To all whom it may concern:

Be it known that I, WILHELM ROTH, a subject of the King of Prussia, residing at Reichenbach, Silesia, in Germany, have invented certain new and useful Improvements in Apparatus for Producing Cotton-Waste, of which the following is a specification.

The manufacture of cotton-waste for cleaning engines in commercial form has been effected hitherto by feeding the raw material to a pair of rotary cylinders provided with prongs. When the cylinders have taken up sufficient material between the prongs, they are stopped, and the material in the form of a fleece having a width equal to that of the machine and a length equal to the circumference of the cylinders is drawn off and in this form is the finished cotton-waste.

Another method of obtaining cotton-waste consists in passing the raw material through a machine of the nature of a carding machine and winding the whole of the fabric that is run off on a roller or spool in the form of a wide fleece ready to be used in trade.

Both methods have a similar disadvantage in that cotton-waste in sheet or fleece form or in the lap form is not convenient for use. Before the fleece is used it must be torn into the different desired portions, whereby the material acquires an unpleasant appearance and there is considerable waste in the places where the division is effected.

The first mentioned process has the further disadvantage that the cylinders cannot work continuously, but every time the teeth are full must be stopped together with the whole mechanism, drawn off and again set in motion. With this process also, as regards the quality of the material and the output of the machine far too much depends on the reliableness of the worker in charge of the machine.

According to this invention the disadvantage that is common to both methods is obviated by the cotton-waste being twisted or twined into a rope-like form. In the shops where the waste is divided in portions for consumption it is only necessary to separate pieces of the necessary length from the rope-like material, which may be of any preferred length and which, in accordance with the invention may be piled up in spiral form for shipment. In consequence of the rope-like form the consistency of the material is permanently assured even when further conveyed to the actual place of consumption and thereby the loss of waste avoided. As the material is in form of an endless rope, in bales or the like, it can be easily taken for use in the simplest and in a continuous manner by twisting or tearing off the rope at the desired place of division. Moreover a division into uniform portions as required for the economical use of the cotton-waste can be effected simply by measurement without any troublesome work and loss of time in weighing it off. In this way also the unavoidable formation of waste when dividing in portions by weighing is prevented.

The process of producing such a rope-like body is continued from one of the two previously mentioned processes by means of which a flat fleece of the width of the working width of the machine is obtained from the raw material. The re-forming into a rope-shape and piling up connected therewith are effected automatically, the fleece being first formed as a band of approximately circular or square section, this band of different threads or groups of threads being drilled, a simultaneous pull being effected in the direction of the length of the band and being finally conveyed to a place of deposit in which the rope is piled up spirally. The rope-forming process is suitably effected by means of guide surfaces which consist of fixed and movable parts, or by guide rollers, in combination with roller-squeezing mechanism, the turning on the other hand being effected by twisting mechanism, in which a system of rollers that simultaneously feeds the material forward and turns it is arranged, to which the band is conveyed suitably by means of appropriate conveying apparatus.

Figure 1 is a side elevation, partly in section, of the machine. Fig. 2 is a plan view of the machine. Fig. 3 is a vertical section of the twisting mechanism. Fig. 4 is a plan view of the twisting-mechanism. Fig. 5 is a front elevation of the guiding and folding device. Fig. 6 is a section on line 1—1 of Fig. 5.

Referring more particularly to said drawings in Figs. 1 and 2, a indicates the taking-off cylinder in a type of carding machine, which is provided with prongs not shown in the drawing and takes the fleece from the drum b over the whole width of the
machine. This fleece is removed from the cylinder \( a \) by two drawing off cylinders \( c \) and comes on to guide surfaces or drawing trumpets \( d \). Their actual form is best seen in Figs. 5, and 6. The fixed part \( d \) forms a concave winding surface that tapers downwardly and as shown in the section through 1—1 is provided with two guide ridges \( d' \) and has bent edges or rolling-in guides \( d'' \) which are partially movable. These movable parts \( d'' \) are formed for example by flaps which are reciprocated by cam-disks \( d'' \). By these devices the fleece is gradually changed from the flat fleece into a strand of approximately square or circular cross section by rolling-in the edges. In this form the strand comes between a pair of pressing and guiding rollers \( e \), which, if necessary may be grooved for the purpose of assisting in producing the said cross-section. After leaving the pair of rollers the material is further conveyed to an obliquely mounted conveyer band \( g \), which conveys the strand of cotton-waste to the feeding-rollers arranged in the twisting mechanism \( h \), (Fig. 1).

The twisting mechanism (Figs. 3 and 4) consists of a bearing \( i \), in which a hollow shaft \( k \), works that is set in rotation by the belt-pulley \( o \), and is provided on its lower end with a plate \( l \) on which the bevel wheel \( m \) is mounted by means of the parts \( n \). When the surface-plate is rotated the bevel-wheel \( m \) rolls down on a second bevel-wheel \( w \) that is firmly connected with the bearing \( i \) and is thus axially rotated, the rotary motion being transmitted by tooth wheels \( p, q \) and \( r \) to the conveying rollers \( a \), which are situated below the boring of the hollow shaft and being thus driven by the belt pulley \( o \) are rotated around their own longitudinal axes as well as around the longitudinal axis of the hollow shaft.

In order that the rollers may be able to hold the material as firmly as possible they are grooved and moreover provided with pressing springs \( t \), by which they are pressed one against the other.

The strand which has entered the twisting mechanism at the upper end of the hollow shaft, and the different threads of which or groups of threads run substantially parallel, and rectilinearly are subjected by the pair of rollers \( s \) to longitudinal tension and to a turning action which can be adjusted to any desired degree by varying the rotary speed. The rope thus produced passes from the twisting mechanism into a drum \( u \) which is mounted in a step-bearing \( v \) and is rapidly rotated axially in any manner (not shown). The speed of the drum can be varied from that of the twisting mechanism. Thus the drum running quickly or more slowly effects a piling up of the material in right or left spiral lines. The rotation of the drum \( u \) coaxially with the twisting mechanism is necessary in order that the twisting of the rope effected in the twisting mechanism may not be again stopped. By this rotation and the different speed of the same in relation to the twisting mechanism, moreover, a complete filling of the drum is automatically effected in consequence of the centrifugal force generated, the outermost layer being piled up as shown in the drawing, then follow the next layer continuously toward the middle of the drum. Thus in this manner an extremely tight piling up of the material is likewise effected.

What I claim as my invention is:

1. A machine for forming twisted waste, comprising in combination, a carding drum and a take-off cylinder, a drawing trumpet for receiving and rolling the fleece from the full width of the take-off cylinder into a strand, a twisting mechanism for twisting said strand rolled by said drawing-trumpet, means for delivering the strand from said drawing-trumpet to said twisting mechanism and a means for piling the rolled and twisted fleece.

2. A machine for forming twisted waste, comprising in combination, a carding drum and a take-off cylinder, a drawing trumpet for receiving and rolling the fleece from the full width of the take-off cylinder into a strand, a twisting mechanism for twisting said strand rolled by said drawing-trumpet, means for delivering the strand from said drawing-trumpet to said twisting mechanism and a rotary drum for receiving and piling the rolled and twisted fleece.

3. A machine for forming twisted waste, comprising in combination, a carding drum and a take-off cylinder, a drawing trumpet for receiving and rolling the fleece from the full width of the take-off drum, compacting ribs formed longitudinally in said trumpet for shaping and packing the fleece into a strand, a twisting mechanism for twisting the strand rolled by said drawing trumpet, means for delivering the strand from said drawing-trumpet to said twisting mechanism and a means for piling the rolled and twisted fleece.

In testimony whereof I affix my signature in presence of two witnesses.

WILHELM ROTHET.

Witnesses:

HENRY HASKER,
WOLDEMAR HAUPT.