Feb. 4, 1936. J. E. LEE ET AL 2,029,624 PAPER SLITTING AND SLOTTING MACHINE
Filed Dec. 3, 1934 3 Sheets-Sheet 1

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This invention relates to a paper slitting and slotting machine and particularly to such a device arranged as an attachment for paper drilling machines by means of which, through the ready connection of a relatively simple attachment, a machine which is used to drill holes through paper may be very quickly converted to one which will either slit or slot the paper outward from the holes to the adjacent edge thereof.

It is a primary object and purpose of the present invention to provide a simple attachment of the character described and one which is very quickly, easily and readily secured in place on the paper drilling machine. And to further provide a very practical and useful means, as an improvement in the gauge stop for paper drilling machines shown in the prior Patent No. 1,928,383, issued September 29, 1933, whereby said gauge stop may be used for fixing or gauging the places where the holes in the paper are drilled, in properly selected spaced apart relation, and which improved stop may also thereafter be operated in connection with the slitting attachment applied to the paper drilling machine so that the sheet or sheets of paper may be simply slitted in alinement with or in extension of a diameter of each of the holes drilled, or may be slitted by slitting the paper at equally spaced distances to each side of said extended diameter of each hole, to thereby provide slots extending from the drilled holes outwardly to the edges of the paper sheets, which slots are symmetrically disposed with respect to the diameter of each hole drilled.

An understanding of the invention for the attainment of the ends stated, as well as many others not at this time particularly set forth may be had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is an elevation, with parts broken away and shown in section, illustrating the paper drilling machine to which our invention is applicable.

Fig. 2 is a fragmentary horizontal section looking down upon the presser member used in connection with the paper drilling, which member is removed from the machine together with the drill, and the slitting attachment applied to the machine at the place of attachment of said presser member construction.

Fig. 3 is a fragmentary plan view showing the machine equipped for slitting or slotting the paper sheets after the same have been drilled.
mally moved upward by a coiled spring 16 but may be pressed downwardly by the foot of the operator. A cable 18 extends from the lever to and partially around a second drum 19 on shaft 20. A spring 21 is attached to the lower end of the lever. The table 10 is elevated, the upper sheet of the pack of paper brought against the underside of the presser bar 6 and the paper fed upwardly to the top. Through the said pack and drills a hole therethrough. The mechanism by means of which the table 10 is elevated is old and well known and need not be further specifically described.

A back gauge 20, against which the rear edges of the sheet pack 11 may engage, is carried on the table 10 and in practice may be adjusted to different positions so as to properly locate the distance that the holes drilled through the sheet pack are from the rear edges of the paper sheets.

The block 8, which carries the rod 7 and presser member 6, is detachably secured to the free end of a forwardly projecting arm 22 by means of removable thumb bolts 21 so that the presser bar assembly can be very quickly and easily removed and, as will later appear, the slitting attachment of our invention secured at the same place, utilizing the same threaded holes that receive the thumb bolts 21 in the front end portion of the arm 22.

The slitting attachment, which is detachably bolted to the outer end of the supporting arm 22, comprises a vertical flat bar 23 having a head 24 at its lower end, there being lateral ears on the bar 23 through which headed bolts may pass into the previously mentioned threaded openings at the front end portion of the arm 22, thereby rigidly securing the slitting attachment in place.

The drill 5 is removed from the shaft 4. A slitting knife extends downwardly, comprising a thin plate 26 having a cutting edge at its lower end, and at its outer vertical edge being secured to a strengthening and reinforcing rod 27 which is also used in attaching the slitting blade to the head.

A vertical bar 28, square in cross section, is slidably mounted through the forward end of the head 24 and through a forwardly turned arm 29. The sheet pack 11 is carried on the outer end of the block 29 at its lower end which extends rearwardly and is slotted or divided at its free end portion to provide a space through which the knife may pass (Fig. 7). The presser foot 20 is yieldably held in a lowered position by a coiled spring 30 disposed between head 24 and the arm 23a.

After the pack has been drilled, in order to properly position the same for slitting it is necessary that it be carried forward and held in a gauged position in front of the back gauge 20. Therefore, for the slitting or slotting operations, an auxiliary gauge bar 31 is positioned in front of the back gauge 20 and detachably held in place by means of a connecting bracket 32 through which thumb screws pass to engage with the back gauge bar 20. The bar 31 has a vertical slit 33 made for the passage of the slitting knife 27 therethrough, thereby serving to maintain the knife against buckling or warping and acting as a reinforcing guide for the knife.

When the sheet pack 11 in the drilling operations, and also later in slitting the sheets, is positioned on the table not only by the back gauge 20 when drilling and by the auxiliary back gauge 31 when slitting, but is also gauged at one side edge, using an improvement made in the structure shown in prior Patent No. 1,928,383 above mentioned. The full detail of the adjustable gauge stop of such Patent No. 1,928,383 need not here be outlined but only the necessary additional hardware necessary to properly set forth the improvement which has been made. In such gauge structure a member 34 is mounted for longitudinal adjustment on the back gauge 20 carrying a rotatable disk 35 which can be turned to different positions, in each of which it will engage against the end of a selected gauge rod to there being a plurality of said rods extending at their free ends to different positions whereby the member 34 may be moved along the bar 30 and stopped at predetermined selected positions. There is also shown in Patent No. 1,928,383 a gauge member carried by a part similar to the part 34 to bear against a side edge of the sheet pack 11, including a bar 37 and a vertical substantially cylindrical rod 38 having its outer side flattened and its lower end resting upon the table 10. By selectively adjusting the member 34 to its several predetermined positions on the member 20, the sheet pack 11, when brought against the flattened side of the member 35, may be placed in several predetermined selected positions with respect to the paper drills of the sheet packs of the pack adjacent one edge thereof at properly spaced apart points.

The side gauge contact member 38 and the part 37 on which it is mounted have a limited range of movement and an adjustment to three different positions. At the end of the member 24 a housing is provided consisting of a longitudinal bar 39 fastened to the end of the member 34 (Fig. 10) and closing the open side of a channel shaped cooperating housing member 40. A bolt 41, passing through said members, connects the same together and also passes through a short longitudinal slot 42 made in an extension bar 43 to the part 37 whereby said part 37, its extension 43 and the contact member 38 are adjustable within the limits prescribed by the slot 42 and bolt 41.

The bar 43 within the housing has a vertical slot 44 therein and at its upper side it is recessed so that a block 45 may be secured in said recess to the inner flange of the housing member 40 by means of screws as shown. A coiled compression spring 46 is also provided. The upper end of the block 45 has a projection 47 on the member 43, as shown in Fig. 9, has a tendency to move the bar 43 and the connected parts 37 and 38 inwardly. A shaft 47 is mounted between the sides of the housing and extends through the vertical slot 44 having therein an eccentric 48. The shaft is provided with a crank 49 at one end, the turning of which can move the bar 43 and connected parts to different positions. A latch bar 50 is pivotally mounted on the bar 43 (Fig. 10) and is adapted to be turned downwardly into slots 51 and 52 cut across bar 43 and the housing member 40. The latch bar can be turned downwardly only when the slots 51 and 52 are in alignment, this being at a midway position between the extreme positions of movement of the bar 43. In Fig. 9 the full line position of the part 39 illustrates its position when bar 43 is moved inwardly to its extreme inner position. The nearest dotted line position thereof shown in Fig. 9 is the intermediate position in which it can be locked by turning the latch bar 50 into the slots 51 and 52, while the other dotted line position, farthest away from the full line position, is the extreme outer position which the part 39 can take. That is, by turning the crank 49 downwardly the bar 43 may be moved first to
its intermediate position with slots 51 and 52 in alignment whereupon the latch 50 may be dropped into said aligned slots. Or if this is not done, a still further movement downwardly of the crank 45 carries the parts to the other extreme position shown in the outer dotted line position in Fig. 9.

With this machine and with the drill and presser member attachment assembled therewith as shown in Fig. 1, a series of spaced apart holes 53 may be drilled through the sheets 11 of the pack of sheets in properly spaced apart relation, generally as to spacing by a gauge stop such as illustrated in Patent No. 1,928,383. When this drilling of the holes 53 takes place the latch bar 50 is turned downwardly into the slots 51 and 52.

In many cases it is desirable only that there shall be a slit, as at 54 in Fig. 12, extending from the holes 53 to the adjacent edge of the paper sheet and in alignment with a diameter of the hole. In such case the drilling presser member and the drill are removed and the slitting attachment to described is holding the gauge member 38 in intermediate position. Then by stepping on the foot lever 17 table 10 is moved upwardly and the slits 54 made. Of course, the auxiliary backing bar 31 is used so as to properly position the sheet pack with respect to the slitting knife 46.

In the case where slots are to extend outwardly from the holes 53 to the edges of the paper sheet the latch bar is turned upwardly to release the bar 43, in which case the intermediate gauge member 38 is engaged against one of the edges of the sheet pack is moved in practice one-sixteenth of an inch, from the position in which it would occupy if bar 43 was latched at its intermediate position. This brings the gauge slitting knife 46 above and adjacent the opening drilled, such as 53 in Fig. 11, in the plane of the dotted line 55; whereupon, on operation of the machine and upward movement of the table 10, the paper is slitted at 55 as indicated at the middle hole 53 in Fig. 11 at 55 at a place one-sixteenth of an inch to one side of an extension of a diameter of the hole which is parallel to said slits 55. Then by grasping the handle 49 and turning it downwardly to its extreme position the slitting knife will be brought above the plane of the line 56, that is one-sixteenth of an inch to the opposite side of said diameter. With upward movement of the table 10 the sheets may be slit on the line 56 thereby providing a slot such as indicated at 57.

It is accordingly evident, with the invention which we have made, that on the same machine sheet packs of paper, which may be sheets of paper or thin cards, may first be properly drilled and then either slitted as shown in Fig. 12, or slotted as shown in Fig. 11. This result is obtained through a very simple addition to the machine in the way of substituting the combined slitting and pressing attachment for the pressing mechanism which is used in drilling, together with the auxiliary backing bar 31 and the adjustable side gauge which has been described. With this construction there may be a very rapid drilling and slitting or slotting of the sheets through the provision of a comparatively simple and inexpensive attachment to a drilling machine.

It is conceived and apparent that the slitting and slotting elements of this invention may be used for that purpose per se without being attached to the same machine which drills the holes and that the holes may be drilled with one machine and slitting or slotting done with another machine.

The invention has proven very practical and satisfactory. It is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

We claim:

1. In a drilling machine of the class described adapted to drill and cut a plurality or pack of sheets or the like having a table adapted to receive said sheets, a support above the table, and a drill movably mounted on the support, said drill being adapted to cut the said sheets, the combination of a back gauge mounted upon the table, said sheets being located against the gauge whereby they may be drilled, a slitting mechanism movably attached to the said support, said drill being removed when the slitting mechanism is attached in position and means of predetermined dimension adapted to be inserted between the back gauge and the sheets whereby the slit which may be cut by the slitting mechanism is positioned in a predetermined relationship relative to the first cut which is made in the sheets.

2. A combination of elements as recited in claim 1 in which the means having a predetermined dimension is a bar extending alongside of the back gauge.

3. The combination of elements as recited in claim 1 but also having additional means for locating the plurality or pack of sheets in a direction parallel to the back gauge.

4. A combination of elements as set forth in claim 1 in which additional means are provided for locating the sheets in a direction substantially parallel to the back gauge, said additional means having two predetermined positions for the purpose described.

5. A combination of elements as per claim 1 in which additional means are provided for locating the sheets in a direction substantially parallel to the back gauge, said additional means having three predetermined positions for the purpose described.

6. In a construction of the class described having a table adapted to receive an article upon which certain manipulations are to be performed, means for moving the table vertically, a stationary support located over the table, two independent mechanisms adapted to perform the said manipulations upon the article, means for detachably mounting each of said mechanisms upon the said stationary support, means fastened to the table to position the article in one direction for one of the mechanisms and a removable gauge bar of predetermined thickness positioned alongside of said means whereby the article is positioned in the same direction for the other mechanism.

7. A construction of elements as set forth in claim 6 but also having means slidably mounted upon the positioning means for positioning the article in a second direction at right angles to the first direction.

8. In combination, a table adapted to receive a plurality of sheets of paper or the like, means for moving the table vertically, two mechanisms, one mechanism for drilling the paper, said mechanism being positioned in spaced relation to each other, a gauge bar mounted upon the said table whereby the sheets of paper may be positioned in the desired relation to the drilling mechanism and removable means adapted to be located alongside of the last mentioned means for locating...
ing the paper in the desired relationship to the other mechanism.

9. In a construction of the class described, a table having a back gauge, a bar located along- side of the back gauge and being removable fast- tened thereto, means slidable mounted for longi- tudinal movement along the back gauge, a side gauge having three predetermined positions and means for detachably attaching said side gauge to the longitudinally mounted means.

10. In combination, a housing, a member slid- ably mounted thereon, said member having an elongated opening therethrough, a bolt extend- ing through the housing and the opening whereby the said member may move a predetermined dis- tance, a shaft extending through the housing, cam means on the shaft adapted to contact the sliding member and move it in one direction, and spring means for moving the member in the other direction.

11. The combination of elements as in claim 10 in which the said member has a slot therein and the housing has a bar pivoted thereon, said bar being movable to a position within the slot when the said member is in its intermediate position.

12. An attachment for paper cutting machines comprising, a lower support, an upper support mounted upon the lower support, a table, means for mounting the table upon the lower support whereby it may be moved vertically, means for moving the table vertically in both directions, lat- erally extending means on the upper support, a removable drill revolubly mounted in said later- ally extending means, a back gauge mounted upon the said table, said back gauge serving as a stop for a plurality of paper sheets whereby the paper sheets may be positioned underneath the drill to perforate the same in a desired location; an arm mounted upon the upper support and also extending laterally therefrom, a slitting attachment mounted upon said arm and means removably mounted between the back gauge and the plurality of paper sheets whereby the sheets are positioned in desired relationship to the said slitting means.

13. A combination of elements as set forth in claim 12 in which a member is slidable mounted upon the back gauge, said member having contact means adapted to contact with an edge of the paper sheets which is located at right angles to the back gauge and means for adjusting the contacting means to two predetermined positions.

14. A combination of elements as set forth in claim 12 in which a member is slidable mounted upon the back gauge, said member having contact means adapted to contact with an edge of the paper sheets which is located at right angles to the back gauge and means for adjusting the contacting means to three predetermined positions for the purpose described.

15. A device of the class described comprising, a horizontal work table, a thin slitting blade above said work table having a lower cutting edge, a stiffening member extending along one vertical edge of said blade, a back gauge on said table having a slot to receive and guide the edge of said blade opposite to that on which the stiff- ening member is mounted and means for mount- ing said blade and said work table for relatively vertical movement.

16. The elements in combination defined in claim 15, combined with an edge stop compris- ing, a stop member and means for moving said stop member alternately to either of two prede- termined locations spaced in a direction parallel to the working face of the back gauge.

17. A device of the class described comprising, a horizontal work table, a back gauge on said work table, means for slitting paper upon said table and against said back gauge, an edge stop compris- ing a stop member and means for moving said stop member alternately to either of two locations relative to said slitting means and means for positively locking said stop member in a location intermediate said two locations.

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