

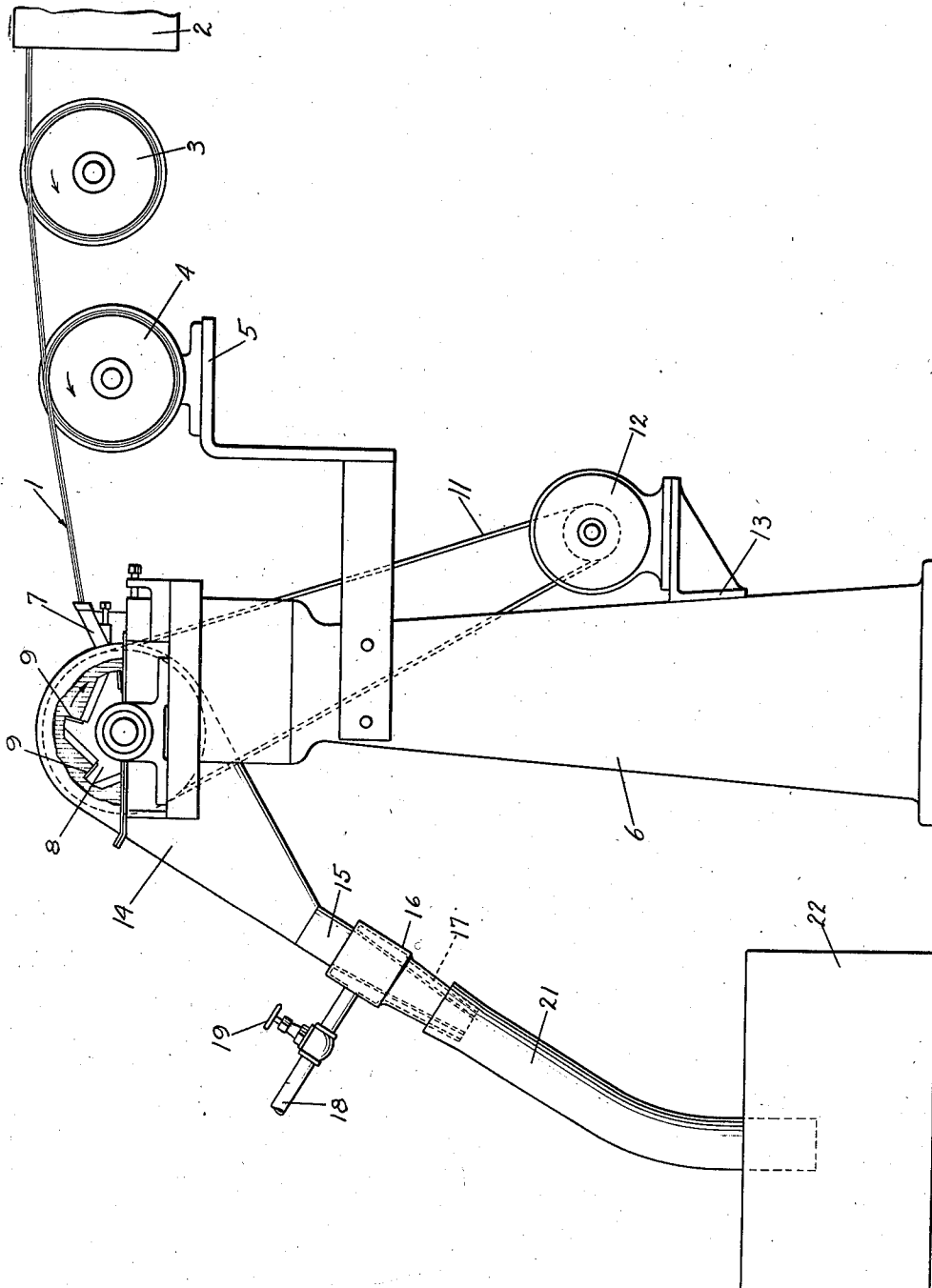
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W. WHITEHEAD ET AL

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APPARATUS FOR OPENING STAPLE FIBERS

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INVENTORS
WILLIAM WHITEHEAD
ALBERT W. KEIGHT

BY *J. S. Kelly* *W. J. Thomson*
ATTORNEYS

UNITED STATES PATENT OFFICE

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APPARATUS FOR OPENING STAPLE
FIBERSWilliam Whitehead and Albert W. Keight, Cum-
berland, Md., assignors to Celanese Corpora-
tion of America, a corporation of Delaware

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1 Claim. (Cl. 19—66)

This invention relates to the production of short lengths or staple fibers from artificial threads or filaments and relates more particularly to the method of and apparatus for opening the fiber to facilitate subsequent textile operations in the manufacture of "spun" yarn.

It is an object of this invention to provide means for opening the fiber immediately following the cutting of the filaments or threads into short lengths.

A further object of this invention is to provide means for opening the fiber by means of air, gas or other fluid under suitable pressure.

Another object of this invention is the provision of means for subjecting the freshly cut short lengths to the action of a blast of air, which blast of air not only opens up the fiber but performs the additional function of drawing the cut staples away from the cutting device. Other objects of the present invention will appear from the following detailed description.

In the production of spun yarn from short lengths or staple fibers made from artificial filaments or threads, it is practically impossible to form a lap from these staples in the normal manner. This is due to the fact that the filaments or threads are led to the cutting machine in the form of rather compact bundles, each bundle containing thirty or more filaments. After the filaments are cut into short lengths, the staples still retain the bundle effect and when it is attempted to build up a lap from these bundles of staples in the usual manner, it results in failure.

Heretofore, when it was desired to spin artificial silk staples, it was necessary to build the lap between layers of paper. This was a rather costly process as it involved the modification of the lapping machinery.

It was found that by subjecting the bundles of staples, preferably as they come from the filament cutting device, to the action of a blast of air or other suitable fluid the bundles are opened, the clots of staples are broken up and the fibers are fluffed up into greater volume. In this condition, the fibers are readily built up into a lap by the usual methods. Moreover, by this method of opening the staple fiber, the filaments or threads are not damaged as they are very apt to be when opened by well-known beater-arm opener used in opening cotton staples.

It was also found that the opened staple fiber is improved if it is treated with a suitable anti-static finish. This treatment, by reducing the tendency of the staple to become electrically

charged, makes it possible to handle the opened material more advantageously and with more uniform results. A finish which was found to be satisfactory in "deadening" the opened staple fiber comprises 100 parts of diethylene glycol, 30 parts of water and 10 parts of magnesium chloride. Variations may of course be made in the proportions of the various ingredients and other finishes having a similar effect may be substituted for the specific one enumerated above. The finish is preferably applied to the filaments, in any suitable manner, before the cutting thereof into short lengths.

It is to be understood that the cut and opened fiber may be delivered to a receiving box, or directly to a standard lapping machine or to a carding engine.

The staple fibers produced by the invention may be spun into yarns in the manner usually applied to staple lengths of natural materials, such as wool, cotton or spun silk, and for this purpose they may be spun alone or mixed with natural staple fibers or fibers of other artificial materials. For example, staple fibers of cellulose acetate or other organic derivatives of cellulose may be spun with staple fibers of viscose, nitrocellulose or cuprammonium silk or vice versa. The yarns may then be woven or knitted into fabrics or used for any other purpose.

In order further to illustrate the present invention, reference is had to the accompanying drawing wherein is shown the preferred embodiment of the invention.

The figure of the drawing is a side elevational view of a filament cutting machine showing the fiber opening device of the present invention attached thereto.

Referring to the drawing, threads of filaments generally indicated by the reference numeral 1 are drawn from a series of spinning machines 2 by means of a feed roller 3. While in the present embodiment, there is illustrated the production of staple fiber from artificial filaments continuously with their production, it is to be understood that the staple fiber may be produced from threads of filaments taken from any other convenient source.

The threads proceed from roller 3 to and around a second roller 4 which is supported on shelf 5 mounted on the base 6 of the cutting machine. The threads are then led from roller 4 through a feeding guide 7 into the path of the cutting device 8 which carries a series of cutter blades 9, the cutting device being rotated in any suitable manner, as by a belt 11 and a motor

12 supported on a bracket 13 secured to the base 6.

The length of the staple fiber cut may be varied by regulating the speed of rotation of the cutting device 8 with respect to the rate of feed of the filaments. The number of blades 9 may also be varied in accordance with the length to be cut.

The cutting device is covered by a hood 14 which is connected by a pipe 15 to a coupling member 16 which houses an air injector device 17. Compressed air is delivered from a suitable source to the injector device through a conduit 18 in which is mounted a cut-off valve 19. Also attached to the coupling member 16 is a discharge hose 21, the free end of which is set into a receiving box 22 for the staples. The cover of the receiving box is perforated to permit the escape of air and means may be provided in the bottom thereof to facilitate the removal of the staples therefrom.

In operation, air under a pressure of 100 pounds is delivered to the injector device. This causes a suction to be created in the hood and an air blast in the discharge hose. The cut bundles of staples are then drawn away from the cutting device and through the hood to the discharge hose. When the bundles pass by the mouth of the injector device, they are subjected to a blast of air which opens the bundles and clots of staples into individual filaments which are fluffed

up into an increased volume. The opened staples are propelled by the air blast to the receiving box where they are collected and the air allowed to escape. By allowing the air to escape, the opened staples are not subjected to the strobic action of the air draft which would be antagonistic to the retention of the open fleecy character of the material as deposited from the discharge hose.

What we claim as new and desire to secure by Letters Patent is:

In apparatus for the manufacture of spun yarn from staple fiber made from continuous filaments, the combination with a device for cutting the filaments into staples to the desired length and means for delivering bundles of continuous filaments to said cutting device, of an unobstructed closed conduit cooperating with said cutting device, means for delivering the cut staples to the conduit, and means comprising an annular nozzle, positioned in said conduit at a substantial distance from said cutting device, for forcibly introducing into said conduit a blast of air directed substantially parallel to and in the same direction as the motion of the bundles, said blast of air being adapted to open the fiber and forward it through the conduit to a collecting box.

WILLIAM WHITEHEAD.
ALBERT W. KEIGHT.