Oct. 19, 1926. 1,603,337

J. B. GURY

CLOTH CUTTING MACHINE

Filed Jan. 30, 1922 2 Sheets-Sheet 1

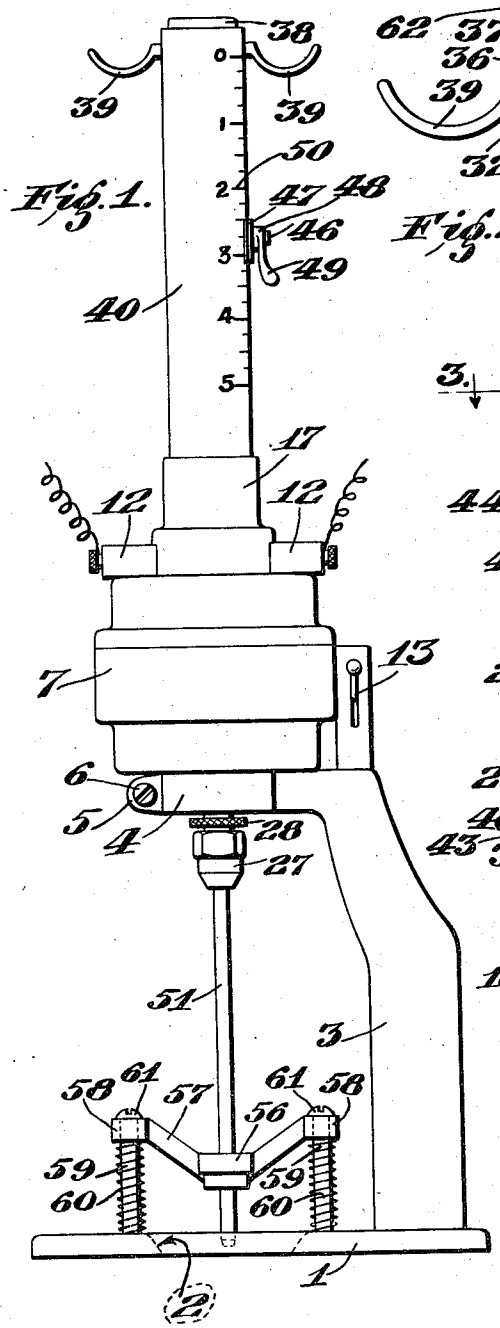


Fig. 1.

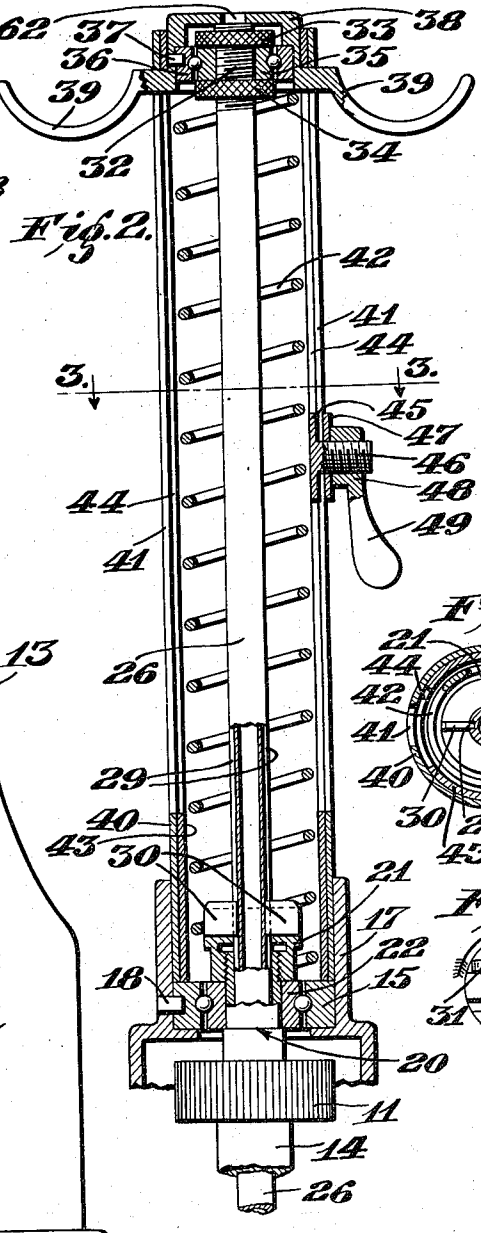


Fig. 2.

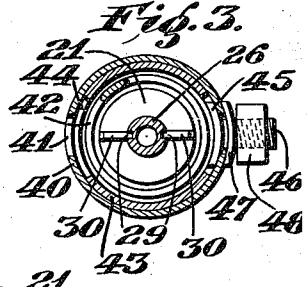


Fig. 3.

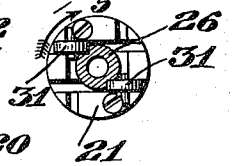


Fig. 4.

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Fig. 5.

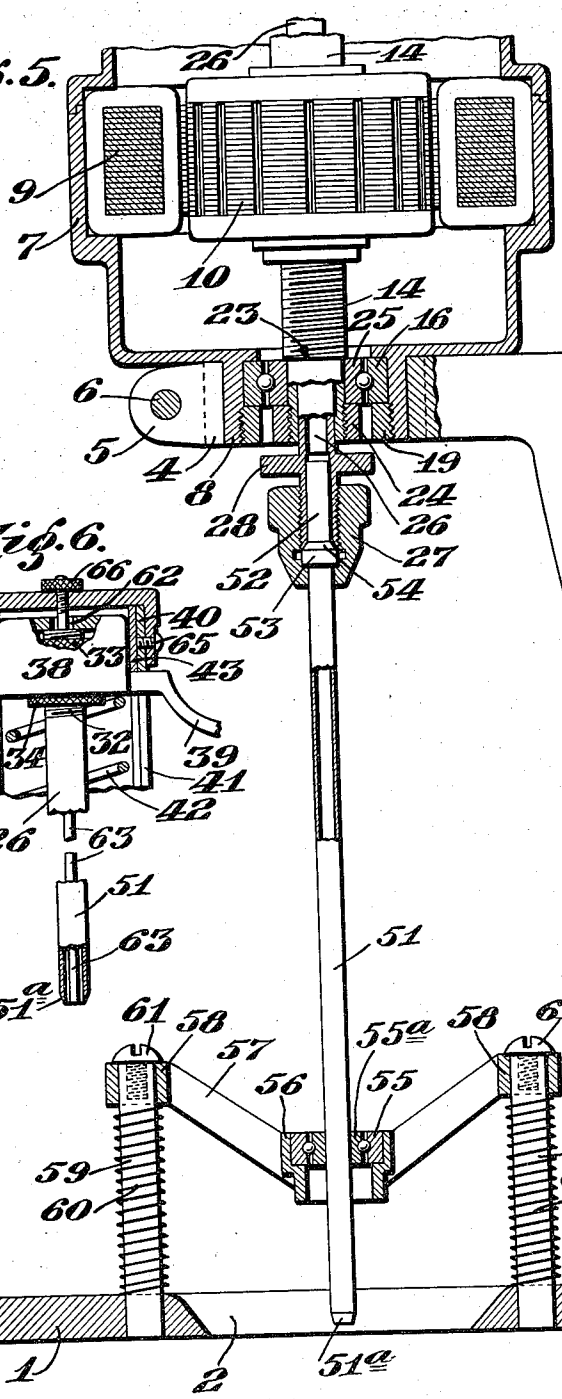
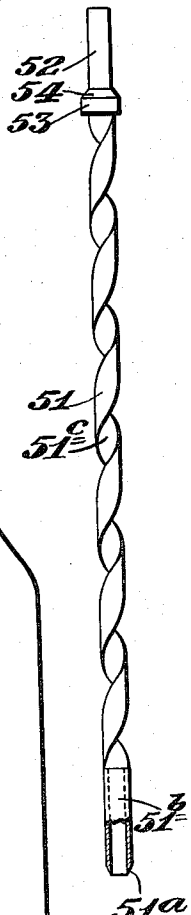


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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CLOTH-CUTTING MACHINE.

Application filed January 30, 1922. Serial No. 532,756.

This invention relates to cloth cutting machines and more particularly to a machine for perforating a pile of cloth to indicate the location of pockets of garments, for other indications within the body of the pattern, and for marking marginal portions thereof to facilitate matching and joining parts of a garment in the manufacture of clothing and wearing apparel.

In factory production of garments in quantity it is customary to lay a pile of cloth upon a table and cut through the entire pile with an electric or other motor-driven cutting machine and following the lines of a pattern marked upon the topmost layer of the cloth.

To mark for the location of pockets and for other indications it is a practice to bore or puncture through the pile of cloth, either before or after pattern cutting as above noted, with an awl or needle which is usually rotated by a motor at an exceedingly high speed so that the heat developed in the awl or needle by the friction scorches and chars the cloth about the edges of the apertures. In this way the goods does not spring back so as to close and obscure the apertures after the awl or needle is withdrawn. This operation, however, requires some time and considerable care and skill to drill in a perfectly perpendicular line to the table, as the very nature and structure of the machine for accomplishing it is usually such that the machine is liable to become tilted, due to its being top-heavy and overbalanced and downward pressure being exerted more on the one side than on the other, particularly when used on a pile of relatively soft and yieldable goods. Obviously, therefore, if the awl or needle is directed obliquely through the pile of cloth the markings on the lower layers will be considerably out of match with those of the upper layers. Furthermore, there is a restricted limitation in the diameter of the awl or needle which is permissible for the above noted purpose. Consequently, this method of puncturing the goods will not answer for marginal marking and it has heretofore been found necessary to use a special tool or machine for notching the marginal portions after the pattern is cut. This necessitates the making of the notches larger than would be required for visibility as the character of the cutting tool is such that unless it is capable of taking out quite a large piece of the goods there is a possibility of the edge portions of some of the layers of the cloth sliding back from the face of the pile far enough to be out of range of the cutting tool.

The present invention is designed to avoid the disadvantages of the cloth puncturing device above described and to obviate the necessity for using a special marginal notching tool or machine. It consists primarily in a rotary and reciprocatory cutting tool, as distinguished from a mere puncturing tool, whereby an aperture is made clearly and well defined in the cloth, and the cutting tool being also of such a character that it may be of relatively large diameter and is effective when rotated at a relatively slow speed. The invention further consists in a novel machine for driving and manipulating the cutter and in the parts and combinations and arrangements of parts hereinafter described and claimed.

In the accompanying drawings illustrating a practical adaptation of the invention,—

Figure 1 is a side elevation of the machine;

Figure 2 is a vertical section, on an enlarged scale, of the upper portion of the machine;

Figure 3 is a horizontal section on the line 3—3 of Figure 2;

Figure 4 is a horizontal section of the tubular spindle, showing a modification of the spline;

Figure 5 is a view, on an enlarged scale and partly in vertical section, of the lower portion of the machine;

Figure 6 is a fragmentary view showing a modification of the sprindle; and

Figure 7 is a detail view of a modification of the cutting tool.

Referring now to the drawings, the numeral 1 designates the supporting base of the machine which may be circular, rectangular or polygonal, as may be desired, having an opening 2 at or about its center. Extending up from the base is a standard 3 having a split ring portion 4 provided with apertured ears 5 for the reception of a clamping bolt or screw 6.

A motor housing 7 has a lower collar or annular flange portion 8 clamped securely within the ring portion 4 of the standard. In the motor housing is the field magnet 9, armature 10 and commutator 11 of an ordinary direct-current electric motor, these

parts being merely shown conventionally. The motor brushes (not shown) which obviously cooperate with the commutator are located in boxes 12 (see Figure 1) on the motor housing 7 and an ordinary switch or circuit-breaker 13 is mounted on the standard 3 adjacent to the motor housing.

The armature shaft 14, which is tubular, so as to permit the reciprocation of a spindle therethrough, as will be presently described, is journalled at its upper and lower ends in ball bearings 15, 16, respectively. The outer ring of the bearing 15 is secured in a collar or annular flange portion 17 at the top of the motor housing 7 by a pin 18, and the outer ring of the bearing 16 is secured in the lower collar or annular flange 8 by a screw-threaded collar or ring nut 19.

The upper end portion of the armature shaft 14 is reduced slightly in outside diameter to provide a shoulder 20 and it is screw-threaded to receive a ring nut 21, between which latter and said shoulder 20, the inner ring 22 of the ball bearing 15 is clamped fast. The lower end portion of the armature shaft is likewise provided with a shoulder 23 and it is screw-threaded to receive a ring nut 24 to clamp it to the inner ring 25 of the ball bearing 16.

Slidable through the armature shaft 14 is a tubular spindle 26 whose lower end portion is externally screw-threaded to receive a securing nut or chuck 27 by which the cutting tool, to be presently described, is attached to the spindle. Adjacent to the chuck the spindle is provided with a knurled collar 28 which is made integral therewith or suitably secured tightly thereon.

The spindle 26 is provided with diametrically opposite longitudinal grooves 29 and the ring nut 21 with keys or splines 30 which enter the grooves 29 (see Figures 2 and 3) so that the spindle may slide endwise in the armature shaft, but both must rotate together.

In some cases an antifriction roller 31 may be used in place of the key or spline 30, as shown in Figure 4. In this modification the grooves in the spindle are formed and respectively located so that one face thereof is engaged by the roller tangentially. Consequently, as the armature shaft 14 is rotated, the spindle 26 is rotated therewith, yet the spindle may be moved endwise through the armature shaft and with less frictional resistance than where the key or spline 30 is used.

The upper end of the spindle, as shown, is screw-threaded, as at 32, to receive knurled jam nuts 33, 34, between which the inner ring 35 of a ball bearing 36 is clamped and thereby fastened on the spindle. The outer ring of the ball bearing 36 is secured by a pin 37 in a hollow plunger head or piston 38. This plunger head or piston has oppositely extending arms 39 which are curved to afford convenient engagement of the fingers of the operator in depressing the spindle as will later more fully appear in describing the operation of the machine.

The plunger head or piston 38 is slidable in a tubular extension 40 of the motor housing, the arms 39 extending through slots 41 in said tubular extension and said plunger head or piston is yieldably held in normal raised position by a spring 42 pressing at one end against it and at the opposite end against the stationary outer ring of the ball bearing 15.

In the tubular extension 40 is a lining 43, preferably of pressed fibre and having slots 44 somewhat wider than the slots 41 of said tubular extension. This lining is provided particularly as a filler to guide the convolutions of the spring 42 and prevent them from catching on an adjustable stop element 45 which limits the travel of the plunger head or piston 38 downward.

As shown, the stop element 45 comprises a curved plate which engages the inside of the tubular extension 40 and has a screw-threaded shank 46 projecting out through the slot 41, and having a clamping washer 47 sleeved loosely thereon and engaged by a nut 48 having a manipulating handle 49. By this structure the stop may be readily loosened by turning the nut 48 and after the stop is moved to the desired position it is as readily tightened in place by the nut being turned to clamp the washer 47 against the outer face of the tubular extension.

On the outside of the tubular extension 40 is a scale 50 which, obviously, may be inscribed directly thereon or upon a separate plate and be attached thereto, as may be desired. This scale, as shown, is marked in inches and fractions thereof, and the stop 45 is set in relation thereto according to the distance the spindle 26 is to be depressed to carry the cutting tool through the pile of the cloth.

The cutting tool, indicated by the numeral 51, whose lower end portion should be tubular according to the present invention, may or may not be tubular throughout the rest of its length, as may be desired, but in most cases it will be tubular its entire length. In any case, however, the cutting tool should have a shank portion 52 to enter the lower end portion of the spindle 26 and have an annular shoulder 53, preferably bevelled on one side, as at 54, so as to engage a counterpart seat at the end of the spindle and being adapted to be clamped by the securing nut or chuck 27.

Normally, when the spindle is in its raised position, the cutting end 51ª of the cutting tool 51 is flush with or just slightly above the bottom face of the base 1. The tool is slidable endwise through the inner ring 55ª of

a ball bearing bushing 55 located in a socket 56 at the middle of a yoke 57 whose end portions 58 are slidable on vertical studs 59 extending up from the base 1 on opposite sides of the opening 2. This yoke is yieldably held in normal raised position by the springs 60 sleeved on the studs and said studs having screws 61 in their upper ends whose heads serve as stops for the yoke. The object in positioning the yoke normally above the base 1 is to not obstruct the view of the operator through the opening 2 when placing the machine and lining up the cutting tool 51 with the place where the perforation is to be made in the pile of goods. By having the yoke yieldably supported, a stable guide is afforded the cutting tool and a shorter cutting tool for a maximum height of the pile of cloth may be used, as the yoke will yield downward when the chuck 27 comes in contact therewith and travel until its middle portion reached the top of the pile.

The preferred form of the cutting tool 51 is plain tubular and the cutting end 51[a] thereof is bevelled to a knife edge. This kind of a tool cuts out a disk or wad from each layer of the pile of cloth and it is effective when rotated at a comparatively slow speed and given pressure endwise at the same time, and, while it is operated at a slow speed, the perforating of the pile of cloth is accomplished quickly as compared to the time the ordinary rotating awl or puncturing tool is required to remain in the pile so as to char the edges of the apertures in the cloth as has been the customary practice heretofore.

In the operation of the machine, it is set with the base 1 upon the pile of cloth with the cutting tool in line above the place where the perforation is to be made, the opening 2 in the base facilitating the locating of the cutting tool and the view of the operator being unobstructed by the yoke being in normal raised position as above set forth.

After the motor is started the spindle 26 is moved downward by the operator pressing two of his fingers, preferably the first and second fingers of one hand, on the curved arms 39 of the plunger head or piston 38. As the tool takes into the pile of goods the disks or wads cut therefrom are forced up through the bore of the tool and thence up through the tubular spindle 26 and out at the top thereof and through an aperture 62 in the plunger head or piston 38.

In some cases, for certain kinds of goods which might crowd and clog in the tubular cutter 51 and spindle 26, the structure may be modified as shown in Figure 6 of the accompanying drawings. In this modification a stationary rod 63 extends from a cap 64 at the top of the tubular extension 40 of the motor housing, down through the tubular spindle 26 and cutting tool 51 and being of a length so that its lower end reaches just about to the cutting edge of the tool when the latter is in normal raised position. As the tool is withdrawn from the pile of cloth after the cutting operation, the rod 63 serves as an ejector or stripper to force the disks or wads from the tool.

As shown in the drawings, the cap 64 is fastened by screws 65 to the tubular extension 40 and the rod 63 has its upper end portion screw-threaded through an aperture in the cap and fastened by a knurled jam nut 66. In this way the cap may be readily detached from the tubular extension 40 by removing the screws 65 and the rod 63 detached from the cap by removing the jam nut 66 and then unscrewing the rod.

A still further modification of the cutting tool is shown in Figure 7, wherein the tool has a tubular bit or cutting end portion 51[b] extending thus for a short distance and then communicating with a spiral groove 51[c] extending the rest of its length. For goods of certain character this kind of a cutter is desirable and advantageous, as the particles cut from the goods are made to travel up the groove 51[c] as the tool enters the pile.

In mounting the motor casing in axial alinement with the cutting tool, but stationary on the standard, and sliding the spindle endwise through the armature shaft of the motor, the center of gravity is maintained relatively low so that the machine is not top-heavy and that the pressure downward is in axial alinement with respect to the rotating elements and evenly distributed as the spindle is depressed so as not to tend to tilt the machine. Furthermore, by having the motor housing stationary and only moving the spindle endwise there is less weight to be carried up and down. Therefore, a relatively light spring may be used to counterbalance or raise the spindle than would be required to normally support and raise the motor.

There is also an advantage in the provision of the adjustable stop for limiting the downward travel of the spindle so as to avoid undue marring of the table on which the work is laid or dulling of the cutting tool. That is, the stop may be set according to the thickness of the pile of cloth so that the spindle is brought to rest just about the time the cutting edge of the tool reaches the bottom of the pile.

By having a cutting tool of the character of the present invention, the machine can be used for the marginal marking of the pattern. In this use the pile of cloth is perforated prior to the cutting of the pattern outline at the place where the notch would occur if made in the margin of the pattern by the notching tool heretofore em-

ployed, as hereinabove described, and then cutting the outline of the pattern. In fact, all the other necessary perforations to be made in addition to the marginal markings may be accomplished before the outline of the pattern is cut.

What is claimed is:

1. In a cloth cutting machine, a supporting base, a motor supported thereon, the shaft of the motor being tubular and vertically disposed, a tubular spindle slidable endwise through said motor shaft but rotatable therewith, and a cutting tool secured to the lower end of said spindle in axial alinement therewith, said cutting tool being capable of cutting a wad of the cloth and having a passageway extending lengthwise thereof and communicating with the cutting end portion of the tool and with said tubular spindle.

2. In a cloth cutting machine, a supporting base, a motor supported thereon, the shaft of the motor being tubular and vertically disposed, a spindle slidable endwise through said motor shaft but rotatable therewith, resilient means for yieldably supporting said spindle in normal raised position, a chuck at the lower end of said spindle, a cutting tool attachable to said chuck, said cutting tool being secured in axial alinement with said spindle and having its lower end portion arranged and adapted to cut a wad of the cloth and having a longitudinal passageway for the wads cut thereby, and a handle for depressing said spindle.

3. In a cloth cutting machine, a supporting base having an opening therein, a standard on said base, a motor housing on said standard, a motor mounted in said housing, the shaft of said motor being vertically disposed and tubular, a tubular upward extension on said motor housing, a spindle slidable endwise through said motor shaft but rotatable therewith, extending normally below said shaft and with its upper portion normally to the upper portion of said tubular upward extension of the motor housing, a plunger head swivelled on the upper end portion of said spindle and having oppositely disposed lateral arms projecting through vertical slots in said upward tubular extension of the motor housing, and a spring in said tubular extension and surrounding said spindle, said spring bearing at one end against said plunger head and at its opposite end against a support whereby to yieldably hold said spindle in normal raised position.

4. In a cloth cutting machine, a supporting base having an opening therein, a standard on said base, a motor stationarily mounted on said standard, the shaft of said motor being tubular and vertically disposed, a spindle slidable endwise through said motor shaft but rotatable therewith, resilient means for yieldably holding said spindle in normal raised position, a cutting tool secured to the lower end of said spindle in axial alinement therewith, the cutting end portion of said tool in the normal raised position of said spindle terminating substantially flush with the bottom face of said supporting base through said opening in the latter, and a guide for the cutting tool above said opening.

5. In a cloth cutting machine, a supporting base having an opening therein, a standard on said supporting base, a motor stationarily mounted on said standard, the shaft of said motor being tubular and vertically disposed, a spindle slidable endwise through said motor shaft but rotatable therewith, means for guiding the upper portion of said spindle, means for yieldably supporting said spindle in normal raised position, a cutting tool secured to the lower end of said spindle in axial alinement therewith, the cutting end of said tool extending through said opening in said supporting base and terminating substantially flush with the bottom face of said base in the normal raised position of said spindle, and a guide for said cutting tool yieldably supported above said opening in said supporting base.

6. In a cloth cutting machine, a supporting base adapted to be placed upon a pile of cloth, a motor supported on said base in balanced relation thereto, the shaft of said motor being tubular and vertically disposed, a spindle slidable endwise through said motor shaft but rotatable therewith, a cutting tool secured to the lower end of said spindle in axial alinement therewith, a spring for yieldably holding said spindle in normal raised position, and means for depressing said spindle with equal pressure on opposite sides.

7. In a cloth cutting machine, a supporting base, a standard thereon, a motor housing on said standard, a motor in said housing, said motor having its shaft vertically disposed and tubular, a spindle slidable endwise through said motor shaft, the lower end of said spindle having a chuck thereon for the attachment of a cutting tool, the upper portion of said spindle being normally extended above said motor and yieldably supported, a cutting tool attachable to said chuck so as to be in axial alinement with said spindle, the cutting end of said tool terminating substantially flush with the bottom face of said supporting base when said spindle is in normal raised position, and a stop for limiting the downward travel of said spindle, said stop being adjustable according to the thickness of a pile of cloth to be perforated.

8. In a cloth cutting machine, a supporting base having an opening therein, a motor

supported on said base, a vertically movable rotary tubular spindle rotated by said motor but moved endwise manually, a cutting tool secured to the lower end of said spindle, said cutting tool being tubular and its lower end extending through the opening in said base and terminating substantially flush with the bottom face of the base in the normal raised position of the spindle, and a rod immovable endwise and extending through said tubular spindle and said cutting tool, the lower end of said rod terminating substantially flush with the lower end of said cutting tool in the normal raised position of said spindle.

9. In a cloth cutting machine, a supporting base having an opening therein, a motor supported on said base, a tubular guide extension above said motor having longitudinal slots on opposite sides, a plunger head slidable in said tubular guide extension and having lateral arms projecting through said slots, a tubular spindle swivelled to said plunger head and having a driving connection with said motor whereby to rotate while being permitted endwise travel, a tubular cutting tool secured to the lower end of said spindle, the lower end of said cutting tool extending through the opening in said base and terminating substantially flush with the bottom face of said base in the normal raised position of said spindle, a cap on said tubular guide extension, and a rod secured to said cap and extending axially through said spindle and said cutting tool, the lower end of said rod terminating substantially flush with the lower end of said cutting tool in the normal raised position of said spindle.

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