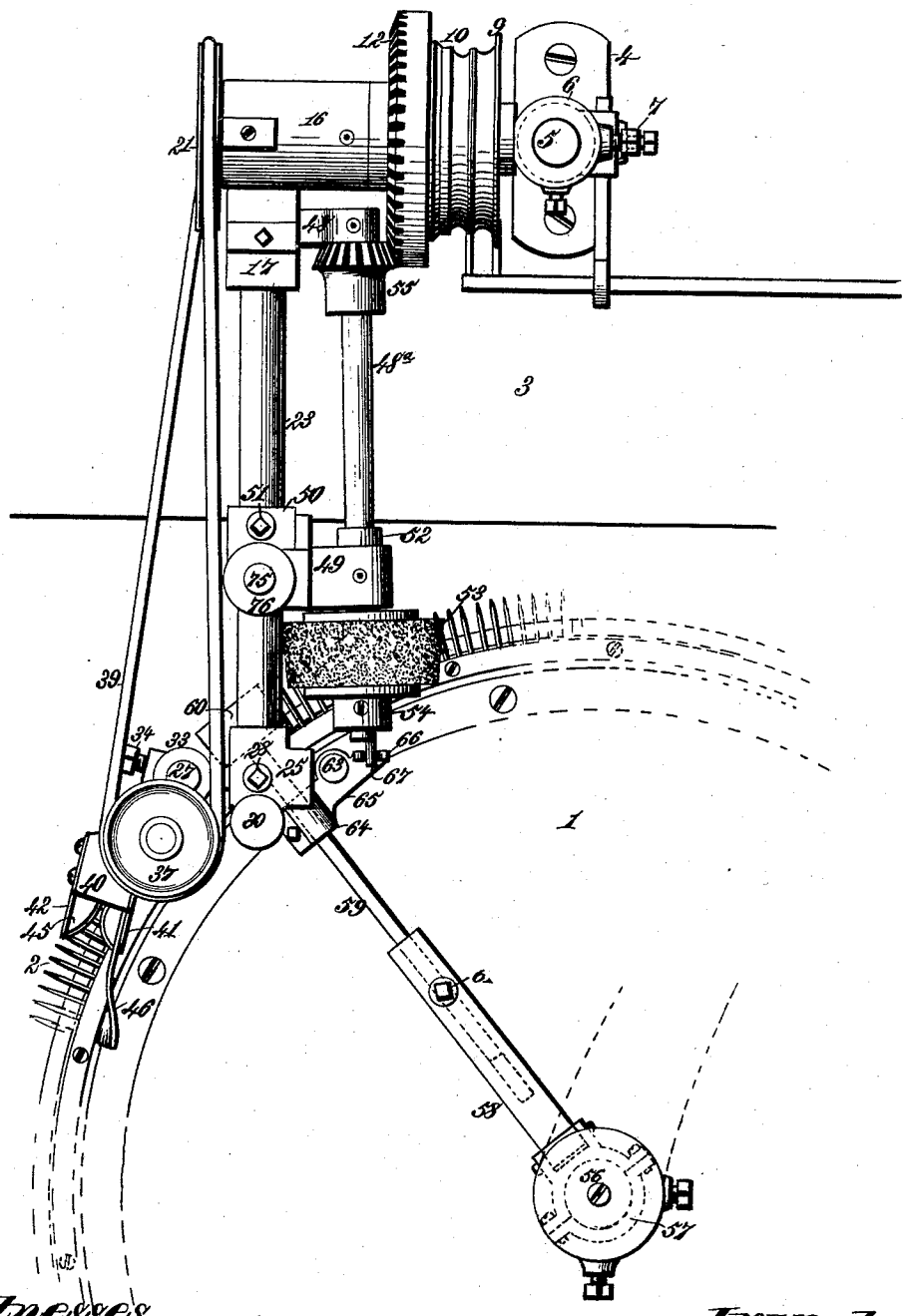
(No Model.) 4 Sheets—Sheet 1.

N. H. BRUCE.

TRIMMING AND BRUSHING ATTACHMENT FOR TURNING OFF MACHINES.

No. 409,557. Patented Aug. 20, 1889.

Fig. 1.



Witnesses.
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Dennis Lumby

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(No Model.) 4 Sheets—Sheet 2.

N. H. BRUCE.

TRIMMING AND BRUSHING ATTACHMENT FOR TURNING OFF MACHINES.

No. 409,557 Patented Aug. 20, 1889.

Fig. 2.

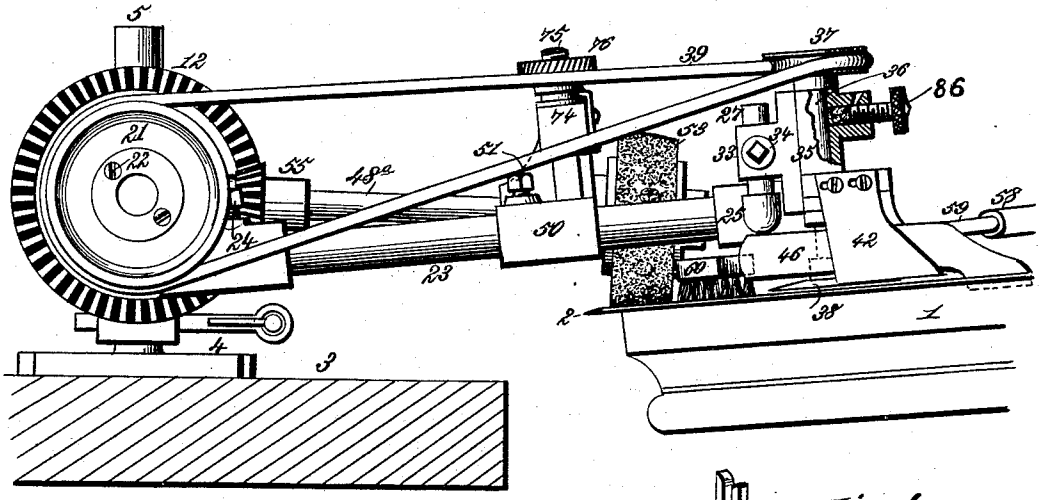


Fig. 4.

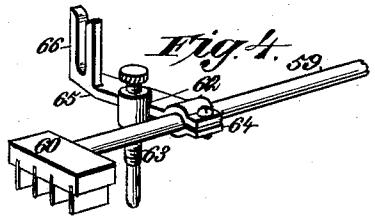


Fig. 3.

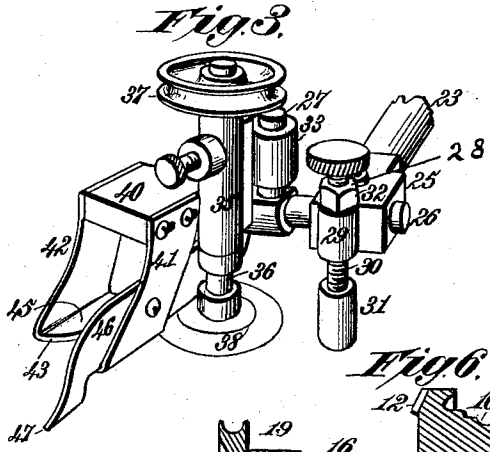


Fig. 5.

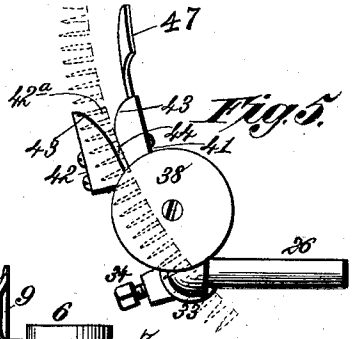
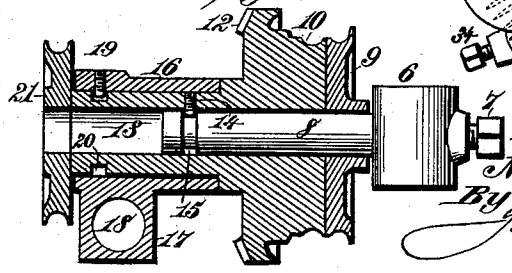


Fig. 6.



Witnesses.
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(No Model.) 4 Sheets—Sheet 3.

N. H. BRUCE.

TRIMMING AND BRUSHING ATTACHMENT FOR TURNING OFF MACHINES.

No. 409,557. Patented Aug. 20, 1889.

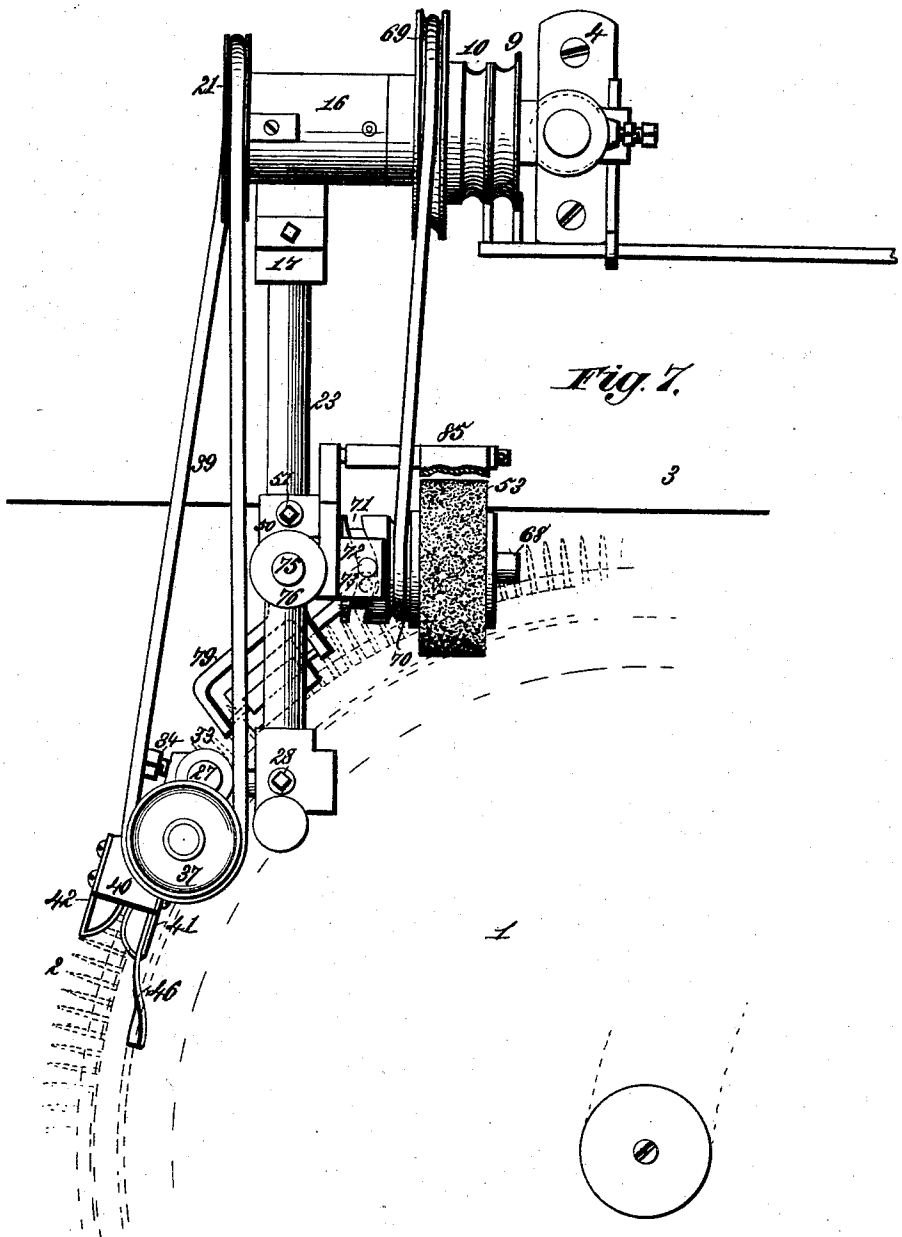


Fig. 7.

Witnesses.
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(No Model.) 4 Sheets—Sheet 4.

N. H. BRUCE.

TRIMMING AND BRUSHING ATTACHMENT FOR TURNING OFF MACHINES.

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Fig. 8.

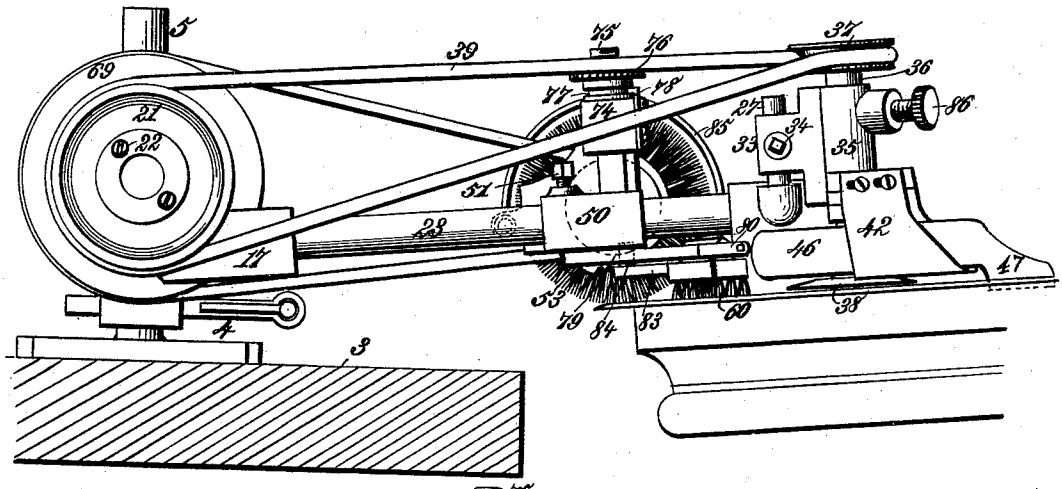
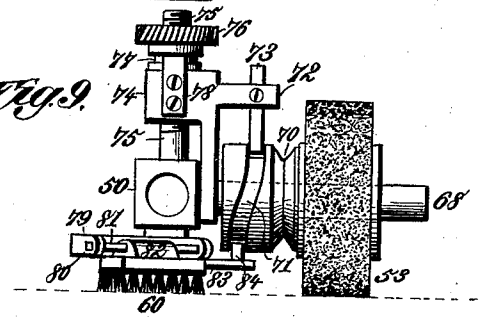


Fig. 9.



Witnesses.
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UNITED STATES PATENT OFFICE.

NORMAN H. BRUCE, OF WATERFORD, NEW YORK.

TRIMMING AND BRUSHING ATTACHMENT FOR TURNING-OFF MACHINES.

SPECIFICATION forming part of Letters Patent No. 409,557, dated August 20, 1889.

Application filed June 8, 1888. Serial No. 276,476. (No model.)

To all whom it may concern:

Be it known that I, NORMAN H. BRUCE, a citizen of the United States, residing at Waterford, in the county of Saratoga and State of New York, have invented new and useful Improvements in Trimmer and Brusher Attachments for Turning-Off Machines, of which the following is a specification.

My present invention relates to that class of mechanism generally known as "cylinder turning-off machines," for uniting the edges of knitted fabrics or for securing the "ribs" to the sleeves and legs of undershirts and drawers; and it consists in certain improvements upon the inventions shown and described in applications for Letters Patent filed by me upon the 1st and 3d days of March, 1888, and numbered in serial respectively 265,821 and 266,065.

In my application filed March 1, 1888, Serial No. 265,821, I show a mechanically-driven rotary brush combined with a turning-off machine, together with means for imparting a vibratory or reciprocatory movement to said brush in conjunction with its rotary movement. I also provide means for adjusting the brush relatively to the points of the turning-off machine. In the application filed by me March 3, 1888, numbered in serial 266,065, and which has now become a patent, dated October 30, 1888, No. 392,005, I show an automatic trimming and brushing attachment for turning-off machines whereby the impaled fabrics are cut or trimmed and their edges cleansed by automatic mechanism. In my application filed June 8, 1888, Serial No. 276,476, I show a cutting or trimming and a brushing attachment for turning-off machines, wherein the fabrics are guided to the single cutter and there trimmed by means substantially similar to those shown in my application, Serial No. 286,370, filed September 25, 1888, and wherein also are shown a rotary brush and means for giving vertical and lateral adjustment thereto, together with an auxiliary reciprocating brush. I therefore make no claim in this application to any feature or features shown in any of the aforesaid applications.

In mechanism of this type it is customary to place the fabric forming the ribs upon the points of the turning-off cylinder, a "slack-course" being formed therein in the manufacture of the fabric to guide the operator and enable him or her to impale a continuous series of loops upon the fringe of points projecting from the ring. The sleeve or leg portion is then impaled upon said points in a similar manner and is pushed up against the ribs, a marginal portion of both fabrics projecting above the points. The projecting edges are then trimmed off, either by hand or by automatic mechanism, the cut being made so close to the points upon which the fabrics are impaled as to sever the line of stitches interlocking with the series of loops impaled by the said points, thereby leaving a short piece of yarn lying in each of said loops. Before the fabrics are united by the stitching mechanism it is essential that these short fragments of yarn, together with the adherent fibrous material generally produced by the use of automatic cutters, should be carefully removed, and for this purpose it has been customary to apply a brush of strong bristles, by the manual operation of which the desired result was effected. This method, however, not only involves time, labor, and expense, but in closely-knitted fabrics severe and protracted use of the hand-operated brush will not always clean the edges properly. Moreover, the prolonged use of the brush rapidly wears away the brass of the point-plate and necessitates its frequent renewal, thereby entailing considerable expense upon the manufacturer, besides the delay, annoyance, and interruption of work. Moreover, the manual application of the brush, unless made by a skilled expert, is very liable to effect an imperfect removal of the pieces of yarn or to remove them from some portions of the edge and not from others.

It is essential in this class of mechanism that the fabrics be severed or trimmed off as close to the points as is consistent with the perfect integrity of the loops impaled thereon. This work, it is evident, can only be accomplished rapidly and perfectly by automatic mechanism.

It is the purpose of my present invention to provide an attachment for cylinder turning-off machines in which suitable guides and

supports for these portions of the fabrics to be severed shall be combined with a cutter operating upon the fabrics as the turning-off ring is advanced, whereby the said fabrics are severed with perfect accuracy upon a uniform line of cut.

It is my purpose, also, to combine with the supporting and cutting devices simple means whereby both vertical and lateral adjustment of an extremely delicate and accurate character may be given to said devices. This portion of my invention comprises also a lifting and guiding plate combined with the cutter-head whereby the edges of the fabrics which usually drop inward upon the turning-off ring are raised and directed between the guiding and supporting jaws, by which they are conducted to the cutter.

It is my further purpose to combine with an attachment for turning-off machines of the character described, a mechanically-driven rotary brush acting upon the severed edges of the fabrics, and to interpose between said brush and the cutting mechanism an auxiliary brush or equivalent device whereby the short fragments of yarn lying in the loops impaled on the points of the turning-off ring are loosened and partly disintegrated before they are subjected to the action of the rotary brush by which they are removed, and the edges of the fabrics thoroughly and uniformly cleansed.

It is my purpose, also, to simplify and improve the construction and operation of the brushing mechanism and the means whereby the same is adjusted relatively to the turning-off cylinder, and to provide simple devices whereby the auxiliary brush may be driven and its position properly adjusted with relation to the turning-off ring.

To these ends the invention consists in the several novel features of construction and new combinations of parts hereinafter fully described, and then definitely pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view showing part of the turning-off cylinder combined with the cutting and brushing attachment. Fig. 2 is a partial side elevation of the parts shown in Fig. 1. Fig. 3 is a detail perspective of the cutter-head, showing the guides or supports, the cutting devices, and the several means of adjustment thereof. Fig. 4 is a detail perspective of the intermediate auxiliary brush, showing one form of device for imparting movement thereto. Fig. 5 is a detail bottom plan view of the supporting and cutting devices. Fig. 6 is a longitudinal section of the driving-shaft and pulleys forming part of my attachment. Fig. 7 is a plan view showing a slightly-modified construction. Fig. 8 is a side elevation of the parts shown in Fig. 7. Fig. 9 is a detail front elevation of the block carrying the auxiliary brush, the rotary brush, and the devices supporting the latter, and means for giving lateral reciprocation thereto.

The reference-numeral 1 in said drawings designates the bed-plate of a turning-off machine of the usual construction, having a cylinder provided with a fringe of points 2 projecting therefrom an intermittent or step-by-step movement being imparted to the cylinder or ring by the means usually employed in this class of mechanism. Inasmuch as this portion of the apparatus forms no part of my present invention and is well known to those familiar with the art, no specific description or complete illustration thereof is essential in this application, and I have shown so much thereof only as will be required for a clear understanding of the present invention.

Mounted upon any suitable support 3 arranged near the turning-off ring is a bed-plate 4, having an upright 5, upon which is mounted a vertically-adjustable sleeve 6, held at any suitable point by a set-screw 7, tapped through the sleeve and bearing against the upright. From the sleeve 6 projects a horizontal stud 8, carrying the driving mechanism by which movement is imparted to the several elements of the cutting and brushing attachment. This driving mechanism consists of the following parts: Upon the stud 8 is first slipped a loose pulley 9 which lies adjacent to the sleeve 6. The driving-pulley 10 is then mounted, turning freely on the stud and lying against the outer vertical face of the loose pulley. Cast with the driving-pulley or rigidly attached thereto is a miter-gear 12, upon which is formed or mounted a sleeve 13, embracing the stud 8, said sleeve and the parts connected therewith being held in place by a threaded pin 14, tapped through the sleeve and having its point running in a circumferential groove 15 in the stud. (See Fig. 6.) Upon a diminished portion of the sleeve 13 is mounted an outer sleeve 16, carrying a bracket 17, the latter provided with a circular aperture 18, and the sleeve 13 rotates freely within this outer sleeve, the latter being retained in place by a threaded pin 19, tapped through it with its point lying in a channel 20 in the surface of the inner sleeve. A pulley 21 is rigidly secured upon the outer end of the sleeve 13 by means of screws 22, passing through the pulley into the end of said sleeve, or in any other suitable manner.

Mounted in the circular aperture 18 of the bracket 17 is an arm 23, held against longitudinal and axial movement by a set-screw 24. Upon the free end of this arm is formed a head 25, having an opening which receives a horizontal arm 26, having upon its end a vertical arm 27. A set-screw 28, tapped through the head 25 and bearing on the arm 26, permits a longitudinal and axially or rotary adjustment of said arm. Upon the front face of the head 25 is formed a boss 29, through which is tapped a screw 30, having a milled head and shod at its lower end by a nipple 31, which rests upon the bed-plate of the turning-off machine and supports the cutter-head at the point to which the screw 30 is adjusted.

A jam-nut 32 may be added to prevent the accidental displacement of the screw. Upon the vertical arm 27 is slipped a sleeve 33, held at any suitable point by a set-screw 34. Upon this sleeve is formed the tubular bearing 35, which receives a shaft 36, having at its upper end a pulley 37 and at the lower extremity a cutting-disk 38. The cutter is driven by a belt 39 from the pulley 21 on the end of the sleeve 13.

Cast upon the tubular bearing 35 is a block 40, projecting at right angles or nearly so from the side thereof. Upon the opposite parallel edges of this block are mounted laterally-yielding elastic plates 41 and 42, preferably formed of steel. These plates drop from the point of attachment to the horizontal plane of the upper surface of the cutting-disk 38, at which point they are bent inward and their lower faces brought flush. The adjacent edges 43 are cut away to form a converging entrance 42^a, leading to a narrow channel 44, the direction of which conforms to the curvature of the turning-off ring, as shown in Fig. 6, the edges 43 forming said channel or guideway being beveled off on their upper adjacent angles to give a degree of sharpness to the same. The inwardly-bent portions of the elastic plates constitute jaws 45, adapted to spring or yield to and from each other and which lie close down to the points of the turning-off ring, and the cutter 38 revolves just beneath said portions, its cutting-edge crossing the rearward end of the channel 44, as shown in Fig. 5.

Upon the inner one of the two plates 41 is mounted a guide-plate 46, projecting in front of the supporting-jaws 45, its upper edge being inclined, Figs. 2 and 8, to taper the plate down to a point 47, which is slightly curved toward the axis of the turning-off ring upon which it rests.

Projecting laterally from the bracket 17 is a boss 48, which furnishes a bearing for the end of a shaft 48^a, the latter receiving a second bearing in a boss 49, carried by a sleeve 50, adjustable upon the arm 23 and held thereon by a set-screw 51. A collar 52 on the shaft 48^a lies behind the boss 49 and holds the shaft in place. Upon the outer end of said shaft is mounted a rotary main brush 53, formed of stiff bristles, wire, or other suitable material, acting upon the trimmed edges of the fabrics in a plane of rotation which may be either a tangent to or a secant of the point-carrying ring, as shown in Fig. 1. A collar 54 is clamped upon the outer end of the shaft to hold the brush in place, and said shaft is driven by a miter-gear 55, mounted thereon and meshing with the miter-gear 12.

Upon the axis 56 of the turning-off machine is mounted a split ring 57, between the ends of which is pivoted a shank 58, having a longitudinal bore receiving a spindle 59, upon the free end of which is mounted a supplemental or auxiliary brush 60, composed of bristles, wire, or flexible scraper-plates, as circumstances may require. The spindle 59 is adjustable longitudinally or radially with relation to the turning-off ring, and is held at any desired point by a clamping-screw 61. Upon the spindle 59 is formed or mounted a boss 62, through which a set-screw 63 is tapped, its lower end resting upon the turning-off ring, whereby the brush may be raised and lowered with relation to the severed edges of the fabric traveling beneath it. Embracing the shank 59 is a clip 64, having an arm 65, upon which is mounted a vertical fork 66, with which a crank-pin 67 upon the end of the shaft 48 engages. By the rotation of said shaft the brush 60 will be vibrated or reciprocated through a short arc of the turning-off ring, and will act upon the cut edges of the fabric after the latter leave the cutter and before they reach the rotary brush 53, loosening and partially disintegrating the short fragments of yarn held by the loops impaled upon the points 2 and produced by severing said fabrics close to the impaled loops. I may mount the rotary brush upon a stud 68, carried by the sleeve 50, mounted on the arm 23, and in this form of construction the axis of rotation of the rotary brush will be nearly at right angles with the points of the turning-off ring as the said points arrive beneath the brush, as shown in Fig. 7. This form of brush will be driven by a pulley 69, which will be substituted in place of the miter-gear 12, said pulley being geared with a pulley 70 on the brush-head. I also impart to this brush a lateral reciprocation in combination with its rotary movement, and for this purpose I form a cam-race 71 in the brush-head, and form a bracket 72, rising from the sleeve 50, I drop a pin 73, which engages therewith. As the brush-head rotates, a lateral reciprocation will be given thereto upon the stud 68. The bracket 72 is carried by a sleeve 74, mounted upon a post 75, rising from the sleeve 50, Fig. 8, and this post is threaded to receive a thumb-nut 76, having a circumferential channel or slot 77, with which the bent end of a plate 78, rigidly mounted on the sleeve 74, engages. As the thumb-nut is turned to raise and lower it upon the post 75, the sleeve 74, the stud 68, and the brush-head rise and fall with the nut. I may also mount and actuate the auxiliary brush in the manner shown in Figs. 7 and 9. Depending from the lower part of the sleeve 50 is a bracket 79, having lugs 80, which support a shaft 81, upon which is carried a loop 82, the latter being mounted upon the back of the auxiliary brush. Projecting from one end of the latter is a finger or arm 83, having a pin 84, which lies beneath the brush-head and in the cam-race 71, Fig. 9. As the rotary brush revolves, the cam-race will vibrate the auxiliary brush upon the shaft 81. By the longitudinal adjustment of the sleeve 50, and by the vertical adjustment of the brush-head effected by the thumb-nut 76, both the rotary and auxiliary brushes may be brought into

proper position and caused to act upon the cut edges of the fabrics with proper force.

The operation of the mechanism is as follows: The fabrics being impaled upon the points 2 in the usual manner, and the turning-off machine being set in motion, the marginal portions of the fabrics rising above the points are lifted by the guide-plate 46 and guided into the entrance 43^a, leading to the narrow channel 44, between the edges of the supporting-plates 45, by which said fabrics are firmly grasped. As the turning-off ring moves onward, the fabrics are drawn through said channel and against the edge of the rapidly-rotating cutter 38, by which they are severed with a clean, accurate, and uniform cut. The further movement of the turning-off ring then brings the severed edges beneath the auxiliary brush, the rapid reciprocation of which loosens and partially disintegrates the short pieces of yarn lying in the impaled loops, after which they are subjected to the action of the rotary or the rotary and laterally-reciprocating brush, by which the severed edges are rapidly, thoroughly, and uniformly cleaned.

The easy, accurate, and extremely delicate adjustment of the cutting and brushing devices render this invention capable of producing the very best results, giving a highly improved quality of work at a materially reduced cost. The auxiliary brush by loosening the yarn fragments left in the impaled loops after the cutter has acted upon the fabrics leaves the same in condition to be removed cleanly and thoroughly throughout both the severed edges, and in closely-knit goods the action of this auxiliary brush is an important factor. The guiding and supporting jaws 45 being carried by elastic plates 41, said jaws will always yield to accommodate fabrics of varying thickness, at the same time that they firmly grip the material, guide it to the cutter, and hold it under a uniform tension while the cutter acts. Owing to the perfect adjustment of the cutter-head, the cutting-disk may be caused to act upon the impaled fabrics at a point close to the loops lying upon the points of the turning-off ring. A shield 85 may be mounted upon any suitable support carried by the bracket, said shield being curved up over the rotary brush.

In order to lubricate the shaft of the cutter, I form in the sleeve 35 a chamber communicating with the bearing in which said shaft turns. This chamber contains any suitable packing material—such as felt—soaked with oil. A set-screw 86 is tapped into the outer end of the boss within which said chamber is formed, which may be turned up past the oil-supply hole to compress the packing against the shaft.

What I claim is—

1. An attachment for a turning-off machine, consisting of a bed-plate, an arm connected therewith and provided at one end with a support carrying two depending yielding plates having jaws at their lower ends projecting toward each other, a cutter carried by the arm and operating below the jaws, a movable brush arranged near the cutter, a support for holding said brush, and means, substantially as described, for operating the cutter and brush.

2. An attachment for a turning-off machine, consisting of a bed-plate, an arm connected therewith and provided at one end with a support carrying two depending plates having jaws at their lower ends projecting toward each other, a cutter carried by the arm and operating below the jaws, a rotary main brush arranged near the cutter, a support for said brush, a support carrying an auxiliary brush which is situate between the cutter and main brush, and means, substantially as described, for operating the cutter and both brushes.

3. The combination, with the cylinder of a turning-off machine, of two depending plates having guide-jaws at their lower ends which project toward each other, a movable brush arranged over the cylinder-points, a cutter located between the brush and the jaws, supports for holding the plates, brush, and cutter above the cylinder, and means for operating said brush and cutter, substantially as described.

4. The combination, with a cylinder of a turning-off machine, of two depending yielding plates having guide-jaws at their lower ends which project toward each other, a movable main brush arranged over the cylinder-points, a cutter located adjacent to the jaws, a movable auxiliary brush between the cutter and main brush, supports for holding the plates, cutter, and brushes above the cylinder-points, and means for operating the cutter and brushes, substantially as described.

5. The combination, with the cylinder of a turning-off machine, of a pair of guiding-jaws, a revolving cutter adjacent to the jaws, a rotating main brush, a movable auxiliary brush located between the cutter and main brush, supports for holding the jaws, cutter, and brushes above the cylinder-point, and means for rotating the cutter and main brush and moving the auxiliary brush, substantially as described.

6. The combination, with the cylinder of a turning-off machine, of a bed-plate having an arm carrying guiding-jaws at its outer end, a vertically and laterally adjustable cutter supported by the arm, means for adjusting said cutter, a movable brush at the side of the cutter opposite the jaws, a support for the brush, and means for operating the cutter and brush, substantially as described.

7. The combination, with the cylinder of a turning-off machine, of an arm supported outside the cylinder and carrying two guiding-jaws located above the cylinder-points, a vertically and laterally adjustable revolving cutter carried by the arm, means for adjusting said cutter, a revolving brush adjacent to the cutter, a support for the brush, and means

for revolving the cutter and brush, substantially as described.

8. The combination, with the cylinder of a turning-off machine, of a pair of guide-jaws, a cutter operating below the jaws, a rotary main brush, a reciprocating brush arranged between the cutter and main brush, supports for holding the jaws, cutter, and brushes above the cylinder-points, and means for operating the cutter, rotating the main brush, and reciprocating the auxiliary brush, substantially as described.

9. The combination, with the cylinder of a turning-off machine, of depending laterally-yielding elastic plates having their lower extremities extending toward each other to form a pair of guiding-jaws having a converging entrance, a movable brush, a cutter movable beneath the jaws between the latter and the brush, supports for holding the plates, cutter, and brush above the cylinder-points, and means for operating the cutter and brush, substantially as described.

10. The combination, with the cylinder of a turning-off machine, of an arm 23, supported at one end and having at the other end a head 25, an arm 26, adjustable axially and lengthwise in said head, a cutter-shaft supported by the said adjustable arm and carrying a cutter-disk 38, a pair of guiding-jaws 45, supported adjacent to the cutter, a movable brush, a support for the latter, means for axially and lengthwise adjusting the arm carrying the cutter-shaft, and means for rotating the cutter-shaft and moving the brush, substantially as described.

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

N. H. BRUCE.

Witnesses:

J. A. RUTHERFORD,

CHAS. B. TILDEN.