Sept. 8, 1931. P. O. E. FRIEDRICH 1,821,937

APPARATUS FOR SPINNING GLASS FILAMENTS

Filed Jan. 25, 1927 2 Sheets-Sheet 1

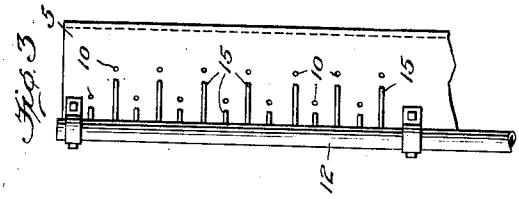


Fig. 3

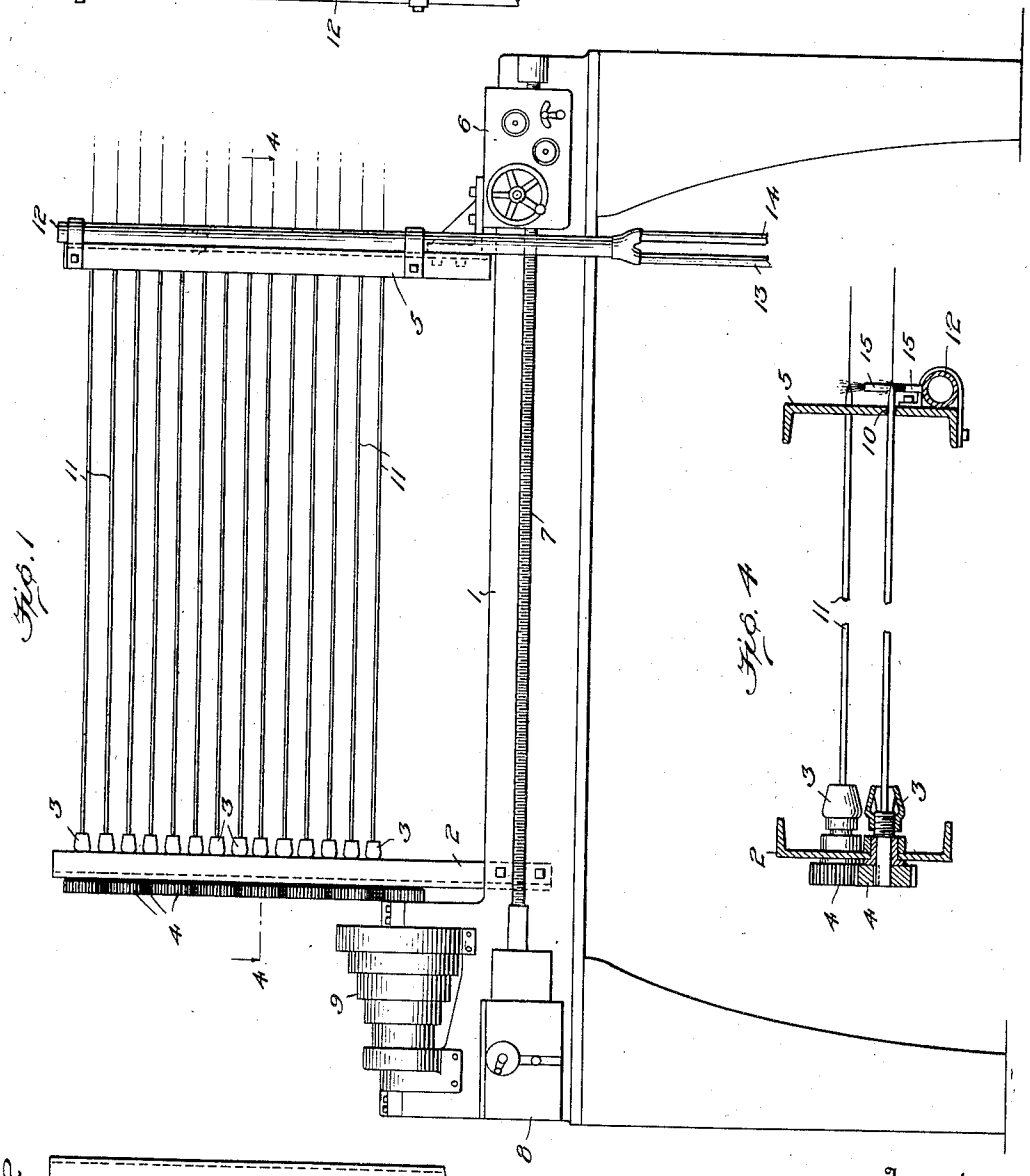


Fig. 1

Fig. 4

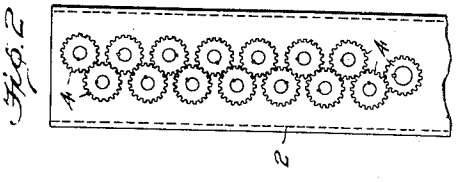


Fig. 2

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APPARATUS FOR SPINNING GLASS FILAMENTS

Filed Jan. 25, 1927 2 Sheets-Sheet 2

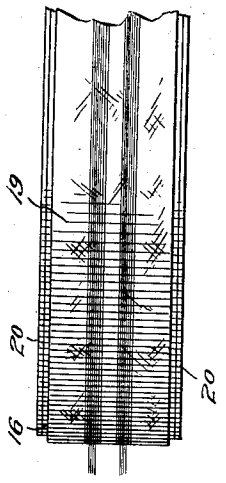


Fig. 6

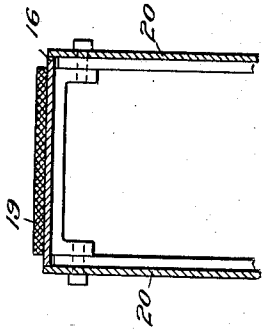


Fig. 7

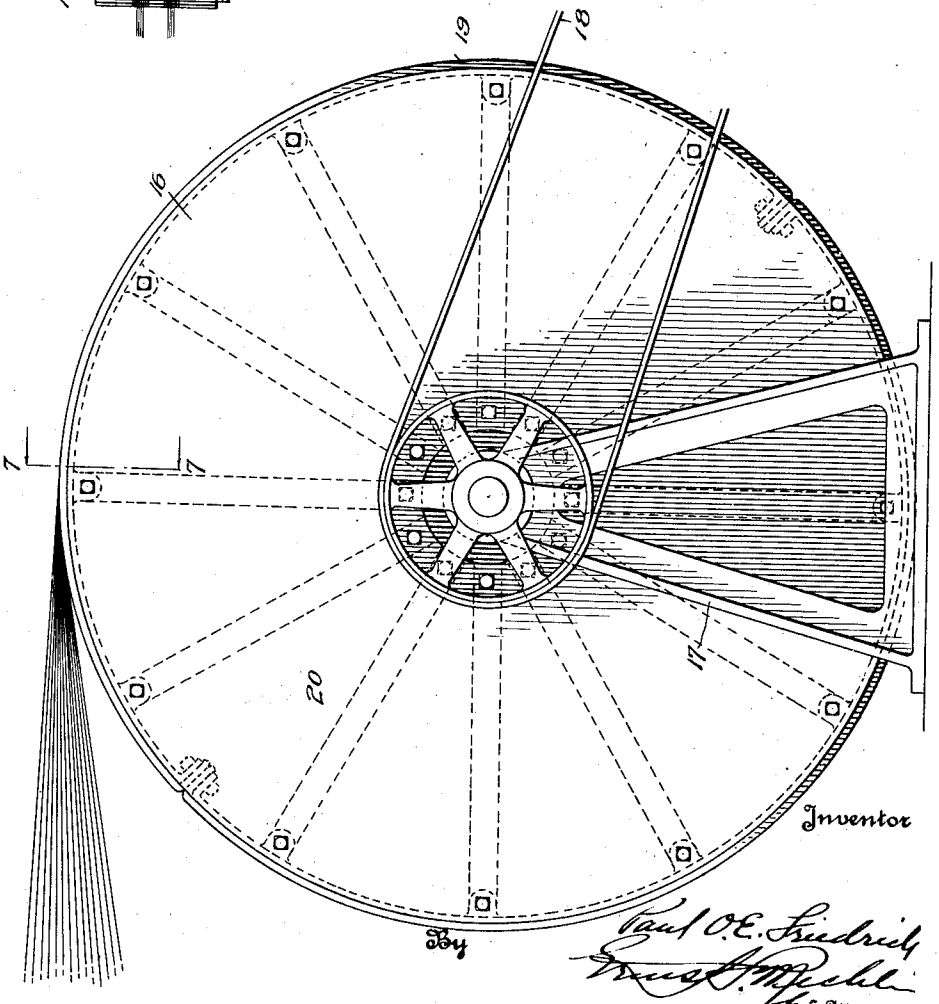


Fig. 5

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UNITED STATES PATENT OFFICE

PAUL O. E. FRIEDRICH, OF MILLVILLE, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GOULD STORAGE BATTERY CORPORATION, OF DEPEW, NEW YORK, A CORPORATION OF DELAWARE

APPARATUS FOR SPINNING GLASS FILAMENTS

Application filed January 25, 1927. Serial No. 163,388.

An object of my invention is to provide an improved apparatus for spinning glass into filaments of substantially the same diameter.

Another object of my invention is to provide an apparatus for spinning glass in which the heating of the glass rods is accurately controlled.

A further object of my invention is to provide a mechanism for spinning glass which permits of a higher rate of spinning than has hitherto been practical.

With these and other objects in view, my invention resides in the various elements and combinations of elements hereinafter set forth in the following specification and illustrated in the accompany drawings of a single embodiment of my invention in which:

Figure 1 is a vertical longitudinal view of the heating and feeding mechanism.

Figure 2 is a vertical transverse view showing the intermeshing gears for rotating the rods.

Figure 3 is a vertical transverse view showing the movable supporting header, equalizing chamber and burners for heating the rods.

Figure 4 is a horizontal sectional view on the line 4—4 showing the relation of the rods, burners and gears.

Figure 5 is a vertical view of the spinning wheel.

Figure 6 is a horizontal plan view of a portion of the spinning surface with the strands thereon.

Figure 7 is a transverse sectional view through the periphery of the wheel on the line 7—7 showing the fabric covering and side plates.

In the single embodiment of my invention shown, a support 1 similar to a lathe bed may have mounted thereon a vertical header 2 which may support a plurality of hollow chucks 3 arranged in two staggered rows and connected mechanically to the intermeshing gears 4, as shown in Figure 2. A similar header 5 may be mounted on a movable member 6 similar to the tool carriage of a lathe which is adapted to be moved on the support 1 toward the header 2 by means of the worm 7. The rate of travel of the header 5 may be controlled by the speed box 8 independently of the speed of rotation of the gears 4, which, however, if desired, may be varied by means of the belt cone 9. The header 5 may be provided with a series of holes 10 each corresponding in location and position to one of the chucks 3 and adapted to support one end of the glass rods 11 which are secured at the other end by the hollow chucks 3. The movable header 5 may also carry a mixing or equalizing chamber 12 to which may be connected the rubber tubes 13 and 14 supplying air and gas, respectively. Adjacent to and opposite each of the holes 10, there may be provided a burner 15 adjusted both in diameter and in position to heat the ends of the glass rods 11 uniformly.

At a convenient distance from the heating and feeding mechanism above described may be the spinning wheel 16 mounted on the supports 17 and driven at a high rate of speed by means of the belt 18. The cylindrical surface of this wheel may be covered with burlap or other suitable fabric 19 thereby providing a medium to which the filaments of glass will readily adhere. In order to reduce the air resistance and decrease the disturbance of air, the sides of the wheel may be encased by the side plates 20.

A serious problem hitherto encountered in the spinning of glass filaments has been the difficulty of coordinating the speed of the spinning wheel and the rate and uniformity of heating the glass rods. Due to inequalities in heating, the filaments frequently broke causing much loss of time and greatly limiting the number of strands that one operator could control. In my invention, by positively controlling the rotation of the rods, I insure uniformity of heating throughout the section of each rod. By use of a mixing chamber and a mixture of gas and air, I obtain a more efficient fuel which, at the burner, is substantially unaffected by room air currents. This thoroughly mixed fuel is supplied to the carefully equalized burners at identically the same pressure

thereby insuring that each rod receives the same amount of heat at a uniform and controlled rate.

I have found that by covering the spinning wheel with burlap, not only is the adhesion of the filaments to the cylinder enhanced, but, at high speed, air currents are formed which tend to drag the filaments around the cylinder until they become attached thereto, thereby greatly facilitating the starting of the spinning operation or the replacement of broken strands. In providing an enclosed wheel and thereby reducing the air resistance and air disturbance, I find that there is much less likelihood of breakage of filaments than hitherto. Because of these improvements in my spinning wheel and my improvements in heat control above described, I am enabled to successfully spin filaments of uniform diameter at peripheral speeds of 5000 to 6000 feet per minute with a resulting increase in production and decrease in cost.

Having now described my invention, I claim:

1. In a glass spinning machine, the combination with a mechanism comprising a pair of spaced upright headers, a plurality of glass rods supported by one of said headers, means on said other header for rotating said rods at substantially the same speed, means on one of said headers and movable therewith for uniformly heating said rods and a spinning wheel for drawing glass threads from each of said rods, said wheel being covered on its cylindrical face with a fabric whereby the glass threads may be caused to adhere thereto.

2. In a glass spinning machine, the combination with a mechanism comprising a pair of spaced headers, a plurality of glass rods supported by one of said headers, means on said other header for rotating said rods, means on one of said headers and movable therewith for uniformly heating said rods and a spinning wheel located adjacent said last named header for drawing glass threads from each of said rods, said wheel having its cylindrical face covered with a fabric to effect adhesion of the filaments thereto and to create an air current at its periphery acting to draw the filaments thereonto.

3. In a glass spinning machine, the combination with a machanism comprising a pair of spaced headers, a plurality of glass rods supported by one of said headers, means on said other header for positively rotating said rods, means for moving one of said headers toward the other at a predetermined rate of travel, means mounted on said movable header for heating said rods uniformly and a spinning wheel adjacent one of said headers for drawing and receiving filaments from said heated rods, said wheel having a fabric covering on the periphery thereof onto which the filaments may be initially caught and which will provide traction, said covering operating, upon rotation of the wheel to create a whirling air current following the periphery for drawing the filaments thereonto.

4. In a glass spinning machine, the combination with a mechanism comprising a pair of spaced members, a plurality of glass rods arranged in spaced vertical rows supported by one of said members, means on said other member for simultaneously rotating said rods, means mounted on one of said members for uniformly heating an end of each rod, and a spinning wheel for drawing glass filaments from said rods, the disposition of the rods in spaced vertical rows causing the filaments from the rods in the respective rows to be arranged upon the wheel in spaced groups with the filaments in each group close together.

5. In a glass spinning machine, the combination with a mechanism including a pair of spaced members, a plurality of vertically spaced glass rods arranged in staggered relation supported by one of said members, means on said other member for simultaneously rotating said rods and a spinning wheel adjacent said mechanism for drawing threads from said rods, the axis of said wheel being perpendicular to said rods, the arrangement of the rods causing the filaments drawn therefrom to be deposited onto the wheel in spaced groups all containing the same quantity whereby upon severing the groups correspondingly uniform hanks will be obtained.

6. In a glass spinning machine, the combination with a pair of spaced headers, of a plurality of glass rods in parallel rows supported by one of said headers, a plurality of staggered directly intermeshing gears on said other header carrying chuck means for rotating said rods, means for moving one of said headers toward the other at a predetermined speed and means mounted on the first named one of said headers for heating said rods uniformly.

7. In a glass spinning machine, the combination with a pair of spaced members, of a plurality of glass rods supported at one end by one of said members, a plurality of hollow chucks mounted on said other member for releasably holding said rods, a plurality of intermeshing gears connected to said chucks for rotating the same, means for controlling the speed of rotation of said chucks, means for moving said members together at a predetermined rate of travel and means for varying said rate of travel independently from said speed of rotation of said chucks.

In testimony whereof I affix my signature.

PAUL O. E. FRIEDRICH.