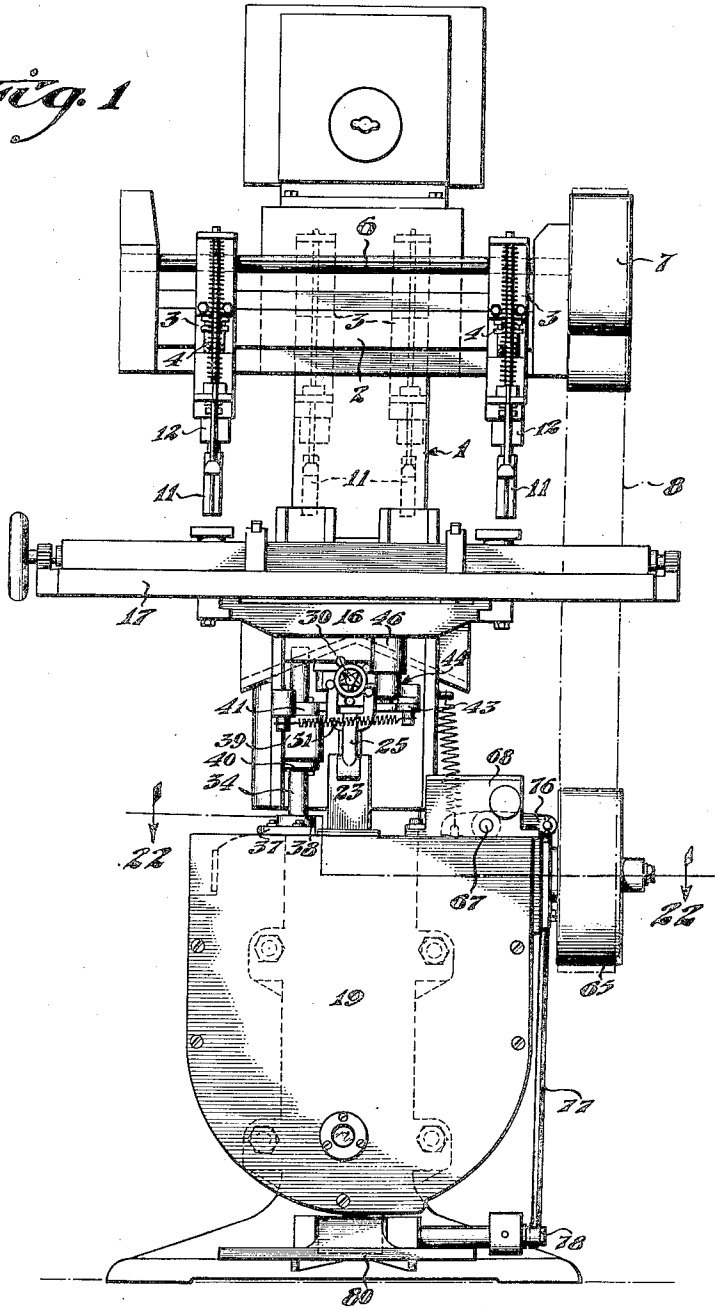
May 2, 1933. J. T. WRIGHT 1,906,875

PAPER CUTTING MACHINE

Filed July 11, 1930 8 Sheets-Sheet 1

Fig. 1



INVENTOR

BY Joseph T. Wright

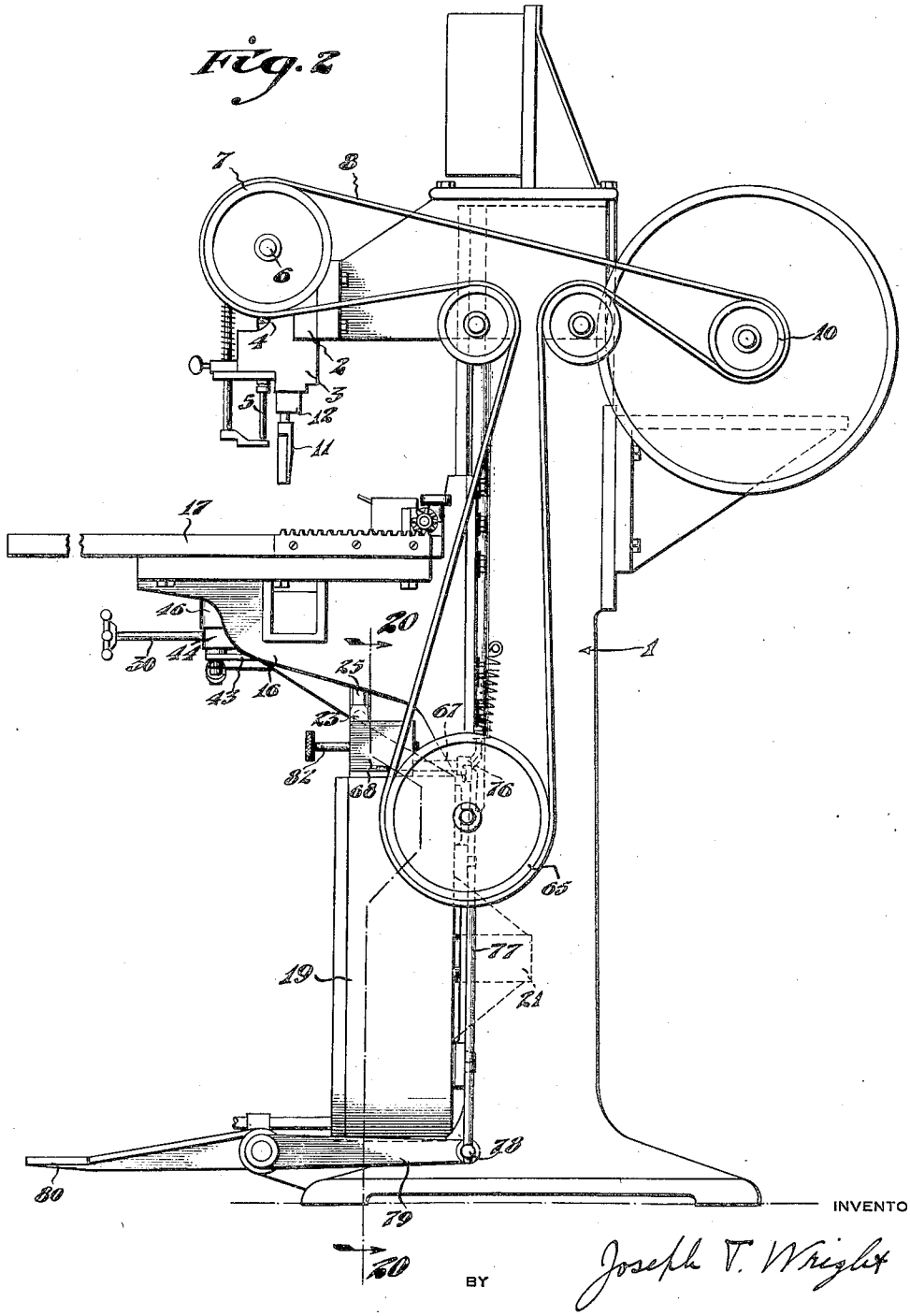
Wood & Wood ATTORNEYS

May 2, 1933. J. T. WRIGHT 1,906,875

PAPER CUTTING MACHINE

Filed July 11, 1930 8 Sheets-Sheet 2

Fig. 2



INVENTOR

BY Joseph T. Wright

Wood & Wood ATTORNEYS

May 2, 1933. J. T. WRIGHT 1,906,875

PAPER CUTTING MACHINE

Filed July 11, 1930 8 Sheets-Sheet 3

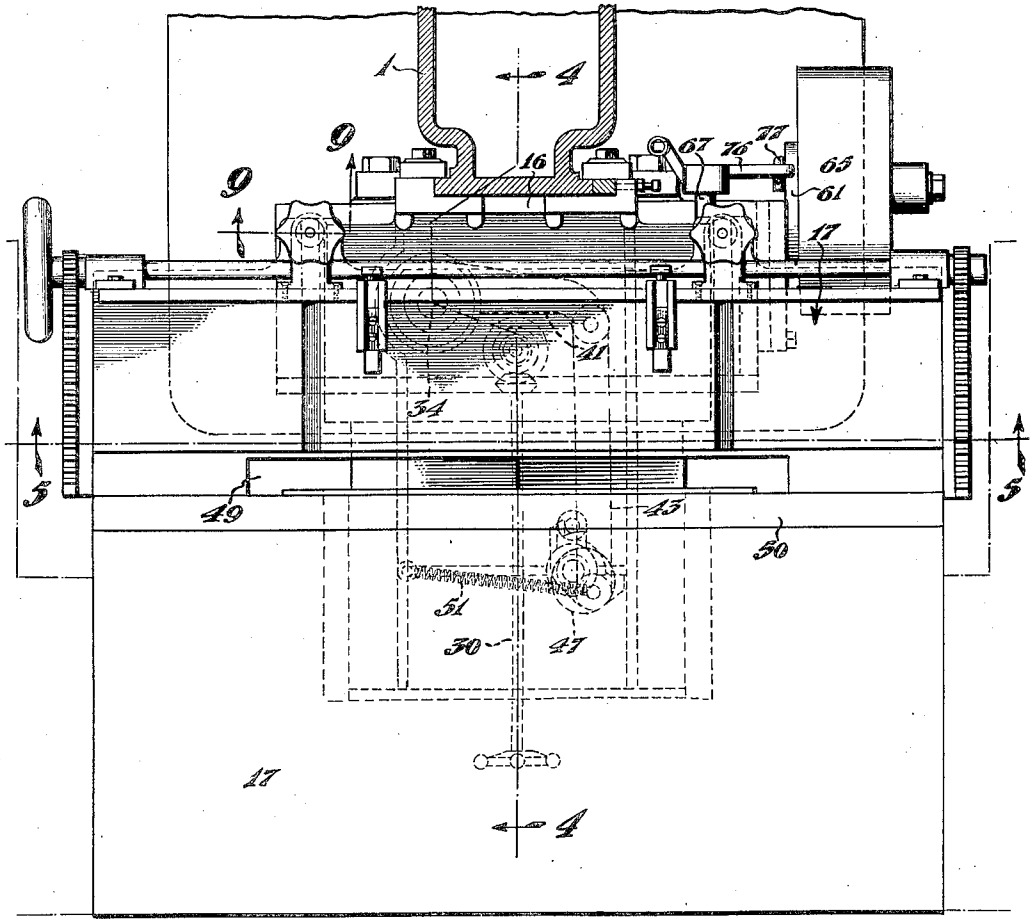


Fig. 3

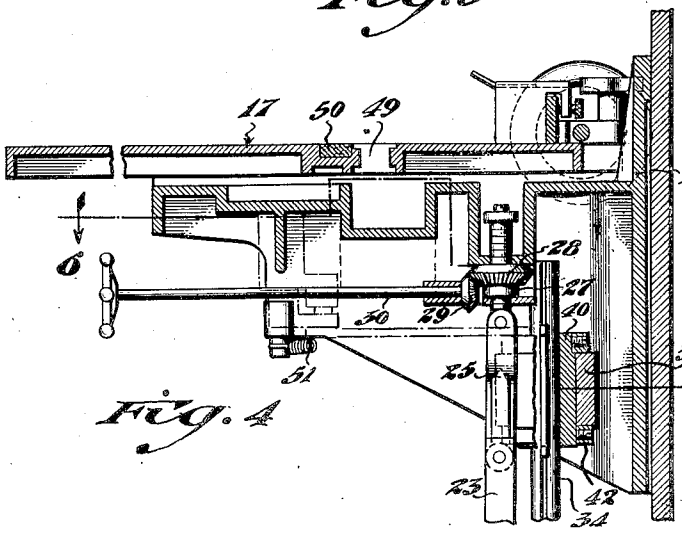
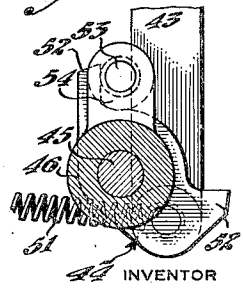


Fig. 4

Fig. 1



INVENTOR

Joseph T. Wright

BY

Wood & Wood ATTORNEYS

May 2, 1933. J. T. WRIGHT 1,906,875

PAPER CUTTING MACHINE

Filed July 11, 1930 8 Sheets-Sheet 4

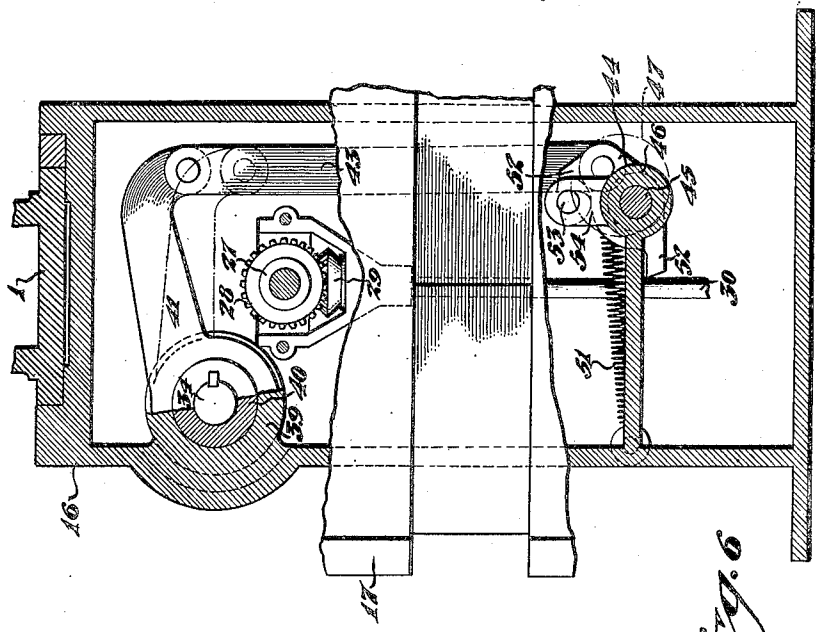


Fig. 6

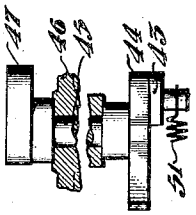


Fig. 8

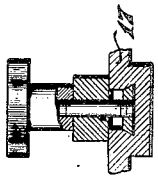


Fig. 9

Fig. 5

INVENTOR

Joseph T. Wright

BY

Wood & Wood ATTORNEYS

May 2, 1933. J. T. WRIGHT 1,906,875

PAPER CUTTING MACHINE

Filed July 11, 1930 8 Sheets-Sheet 5

Fig. 10

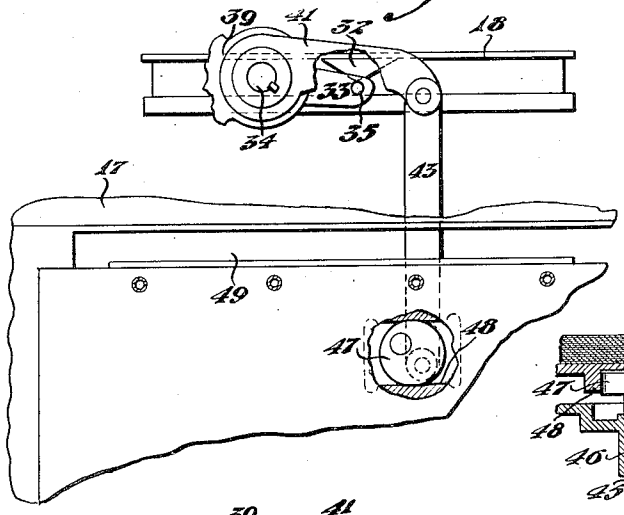
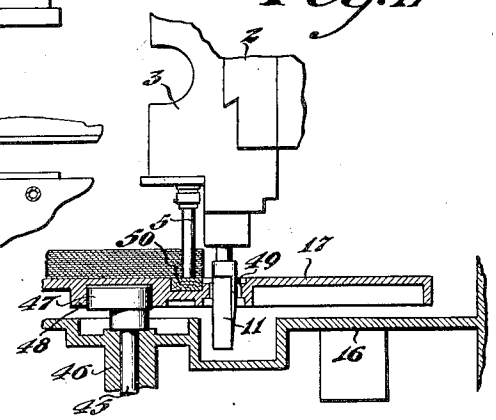


Fig. 11



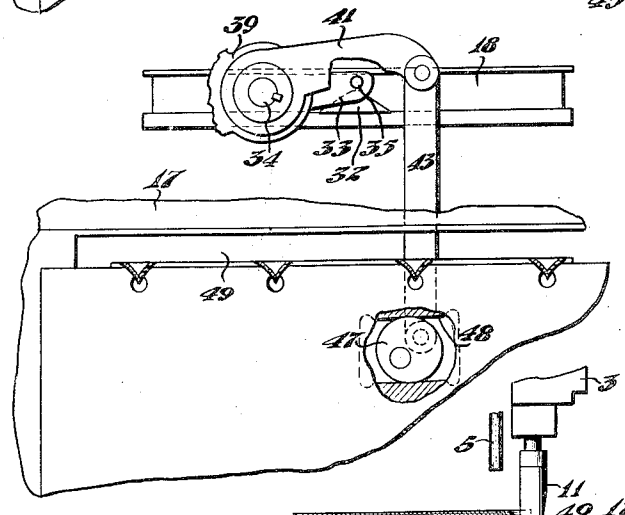


Fig. 12

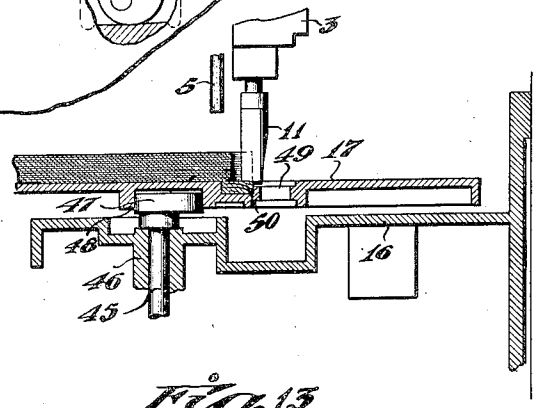


Fig. 13

INVENTOR

Joseph T. Wright

BY

Wood & Wood ATTORNEYS

May 2, 1933. J. T. WRIGHT 1,906,875

PAPER CUTTING MACHINE

Filed July 11, 1930 8 Sheets-Sheet 6

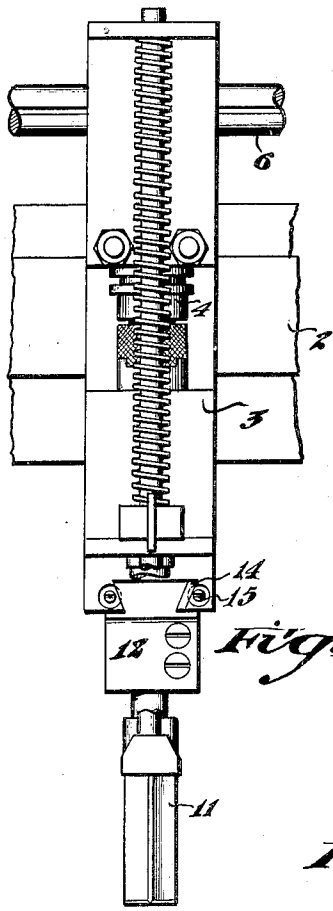


Fig. 14

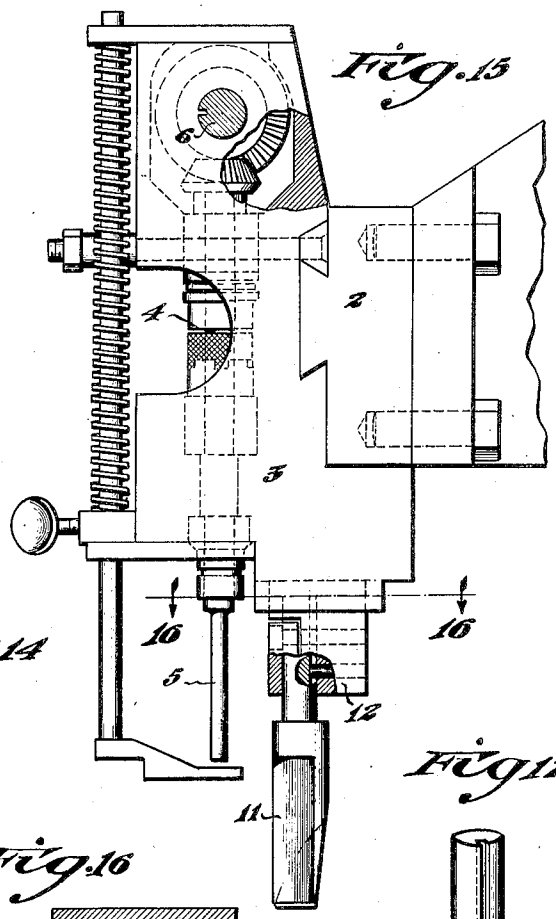


Fig. 15

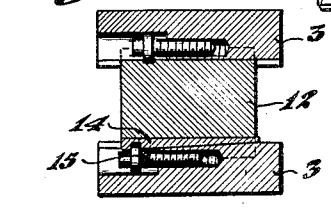


Fig. 16

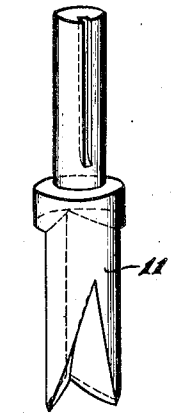


Fig. 17

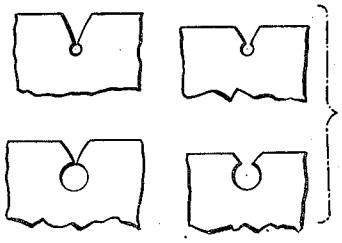


Fig. 19

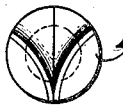


Fig. 18

INVENTOR

Joseph T. Wright

BY

Wood & Wood ATTORNEYS

May 2, 1933. J. T. WRIGHT 1,906,875

PAPER CUTTING MACHINE

Filed July 11, 1930 8 Sheets-Sheet 7

Fig. 21

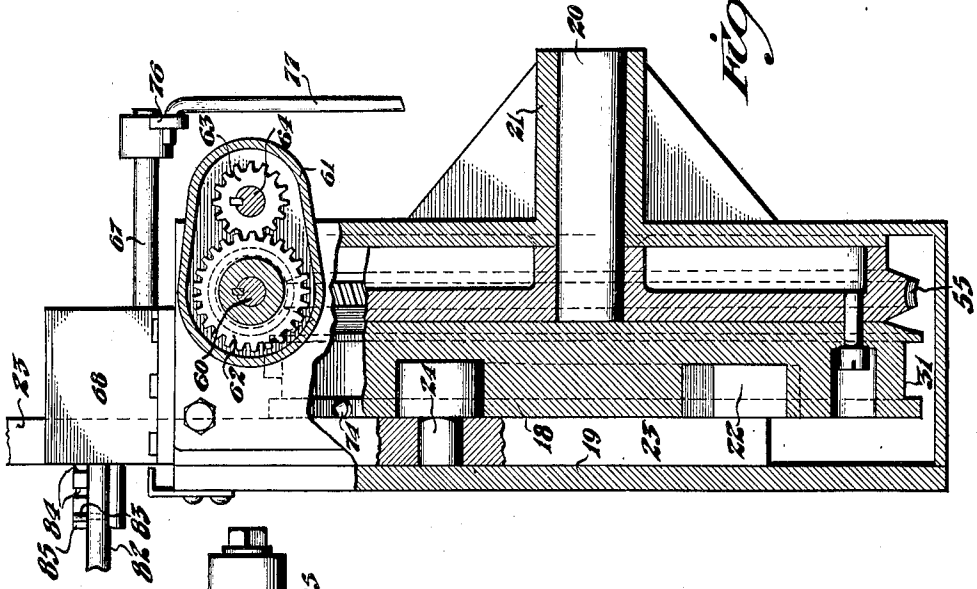
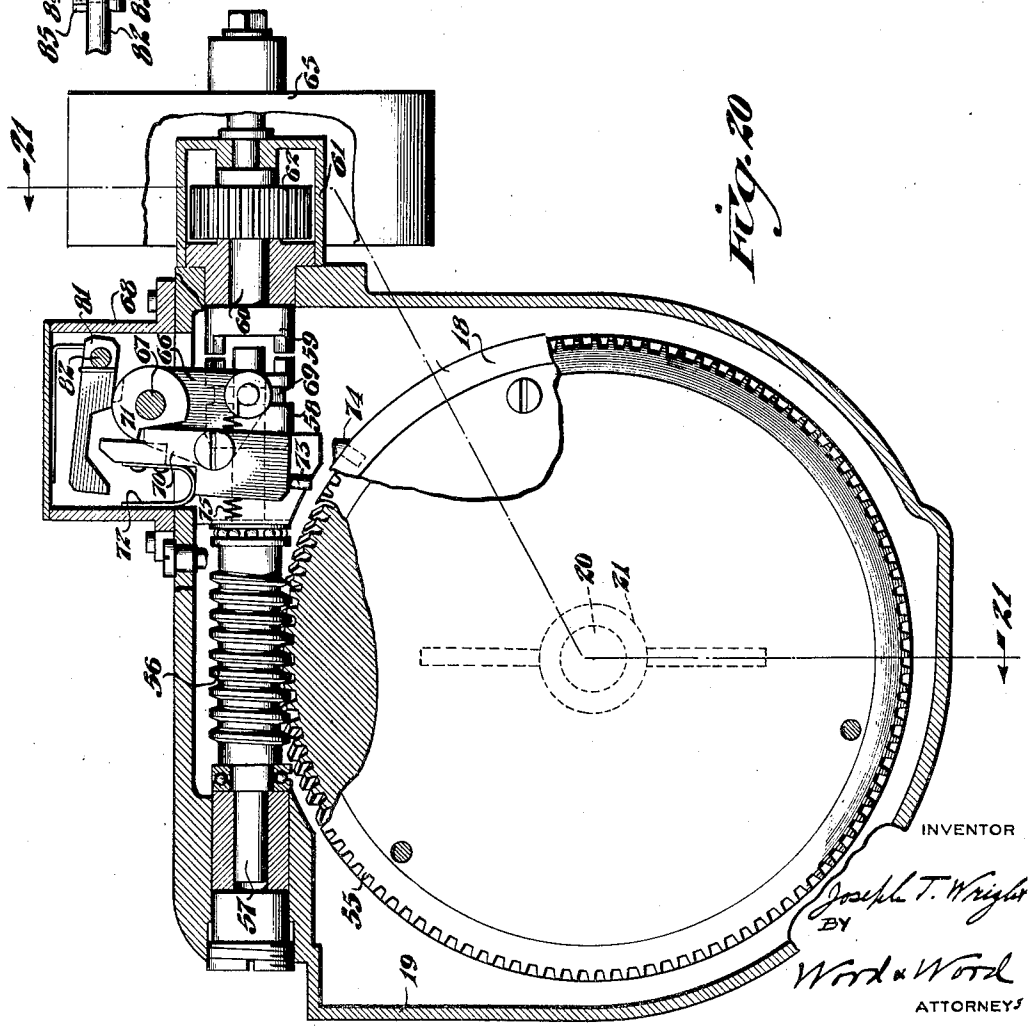


Fig. 30



INVENTOR

Joseph T. Wright

BY

Wood & Wood

ATTORNEYS

May 2, 1933. J. T. WRIGHT 1,906,875

PAPER CUTTING MACHINE

Filed July 11, 1930 8 Sheets-Sheet 8

Fig. 22

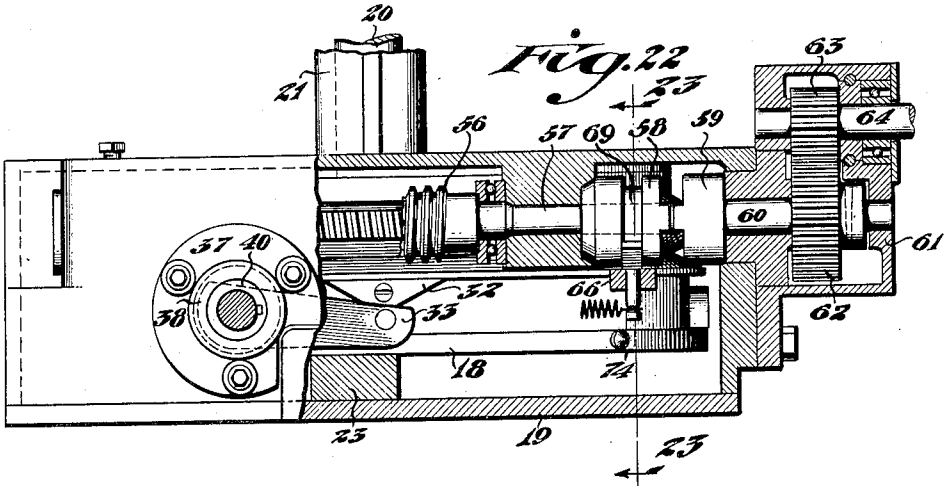


Fig. 23

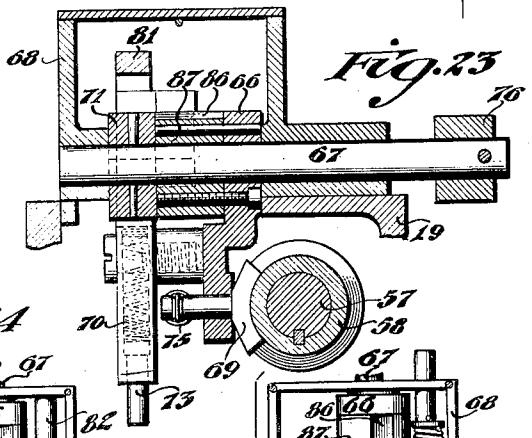


Fig. 24

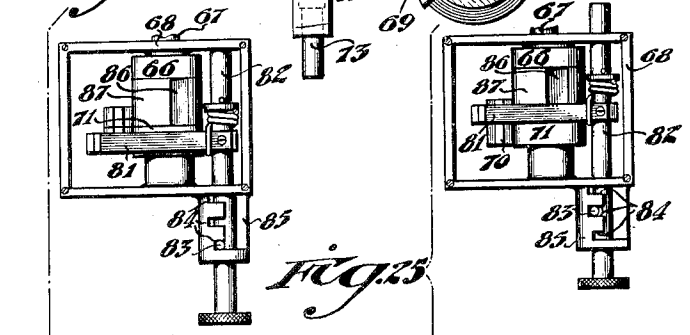


Fig. 25

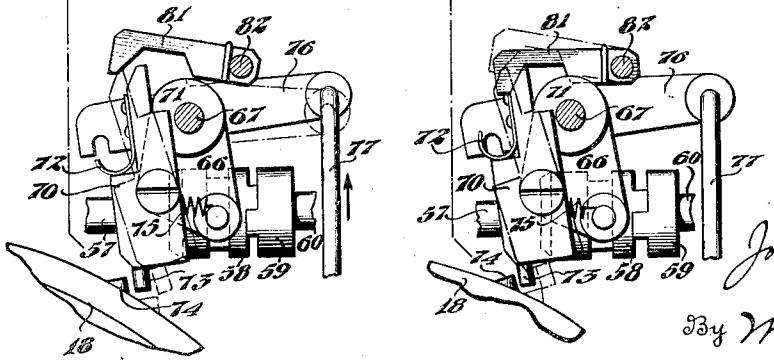
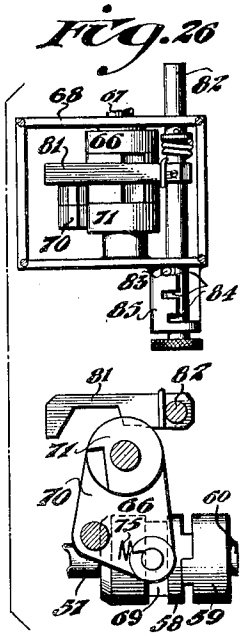


Fig. 26



Inventor

Joseph T. Wright

By Wood & Wood

Attorneys

Patented May 2, 1933 1,906,875

UNITED STATES PATENT OFFICE

JOSEPH T. WRIGHT, OF CINCINNATI, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE HARRIS-SEYBOLD-POTTER COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF DELAWARE

PAPER CUTTING MACHINE

Application filed July 11, 1930. Serial No. 467,193.

This invention relates to improvements in paper cutting machines and particularly to a machine for multiple drilling and cutting through a stack of sheets to prepare the sheets with filing apertures or holes, either open or closed, for binders or filing devices.

It is the general practice in preparing sheets with round filing holes or apertures known as "closed" holes, particularly for volume production to drill the holes with a revolving tubular drill, as a greater thickness of paper can be penetrated than by any punching method to cut a clean and perfect hole. With the expediency of drill recognized, the present improvement incorporates the same as an initial step in producing what is known as "open" or configurated filing holes. A favorable design of open hole constitutes circular apertures with a slit or stem-like slot cutting across the margin of the paper between the hole and adjacent edge of the sheet. After the round hole is drilled through a stack of sheets, a table supporting the sheets without disturbing their position as arranged for drilling, is moved horizontally backward and to a lower elevation than the vertical reciprocating stage in which the table is fed or moved for drilling, whereupon the table is moved upwardly bringing the stack of sheets against a stationary cutter having its cutting edge at a lower elevation than the cutting edge of the drill and preferably of V form with the apex portion of the cutting edge coming within the area of the drill hole, the cutter cutting a slot across the margin of the sheet, thereby converting the "closed" to an "open" filing hole. The table stops at the limit of the upstroke for the second or lower cutting stage, then drops back enough to clear the cutting edge and moves horizontally forward to be in position to receive a second stack of sheets for drilling.

An object of the invention is to provide a machine for producing perfect or clean open or configurated filing holes at a margin of sheets of paper, the tools of the machine operating through a stack thickness of sheets or capacities beyond that feasible under punch press operations.

Another object of the invention is to provide a paper cutting machine with a reciprocating work supporting table for moving and feeding the work toward and from cutting tools and moving the table laterally to the feeding motion for bringing or shifting the work to different positions for operation by one or the other of several cutting tools.

Another object of the invention is to provide a drilling machine for drilling through paper sheets in stack quantities with means operating upon the sheets immediately after a drilling operation for cutting or slitting through the paper margin between the hole or aperture made by drilling and an edge of the sheets to produce an open or configurated filing hole, without disturbing the stack of sheets for the several operations from their gauged position upon a work table.

Another object of the invention is to provide a new method for producing configurated filing holes in sheets of paper in large or stack quantities by drilling a round hole through the stack and then cutting through the margin of the sheets between the drilled hole and the edge of the paper with a knife-edged tool.

Other objects and advantages will be more fully set forth in the description of the accompanying drawings, in which:

Figure 1 is a front elevation of the improved drilling and slotting machine and Fig. 2 is a side elevation of the same.

Fig. 3 is a top plan view showing the table in forward position and the column portion of the machine frame above the table in cross-section.

Fig. 4 is a section on line 4—4, Fig. 3.

Fig. 5 is a vertical transverse section taken on line 5—5, Fig. 3 showing the cam and connections for imparting vertical reciprocation to the table and its supporting knee and for horizontally reciprocating the table upon the knee.

Fig. 6 is a horizontal section taken on line 6—6, Fig. 4 showing the lever mechanism and devices for horizontally reciprocating the table. The fragments shown in the plan illustrate a chute or hopper for receiving the knife or punch cuttings formed in the upper surface of the knee.

Fig. 7 is an enlarged detail plan view with parts thereof in section of the mechanism for reciprocating and locking the table at the point connecting with the table.

Fig. 8 is a fragmentary view of a vertical rock shaft and mechanism shown in Fig. 7.

Fig. 9 is a detailed section on line 9—9, Fig. 3 showing the slide and lock means for the table gauge.

Fig. 10 is a diagrammatic plan view of the rear portion of the table and top plan view of lever mechanism for horizontally reciprocating the table illustrating the table in its forward uppermost position when the drills are operating on a stack of sheets disposed upon the table.

Fig. 11 is a detail end view of the lower portion of a headstock and cross-section of a portion of the table in its uppermost position after the drill has cut through the stack of sheets upon the table.

Fig. 12 is a view similar to Fig. 10 illustrating a step in the operation of the machine with the table elevating to a second height or plane and in a rearmost position when the cutting knives are operating upon the stack of sheets to open-cut the perforations or apertures in the sheets cut by the drill or previous drilling operation.

Fig. 13 is a view similar to 11 showing a stage in the operation of the machine when the cutter or knife has completed its operation for slitting or cutting the paper with the table at its second plane or elevation.

Fig. 14 is a front elevation of one of the drill heads and Fig. 15 is a side elevation.

Fig. 16 is a section on line 16—16, Fig. 15, illustrating means for horizontally adjusting the knife relative to the drill or drill spindle and for locking the same in its adjusted position.

Fig. 17 is a perspective view of one of the cutting knives or punching dies.

Fig. 18 is an end view on a knife or die at its cutting edge.

Fig. 19 illustrates various types of open holes in sheets capable of being made by adjusting the knife to and from the axis of the drill or by changing the diameter or size of the drill.

Fig. 20 is an enlarged vertical section taken on line 20—20, Fig. 2 illustrating the worm and worm wheel drive mechanism for moving the table and the clutch mechanism for transmission control.

Fig. 21 is a vertical transverse section taken on line 21—21, Fig. 20.

Fig. 22 is a fragmentary section on line 22—22, Fig. 1, showing the transmission and clutch control devices with the parts in position for moving the table forwardly upon the knee.

Fig. 23 is a section on line 23—23, Fig. 22.

Figs. 24, 25, and 26 are detailed views respectively showing the clutch control mechanism in three differently set positions, Fig. 24 showing a setting in which the automatic trip mechanism is thrown out adapting the transmission to be governed by a foot treadle; Fig. 25 a setting for automatic clutch control at the end of an operating cycle and Fig. 26 a setting in which the clutch is constantly maintained in action for continuous operation of the machine.

The machine in its organization contains certain characteristics of commercial drilling machines for multiple drilling through a stack of sheets of paper. In such types of machines it is customary to have a table for the work mounted upon a vertical reciprocating knee slidably mounted upon vertical ways of a column for feeding the work toward and from the rotating drills or tools. The drills are carried by spindles, each in a housing or headstock mounted and horizontally adjustable upon a cross-head or rail at the top of the column. The transmission for rotating the drills and the transmission for elevating the table preferably are driven by a single belt, such form of single belt drive corresponding to that illustrated and described in a prior Patent No. 1,571,153 issued to me January 26, 1926. Likewise a headstock for a drill structure may correspond to that disclosed to a prior pending application filed by me April 29, 1930, Serial No. 448,384 or of other commercial design, therefore, specific detailed description of the single belt drive and headstock mechanism is not made nor included herein.

Referring to the drawings, the machine comprises a frame 1, which includes a base, vertical column and overhanging or projecting head carrying a cross-rail 2 with which a drill headstock 3 in either a single or plural number has a dovetailed connection for horizontally adjusting the headstock upon the cross-rail and for rigidly setting or clamping the same in its adjusted position.

Each headstock journals a vertical drill spindle 4, having its lower end provided with a socket to receive and chuck a drill 5. The spindle is rotated by gears housed within the headstock 3 and connecting with a horizontal shaft 6 journalled at its opposite ends within bearings at the opposite ends of the cross-rail 2. The shaft 6 carries a pulley 7 driven by a belt 8 receiving its driving power from a pulley 10 driven from an electric motor or other source of power. The horizontal drive shaft 6 extends through all of the headstocks and is common to all of the spindles for the number with which the machine is provided.

In Fig. 1 of the drawings the machine is shown as provided with a pair of headstocks and drill spindles which are shown in full line occupying a relative position toward the opposite ends of the cross-rail, and in

dotted line as adjusted more centrally of the cross-rail.

A stationary cutting tool or knife 11 is dependently supported from the lower end of the headstock in the rear of the drill, with its cutting edge at an elevation lower or below the cutting edge of the drill. This relative arrangement of drill and punch provides for first drilling through the stack of sheets at one edge thereof, the stack being fed upwardly as the drill cuts through the sheets with the edge of the stack clearing the stationary cutting tool or knife.

Subsequently after the sheets have been drilled the work table is moved rearwardly without disturbing the stack of sheets, bringing the stack approximately beneath the knife edged tool at a point where the tool will cut through the sheets from the perforation or drilled hole to the rear edge to make what is known as "open" or configurated hole, several designs of cuttings or open hole forms being shown in Fig. 19. The cutting edge of the tool is of V-form which has been found produces the best results and admits the design of slitting to be varied or changed by merely laterally adjusting the tool or changing the size or diameter of the drill. The apex of the V is directed diametrically toward the drill hole. Also it has been found that the better cutting results can be obtained by having the bevel producing the cutting edge at a forward side to make an absolute perpendicular cut through the stacks with the sheets crowded away from the cutting tool as it advances through the stack.

The shank of the cutting tool is engaged and frictionally clamped within a holder 12, the holder horizontally secured to the lower end of the headstock. As shown in Figs. 14 and 16 the holder has a dovetailed connection with the lower end of the headstock and is micrometrically adjusted by an adjusting screw threaded into the headstock and provided with an annular flange engaging into a groove in a side of the holder. The holder is locked in its adjusted position by a wedge 14 operated by a screw 15.

The front side of the column of the frame is provided with vertical ways upon which a knee 16 slides and is reciprocated vertically, the knee slidably supporting a work table 17. The work table 17 is provided with suitable gauge devices between and against which a stack of sheets is abutted for appropriately locating the sheets relative to drill and stationary cutting tool. The knee is reciprocated vertically to feed the work or sheets toward the cutting tools and retract the same therefrom and the table is moved horizontally on the knee to bring the top margin of the sheets alternately into and out of cutting position with the stationary cutting tool. The drilling and punching operations preferably take place successively, the knee and table move unitarily, vertically, and the table is moved horizontally by a cam wheel 18 housed within a transmission casing 19, fixed to the column at the base thereof. The cam wheel has its rear face engaged against the face of a worm wheel and fixed thereto, the cam and worm wheel rotating as a unit, with the worm wheel journalled upon the stud shaft 20 extending from a bearing 21 integral with the rear wall of the transmission casing (see Fig. 21). The front face of the cam wheel is provided with a cam groove 22 of appropriate design to reciprocate the knee twice and at relatively different heights with each revolution of the cam wheel. The cam wheel for a part of a revolution reciprocates the knee to bring and feed the work against the drill for drilling through the stack of sheets after which the knee and table are lowered to bring the stack at an elevation below the stationary cutting tool and feed the work upwardly against said tool but not to a height which would bring the stack in contact with the drill. Thus the table is reciprocated twice, once for drilling and again for slitting with each revolution of the cam wheel.

The cam wheel 18 operates a pitman 23 vertically slidable within the transmission casing 19 and extended upwardly therethrough. The pitman is provided with a laterally extended stud 24 carrying a roller which engages into the cam groove 22 formed in the outer or forward face of the cam wheel, and the upper end of the pitman is pivotally attached to one end of a connecting link 25, the opposite end of the link is pivotally attached to the head of an adjusting screw threaded upon a nut 27 sustaining the knee, confined between cross walls or webs of the knee (see Fig. 4). The nut 27 has a bevel gear 28, formed on its periphery in mesh with a bevel gear 29 fixed upon the inner end of an end operated shaft 30, journalled in bearings formed in the knee. The shaft 30 extends forward below the work table to a degree sufficient for convenient access to the operator. The table height or elevation can be thus adjusted with the knee so that it may be reciprocated to relatively different stages from the cutting tools.

The periphery of the cam wheel 18 has an annular groove formed therein, providing a camway 31 having a pair of definitely spaced trip segments 32—32 arranged therein for actuating a crank arm 33, fixed upon a lower end of a vertical rock shaft 34. The free end of the crank arm 33 has a pin 35 laterally extending therefrom and engaging into the cam way to be engaged by the cam or trip segments, one for moving the arm in one direction and the second for moving the same in an opposite direction (as shown in Fig. 5. The crank arm 33, is provided with

a hub 36, extended through a bearing bushing 37, extending through and fixed to the top wall of the transmission casing, and the hub of the crank arm is provided with a collar 38 for retaining the arm against axial displacement.

The rock shaft extends through a bearing 39 formed integral within the knee and is splined to a hub or sleeve 40 extending from a lever 41 journalled in said bearing and confined against displacement by a collar 42 fixed on the lower end of the hub of the lever engaging or bearing against the lower side of the bearing 39. This provides a sliding connection for the rock shaft and lever 41, the lever moving as a unit with the knee. The free end of the lever 41 pivotally connects with a link 43 extending forwardly of the knee and the opposite end of the link is pivotally engaged with a crank arm 44 fixed upon the lower end of a vertical rock shaft 45. The rock shaft 45 is journalled in a bearing 46 formed integral with the knee and the upper end of the rock shaft is provided with an eccentric 47 rotative within a bearing socket 48 formed in the lower side of the rock supporting table 17. Rotation or oscillation of the eccentric by the link and lever mechanism actuated by the cam wheel 18 reciprocates the table 17 horizontally upon the knee. This shifts or moves the table to fore and aft positions as shown in Figs. 10 to 13 inclusive, in the forward position for appropriately setting a margin of the stack of sheets for drilling and in the rearward position for cutting or slitting across the margin of the sheets between the drill hole or aperture and the edge of the sheet.

The table along a line beneath the stationary cutting tool is provided with an elongated slot 49 for the reception therethrough of the tool when the table is fed or moved upwardly for drilling. This allows the stationary cutting tool to pass through the table as their lower cutting edges are at elevations below the cutting edges of the drill. The table longitudinally adjacent the opening or slot 49 is recessed or grooved to receive a wood or fiber strip 50 used as a knife or drill block with which the cutting edges of the tools engage or are brought against the end of the cut.

The table is locked at the limits of its fore and aft positions by a spring 51 imparting the final movements to an eccentric connecting with the table. One end of the spring is connected to a pin fixed to the knee and the opposite end of the spring connects with a crank arm 44 preferably at the pivot axis connecting the link 43 and crank arm 44. The end of the spring connecting with the knee is preferably located at a point along a diametric line with the rock shaft 45 to serve for applying its tension in either fore or aft positions of the table and also serves to impart a final or complete stroke motion to the table actuating mechanism beyond the throws of the cam or after the crank arm is moved to either side of a dead central position of the crank arm 44. As shown in Fig. 7 a crank arm 44 is provided with a pair of stop lugs 52—52 adapted to alternately engage with a stop pin 53 depending from a stationary arm 54 horizontally extending from the bearing hub 46 of the knee which journals the rock shaft 45, the stop pin 53 limiting the arc of swing of the crank arm for controlling this degree of oscillation.

The spring 51, crank arm 44, and eccentric 47 are arranged relatively to have a dead central position when the horizontal axes of the parts are in a diagrammatic line with the fixed end of the spring 51 so that a movement of the crank arm to either side of such central line will render the spring effective for continuing the movement of the arm with and beyond the positive motion transmitted thereto by the cam wheel 18. The crank arm and eccentric at their opposite limits of movement are therefore held under the tension of the spring locking the table so that it cannot be disturbed by any pressure brought thereagainst, as by the operator leaning or pushing against the forward edge of the table when depositing or removing a stack of sheets therefrom.

With a stack of sheets properly gauged upon the table 17 for drilling and punching or slitting, a transmission is tripped for rotating the cam wheel 18 for a single revolution, mechanism is provided for automatically cutting out the transmission at the end of a full revolution of the cam wheel. Normally the knee and table are at rest with the table at an elevation for beginning upward movement in the first stage whereupon as the cam wheel starts its rotation it will commence to gradually move the knee and table upwardly at a rate to properly feed the work to the action of the rotating drill for drilling through the stack of sheets. The upper feed of the table continues until all the sheets of the stack have been drilled or until the required depth of the drill has been reached, whereupon the table is retracted or lowered to a second depth to be again elevated for a second stage or operation. After the knee and table have been lowered to a full degree provided by the cam, the table is shifted rearwardly to position the margin of the stack of sheets beneath the punch or cutting tool, whereupon the knee and table are again elevated at an appropriate rate in the second stage for feeding the stack to the stationary cutting tool, stopping with the table at an elevation, and when the limit of feeding motion for the second is reached the table is retracted slightly and moved forwardly and brought to rest ready to be moved upwardly for a successive drilling operation or second cycle.

This operation takes place with each revolution of the cam so that the stack is drilled and slitted for making an open filing hole or aperture without disturbing the setting of the stack for the two operations. The stack of sheets, thus, when once set for drilling remains in its set position for slitting the stack being shifted as a unit with the table. This insures very accurate slitting, resulting in a uniformity of the work and greater efficiency in operation.

The transmission mechanism and its control may be substantially of that disclosed in a prior application filed by J. T. Wright and J. T. Rowell, Serial No. 44,704, filed July 20, 1925, although in the present instance improvements have been made thereto to give the machine added facilities. The controlling mechanism can be said to operate substantially as the mechanism is disclosed in aforesaid application, in which the clutch is thrown and held in commission by foot pressure applied upon a treadle and the clutch automatically thrown out at the end of the cycle while the treadle is being depressed. Second, the clutch is thrown in by the treadle, held in commission mechanically and automatically cut out at the end of the cycle. Third, the clutch is thrown in by the treadle and then held in mechanically for continuous operation.

The worm wheel 55 which has the cam wheel 18 fixed to a side face thereof is in mesh with a worm 56 fixed upon a part of the shaft 57 journalled in the transmission casing 19. The shaft 57 at one end has a toothed clutch member 58 splined thereon adapted to be thrown into engagement with a second clutch member 59 fixed upon the end of a shaft 60 journalled in a gear box 61 secured to the transmission casing 19 with the shaft 60 coaxial with the shaft 57. The shaft 60 carries a gear 62 in mesh with a gear 63 upon a shaft 64 journalled in the gear box 61. The shaft 64 also carries a pulley 65 driven by the belt 8.

The movable clutch member 58 is actuated in one direction for throwing the same in the same direction with the second clutch member 59, by an arm 66 pivoted or swinging upon a rock shaft 67 suitably journalled in a casing 68 fixed to and mounted on top of the transmission casing 19. The arm 66 carries a yoke or fork 69 swiveled to the arm and engaged into an annular groove in the clutch member 58. The clutch throwing arm 66 is also provided with a pawl or latch member 70 pivoted upon the arm at one side thereof and the pawl is provided with a butt end for engagement with a shoulder formed by notching into the periphery of a collar 71 fixed to the shaft 67.

The pawl is yieldingly urged or moved to the notch of the collar 71 by a spring 72 and when the pawl is engaged with the collar, the clutch throwing arm 66 is coupled or connected with the rock shaft 67 so as to be actuated thereby. As shown in Figs. 24 and 25, the pawl is in engagement with the collar and the clutch throwing arm has been moved to throw the clutch member 58 into commission for coupling shafts 57 and 60. The pawl at its lower end is provided with a projecting pin 73 extending in the path of a stud 74 fixed to the periphery of the cam wheel 18. Thus in the rotation of the cam wheel when the stud 74 strikes the pin 73 of the pawl, the pawl will be thrown out of engagement with the collar 71 releasing the clutch throwing arm 66 from its coupling connection with the shaft 67, whereupon the arm and clutch member will be moved by a spring 75 connecting with the arm disengaging the movable clutch member 58 from the clutch member 59.

The rock shaft 67 is actuated by a lever or crank arm 76 fixed upon the end of the rock shaft 67 with the free end of the arm 76 connecting with a link or connecting rod 77 extending downwardly toward the base of the machine and connecting with a crank arm or lever 78 fixed upon the end of a treadle shaft 79 suitably journalled in bearings extending from the base of the machine frame. The treadle shaft 79 carries a foot treadle 80. Depressing the foot treadle moves the connecting rod or link 78 upward actuating the crank arm 76 in a direction to swing the clutch throwing arm 66 for throwing the clutch member 58 into commission.

For one type of control the foot pressure must be continuously applied to the treadle to hold the clutch in commission which, however, is automatically tripped and thrown out at the end of a cycle of the cam wheel by disengaging the latching connection between the pawl carried by the clutch throwing arm 66 and the collar 71 on the rock shaft 67 of the treadle mechanism.

To provide for holding the clutch in commission after it has been initially thrown in by the treadle mechanism, a shiftable latch member or finger 81 fixed upon a slide rod 82 is arranged to engage or interlock with the upper end of the pawl 70 holding the pawl in engagement with the coupling collar 71 for a full cycle of the cam wheel and until it is automatically thrown out through the action of the stud 74 carried by the cam wheel. The latch or interlocking connection between the lock finger 81 and the pawl 70 is such as to permit the lock finger to be thrown upwardly when the pawl is tripped by the cam wheel allowing the clutch to be automatically disengaged.

The slide rod 82, provided with a pin 83 for interlocking with one of a plurality of notches 84 formed in a hub 85 extending from the forward wall of the casing 68 and through which the slide rod 82 is engaged, provides for definitely setting the lock finger 81 into one of three positions. In the first notch for

holding the locking finger 81 upwardly out of interlocking connection with the pawl 70 and in a second notch for bringing the locking finger 81 into engagement with the pawl 70, and in a third notch for engaging the locking finger 81 with a notch 86 formed in the periphery of a collar or hub 87 fixed to the clutch throwing arm 66 concentric with the rock shaft 67. When the locking finger 81 is engaged with the collar 87 it will hold the clutch throwing arm in a position with the clutch in commission and against the tension of the spring 75 for continuous operation of the machine and any tripping of the finger of the pawl would be ineffective toward releasing the clutch throwing arm 66, as the pawl under such conditions would merely swing idly when tripped.

Having described my invention, I claim:

1. In a machine of the character disclosed, a columnar frame, a knee extending from and vertically slidable upon said frame, a work supporting table carried by said knee and horizontally slidable thereon, a tool carrying headstock mounted upon said frame overhanging the table and having a revolving cutting tool and a stationary cutting tool, the cutting tools having their cutting edges at relatively different elevations, and means for automatically reciprocating said knee and table as a unit in a plurality of stages for presenting the work to and from said tools successively.

2. In a machine of the character disclosed, a columnar frame, a knee extending from and vertically slidable upon said frame, a work supporting table carried by said knee and horizontally slidable thereon, a tool carrying headstock mounted upon said frame overhanging said table and having a revolving cutting tool and a stationary cutting tool, the cutting tools relatively in fore and aft positions with their cutting edges at relatively different elevations, means for automatically reciprocating said knee and table as a unit in a plurality of stages for presenting the work to and from said tools successively, and means for reciprocating the table upon the knee.

3. In a machine of the character disclosed, a frame, a work supporting table carried by said frame movable horizontally and reciprocable vertically, a tool carrying headstock mounted upon said frame overhanging the table and having a revolving cutting tool and a stationary cutting tool, the cutting tools having their cutting edges at relatively different elevations, and means for automatically reciprocating said support in relatively different stages for successively presenting the work to and from said respective cutting tools.

In witness whereof, I hereunto subscribe my name.

JOSEPH T. WRIGHT.