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C. F. TOPHAM ET AL

2,149,197

MANUFACTURE AND PRODUCTION OF STAPLE FIBER

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Fig. 1.

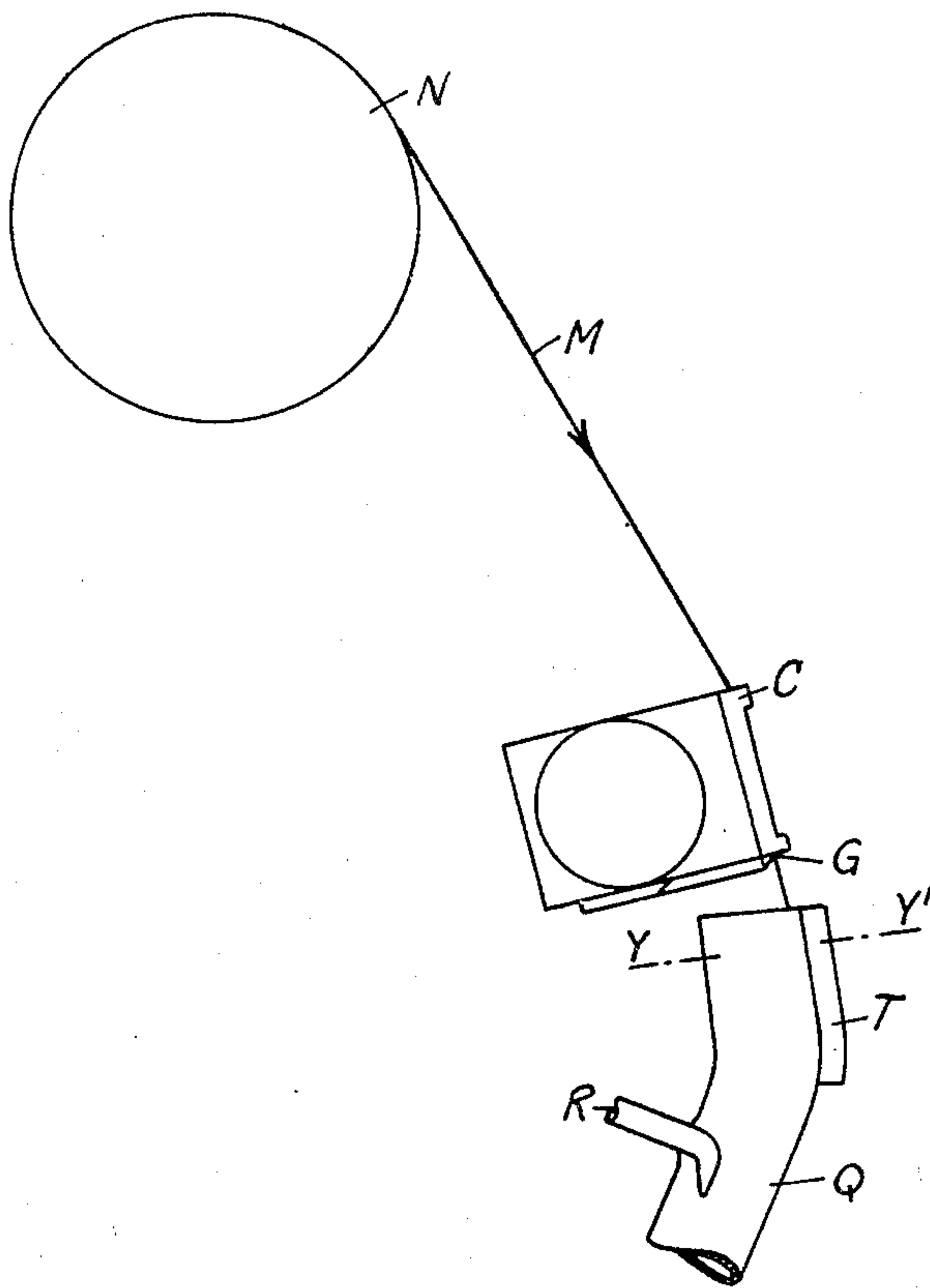


Fig. 4.

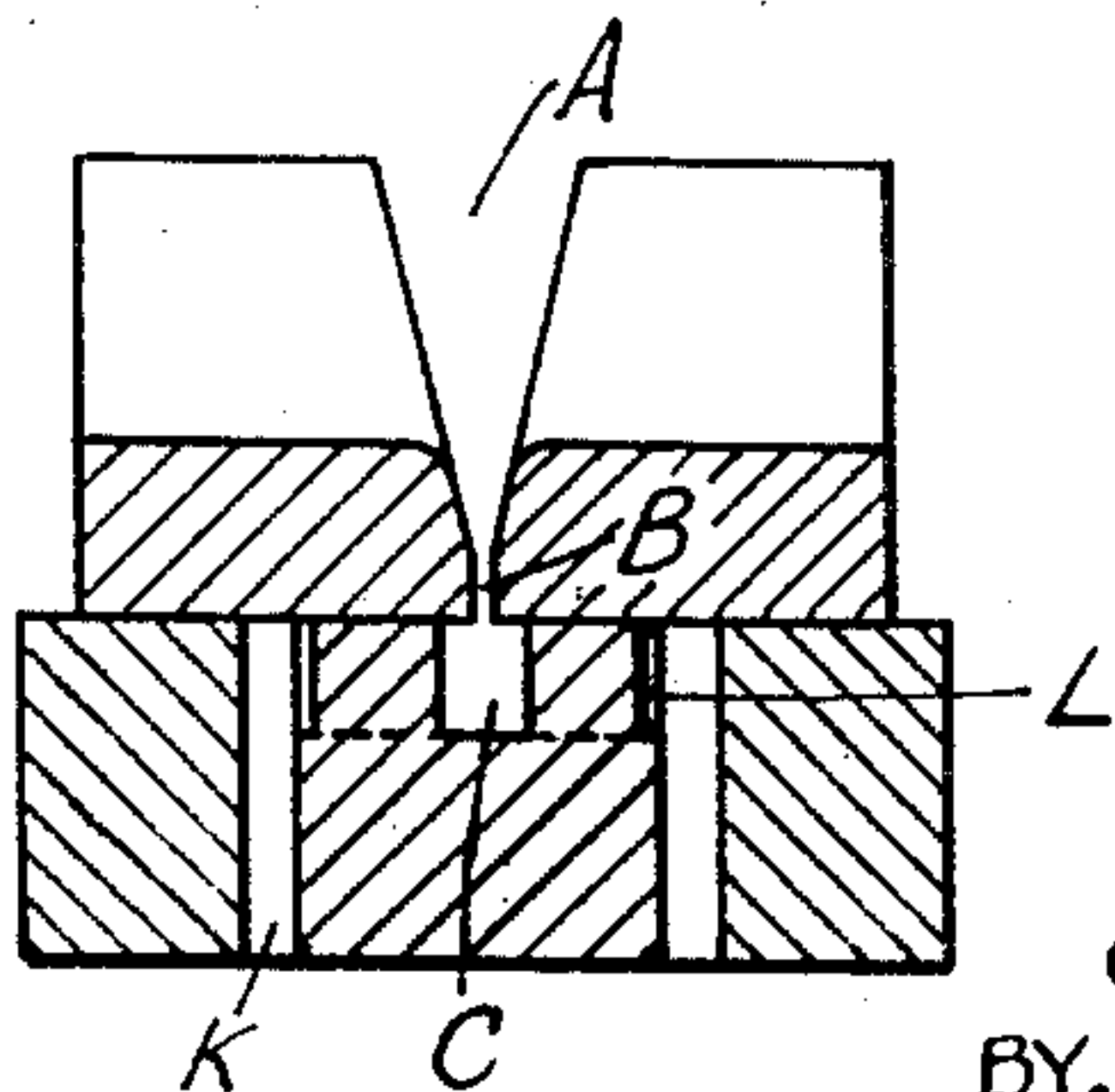
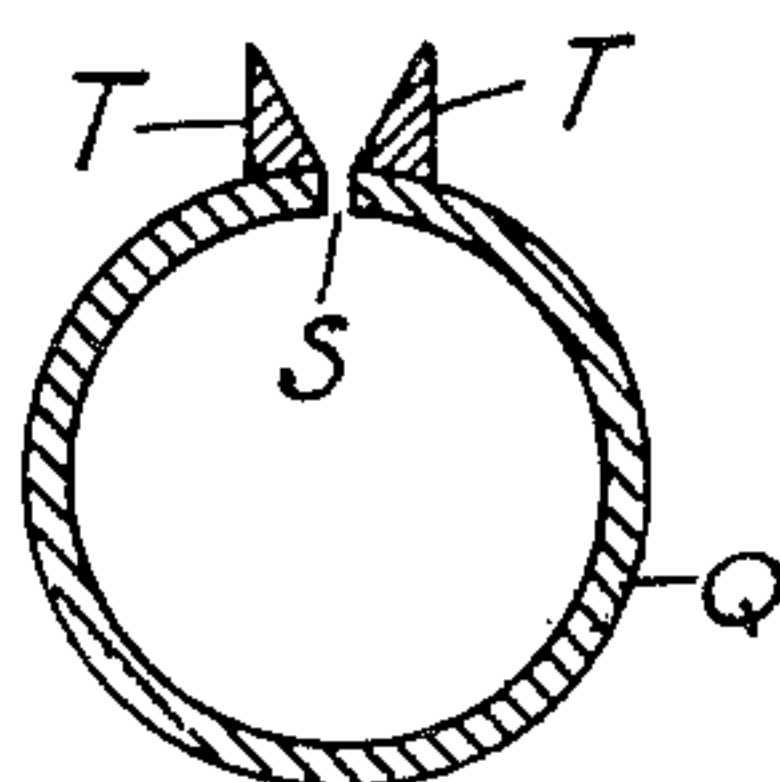


Fig. 5.



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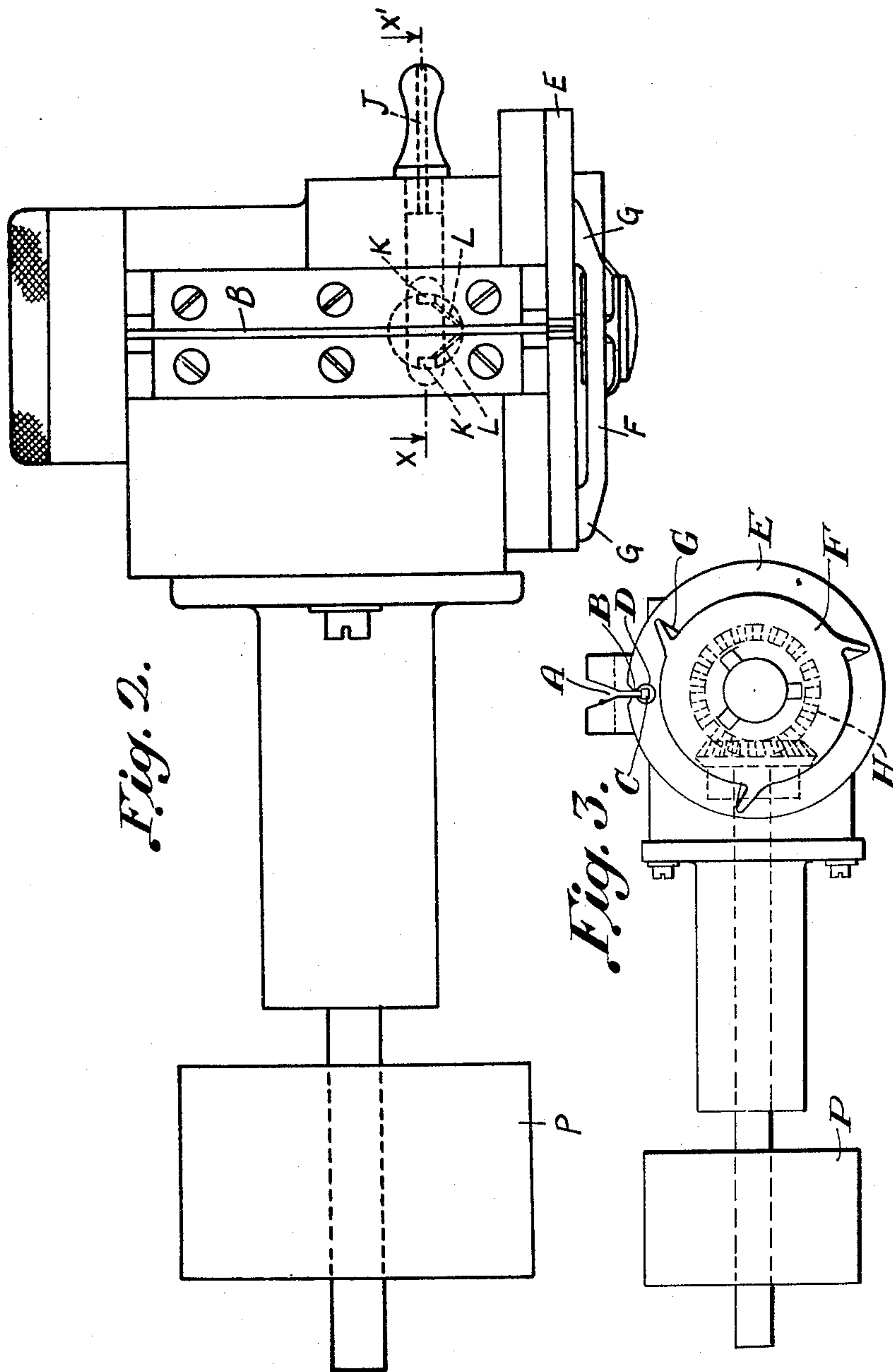
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,149,197

MANUFACTURE AND PRODUCTION OF
STAPLE FIBER

Charles Fred Topham, deceased, late of Coventry,
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ited, London, England, a British company

Application January 16, 1937, Serial No. 121,028
In Great Britain January 17, 1936

2 Claims. (Cl. 19—1)

This invention relates to a new and improved process and apparatus for cutting into short lengths a continuous filament or bundle of filaments which will hereinafter be referred to as a thread.

According to this invention one or more threads are led along a narrow tube or conduit hereinafter referred to as a tube, which is provided from the beginning to the end thereof with a narrow slot, while at the end is situated a rotating cutter which cuts the thread into short lengths. The thread shortly before it enters the tube passes over one or more positively driven rollers, which impart to it a constant speed of travel. The passage of the thread through the tube is assisted by means of a fluid current, as for example of air or water, led into the tube and preferably introduced in two or more portions. These currents of fluid may conveniently be introduced into the tube at some distance from the beginning thereof, for example two thirds of the length in the case of air and a third of the length in the case of water, so that the fluid and the thread travel together for part of the length of the tube. The currents of fluid are also preferably led into the tube at an angle approximating to the direction of flow subsequently desired in the tube. The rotary cutter may conveniently comprise three blades which press against the end surface of the tube and cut the thread as it emerges.

The narrow slot along the length of the tube enables the thread to be introduced easily when starting up the process.

The process and apparatus according to this invention are particularly useful for cutting a dry continuous thread, such for example as a cellulose acetate thread, when the thread emerging from the spinning cell is first wound on to an intermediate roller or waste roller. According to this invention, a loop of the thread may be drawn out, for example by running it round a finger, and one part of the travelling loop led in a direction parallel with the tube through the slot into the interior of the tube. The loop is immediately cut by one of the knife blades, and the receding part of the loop is wound up on the roller, while the oncoming thread is blown forward by the current of gas down the tube so that it is continually fed towards the cutting blades.

The cut filaments may conveniently be conveyed along a broader tube commencing immediately below the cutter, a current of gas being introduced into this broader tube in order to cause the filaments to move along it. It is also

convenient to impart to this lower tube a slight bend at a short distance from the rotating cutter, and to provide the tube as far as the bend with a slot which is in a line with the slot of the narrow tube down which the thread passes to the cutter. The slot in the broader tube also assists in the introduction of the thread when starting the process. The further end of the broader tube may lead into a bag or cage or other device suitable for collecting the cut filaments.

If desired, two or more narrow tubes, each provided with a slot, may be employed side by side, and a thread passed along each such tube, so that the rotating blade cuts these threads consecutively. This arrangement presents certain advantages, since it is easier for the blade to cut several thinner threads consecutively than one thicker thread.

When the process and apparatus according to this invention are applied to cutting a thread produced by the dry spinning process, air is conveniently used as the fluid for assisting the passage of the thread through the tube. If, however, a thread of regenerated cellulose obtained by the wet spinning process is being cut it is convenient to assist the thread in its passage through the tube by a stream of water or in the case of threads from viscose, preferably a stream of dilute acid introduced at a distance of about a third of the way from the beginning. The wet threads after being cut by the rotating knives are carried away and given the usual after-treatment.

The invention will be further described with reference to the accompanying drawings which illustrate an example of the apparatus according to this invention, but the invention is not limited to the particular example shown.

Figure 1 is a side view on a small scale showing how the thread is led from the delivery device through the cutter to the broad tube, Figure 2 is an elevation of the cutter, Figure 3 is a view of the cutter from the underside, Figure 4 is an enlarged section of the thread channel taken across the line X—X¹ of Figure 2 and Figure 5 is an enlarged section taken across the line Y—Y¹ of Figure 1.

The thread M which has been produced by a dry spinning process is introduced by means of the wheel N at a constant rate into the thread channel A through the narrow slot B into the tube C. A current of air is introduced through a pipe J into a receiving slot which directs it through two perpendicular channels K into two grooves L leading at an angle into the tube C.

The tube C is composed of two portions, the upper and longer portion being rectangular in shape while the lower portion D contained in the base plate E is of circular cross section. The current of air carries the thread down the tube C through the hole D in the base plate E against which press the three blades G, of the rotating cutter F. The cutter is driven by a bevel wheel drive H by means of a pulley P.

10 The cut thread then passes into the broader tube Q and is led away to a bag or other collecting device, its motion being preferably assisted by means of a current of air introduced through the pipe R. The tube Q is provided for a short distance from commencement thereto with a slot S and two cheeks T are provided to enable the running loop of the thread to be led into its position in the tube C at the commencement of the run.

20 What is claimed is:

1. Apparatus for use in the manufacture and production of staple fiber, comprising a tube provided along its whole length with a narrow slot

through which a bundle of continuous filaments is introduced into the tube, a rotary cutter, the blades of which move perpendicularly to the axis of the tube and press against one end thereof, and means for passing a current of fluid along at least a part of the tube to assist the passage of the bundle of filaments along the tube to the cutter.

2. In combination with apparatus as claimed in claim 1, a broader tube provided with a longitudinal slot for at least a part of its length, the end of the said tube being situated in close proximity to the rotary cutter, so that the thread, after having been cut passes along the said broader tube.

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