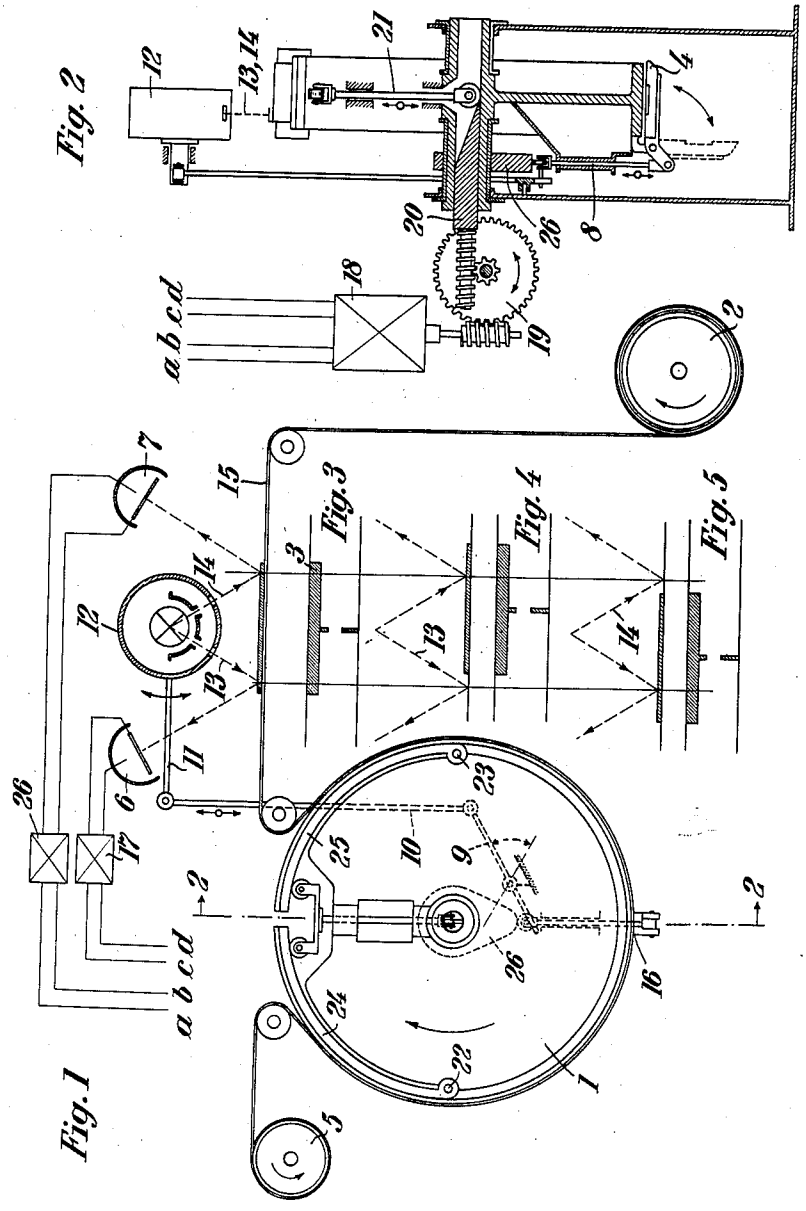
Oct. 15, 1935. K. RIESS ET AL 2,017,184

CUTTING WEBS OF PAPER

Filed Sept. 28, 1933



Inventors:
Kurt Riess,
Adolf Knodel,
Rudolf Klaus,
By Attorney Philip S. Hopkins.

Patented Oct. 15, 1935 2,017,184

UNITED STATES PATENT OFFICE

2,017,184

CUTTING WEBS OF PAPER

Kurt Riess, Wolfen, Kreis Bitterfeld, Adolf Knodel, Dessau In Anhalt, and Rudolf Klaus, Wolfen, Kreis Bitterfeld, Germany, assignors to Agfa Ansco Corporation, Binghamton, N. Y., a corporation of New York

Application September 28, 1933, Serial No. 691,410
In Germany October 4, 1932

1 Claim. (Cl. 164—48)

Our present invention relates to cutting paper and more particularly to cutting a paper web provided with marks.

One of its objects is to provide an apparatus for cutting a paper web at the marks printed thereon. Further objects will be seen from the detailed specification following hereafter. Reference is made to the accompanying drawing in which

Fig. 1 diagrammatically represents a device according to this invention,

Fig. 2 represents a section of the device shown in Fig. 1 on the line 2—2,

Fig. 3 shows a mark as applied on the paper, the mark being in correct position with relation to the photoelectric cells of the device,

Figs. 4 and 5 show the mark in incorrect positions with relation to the photoelectric cells of the device.

For some purposes it is necessary that paper webs are cut at distinct places indicated by printed marks. When webs thus marked are cut in continuous operation, it is very difficult to produce the cuts exactly at the marked places. Thus it happens frequently that the printed marks are displaced partly by the slip of the web in the printing machine, partly because the paper may change its length, for instance, with varying conditions of the atmosphere in the work room.

For instance, when applying the printed marks at equal distances and feeding the paper to the cutting device by a drum of a given diameter, the cut would not always occur at the marks but the cut would be gradually displaced away from the mark, owing to the aforesaid influences.

In order that the cuts occur at the correct places the feeding speed was hitherto accelerated or retarded by manually controlling a friction gear or by extending or contracting the feed drum whose diameter is capable of being varied in accordance with the observed displacement of the cut. It is evident that this control effected by hand is complicated and depends, as to exactness, greatly on the attending person.

According to the present invention the paper cutting machine is controlled automatically by the co-operation of marks provided on the sheet to be cut, photoelectric cells and relays.

The character of the invention will be more fully understood from the following examples:

Example 1—With the following embodiment of the invention the regulation is effected by varying the diameter of the feed drum. The action of this device will be described with reference to the accompanying drawing: The paper strip 15 provided with the printed marks 3 is drawn from the supply drum 2 by means of the feed drum 1, cut in at the cutting point 16 by the knife 4 and wound on the drum 5. In order to ensure that the incision is effected at the very point marked by a printed sign, use is made of a regulation device controlled by the two photoelectric cells 6 and 7. The knife 4 (cf. Fig. 2) is actuated by the eccentric 26 and the rod 8. Shortly before cutting the eccentric 26, by means of the rod system 9, 10, 11 connected with rod 8, opens a diaphragm of the illuminating device 12, so that two pencils 13 and 14 of light are projected on the paper strip. When the paper strip is in correct position with regard to the knife, both the light rays fall upon the dark printed mark 3 (Fig. 3). In this case the light rays are reflected with the same low intensity, so that the photoelectric cell does not actuate the regulating device. If the position of the printed mark is displaced in either direction, such as is shown in Figures 4 and 5, one of the two light ray bundles is reflected by the brighter paper stripe. The current impulse produced in the corresponding photoelectric cell actuates a motor 18, after having been sent through one of the amplifying systems 17 or 26 combined with a relay. According to the excitation of the one or the other photo-electric cell, the motor rotates in one direction or in the inverse direction. By means of a reduction gearing 19 the motor acts on a rack with a wedge 20 which according to the photoelectric cell used is shifted inwards or outwards. Consequently the tappet 21 that glides on the wedge surface is given an upward or downward movement against the arcs 24 and 25 of the feed drum and movable about the hinges 22 and 23, arcs, thus increasing or diminishing the circumferences of the feed drum. The speed of the paper web, is therefore either increased or reduced and the printed mark is brought in the correct distance from the point of incision. As soon as, in the course of the operation, both the light bundles again projected on the printed mark, the impulse of current is interrupted and the motor is stopped. When the incision is finished, the diaphragm is readjusted automatically, in order to shield the photoelectric cell against illumination when the non-printed paper passes the point of illumination.

Obviously in the device shown in the drawing the marks on the paper must have about the same distance from each other which distance should correspond with the mean circumference of the feed drum inasmuch as the actuation of the photoelectric cell is combined with the cutting device which latter is actuated once per one revolution

of the feed drum. However, other constructions are possible which include means for cutting several times per one revolution. In this case the distance on the circumference of the feed drum from one point of incision to another is substantially the same.

The object of the device described is only to incise paper sheets, whereupon these are fed to the winding roller 5. It is, however, obvious that lengths of paper may also be severed and the severed portions of paper be removed after passing the cutting place and directly be employed for any desired purposes.

What we claim is:

An apparatus for automatically cutting paper provided with marks comprising an axle, a feed drum mounted on said axle said feed drum being provided with two arcs hinged to said drum, a cutting device provided with a knife cutting against said feed drum, an illuminating device projecting two pencils of light on the path of said marks at a distance from each other substantially corresponding with the length of said marks, a mask for masking said pencils of light, an eccentric mounted on said axle actuating said knife and said mask by a rod connection so that the pencils of light are projected on said paper web a short interval before cutting, two photoelectric cells arranged so as to receive said pencils of light after reflection by the paper, an amplifier connected with said photoelectric cells, a tappet in contact with said arcs, a rack provided with a wedge in contact with said tappet, a reduction gearing for displacing said rack, a motor for driving said reduction gearing, said photoelectric cells, said amplifier, said motor, said reduction gearing said rack and said tappet co-operating so as to change the circumference of said feed drum in accordance with the incorrect position of said marks in relation to said pencils of light, and to effect cutting of the paper web at the center of said pointed marks.

KURT RIESS.
ADOLF KNODEL.
RUDOLF KLAUS.