Oct. 27, 1953

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AUTOMATICALLY OPERATED CUTTING WHEEL FOR OPENING ENVELOPES

2,656,889

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2 Sheets-Sheet 1

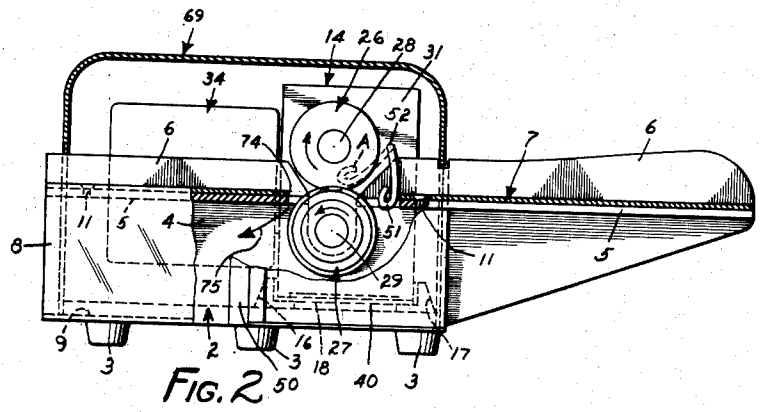


FIG. 2

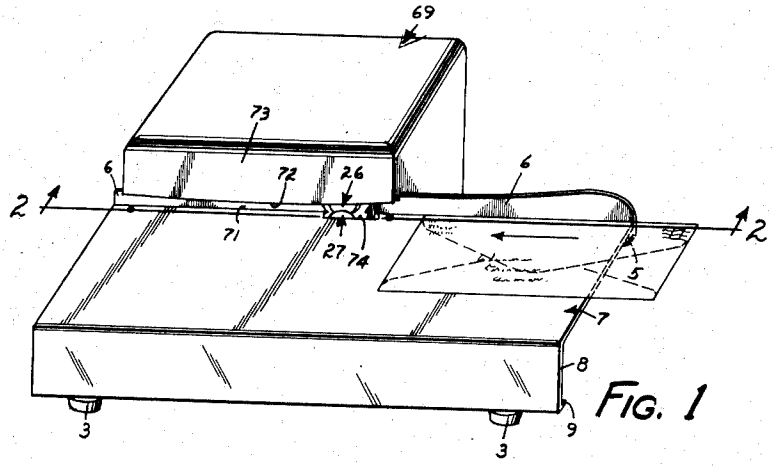


FIG. 1

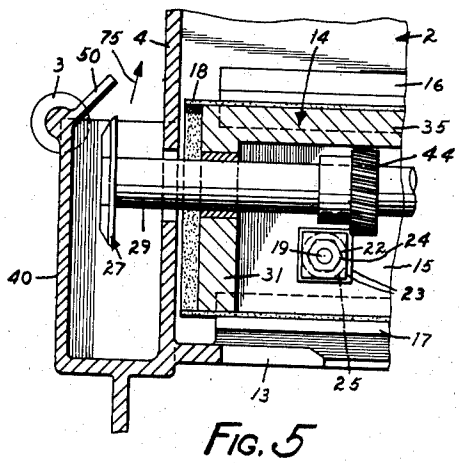


FIG. 5

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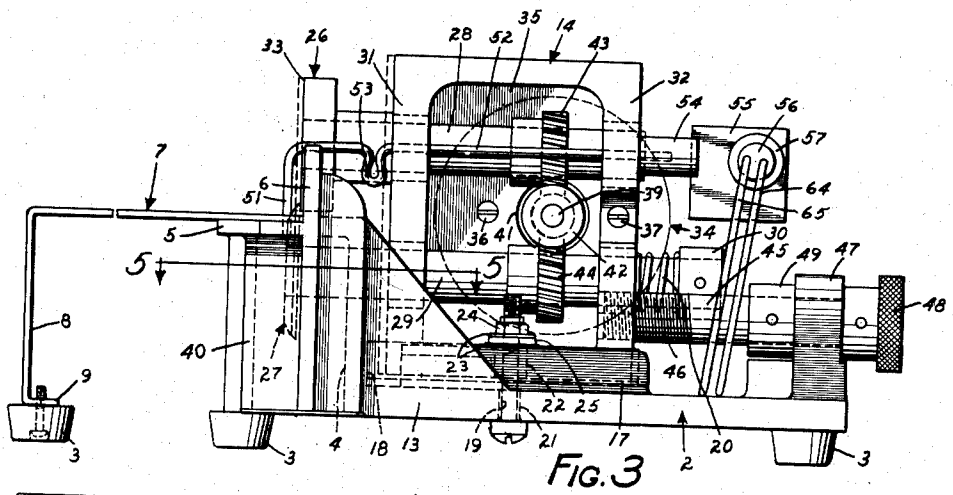


FIG. 3

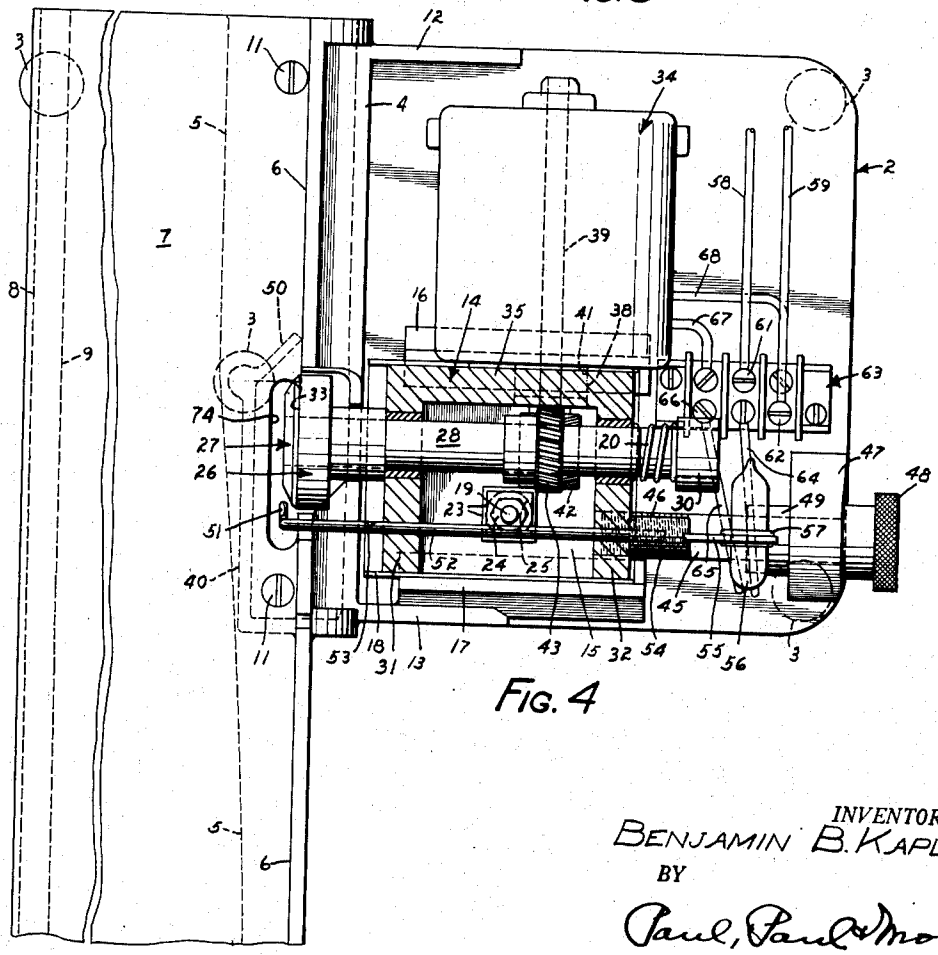


FIG. 4

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AUTOMATICALLY OPERATED CUTTING WHEEL FOR OPENING ENVELOPES

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2 Claims. (Cl. 164—60)

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This invention relates to new and useful improvements in envelope openers and more particularly to power operated openers.

An important object of the present invention is to provide a simple and inexpensive machine for opening envelopes, which is small and compact whereby it may readily be placed upon a desk or table in a place of business to facilitate the usual laborious task of opening numerous letters each day.

A further and more specific object of the invention is to provide an envelope opener comprising a pair of coacting cutting elements disposed adjacent to a suitable guide for guiding the envelopes into engagement with the cutters, and said cutters having a motor operatively connected thereto and provided with an electric circuit having a control switch therein adapted to be actuated by movement of each envelope fed through the machine, whereby the operation of the machine is automatically controlled by the movement of the envelopes therethrough.

A further object is to provide an envelope opening machine comprising a support over which the envelopes are fed into engagement with a cutting mechanism, and the cutting mechanism being supported on a suitable frame mounted for limited sliding adjustment with respect to the path of travel of the envelopes, whereby the width of the edge or strip severed from each envelope may be varied as may be desired.

A further object is to provide a small compact power driven envelope opener adapted for office or business use, which is extremely efficient and positive in operation, and is designed to operate only when an envelope or other article is moved into engagement with its cutting elements, whereby the starting and stopping of the machine is entirely automatic.

Other objects of the invention reside in the unique mounting of the cutting elements whereby they are self sharpening and are always retained in cutting engagement with each other; in the simple means provided for laterally adjusting the cutters with respect to the path of travel of the envelopes; in the automatic control means for the cutter, whereby the operation of the machine is controlled entirely by the passage of envelopes therethrough; in the arrangement of the cutters whereby they are completely shielded for the protection of the operator's fingers; and in the provision of means for absorbing vibration to render the machine substantially noiseless in operation.

These and other objects of the invention and

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the means for their attainment will be more apparent from the following description taken in connection with the accompanying drawings.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a perspective view of the novel envelope opener herein disclosed showing an envelope about to be fed to the cutters;

Figure 2 is a longitudinal sectional view substantially on the line 2—2 of Figure 1, showing the control element adapted to be actuated by each envelope passing through the machine, thereby to automatically control the starting and stopping of the cutters;

Figure 3 is a view looking at the receiving end of the machine;

Figure 4 is a plan view of Figure 3; and

Figure 5 is a sectional plan view on the line 5—5 of Figure 3.

The novel envelope opener herein disclosed is shown comprising a base plate 2 provided with suitable rubber feet or buttons 3, whereby it may be placed upon a desk or table without danger of marring the surface thereof. The base plate 2 constitutes the main support for the working parts of the machine and for the sake of economy may be constructed of cast metal.

An upright wall portion, generally designated by the numeral 4 is provided on one side of the base and has an upper horizontal flange 5 from which rises a vertical envelope guide 6, shown integrally formed therewith. The flange 5 also provides a support for one side of a plate 7 which forms a table or support over which the envelopes are fed with one edge engaged with the guide 6. The plate 7 has a depending wall portion 8 terminating in a horizontal flange 9 at its bottom to which rubber buttons or feet 3 are secured, as shown in Figure 3. The plate 7 is shown detachably secured to the flange 5 by suitable screws 11—11. The upright wall 4 of the base may be reinforced by diagonal wall portions 12 and 13, shown in Figures 3 and 4.

An important feature of the present invention resides in the novel construction and mounting of the cutter mechanism which comprises a minimum of moving parts and all such parts being carried by a frame, generally designated by the numeral 14. The frame 14, as herein shown, is

box-like in shape, but obviously it may be otherwise formed without departing from the scope of the claims. The bottom wall 15 of the frame 14 is movably mounted upon and between suitable guides 16 and 17 which, for the sake of economy, may be integrally formed with the base plate 2. A piece of sheet rubber, designated by the numeral 18, is shown interposed between the guides 16 and 17 and the bottom wall 15 of the frame 14, and is sufficiently compressed between the guides and the frame 14 to frictionally retain the frame 14 in its adjusted postion. A bolt 19 is received in aligned apertures 21 and 22 provided respectively in the base plate 2 and bottom wall 15 of the frame 14, and serves to secure the frame 14 in position between the guides 16 and 17.

The aperture 22 in the bottom wall 15 of the frame 14 is made relatively larger than the aperture 21 in the base plate 2, as indicated in Figure 3, thereby to allow freedom of movement of the frame in its guides without interference from the screw 19. A pair of relatively large metallic washers 23, shown square in configuration, may, if desired, be interposed between the nut 24 of the bolt 19 and the bottom wall 15 of the frame 14. The nut 24 is preferably of the lock type, whereby it will retain its adjusted position upon the bolt without danger of shifting, as a result of vibration of the machine. A suitable resilient washer 25, preferably of rubber, is interposed between the metallic washers 23 and cooperates with the sheet rubber member 18 to absorb vibration and to render the machine practically noiseless in operation.

The cutting means is shown comprising a pair of cutting elements 26 and 27 mounted, respectively, on shafts 28 and 29, rotatably supported in suitable bearings provided in the upright walls 31 and 32 of the frame 14. The upper cutting element 26 is preferably in the form of a roller having a square cutting edge 33 which cooperates with the sharpened edge of the lower cutting element 27 to effect the cutting of the envelopes, as will subsequently be described. The lower cutting element 27 is preferably in the form of a disk having a knife edge which overlaps a portion of the front face of the cutting element or roller 26 to assure a clean cut of the paper, when an envelope is fed along the guide 6 between the cutting elements.

The cutting elements 26 and 27 are simultaneously driven in opposite directions, when the machine is in operation, and the means provided for thus driving said elements is shown comprising a small motor 34 which may be mounted directly upon the back wall 35 of the frame 14 and secured thereto by suitable screws 36 and 37, as best shown in Figure 3. The usual hub 38 of the motor housing and the drive end of the motor shaft 39, are shown received in an enlarged aperture 41 provided in the back wall 35 of the frame 14. A worm 42 is secured to the motor shaft 39 and intermeshes with worm gears 43 and 44 secured respectively to the shafts 28 and 29 of the cutter elements 26 and 27. Thus, when the motor is operating, a rotary movement is simultaneously imparted to the cutting shafts 28 and 29, as will be understood by reference to Figure 3.

Means is provided for rendering the cutting elements 26 and 27, self-sharpening, and is shown comprising a spring 20 coiled about the rear end portion of the shaft 29 of the lower cutter 27. One end of the spring engages the adjacent wall 32 of the frame 14, and its other

end a collar 30 secured to the projecting end of the shaft 29, as best shown in Figures 3 and 4. The spring 20 thus constantly tends to move the shaft in a rearward direction, whereby the cutting edge of the disk 27 is automatically retained in self-sharpening, cutting engagement with its complemental cutting element 26, as will readily be understood.

The means provided for varying the strip or edge cut from each envelope is shown comprising a stub shaft 45 having a threaded end portion 46 received in threaded engagement with the wall 32 of the frame 14. The opposite end of the shaft 45 is supported in a bearing 47 provided on the base plate 2. A knurled finger knob 48 is secured to the outer end of the shaft 45, and a collar 49 is shown secured to said shaft at the inner side of the bearing 47, whereby the hub of the finger knob 48 and the collar 49 cooperate to prevent axial movement of the shaft 45 relative to the base plate 2.

By referring to Figure 3, it will be noted that because of the shaft 45 being restrained against axial movement when rotated, the threaded terminal 46 thereof will cause the frame 14 to be relatively moved in its guides, whereby the cutters 26 and 27 are correspondingly adjusted with respect to the guide flange 6, thereby to vary the width of the strip cut from each envelope.

Another feature of the invention resides in the means provided for automatically controlling the operation of the motor each time an envelope is fed along the guide 6 over the feed table 7. To thus control the operation of the motor, a small control element or feeler, generally designated by the numeral 51, is pendently supported over the path of travel of the envelopes with its lower end positioned beneath the top surface of the feed table 7, whereby the feeler 51 is engaged by each envelope fed over the table and swung forwardly to the dotted line position shown at A in Figure 2.

The feeler 51 may, for the sake of economy, be made from a piece of wire bent to form a shaft 52 having a loop 53 formed therein adapted to engage the wall 31 of the frame 14, thereby to prevent axial movement of the shaft 52 in one direction. A hub 54 is secured to the opposite end of the wire shaft 52 and engages the wall 32 and thus prevents axial movement of the shaft 52 in the opposite direction. A plate 55 is suitably secured to the hub 54 of the shaft, as by welding, and has an aperture therein in which is mounted a mercury switch 56, of conventional construction. A rubber sleeve 57 is mounted in the aperture in the plate 55 into which the bulb of the mercury switch 56 is inserted, and whereby the switch bulb is frictionally supported in the plate 55 in insulated relation thereto.

By reference to Figure 3, it will be noted that the center of the plate 55 is laterally offset from the axis of the shaft 54 in a downward direction, whereby the lower portion of the plate acts as a weight to retain the mercury switch in its circuit opening position. Thus when the machine is at rest, the plate 55 will be supported as shown in Figure 3, whereby the usual contacts of the mercury switch are in circuit-opening position, and the feeler 51 is supported in the path of the envelopes, as shown in full lines in Figure 2.

The mercury switch controls the supply of current to the motor 34, and is interconnected in an electric circuit comprising conductors 58 and 59 each having one end connected to ter-

minals 61 and 62, respectively mounted in a terminal block, generally designated by the numeral 63. A wire 64 has one end electrically connected to the terminal 61 and its opposite end to one of the contacts of the mercury switch 56. A second wire 65 leads from the other contact of the mercury switch to a terminal 66 which is in electrical connection with a wire 67 leading to one side of the usual winding of the motor. A second wire 68 leads from the other side of the motor winding to the terminal block 62 and is electrically connected to the wire 59, thereby completing the circuit to the motor.

A suitable housing, generally designated by the numeral 69, is adapted to be fitted over all of the working parts of the machine and has three upright walls, the edge portions of which are detachably secured to the base plate 2 by suitable screws, not shown. An opening is provided in the front side of the housing whereby the upper portion of the housing may be extended over the cutters, thereby to serve as a guard to shield the cutters and prevent the operator's fingers from accidently engaging the cutters when the machine is in operation.

The space 71 between the table top 7 and the bottom edge 72 of the front wall 73 of the housing is less than the normal diameter of a finger, whereby an operator is not likely to insert a finger under the housing into contact with the cutters.

In the operation of the novel machine herein disclosed, the motor is connected to a conventional lighting circuit or the like by a suitable plug-in cord forming a continuation of the conductors 58 and 59, whereby the machine is made ready for use. The envelopes to be opened are then successively passed over the table 7 with one edge engaged with the upright guide flange 6, as indicated in Figure 1, whereby the edge of the envelope engaged with the guide 6 is severed from the body of the envelope thereby to open the envelope along the full length of its body. The portion of the table 7 in advance of the cutting elements or wheels 26 and 27 constitutes an envelope feeding zone. An envelope cutting zone is provided in the table 7 by an opening 74 in which the cutting wheels 26 and 27 are disposed.

The narrow edge trimmed from the envelope is directed downwardly through the opening 74 in the table top 7, as indicated by the arrow 75 in Figure 2, whereby such waste may be delivered into a suitable receiving means or directly onto the top of the table upon which the machine is supported.

The machine is self supporting and complete in construction, and when the current supply cord (conductors 58 and 59) of the motor is plugged into the receptacle of an electric supply circuit, the machine is always ready for immediate use. The compactness and lightness of the machine make it possible to readily and conveniently shift it about from one place to another, whenever desired, which is a desirable feature in an apparatus of this general type. Should it be found advisable to vary the width of the strip severed from the envelope, the operator simply rotates the finger knob 48 in one direction or the other, depending upon the width desired. Such rotation of the finger knob 48 shifts the frame 14 in its guides 16 and 17 in a direction towards or away from the feed table 7, because of its threaded connection with the shaft 45.

In actual operation, it has been found that because of the unique construction and orientation of the various parts of the apparatus, the cutting edges of the cutters may, if desired, be positioned to sever only the bare edge from each envelope. In actual use, however, the cutters are preferably positioned to sever a strip one sixteenth inch wide, which is sufficient to allow for slight irregularities in the feeding of the envelopes through the machine.

The upright wall portion 4 of the base plate 2 is shown formed with an auxiliary housing 40 disposed to conceal the lower cutting element 27 under the table 7. One end of the auxiliary housing 40 is open, and said opening is defined by an upright inwardly inclined deflecting flange 50, as best indicated in dotted lines in Figure 4, and full lines in Figure 5. The edge of the flange 50 is spaced outwardly from the wall 4 to provide an opening through which the severed strips from the envelopes are directed, as indicated by the arrow 75 in Figure 5.

The sheet rubber member 18 interposed between the guides 16 and 17 and the lower portion of the frame 14, in conjunction with the rubber washer 25 of the bolt 19, will frictionally retain the cutting edges of the cutters in fixed relation to the flange 6, even though the threaded connection between the shaft 45 and frame 14 may have some play therein. The rubber element 18 and washer 25 also cooperate to absorb vibration from the motor, whereby the apparatus is extremely quiet in operation.

Another feature of the invention resides in the formation of the cutters, whereby the upper cutting element 26 in addition to cooperating with the lower disk-like cutter 27 to sever an edge from each envelope, also serve to automatically feed each envelope through the machine, the moment the envelope has been moved into cutting engagement with the cutters.

The construction of the machine as a whole is very simple and inexpensive, all of the parts being so designed that they readily lend themselves to manufacture in mass production on conventional machinery, whereby the cost of producing the machine in quantity production may be comparatively low, relative to the cost of such machines now on the market.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

I claim as my invention:

1. In an envelope opening machine, a base plate including a cutting zone and an envelope feeding zone, co-acting cutting wheels positioned on said base plate in said cutting zone, means for driving said cutting wheels, said means comprising an electric motor, a motor starting means, a control member connected to said motor starting means and having a downwardly extending portion positioned ahead of said cutting wheels and extending toward said envelope feeding zone, whereby said downwardly extending portion will be engaged by the edge of an envelope inserted between said cutting wheels, said downwardly extending portion of said control member being movable from said downwardly extending position ahead of said cutting wheels to a position wherein said portion is raised slightly above the juncture of said cutting wheels in response to the movement of an envelope through said cutting zone to actuate said motor starting means, said downwardly extending portion of said control

member being maintained in said last-named position during the passage of an envelope through said cutting zone.

2. In an envelope opening machine, a base plate including a cutting zone and an envelope feeding zone, co-acting cutting wheels positioned on said base plate in said cutting zone, means for driving said cutting wheels comprising an electric motor, a control rod mounted transversely of said base plate, motor starting means mounted on said transverse control rod, a rocker control arm depending from said transverse control rod, said rocker arm being normally positioned ahead of said cutting wheels and extending toward said envelope feeding zone, said rocker arm being movable in response to the movement of an envelope through said cutting zone from a substantially vertical and downwardly depending position to a second position wherein said rocker arm is slightly above the juncture of said cutting wheels to actuate said motor starting means, said rocker arm being maintained in said second named position during the passage of an envelope through said cutting zone.

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