Dec. 29, 1931. A. J. KEISER 1,838,840

ENVELOPE OPENING MACHINE

Filed May 31, 1928 3 Sheets-Sheet 1

Fig. 1

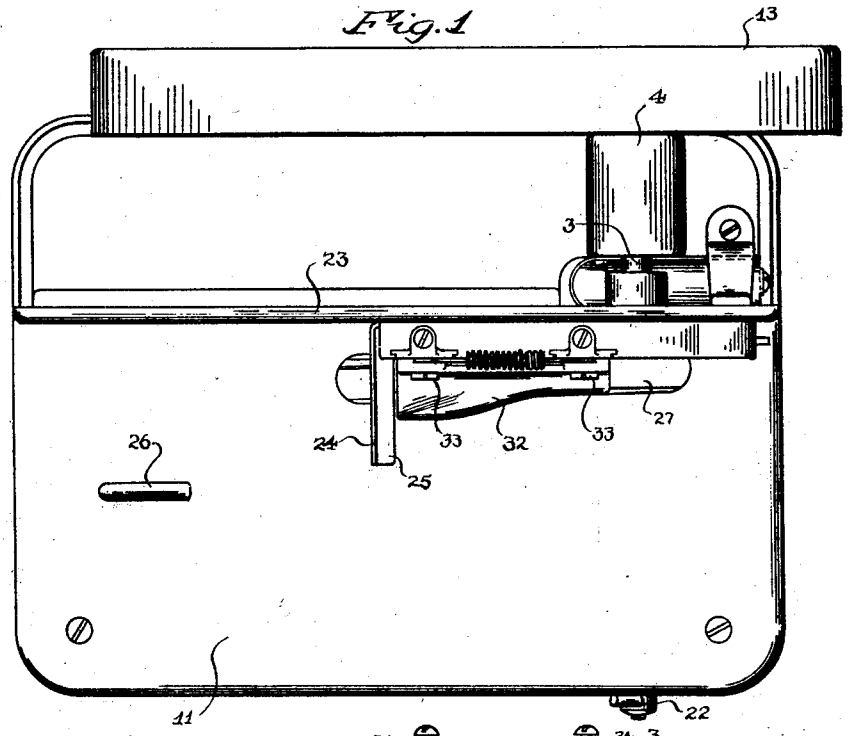
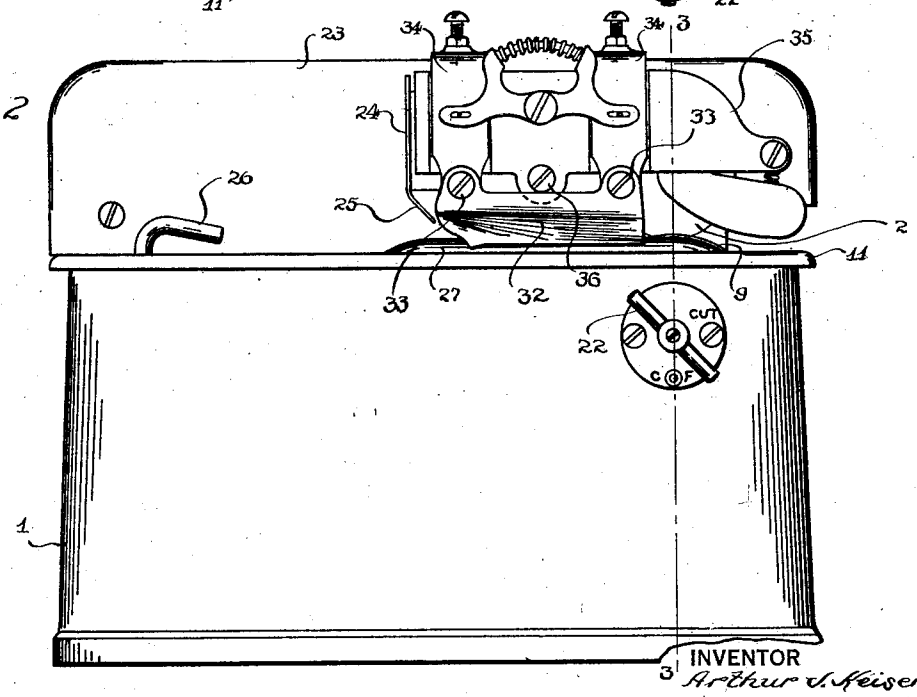


Fig. 2



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Filed May 31, 1928 3 Sheets-Sheet 3

Fig. 6

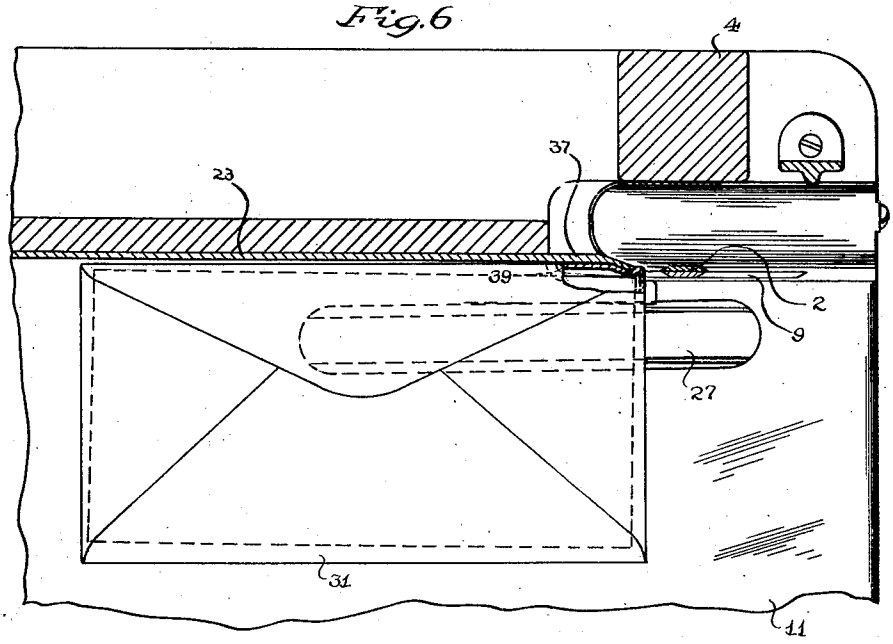


Fig. 8

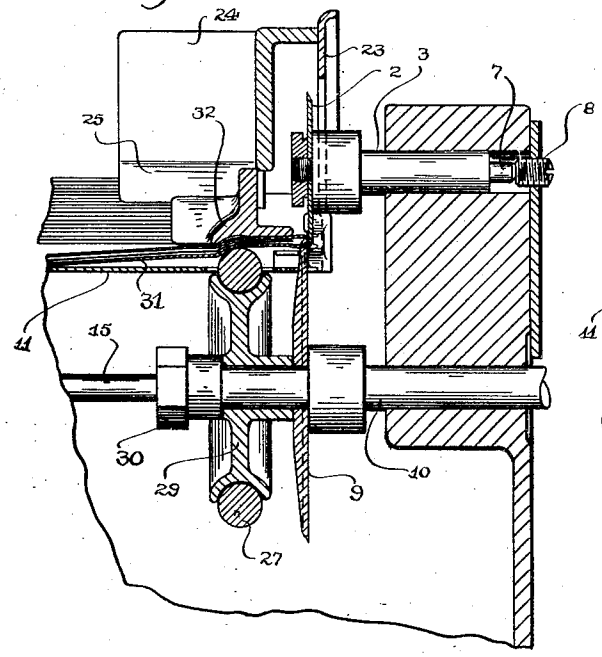
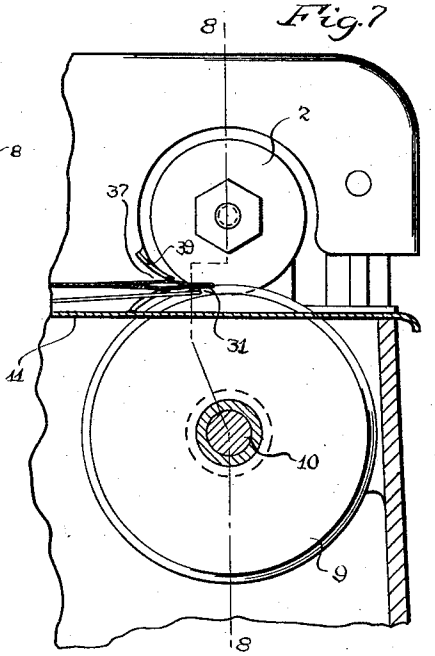


Fig. 7



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ENVELOPE OPENING MACHINE

Filed May 31, 1928 3 Sheets-Sheet 2

Fig. 5

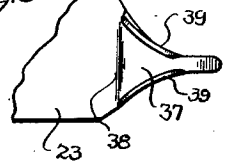
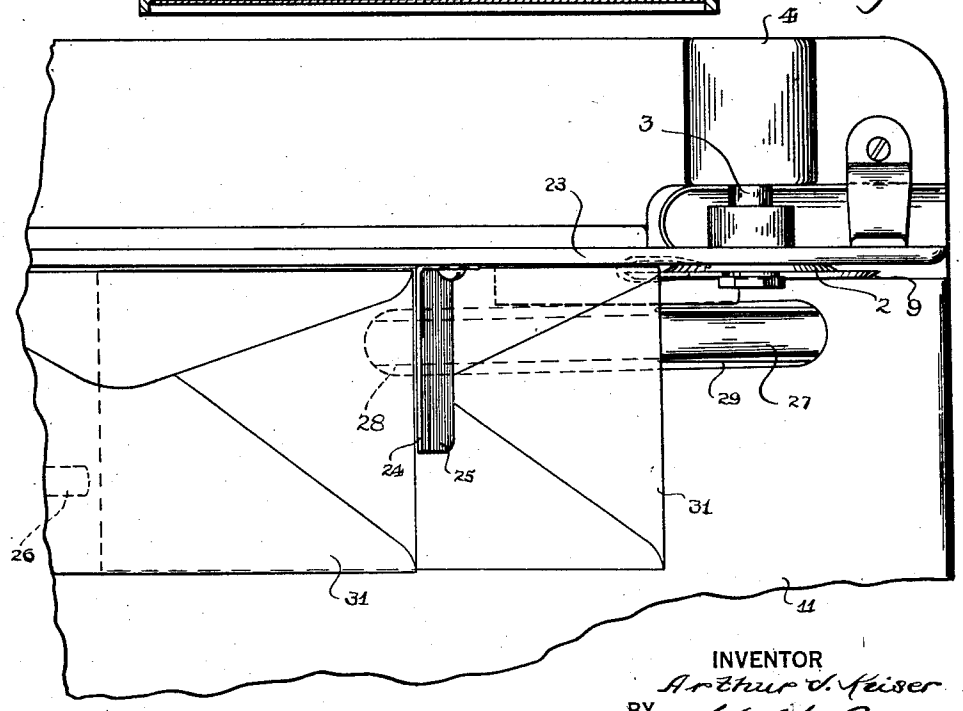


Fig. 3

Fig. 4



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UNITED STATES PATENT OFFICE

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ENVELOPE OPENING MACHINE

Application filed May 31, 1928. Serial No. 281,647.

The present invention relates to envelope opening machines. An object thereof is to provide a novel means for mounting a pair of rotary cutters so as to obtain a shearing cutting action. Another object of the invention is to provide a novel means for adusting a pair of rotary cutters to vary the width of the cut. Still another object of the invention is to provide means for creating pressure upon the edge of an envelope to move the contents of said envelope from said edge as the latter moves toward the cutting mechanism, said means being situated in proximity of the cutting point of the cutting mechanism so that the cutting mechanism obtains an effective grip of the envelope as the latter moves past the cutting point.

To these and other ends, the invention consists of certain parts and combinations of parts, all of which will be hereinafter described: the novel features being pointed out in the appended claims.

In the drawings:

Fig. 1 is a plan view of an envelope opening machine constructed in accordance with this invention;

Fig. 2 is a view of the machine in front elevation;

Fig. 3 is a section on the line 3—3, Fig. 2;

Fig. 4 is an enlarged fragmentary plan view illustrating the envelope just prior to the latter's engaging the cutter;

Fig. 5 is a fragmentary detail view of the means on the guide plate for producing an inward pressure on the edge of the envelope;

Fig. 6 is a horizontal fragmentary section substantially in the plane of the envelope;

Fig. 7 is a fragmentary view partially in section showing the manner in which the envelope engages the cutter; and

Fig. 8 is a section on the line 8—8, Fig. 7.

Referring to the illustrated embodiment of the invention, 1 indicates a housing, which, in this instance, encloses a motor (not shown) employed for driving a cutting mechanism and a feeding mechanism.

The cutting mechanism, in this instance, embodies an upper cutter 2 in the form of a circular disk secured to a shaft 3 which has rotary or axial movement in a bearing member 4 formed on the housing 1 and projecting above the latter. The shaft 3 is made hollow at 5 at its inner end to receive a helical spring 6 which abuts the bottom of the hollow portion and also a short rod 7 fitting in said hollow portion and abutting an adjustable screw 8 at its other end, the screw serving the purpose of increasing or decreasing the tension on the spring 5. Cooperating with the upper cutter is a lower cutter 9 secured on a shaft 10 which turns in the bearing 4 below the top plate or table 11 of the casing or housing 1. This shaft 10 is driven through a large pulley 12 on the shaft 10 and within a detachable housing 13 which encloses an endless belt 14 connecting with the motor (not shown). The cutter 9 is also of disk formation and has its rear face engaged by the cutter 2, the peripheries of the two cutters overlapping, and the spring 5 holding the cutter 2 with yielding pressure against said face. The shafts 3 and 10 are slightly out of vertical alignment so that there is a shearing action produced by the two cutter blades.

With the end in view of varying the depth of the cut of the cutting mechanism upon the envelopes, in order to take off more or less of an edge, means is provided for shifting the plane of operation of the cutter 9 and at the same time the cutter 2, in this instance, this means comprises a longitudinally adjustable rod 15 which at one end has a ball and socket connection 16 with the shaft 10 and at the other end is externally threaded at 17, the externally threaded portion having a nut 18 adjustable thereon to provide for fine adjustment and cooperating with an adjustable abutment 19 which provides for rough adjustment. This adjustable abutment, in this instance, is in the form of an externally threaded member, which is mounted to rotate in and move axially of a fixed internally threaded sleeve 20 mounted in the front wall of the housing 1. The rotary member 19 has an axially aligned bore or pocket 21 in which the externally threaded end 17 of the rod projects so that the adjustable nut 19 may cooperate with the end of the rotary abutment 21. By turning the rotary abutment

19 through the finger piece 22, the rod 15 will shift longitudinally either under or against the action of the spring 5 which acts on the cutter 2. In one direction of adjustment, the spring 5 shifts the cutter to cause the latter to shift the cutter 9 axially and consequently the shaft 10 and the rod 15, causing the nut 18 to follow the end of the rotary abutment 19, whereas, in the other direction of adjustment this movement is reversed and compresses the spring 5.

The envelopes to be opened are stacked against the guide plate 23 which projects vertically above the table or envelope support 11, a stacker plate 24 being projected forwardly from the guide plate and having its lower end 25 deflected toward the cutting mechanism. To elevate the rear end of the stack an inclined member 26 is provided which lifts the stack of envelopes from the table at the rear end of the stack, while the forward lower end of the stack cooperates with the feeding mechanism.

The feeding mechanism, in this instance, comprises an endless belt 27 of circular cross section passing about two pulleys 28 and 29, the latter being arranged on the shaft 10 and being held thereto by a clamping nut 30 which also serves to clamp the rotary cutter 9 to the shaft 10. The belt 27 not only has a traveling motion but it tends to twist or turn during rotation, in a known manner, so as to act on the under surface of the envelope 31 to move the latter toward the guide plate 23. A grooved presser foot 32 is pivotally connected at 33 to two slides 34 which are vertically guided on the movable frame 35 bolted at 36 to the guide plate 23. This presser foot cooperates with the upper surfaces of the envelopes 31 as the latter are moved forwardly and laterally by the feed belt 27.

As the envelopes approach the cutting point, it is desirable that a bulged condition of the envelope adjacent the edge to be cut be produced in order that the contents of the envelope be shifted away from said edge and a better grip of the cutting mechanism on the envelopes may be obtained. With this end in view, means is provided over which the edge of the envelope is caused to travel, this means being situated in immediate proximity to the cutting point and producing an inward pressure on the edge of the envelope greater than that produced by the guide plate in the travel of the envelope to the cutting point. In this instance, this means comprises a reduced extension 37 on the guide plate 23 which is bent or deflected at 38 preferably about ten-thousandths of an inch. This extension is extended as close as possible to the cutting point of the cutting mechanism and preferably has two converging side flanges 39 extending throughout the greater portion thereof, so as to prevent the lateral shifting of the envelope while at the same time directing it in a straight line to the cutting point. This pressure device produces a bulging of the envelope as shown in Fig. 8 of the drawings and enables the cutters 2 and 9 to more effectively grip the envelope.

The operation of the invention will be understood from the foregoing but may be summarized as follows. The envelopes are placed in a stack beyond the stacker plate 24 so that the lowest envelope in the stack rests at its forward end upon the belt 27. As the belt moves, the envelopes are fed forwardly successively from the bottom of the stack beneath the stacker plate 24 and beneath the presser foot 32, each envelope at the same time being given a lateral movement toward the guide plate 23 so that as it moves forwardly, it travels in engagement with the guide plate. Just before the cutting point is reached, each envelope travels in engagement with the edge of the pressing device 37, which being projected inwardly with reference to the envelope, presses said edge inwardly producing a bulged condition, thus moving the contents away from said edge and giving a more desirable portion to be engaged by the two cutters. Should the amount removed from each envelope be either too narrow or too wide, the width of the removed portion may be readily varied by turning the finger piece 22 which will shift the cutters 2 and 9 in the direction of their axes and also relatively to the guide plate 23. The angular arrangement of the cutters insures a shearing action.

From the foregoing there will be seen that there has been provided two rotary cutters with their axes at slight angles to each other to insure a shearing cutting action. A novel means has been employed for effecting a shifting of both cutters with reference to the guide for the envelopes. There has also been provided a novel device for producing pressure upon the edges of the envelopes as they travel toward the cutting mechanism, this pressure device being situated in proximity to the cutting point so that a better grip of the cutting mechanism on the envelopes will be insured.

What I claim as my invention and desired to secure by Letters Patent is:

1. In an envelope opening machine a guide past which the envelopes travel, a cutting mechanism for opening an envelope as it travels along the guide embodying two rotary disk cutters having overlapping peripheries, means supporting both cutters for axial movement transversely of the guide, means tending to hold one of said cutters with resilient pressure against the other, and means for adjusting the other cutter axially to adjust both simultaneously transversely of the guide, said means holding the said other cutter in its adjusted position and comprising a screw member adjustable in the direction of the axis of said other cutter and means for driving the latter cutter, the first named cut-

ter being driven solely through its frictional engagement with the second named cutter.

2. In an envelope opening machine, a cutting mechanism embodying two rotary disk cutters having overlapping peripheries, a rotary shaft to which one of said cutters is secured, a rod secured to said shaft to permit the latter to turn relatively thereto, a screw member adjustable axially in the direction of the axis of the shaft, and means adjustably connecting the rod to the screw member.

3. In an envelope opening machine, the combination with a guide having an opening, and two cutters mounted adjacent the guide opening and having overlapping peripheries for cutting an edge of envelopes movable along the guide, an envelope edge pressing device in the form of an extension on the guide within said opening, projected toward the cutting point of the cutting mechanism and projected forwardly from the plane of the guide in the plane of the edge of the envelope moving to the cutters along the guide to press the edge away from the guide just before the edge reaches the cutters, and mechanism for feeding envelopes along the guide and against and along the envelope edge pressing device.

4. In an envelope machine, the combination with a guide, and cutting mechanism for cutting the edges of envelopes moved along the guide, of an envelope edge pressing device arranged in the path of an envelope moving along the guide, projecting forwardly from the plane of the guide at a point in immediate proximity to the cutting mechanism, said edge pressing means being adapted to press inwardly the contacting portion of the envelope edge to move the contents of the envelope out of line of the cutters.

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