Jan. 19, 1971 J. B. DENT, JR 3,556,755

APPARATUS FOR MANUFACTURING FIBER GLASS

Filed July 9, 1968 2 Sheets-Sheet 1

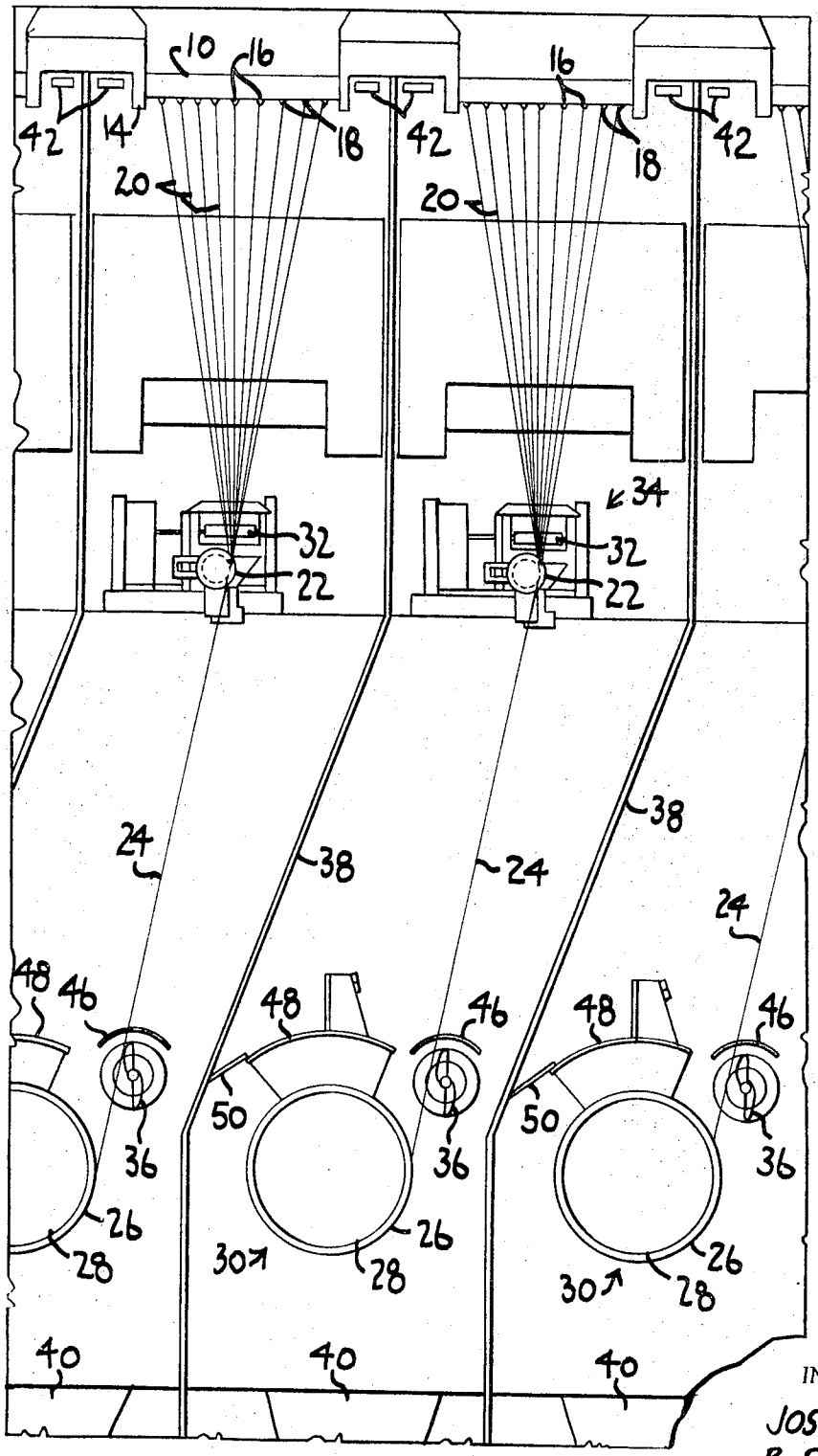


FIG. 1

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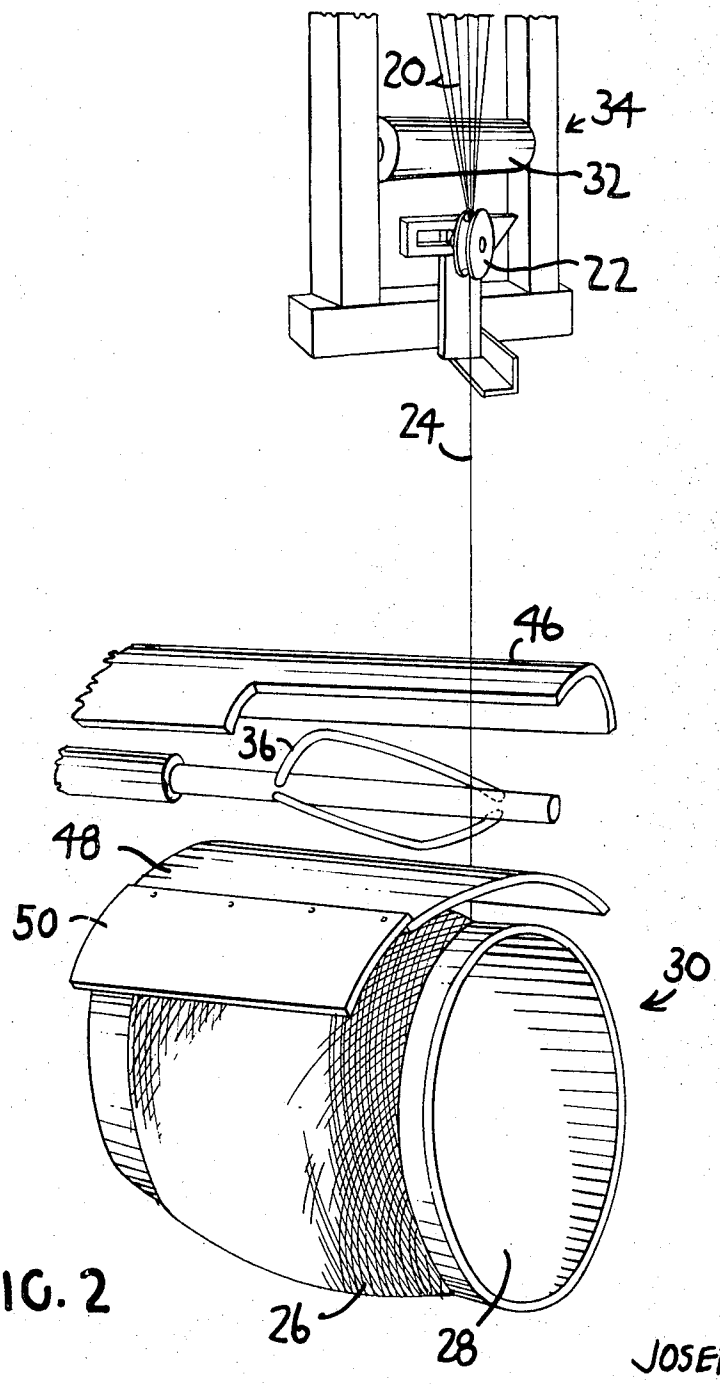


FIG. 2

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APPARATUS FOR MANUFACTURING FIBER GLASS

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U.S. Cl. 65—11 3 Claims

ABSTRACT OF THE DISCLOSURE

This invention involves an apparatus for the manufacture of glass fibers in which the fibers are drawn through a bushing and attenuated into fibers. These fibers are collected on a winder having a metal guard to protect the winder from falling beads and to direct undesirable air currents into a waste chute located below.

BACKGROUND OF THE INVENTION

Fiber glass strand is manufactured by drawing a plurality of filaments from a like member of streams of glass passing through openings or orifices in a bushing which contains a supply of molten glass. The filaments are grouped or gathered together into a strand. Just prior to being gathered together, a binder is applied to the individual filaments, so as to coat all filaments and to insure strand integrity when the filaments are gathered. The strand is wound as a forming package on a tube, such as paper, received on a rotating collet of a winder, which applies the drawing force to produce the filaments. The strand is distributed on the tube by means of a traverse of which a spiral is one form. An arrangement for forming strand including a spiral is illustrated in Beach Patent No. 2,391,870.

In the normal factory, a plurality of bushings are arranged side-by-side, being supplied with molten glass by a common forehearth. Each bushing has a winder, traverse, gathering shoe, and binder applicator associated therewith, forming a position. Each position is separated from the next adjacent position by a sheet metal position divider. Generally each divider has an angular portion and a substantially vertical portion as will be later described herein.

The rotating winding collet and rotating traversing spiral create air currents such that some binder is thrown off the fibers and travels in a direction opposite to the direction of movement of the fibers and into the actual forming area below the bushing. Thus dirt and other impurities can enter the zone beneath the bushing disrupting the forming process. To at least partially overcome this condition, cooled and conditioned air is introduced adjacent the bushing and is directed generally downwardly in the direction of fiber travel to be preferably exhausted below the winder. While this has improved the process, the winder still can create air flow problems. Short yardage variations, i.e., variations in fiber diameter result from this condition. Because of forming conditions, beads are sometimes formed at the bushing openings and being heavier than fibers, drop onto the collet or the forming package thereon and/or traverse or spiral, perhaps causing damage to the apparatus and interfering with the normal operating conditions.

THE INVENTION

According to this invention a shield is placed over and affixed to the traversing spiral, thus protecting the spiral against damage from falling beads. Another shield is placed over and is affixed to the collet, so as to influence air current at the collet level. Generally, the collet and spiral are arranged for relatively horizontal movement with respect to one another, so as to obtain a reasonably long package. With the shields fixed to the traverse, these parts are protected during operation.

The shields are made of sheet metal and will not only deflect any beads which may fall thereon but will also direct air currents generated by the rotating element being shielded generally downwardly toward the waste chute located in the floor below the winder. A decrease in yardage variations result from the use of the winder shield, so that the diameter of the fiber produced is substantially uniform along its length. The shield for the winder also includes a resilient wiper member to seal the space between the shield and the position divider while permitting movement of the collet.

THE DRAWINGS

FIG. 1 is an elevation of a typical fiber-forming arrangement showing a plurality of forming positions and illustrating shields associated with the winder collet and spiral; and

FIG. 2 is a partial perspective view of FIG. 1 illustrating the shields in operating positions.

THE PREFERRED EMBODIMENT

FIGS. 1 and 2 illustrated a typical fiber-forming arrangement of a plurality of fiber-forming positions incorporating the invention herein described. Each forming position includes a bushing **10** located in the bottom of a forehearth **12** connected to a source of molten glass (not shown) and heated by electric current through bus bars **14**. Each bushing **10** is constructed of an alloy, such as platinum rhodium and is provided with a plurality of orifices **16** through which molten glass flows as streams **18**. The streams of molten glass are attenuated into fibers **20** which are grouped by a guide **22** into a strand **24** to be wound as a package **26** on a rotating collet **28** of a winder **30**. A binder is applied to the individual fibers **20** by being passed over a rotating member **32**, such as a roller or belt, of a binder applicator **34**. The roller or belt passes through a supply of binder and carries a layer on its surface which engages the fibers **20**. To distribute the strand **24** on the package **26**, the strand is engaged by a traverse means, such as a rotating spiral **36**. To produce relatively long packages, either the collet **28** or the spiral **36**, or both elements, are moved relative to one another in a horizontal direction. Each position is separated from the next adjacent position by a sheet metal position divider **38**, a portion of which is angular with respect to other portions in order to follow the general path of the strand, as illustrated. Below the winder, a waste chute **40** is provided in the floor for the receipt of waste materials, water, etc.

At or near the bushing level, air manifolds **42** are provided to discharge cooled and conditioned air downwardly in the direction of fiber travel.

To protect the spiral **36** from beads which may form at the bushing and fall therefrom a curved sheet metal guard **46** is provided which covers the spiral **36**. A sheet metal cover **48** is attached to the collet **28**, so as to move horizontally therewith to control and influence any air currents generated thereby. A resilient sealer strip **59**, such as rubber, is attached to the guard **48** and engages the adjacent position divider **38**. In addition to its function as a shield to prevent damage to the spiral from falling beads, the shield **46** also deflects air currents generated by the rotating spiral, directs such currents generally downwardly toward the waste chute **40** and prevents the flow of such air currents, which can contain binder particles thrown off the strand and other undesirable foreign material into the critical forming zone immediately below the bushing **10**.

I claim:

1. In apparatus for manufacturing glass fibers which includes,

a bushing containing a supply of molten glass and having orifices through which glass flows generally as streams to be attenuated into fibers, said glass at times forming as beads adjacent said orifices, which beads fall and interfere with the fiber-forming operation,

means to group said fibers into a strand,

a winder having a rotating collet onto which a forming package of strand is collected, said winder supplying attenuating force to said streams to produce said fibers, and said rotating collet creating undesirable air currents,

a rotating traverse means to distribute said strands on said package, and

a waste chute located below the collet for the receipt of waste materials, and

a sheet metal guard over said collet to direct air currents generated by the collet in a direction generally downwardly toward the waste chute and away from the bushing.

2. Apparatus in which there are a plurality of positions for producing glass fibers, each position including a bushing, grouping means, winder and traverse means, as recited in claim 1, and further including sheet material position dividers separating such fiber forming positions, and resilient seal means attached to the collet guard at each position to span the space between the guard and the adjacent position divider.

3. Apparatus as recited in claim 1 in which there is a sheet metal guard covering the traverse means to protect the traverse means from damage from falling beads.

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