Oct. 29, 1940. H. DONNERBERG ET AL 2,220,056

PAPER DIE CUTTING MACHINE

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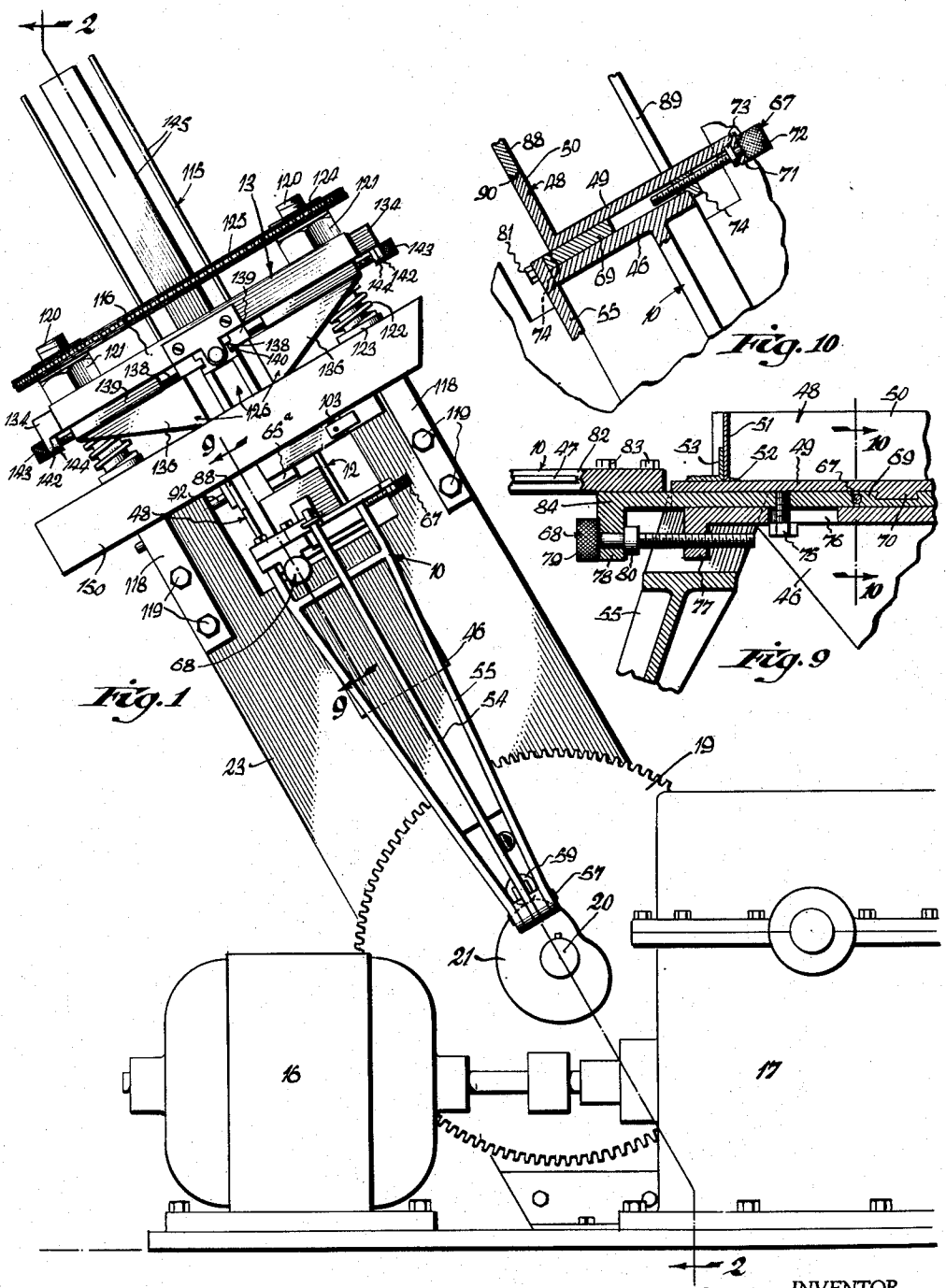

Fig. 1

Fig. 10

Fig. 9

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PAPER DIE CUTTING MACHINE

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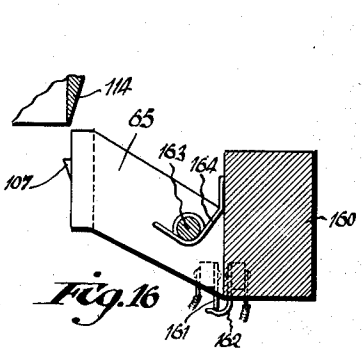

Fig. 16

Fig. 2

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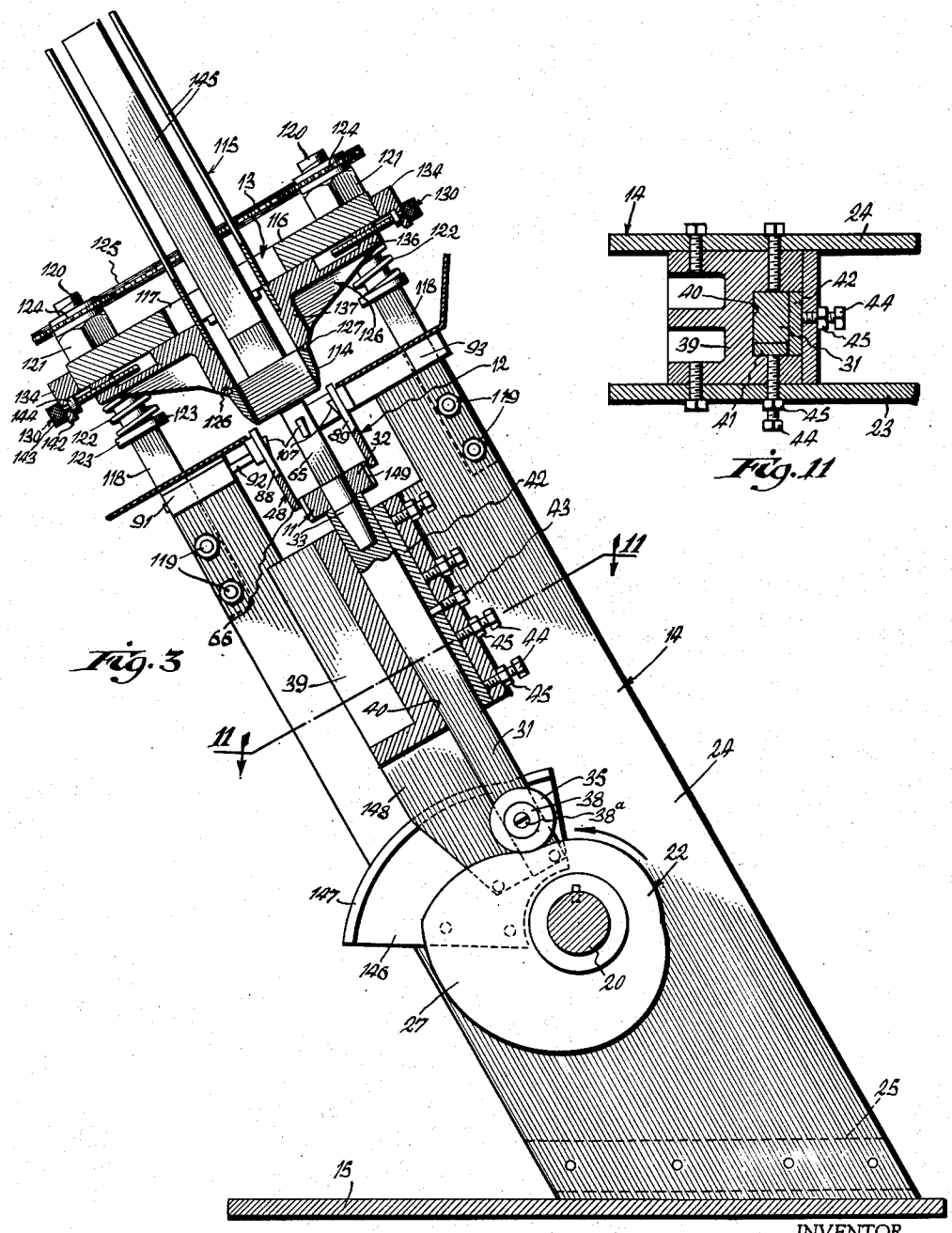

Fig. 3

Fig. 11

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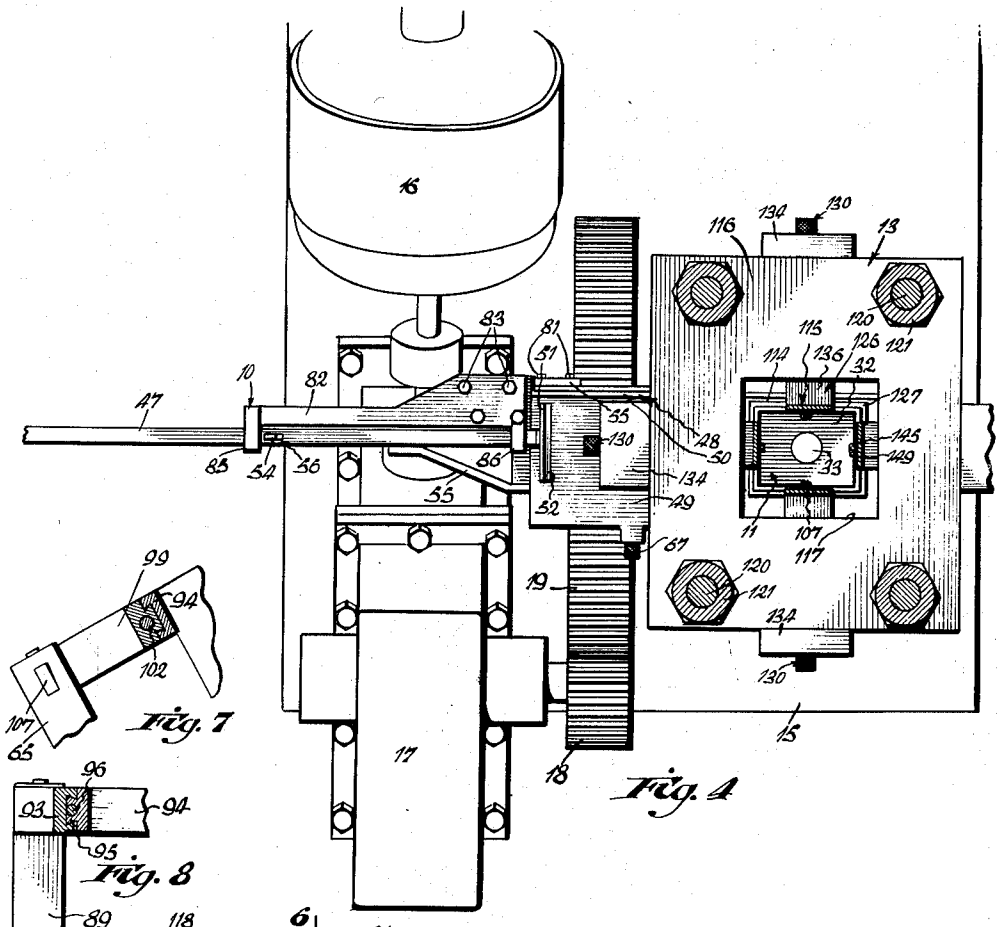

Fig. 4

Fig. 7

Fig. 8

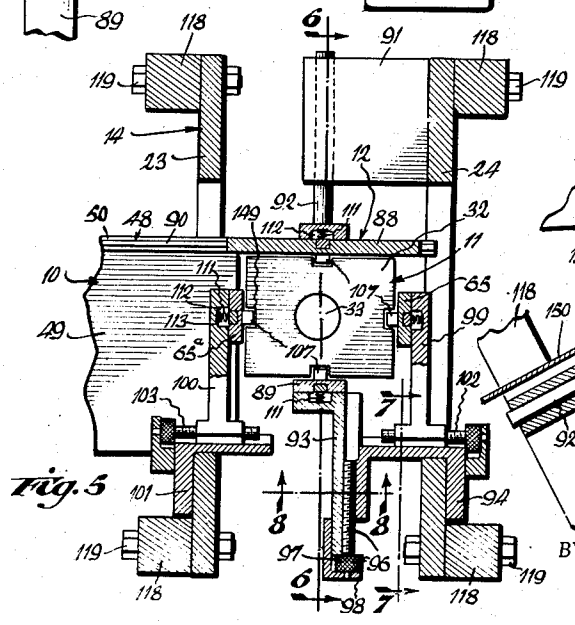

Fig. 5

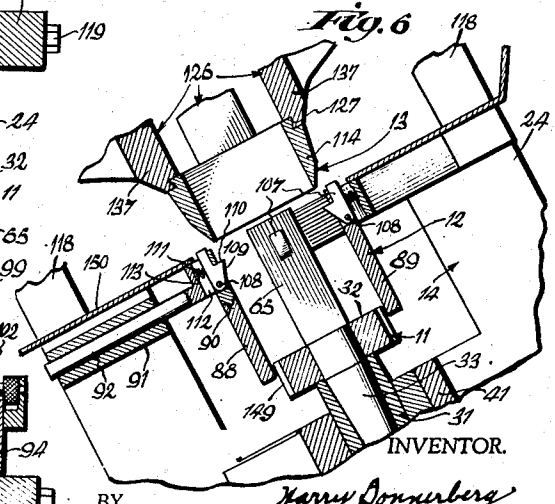

Fig. 6

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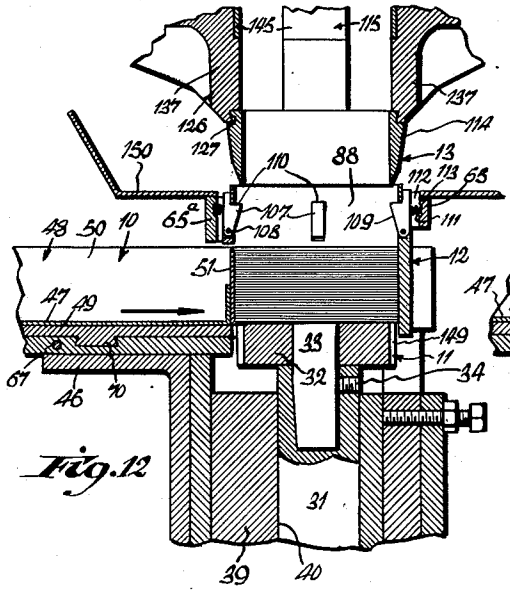

Fig. 12

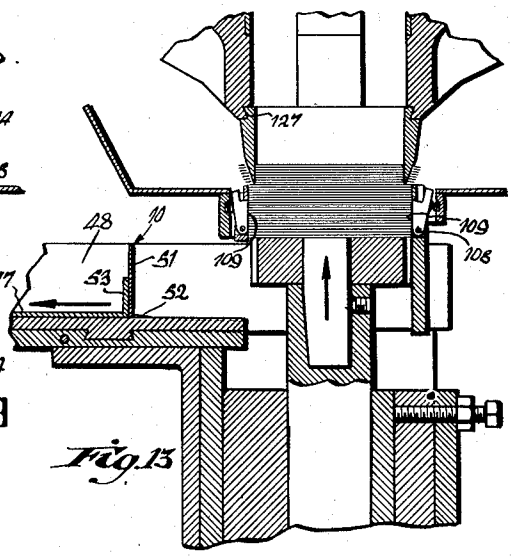

Fig. 13

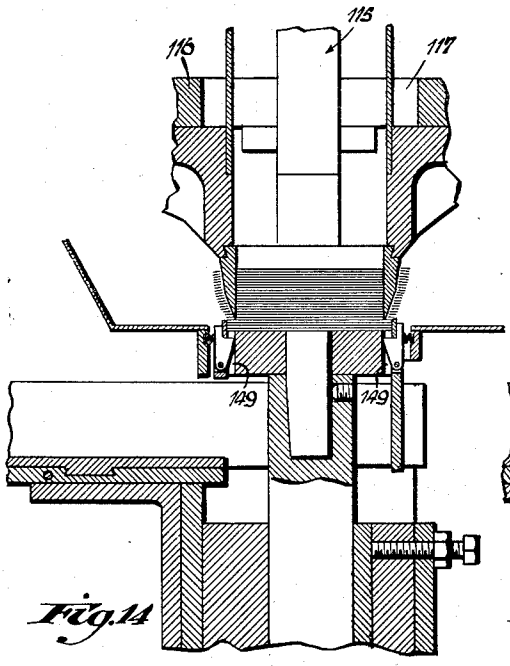

Fig. 14

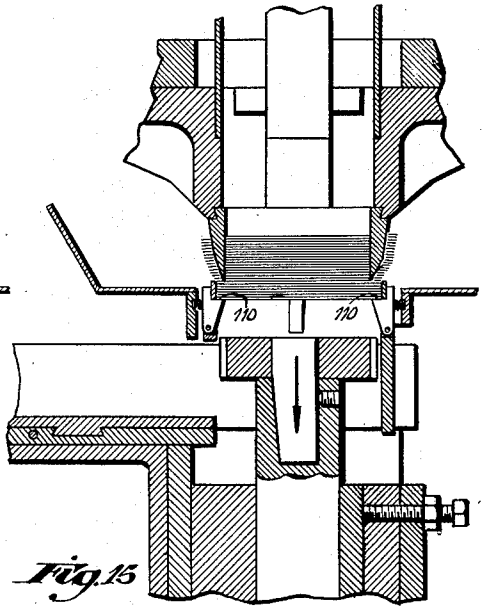

Fig. 15

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Patented Oct. 29, 1940

2,220,056

UNITED STATES PATENT OFFICE

2,220,056

PAPER DIE CUTTING MACHINE

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Application June 23, 1937, Serial No. 149,930

11 Claims. (Cl. 164—21)

This invention relates to paper cutting machines and is particularly directed to an automatic machine for cutting stacks of paper sheets to produce sheets of predetermined size and shape, as for example, labels, blanks for bags or boxes, shelf edging, etc. The present machine employs a hollow die and a cutting block or ram, which elements are relatively movable. A stack of sheets to be cut, for example 1,000 sheets, is delivered between the cutting block and die, and forced against the lower edge of and through the die to produce sheets of the desired shape or configuration. The cutting block, in order to support the stack properly must extend beyond the edges of the cutting die.

It is impractical to use a cutting block of material such as wood which will receive the cutting edge without damage thereto. It is preferable to use a metal block which need not be replaced and the surface of which will not wear and will remain perfectly smooth. This type of block, however, would damage the cutting edge if the die engaged the block in the usual manner. Accordingly, it has been the object of the present invention to provide an arrangement of die cutting elements for cutting a stack of sheets wherein the die cutting edge is not damaged in the cutting stroke, and wherein the progressive movement of the paper through the die is not disturbed; that is to say, sheets are at all times disposed adjacent to or against the die edge for subsequent movement through the die.

In the manufacture of labels or in the cutting of printed sheets, it is necessary that the cutting die be accurately positioned with respect to the printed face of the sheet and that the sheets be accurately aligned whereby the finished products may include uniform margins and may be accurately cut with respect to the printing for the production of articles of good quality and appearance.

Accordingly, it has been the further objective of the present invention to provide an automatic paper cutting machine in which the various movements including the delivery means, the relatively movable die and cutting block, and the discharge hopper may be set for a given size and shape of finished sheet, and may be operated continuously in the production of large quantities of duplicate sheets of uniform quality.

It has been the further objective to provide a delivery mechanism which permits the operator to feed the stacks to the cutter die without endangering his hands.

In a more detailed statement, it has been a further objective of the invention to provide a machine for cutting paper sheets into predetermined shape in which the stacks of sheets to be cut may be handled in piles or stacks and deposited within the feed intake area of the machine for mechanical delivery to the cutting zone and subsequently cut to size and deposited in a hopper, the points of deposit and delivery being entirely removed from the cutting mechanism so that there is no danger to the operator.

Further objectives have been the provision of a discharge means for the waste material from around the die, the provision of an adjustment for the die and discharge hopper wherein the parallelism of the die edge and face of the cutting block is constantly maintained, and the provision of adjustment means throughout the machine for varying the spacing of parts and interchangeable elements for delivering and cutting sheets of different sizes and contours.

These objectives have been accomplished in the provision of a machine as disclosed herewith and which constitutes one embodiment of the present concept.

Further objectives and advantages will be more fully apparent from a description of the accompanying drawings in which:

Figure 1 is an end elevation of the label cutting machine of the present invention.

Figure 2 is a sectional view taken on line 2—2, of Figure 1.

Figure 3 is a sectional view taken on line 3—3, of Figure 2, the moving work table or block being shown in retracted position with respect to the cutter die.

Figure 4 is a sectional view taken on line 4—4, of Figure 2, detailing the adjustment means for the stationary die.

Figure 5 is a sectional view taken on line 5—5, of Figure 2, illustrating the guide unit and adjustment elements.

Figure 6 is a sectional view taken on line 6—6, of Figure 5, further illustrating the guide mechanism and showing its relationship to the pressure head and cutting die.

Figure 7 is a sectional view taken on line 7—7, of Figure 5 detailing the adjustable mounting of one of the guide sustaining arms in the frame of the machine.

Figure 8 is a sectional view taken on line 8—8, of Figure 5 detailing the mounting of another of the guide arms.

Figure 9 is a sectional view taken on line 9—9, Figur detailing a portion of the label de-

livery or feeding mechanism at an adjusting point thereof.

Figure 10 is a sectional view of the feeding mechanism taken on line 10—10, of Figure 9 detailing another adjusting point of the mechanism.

Figure 11 is a sectional view taken on line 11—11, of Figure 3 showing the construction and assembly of the plunger bracket.

Figures 12, 13, 14 and 15 illustrate the feeding and cutting mechanism in the various stages during one cycle of the machine in the cutting of a stack of labels.

Figure 16 is a detail view showing the device for breaking the circuit to the motor when the labels are out of position or alignment.

The machine of the present invention is designed to trim labels or other relatively small printed sheets to a predetermined size and shape. The sheets or labels may be first printed or engraved with the appropriate inscription or design and subsequently cut to exact size by marginal trimming.

The trimming of the sheets is accomplished by a dieing or stamping operation, the sheets being delivered and cut in stacks of substantial thickness. In trimming, the stack is accurately positioned beneath a hollow die and forced upwardly with sufficient pressure to cause the stack to be forced through the die, the die having downwardly projected cutting edges.

The size of the stack of sheets before trimming is slightly greater than the size of the die and extends beyond it on all sides. As the stack is forced through the die, this excess material is shaved or trimmed off and the finished product corresponds in size and shape to the interior of the die. The waste material which extends beyond the cutting edge of the die is forced upwardly with the stack during the cutting operation but divides from the sheets at the cutting edge and is shed to the outside of the die.

The work table or ram at its upper limit stops short of the cutting die and accordingly a portion of the labels are uncut. This portion serves as a pad protecting the die edge. Thereafter, this portion is held suspended, being forced through the die in the next cutting cycle. In other words, the retained portion is carried upwardly by the next stack.

Generally described, the machine comprises four essential units or elements, namely a feed mechanism, a pressure element, a guide unit and a cutting unit. In the cutting operation, a stack is first fed into the machine, into position for cutting, by the feed mechanism. The feed mechanism deposits the stack on the work table or pressure block or head which is mounted on a reciprocating plunger. The table or block is of substantially the same size and shape as the blanks and forces the stack against the cutting unit for the trimming operation. In the upward or cutting stroke of the pressure block or head, the stack of label blanks is held in alignment by the guide unit which contacts the stack on four sides to insure correct approach to the cutting unit. The cutting unit includes a die and a magazine or hopper, the magazine retaining the cutout labels as they are forced through the die on the upward stroke of the pressure head.

The nature of the work requires that the machine be adaptable to variations in the size and shape of the sheets and thickness of stacks to be trimmed. To this end, the main operating elements are provided with adjustments which permit the setting of the parts to operating conditions exactly suitable to the character of the work being done. Thus the feed mechanism is adjustable so as to fix the distance which the sheets are fed inwardly to their position against the guide members. The guide members are adjustable so that they will be in contact with the sheets on all edges for correct feeding alignment of the sheets with the die.

The die, forming a part of the cutting unit is horizontally adjustable with respect to the guide unit and pressure head to permit proper registration with the labels so that the material around the printed matter is removed accurately and without cutting into the printed matter. The die is also adjustable vertically with respect to the pressure block to set the cutting edge of the die at the proper distance from the upper limit of travel of the head or work table for leaving the pad of labels protecting the cutting edge.

Referring specifically to the drawings, the feed mechanism is generally indicated at 10, the pressure element or ram at 11, the guide unit at 12 and the cutting unit at 13. The frame 14 of the machine is mounted on a base 15 and is inclined to facilitate stacking of the labels, the stacks being sustained partially on edge both in the feeding and in the cutting mechanisms.

The machine is driven by a motor 16 mounted on the base 15 and in driving connection with a speed reducing unit 17, a pinion 18, and a gear 19. The gear 19 is keyed to a cam shaft 20 which in turn drives cams 21 and 22 mounted and keyed thereon. The cams 21 and 22 drive the feed mechanism 10 and the pressure element 11 respectively.

The frame 14 of the machine consists of a pair of parallel spaced side members 23 and 24 fastened to the base 15 by means of the angle irons 25. A pair of bearing brackets 26 are secured in the side members near the base and serve to journal the cam shaft 20 at its opposite ends. The cam 22 for the pressure element 11 is keyed to the shaft 20 on the portion extending between the two side members of the frame.

The cam 22 is of duplex construction, consisting of a pair of lobes 27—27 cast integrally with a hub 28. The hub extends the length of the shaft between the side members to the inner edges of the bearing brackets 26. The bearing brackets are rigidly secured to the side members by the engagement of the bosses 29 into bores 30 of the side members. The arrangement of the bearing brackets with relation to the cam, and the manner of fastening the brackets to the side members produces a very rugged structure, calculated to best withstand the stress imposed upon the shaft and cam during the cutting period in the operation of the machine.

The cam drives the pressure element or ram 11 by means of a plunger 31. The upper end of the plunger extends substantially to within the region of delivery of stacks of labels and carries the block or head 32. This head is of the same dimensions as the untrimmed labels and is removably attached to facilitate the changing of blocks when labels of a different size are to be trimmed. Attachment of the block is achieved through the use of a stub shaft 33 secured to the block and inserted in a bore axially of and at the top of the plunger. A set screw 34 is threaded into the plunger and bears against the stub shaft to secure it against displacement.

The lower end of the plunger is in driving contact with the cam for reciprocation, contact being established through a pair of cam rollers 35 in

contact with the periphery of the cam lobes. The rollers are journalled on opposite sides of the plunger on a shaft 36 extending crosswise of the plunger through a bore 37. The shaft projects on each side of the plunger a distance approximately equal to the thickness of the rollers and the rollers are held against lateral movement by recessed washers 38 fastened at opposite ends of the shaft by screws 38a.

The plunger is slidingly sustained for reciprocation in a guide bracket 39. The bracket spans the members of the frame and is attached to both members serving to reenforce the frame near the upper end. The bracket acts as a housing to enclose the plunger, having, for this purpose, a slideway 40 corresponding to the rectangular cross section of the plunger (see Figure 11). Provision is made to accommodate for wear between the plunger and slideway by the addition of adjustable gibs 41 and 42 in the slideway on adjoining sides of the plunger. Each gib is held in place against longitudinal displacement by a screw 43 having a plain end sliding in a bore of the gib.

Adjustment is provided by four set screws 44 in each gib, which are threaded through the bracket and abut the gib members. A lock nut 45 is provided on each set screw in order to hold the screw in adjusted position. Adjustment to compensate for wear is accomplished by loosening the lock nuts 45 and tightening the set screws the proper amount to reestablish proper bearing contact with the plunger for correct running fit.

The feed mechanism 10 of the machine is located at the upper portion of the frame and is supported thereon by an angular bracket 46. The function of the unit is to deposit the stacks of labels on the face of the pressure block when the block is stationary at the lower limit of its stroke. The feed mechanism consists primarily of a pusher blade 47, reciprocating horizontally in an angular guideway or receiving trough 48. The trough consists of a bottom member 49 and side member 50 at right angles, the bottom member providing a supporting surface in the same plane with the upper face of the pressure block when the block is at rest, as previously mentioned.

As shown in Figures 1 and 3 of the drawings, the entire machine is canted. This arrangement disposes the trough 48 of the feed unit at an angle, forming in effect, a right angular V (see Figure 10). As the stacks are placed in the trough by hand, the slant of the bottom member 49 causes the stack to rest partially on edge against the side member 50 due to the influence of gravity and thus retain the stack in perfect alignment.

In operating the machine the stacks are placed against a pusher plate 51, the plate having a slight tapered or sharpened leading edge 52 extending across its lower edge for the purpose of engaging under the lower edge of the stack preventing loss of the lower labels under the plate. The pusher plate is attached, for reciprocation, to the feed bar 47 at its forward end as at 53 and slides on the bottom of the trough 48. On the feeding stroke, the pusher plate traverses the trough and momentarily comes to rest when the labels are properly disposed on the pressure head 31 and in contact with the guide unit 12. The pusher is then withdrawn, depositing the labels on the head to be subsequently trimmed on the upward stroke of the head.

The feed bar and pusher plate are reciprocated by means of a lever 54 pivoted at its lower end in a bracket 55 depending from the bracket 46. This lever has its upper end engaged in a slot 56 in the pusher blade. The lever 54 is pivoted on a cross pin 57 at the lower end of the bracket 55 and includes a laterally extended arm 58 on which is pivoted a cam roller 59 in contact with the feed cam 21. The cam 21 is keyed on the cam shaft and is so related to the main drive cam 20 for synchronization of the movements of the feed bar and the cutting block 11, so that loading of the block occurs at the proper time. The relative movements of these parts are illustrated in Figures 12 to 15 inclusive, in the drawings.

The bracket 55 includes a laterally extending arm 61. A spring 62 is attached under tension at opposite ends to screws 63 and 64 engaged in the bracket arm and the lever respectively. The spring functions to urge the lever in the feeding direction of its stroke, the roller 59 in contact with the cam permitting the feed stroke only as the periphery of the cam allows downward movement of the roller. Thus the feed bar and pusher are spring urged during the feeding or loading stroke and positively driven by the cam on the return stroke. This expedient prevents damage to the parts if there is a slight overrunning of the stroke and permits the use of a positive stop against which the labels are deposited under the spring-impelled movement of the pusher.

In the loading or feeding movement of the pusher plate, the plate is brought to a halt when the stack of labels is in contact with a stop plate 65 forming a part of the guide unit 12. This ensures alignment of the stack along this edge. An extension 66 of the side element of the receiving trough 48 is carried back to this area to sustain the stack along the adjacent edge and in this manner the stack is sustained on the pressure block in proper alignment to be presented to the cutter unit 14.

As previously mentioned the feed mechanism is provided with adjustments to facilitate variations as to the range of stroke of the pusher plate and of the lateral position of the trough in order to permit the feeding and cutting of labels of various sizes. For this purpose knurled adjustment screws 67 and 68 are provided. Manipulation of the screw 67 (see Figure 10) adjusts the position of the trough laterally and of screw 68 (see Figure 9) changes the range of the feed stroke.

The trough 48 is slidingly secured to a longitudinally shiftable base plate 69 by means of a dovetail guideway 70. The adjustment screw 67 is screw-threaded into this plate and is rotatably engaged in a lug 71 of the trough. The lug is disposed between the head 72 of the screw and a collar 73. Rotation of the screw moves the trough crosswise in relation to the base plate 69.

The base plate 69 is longitudinally shiftable with respect to the bracket and has side flanges 74 overhanging the bracket edges to prevent lateral displacement. A bolt 75 is screw-threaded into the plate and traverses a slot 76 in the bracket to permit longitudinal shifting, the purpose of the bolt being to lock the plate firmly in adjusted position. The adjustment screw 68 is screw-threaded into a lug 77 integral with the bracket and rotatably engaged in a lug 78 of the base plate. The lug 78 is engaged between the head 79 and collar 80. Rotation of this screw moves the plate longitudinally with respect to the bracket.

It will be noted (see Figures 4 and 10 of the drawings) that the bracket 55 to which the feed lever is pivoted is fastened to the base plate 69

by the bolts 81 on the two opposite side edges of the plate. A guide bracket 82 is also secured to this plate by means of bolts 83 screwed into a lug 84 projecting rearwardly of this plate. The guide bracket extends rearwardly a considerable distance and is provided with laterally projected lugs 85 and 86 at its respective ends. These lugs are slotted to a depth slightly greater than the width of the pusher blade and slidingly sustain the blade for reciprocation in these slots.

In adjusting the machine for a label of given size, the feed unit is shifted bodily on the bracket to or from the frame so that when the pusher plate is at inner limit of travel, the stack of labels is properly located in the guide unit. This adjustment is made by manipulation of the adjusting screw 68. Since the feed lever and pusher blade brackets are secured to the base plate 69, all are shifted unitarily upon shifting of the base plate. It will be noted that the feed cam 21 is of substantial width providing that the cam roller is at all times in operative relationship with the cam surface despite the lateral shifting of the cam in the aforesaid adjustment.

The above described adjustment as previously mentioned is utilized when labels of different length are to be cut. The variation in label length is accommodated for, not by changing the length of the stroke, but by shifting the range of the stroke. This determines the proper forward limit of the feeding stroke. When the width of the label varies the operator laterally shifts the receiving trough by the adjustment screw 67 in the manner as described in the preceding paragraph. The two adjustments are independent of each other so that labels of any desired proportions within the capacity of the machine may be accommodated.

The vertical guide unit located directly beneath the cutting unit is adapted to guide the stack of uncut labels in aligned relationship during the upward translation of the stack in the cutting stroke of the plunger. The guiding elements consist of four downwardly projected plates which extend somewhat below the upper face of the pressure head.

The plate 65 is disposed to the rear of the feed mechanism, and acts as a stop or gauge against which the stack is deposited. Adjacent plates 88 and 89 on opposite sides of the pressure block ensure alignment on these two sides of the stack.

The side plate 88 is in alignment with the side element of the receiving trough and is in effect, a continuation thereof, the two parts being engaged through a tongue and groove joint as at 90. This connection permits the longitudinal adjustment of the feed unit without disturbing the side member 88, the side element of the trough being free to slide with relation to the side member 88 of the guide unit. The side member 88 is sustained in a bracket 91 attached to the side frame. The bracket 91 includes a bore which is traversed by the stud 92 projecting at right angles from, and as a part of the side member 88. This mounting permits the side member 88 to move laterally with the receiving trough when it is shifted in making adjustments so that the alignment of the two parts is preserved at all times.

The side member 89 is located opposite the member 88 and is secured on a horizontal arm 93. The arm is slidably secured to an angular bracket 94 which is fastened to the frame of the machine. The bracket includes a dovetailed slideway 95 (see Figure 8) to which is fitted the arm, adjustment being procured by means of the screw 96. The adjustment screw 96 is screw-threaded into the bracket 94 and is rotatably secured to the arm by confinement of the knurled head 97 thereof between the end of the arm and an angular clip 98. Rotation of the screw in the appropriate direction shifts the plate laterally as desired.

The stop plate 65 and the forward plate 65a are secured to arms 99 and 100. The arm 99 of the finger 65 is dovetailed to an adjacent side of the angular bracket 94 and the arm 100 is in the same manner associated with a bracket 101. Lateral adjustment of each finger is procured by screws 102 and 103 respectively arranged and effective in the same manner as screw 96. The plate 65a is positioned in the guide unit on the receiving side opposite to the stop finger 65. It is considerably shorter than the other plates in order that its lower end does not interfere with the stacks as they are fed onto the cutting block.

Each of the guide fingers is provided with a spring pressed detent 107. These detents are located in slots formed in the fingers and are pivoted on pins 108 at their lower ends. Each detent projects inwardly of its respective finger, being formed with an inclined face 109 disposed angularly with respect to the inner surface of the plate. The face of the detent terminates at the top in a ledge 110 disposed horizontally. The active or stack engaging portion of the detent may be described as a sawtooth shaped buttress.

Each detent is urged outwardly by a small compression spring 111 bearing against the rear surface of the detent. The opposite end of the spring seats against the inner wall of a recess 112 formed in each of the supporting arms of the fingers behind the detents as shown in Figs. 5 and 6. The detents engage against cross portions 113 of the plates at their upper ends which act as limits against the pressure of the springs. The guide fingers and detents cooperate with the cutter unit. Their purpose will be more clearly illustrated when described in conjunction with the cutter unit.

The cutter unit is made up essentially of a cutting die 114 and a magazine 115 secured to a table 116. The table comprises a rectangular block having a central opening 117 through which the magazine or hopper extends. The table is mounted on the frame of the machine by means of four standards or posts 118. These posts are secured to the side members of the frame by bolts 119 at their lower ends. The upper portion of each of the bars is counterturned and threaded as at 120 for screw-threaded engagement of the nuts 121 thereon. The table 116 is bored at the four corners for slidable engagement on the counterturned portions of the posts 118 and is engaged under the nuts 121. The table is supported from beneath on the springs 122 engaging the under surface of the table. Each spring is seated at its lower end on a washer 123 which rests on the shoulders formed at the juncture of the square post with the counterturned upper portion.

Each of the four nuts 121 includes a sprocket wheel 124 formed integral therewith. The sprocket wheels mesh with an endless sprocket chain 125 which encircles the four sprockets for positive unitary rotation. The arrangement of the nuts in conjunction with the springs provides for vertical adjustment of the cutter unit, the entire unit being subject to vertical move-

ment upon rotation of any of the nuts 121. The table, therefore, is always maintained in parallelism with the cutting block surface.

The hollow die 114 is of one piece construction and is detachably secured beneath the table 116. As shown in the drawings it is of rectangular shape although it may be of any other configuration required, because the shape of the finished label is determined by the shape of the die.

The die, along its upper edges is provided with undercut grooves 127, the grooves registering with corresponding grooves of adjustable supporting and clamping brackets 126, one on each of the four sides of the die. In other words the brackets hook under the undercut edge of the die. The brackets are slidably secured to the under side of the table 116, each being translatable toward and from the die by means of an adjustment screw. The adjustment screws designated as 130, project from the table, one on each of the four sides of the table. Each screw is rotatably confined in a block 134 secured to the edge of the table.

The four die adjusting brackets are duplicates and are of one piece fabrication. Each consists of a horizontal slide member 136 and an inner downwardly extended arm 137. Each is slotted as at 138 along the two sides and sustained beneath the table by a pair of rails 139 (see Figure 1). The rails are fastened beneath the table by screws (not shown) and include inwardly extended lips 140 engaged in the slots 138 to provide a slidable mounting for the bracket.

The adjusting screws are screw-threaded into the end of each of the die adjusting brackets and are rotatably mounted at their operating ends in the respective mounting blocks 134 secured on sides of the table 116. Each screw is held on a lug 142 of its mounting block 134 extending between a head 143, and a collar 144 of the screw, the mounting permitting rotation of the screw but preventing longitudinal movement. Rotation of the screw, therefore, moves the die adjusting bracket longitudinally for adjustment of the die or for tightly clamping it in place as hereinafter described.

The adjusting and supporting brackets sustain the die in position over the labels and provide a convenient arrangement by means of which the cutting edge of the die may be accurately disposed with relation to the printed face of the labels. In setting the die, two opposite adjusting screws are loosened sufficiently to permit the die to slide along the grooves at the upper edge. The adjacent pair of opposed screws is then operated in appropriate direction to move the adjustable support brackets longitudinally and thus position the die. In adjusting for movements in the crosswise direction the same procedure is followed and when the die is in proper position the four adjusting screws are tightened to hold the die firmly in place.

The four strips 145, forming the hopper are secured to the adjusting brackets and automatically assume the proper relationship over the die as the position of the die is changed, each strip being countersunk in the adjusting bracket for providing a flush inner guide surface. For the same reason the size of the hopper automatically changes when a die of different size is installed in the cutter head.

In the reciprocation of the plunger and cutting block, the plunger, on reaching the upper limit of its cutting stroke, is retracted by a supplementary cam element 146 forming a part of the main driving cam 22. This retracting cam element is attached to one side of the driving cam and has a laterally extended flange 147 which conforms to the periphery of the cam on the receding side of the driving lobe, forming in effect, a groove of approximately the same width as the cam roller. This arrangement provides a positive drive for the plunger on its return stroke so that there is no possibility of the plunger and cutter block remaining in the upper position after the completion of the cutting stroke. Thus, the cutting block is lowered to the proper stopping point and in a plane with the feed unit for receiving the succeeding stack of labels.

The plunger, at its lower end is sustained against lateral movement by a rib 148 depending from the guide bracket. This rib is disposed along the plunger on the side opposed to the direction of rotation of the cam and acts in the capacity of a crosshead against the lateral forces applied to the lower portion of the plunger during the cutting stroke in the operation of the cam. This arrangement prevents flexing and bending of the plunger in the guide bracket. Thus, breakage or excessive friction of the parts is eliminated.

In the operation of the machine, it is essential that the pressure block be slightly larger than the die so that the stack of sheets is supported in the general area beneath the cutting edge as the cut is made. If the block were of the same size or smaller than the die the stack would be distorted and the trimmed labels would be irregular in shape or size. Since the block overhangs the cutting edge of the die, it must be stopped short of actual contact with the cutting edge, or the edge will be damaged.

Accordingly, since the stroke of the cutting head or pressure block is fixed, the cutter head is raised or lowered to dispose the cutting edge of the die in the proper plane over the block. The adjustment is also made when the die has been resharpened and the length shortened or when the die lengths vary. Also, the die edge must be in the same plane with or below the plane of the top of the guides to prevent sidewise displacement of the retained labels. This adjustment is made by rotation of the nuts on the top of the table 116. The nuts are operated unitarily by reason of the sprocket and chain connection so that the adjustment is equalized and the unit moves up or down vertically in a plane parallel with the cutting block.

A clearance is thus maintained between the pressure block and the cutting edge of the die which results in a portion of the stack remaining uncut at the end of each stroke. As shown in Figure 13, the detents, by reason of their inclined faces, move inwardly upon passage of the stack of sheets. As the cutting stroke progresses the bottom of the stack is raised above the ledge or shelf forming the upper surface of each detent. The stopping position of the block disposes the bottom of the stack slightly above these ledges permitting the detents to snap inwardly of the guideway as shown in Figure 14. The pressure block is provided with slots 149, permitting this motion of the detents.

On the downward or return stroke of the pressure block, the uncut portion of the stack is sustained on the detents, as shown in Figure 15, to be cut as the succeeding stack is carried up-

wardly on the pressure block. The detents, therefore, serve to support the cut labels in the hopper with the pressure block short of actual contact with the cutting edge of the die. The stack, therefore, is retained in the guide unit beneath the die by the action of the detents and forms in effect a bottom for the hopper to support the cut labels contained therein. The lowermost portion of the stack remains in position to be cut with the succeeding stack on the next stroke of the cutting or pressure block.

The waste material which collects about the outside of the die slides clear of the working parts of the machine over an inclined tray or chute **150**. The tray is fastened at the top of the frame and is open at its discharge end so as to discharge the cuttings from the die into a waste receptacle.

As shown in Figure 16, the guide **65** and a supporting block **160** may be provided with electrical contacts **161**, and **162** respectively. These contacts are normally closed. In the event that the labels are out of alignment or for any reason do not pass between the guides, the guides **65** will be moved forward by the labels about a pivot **163** of the guide thereby breaking the contact between the contacts **161** and **162** and stops the motor **28** since these contacts are in a lead to the motor. The guide is held in normal position by a spring **164**.

Having described our invention, we claim:

1. In an apparatus for cutting stacks of paper, a cutting block, a hollow cutting die providing a continuous cutting edge disposed in parallelism with the face of the cutting block, means for moving one of said elements toward and from the other for cutting a stack of sheets of predetermined size and design, a support bracket for one of said elements said bracket of rectangular outline, posts slidably mounting said bracket, one at each corner thereof, and means on each post for adjusting the bracket on the posts and maintaining it in fixed position, said means interengaged for adjusting the element without disturbing the parallel relationship of the die cutting edge and the surface of the cutting block.

2. In a cutting machine, a stationary hollow die having a downwardly extended cutting edge, a work receiving pressure block substantially larger in size and shape than the area outlined by the cutting edge of the die, means for reciprocating said block, said cutting edge disposed in a plane directly above the face of the pressure block and above the upper limit of the working stroke of said pressure block, a plurality of guides surrounding said pressure block extending from below the work receiving face of the pressure block to a point slightly above the cutting edge of the die, said guides including work supporting detents disposed below the upper limit of the working stroke of said pressure block.

3. In a machine for die cutting stacks of paper, a hollow cutting die, a cutting block movable toward and from said die, means for mounting the die and block respectively, guide means for receiving a stack of sheets and guiding the same in its movement toward and from said die, an adjustment apparatus for said die element for moving it toward and from the cutting block to dispose the cutting edge beneath the upper ends of the guide means, and ledges in said guide means for supporting any uncut portion of the stack when the cutting block is retracted for receiving the next stack.

4. A die cutting machine, comprising, a frame, a die support adjustably mounted in said frame, a die secured to said die support, a reciprocating ram, feed means for supporting a stack of paper sheets, means for reciprocating said feed means for moving said stack into position on said ram, adjustable guides for guiding said stack in its movement against the die under the influence of the ram, and fingers on the guides for engagement under the stack as the ram reaches the limit of its stroke toward the die.

5. A die cutting machine, comprising, a frame, a die supported on said frame, guides leading to said die for guiding a stack of paper sheets thereto, a cutting block in alignment with said die, means for forcing the stack against the die, and fingers on the guides for engagement under the stack as the cutting block reaches the limit of its stroke toward the die.

6. A machine for cutting stacks of paper sheets into predetermined shapes, comprising, a frame, a die, a reciprocating stack support, a feeding device for delivering a stack of sheets to said support, guides for directing the stack to the die, means for reciprocating said support, and a control device for stopping the operation of the machine, said device actuated when the sheets are not properly positioned in the guides.

7. A machine of the class described, including a die and a cutting block oppositely disposed; comprising, a frame, a guide support mounted on the frame, means for adjusting the support toward and from the cutting block, a guide laterally adjustably mounted on said support, a pusher plate for pushing a stack of sheets through the guide, a lever for operating said pusher plate, a wide faced cam engaging said lever, said lever mounted on said support and having a constant throw whereby said support may be adjusted for changing the relation of the range of movement of the pusher plate relative to the cutting block without disturbing the length of the stroke or disturbing the operating relation of the cam and lever.

8. In a label die cutting machine, a frame, a reciprocating ram, adjustable guides adjacent to said ram, a die head in advance of said guides, automatic means for moving a stack of labels into said guides, means for reciprocating said ram, and means for arresting the movement of said ram when said labels are not properly positioned in said guides.

9. A label die cutting machine comprising a frame, a die head adjustably positioned in said frame, a die secured to said die head, a reciprocating ram in alignment with said die, means for reciprocating said ram, means for supporting a stack of labels on one side of said frame, means associated therewith for moving said stack of labels into alignment with said die, adjustable means for positioning said stack of labels in alignment with said die, and fingers on said last-named means for holding a portion of said labels against said die.

10. A label die cutting machine comprising a frame, a die head adjustably positioned in said frame, a die secured to said die head, a reciprocating ram in alignment with said die, means for intermittently reciprocating said ram, means for supporting a stack of labels on one side of said frame, means associated therewith for moving said stack of labels into alignment with said die and adjustable guides for positioning said stack of labels in alignment with said die, and fingers on said guides for holding a portion of said labels against said die.

11. An apparatus for cutting labels or the like, comprising, a cutting block for suppcrting a stack of sheets to be cut, a hollow cutting die providing a cutting edge disposed above the supporting surface of the cutting block, means for moving said cutting block upwardly for forcing the stack of sheets substantially through the cutting die, support means separate and apart from said cutting die and adapted to engage the stack and hold the uncut portion thereof in place against the cutting edge of the die for subsequent feed and cutting by the engagement of the next succeeding stack therewith.

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