached by welding, soldering or in any other suitable manner to holding rings or covers of the disc or to the disc itself. The parts carrying the wires preferably consist of the same heat-resistant metal or metal alloy as the wires or are provided with a coating of such metal. This wire aureola considerably enlarges the diameter of the centrifuging disc. It may be of a dimension to increase the said diameter for example from about 200 millimeters to about from 400 to 500 millimeters. The centrifuging disc may be disposed in a horizontal or inclined plane.

It is attained by the invention that the molten mass delivered to the revolving disc is guided by the said wires beyond the periphery of the disc proper, subjected thereby to an utterly fine division and thrown as fibers or filaments into the surrounding space only at the free ends of the wires. The great fineness of the fibers attainable in this way may even be increased by an increased speed of rotation of the revolving disc. Owing to the possibility of drawing the mass to fibers of exceedingly great fineness, the supply of a predetermined quantity of molten mass yields a correspondingly large volumetric quantity of fibers. The resulting fibrous product has less density, a considerably looser texture and therefore a higher insulating efficiency than products obtained by the corresponding old method. The fine fibers or filaments, moreover, are much more suited for undergoing treatments for textile and like purposes.

Several embodiments of devices according to the invention are illustrated, by way of example, in the accompanying drawings, in which:

Fig. 1 is an elevational view, partly in section, of an apparatus for producing glass fibers with the improved centrifuging device according to the invention.

Fig. 2 is a vertical section and Fig. 3 a plan view of the centrifuging device on an enlarged scale.

Fig. 4 is a section similar to Fig. 2 of a somewhat modified form of device.

Fig. 5 is a partial section through another modification, and

Fig. 6 is a vertical section of still another form of centrifuging device.

Referring to the drawings the numeral 10 designates a melting furnace for the material, such as glass, from which the fibers are to be produced. The furnace has in its bottom an outlet 11 through which a stream of molten material 12 is delivered to the top surface of a cylindrical body or disc 13 of suitable refractory material, which is caused to revolve at high speed and from which the molten mass is thrown off in divided state and drawn to fibers by centrifugal action. 14 is a jacket surrounding the space of fiber formation. The disc 13 is fastened by means of a suitable armature 15 to a vertical shaft 16 which may be mounted stationarily or in a truck 17, as shown in Fig. 1. Rotating power is transmitted to the device through a belt pulley 18 or any other suitable drive.

According to the invention, the disc 13 is provided at its periphery with a multiplicity of thin metal wires 19 extending substantially radially of the disc and lying flush with the top surface thereof, forming a kind of aureola surrounding the disc.

In the form illustrated in Figs. 2 and 3 the

wires 19 are fastened to the upper edge of a metal ring 20 encircling the centrifuging disc 13.

According to Fig. 4 the disc 13 has a central projection 21 hooded by a metal cap 22 to which the wires 19 are attached.

With the embodiment according to Fig. 5, the cylindrical armature 15 holding the disc 13 has fitted on its upper margin a metallic border ring 23 of inverted U-shape the surface of which lies flush with the surface of the disc 13. The wires 19 are clamped with their inner ends between the disc and the border ring and fastened to the latter.

According to the modification illustrated by Fig. 6, the disc 13 is formed in one piece with a hollow stub-shaft 24 and is seated at the lower end of this shaft. The wires 19 are fastened directly to the disc 13. The stub-shaft is coupled by the armature 15 with the driving shaft 16 which is likewise hollow. Thus a continuous channel 25 is formed in the shafts 16 and 24 through which air or another medium may be admitted. The molten mass is supplied to the disc 13 by a chute 26.

The fibers produced by the centrifuging devices are designated by the numerals 27 in Figs. 1 and 6.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A method of producing fibers from molten glass, slag and the like meltable materials, consisting in delivering a thin stream of molten material onto the surface of a disc-like body, imparting high-speed rotation to this body and thereby causing the supplied molten mass to be divided into small particles and thrown off the disc by centrifugal action, passing the divided mass as it leaves the disc surface onto another surface contiguous and flush with the former and formed by a multiplicity of thin linear members fast to and surrounding the disc like an aureola, the mass particles thrown off the disc being guided along and subjected to further subdivision by the said members so as to yield fibers of greatest fineness.

2. A centrifuging device for use in the production of fibers from glass, slag and the like meltable material, comprising a disc-like body having attached to its periphery in one plane with its top surface a multiplicity of fine wires of highly heat-resistant metal extending substantially radially from the disc periphery and surrounding same like an aureola.

3. A centrifuging device for use in the production of fibers from glass, slag and the like meltable materials, comprising a disc-like body, a central projection on the top surface of this body, a cap of highly heat-resistant metal covering the said projection and thin wires of highly heat-resistant metal fastened to the periphery of the said cap so as to extend substantially radially therefrom in the plane of the top surface of the cap.

4. A centrifuging device for use in the production of fibers from glass, slag and the like meltable materials, comprising a disc-like body, a cylindrical armature for holding this body, a border ring of highly heat-resistant metal on the upper edge of the said armature contiguous with the top surface of the disc, and a multiplicity of thin wires of highly heat-resistant metal fastened on the said border ring and extending substantially radially relative to the disc and substantially in the plane of the top surface of the disc-like body.

5. A centrifuging device for use in the production of fibers from glass, slag and the like meltable materials, comprising a vertically disposed shaft, a disc formed at the lower end of this shaft in one piece therewith and a multiplicity of thin wires of highly heat-resistant metal fastened directly to the periphery of the said disc and extending substantially radially thereof in a plane level with the upper surface of the disc.

6. In an apparatus for producing fibers from glass, slag and the like meltable materials, in combination a container for holding a supply of molten material, an outlet in this container wherethrough to discharge a stream of the molten material, a rapidly rotating disc-like body of refractory material below the outlet whereon to deliver the stream of molten material and a multiplicity of fine wires of highly heat-resistant metal extending substantially radially from the periphery of the disc and in the plane of the top surface of the disc.

7. A centrifuging device for the manufacture of fibers from glass, slag and the like meltable materials, comprising a disc-like body, a ring of highly heat-resistant metal surrounding such body at the top thereof, such ring being coaxial with the body and having the inner dimension thereof corresponding substantially to the outer dimension of the upper part of said body, and a multiplicity of fine wires of highly heat-resistant metal fastened to the said ring substantially radially thereof in a plane level with the top surface of the body.

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