Jan. 13, 1942. W. I. TAYLOR ET AL 2,269,564

CUTTING AND COLLECTING OF STAPLE FIBER

Filed Oct. 3, 1939

FIG. 3

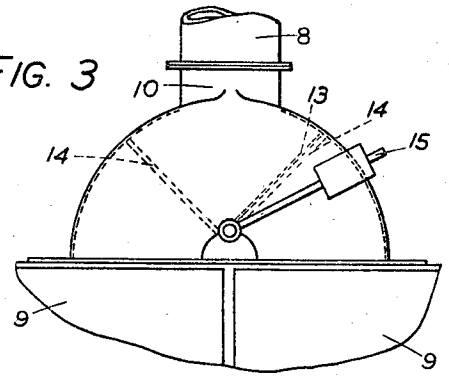
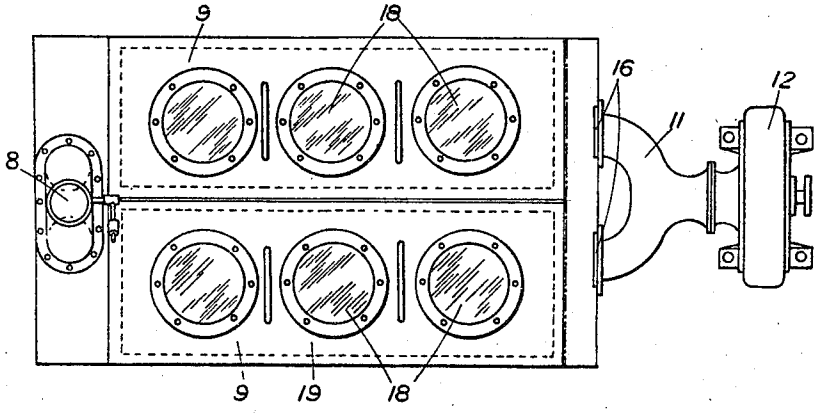


FIG. 1

FIG. 2



W. I. TAYLOR
A. H. WOODRUFF
INVENTORS

J. Selby & C. W. Severinson
ATTORNEYS

Patented Jan. 13, 1942 2,269,564

UNITED STATES PATENT OFFICE

2,269,564

CUTTING AND COLLECTING OF STAPLE FIBER

William Ivan Taylor and Alfred Herbert Woodruff, Spondon, near Derby, England, assignors to Celanese Corporation of America, a corporation of Delaware

Application October 3, 1939, Serial No. 297,677
In Great Britain October 26, 1938

2 Claims. (Cl. 19—1)

This invention relates to improvements in or relating to the cutting and collecting of staple fiber.

According to the invention, staple fiber is cut from continuous filaments in dry condition and is carried away from the cutting point by means of suction through a conduit leading into a chamber of substantially larger cross-section than that of the conduit, the chamber extending transversely away from the conduit (i. e., if the conduit discharges downwardly, the chamber may extend away from it in a generally horizontal direction), so that the fibers entering the chamber proceed along the chamber at a velocity less than the conduit velocity, but nevertheless with a fairly rapid but swirling motion that serves to bring about some separation of the fibers in any compact fiber bundles produced by the cutter. At the end of the chamber remote from the conduit, a screen is provided to restrain the fibers, for example, a wire-gauze or perforated screen covered with a fabric. The fibers collect against the screen and may from time to time be removed, which operation is conveniently effected by duplicating the collecting chambers and providing change-over valve mechanism to switch the conduit and the suction from one chamber to the other.

The invention will now be described in greater detail with reference to the accompanying drawing, in which

Fig. 1 is a side elevation partly broken away;

Fig. 2 is a plan view of Fig. 1 below the line 2—2; and

Fig. 3 is a detail of Figs. 1 and 2, looking in the direction of the arrow in Fig. 2 and drawn on a larger scale.

In Fig. 1 a bundle 1 of dry continuous filaments is shown proceeding downwardly through the nip rolls 2 and a funnel 3 into a cutting machine 4 comprising a cutting cylinder 5 and a fixed cutting blade 6. The cutting machine is contained in a casing 7 which extends downwardly to form a conduit 8 connected to the left-hand ends of two horizontal chambers 9 by a branched member 10. At the right-hand end of the chambers 9 a branched pipe 11 connects the chambers to a suction pump 12. The suction developed in the conduit 8 causes an inflow of air through the funnel 3 which assists in feeding the end of the bundle 1 to the cutting point, and the bundles of staple fiber are sucked down the conduit 8, the fixed blade 6 of the cutting machine having an extended downward curve to assist in guiding the fibers away from the cutting point into the conduit 8. A valve 13 is brought against one or other of a pair of stops 14 by means of a counter-weighted handle 15 so that the fibers are directed into one of the two chambers 9. Dampers 16 permit one branch of the pipe 11 to be closed in accordance with the position of the valve 13.

The fibers are thus sucked into one chamber 9 with considerable velocity but as they reach the chamber their velocity is reduced, and this reduction, combined with their change of direction from the vertical to the generally horizontal, causes them to pass towards the right-hand end of the chamber with a swirling motion until they reach a screen 17 which prevents their escape from the chamber. Collection of the fibers in one chamber proceeds until it is necessary to change over to the other chamber, as may be seen by inspection through the windows 18. These windows are provided in removable covers 19 provided with handles 20, a rubber or like packing at the joint 21 with the top of the chamber 9 permitting the cover 19 to be sealed against the suction applied inside the chamber.

When one chamber has a sufficient quantity of fiber, the valve 13 and chambers 16 are operated to carry the fiber into the other chamber, after which the cover 19 of the first chamber may be lifted for removal of the fiber. The ability to discharge two chambers 9 alternately thus provides for continuous collection of fiber from the single cutting machine 4.

Projections, for example nuts or bolts, should be avoided on the inside of the chamber, otherwise fibers might be caught and twisted into compacted tails by the swirling of the chamber. With the chamber free from such projections, a mass of fiber is produced direct from the cutting operation in good open condition suitable for subjection to the usual operations associated with the spinning of the fiber into yarn, the swirling motion within the chamber causing the dry fibers to separate from each other and lose the compact form of fiber on fiber in the bundle 1 fed to the cutting machine.

Having described our invention, what we desire to secure by Letters Patent is:

1. Apparatus for cutting and collecting staple fiber, comprising a cutting machine, a conduit leading from the cutting machine, a chamber substantially larger in cross-section than that of the conduit and into which the conduit discharges, the chamber extending transversely away from the conduit, and means to apply suction to the chamber at the end remote from the conduit so as to carry the cut fiber away from the cutting machine and along the length of the chamber at a velocity less than the conduit velocity.

2. Apparatus according to claim 1, wherein the conduit discharges downwardly into the chamber and the chamber extends away from the conduit in a generally horizontal direction.

WILLIAM IVAN TAYLOR.
ALBERT HERBERT WOODRUFF.