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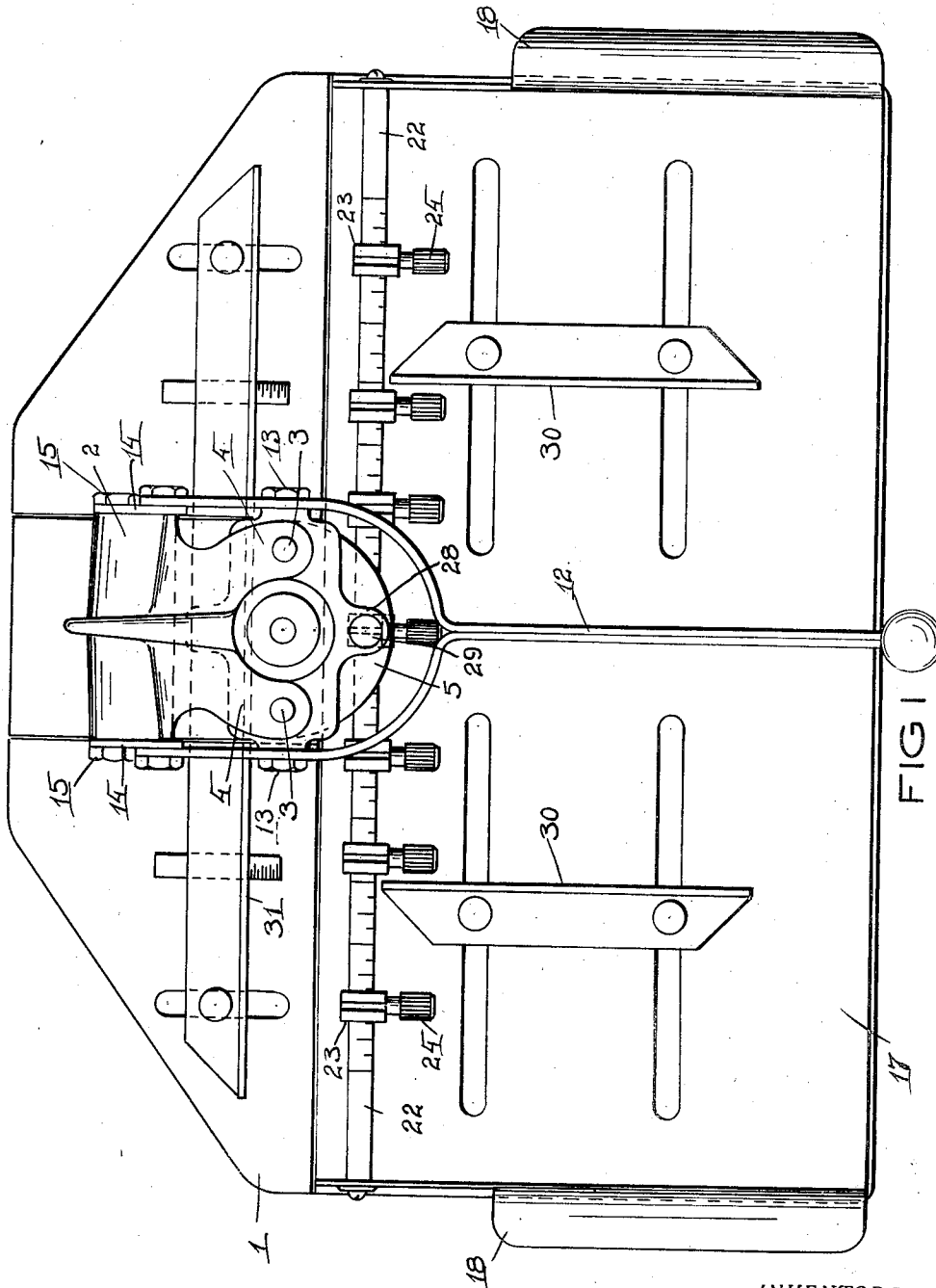
J. E. ELF ET AL

2,214,665

DRILLING MACHINE

Filed May 29, 1939

3 Sheets-Sheet 1



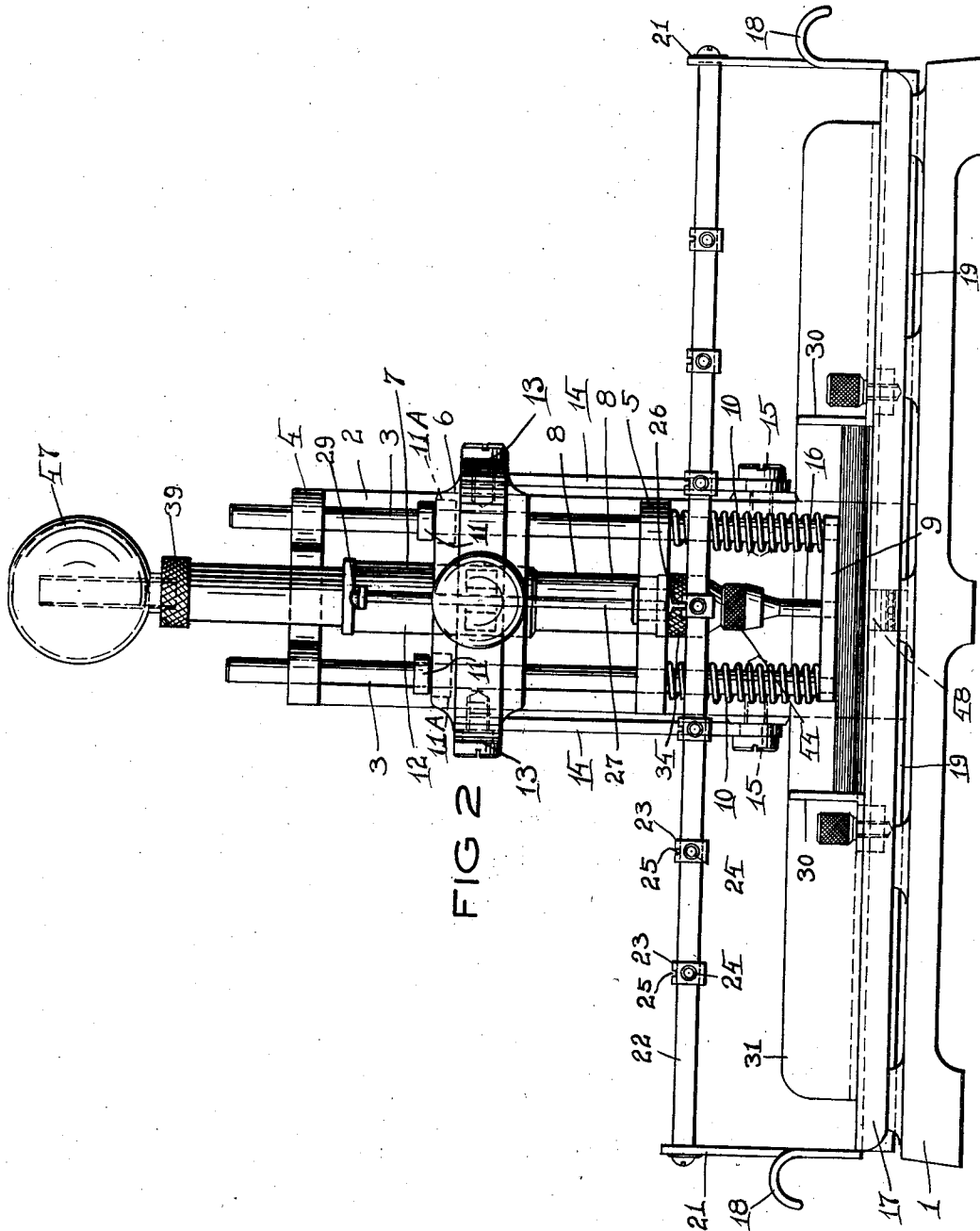
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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

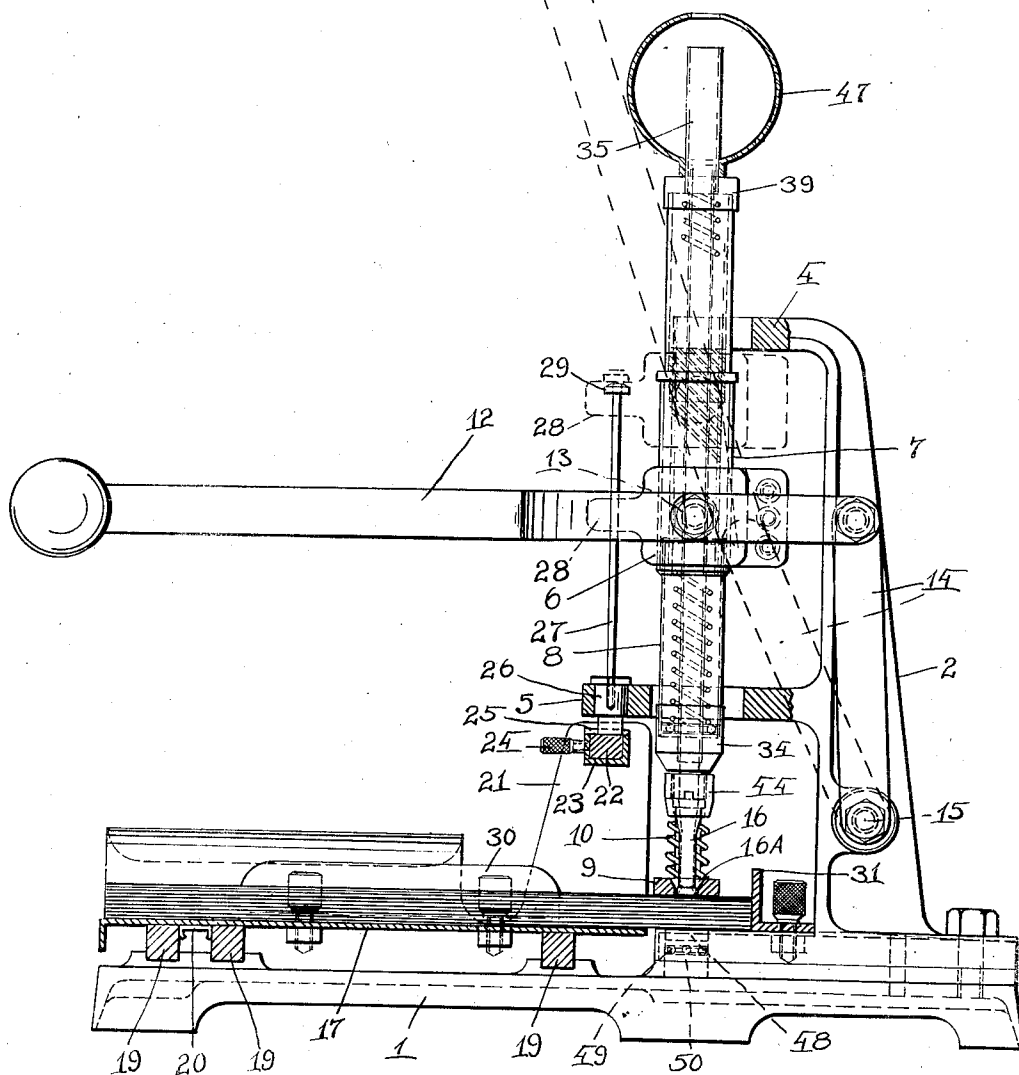


FIG 3

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UNITED STATES PATENT OFFICE

2,214,665

DRILLING MACHINE

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Application May 29, 1939, Serial No. 276,264

6 Claims. (Cl. 164—86)

This invention relates to drilling machines for paper, felt, leather, cloth or other similar materials or a combination of such materials and the invention has for its principal object to provide a drilling machine of this kind with novel material supporting and gauging means.

Another object of this invention is to provide novel interlocking means between the drilling mechanism and the material supporting and gauging means.

Both these and other objects and attendant advantages of the invention will become more readily apparent from the detailed description thereof which follows, reference being had to the accompanying drawings in which

Figure 1 is a top plan view of the novel drilling machine.

Figure 2 is a front elevation thereof.

Figure 3 is a partial side elevation and vertical sectional view of the machine.

The drilling machine, forming the subject matter of the present invention is especially adapted for use in offices, small book binderies or other places of business which require the perforation of paper or other sheet material in quantities which do not warrant the use and the expense of a power driven machine. Hand operated punches are at present used for perforating small numbers of sheets at a time but this at best is a slow and therefore costly way of perforating sheet material. With the present manually operated machine many times the number of sheets that can be punched by hand at a time may be drilled at one time.

As illustrated in the figures of the drawings, the drilling machine has a base 1 which carries in the middle and rear thereof the upright 2. A pair of vertical guide rods 3, 3 are supported by the upright and are mounted in the horizontal brackets 4 and 5 in front thereof. Mounted to slide on the guide rods is the spindle carrier 6 which has the spindle sleeve 7 adjustably held clamped therein. The rotating hollow spindle 8 is journaled in this sleeve and is operated by the mechanism that will hereinafter be described.

The lower ends of the guide rods 3, 3 carry the pressure plate 9 and surrounding the guide rods between this pressure plate and the under side of the bracket 5 are the coil springs 10, 10. These springs force the pressure plate 9 against the stack of sheets to be drilled to hold the sheets compressed while the drilling operation takes place. To release the pressure of the plate 9 on the sheets after each drilling operation, the guide rods 3, 3 are provided with the collars 11,

11 which are adapted to engage the shoulders provided by the pockets 11A, 11A in the top of the spindle carrier 6 and cause the spindle carrier to raise the guide rods and move the pressure plate to release its pressure on the sheets during its final upward movement after the drill has been withdrawn from the hole drilled thru the sheets. When therefore the spindle carrier is in its normally elevated position illustrated in dotted lines in Figure 3, the pressure plate 9 is held elevated by it. The spindle carrier is moved by the bifurcated lever arm 12 which embraces the carrier and is pivotally attached thereto at 13, 13. The ends of the lever arm 12 are pivoted to the links 14, 14 which in turn are mounted to swing at 15, 15 on opposite sides of the upright 2 near the bottom thereof. In this way the pivotal connections of the lever arm 12 with the upright and the spindle carrier provide a free movement for the spindle carrier on the guide rods and a free movement of the guide rods in the brackets 4 and 5 on the operation of the drilling machine by the lever arm. When the lever arm is raised into the dotted line position illustrated in Figure 3, the pivotal connection between the lever arm 12 and the links 14, 14 has been moved past the center line between the pivotal connection 13 of the lever arm to the carrier and the pivotal mounting 15 of the links, while the lever arm rests against the upper portion of the spindle so that the spindle carrier 6 and with it the pressure plate 9 is held in its normal elevated position with the springs 10, 10 held compressed above the pressure plate.

For the drilling operation the lever arm is moved downward so as to shift its pivotal connection and permit the expansion of the springs 10 and the downward movement of the guide rods 3, 3 with the pressure plate 9 while the spindle carrier is moved by the lever arm. Movement of the pressure plate and the guide rods is arrested when the pressure plate rests on top of the stack of sheets to be perforated and holds these sheets compressed while the spindle carrier with the spindle moves on to have the drill 16 pass thru the counter sunk hole 16A in the pressure plate and drills the stack of sheets in the manner that will hereinafter be described.

After the sheets are drilled, the lever arm 12 is raised to first withdraw the drill from the perforation and then raise the pressure plate 9 to release its pressure from the sheets. With the spindle in the raised position, above described, the stack of sheets may then be moved and located for the next hole to be drilled therethru.

To facilitate the movement of the sheets and provide for an accurate positioning thereof relative to the drill, a tray 17 is mounted to slide on the base 1 in front of the upright 2. This tray is preferably made up of sheet metal with the handles 18, 18 formed up at each end thereof. The tray is slidably mounted on the parallel rails 19, 19 which are held fixed on the base and are made up of wood or other suitable nonmetallic material. A clip 20 fastened to the under side of the tray, as illustrated in Figure 3, engages between two of the rails 19 so as to move between them and guide the tray in a straight line lateral motion on the base. A pair of vertical flanges 21 at the ends of the tray and the rear thereof support a gauge rod 22 in an elevated position above the bottom of the tray. Gauge members 23, 23 are movable on this gauge rod and may be adjustably fixed thereon by means of their thumb screws 24. Each of the gauge members 23 has a slot 25 in the top thereof to have a locking latch 26 engage therewith. This locking latch is carried by and is vertically movable in the outer bracket 5. For its operation the latch is provided with the latch rod 27 which extends upwardly therefrom and passes thru the lug 28 of the spindle carrier 6. At the top the latch rod carries the head 29 so that it will be engaged by the top of the lug 28 and raised thereby on the final upward motion of the spindle carrier. In this way the latch is disengaged from the gauge member on the withdrawal of the drill after each drilling operation. The gauge members 23 are arranged on the gauge rod according to the spacing desired for the holes to be drilled. The scale provided at the top of the gauge rod facilitates this spacing and permits the gauge members to be spaced and located in any predetermined position from the middle of the tray. As many positions for holes as there are gauging members may thus be located for drilling prior to the drilling operation and after the gauge members are set the tray is moved to bring one after the other of the gauge members in line with the latch so that the downward movement of the lever arm will cause the latch to first engage the gauge member and lock the tray in position and then have the pressure plate rest on the located sheets and hold them compressed while the drill is operated to drill thru the sheets. After this is accomplished, the upward movement of the lever arm withdraws the drill, releases the sheets from the pressure plate and unlocks the tray for lateral movement with the sheets to bring another gauge member in line with the latch for the next drilling operation.

The tray 17 is provided with a pair of parallel adjustable guide flanges 30, 30 which partially extend across the tray and are adjustable laterally to properly locate and hold the stacks of sheets between them relative to the scale on the gauge rod. A gauge flange 31 mounted on the base 1 and adjustable toward and away from the rear of the tray between it and the upright 2, is adapted to locate and guide the rear edge of the

stack of sheets supported on the tray and held between the flanges 30 in order to space the holes a uniformly predetermined distance from the edge. The clip 20, which guides the tray in its lateral motion on the base, is the only means which holds the tray in place on the base so that the tray and its gauging means may be easily and quickly removed and replaced on the base.

We claim:

1. In a drilling machine the combination of a base, a tray laterally movable on said base, a gauge rod held supported above said tray parallel to the movement thereof, gauge members adjustable on said gauge rod, a drill spindle vertically movable on said base and locking means operated by said drill spindle for engagement with said gauge members to hold and release said tray on said base on the movement of said drill spindle.

2. In a drilling machine the combination of a base, a drill spindle vertically movable on said base, a plurality of supporting rails on said base, a tray movably supported on said supporting rails, a clip carried on the under side of said tray for engagement with said guide rails to guide the tray in a straight line motion on said base relative to said spindle.

3. In a drilling machine the combination of a base, a tray movably supported on said base, adjustable sheet holding means on said tray, a gauge flange extending parallel to the movement of said tray and adjustably supported on said base for movement toward and away from said tray and a drill spindle vertically movable on said base between said tray and said gauge flange.

4. In a drilling machine the combination of a base, a tray laterally movable on said base, a gauge extending longitudinally of said tray, gauge members adjustable on said gauge, a drill spindle movable on said base, and locking means operated on the movement of said drill spindle for engagement with said gauge members to hold and release said tray on said base.

5. In a drilling machine the combination of a base, a tray laterally movable on said base, a gauge extending longitudinally of said tray, gauge members movable on said gauge, a drill spindle movable on said base, a locking latch movable on said base for engagement into and out of said gauge members, and means carried by said spindle for engagement with said locking latch to cause its engagement and disengagement with said gauge member during part of the movement of said drill spindle.

6. In a drilling machine the combination of a base, a tray laterally movable on said base, a gauge carried by said tray, gauge members on said gauge, a drill spindle movable on said base, a locking latch operated by said drill spindle for engagement with said gauge members, and guide means on said base for guiding the movement of said tray relative to said locking latch.

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