

April 30, 1940.

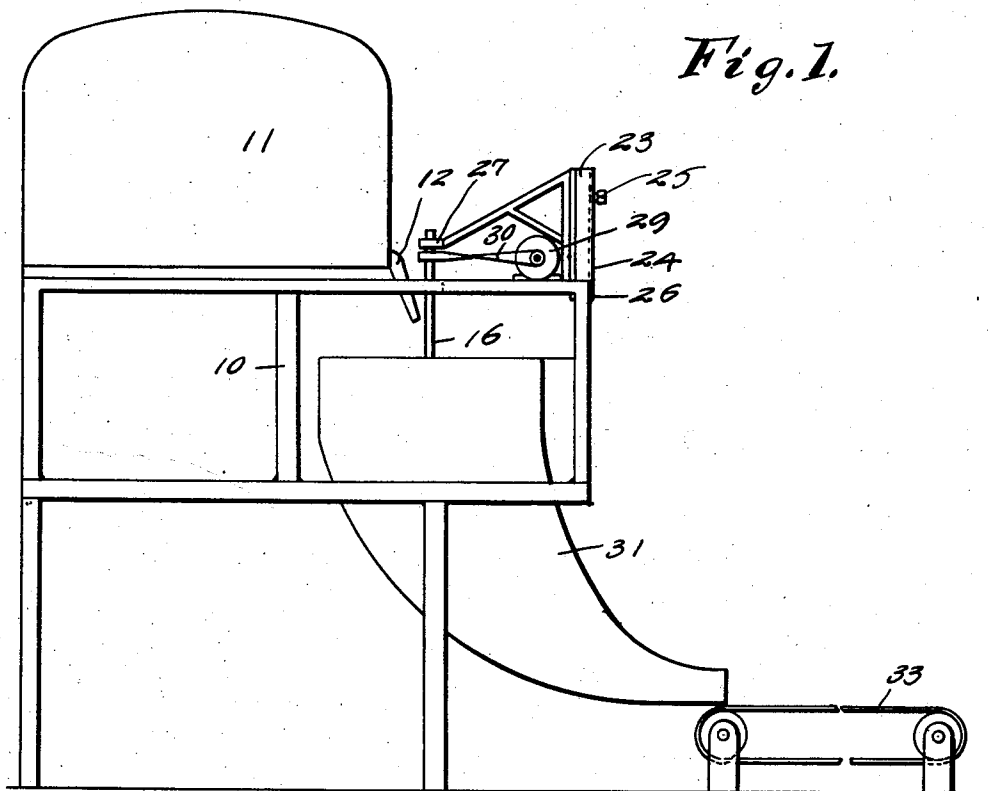
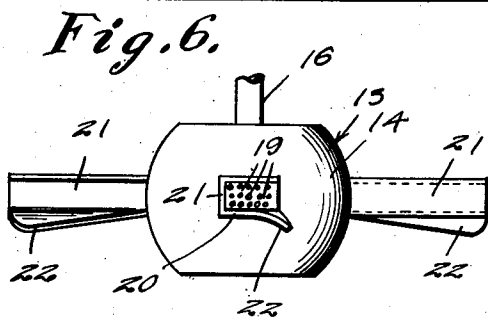
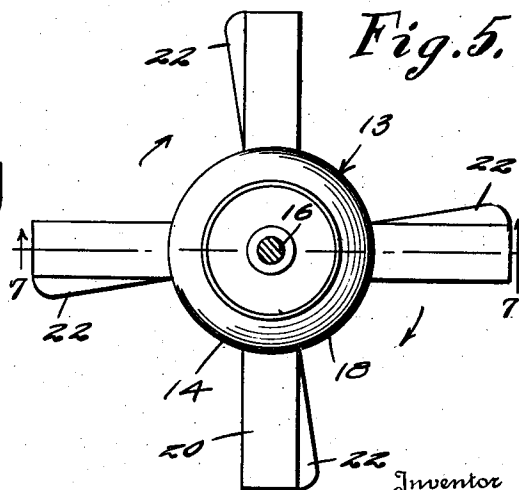
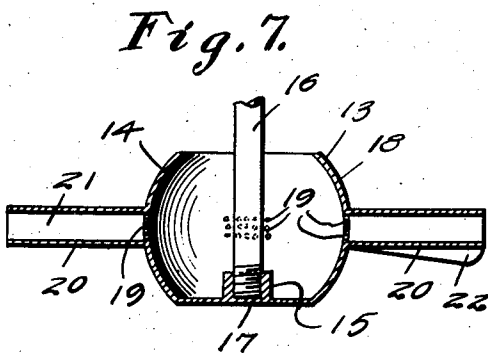
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2,199,309

SPINNING BOWL

Filed April 20, 1939

2 Sheets-Sheet 1



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Fig. 2.

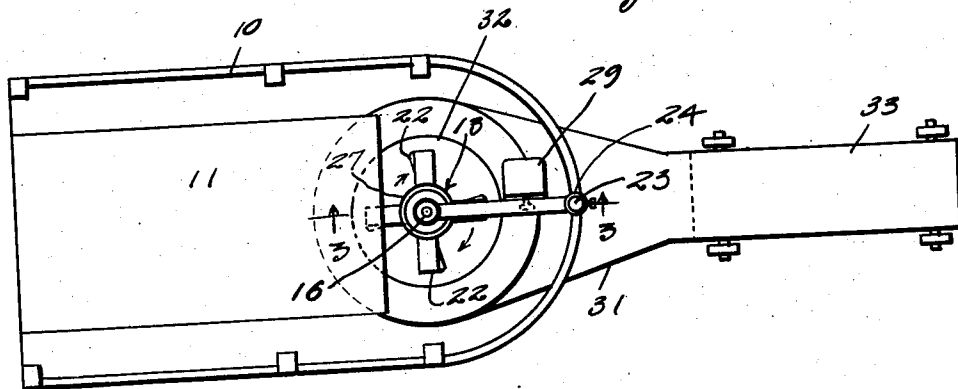


Fig. 3.

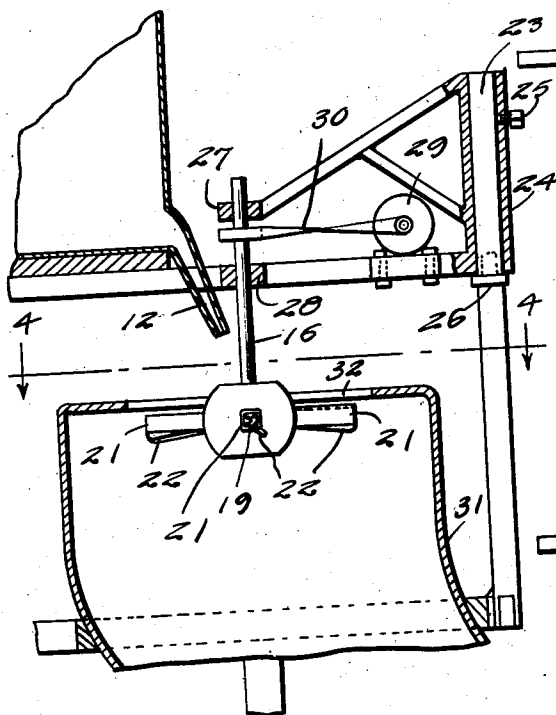
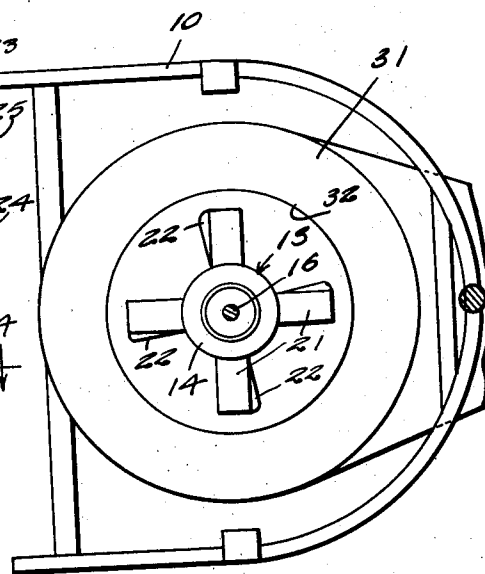


Fig. 4.



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UNITED STATES PATENT OFFICE

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SPINNING BOWL

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2 Claims. (Cl. 83—91)

This invention relates to a spinning apparatus and particularly to the bowl thereof.

More specifically, the invention concerns apparatus for the manufacture of mineral wool or fiber spun from molten slag or rock, and the spinning of fiber from cold viscous solutions such as semiplastics which will dry in the air quickly, and the like.

It is additionally aimed to provide a construction which will operate with minimum power and produce a finished product in a single operation.

It is further aimed to provide such an apparatus wherein the length of the fibers may be controlled by changing the speed of the bowl and the viscosity of the slag, wherein the fibers may be controlled as to diameter or cross sectional shape, and may also be extremely simple and durable in construction and inexpensive in operation.

Especially, it is aimed to provide such an apparatus having a hole to extrude the material therefrom primarily by centrifugal force, with fins or the like to protect the extruded material from air currents incidental to rotation, with certain of the fins having a fan action which aids in disposing of the product as it is extruded.

The more specific objects and advantages will become apparent from a consideration of the description following taken in connection with the accompanying drawings illustrating an operative embodiment.

In said drawings:

Figure 1 is a view in side elevation of the apparatus;

Figure 2 is a plan view of the apparatus;

Figure 3 is an enlarged vertical sectional view taken on the plane of line 3—3 of Figure 2;

Figure 4 is a horizontal section taken on the plane of line 4—4 of Figure 3;

Figure 5 is a view primarily showing the bowl in plan;

Figure 6 is a side elevation of the bowl, and

Figure 7 is a vertical section through the bowl taken substantially on the plane of line 7—7 of Figure 5.

Referring specifically to the drawings wherein like reference characters designate like or similar parts, 10 designates a skeleton frame work of any suitable design, which supports a melting furnace 11 having a discharge spout 12.

Said spout 12 is positioned to discharge into a rotatable bowl generally designated 13. The bowl body or container is designated 14, and is of any suitable shape or size, preferably having a spheri-

cal side wall as shown, being open at the top and closed at the bottom from which a socket 15 rises and in which a rotatable shaft 16 is detachably screw threaded as at 17.

The aforesaid spherical wall of the bowl which is specifically designated 18, at suitable intervals or zones, preferably equidistantly spaced, has one or pluralities of orifices 19 therethrough for the centrifugal discharge of the molten material. Hoods or fins 20 radiate outwardly from the wall 18 and the orifices 19 discharge within the same. Such hoods or fins 20 are preferably U-shaped in vertical section, so as to be closed at top and bottom and at a vertical wall 21 disposed in advance of the orifices in the direction of rotation. The lower wall of the hoods as at 22 is preferably shaped and deflected downwardly to constitute a fan blade. Such hoods or fins are also open at the outer end.

The frame 10 mounts a vertical post 23 on which a skeleton bracket 24 may swivel and to which it is removably secured as by means of a binding screw 25 engaging the post 23. A collar or shoulder 26 is provided on the post on which the bracket rests. The aforesaid shaft 16 is journaled in suitable bearings 27 and 28 of the bracket and is removable as a unit with the bracket. Also, the bracket has an electric or other motor 29 mounted thereon, adapted to rotate the shaft 16 through a belt and pulley drive 30, or any equivalent. It will be realized that the motor 29 and drive is also in unitary relation with the bracket 24, shaft 16 and the bowl 13.

Bowl 13 rotates within a container or chute 31, suitably supported on frame 10, and which is of elbow shape, and which decreases in cross sectional area in a downward direction, the same being open at the top as at 32.

A suitable off-bearer or conveyor 33 is disposed at the outlet of the duct 31 to receive the product for delivery to the desired location for manual or mechanical removal as desired.

In the operation of the device, the material may be reduced to a molten state in the furnace 11, for instance slag or rock as in the manufacture of mineral wool or fiber. At the same time, some materials may be used which do not require heating and for instance viscous solutions such as semiplastics which will dry in the air quickly. Whichever material is used, it flows or discharges through the spout 12 directly into the bowl 13 and due to the rotation of the latter in the direction of the arrows, the material is extruded by centrifugal force through the orifices 19 into the interior of the container or duct 31.

Such materials are protected by the hoods 20, especially forwardly of the material since the hoods are closed at wall 21 which is foremost in the direction of rotation. At the same time, the rotation of the bowl causes members 22 to act like fans to produce a down current of air to aid in disposing of the product as it is extruded or thrown out of the orifices 19. The hoods or fins 20 protect the many fine streams of the extruded material, from the air stream or current set up by the rapid rotation of the bowl, until each thread of molten material has had time to solidify. The length and shape of the fins will vary with the kind of material under treatment. The molten material emerges from the orifices 19 in a closely interwoven mass of fibers.

The fibers may be controlled as to diameter by varying the size of the orifices 19 and controlled as to shape according to the shape of such orifices. By changing the speed of the bowl and the viscosity of the slag or molten material therein, the length of the fibers can also be controlled.

The present apparatus produces fibers or filaments of greater length and in a closely interwoven mass of great resiliency and strength as a finished product in one or a single operation. This avoids secondary sorting, cleaning or compacting to the desired shape. This is especially desirable in the manufacture of rock wool or allied products. The action on the molten material is a pulling or spinning action as compared to a shredding action caused by blowing a stream of the molten material with steam or compressed air as is common in the manufacture of rock wool at the present time. The present product may be very closely controlled and it has a minimum

of objectionable features such as shot and short and irregular fibers.

Various changes may be resorted to provided they fall within the spirit and scope of the invention.

I claim as my invention:

1. Apparatus of the class described having a bowl provided with discharge openings, said bowl being constructed to receive material adapted to solidify upon extrusion by centrifugal force through said openings, means to rotate said bowl, and a protecting element of substantial length radiating from the bowl, said element being of U-shape in cross section with the bight disposed in the direction of rotation, the legs of said element lying in horizontal planes and being directly connected to the bowl, the walls of the U-shaped element partially surrounding groups of openings in the bowl.

2. Apparatus of the class described having a bowl provided with discharge openings, said bowl being constructed to receive material adapted to solidify upon extrusion by centrifugal force through said openings, means to rotate said bowl, and a protecting element of substantial length radiating from the bowl, said element being of U-shape in cross section with the bight disposed in the direction of rotation, the legs of said element lying in horizontal planes and being directly connected to the bowl, the walls of the U-shaped element partially surrounding groups of openings in the bowl, and a part extending from one edge of said element functioning as a fan to aid in the deposit of solidified material.

HERMAN O. FREUDENBERG.