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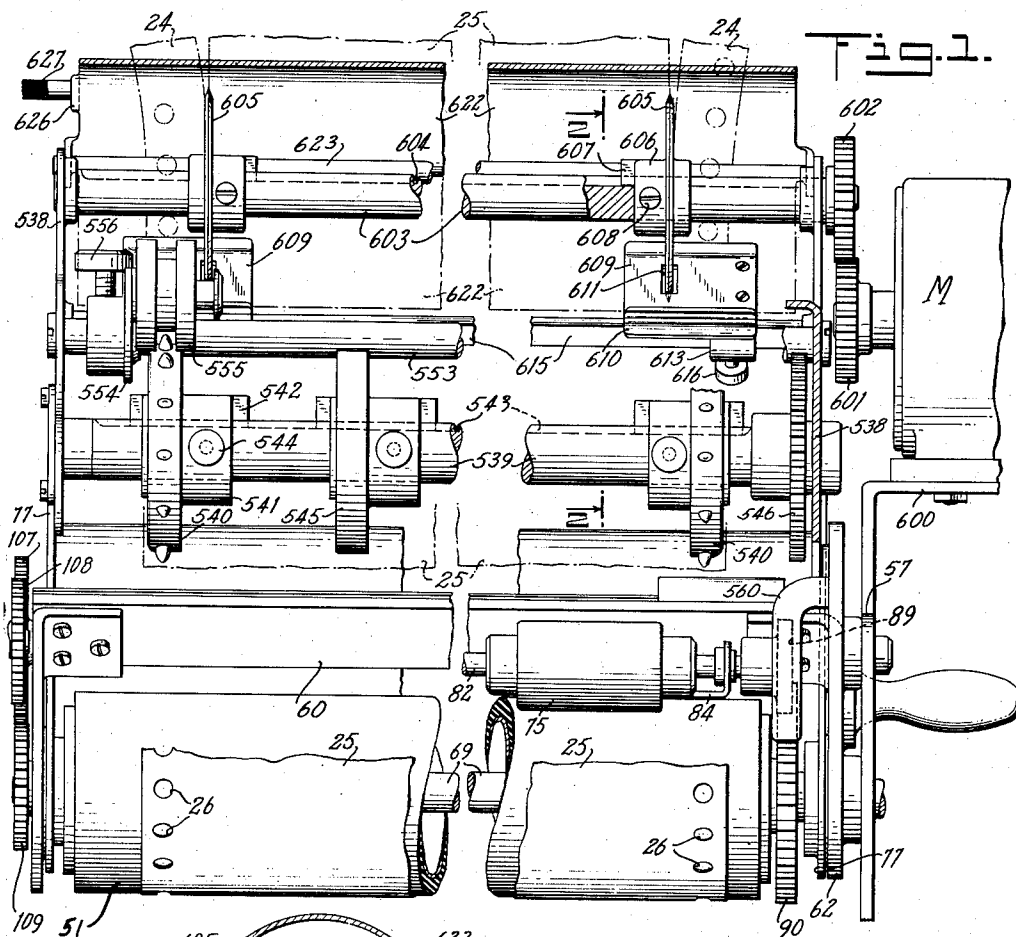
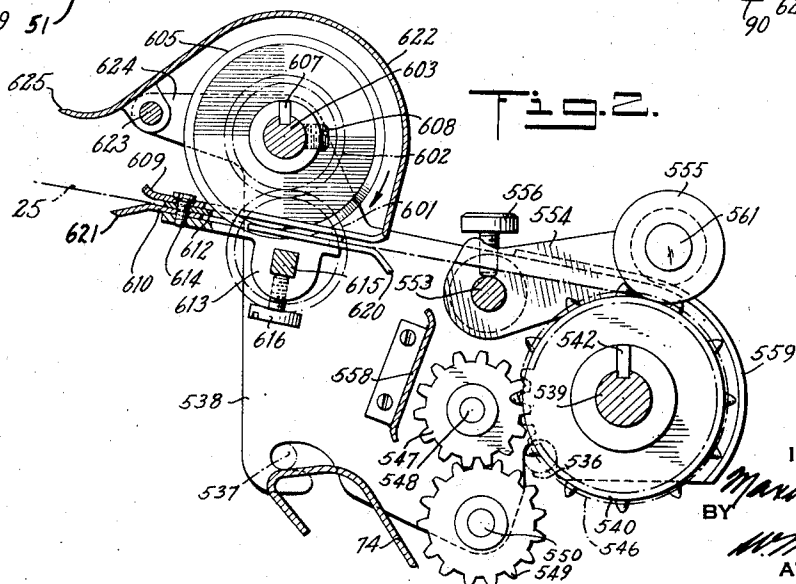
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2,304,499

CUTTING DEVICE

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2 Sheets-Sheet 1



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2,304,499

CUTTING DEVICE

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6 Claims. (Cl. 164-61)

This invention relates generally to paper cutting devices and more particularly to motor driven discs for slitting accounting records to remove the marginal portions with perforations that cooperate with pin feeding devices.

Heretofore, when it was desired to cut accounting records to divide them or remove the portions with marginal perforations, stationary knives were placed in the path of record material and severing was performed by forcing the paper past the stationary blades. Such construction is inefficient because it retards the feeding operation and causes the record material to bend backwards and bulge or buckle at the printing point. It is also ineffective to cut fast enough to sever a rapidly moving sheet; for example, one moved for long feeding or ejection.

It is an object of the invention to provide motor operated circular blades or slitting discs, with said sharp discs operating in a direction to help advance the record material instead of retarding it as in the case of the stationary blades. It has been found that a disc speed of 3000 R. P. M. or more is advisable, especially when the material is to be advanced rapidly in long feeding operations.

Another object of the invention is the provision of controls for selectively calling the motor operated cutting discs into action as an incident to line spacing, long feeding or ejection movements of the record material. A selective control is provided so that the discs can be operated either continuously or only as feeding occurs.

Another object of the invention is the provision of a cover or guard concealing the rapidly operating discs, said cover cooperating with interlocking controls for suspending operation of the motor whenever the cover is lifted for adjustment of the slitting blades.

Another object of the invention is the provision of sheet guides or stripping plates for confining the record material as it passes the slitting discs. It is a feature of the invention that these stripping plates are made adjustable laterally along with the slitting blades to accommodate various widths of record material.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a front elevation view showing a

platen, the pin feed devices and the slitting devices.

Fig. 2 is a sectional elevation view taken along line 2-2 of Fig. 1 and showing the pin feed and slitting devices.

Fig. 3 is a side elevation view showing the slitting devices assembled on a paper carriage located above the printing unit of a tabulating machine.

Fig. 4 is a wiring diagram showing the slitter operating controls associated with the electrical controls for sheet feeding.

The invention is illustrated by devices incorporated in a record controlled tabulating machine with record feeding devices of the kind illustrated in Patent No. 2,189,025, issued February 6, 1940. In that patent it is explained that perforated record cards are analyzed and the readings thereon used to control printing devices for recording data on ledger sheets or other forms of accounting records.

Referring to Fig. 3, it is noted that a platen 51 is mounted on a carriage unit which, in turn, is supported above the tabulator frame 52 in a position adjacent the typebars 53. The platen is supported between a pair of side frames 57 secured to a carriage casting which is movably supported above the tabulator frame 52.

The printing devices are controlled by magnets PM for positioning typebars 53 so that certain of the types 317 are positioned opposite the heads of the printing hammers 329 opposite the printing point on the platen.

The platen 51 (Fig. 1) is rotated to advance the record sheet 25 by means of a train of gearing comprising gear 109 (Fig. 3), idler 108 and a gear 107 projecting from the casing of the feed operating unit 134. Within the casing 133, 134 is contained the controls for governing the rotation of the platen to advance the record material for line spacing and long feeding operations. The carriage motor CM is provided for motive power to operate the feeding devices and the controls therefor are fully described in the patent already mentioned.

Although it is possible that the slitting devices may cooperate with ordinary record material having no provisions for pin feeding control, the present illustration includes a record sheet 25 (Fig. 1) having marginal perforations 26 adapted to cooperate with pin feeding wheels so that one or more of such sheets will be held in alignment as they pass the printing point on the platen. Although the slitting devices are useful in cutting sheets through the center and in other

portions, it is often desired that they be used to trim off the perforated margins of the record sheets after they have served their purpose in maintaining alignment during printing.

Figs. 1 and 2 show the pin feed mechanism which may be attached to the carriage and removed whenever ordinary imperforated recording paper is used. Instead of removing the entire unit, it is possible to slide the pin wheels to the side out of the path of the paper. The side frames 77 of the carriage have pairs of studs 536 and 537 (Fig. 2) upon which a pair of pin feed unit side frames 538 may be assembled. The frames 538 are formed with a pair of notches fitting around the studs 536, 537 but readily removable therefrom. The frames carry a rotatable shaft 539 upon which is assembled a pair of pin feed wheels 540. Referring to Fig. 1, it is seen that each wheel is formed with a hub 541 carrying a key 542 located in a key slot 543 cut along the length of shaft 539. By means of this construction, the pin feed wheel 540 may be shifted along shaft 539 to accommodate any width of record material. The hub 541 carries a locating screw 544 which may be turned to fasten the wheel to the shaft to prevent axial movement. The shaft 539 also carries a number of wheels 545 similar to wheels 540 in all respects except the omission of the pin feed projections appearing on the feeding wheels. These last mentioned wheels are used to support the paper at any point between the wheels 540.

At the right end of shaft 539 (Fig. 1) is fixed a gear 546 in mesh with an idler gear 547 (Fig. 3) pivoted on a stud 548 on side frame 538. This gear 547 meshes with another gear 549 pivoted at 550 on the bottom of the left frame 538 (Fig. 2). The last mentioned gear provides a removable driving connection with another idler pinion 551 (Fig. 3) pivoted on shaft 552 supported in the carriage side frame 77. This gear 551 meshes with the platen drive gear 90 already mentioned. Through the described train of gearing all motions of the platen shaft 69 in line spacing or ejection are transmitted to shaft 539 for feeding the perforated sheets by means of the pin wheels.

Cooperating with the pin feed wheels 540 is a pair of grooved rollers 555, Fig. 2, for holding the record material down into engagement with the projections on the pin wheels. These devices are mounted on a shaft 553 braced across the top of frames 538. An arm 554 holds each of the guide rollers 555 in position above a related wheel 540. The guide arm 554 is held in position by a screw 556 attaching the arm in any selected position along shaft 553.

The right side frame 538 is formed with an offset flange 559 covering the gear 546. Another guard in the shape of a projection 560 is fastened to the side of frame 77 in position to cover the pressure roll driving pinion 89.

The path taken by the record material is shown in Fig. 3. There it is seen that the paper is drawn in from the right and carried under the platen 51 and up around the front of the platen. Then, it is carried upward over the top of the pin feeding wheels 540 and again directed towards the right into cooperation with the slitting devices before being ejected at the right.

While the pin feed wheels 540 are used to advance the record material, the pressure rollers, which usually cooperate with the platen, are separated therefrom to allow free movement of the paper past the platen as drawn by the pin wheels. However, in the case of ordinary record

material without feed control perforations, the pressure rollers are used, and then the path of the paper is directed under the pin wheels and out of contact with the wheels so that only the platen movement determines the rate of advance of the record material.

Turning now to the consideration of the slitting devices and the operating drive therefor, it is noted in Fig. 3 that the carriage side frame 57 extends upward and is formed with a platform 600 upon which is secured a motor M for operating the slitting knives. Attached to the shaft of motor M (Fig. 1) is a driving gear 601 meshing with another gear 602 fastened on a shaft 603 passing through bearings formed on extensions at the upper ends of the side frames 538. The shaft is slotted or notched with a key way 604 and carries a pair of circular slitting discs 605 having hubs 606 with keys 607 fitting into said key slot 604 to fix the discs to the shaft so that they partake of all rotating movement imparted thereto. The lateral axial adjustment or positions of the discs 605 is controlled by set screws 608 passing through threaded portions of hubs 606 and abutting against shaft 603 to hold the discs in selected positions along the shaft.

The rotation of discs 605 (Fig. 2) is arranged to be in a clockwise direction so that in cutting the record material the blades do not retard the feeding movement of the record towards the left but rather aid the feeding devices in carrying the material towards the ejection position.

Cooperating with the bottom of the slitting discs 605 and arranged on opposite sides of the record material are pairs of upper and lower stripping plates 609 and 610. These plates are slotted at 611 to allow projection of the discs therethrough into cooperation with the record between the plates. At one side the plates 609, 610 are spaced by a separating bar 612 and the entire assembly is attached to a sliding bracket 613 by means of screws 614 passing through the stripping plates and the separating bar 612. The supporting bracket 613 is slidably mounted on the square rod 615 extending across the feeding devices and secured to the side frames 538. Fastening screws 616 are threaded in the bottom of the brackets and adapted to be loosened when the set screws 608 (Fig. 1) are loosened to permit adjustment of the slitting discs. When loose, the bracket and stripping plates follow along to take up the position assumed by the slitting disc and then, when set screw 608 is made fast to lock the blade in position, screws 616 may also be turned up to lock the stripping plates in the proper position with respect to the slitting blade.

Although the stripping plates 609, 610 as shown in Fig. 1 have only a short overhang to guide the margins of record material, it is contemplated that they may be made longer to project beyond the center of record material and provide a guide means to hold the sheets as they are severed along any line up to the center line.

The front and rear ends of the stripper plates 609, 610 are flared to facilitate threading of the record sheet therethrough. The flared ends of the lower plate 610 are of extra length; the front end 620 (Fig. 2) guiding the sheet when it comes directly from the platen, and the rear end 621 is sharpened to act as a tearing edge for the trailing marginal strips 24 (Fig. 3) cut from the body of the record sheet 25.

As shown, two sets of stripper plates are associated with the two rotating slitter discs 605 at the sides of the record feed devices. The lead-

ing edge of the sheet 25 is directed between the upper plates 609 and the lower plates 610 and pushed back to start the slitting operation. As soon as a portion of the sheet is cut and the sides of the discs contact with the cut edges of the sheet, the constant rearward rubbing action of the discs tends to hold the sheet taut between the pin feed wheels and the blades, and also direct the ejected part of the sheet out of the rear of the machine. As explained hereinafter, there are times when the cutting blades are operated intermittently or selectively, only when feeding takes place, and then also the cutting action aids feeding operation by urging the sheet toward the rear.

In order to protect the fingers of the operator from the sharp rotating discs 606, they are shielded by a cover 622 pivoted on a rod 623 (Fig. 3) extending across the machine and supported on ears 624 (Fig. 2) extending from the rear of side frames 538. The cover also extends across the machine and over all possible positions of the blades, and the front end cooperates with the top part of the flared portions on the upper stripper plates 609. The sides of cover 622 are formed with side pieces which encircle rod 623. The rear edge of cover 622 (Fig. 3) is extended along the path of the ejected sheet 25 and formed with a sharp edge 625 against which the sheet may be drawn to tear it in a straight horizontal line.

Extending rearwardly from the left side of cover 622 is an arm 626 carrying a pin 627 tipped with insulation material. This pin projects through an opening 628 in the casing 133 covering the feeding controls. Inside cover 133 there is fastened a bracket 629 holding a pair of contacts SC. The lower blade of contacts SC rests upon insulation pin 627 and is held upward thereby to close the contacts. However, the lower blade tends to press downward and open the contacts and does so whenever the cover 622 is lifted to gain access to the slitting mechanism in order to adjust it. Thereby a protective interlock is provided since contacts SC are in series with the motor M for operating the cutting blades. Whenever the operator opens the cover to adjust the cutting blades, the cover is rocked in a clockwise direction and contacts SC open to stop the motor and terminate rotation of the cutting blades so that they are always stationary when the operator moves them laterally.

In the wiring diagram (Fig. 4) it is shown how the motor M is connected in the feeding control circuits in order that the actuation of the slitting mechanism may be correlated with feeding operation. The main lines 309 and 310 are understood to be connected to a source of electrical energy. When a main carriage control switch CS is closed, an auxiliary line 356 is made effective to call into operation many of the controls connected with the feeding functions. Connected to this line 356 are the contacts SC normally closed, motor M and a slitter control switch S shown in the "off" position. When switch S is rotated to contact with terminal 631 at the end of a wire 632 connected to the line 309, a circuit is established to drive motor M continuously as long as the cover control contacts SC remain closed. The continuously operating circuit includes line 309, wire 632, terminal 631, switch S, motor M, contacts SC and auxiliary line 356.

As explained in detail in Patent No. 2,189,025, the machine is provided with a series of controls

for effecting line spacing and a long feeding operation at the proper times. Line spacing operations are called into effect by a magnet LSM operated by the closure of a number of contacts shown in a general way in Fig. 4. Another magnet EM is operated whenever a sheet is to be ejected or driven with a long feeding operation. This last mentioned magnet is connected in parallel with a control magnet TIM which is energized upon initiation of an ejection cycle and sustained by the closure of associated holding contacts 376 and through normally closed contacts 286 as long as the ejection action is in operation. Upon termination of the long feeding operation, contacts 286 open to de-energize magnet TIM. The two magnets LSM and TIM which are called into operation when the sheet is shifted through short or long distances, respectively, are used to call into action the motor M for driving the slitting mechanism in a manner about to be described.

There are times when it is desired that the slitting motor M operate only while feeding is taking place, in other words, if the feeding operations are to be widely separated and comparatively infrequent, then the motor is to be normally idle and called into operation only at such times when the record sheet is directed past the slitting blades. To effect such control the switch S is lowered to contact with a terminal 639 connected to pairs of contacts 633 and 634 arranged in parallel with each other and both in series with the motor M. Contacts 633 are operated to close by the line space control magnet LSM whenever a short spacing operation is selected. Then the motor is energized by a circuit including line 309, wire 635, wire 636, contacts 633, wire 637, terminal 639, switch S, motor M, contacts SC and line 356.

The other contacts 634 are closed and held closed by magnet TIM as long as a long feeding or ejection operation is in effect. A circuit through the contacts 634 may be traced from line 309, through wire 635, contacts 634, wire 638, terminal 639, switch S, motor M, contacts SC and line 356.

From the foregoing, it is obvious that the slitting mechanism may be made ineffective by deenergizing the motor M and shifting the slitting blades to the side of the carriage. At other times the slitting discs may be made continuously effective by connecting the motor so that it is only cut out when a cover plate is lifted. The third form of control involves selective operation of the slitting motor only at such times as the line spacing or ejection is taking place.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine for feeding and slitting a record sheet, devices for feeding said sheet, a pair of sharp circular slitting discs, a shaft carrying said discs, means for adjusting said discs on said shaft to cooperate with selected portions of said sheet, a motor for driving said shaft, a power source, a pair of contacts for calling said motor into operation selectively, a switch for connect-

ing said motor to said power source for constant operation or to said contacts for selective operation, and means under control of said feeding devices for closing said contacts to operate the motor and the discs.

2. In a machine for feeding and slitting a record sheet, devices for feeding said sheet for line spacing and long feeding, means for slitting said sheet, a motor for driving said slitting means, a power source, two pairs of contacts for calling said motor into operation selectively, a switch for connecting said motor to said power source for constant operation or to said contacts for selective operation, means under control of said line spacing devices for closing one pair of said contacts momentarily as an incident to line spacing, and means under control of said long feeding devices for closing the other of said pair of contacts and holding them closed during long feeding.

3. In a machine for feeding and slitting a record sheet having marginal feeding perforations, pin feeding devices cooperating with the perforations in the sheet to advance it, a pair of sharp circular slitting discs, a shaft carrying said discs, means for adjusting said discs on said shaft to cut off the marginal areas of said sheet, a motor for driving said shaft, a power source, two pairs of contacts for calling said motor into operation selectively, a switch for connecting said motor to said power source for constant operation or to said contacts for selective operation, a line spacing mechanism for operating said feeding devices, means for initiating operation of said line spacing mechanism, means under control of said initiating means to close one of said pairs of contacts for calling said motor into operation upon line spacing, long feeding devices for operating said pin feeding devices, means for initiating long feeding operation to eject said record sheet, means for holding said long feeding devices in operation until ejection is completed, and means under control of said long feed initiating and holding means to close the other of said pairs of contacts for calling said motor into operation while ejecting said sheet.

4. In a machine for feeding and slitting a record sheet, devices for feeding said sheet, a sharp circular slitting disc, a shaft for carrying said disc, means for adjusting said disc on said shaft to divide said sheet as desired, means for operating said shaft, a pair of stripping plates for guiding said sheet past the disc, said pair of plates having openings through which the disc projects, an adjustable mounting for said plates whereby they may follow the adjustment of said disc, and a tearing edge formed on one of said plates for use in severing part of the divided sheet.

5. In a machine for feeding and slitting a record sheet, devices for feeding said sheet, a pair of sharp circular slitting discs, a shaft for carrying said discs, means for adjusting said discs on said shaft to cooperate with the marginal areas of said sheet, a motor for driving said shaft, a power source, two pairs of contacts for calling said motor into operation selectively, a switch for connecting said motor to said power source for constant operation, a cover over said discs, a pair of contacts in series with said motor, means under control of said cover for opening said contacts to disable the motor when the cover is lifted to adjust said discs, and a tearing blade on said cover for tearing parts of the divided sheet.

6. In a machine for feeding and slitting a record sheet having marginal perforations, pin feeding devices cooperating with the perforations in the sheet to advance it, a pair of sharp circular slitting discs, a shaft carrying said discs, means for adjusting said discs on said shaft to cooperate with said sheet inside the margins with said marginal perforations and thus cut marginal strips off the body of said sheet, a motor for driving said shaft to turn said discs in the direction of the feed, a power source, two pairs of contacts for calling said motor into operation selectively, a switch for connecting said motor to said power source for constant operation or to said contacts for selective operation, pairs of stripping plates for guiding said sheet past the discs, each pair of plates cooperating with a disc and having openings through which the disc projects, adjustable mountings for said plates whereby they can follow the adjustment of said discs, a tearing edge formed on one of said plates for use in severing the marginal strips, a cover over said discs, a pair of contacts in series with said motor, means under control of said cover for opening the last mentioned contacts to disable the motor when the cover is lifted to adjust said discs, the front of said cover being formed to coincide with the edges of said stripping plates, a tearing blade formed on said cover for severing the center portion of said record sheet, a line spacing mechanism for operating said feeding devices, means for initiating operations of said line spacing mechanism, means under control of said initiating means to close one of said pairs of contacts for calling said motor into operation upon line spacing, long feeding devices for operating said pin feeding devices, means for initiating long feeding operation to eject said record sheet, and means under control of said long feed initiating means to close the other of said pairs of contacts for calling said motor into operation while ejecting said sheet.

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