

Feb. 11, 1936.

J. VIGLIANO

2,030,280

CLOTH DRILLING MACHINE

Filed Nov. 19, 1935

2 Sheets-Sheet 1

Fig. 1

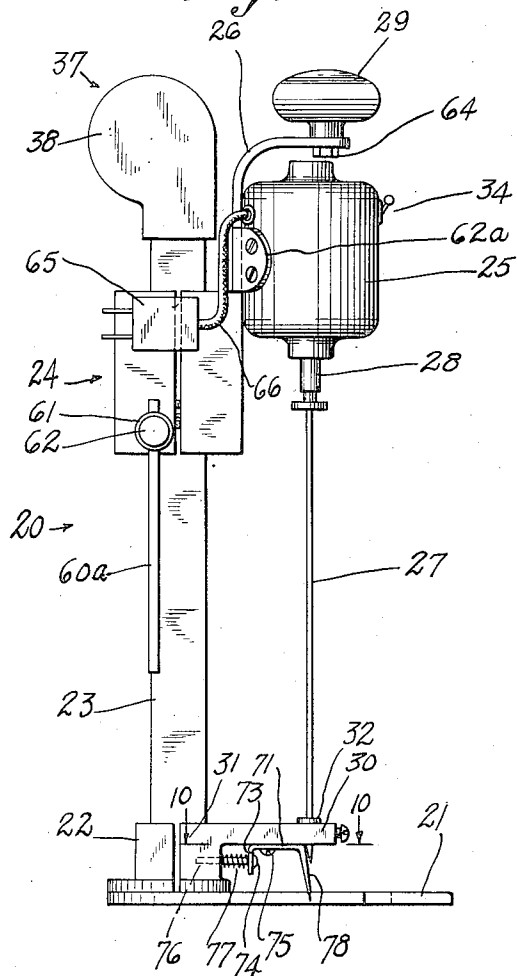


Fig. 2

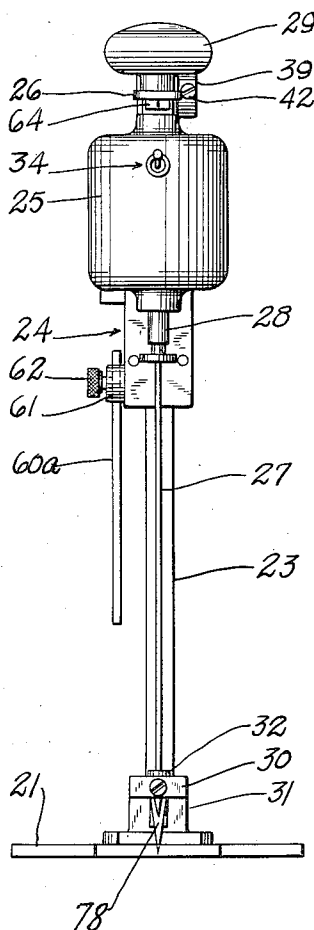
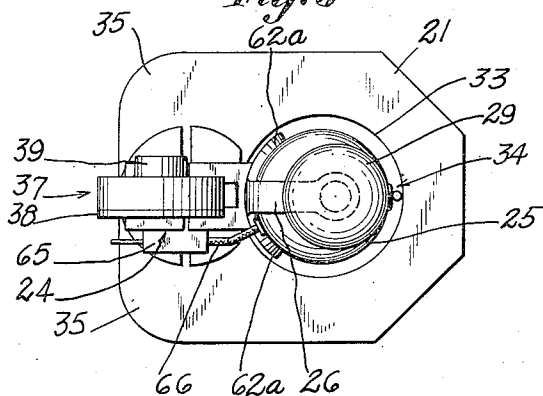


Fig. 3



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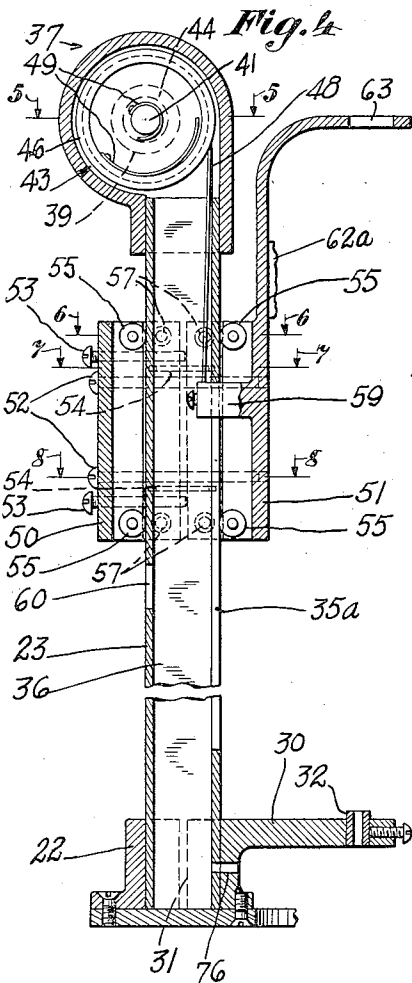
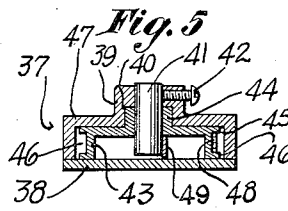
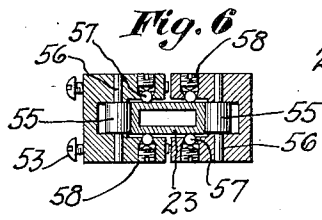
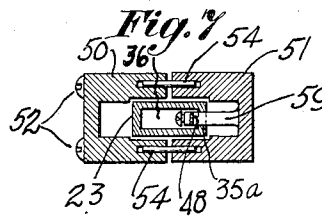
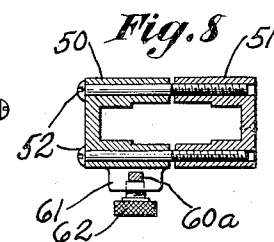
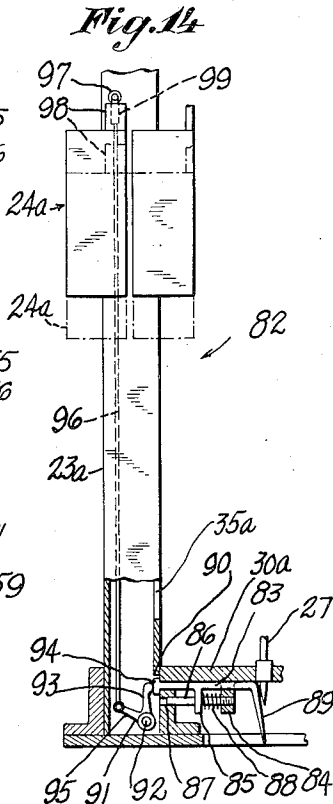
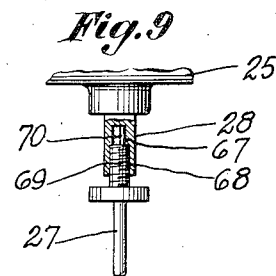
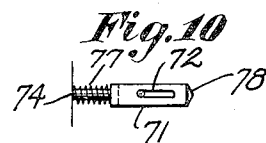
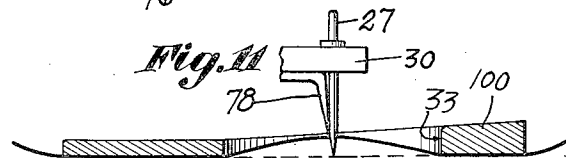
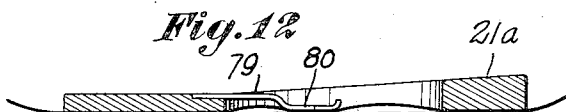
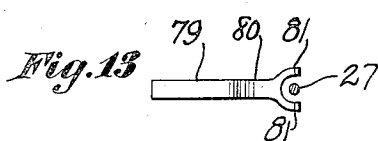
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CLOTH DRILLING MACHINE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,030,280

CLOTH DRILLING MACHINE

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Application November 19, 1935, Serial No. 50,529

14 Claims. (Cl. 164—86)

This invention relates to machines for marking or cutting materials, and has particular reference to machines for drilling cloth.

In the tailoring art to facilitate the rapid marking or cutting of cloth according to a desired pattern, a large number of sheets of cloth are superimposed on each other to form a stack, and a fine drill or rotating needle may be worked through the stack at desired points of the pattern, whereby each sheet of cloth is thus marked by several very small and regular perforations so that the operator may sew or cut the cloth from one perforation to another to obtain a reproduction of the pattern in each sheet of cloth.

The drilling machine used for this purpose is generally of a portable type and is placed to rest on the stack, and pressure is exerted downward on the machine to drive the drill through the stack. Naturally, a stack of pliable cloth fabrics may form a rather yielding or resilient body, and hence may effect the seating of the machine so as to throw the drill out of vertical and hence affect the accuracy of the perforations. Heretofore, the vertically, slidably movable drill carrying head was mounted on a vertical bar and would bind thereon for various reasons accentuating the tendency to move the drill away from vertical position. Likewise the point of pressure application on the machine tended to produce a similar undesirable effect. Furthermore, the prior art machine had features of construction which were difficult of smooth working or easy adjustment, and for securing of the drill in true alinement, nor was there any way to guide the application of the drill to the precise point that was to be perforated.

It is therefore an object of the invention to provide a machine having improved features for avoiding the difficulties mentioned.

More particularly, the invention contemplates the provision of improved spring means for raising the drill carrying head; and without causing any binding; anti-friction means in improved coordination in the machine to prevent retardation of the drill carrying head; improved means for assembling and adjusting the head; improved drill guiding means mounted in a secure manner and comprising associated means adapted to register with the point at which the drill is to enter the stack to facilitate rapid application of the drill; improved means to level off a bulge in the cloth stack to permit accurate use of the drill while permitting full observation of the cloth; an arrangement and alinement of the drill carrying head and its seating base, and

desirably, also, a novel coordination of the manual actuating or holding means to assure retention of the drill substantially vertically; and improved means for rigidly securing the drill in perfectly alined relation with its operating motor.

A further object of the invention is the provision of a machine of the nature set forth which is relatively simple in construction and inexpensive to manufacture, compact, durable, reliable and efficient to a high degree in use.

Other objects and advantages of the invention will become apparent as the specification proceeds.

With the aforesaid objects in view, the invention consists in the novel combinations and arrangements of parts hereinafter described in their preferred embodiments, pointed out in the subjoined claims, and illustrated in the annexed drawings, wherein like parts are designated by the same reference characters throughout the several views.

In the drawings:

Figure 1 is a view in side elevation showing a machine embodying the invention.

Fig. 2 is a similar front view thereof.

Fig. 3 is a top plan view of the machine.

Fig. 4 is a vertical sectional view of a part of the machine, with parts removed.

Figs. 5, 6, 7, 8 are sectional views taken on lines 5—5, 6—6, 7—7, and 8—8, respectively, of Fig. 4.

Fig. 9 is an enlarged fragmentary vertical sectional view showing the removable drill securing means.

Fig. 10 is a top view taken on line 10—10 of Fig. 1.

Fig. 11 is a fragmentary view with the base in section showing the drill and indicator or setting means therefor as applied to a stack of fabrics.

Fig. 12 is a similar view showing a modification of the invention.

Fig. 13 is a plan view of the drill setting element shown in Fig. 12.

Fig. 14 is a fragmentary diagrammatic view in vertical elevation with parts in section showing an automatic control for the drill setting means.

The advantages of the invention as here outlined are best realized when all of its features and instrumentalities are combined in one and the same structure, but, useful devices may be produced embodying less than the whole.

It will be obvious to those skilled in the art to which the invention appertains, that the same may be incorporated in several different constructions. The accompanying drawings, therefore, 55

is submitted merely as showing the preferred exemplification of the invention.

Referring in detail to the drawings, I provide a portable device 20 embodying the invention. The same may include a seating base 21 having secured thereto a suitable angle bracket 22 to which there may be rigidly connected an upright guide or standard 23 at right angles to the plane of the base. Slidable along the standard 23 is a head that may include a guide means 24 engaged with the standard, and a high speed motor 25 mounted on a bracket arm 26 of the guide means. The drill 27 may be direct connected to the motor shaft 28 in alinement therewith and in parallelism to the standard 23. For carrying or otherwise manipulating the device 20, I may secure a knob 29 to the bracket 26, above the motor, and either in alinement therewith or preferably so offset as to balance the downward force exerted by the lower face of the base 21 in the normal use of the machine. For steadying the lower portion of the drill 27, I may provide an angle bracket 30 rigidly secured to the standard, base, or both, as with flanges 31 embracing the standard as shown. The bracket 30 may have its horizontal portion spaced above the base and provided with a specially hardened steel thimble 32 for guiding or steadying the drill.

In general, the head of the machine is vertically reciprocable against the force of an elevating spring, hereinafter described, with the drill 27 passing through the base opening 33 into a stack of fabrics on which the base rests while the operator, having closed the motor switch 34, bears down on the knob 29 to drive the drill into the stack.

To distribute or equalize the bearing pressure of the base 21, I provide the same with a relatively greater area at the portions 35 adjacent to the standard 23 to compensate for the weight of the latter and its parts. For like reasons the base is relatively large, and this incidentally permits the opening or sight window 32 to be quite large so that the operator can readily note the point or mark at which the stack of fabrics is to be drilled. By placing the knob 29 relatively remotely from the standard 23, the arrangement may be such that the downward pressure exerted by the operator tends to further equalize the base pressure, so that uneven bulging or compression of the fabrics is avoided to the degree that the base may be relatively horizontal and the drill consequently vertical.

The standard 23 may be hollow, and may consist of a piece of rectangular tubing if desired. The same may be open ended at the top and may have a slot opening 35a for a purpose hereinafter described.

Mounted rigidly on the standard 23 at the top thereof and in communication with the passage 36 of the standard is a casing 37, adapted to be closed by a side plate 38. The casing 37 may have an integral external hub 39 that may be internally counterbored as at 40. Fitted in the hub 39 is a shaft 41 which may be nonrotatably fixed thereto as by a set screw 42 threaded through a wall of the hub. Rotatably mounted on the shaft 41 I may provide a drum 43 having a hub portion 44 having bearing engagement in the counterbore 40. The drum 43 may have an annular track formed as by the lips 45, 46, with the drum relatively snugly slidably fitted between the closure 38 and the opposing side wall 47 of the casing, and the lip 46 providing adequate bearing engagement against the closure wall 38.

Connected to the drum 43 so as to be wound and unwound upon the track thereof with the lips 45, 46 constituting guides, is a flexible element 48 which may be connected at its lower end to the slide 24 as hereinafter described. Tending to constantly elevate the slide 24 is a coil spring 49 disposed within the drum and connected at opposite ends to the drum and to the stationary shaft 41 respectively. The spring 49 is reliably retained in the drum by the closure plate 33. Now, when the slide 24 is moved downward, the tension element or strap 48 causes rotation of the drum clockwise and consequent tensioning of the spring 49. Upon relieving the downward pressure on the slide, as at the knob 29, the reverse action occurs and the slide is elevated by the spring until the parts assume the position substantially as shown in Fig. 1.

The slide 24 may include a plurality of sections 50, 51 which may cooperate to provide a box-like open ended structure through which the standard 23 is passed. These sections 50, 51 may be held together as by screws 52 and may be maintained at a desired spacing to each other as by set screws 53 which may be threaded through the section 50 to abut the section 51 to thereby cause a desired snugness of fit of the slide with the standard. In order to maintain the sections 50, 51 in suitable parallelism with each other, guide pins 54 may be secured to one section so as to be adapted to be received in corresponding holes of the other section.

In order to still further minimize any tendency of the slide 24 binding on the standard, and thus to assure an even vertical feed of the drill 27 through a resilient stack of fabrics on which the machine 20 rests, I provide anti-friction means between the standard 23 and the slide 24. In this manner I have discovered that the eccentric pressure that may be exerted on the knob 29 is wholly taken up in overcoming the force of the spring 49 and in feeding the drill through the stack of fabrics, and no additional pressure need be exerted as for the purpose of overcoming frictional resistance of the slide against the standard with the consequent tendency to throw the machine out of perpendicular relative to the yielding supporting fabric stack. Incidentally, I desire to point out that the flexible element 48 is disposed at a side of the standard 23 nearest to the point of pressure application at 29 to thus tend to balance the slide 24 against the application of an eccentric pressure as at 29.

The anti-friction means referred to may assume any suitable form. For example, opposed rollers 55 may be disposed in the slide 24 and mounted in respective sections thereof as by externally inserted pins 56. Such rollers may be employed at the upper and lower ends of the slide. If desired, lateral anti-friction means may also be used, including, for example, opposed balls 57 adjustable to desired position as by set screws 58. Such balls may be mounted at the upper and lower ends of the slide. It will be readily perceived that the pressure at the anti-friction means is thus fully adjustable, the balls by their individual set screws, and the rollers by means of the screws 52 and the set screws 53.

The slide section 51 may have an internal lug 59 to which the tension element 48 may be connected as by a set screw that may be accessible through an opening or hole 60 in an opposite wall of the standard 23 and prior to attaching the section 50 to the section 51.

It will now be seen that a full, smooth and rapid

reciprocation of the slide 24 is possible, and that the spring 49 cannot bind or catch, as would be the case if a usual coil spring were employed, and all parts being so housed as not to interfere

While the lug 59 may constitute an upward stop for the slide by engaging an end of the slot 35, an adjustable downward stop means may be provided as by a rod 60a passed through a vertical hole in a lug 61 formed in the slide section 50, and secured in adjusted position as by a set screw 62 threaded into the lug. The lower end of the rod 60 may abut the base 21 or other fixed part to thus limit the downward movement of the drill 27.

The bracket 26 which may constitute a part of the slide section 51 may have arms 62a extending in opposite directions along an arc to facilitate direct rigid securement of the motor 25 thereto. The knob 29 may be directly secured to the arm 26 in superposed relation to the motor. If desired, the securement may be as by a screw attached to the knob and passing downward through a slot 63 elongated along the arm, and fixed to the arm by a nut 64. In this manner the knob 29 may be adjusted toward and away from the axis of the drill 27 as desired and according to the yieldability under pressure of the fabric stack that is to be drilled.

Any suitable means may be used to connect the motor to a source of current. For instance, a conventional plug 65 may be secured to slide section 50, with a flexible lead 66 connecting the plug to the motor. A companion plug and lead, not shown, may be detachably connected to the plug 65.

To removably interchangeably secure the drill 27 to the motor shaft 23 in rigid alinement therewith, I preferably axially counterbore the shaft as at 67 and internally thread the lower end of the bore as at 68 for screw engagement with a ferrule 69 having an integral end 70 snugly fitted into the bore 67. The drill 27 may be permanently press fitted into the ferrule in any suitable manner.

To aid in aligning the point of the drill with a point on the fabric stack that is to be drilled, I may use a setting means which may automatically move into and out of the path of the drill. In this regard, it is to be borne in mind that the end of the drill terminates above the base 21 so as not to accidentally catch on fabric that may bulge upward in the base opening 33. Hence, I provide a slide member 71 having a slot 72 as shown in Fig. 10, and a toe part 73 to which there may be rigidly secured a pin 74. A pin 75 passing through the slot 72 may mount the element 71 on the underside of the arm 30, with the pin 74 being slidably movable in a bore 76 in the bracket 31 and standard 23 as may be necessary. Thus the element 71 is held for movement toward and away from the drill and in alined relation therewith. To actuate the element toward the drill, an expansion coil spring 77 may take around the pin 74. Adjacent to the drill, the element 71 may have a pointer 78 inclined for a cam engagement with the drill, and with the point of the pointer lying in the path of the drill. Now if the drill is lowered, it presses the element 71 rearward against the force of the spring 77, due to said cam engagement, so that the pointer 78 is moved out of the path of the drill, as shown in Fig. 11.

In Figs. 12, 13 is shown a modified setting means which can be substituted in place of the

element 71 and its associated parts. For instance, a member 79 may be suitably rigidly connected to the base, and having a downwardly offset arm 80 having a pair of spaced fingers 81 whose ends may be upwardly bent. These fingers may define a generally semi-circular area with the center of which the drill is adapted to align. The resilient arm 80 is capable of exerting a downward pressure on the fabric to facilitate accuracy in setting.

In Fig. 14 is shown a modification of the invention embodied in a device 82 which may in all material respects be similar to the device 20 with the exception that a different type of means is provided for automatically setting the position of the drill 27 and without requiring that the drill exercise any pressure on the setting pointer. Thus the element 83 is slidable in a lug or guide 84 secured to the underside of the bracket arm 30a and the element having a downward extending companion lock or guide 85 for slidably receiving in a hole thereof a pin 86 which may be slidable in a hole 87 of the bracket structure of the arm 30a. Disposed between the lugs 84 and 85 is an expansion coil spring 88, the co-operation of the parts being such that the spring tends to retract the pointer portion 89 of the element 83. The end of the element 83 opposite to the pointer portion may communicate with the interior of the standard 23a as through an opening 90 in an adjacent wall of said standard. Within the standard at the lower end thereof is a bell crank lever 91 which may be fitted on a stationary pin 92 journaled in side walls of the standard. One arm 93 of the bell crank lever may be arranged to bear against an adjacent head 94 of the element 83, the other arm 95 of the bell crank lever may be connected by a rod or flexible tension element 96 with a finger 97 that is engageable by an abutment 98 which may be rigidly fixed upon the slide 24a. The element 96 extends upward in the standard 23a internally thereof and at a side other than that occupied by the strap 48. The finger 97 which is connected to the element 96 may extend outward of the standard through a side wall thereof and so as to be movable along a slot 99 in the standard. If now the slide 24a is moved into its upper position of elevation by the spring 49 as hereinbefore described, the abutment 98 will strike the finger 97 and hence move the element 96 upwardly, causing the bell crank lever 91 to swing clockwise and cause the arm 93 to exert pressure on the head 94 to move the element 83 toward the right with the end of the pointer 89 lying in alignment with the drill 27. Upon moving the slide 24a downward by pressure on the knob 29 into the dot-dash line position shown, the abutment 98 releases the finger 97, permitting the element 96 to drop gravitationally with consequent anti-clockwise movement of the bell crank lever 91, thus releasing the element 83 and permitting the spring 88 to move the said element toward the left with the pointer 89 spaced from the drill 27. Hence when the drill is lowered into the fabric stack, there will be no contact between the drill and the pointer 89. It will be appreciated that the device herein described is highly reliable and positive in action and possesses a minimum tendency to binding and sticking.

The operation of the device will now be briefly described. The operator builds up a stack of fabrics which are to be marked out for cutting, and may place certain marks or indicia upon the top fabric of the stack. The operator then grasps

the knob 29 in order to manipulate the portable device 20 and sets the latter upon the fabric stack with the indicating or setting means in alignment with the point that is to be marked or drilled through the entire stack. With the same hand that holds the knob 29, the operator throws on the switch 34 to start the motor 25. The said motor desirably operates at very high speed, and may make from six to ten thousand revolutions per minute. The drill 27 may consist of a perfectly smooth rod of steel, the speed of rotation thereof being so high that the drill wears away the fibers of the fabric or shrivels or burns the same in order to produce a hole in the fabrics. Now the operator presses downward on the knob 29, causing the head of the machine to be moved downward in a substantially vertical path with the slide 24 being guided by the standard 23, and thence the drill 27 is driven through the fabric stack to form the hole therein. Thereupon the pressure on the knob 29 may be relieved so that the head is raised by the spring 49 with the drill being withdrawn from the stack. The operator may now form another perforation in the fabric stack in the same manner. It will be appreciated that since the preponderance of the weight of the device 20 is at the left thereof as may be readily perceived from Fig. 1, consequently causing the device to tilt toward the left away from the vertical since the base 21 rests entirely upon the relatively resilient or yielding fabric stack. According to this invention, the downward force applied by the operator on the machine is positioned in such manner as to tend to counteract this relatively uneven distribution of weight. Furthermore, the device is arranged so as to avoid binding or sticking of the head with respect to the standard, and thus to minimize the required downward pressure, and hence the possibility of throwing the machine out of vertical. Furthermore, the bearing area of the base 21 is distributed so as to be larger at the left of the machine than at the right thereof, and if desired, the base may be thickened at the right as shown at 100 in Fig. 11, to thereby further equalize the distribution of weight and pressure upon the fabric stack. By thus providing features tending to automatically maintain the machine in a true vertical position, it is assured that all of the perforations in the different fabric layers of the stack will be in corresponding true relationships.

I claim:

1. A cloth drilling machine, including a portable base, a standard secured on the base at one side thereof, a head movable along the standard, said head including a motor and a drill, the latter being disposed substantially centrally over the base, the base having an opening for the passage of the drill, manual means adjacent to the axis of the drill for exerting a downward pressure on said head for downwardly moving the slide, motor and drill, and means for automatically elevating said head, including a wound spring tensioned upon downwardly moving the head, the axis of the spring being at right angles to the standard, as and for the purpose set forth.

2. A cloth drilling machine of a portable type, including a base, a standard thereon, a slide movable along the standard, a motor and a drill direct connected thereto, said motor being mounted on the slide at one side of the standard, said standard having at its upper portion a means tending to elevate the slide, said means including a coil spring adapted to wind and unwind upon reciprocation of the slide along the

standard, said coil spring having a stationary axis at right angles to the standard and being otherwise independent of the standard so that the movement of the slide can be accomplished with a minimum of friction at the spring.

3. A cloth drilling machine, including a hollow standard, a slide externally engaging the same for movement therealong, a motor and drill mounted on the slide, a casing at the top of the standard and being in communication therewith, a stationary shaft in said casing, a drum rotatable on said shaft, a coil spring lying along a plane within the drum and interconnecting the latter and the shaft, a flexible element connected to the drum and extending downward into the standard, the latter having a longitudinal opening, the slide engaging said element through said opening, whereby the spring tends to elevate the slide to thus raise the motor and drill.

4. A cloth drilling machine, including a hollow standard, a casing removably connected to the standard in communication with the interior thereof, a side cover plate for the casing, a coil spring in the casing, said coil spring lying along a plane and being retained in the casing by the cover plate against lateral deformation, a flexible tension element, means coacting between said element and said spring so that downward and upward movements of the element cause coiling and uncoiling movements of the spring, a slide movable along the standard, a drill and operating means therefor carried by the slide, and said slide being connected to the flexible element with the latter housed in part by the standard.

5. A cloth drilling machine, including a standard, a slide movable therealong, said slide including complementary spaced slide sections embracing the standard, means for maintaining the slide sections in cooperation with each other about the standard, means for maintaining said slide sections adjustably spaced from each other, anti-friction roller means between the standard and the slide sections, a bracket arm connected to one section, and a motor and drill mounted on said bracket.

6. A cloth drilling machine including a standard, a slide guidingly movable therealong, said slide including a plurality of opposed slide sections embracing the standard therebetween, a drill and motor therefor, both mounted on one slide section at a side of the standard, manual means for causing exertion of a downward pressure on the drill laterally of the standard, rollers between the standard and the slide to prevent binding of the slide on the standard upon imposing a downward pressure on said manual means, means for interconnecting the slide sections and for maintaining a desired relative adjustment therebetween to adjust the bearing pressure between the rollers and the standard.

7. A cloth drilling machine including a vertical standard, a slide thereon, a motor mounted on the slide in laterally offset relation to the standard, a drill direct connected to the motor and being parallel to the standard, and anti-friction rollers between the slide and standard, one roller being at a side of the standard nearest to the motor, another roller being at an opposite side of the standard.

8. A cloth drilling machine including a base, a standard, means mounted on the standard including a drill movable in a fixed path in parallelism with the standard, and a position indicator for the drill located at the base and movable toward and away from the path of the drill.

9. A cloth drilling machine including means for mounting a drill for movement up and down along a fixed path, and indicator means automatically coacting with the first mentioned means so as to move into the path of the drill when the latter moves upward, and away from said path upon downward movement of the drill.

10. A cloth drilling machine having a support including a base, a standard thereon, at one side of the base, a head movable along the standard, said head having a vertical drill, said base having a generally central opening through which the drill is adapted to pass, said opening being of large size for visibility of the cloth to be drilled, and a radial indicator member in said opening lying substantially in the plane of the base and being permanently connected to said support, said indicator member being adapted to substantially align with the drill to indicate on the cloth the point at which the drill will penetrate the cloth.

11. A cloth drilling machine including a base, a standard mounted thereon at one side of the base, a head slidable along the standard, the head having a motor and a drill in generally aligned relation with the base, said base having an opening for the passage of the drill, the base at that side of the axis of the drill nearest to the standard having a substantially greater area for reduced unit bearing pressure on the cloth than the other portion of the base, and manual means superimposed over the motor for exerting a downward pressure on the head adjacent to the axis of the drill.

12. A cloth drilling machine including a base, a standard mounted thereon at one side of the base, a head slidable along the standard, the head having a motor and a drill in generally aligned relation with the base, said base having an opening for the passage of the drill, the base at that side of the axis of the drill nearest to the

standard having a substantially greater area for reduced unit bearing pressure on the cloth than the other portion of the base, the last mentioned portion of the base having substantially greater thickness than the first mentioned portion to partially counterbalance the offset standard, and means for exerting a downward pressure on the head adjacent to the axial line of the drill.

13. A cloth drilling machine, including a base, a standard mounted on the base at one side thereof, a head movable along the standard and including a drill and a motor therefor in general alignment with a central point of the base, and a bracket having a U-shaped portion embracing the standard and secured thereto, said bracket having a guide opening for the drill in proximity to but above said base, and the latter having an opening of large size for the passage of the drill and observation of the cloth under the base.

14. A cloth drilling machine including a base, a standard mounted thereon at one side of the base, a head movable along the standard, said head including a drill, a motor therefor and manual means for exerting downward pressure on the said drill, said drill, motor and manual means being located at a side of the standard generally above the central portion of the base, the latter having an opening for passage of the drill, anti-friction roller means between the slide and the standard, a flexible element connected to the head and movable along the standard, a drum on the standard on which said flexible element is adapted to be wound, and a coil spring connected to the drum and arranged to wind and unwind to tend to cause the head to be elevated, whereby a downward pressure on the manual means avoids the shifting of the machine from a vertical position when the base rests on a stack of fabrics.

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