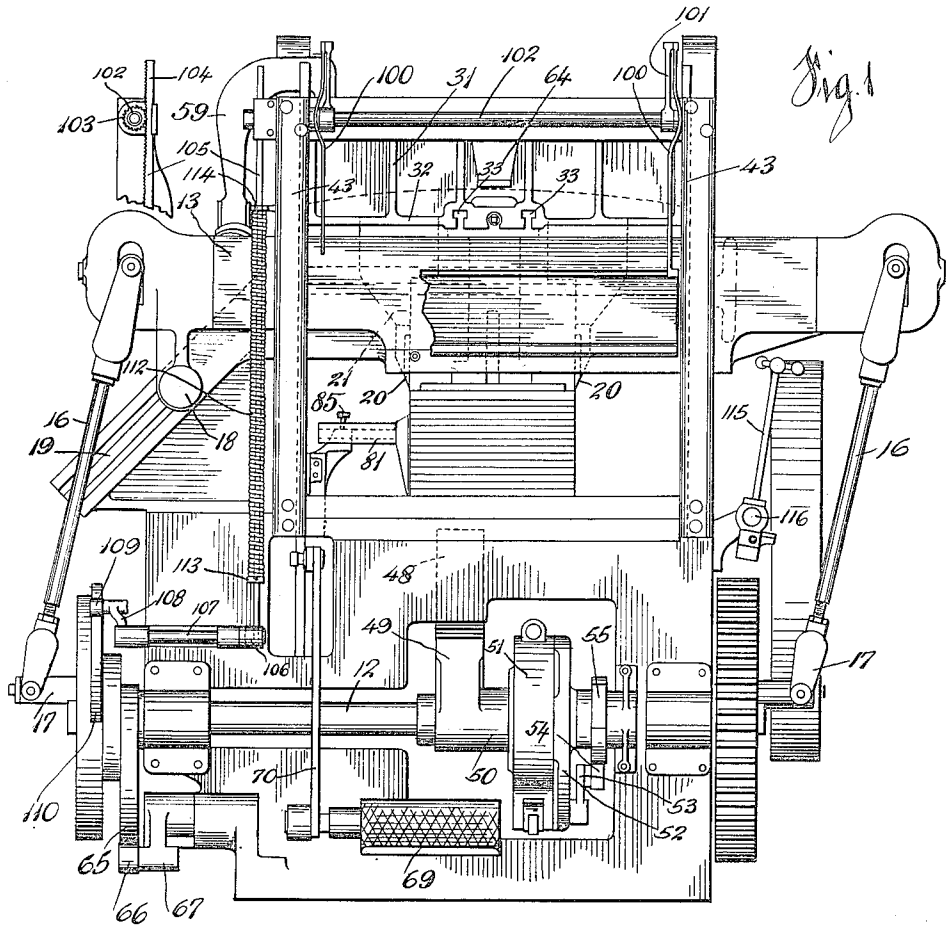
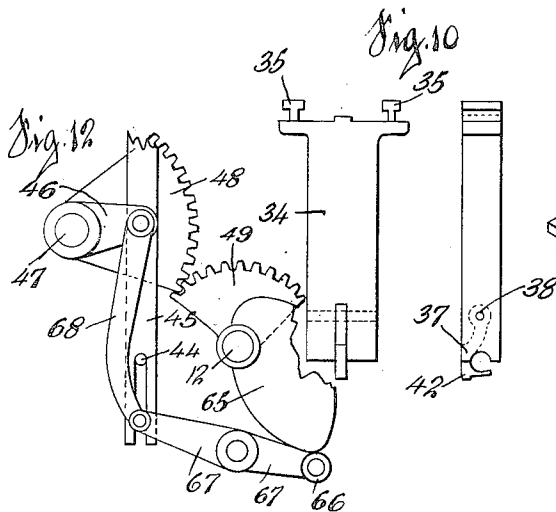
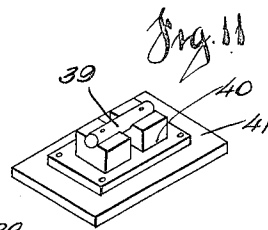


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PAPER CUTTING MACHINE.
APPLICATION FILED APR. 11, 1916.

1,267,283.

Patented May 21, 1918.

3 SHEETS—SHEET 1.



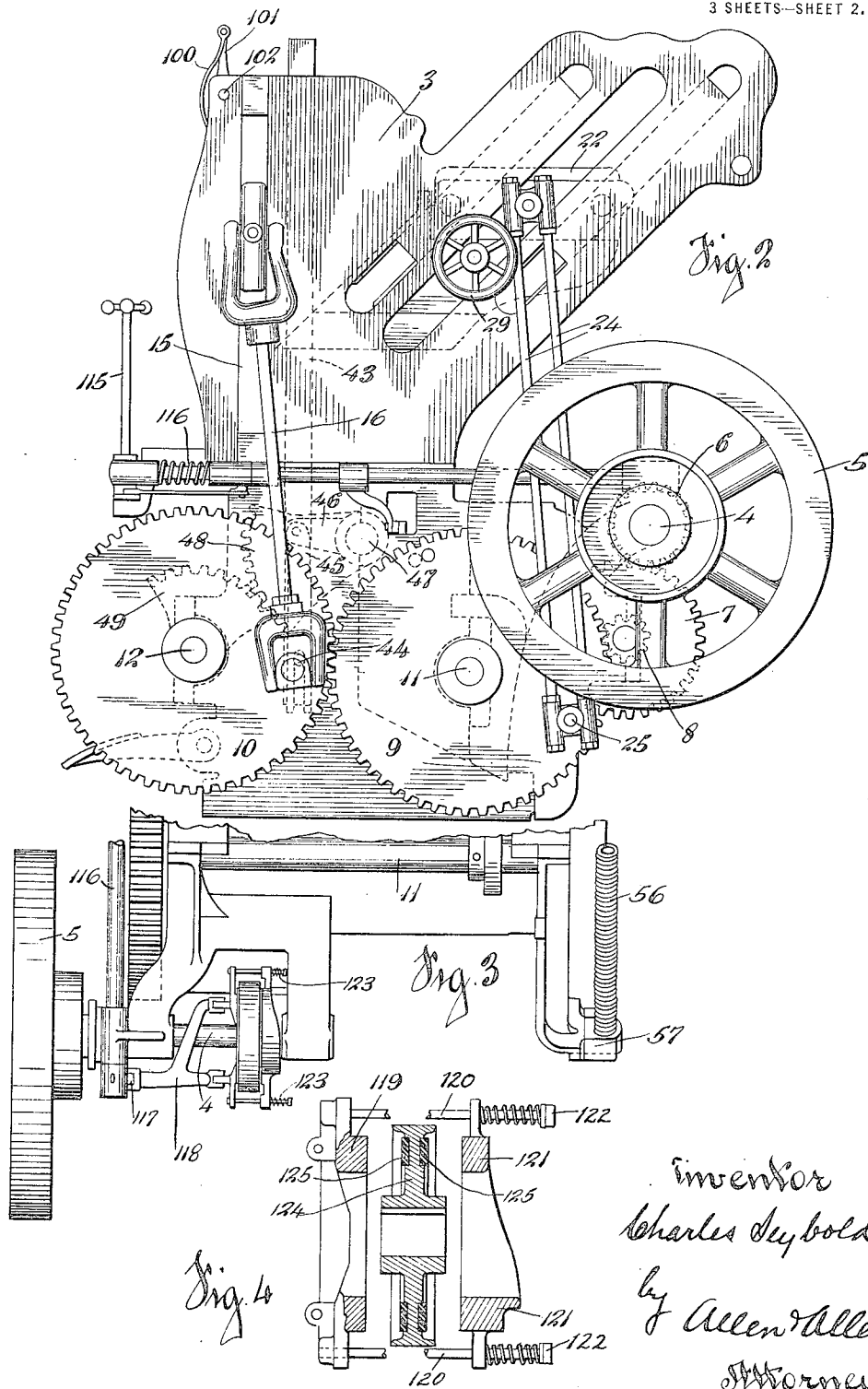
Inventor
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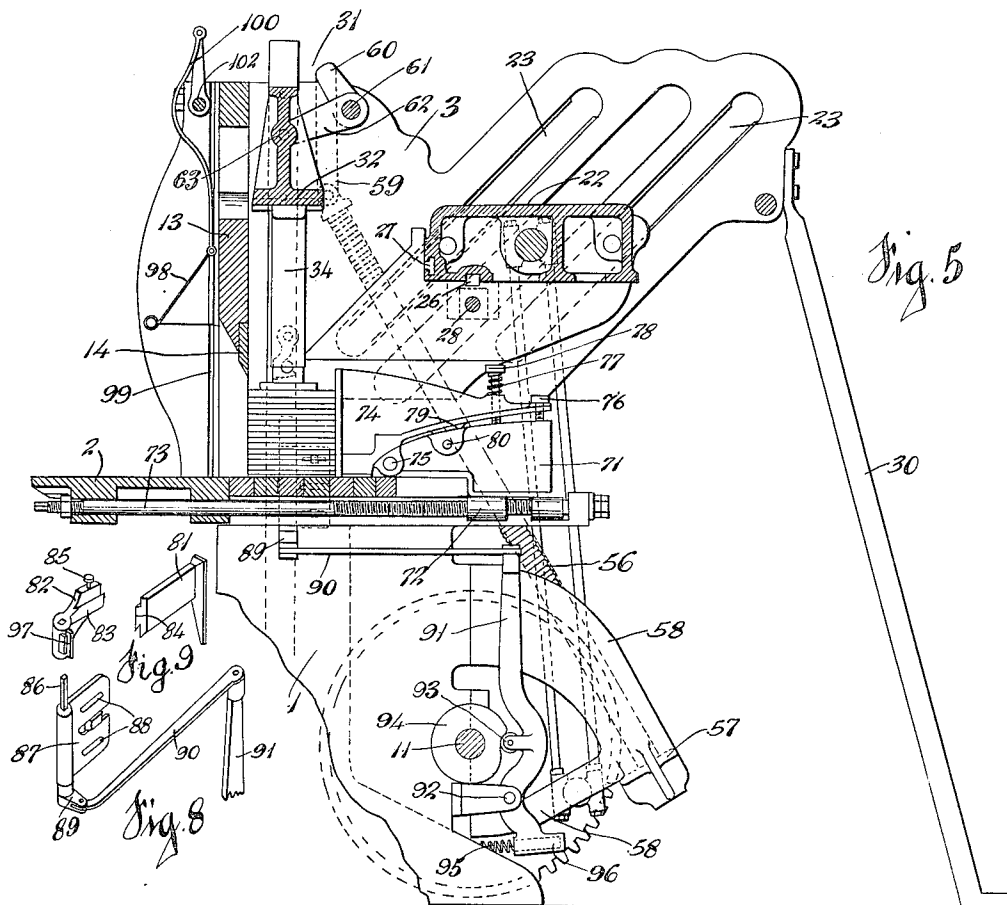
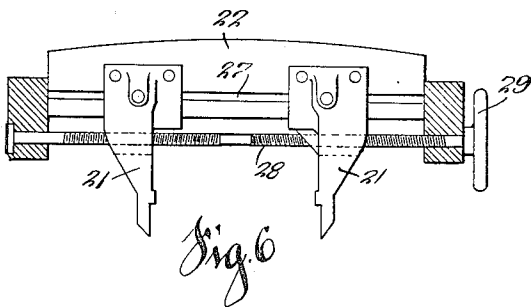
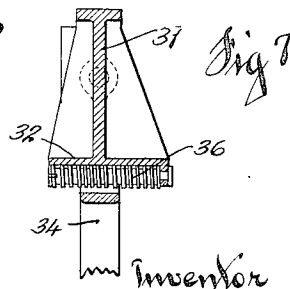
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UNITED STATES PATENT OFFICE.

CHARLES SEYBOLD, OF DAYTON, OHIO.

PAPER-CUTTING MACHINE.

1,267,283.

Specification of Letters Patent.

Patented May 21, 1918.

Application filed April 11, 1916. Serial No. 90,472.

To all whom it may concern:

Be it known that I, CHARLES SEYBOLD, a citizen of the United States, and a resident of the city of Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Paper-Cutting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to paper cutting machines especially designed for the trimming of books, pamphlets and the like, in which three knives are employed, one for the front and two for the ends of the pile, the knives being arranged to act automatically in succession, the front knife making the first cut and the two end knives following the cut of the front knife as it reaches the end of its return stroke.

The invention consists of that certain novel construction and arrangement of parts to be hereinafter particularly pointed out and claimed, whereby the greatest accuracy with a capacity for a very large range of work can be attained, and in which the necessity of turning the piles of material or the table for the front and end cuts is obviated, and a most powerful and efficient machine is provided at a minimum cost of manufacture.

In the drawings,

Figure 1 is a front elevation of my improved machine and also showing at the upper left side a detail of the rack and pinion.

Fig. 2 is a side elevation.

Fig. 3 is a top plan view of the safety brake construction on the driving shaft.

Fig. 4 is a central longitudinal section of the safety brake mechanism.

Fig. 5 is a vertical cross section of the machine.

Fig. 6 is a front elevation of the end knife carrier mechanism.

Fig. 7 is a cross section of the upper portion of the clamp bar.

Fig. 8 is a perspective view of a portion of the back gage operating mechanism.

Fig. 9 is a perspective view of the back gage.

Fig. 10 is a front and side elevation of the clamp column for attaching the pattern blocks.

Fig. 11 is a perspective view of a pattern block.

Fig. 12 is a detail showing clamping mechanism.

The operating parts of the paper cutter are mounted in a solid and substantial casting 1, forming supporting standards and framework for the various shafts and operating mechanism of the machine. Upon the upper portion of this framework and above the table top 2 are the side standards 3, 3, for holding and guiding the knife carriers and clamp.

Mounted in suitable bearings in the lower portion of the framework is the power shaft 4, carrying the fly wheel 5, which shaft receives its power by belt and pulley from any suitable source of power. The driving power is communicated from the power shaft 4 by a train of pinions and gears 6, 7, 8, to the large intermeshing gears 9, 10, mounted on the two machine driving shafts 11 and 12, mounted in suitable bearings in the framework, one of these driving shafts 12 being designed to actuate the front knife, and the other shaft 11 to actuate the two end knives. The knife carrier 13 for the front knife 14 is arranged to reciprocate in guide slots 15 in the end frames 3, and is coupled at each end outside the framework by the pulling bars 16, 16, with crank pins 17, 17, on each end of the driving shaft 12, under the rotation of which the knife carrier and the knife attached thereto is reciprocated during the operation of the machine, the knife carrier being given a diagonal or shearing movement by means of the roller 18 thereon engaging in the diagonal guide slot 19 in the frame.

The two knives 20, 20, for making the end cuts, are mounted at right angles to the front knife on the knife holders 21, 21 (Fig. 6). These knife holders are in turn mounted on the knife carrier 22 which extends across the machine parallel to the front knife carrier 13, and is guided in a diagonal direction by rollers guided in the guide slots 23, 23, in the side frames 3, 3. This knife carrier 22 is coupled by the pulling bars 24, 24, on each end outside the frame to the crank pins 25 on the driving shaft 11, and the cranks for the shafts 11 and 12 are so arranged that at the end of each complete operation of the machine the two knife carriers will rest about midway of the full extent of their respective up and down movement. When the machine has started, the gear 10 will rotate to draw down

the knife carrier for the front knife, while the gear 9 will rotate in the opposite direction and will carry upward the knife carrier for the end knives. When the front knife has reached the cutting table, the end knives will be at the full limit of the upstroke, and as the front knife rises, the end knives will descend and they will reach the bottom of the cutting stroke as the front knife reaches the limit of its upstroke. Thus the front and end knives will act in succession, each with a shearing cut, and there will be no interference between the action of the knives, the machine being automatically stopped at the end of a complete operation, with both knives resting about midway of their respective up and down movements.

In order to quickly adjust the end knives toward and away from each other for various sizes of books and pamphlets to be trimmed, the knife holders 21 will be mounted on the knife carrier so as to be adapted to slide thereon toward and away from each other. As shown in the section of the knife carrier 22 in Fig. 5, there is a keyway 26 in the base of the knife carrier and a T-slide 27 along the front side of the knife carrier, and corresponding parts of the holders ride in these grooves. A right and left threaded screw 28 engages these two knife holders 21, which is operated by the hand wheel 29 to adjust the knife holders and the side knives toward and away from each other for the desired size of the books to be trimmed.

In order to properly support the side frame 3 at the rear, inasmuch as the upper end of the side frames extend considerably to the rear of the base of the machine, I prefer to provide a standard bar 30, the lower end of which rests upon the floor; although where the main framework is sufficiently massive, this rear supporting bar 30 for the frame may be omitted.

The power clamp arranged to be reciprocated, to clamp and hold the piles in connection with the action of the knives, comprises a substantial cross bar 31, arranged to slide up and down in vertical slots in the side frame. The lower end of this clamp bar is provided with a broad base 32 formed with a pair of T-grooves 33 running transverse the clamp bar and on this bar is supported the clamp column 34 by means of the T-heads 35 (Fig. 10), which ride in the grooves 33, while a screw 36 (Fig. 7) mounted on the clamp plate, engages a screw-threaded recess in the column 34, so that the column can be adjusted transverse the clamp bar. The lower end of the clamp column is slotted, and in this slot is mounted a hook 37 on the pin 38. The hook 37 engages the pin 39 on the upper surface of the clamp block 40 (Fig. 11), and the clamp block is thus suspended from and

locked to the clamp column, so as to give a slight rocking motion. On the base of the clamp block 40 a pattern block 41 of the desired size is secured. The hook 37 is provided with a heel 42 so that the hook can be pulled out to release the clamp block with its pattern block for the insertion of any other desired pattern block. For the purpose of actuating the clamp mechanism to bring pressure upon the pile during the cutting operation; I make use of the devices shown and described in my prior Patent No. 1,100,000 of June 16, 1914.

At the ends of the clamp bar 31, are downwardly depending pulling bars 43, shown in dotted lines in Figs. 1 and 2. These pulling bars each carry at their lower end an outwardly projecting stud 44, which is engaged by a bifurcated arm 45, pivotally secured to crank arm 46 on the rock shaft 47, extending across the machine from side to side and provided at each end with one of these crank arms. The rock shaft 47 has secured thereon near its middle portion a segment gear 48, which meshes with the segment gear 49, which is loosely mounted on the driving shaft 12. The hub 50 of this segment gear is formed with a friction disk, the periphery of which is provided with the usual friction band of leather and which is engaged by a split friction ring 51. One end of this split friction ring is coupled by a bolt with the crank arm on the crank pin which is journaled in the opposed half of the split friction ring. The crank pin passes loosely through a suitable opening in a disk plate 52, which is keyed to the shaft 12. The crank pin on the outer face of the disk 52 is provided with a crank arm 53, carrying a roller 54. This roller bears against the cam 55, loosely mounted on the shaft 12, but secured to the frame so that it cannot rotate, and as the shaft 12 is rotated, the roller 54 rides on the cam 55 and causes the friction band to tighten on the friction surface connected with the hub of the segment gear 49, thus coupling the gear to the shaft 12 with a powerful friction clutch and drawing down the clamp mechanism to engage the paper pile. I have not illustrated this construction in detail, as it is fully disclosed in my former Patent, No. 1,100,000 above referred to.

To return the clamp to its normal position above the pile, I provide a coiled spring 56. The spring bears between the projection or base 57 on the bracket 58 secured to the framework and the lower end of a depending arm 59, which is curved up over the side of the frame at 60 and secured to the rock shaft 61. This rock shaft 61 also carries the arm 62, pivotally secured at 63 to the clamp bar, so that when the clamp bar is lowered, the coiled spring is compressed and when the clamp bar is released

from the action of the pulling bars, the spring will actuate the rock shaft to raise the clamp bar to the upper end of the frame, and to prevent too sharp a return, I provide a stop 64, depending from the head cross bar of the frame, near the middle and against which the clamp bar strikes.

To return the rock shaft 47 and with it the segment gears to their normal position, a cam 65 is mounted on the driving shaft 12, which cam engages a roller 66 on one end of the bell crank lever 67 journaled in the base of the machine. The outer arm of this lever is coupled to a lifting bar 68 which is pivoted to the crank arm 46 on the rock shaft 47.

As described in my former Patent No. 1,100,000, the action of this cam is so timed that after the clamp has been brought down on the paper pile and the knives have been reciprocated to trim the front and end edges of the books, the cam comes in contact with the roller 66 and through the connecting devices the rock shaft 47 is rocked back to its normal position, and with it the gears 48 and 49. Then the coiled spring 56 is free to raise the clamp to its normal position above the paper pile.

A foot lever 69 is also provided, connected by a connecting bar 70 with an arm coupled to the pulling bars for the clamp so that by depressing the foot treadle the clamp can be rapidly lowered to the paper pile when desired.

It frequently happens that when books and pamphlets of spongy paper are to be trimmed, the pressure of the pattern board causes the uppermost portion of the pile to curve and the result is that with the ordinary vertical face for the back gage, the upper portion of the pile is not trimmed of the same width as the lower portion. In order to overcome this difficulty, I construct my back gage in two parts. The body of the back gage 71 is provided with the usual screwthreaded collars 72 at the base, which collars are engaged by the horizontal screw 73 (Fig. 5) which runs to the front of the machine for adjustment in the usual way, so that the rotation of the screw causes the back gage to move forwardly or rearwardly. The contacting portion 74 of the back gage is pivoted at 75 to the body portion and extends rearwardly over the body portion and is provided at the back end with a regulating set screw 76, so that by adjusting the set screw 76 the vertical face of the pivoted portion 74 may be tilted forward, whereby the front edges of the pile may be shifted forward to compensate for any curvature of the pile under the clamp pressure, the back gage being held in its adjusted position by the coiled spring 77 interposed between a boss on the tilting portion and the head of a pin 78 mounted on

the body portion 71 of the back gage, which pin passes through an opening in the tilted portion. There is also a depending lug 79 on the tilting portion which takes into a socket in the body portion, which lug is provided with a hole to register with the hole 80, so that a pin can be inserted to lock the two parts together when the clamp is to be used in the ordinary way with the gaging surface vertical.

In order to properly adjust the pile of paper to be trimmed, it is necessary to have the side or end gage as well as the usual back gage, and in order that there may be no interference between such end gage and the operation of the end trimming knife, I provide as follows: A gage member 81 is provided with the usual elongated vertical face and this is mounted (Figs. 8 and 9) in a hinge member 82 which is provided with a beveled keyway 83 to receive the beveled key 84 on the gage member, and the gage member is held in adjustable position by the knurled set screw 85. The hinge member 82 is mounted on a pivot pin 86 extending upward through the plate 87, which plate is secured to the side of the frame in adjustable position by screws or bolts passing through the slots 88. The lower end of the pin 86 is provided with a crank arm 89 coupled by the connecting bar 90 with the lever 91, pivoted at 92 in a bracket at the base of the frame. This lever 91 carries the roller 93 which bears against the cam 94 on the shaft 11, the roller being kept in engagement with the periphery of the cam by the spring 95 bearing between a lug on the frame and the head 96 at the lower end of the bar 91. This cam 94 is so positioned on the shaft 11 (by the rotation of which the end knives are actuated), that with the commencement of the downward throw of the end knives, the roller 93 will ride up on the raised portion of the cam 94 and through the medium of the connecting bar 90 rock the pin 86 which carries the gage member, so that by this construction the end gage is withdrawn from the side edge of the pile with the actuation of the end trimming knives. At the completion of the throw of the end knives, the gage is brought back to normal position by the action of the spring 95. In order to serve as an effective stop for the movement of the end gage, the hinge member 82 of the gage is provided with a stop 97 usually shod with rubber, which comes in contact with the side frame.

In order to secure the safety of the operative and to warn him that the machine is in operation, I provide a guard or shield 98, preferably of sheet metal, which is mounted to slide up and down in vertical guideways 99 (Fig. 5) in the side frame. This shield, which is shaped to extend outwardly over

the front of the table, is connected by the upwardly extending side rods 100 to the vertical arms 101, 101, on the rock shaft 102, which rock shaft is mounted in the upper portion of the framework. The rock shaft 102 on one end outside of the side frame, as shown in detail in Fig. 1, carries a pinion 103 which meshes with a rack 104 on the vertical rod 105. This rod is connected at its lower end to a horizontal arm 106 mounted on a rock shaft 107 and journaled in bearings on the side of the frame and carrying on its outer end an arm 108 with roller 109, which roller bears on the periphery of a cam 110 on the shaft 12.

Mounted on the rod 105 is a coiled spring 112 which bears between a collar 113 on the rod and a lug 114 on the frame through which the bar 105 passes. When the guard 98 is in its uppermost position, as illustrated in the drawings, the roller 109 on the rock shaft 107 is raised by the cam 110, so that the coiled spring 112 is under tension. Now as the knives begin to descend, the tension of the coiled spring draws downwardly the rod 105 which with its rack rotates the pinion 103 and rock shaft 102 to cause the guard or shield to descend to the table. As the shield is thus actuated by the spring 112, the shield can be stopped by the hand or arm or even be moved by upwardly compressing the spring 112 so that if any part of the person of the operator is struck by the descending shield, it will merely serve as a warning and not cause damage.

The shield during the operation of the knives remains on the table completely covering up the cutting mechanism; but as the knives are carried back to the top of the stroke, the cam roller rotates upon the cam 110, which lifts the rod 105, rocking the shaft 102 in the opposite direction and raising the shield to its uppermost position.

As in my former machine, the power shaft is thrown into and out of operation by a friction clutch intermediate the shaft and hub of the fly wheel 5, the clutch being shifted into and out of operation by the hand lever 115 mounted on the rock shaft 116. If for any reason, however, when the clutch is thrown off, the fly wheel should stick, or for any other reason the power mechanism should fail to become disconnected, I provide a safety brake attachment for the power shaft.

Mounted on the inner end of the lever rock shaft 116 is a depending arm 117 which is coupled to a bifurcated bar 118 (Fig. 3), which bar is coupled to the annular plate 119 through the central opening of which the power shaft passes.

The annular plate 119 carries projecting pins 120 which pass through lugs on a corresponding annular plate 121, which is fixed to

the frame. The pins 120 have heads 122 with coiled springs 123 bearing between the lugs on the fixed plate and the heads, which springs tend to pull the plate 119 up toward the corresponding plate 121. Keyed to rotate with, but sliding on the power shaft 4 is the disk plate 124, carrying annular contacting surfaces shod with leather or other suitable brake material 125, and when the rock shaft 116 is rocked by the starting lever to throw out the clutch connection, the movement of the lever assisted by the springs 123, brings the brake surface 125 into close braking contact with the plates 119, 121, and a powerful brake is supplied against the rotation of the shaft 4.

To illustrate this brake construction, I have shown the parts separated in Fig. 4.

As the general construction of machine is in many respects like the single knife paper cutter illustrated in my former Patent No. 1,100,000, it will not be necessary to undertake a description of the detailed operation of the machine. By my present invention, I have coupled to the single cutting knife construction of this patent, additional mechanism for actuating end trimming knives at the conclusion of the stroke of the front knife. In paper cutting machines for simultaneously trimming the front and ends of books and pamphlets, so far as I am aware, it has been necessary heretofore either to turn the book piles, or to rotate the table upon which the piles of paper are mounted.

The ease with which the pattern boards for the clamp can be changed by means of the hook construction for any size of book, and the ease with which the end cutting knives can be adjusted toward and away from each other, with the ability to adjust the back and end gages within wide limits, gives a very large range as to capacity of the machine, while the safety appliances which have been fully described render the book-trimmer proof against accident.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a paper cutting machine, the combination with a pair of knife carriers and a clamp bar intermediate the knife carriers, each mounted to reciprocate in parallel relation, of a clamp column with a pattern board removably coupled thereto, a knife secured to one carrier and a pair of knives secured to the other carrier at right angles to the single knife, and interconnected actuating mechanism for the two carriers and the clamp bar whereby they may be reciprocated in succession to hold and trim the front and ends of a paper pile in one continuous operation.

2. In a paper cutting machine, the combination with a pair of knife carriers and a clamp bar intermediate the knife carriers, 130

each mounted to reciprocate in parallel relation, of a clamp column with a pattern board removably coupled thereto, and with the clamp column adjustable transversely of the clamp bar, a knife secured to one carrier and a pair of knives secured to the other carrier at right angles to the single knife, and interconnected actuating mechanism for the two carriers and the clamp bar whereby they may be reciprocated in succession to hold and trim the front and ends of a paper pile in one continuous operation.

3. In a paper cutting machine, the combination with a pair of knife carriers and a clamp bar intermediate the knife carriers, each mounted to reciprocate in parallel relation, of a clamp column with a pattern board removably coupled thereto, and with the clamp column adjustable transversely of the clamp bar, a knife secured to one carrier and a pair of knives secured to the other carrier at right angles to the single knife, with means for adjusting said pair of knives in parallel relation toward and away from each other, and interconnected actuating mechanism for the two carriers and the clamp bar whereby they may be reciprocated in succession to hold and trim the front and ends of a paper pile in one continuous operation.

4. In a paper cutting machine provided with mechanism for cutting the front and ends of a paper pile, a pivoted end gage for

adjusting the ends of the pile, a driving shaft for the cutting mechanism and connecting mechanism intermediate the gage and driving shaft to swing the gage out of the pathway of the cutting mechanism.

5. In a paper cutting machine, in combination with knife carriers and knives and means for reciprocating them to trim the front and end edges of a paper pile, of a pivoted end gage for adjusting the ends of the pile, a driving shaft for the cutting knives and connecting mechanism intermediate the end gage and the shaft to swing the gage out of the pathway of the cutting knives upon the reciprocation thereof.

6. In a paper cutting machine, the combination with the frame and a pair of knife carriers mounted to reciprocate in parallel relation, of a knife secured to one carrier and a pair of knives secured to the other carrier at right angles to the single knife, two driving shafts, with intermeshing gears to reciprocate the knife carriers, and an end gage pivoted to the frame with a cam on one of the driving shafts, and intermediate connection with the gage whereby the operation of the driving shaft will swing the end gage out of the pathway of the end knives.

CHARLES SEYBOLD.

Witnesses:

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EMMETT E. LEO.