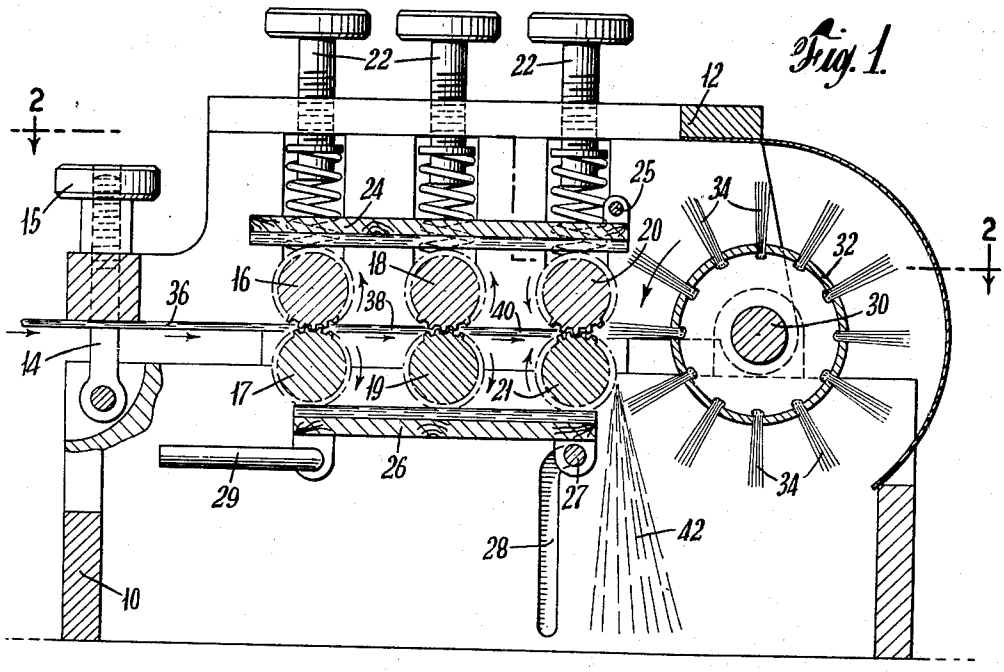
Aug. 9, 1960 F. H. BAILIFF 2,948,021

ATTENUATING APPARATUS

Filed March 28, 1957

Fig. 1.



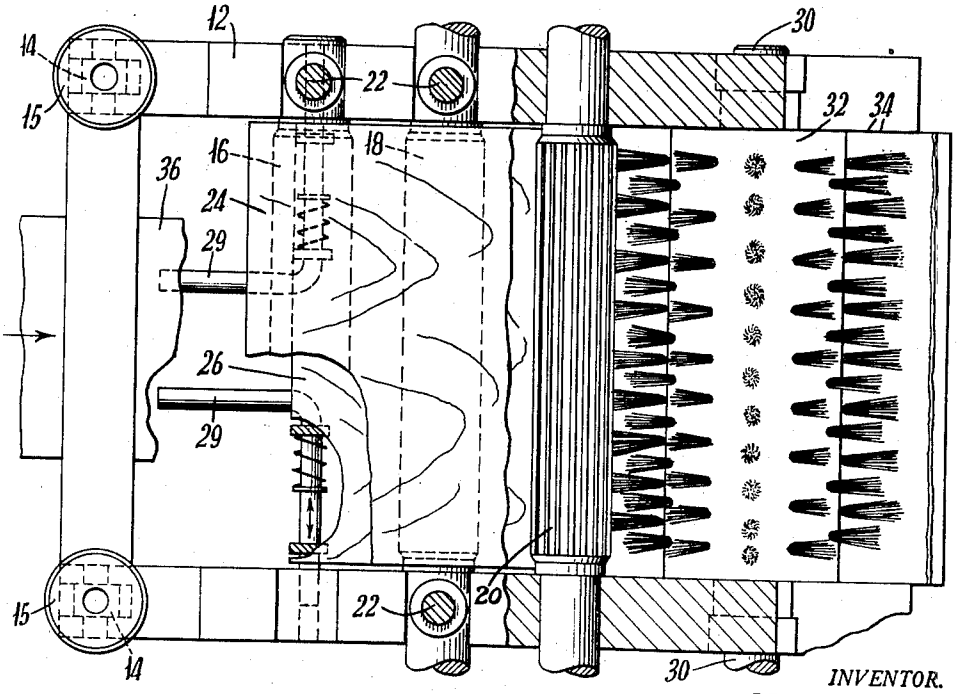


Fig. 2.

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ATTENUATING APPARATUS

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3 Claims. (Cl. 19—65)

This invention relates to attenuating apparatus for converting a tow or sliver into random length fibers and dispersing the separated fibers in an air stream generated by a rapidly revolving beater roll.

In the manufacture of fiber glass preforms or mats for reinforced plastic laminates, it is usual to build up a preform or mat of chopped strands cut to approximately two inches in length from glass roving. These strands are deposited by air currents onto a perforated screen, the air being exhausted through the screen.

It has been proposed to supply thermoplastic binder fibers into the plenum chamber to be carried by the air currents onto the perforated screen, usually along with the glass strands.

The main object of the present invention is to provide apparatus for supplying the thermoplastic fibers for this process.

According to the present invention the attenuating apparatus comprises a drafting head having drafting rolls, and a beater roll which takes the individual thermoplastic fibers as they emerge from the drafting head and projects them into the air stream in the plenum chamber for intimate mixing with glass fibers. The apparatus is also useful for recovering glass fibers from imperfect preforms and mats by passing the preforms or mats through the machine in the same manner as tow or sliver.

The drafting head or breaking down section of the fiber feeding device has three sets of rolls and consists of two drafting zones. The bottom roll of each pair is positively driven through suitable gearing from a common variable speed source. Both the top and bottom rolls are fluted so that they intermesh and the top rolls are held down by suspended weights. The ratch between the nip of the rolls can be varied, and the draft in each zone can be varied.

Following the drafting head is a beater roll fitted with flexible fingers, preferably rubber bands, which disintegrate the attenuated sliver or broken tow into individual fibers. This roll is, for example, 2½ inches in diameter and has its axis in the plane of the nip of the rolls of the drafting head, and parallel to the last set of drafting rolls. It is positioned so that the rubber fingers can reach into or at least whip close to the nip of the rolls. The peripheral surface is fitted with rubber bands which are held in holes drilled in the surface. These holes are in staggered rows around the circumference.

A sliver or tow is fed into the drafting head and subjected to two drawings before it emerges from the nip of the third set of rolls. Here the drafted sliver or broken tow is separated into individual fibers by the rapidly rotating beater roll which is equipped with the rubber fingers.

The beater roll is rotated at a high speed of from 2000 to 8000 r.p.m. and the rubber fingers pick off the fibers as they emerge from the nip of the last set of draw rolls. The fingers of the beater roll project or throw the binder fibers into the plenum chamber where they are

carried by air currents into the perforated screen, usually along with the glass strands.

In the drawings:

Fig. 1 is a vertical section through a drafting head and beater roll according to the preferred embodiment of the present invention; and

Fig. 2 is a horizontal section taken along the line 2—2 of Fig. 1.

As shown in the drawing the drafting head comprises a box-like frame or casing having a base **10** and a pivoted top portion **12** closed by an eyebolt **14** pivoted on the base **10** and spring pressed by a handwheel **15**. Journaled in the base frame **10** are the lower rolls **17**, **19**, and **21** of pairs of fluted drafting rolls, the coacting nipper rolls **16**, **18**, and **20** of which are journaled in sliding bearings in the pivoted top frame **12**. These sliding bearings are individually spring pressed and adjustable by handwheels **22**.

The upper rolls are provided with a clearer board **24** pivoted at **25** and held in contact with its rolls by its own weight. The lower rolls are provided with a clearer board **26** pivoted on a rod **27**, each end of which rides in a slot **28** in the base **10** having a retaining notch at its upper end. The front end of the lower clearer board is supported by spring pressed rods **29** which enter retaining holes in the base.

This arrangement permits the bottom clearer board **26** to be dropped for cleaning by grasping the angle extensions of the rods **29** and pulling the rods out of their retaining holes, and lowering the rods **27** along the slots **28**. After cleaning, the clearer board **26** is raised to bring the rods **27** into the notches in the tops of slots **28**, and the front rods **29** snap into their retaining holes in the base **10**.

Journaled in the base frame **10** and forming the pivot for the top portion **12** is a beater shaft **30**, on which is keyed a beater roll **32** provided with flexible elastic fingers or filaments **34**. The fingers **34** are preferably rubber bands, but may be filaments of crepe rubber or synthetic elastic material. The fingers **34** are preferably staggered in rows of bunches mounted in drillings in the periphery of the roll **32**.

The tow or sliver **36** in its course through the drafting head passes between the coacting rolls of the sets, the lower rolls of which are driven at increased speed by conventional gearing not shown. The upper rolls of the sets are driven by the mutual engagement with the flutes of the lower rolls. Rolls **16** and **17** engage the tow or sliver **36** first, and the speed of these rolls is preset to give the desired percentage addition of thermoplastic fiber to the preform or mat.

Rolls **18** and **19** are driven at a faster rate so that in passage thereto fibers of the tow or sliver **36** are broken or drafted as at **38** because of the tensile stress produced. Similarly in passage of the broken tow or sliver **38** therefrom to the rolls **20** and **21** the tensile stress is again increased, resulting in breaking or drafting those of the fibers of the broken tow or sliver **40** which were not broken or drafted in the first drafting stage.

As the band of broken fibers emerges from the rolls **20** and **21** it is contacted by the beater fingers **34**. The beater roll **32** is positioned so that the rubber fingers can reach into or at least whip close to the nip of the final drafting rolls **20** and **21** and disintegrate the broken tow **40** into individual fibers **42**.

What is claimed is:

1. Attenuating apparatus comprising a drafting head in which is journaled a series of rolls through which a sliver passes, and a beater roll provided with thin narrow elastic filaments and journaled in position so that the ends of said filaments whip close to the nip of the final

drafting rolls to disintegrate the attenuated sliver into individual fibers.

2. Attenuating apparatus as claimed in claim 1, in which said elastic filaments are constructed of rubber bands staggered in rows of drillings in the periphery of said beater roll.

3. Attenuating apparatus comprising a drafting head in which is journaled a series of rolls through which a sliver passes, and a beater roll provided with bunches of thin, narrow elastic filaments in staggered relation on the periphery of said beater roll, said beater roll being

journaled in position so that the ends of said filaments whip close to the nip of the final drafting rolls to disintegrate the attenuated sliver into individual fibers.

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