May 30, 1950 D. HORSÁK 2,509,735

DEVICE FOR THE PRODUCTION OF ARTIFICIAL FIBERS

Filed Jan. 29, 1949

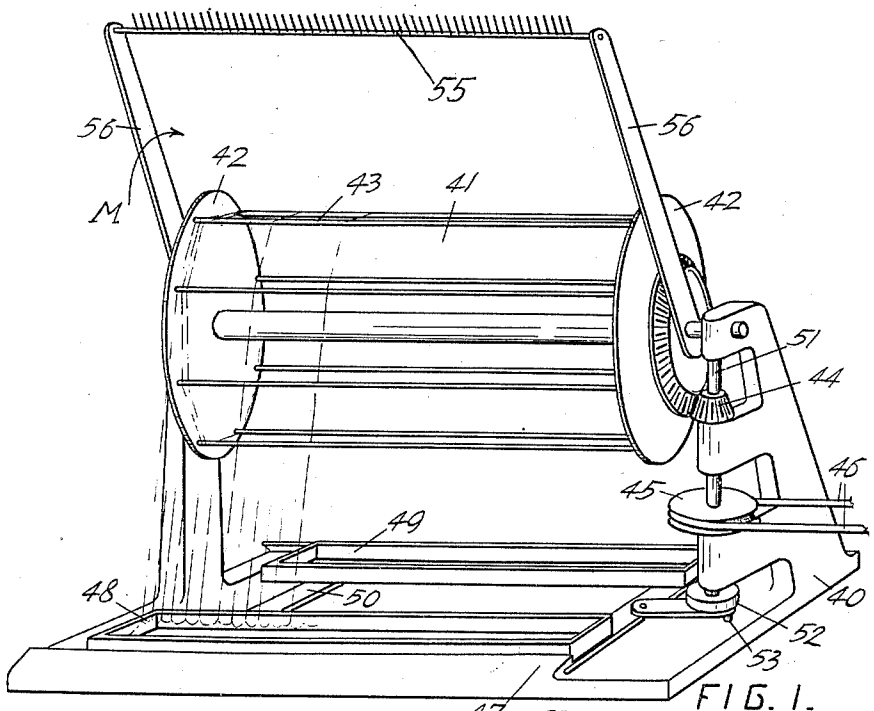


FIG. 1.

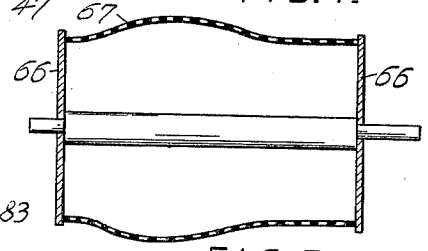


FIG. 3.

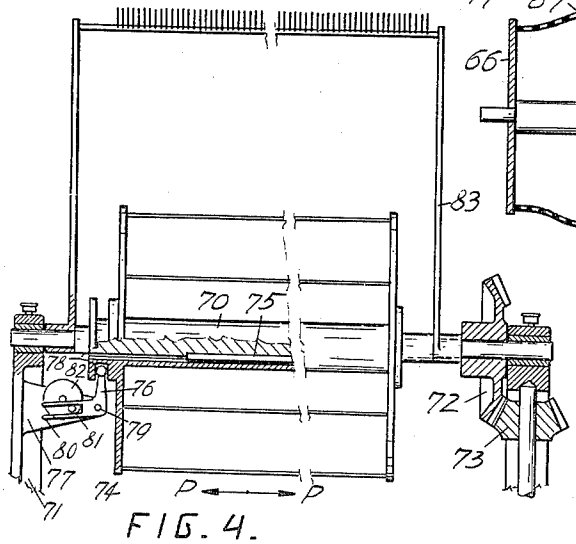


FIG. 4.

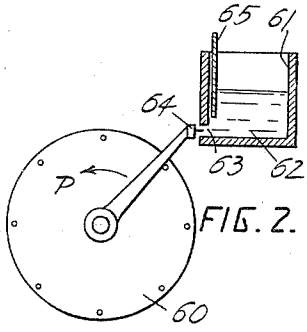


FIG. 2.

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DEVICE FOR THE PRODUCTION OF ARTIFICIAL FIBERS

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9 Claims. (Cl. 18—8)

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The present invention relates to improvements in a device for the production of artificial fibers and is an improvement in or modification of application Serial No. 766,102 filed on August 4, 1947. According to the said parent application artificial fibres are produced in dry or wet state by extruding a fibre-forming mass in solution or in a molten state through a porous wall made of a material of natural or artificial porousness consisting for example of earthenware, glass or metal, re-inforced if necessary, and suitably heated in case thermoplastics are being treated and preferably consisting of a screen or a system of screens made of fibres or strips. The extrusion of the fibre forming mass through the porous wall (which is preferably of cylindrical shape) is assisted by withdrawing the formed fibres either by direct pulling action or by centrifugal force. The withdrawing operation may take place with a greater velocity than the speed of formation of the fibres so that the latter are stretched at the same time.

In further development of the device according to the parent application, I have found that the continuous formation of artificial fibres may preferably be carried out by continuously withdrawing fiber-like bodies from a magazine or storage container filled with the fiber forming mass by mere pulling action of the receiving or winding mechanism, the orifices in the container, serving for the passage of the fibre forming mass having a dimension equal to a multiple of the diameter of the formed fibers.

According to the present invention I use a surface of a rotating body as a deposition surface, at the sides of which containers for the fiber-forming mass are placed, said containers receiving reciprocating movements; for initiating the formation of fibers and for their introduction on to the rotating body a rockable comb is used.

According to a further feature of the invention, the containers are provided with a slot or with a system of orifices from which the fibers are withdrawn and deposited on a drum, the container being provided with a throttling member to control the size of the slot or orifices.

In a modified embodiment of the invention reciprocating movement is imparted to the rotating body in addition to the reciprocating movement of the container or containers.

The shape of the rotating body is preferably made to conform with the shape of the article to be produced.

In order that the invention may be clearly understood and readily carried out in practice, three examples of a practical embodiment will

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now be described with reference to the accompanying drawing, it being understood that the examples are only illustrative without restricting the scope of the invention.

In the drawing:

Fig. 1 shows in a perspective view a modified embodiment of the device for depositing the fibers in a zig-zag course.

Fig. 2 is a diagrammatic view of a further embodiment and

Fig. 3 shows the formation of a depositing surface for the production of shaped articles.

Fig. 4 shows in a longitudinal section a modified embodiment of the invention.

For producing fibers in a continuous way and at the same time for achieving a new effect by depositing the fibers in a zig-zag course the device shown in Fig. 1 is preferably used.

In a frame 40 of a suitable shape a drum 41 is mounted for rotation. The drum consists of two flanges 42 connected by rods 43. The drum is driven by any suitable means as for example by means of bevel gears 44, pulley 45 and belt 46. Mounted for reciprocal movement in a suitable guide 47 are two containers 48 and 49 preferably connected together by cross-pieces 50. The driving shaft 51 is provided at its lower end with a crank or crank disc 52, the pivot 53 of the crank being journalled to a link 54 engaging the cross-piece 50.

When the shaft 51 is driven the drum 41 is rotated and at the same time the crank 53 imparts reciprocating movement to the two containers 48, 49.

A comb 55 is arranged on two arms 56, mounted for rotation on the axis of the drum. The arrangement is such that when the comb 56 is rocked downwards it engages or dips into one or the other container 48 or 49.

The device described operates as follows:

Movement is imparted to the belt 46 thus setting the drum 41 in rotation and containers 48, 49 which have been filled with fiber-forming material in reciprocating movement. The comb 55 is then immersed into the container 48 and lifted therefrom in the direction of the arrow M. The fiber-forming mass which is of sticky tenacious character adheres to the points of the comb and is thus drawn or extruded in simple manner in the form of filaments from the container 48 and upon further rotation deposited on the rods 43 of the drum and entrained thereby. Owing to the reciprocal movement of the container the fibers are deposited in a zig-zag manner on the drum 41.

In a similar way may fibers or filaments of

the same character be drawn or extruded from the container 49, said fibers too being wound on the drum 41 from the other side and immediately adhere to the still somewhat sticky fibers previously deposited.

It is obvious that the amplitude of the reciprocating movement imparted to the containers may be controlled by changing the distance of the pivot 53 from the centre of the disc 52. The pivot 53, may, therefore, be mounted adjustably in radial direction.

Further it is obvious that because the filaments or fibers are not extruded through orifices in nozzles but simply drawn from the fluid mass, the density of the zig-zag course of the fibres may easily be altered by changing the ratio between the revolutions of the drum and the period of the reciprocating movement of the containers. The drive of the drum may be independent from the drive of the reciprocating containers to allow any desired ratio between the revolutions of the drum and the period of reciprocating movement. It is, of course, possible to use only one container, if desired. Furthermore different fiber forming materials in each container may be used or material of different colours or other properties as the case may be. Each container may receive a different movement or one may be at rest and the other moved, to achieve various effects. Further it is possible to impart reciprocal movement to the drum to achieve undulation of the zig-zag placed fibres. For this purpose the drum is mounted for movement in axial direction and reciprocal motion is imparted thereto in any suitable way, e. g. by a separate drive or suitable gears.

This embodiment of the invention is shown in Fig. 4. A shaft 70 is mounted for rotation in a suitable frame 71, and is driven by bevel gears 72, 73 in a way similar to the embodiment according to Fig. 1. A drum 74 is mounted for axial movement on the shaft 70, its rotation relatively to the shaft 70 being prevented by a key 75. A bell crank lever 76 is mounted on a bracket 77 of the frame 71, one arm of the bell crank lever 76 engaging into a groove 78 on the hub of the drum 74. The bell crank lever is pivoted at 79 in the bracket 77, its other arm being provided with a slot 80 cooperating with a pin 81 eccentrically arranged on a disc 82 or on a crank mounted for rotation in the bracket 77. The disc 82 is rotated by any suitable means (not shown).

A comb 83 is mounted for rocking movement on the shaft 70 in a way similar to that shown in Fig. 1.

In Fig. 4 the drum portion of the device only is shown it being understood that the formation of containers may be similar to that shown in Figs. 1 or 2 (which will be described hereinafter).

This embodiment of the invention operates as follows:

By the movement imparted to the disc 82 the bell crank lever 76 is set into reciprocal movement which is transmitted to the drum 74 the latter carrying out reciprocal movement in axial direction as shown by the arrows P—P.

It is obvious that any other suitable means for imparting reciprocal movement to the drum may be used, the arrangement described above and shown in Fig. 4 being given by way of example only.

In this way the individual fibres are superimposed in undulated formation in a zig-zag course.

In certain cases it may be an advantage not to extrude the fibers upwards but to draw the fibers from a container placed near the upper part of the drum.

Such an embodiment is shown in Fig. 2, wherein the drum 60 may be of similar design as according to Fig. 1. The fiber-forming mass 61 is placed in a container 62 having an orifice or a system of side orifices 63 which is in close proximity to the upper part of the drum. The comb 64 is adapted to enter the orifices 63 and if rotated in the direction of the arrow P, and after making contact with the material in container 62, it draws or extrudes a system of fibers which are then deposited on the rods of the drum 60 and drawn out by the drum in an approximately tangential direction from the container 61. If desired a slide 65 may be arranged for controlling the dimensions of the orifice 63 without the use of nozzle so as to control the flow and quantity of material extruded. It is obvious that also in this case reciprocal movement may be imparted to the container or to the drums.

The process according to the invention makes it possible to produce articles directly in the required shape. In such a case it is only necessary to give the drum a shape corresponding to that of the finished article. Such a drum is diagrammatically shown in Fig. 3 wherein the drum consists of two flanges 66 between which a surface (screen or the like) 67 is fastened, said surface having a shape corresponding to that of the final product.

It is obvious that the described process of production may also be used for other materials than mentioned above, such as glass or the like and may be carried out in a suitable medium e. g. in gaseous nitrogen or carbon dioxide according to the characteristics of the polyamide or other material used, so as to prevent undesirable oxidation.

Further it is possible by suitably shaping the drum 42, 60 or 74 to draws and thus deposit the mass on the drum in the form of strips or sheets of any desired width.

While I have disclosed the principles of my invention in connection with several embodiments it will be understood that these embodiments are given by way of example only and not as limiting the scope of the invention as set forth in the appended claims.

I claim:

1. A device for producing artificial fibers from a fiber-forming mass, comprising a rotary body serving as a deposition surface for the fibers, containers for the fiber forming mass arranged at the sides of the said rotary body, means for imparting reciprocal motion to the said containers, and a rockable comb adapted to initiate the formation of fibers and to deposit them on to the rotating body, the said container having an orifice for the exit of the fiber-forming mass, the said orifice having a dimension equal in area to a multiple of the diameter of the produced fibers, the latter being continuously withdrawn from the containers by mere pulling action of the said rotating body.

2. A device according to claim 1, wherein the container is provided with a slot from which the fibers are withdrawn and deposited on the rotating body and, a throttling member is included which is movably disposed on the container to control the area of the said slot.

3. A device as claimed in claim 1, wherein the container is provided with a system of slots from which the fibers are withdrawn and deposited on the rotating body, and a throttling member is in-

cluded which is disposed on the container to control the area of the said system of slots.

4. A device for the production of artificial fibers from a fiber-forming mass, comprising a rotary body serving as a deposition surface for the fibers, containers for the fiber forming mass arranged at the sides of the said rotary body, means for imparting reciprocal motion to the said containers, a rockable comb adapted to initiate the formation of fibers and to deposit them on to the rotating body, the container having an orifice for the exit of the fiber-forming mass, the said orifice having a dimension equal in area to a multiple of the diameter of the produced fibers, the latter being continuously withdrawn from the containers by mere pulling action of the said rotating body, and means for imparting reciprocating motion to the said rotary body to super-impose the fibers in undulated formation in a zigzag course.

5. A device for the production of artificial fibers from a fiber-forming mass, comprising a rotary body serving as a deposition surface for the fibers, containers for the fiber forming mass arranged at the sides of the said rotary body, means for imparting reciprocal motion to the said containers, and a rockable comb adapted to initiate the formation of fibers and to deposit them on to the rotating body, the container having an orifice for the exit of the fiber-forming mass, the said orifice having a dimension equal in area to a multiple of the diameter of the produced fibers, the latter being continuously withdrawn from the containers by mere pulling action of the said rotating body, the shape of the rotating body conforming with the shape of the article to be produced.

6. A device for the production of artificial fibers from a fibre-forming mass, comprising a rotary body serving as a deposition surface for the fibers, a container for the fiber-forming mass, an orifice provided in the said container for the extrusion of fibers on to the rotary body from above in approximately tangential direction, and a rockable comb adapted to initiate the formation of fibers and to deposit them on to the rotating body, the orifice in the said container having an areal dimension equal to a multiple of the diameter of the produced fibers.

7. A device for the production of artificial fibers from a fibre-forming mass, comprising a rotary body serving as a deposition surface for the fibers, a container for the fiber-forming mass, an orifice provided in the said container for the extrusion of fibers on to the rotary body from above in approximately tangential direction, and a rockable comb adapted to initiate the formation of fibers and to deposit them on to the rotating body, the orifice in the said container having an areal dimension equal to a multiple of the diameter of the produced fibers, and means for imparting reciprocal movement to the container.

8. A device for the production of artificial fibers from a fibre-forming mass, comprising a rotary body serving as a deposition surface for the fibers, a container for the fiber-forming mass, an orifice provided in the said container for the extrusion of fibers on to the rotary body from above in approximately tangential direction, a rockable comb adapted to initiate the formation of fibers and to deposit them on to the rotating body, the orifice in the said container having an areal dimension equal to a multiple of the diameter of the produced fibers, means for imparting reciprocal movement to the said rotary body, and means for imparting reciprocal movement to the container.

9. A device for the production of artificial fibers from a fiber-forming mass, comprising a rotary body serving as a deposition surface for the fibers, containers for the fiber forming mass arranged at the sides of the said rotary body, means for imparting reciprocal motion to the said containers, and a rockable comb adapted to initiate the formation of fibers and to deposit them on to the rotating body, the container having an orifice for the exit of the fiber-forming mass, the said orifice having an areal dimension equal to a multiple of the diameter of the produced fibers, the latter being continuously withdrawn from the containers by mere pulling action of the said rotating body, said rotary body being shaped so as to deposit the mass in the shape of strips of desired width.

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No references cited.