Oct. 14, 1941. J. E. LEE ET AL 2,258,856

ATTACHMENT FOR PAPER DRILLING MACHINES

Filed Nov. 8, 1939 3 Sheets-Sheet 1

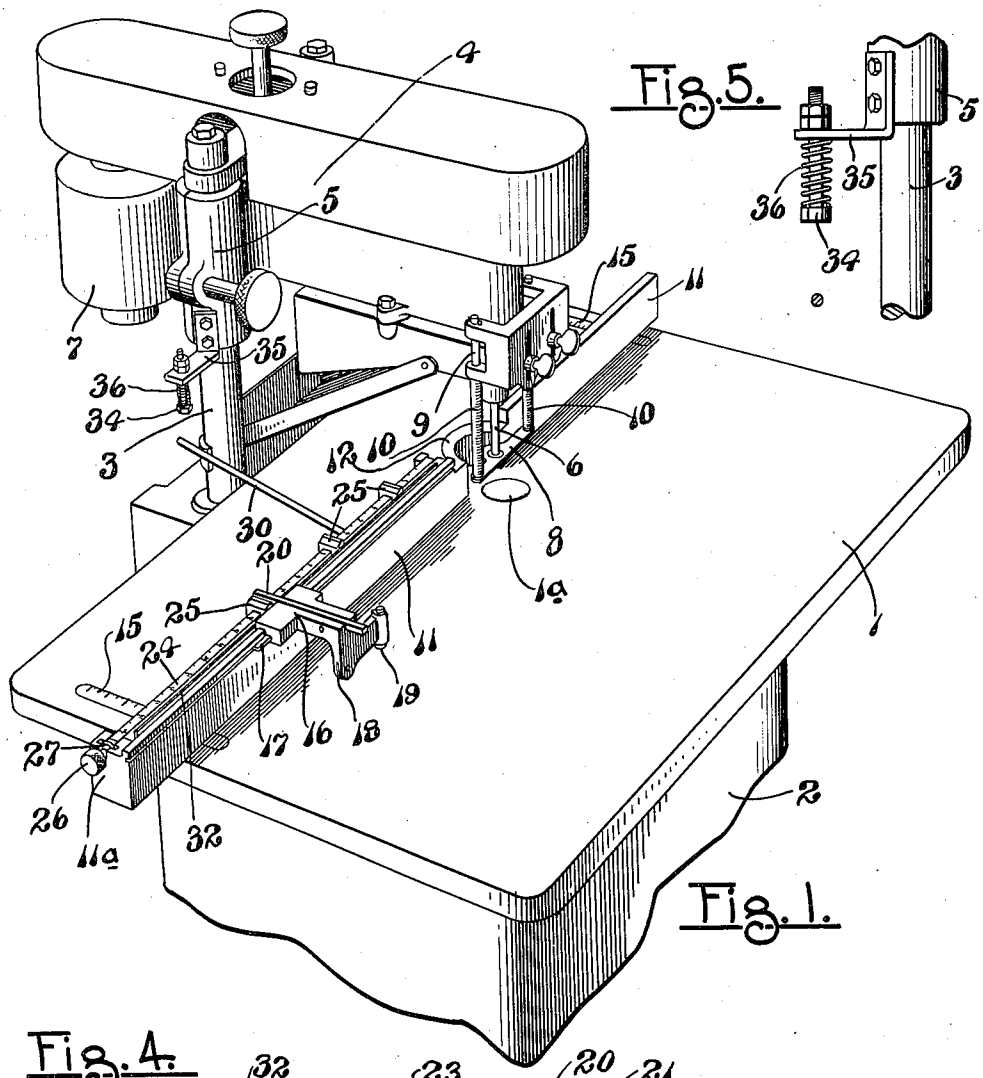

Fig. 1.

Fig. 5.

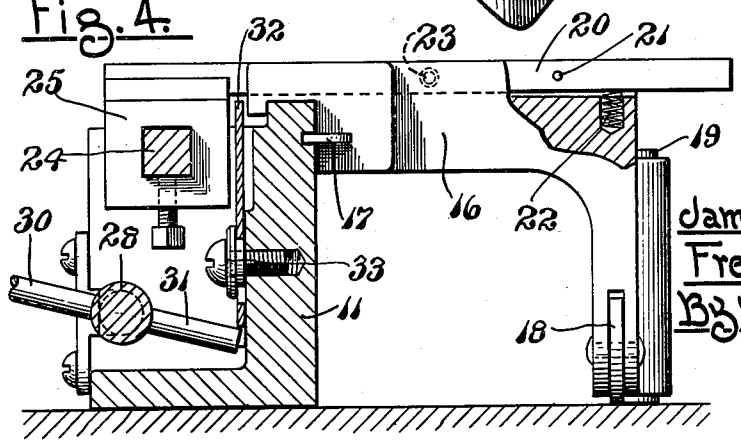

Fig. 4.

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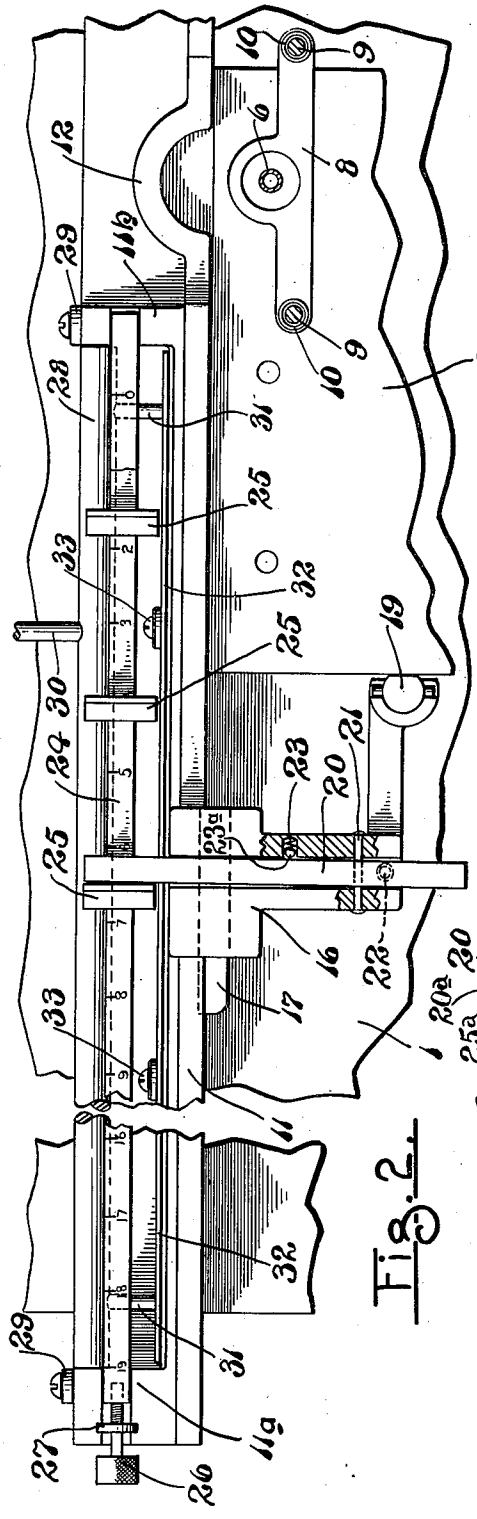

Fig. 2.

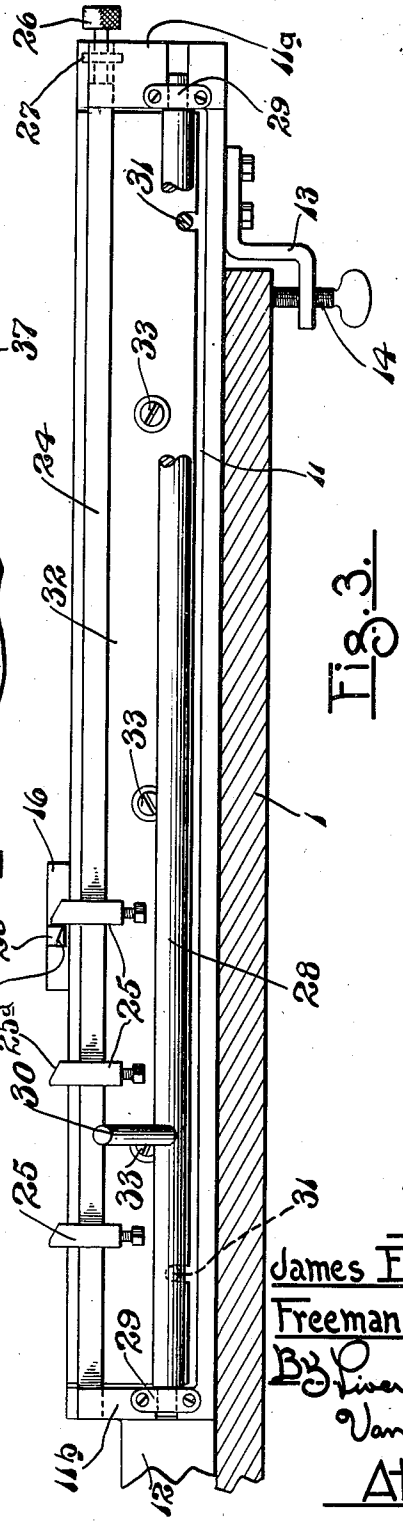

Fig. 3.

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Filed Nov. 8, 1939 3 Sheets-Sheet 3

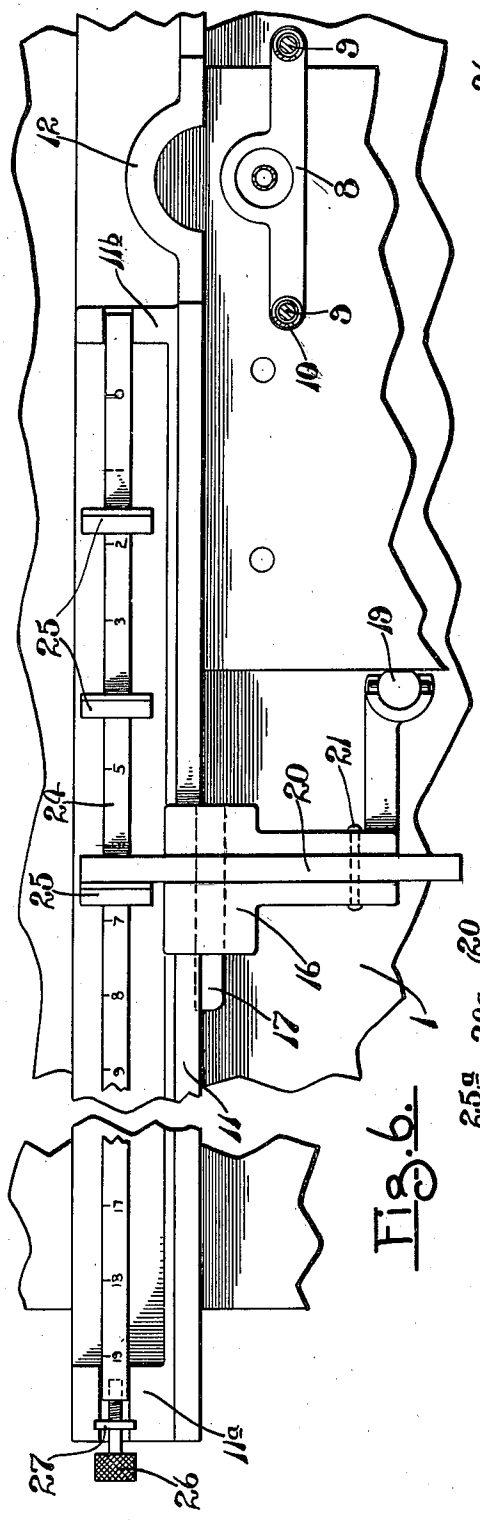

Fig. 6.

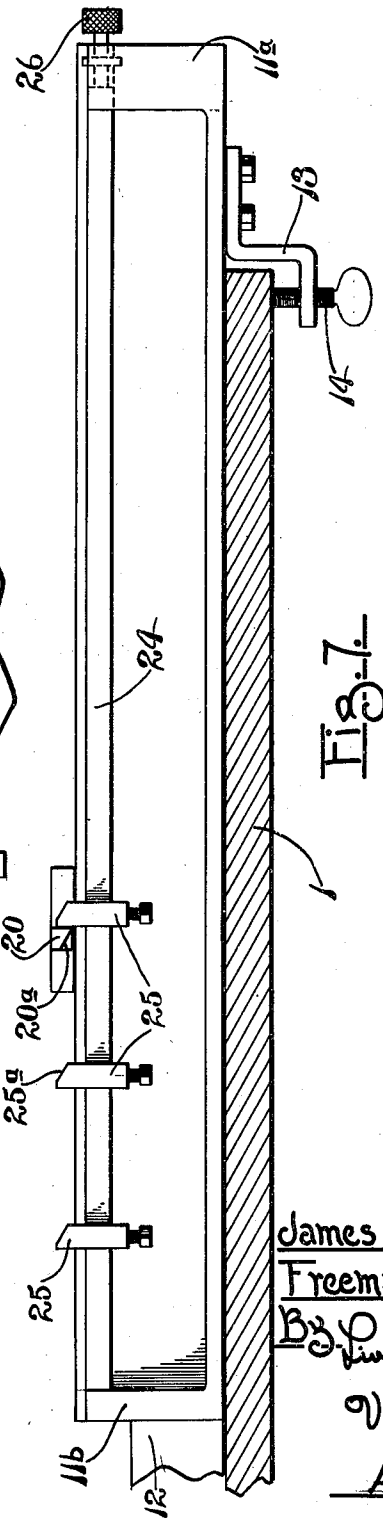

Fig. 7.

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UNITED STATES PATENT OFFICE

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ATTACHMENT FOR PAPER DRILLING MACHINES

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Application November 8, 1939, Serial No. 303,374

11 Claims. (Cl. 164—86)

This invention relates to paper drilling machines, and is more particularly concerned with a novel construction for properly locating a pack of paper sheets underneath the drill at two or more different positions in which the drill is to be brought against the sheet back for drilling a hole downwardly therethrough at each of several predetermined and preselected places for such holes.

Our invention is applied to paper drilling machines wherein a pack of paper sheets is placed upon a horizontal table and against a back gauge which lies lengthwise of the table, and also against an end gauge movably mounted upon the back gauge and adapted to be set at a number of predetermined and preselected positions in the length of the back gauge. The drill is movable vertically in a downward direction to and passes through the sheet pack to drill holes in the several sheets in alinement with each other. The back gauge as stated, is fixed with respect to the table and back gauge, the end gauge being adjustable to several different positions whereby the sheet pack after one drilling has been accomplished, may, after the adjustment of the end gauge to a different position, be moved to engage against said end gauge in its new position, and thus the drill will drill the sheet pack at a different place and in accordance with the change in position of the end gauge which has been made.

The present invention is directed to a novel construction for practically and effectively attaining the objects of this invention which are primarily concerned with a simple, practical and efficient control of the positioning of the end gauge at any one of a plurality of positions in the length of the back gauge, which positions may be preselected, may be readily changed for different conditions and for the drilling of holes through different packs of paper sheets at many differing distances from each other, and for automatically freeing the end gauge for an adjustment at the completion of the drilling of a hole through the sheet pack.

The invention may be understood from the following description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a paper drilling machine equipped with our invention.

Fig. 2 is a fragmentary plan view of the table of the machine with the invention applied thereto, showing the back and end gauges partly in plan and in section.

Fig. 3 is a fragmentary rear elevation of the structure shown in Fig. 2, the table being in vertical section.

Fig. 4 is a transverse section through the back gauge and an end elevation of the end gauge mounted thereon.

Fig. 5 is a fragmentary enlarged elevation of a detail of the machine.

Fig. 6 is a view similar to Fig. 2 omitting the automatic means, and

Fig. 7 is a view similar to Fig. 3, also omitting the automatic means.

Like reference characters refer to like parts in the different figures of the drawings.

The paper drilling machine to which our invention is applied includes a horizontal table 1, supported at a convenient height upon a lower housing 2. At the rear of the table are vertical posts 3, to which the drilling head 4 is adjustably connected for vertical adjustment by means of a split clamping sleeve 5 on the head which may be adjustably clamped to the posts 3 at different positions. The drill 6 is a hollow paper drill mounted vertically at the forward end of the drilling head so as to extend over the table and at its lowermost position, after completing the drilling of a sheet pack, its lower end may come to an insert 1a of wood, fiber or the like in the table. The drill is driven preferably by an electric motor shown at 7. Adjacent the drill 6 is a presser foot 8 mounted at the lower ends of vertically movable and guided rods 9 and normally pushed downwardly by coiled springs 10 which surround the rods. Such structure of drill, presser foot, drill head and the like is not new. The posts 3 are adapted to be vertically reciprocated, being moved downward when a drilling operation is to be performed and elevated after the operation has been completed. The method by which said posts are moved downwardly is not important. It can be done by a foot pedal physical operation or may be done in accordance with the disclosure of the pending application, Serial No. 180,818, filed December 20, 1937 for Hydraulic drive mechanism.

The back gauge 11 is a bar preferably having vertical and horizontal legs as shown in cross section in Fig. 4, the lower side of the horizontal leg resting upon the upper surface of the table 1, and the front face of the vertical leg being the face against which the rear edges of the sheets of a sheet pack are located. The back gauge, adjacent the position of the drill 6, has a rearwardly curved arcuate section 12. Said gauge bar 11 in practice is adjustably secured to the table 11 by brackets 13 and set screws 14 (Fig. 3)

at each end of the back gauge bar 11, and it is adjustably set with respect to the table in accordance with a gauge scale 15 shown in Fig. 1, preferably at each end edge of the table over which the back gauge is positioned.

The end gauge includes a bracket portion 16, one end of which is connected to and has a sliding movement upon the upper edge of the vertical leg of the back gauge 11, and is held in place by a key 17 which slides in a suitable longitudinal groove in the back gauge, as shown. The bracket 16 extends forward and then downwardly toward the table 1, at its lower end having a roller 18 which rides upon the table, and also having an extension substantially paralleling the back gauge 11, at the free end of which a vertical rod 19 is mounted, having a vertical face (Fig. 2) against which the end edges of the sheets of a pack of sheets are adapted to engage. Thus with the back gauge permanently fixed in position and the end gauge held in any one of a number of adjusted positions on the back gauge, the sheet pack is brought at its rear edge against the front face of the vertical leg of the back gauge 11 and one end against the vertical face of the member 19.

Lengthwise of and in the upper side of the forwardly projecting portion of the bracket 16, a longitudinal slot is cut in which a bar 20, provided with a beveled portion 20*a*, is located and pivotally mounted between its ends at 21, nearer the front end of the bar than the rear end (Fig. 4). The front end portion of the pivotal bar 20 is normally lifted by a coiled spring 22, as shown in Fig. 4. The width of the slot is greater than the width of the bar 20. A coiled spring 23 and ball 23*a* (Fig. 2) engages against the side of the bar 20 which is toward the position of the drill 6, and at a point back of the pivot pin 21, so that normally the spring 23 when free to do so will move that portion of the bar 20 back of the pin 21 to the left (referring to Figs. 1 and 2).

The back gauge bar 11 at its rear side has two integral rearwardly projecting and spaced apart blocks 11*a* and 11*b*, the latter of which is at the left of and adjacent the rearwardly curved section 12 of the back gauge bar, and the former at the outer left hand end of the bar as shown. The blocks 11*a* and 11*b* at their upper sides and back of the face of the back gauge have vertical slots.

A square bar 24 is removably located at its ends. The bar 24 at its upper side carries indicia measured in inches and fractions thereof, beginning at zero a short distance to the left of the block 11*b* (Fig. 2) and extending therefrom as a scale to the left hand end of the bar. Stop blocks 25, any number that may be required, provided with beveled portions 25*a*, have square openings therethrough and are placed upon the bar at spaced apart distances and secured in any desired position by tightening set screws which pass upwardly through the lower sides of the blocks 25 against the bar 24, as shown in Figs. 3 and 4. At the outer end of the bar 24 a screw having a head 26 is threaded thereinto on the shank of which screw is a fixed or integral collar 27 of greater diameter than the width of the slot which receives the bar, and which is seated in a transverse slot in the upper side of the end block 11*a* (Fig. 2). The bar is readily removed from the slots in which it is held, both for changing the number of stop blocks 25 to be placed thereon, and for adjusting and setting the blocks at desired positions, being returned to place after the selected number of stop blocks have been properly adjusted and secured.

A rock shaft 28 extends between the end supporting blocks 11*a* and 11*b* and at its ends is received in slots made in the rear lower portions thereof and held by securing clips 29. A rod 30 connected with the rock shaft 28 extends rearwardly and slightly upwardly therefrom. Two fingers 31 are connected one toward each end of the rock shaft 28, and come underneath an elongated thin plate 32 mounted at the rear side of the vertical leg of the back gauge 11 and adapted to have a limited vertical movement. The plate 32 is provided with spaced vertical slots through which screws 33 pass into the vertical leg of the back gauge, the slots permitted a limited vertical movement, whereby on elevation of the plate 33 it comes against the under rear portion of the bar 20, elevating the same with an attendant compression of the spring 22.

The rod 30 at its rear end portion comes underneath the head of a bolt 34, the shank of which passes upwardly freely through a horizontal bracket 35 connected with the clamping sleeve 5. A coiled compression spring 36 holds the bolt in its lowermost position but permits an upward movement of the bolt through the bracket 35; and when in the downward movement of the post 3 during the drilling operation, the head 34 comes against the rod 30, shaft 28 is rocked, the fingers 31 at their free ends turned upwardly and the plate 32 is elevated the distance permitted by the slots in the plate through which the screws 33 pass.

A plurality of sheets of paper in a pack, as shown at 37 in Fig. 2, is placed upon the table with the rear edges of the sheets against the back gauge and against the end gauge so that the rear end portion of the bar 20 is against the right hand vertical face of the stop block 25 nearest to the drill.

Having particular reference now to Figs. 6 and 7, it will be noted that all of the elements which relate to the automatic means for raising one end of the bar 20 may be eliminated for the purpose of operating the same manually. When it is desired to utilize the machine without the automatic means, the operator may manually depress the front end of the bar 20 so as to carry the rear end portion of the bar 20 over the upper sides of the stop blocks 25.

The end gauge is pressed against by the sheet pack so that the bar 20 at its rear portion is swung, as shown in Fig. 2, with an accompanying compression of the spring 23, this being done when the sheet pack 37 is moved to engage an edge against the member 19. The drilling may be then performed. The automatic elements may operate at the end of the operation when the lower end of the head of the bolt 33, by engaging with the rod 30 rocks the shaft 28 and elevates the plate 32, which thereupon lifts the rear portion of the bar 20 above the stop gauge block 25 with which it is engaged; and when it has cleared the block, spring 23 automatically swings the rear portion of the bar 20 to the left (Fig. 2) over said block whereby the end gauge is freed and may be moved to the left until stopped when the bar 20 engages against the vertical side of the next succeeding stop gauge block 25. This may be done by moving the sheet pack to the left, the end gauge moving ahead of it because it has been automatically freed from the block 25 which has previously held it in fixed position. The drilling performance is

then repeated and may be repeated for as many holes as are to be drilled through the pack. When all of the holes have been drilled through the pack and the pack has been removed, the end gauge is then brought back to its initial position. No further operations on the part of the operator is necessary when moving the end gauge back, since the beveled portions **20***a* on the bar **20** and **25***a* on the stops **25** coact to automatically lift and drop the bar **20** as the end gauge is moved toward the right in Figs. 1 and 2. With this construction an accurate preselection and the distances apart of the holes which are to be drilled through a pack of paper sheets may be accomplished very quickly and easily, and the drilling of the sheets performed readily and efficiently.

The invention has proven very practical and successful in use. Variation in the detail of structure may be resorted to without departing from the invention which is defined in the appended claims, and the invention is to be considered comprehensive of all forms of structure coming within the scope of said claims.

We claim:

1. A construction of the class described comprising, an elongated stop gauge bar, an end gauge member slidably mounted for movement lengthwise of the stop gauge bar, said end gauge member extending forward from the stop gauge bar substantially at right angles thereto and having a longitudinal slot in its upper side, a lever of less width than the slot pivotally mounted between its ends on the end gauge member and located in said slot, spring means normally elevating the outer end of the lever and depressing the rear end thereof, a second spring means engaging against a side of the lever to normally move the same toward one side of the slot, and stop blocks adjustably mounted on said back gauge member having upper portions in the path of movement of the rear end of the lever whereby when the end gauge member is moved in one direction said lever comes against a stop block and is held in a fixed position from which it may be released by elevating the rear end of said lever or depressing the front end thereof.

2. In a construction of the class described, an elongated stop gauge bar, an end gauge slidably mounted on and extending forward from the back gauge bar, said end gauge member having a longitudinal slot in its upper side, a lever located in said slot and pivotally mounted on the end gauge member between the ends of said lever, a scale bar having a measurement scale at its upper side mounted on the back gauge bar at the rear thereof, a plurality of stop blocks having openings through which the scale bar passes, means for releasably securing the stop blocks at preselected positions in the length of said scale bar, said stop blocks projecting upwardly into the path of movement of the rear end portion of said lever, spring means acting on the lever to normally maintain the rear end of the lever in a lower position, a flat plate at the rear side of the back gauge bar and in front of said stop blocks, said plate having mounting means permitting a limited vertical movement thereof, and having its upper edge in the lowermost position of the plate located a short distance below the lower edge of said lever, a rock shaft paralleling said stop gauge bar and scale bar mounted for rocking movement below the scale bar, fingers extending forwardly from the rock shaft underneath the lower edge of said plate, and an operating member extending rearwardly from the rock shaft, as and for the purposes specified.

3. A construction containing the elements in combination defined in claim 2, said slot in the end gauge member being of greater width than the width of said lever, and a second spring means engaging with the lever back of its pivotal mounting to move the rear portion of the lever against one side of the slot, said spring means being overcome and the lever moved against the opposite side of the slot on moving the end gauge member and the lever carried thereby so that the lever engages against a side of a stop block, whereby when the rear end of said lever is lifted above the stop block it is automatically moved over the upper end of the stop block substantially the distance that the slot is wider than said lever.

4. A paper drilling machine having a horizontal table, a drilling head, said drilling head being adapted for reciprocating vertical movements, a back gauge bar secured lengthwise of and above the table, an end gauge member slidably mounted on the back gauge bar, stop blocks carried by the back gauge bar in spaced relation to each other, releasable means on the end gauge member engaging said stop blocks, and means for actuating said releasable means on downward movement of the drilling head to a predetermined position.

5. A construction containing the elements in combination defined in claim 4, combined with a scale bar having a measurement scale at its upper side secured lengthwise of the back gauge bar upon which said stop blocks are mounted, and said releasable means consisting of a lever pivotally mounted between its ends on said end gauge member, the rear end of which in the lowermost position thereof engages against a side of a stop block, the elevation of the rear end of the lever serving to free the end gauge member from a stop block.

6. In a construction of the class described, a paper drilling machine having a horizontal table and a drilling head, a post on which the drilling head is mounted, said post being adapted for vertical reciprocation, a back gauge bar mounted on and lengthwise of and over the table, an end gauge member slidably mounted on the back gauge member, spaced stop blocks carried by the back gauge bar, a pivotally mounted lever on said end gauge having a rear end portion adapted to engage against a side of a stop block, said rear end portion of the lever being movable in an upward direction to disengage therefrom, means mounted on the stop gauge bar extending toward said reciprocable post, and means movable with said reciprocable post to engage with said first mentioned means on downward movement of the post whereby said first mentioned means is operated to elevate the rear end of said lever.

7. A construction of the class described for use with a drilling machine comprising, a back gauge bar, an end gauge slidably mounted thereon, stop blocks carried by said back gauge bar in spaced relation to each other, a movable member on said end gauge adapted to come against a side of a stop block, and means for automatically moving said movable member in a direction away from said block upon the substantial completion of a drilling operation, whereby the end gauge may

be moved lengthwise of the back gauge bar to a next succeeding stop block.

8. In a construction of the class described, an elongated back gauge bar, an end gauge member slidably mounted thereon to move lengthwise of the bar, stop blocks adjustably mounted on said back gauge bar, a lever pivotally mounted between its ends lengthwise of the end gauge member and extending transversely of the back gauge bar, having its rear end portion normally held in a lower position to come against a side of a stop block, but tiltable to elevate its rear end portion to pass over said block with which engaged, a plate mounted for a limited vertical movement on the back gauge bar with its upper edge normally slightly below the lower edge of said lever, and means comprising a rock shaft, fingers extending therefrom underneath the lower edge of said plate, and an operating member extending rearwardly from said rock shaft, the depression of said operating member at its rear portion serving to elevate said plate and lift the rear end of said lever.

9. A paper drilling machine having a horizontal table, a vertically reciprocating drilling head, a back gauge bar secured lengthwise of and above the table, an end gauge slidably mounted on the back gauge bar, stop blocks carried by the back gauge bar in spaced relation to each other, releasable means on the end gauge member engaging said stop blocks, and means so arranged that said releasable means will rest on top of a stop block after release thereof.

10. The combination of elements defined in claim 9, combined with means for actuating said releasable means on downward movement of the drilling head to a predetermined position.

11. The combination with a drilling machine having a vertically movable head, of a back gauge bar, an end gauge movable lengthwise thereof, stop blocks carried by said back gauge bar in spaced relation to each other, a movable member on said end gauge adapted to come against a side of a stop block and movable to disengage therefrom, whereby the end gauge may be moved to the next succeeding stop block, and means adapted to be operated on downward movement of the vertically movable head to move said movable member and release same from engagement with a stop block against which it is engaged, as specified.

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