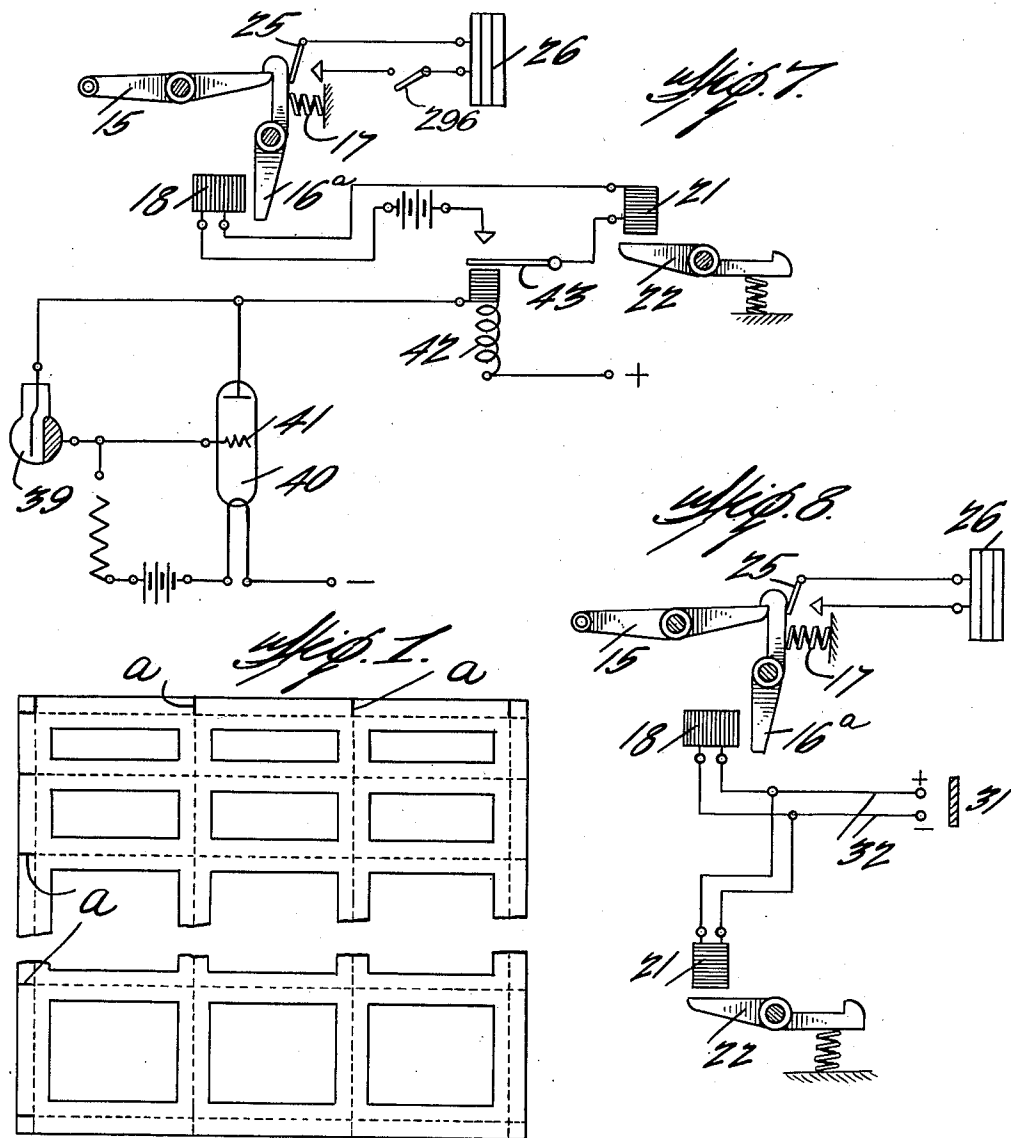
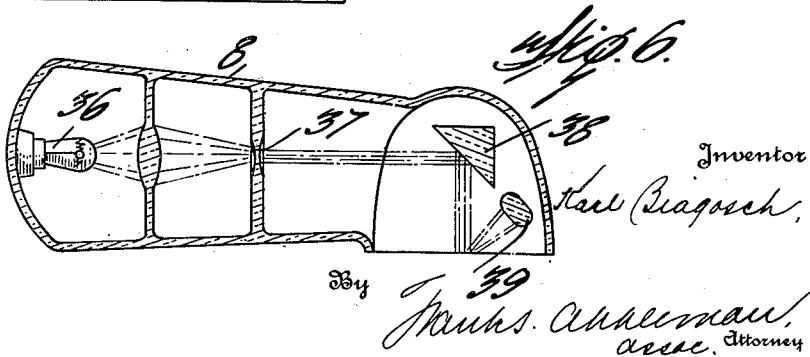


July 14, 1931.

K. BIAGOSCH
CUTTING MACHINE FOR PAPER, CARDBOARD, AND
SIMILAR MATERIAL WITH AUTOMATIC FEED
Filed July 11, 1930 3 S

1,814,890

3 Sheets-Sheet 1



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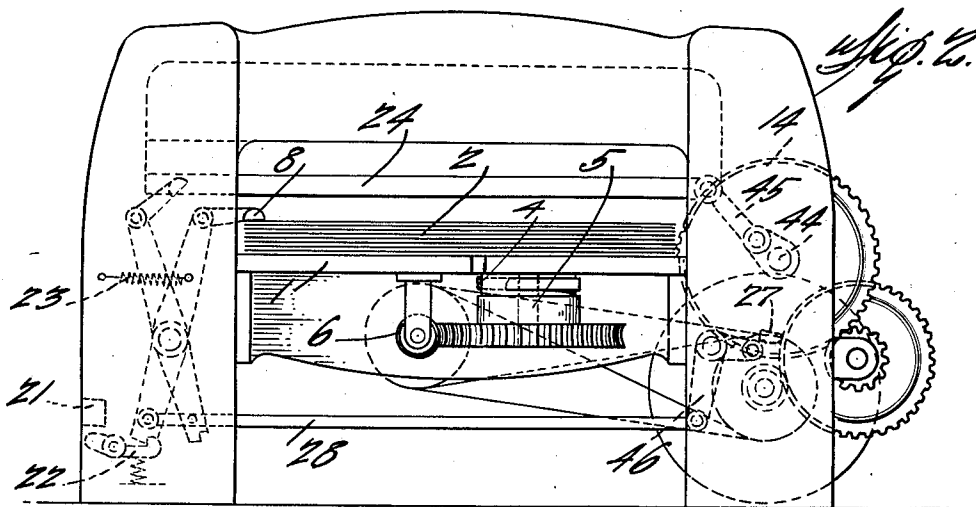
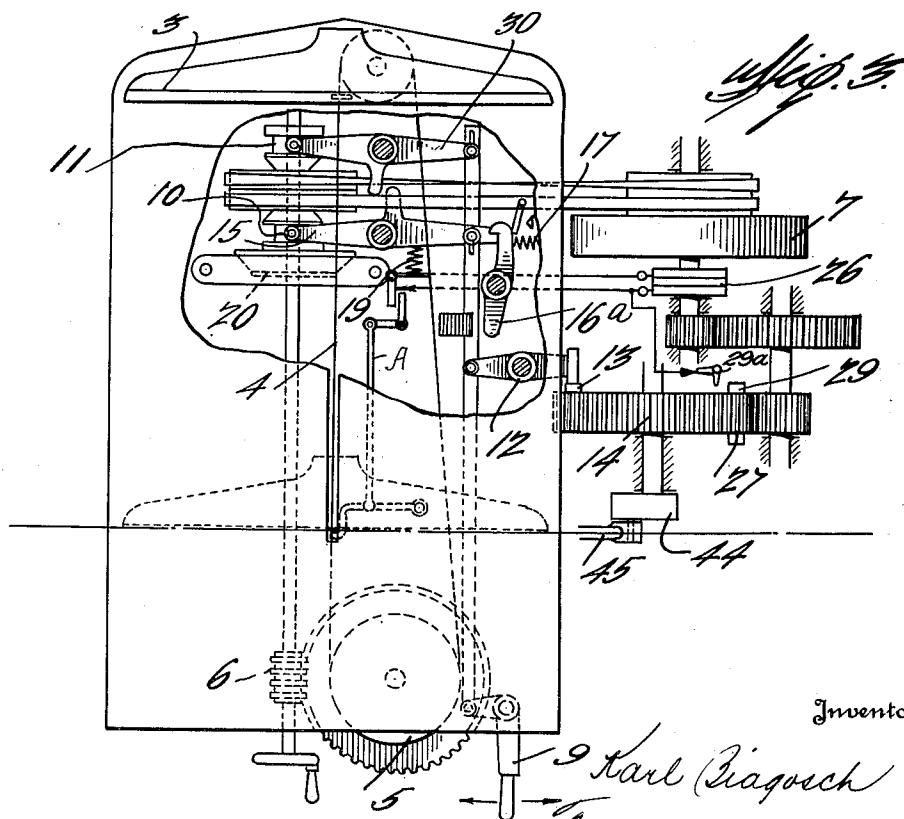
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Thos. Appleman,
Assoc. Attorney

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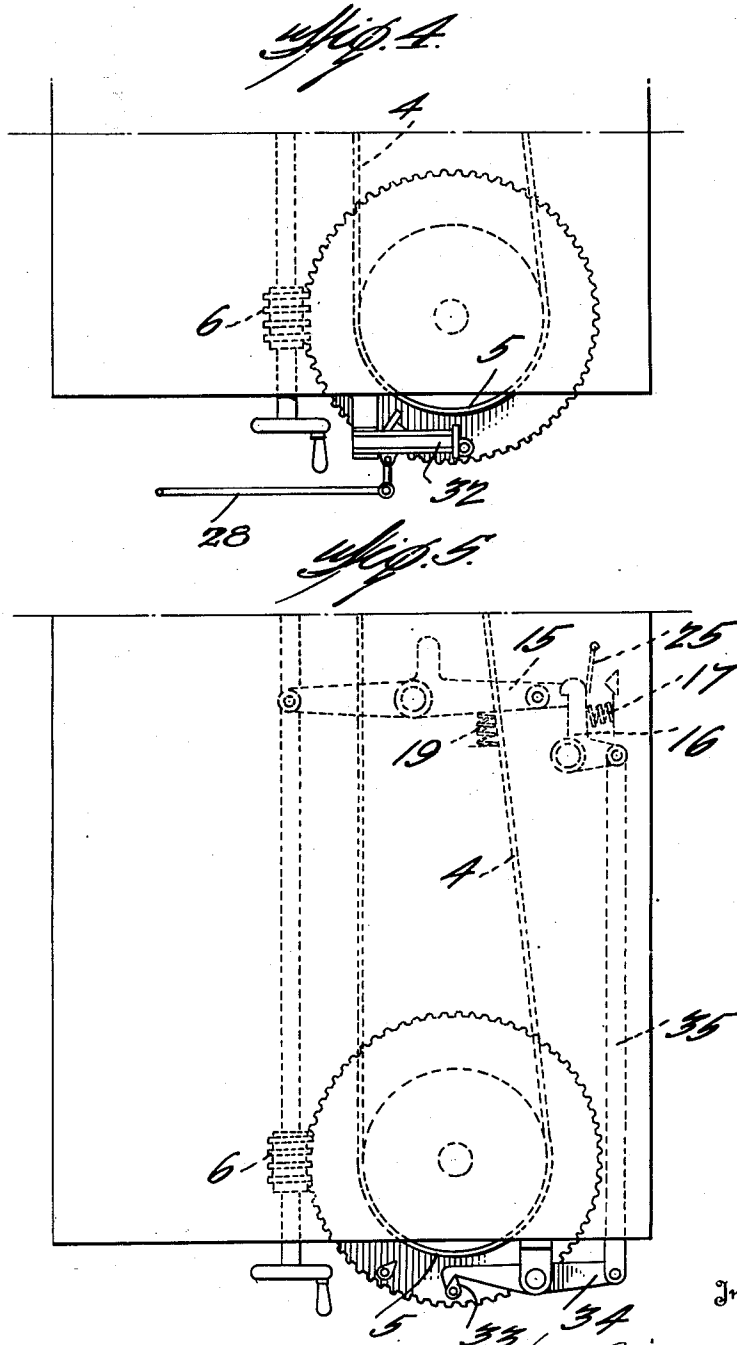
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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CUTTING MACHINE FOR PAPER, CARDBOARD, AND SIMILAR MATERIAL WITH
AUTOMATIC FEED

Application filed July 11, 1930, Serial No. 467,236, and in Germany October 9, 1928.

The working up of printed sheets in cutting machines with automatic feeds of any kind encountered hitherto great difficulties in so far as it is practically impossible to maintain the printing properly spaced with relation to edges of the several strips, labels and the like. If, therefore, sheets printed with strips or labels have to be subdivided in cutting machines by means of automatic feed, it is possible to obtain, by means of the automatic feeds of known type, strips and labels of accurately uniform size, but when the cutting line has to be adapted accurately to the printed matter, the known automatic feeds fail, as they are adjustable only to one and the same size, or can be adjusted to a different size only gradually by automatic adjusting of the feed. The cuts are made at accurately equal distance the one from the other, or this distance is gradually increased or decreased, however not accurately along the lines determined by the printed matter.

The problem has therefore to be solved, to make it possible to automatically interrupt the automatic feeding of the cutting material at any desired point, in order that the cutting material may be automatically subdivided into strips or labels of any desired changing size. For the solution of this problem a locking element, for instance a ratchet pawl, is provided in the automatic feed, which maintains the power transmitting means as, for instance, a clutch of an automatic feed for the cutting material in the engaged position; until it is automatically disengaged by any means, whereby the power transmitting means of the automatic feed is disengaged and the feed interrupted. The automatic disengaging of the locking element and therefore the interrupting of the feed can be effected in various manners. For instance marks may be printed on the sheets to be printed, situated at points, at which the subdividing cuts are to be made. At the automatic feeding of the material to be cut, the material passes with the marks under a light sensitive element, for instance a photo cell. If such a printed mark comes into the range of the light sensitive element,

this element is operated and excites an electro-magnet, which in turn disengages the locking element of the power transmitting means of the automatic feed. Instead of printed marks, current conducting marks, characteristics or elements may be located on the sheet at the points, at which the cut has to take place. The material to be cut passes at the automatic feeding with these current conducting marks under two current conducting feelers, which form the end poles of an electric circuit. If at the feeding of the material to be cut a current conducting mark arrives under the current conducting feelers, the electric circuit is closed, and an electro-magnet is excited, which disengages the locking element of the clutch so that the automatic feed is interrupted. These current conducting marks need not be printed on the sheets; they may be arranged as adjusting marks on the band disk which effects the conveying of the material to be cut, or on any other element travelling in proportion with the feeding of the material to be cut, when they are adapted to be adjusted according to any desired cutting points, so that at the automatic feeding of the material to be cut it slides underneath two current conducting feelers or detectors and disengage thus electromagnetically the locking element of the power transmitting means of the feeding mechanism. A further possibility to disengage the locking element of this power transmitting means consists in that on a band disc stops are adjusted in accordance with the desired cutting points, which stops at the conveying of the pile of sheets, i. e. at the rotation of the band disc, move along a control lever and lift the same, whereby the locking element is disengaged mechanically. The terms "marks," "characteristics," or "elements" have been used as descriptive of the current conducting device employed for conducting current and these terms are used generically to denote broadly any substance or deposit, or the like, having the function possessed thereby.

Several embodiments of the invention are

illustrated by way of example in the accompanying drawings in which:

Fig. 1 shows a sheet having marks or current conducting marks.

Fig. 2 is a front elevation of a cutting machine, in which the disengaging of the locking element is effected by means of a light sensitive element. Fig. 3 is a top plan view of a table of such a cutting machine.

Fig. 4 shows a detail of the table, in which the disengaging of the locking element is effected by current conducting marks adjustable on the band disc.

Fig. 5 shows a detail of the table, in which the disengaging of the locking element is effected mechanically by means of stops adjustable on the band disc.

Fig. 6 shows a detail of the light sensitive element with its source of light.

Fig. 7 shows a partial connection diagram for the disengaging of the locking element by means of a light sensitive element.

Fig. 8 shows a partial connection diagram for disengaging the locking element by means of current conducting marks.

On the table 1 of the cutting machine, material 2 to be cut (Fig. 1) is lying the rear edge of which bears against a saddle 3, said saddle adapted to be moved forward and backward by means of a band or cable 4 (Fig. 3), which operates in contact with a pulley 5. A worm 6 gears with the worm crown pulley 5, said worm adapted to be rotated in right hand or left hand direction through the intermediary of open or crossed belts from the fly wheel 7, so that the saddle 3 is moved forward or backward respectively. Above the material to be cut, which has marks *a* corresponding to the desired cutting points (Fig. 1), a light sensitive element 8 is arranged, under which the material to be cut passes. A power transmitting means which, in the present embodiment of the invention, consists in part of two clutches 10 and 11 can be shifted for the forward and backward movement of the saddle by a hand lever 9. The clutch 10 for the forward movement of the saddle can further be engaged by means of a roller lever 12, actuated by a cam 13 of a crank spurwheel 14. If the forward clutch 10 is engaged by means of the hand lever 9 or automatically by the roller lever 12, the fork lever 15 engaging the clutch is secured in its engaged position by a locking element 16^a pressed by the action of a spring 17 against said fork lever 15, and the feed of the cutting material continues as long as this locking element 16 secures the fork lever 15 in its position. If the locking element 16^a is disengaged, the fork lever returns into its inoperative position by the action of a spring 19 and disengages the forward clutch 10, so that the conveying of the cutting material is stopped.

The operation of the machine is as follows:

After the material 2 to be cut has been placed on the rear table of the cutting machine, and the light sensitive element is engaged as regards height, so that it rests lightly on the surface of the material to be cut (Fig. 2), the forward clutch 10 is engaged by hand by means of the hand lever 9, secured in this engaged position by the locking element 16 and the material 2 to be cut is automatically fed by the saddle 3 on the table (Fig. 3).

A source of light 36 mounted in the housing of the light sensitive element 39 (Fig. 6) throws through a gap 37 and through a prism 38 a narrow pencil of light rays upon the moving pile. The light thus reflected is intercepted by the light sensitive element 39. As long as this reflected light falls onto the light sensitive element 39, the grid 41 in the amplifier valve 40 (Fig. 7) is positive and current flows through the amplifier valve and maintains open a contact through the intermediary of a relay 42 inserted in the circuit of the amplifier valve (Fig. 7). As soon as however a mark *a* arrives in the range of the light gap on the material to be cut, when the material to be cut is sliding under the light sensitive element, the light gap is darkened and no light can reflect anymore. At this instant no reflected light strikes the light sensitive element and the grid 41 of the amplifier valve 40 becomes negative and throttles the anode current of the amplifier valve. The relay 42 becomes thereby currentless and the contact 43 closes. By the closing of the contact 43 the circuit of the electro-magnet 18 is closed, and the electromagnet excited pulls back the locking element 16^a, which secures the forward clutch 10 in the engaged position, whereby the clutch 10 is disengaged and the automatic feeding of the pile interrupted. The moved masses of the automatic feeding mechanism are thereby arrested by a brake 20 (Fig. 3). By the closing of the contact 43 the circuit of the electromagnet 21 is closed at the same time, and this electromagnet is excited, so that it disengages the locking lever 22, which has held the light sensitive element 8 in its operative position (Fig. 2). This element returns therefore under the action of the spring 23 into its extreme position and is removed from the movement plane of the knife 24. By the disengaging of the locking element 16^a the contact 25 (Figs. 7 and 8) and therefore the circuit of the electromagnetic clutch 26 is closed and this clutch engaged. This knife 24 is thus actuated through the gearing of the machine, crank 44 and pull rod 45 of the knife, so that this knife operates to cut at the point indicated by the mark *a* (Fig. 1). When the knife is ascending, a cam 27 on

the crank spur wheel 14 returns, shortly before the knife arrives in its highest position, the light sensitive element 8 through the intermediary of an elbow lever 46 and the connecting rod 28 into its operative position, in which it is secured by means of the locking lever 22. At the same time the forward clutch 10 is engaged by the abutment cam 13 of the crank spur wheel 14 and by the roller lever 12 and secured in this engaged position by the locking element 16^a, so that the material to be cut begins again its forward movement. The knife is stopped in its highest position by a contact cam 29 on the crank spur wheel 14, which strikes a trip 29^a to open the switch 29^b and thus interrupts the circuit for the electromagnetic clutch 26 and disengages the same. (Figs. 3 and 7). When the saddle 3 arrives in its extreme forward position, a switch, operated by mechanism generally identified by the letter A, against which the saddle 3 strikes, interrupts all circuits so that all driving mechanisms are stopped. The saddle 3 is returned into its initial position by oscillating the hand lever 9 to the left, whereby the backward clutch 11 is engaged. The brake 20 is released by the engagement of the two projections of the fork levers 15 and 30 (Fig. 3).

The interruption of the automatic feed, i. e. the disengaging of the locking element 16^a, can be obtained by any well known current conducting means instead of the marks *a*, on the points where the cut has to take place. Metallic inks are for instance used for printing these marks. In this case two juxtaposed current conductor feelers 32 (Figs. 4 and 8) may be arranged above the printed sheet instead of the light sensitive element 8, said feelers forming the end poles of an electric circuit and sliding on the pile 2. As soon as such a current-conducting mark arrives under the feelers 32 at the automatic feeding of the material 2 to be cut, the electric circuit is closed and the two electromagnets 18 and 21 excited which, on the one hand, disengage the locking element 16^a so that the conveying of the material to be cut is interrupted and, on the other hand, pull back the locking lever 22 whereby the feelers are pulled back by the spring 23 and removed from the plane of movement of the knife (Fig. 8). The engaging of the electromagnetic clutch 26 and thereby the starting of the movement of the knife and the re-engaging of the feeding mechanism and stopping of the knife movement are effected in a similar manner as at the use of the light sensitive element 8.

It is further possible, to obtain the disengaging of the locking element 16^a mechanically. With this object in view, abutment cams 33 are arranged on the band pulley 5, adjustable according to the desired cutting

points (Fig. 5), said cams striking at the automatic conveying of the cutting material, i. e. at the rotation of the band pulley 5, against a controlling lever 34 lift the same. By the lifting of this control lever, the locking element 16^a is pulled back through the intermediary of a pull rod 35, and the feeding, as described, is interrupted. The engaging and disengaging of the electromagnetic clutch 26, as well as the re-engaging of the forward clutch 10 are effected in the same manner as described above.

I claim:—

1. A cutting machine for paper, cardboard and the like, comprising a pusher therefor, means for actuating the pusher including in combination driven clutch members, a clutch lever for operating the clutch elements, a locking element for such clutch lever adapted to lock said lever in the engaging positions while material is to be fed to the cutting instrumentality of a cutting machine, means for automatically disengaging said locking element at any desired point comprising in combination with the locking element an electromagnet, a light sensitive element such as a photo-cell, and marks movable with a sheet to be cut and adapted to pass under the said light sensitive element, whereby the locking element releases the clutch lever.

2. A cutting machine for paper, cardboard and the like, a cutter therefor, a pusher, means for operating the pusher comprising in combination driven clutch members, a clutch lever for operating the clutch elements, a locking element for such clutch lever adapted to lock said lever in the engaging positions while material is to be fed to the cutting instrumentality of a cutting machine, means for automatically disengaging said locking element at any desired point comprising in combination with the locking element an electromagnet adapted to disengage said locking element, current conducting feelers forming end poles of a circuit, and current conducting elements movable proportional to the movement of the material to be cut adapted to be engaged by said feelers for closing a circuit.

3. In a machine for cutting paper, a cutter, a pusher for feeding material to the cutter, means for intermittently actuating the pusher, means for intermittently actuating the cutter, characteristics spaced in any predetermined relation corresponding to the length of material to be cut and movable in predetermined relation with the pusher, and controlled means for the said pusher actuating means including sensing means responsive to said characteristics.

4. In a machine for cutting material, a cutter, a pusher for feeding material to the cutter, means for actuating the pusher and the cutter, means movable in timed relation

with the pusher, said means being provided with characteristics spaced in any predetermined relation corresponding to the lengths of material to be cut, and control means for the said actuating means including sensing means responsive to said characteristics.

5. In a machine for cutting paper and the like, a cutter, means for feeding the paper to the cutter, means adapted to be disposed adjacent the path of movement of the paper for sensing characteristics formed at any predetermined points on the paper substantially at the places to be cut, means for moving the sensing means into and out of sensing position, and means controlled by the sensing means to actuate the cutter.

6. In a machine for cutting paper and the like, a cutter, means for feeding the paper to the cutter, adapted to be disposed adjacent the path of movement of the paper for sensing characteristics formed at any predetermined points on the paper relative to the places to be cut, means for moving the sensing means into and out of sensing relation to the paper, and means controlled by the sensing means to stop the feed and actuate the cutter.

7. A cutting machine for paper, cardboard and the like, comprising a cutter, a pusher, means for actuating the pusher for feeding the material to be cut including a clutch, a clutch lever, a locking element for said clutch lever adapted to lock the lever in clutch-engaging position as long as the material is to be fed, means for disengaging said locking member, and means for controlling said disengaging means, comprising sensing means for disposal adjacent the path of movement of the paper for sensing predetermined characteristics formed upon the paper or the top sheet thereof.

8. In a machine for cutting material, a cutter, a pusher for feeding the material to the cutter, means for actuating the pusher and the cutter, means movable in timed relation with the pusher, said means being provided with characteristics spaced in predetermined relation corresponding to the lengths of material to be cut, and controlling means for said actuating means including sensing means such as a photo-cell responsive to said characteristics.

In testimony whereof I affix my signature.

KARL BIAGOSCH.