March 23, 1954 F. C. IFFLAND 2,672,930

MOTOR-DRIVEN ENVELOPE OPENER

Filed July 1, 1949 3 Sheets-Sheet 1

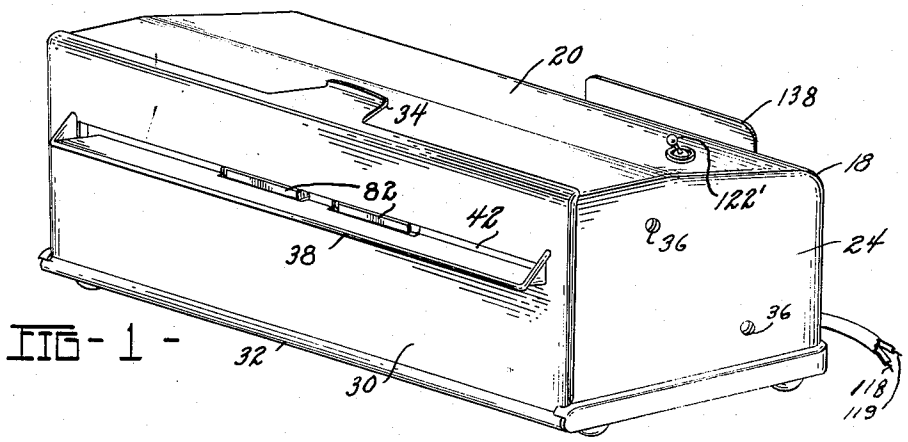


FIG-1-

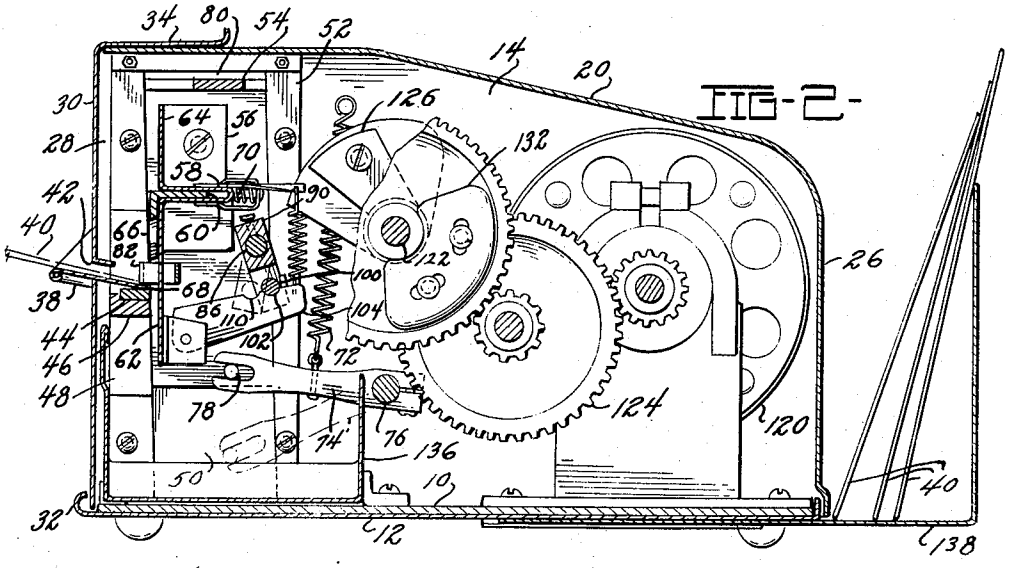


FIG-2-

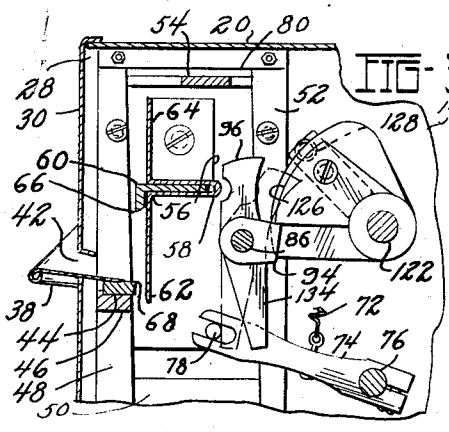


FIG-3-

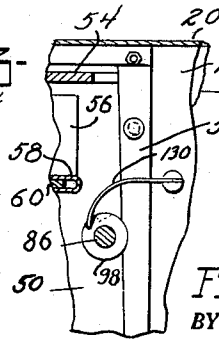


FIG-4-

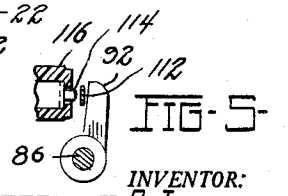


FIG-5-

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MOTOR-DRIVEN ENVELOPE OPENER

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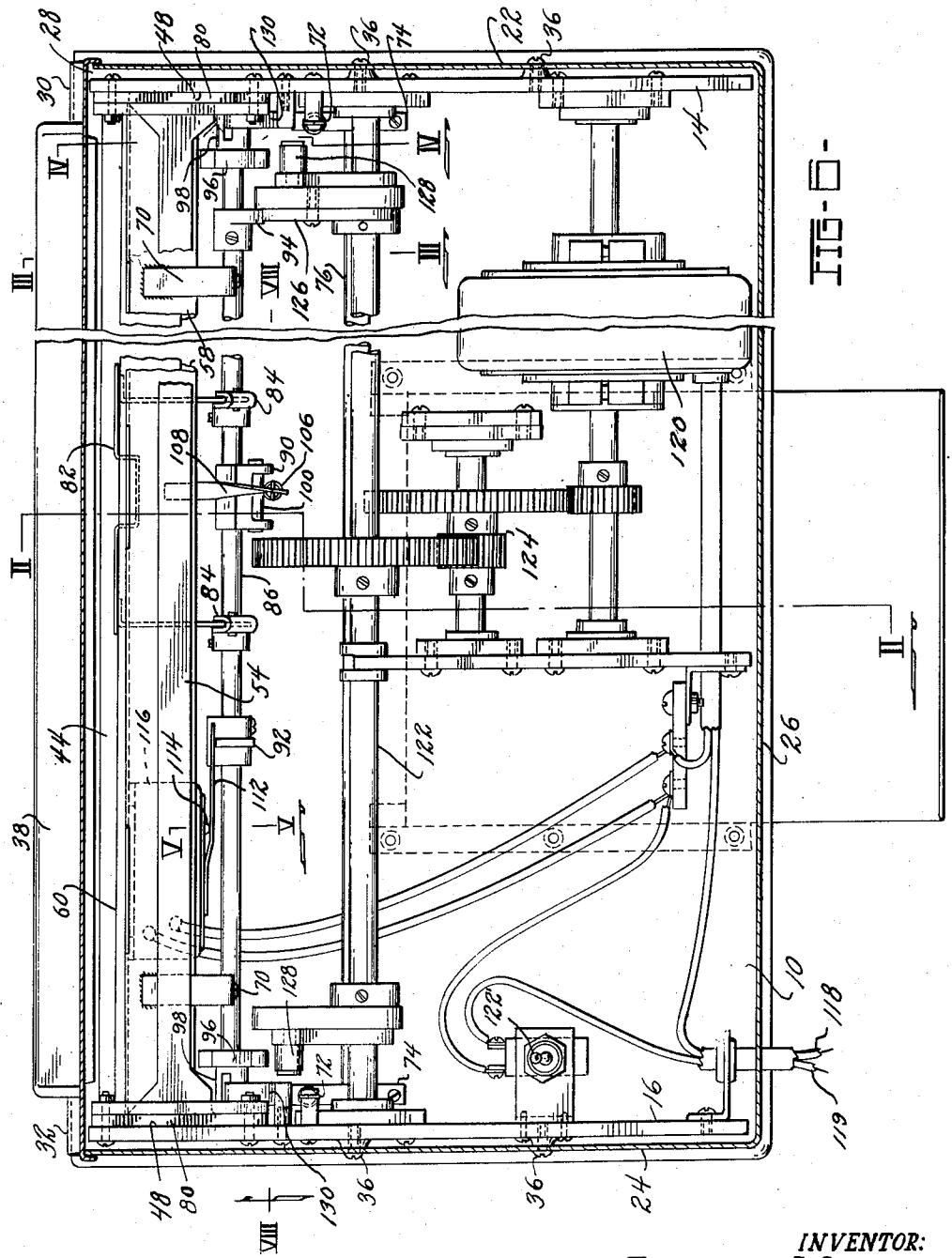


FIG. 6.

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MOTOR-DRIVEN ENVELOPE OPENER

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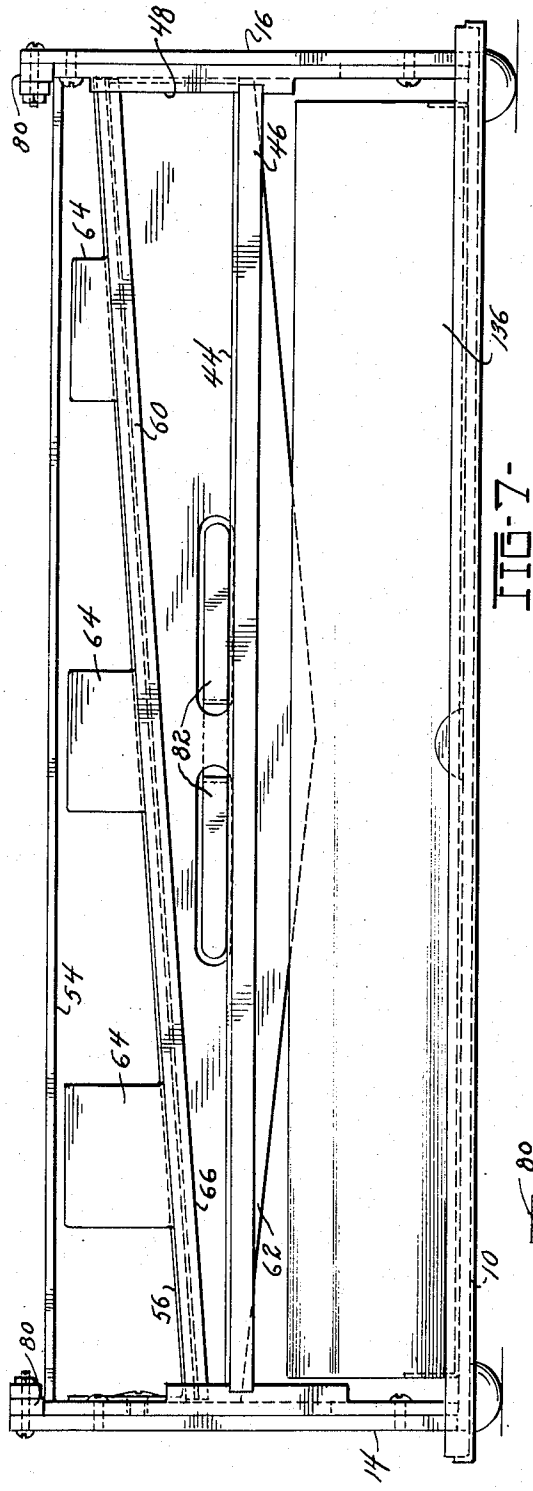


FIG-7-

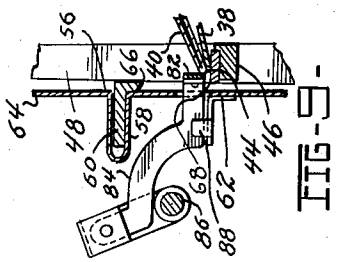


FIG-9-

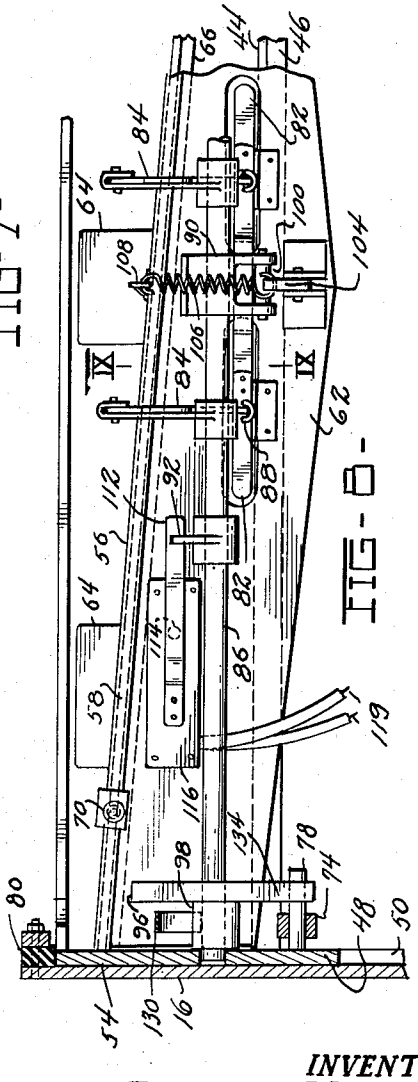


FIG-8-

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UNITED STATES PATENT OFFICE

2,672,930

MOTOR-DRIVEN ENVELOPE OPENER

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Application July 1, 1949, Serial No. 102,470

4 Claims. (Cl. 164—47)

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This invention relates to envelope openers.

An object of this invention is to provide a fully automatic machine which, upon insertion of one edge of a sheet of material thereinto, will perform a complete cycle of operations including the shearing of a predetermined amount from the sheet.

Another object of this invention is to provide an envelope opener which will automatically shear the edge from an envelope inserted thereinto and return the parts to starting positions in readiness to receive a succeeding container.

And another object of this invention is to provide an attractive, electrically driven machine, when not in use having all its parts idle, but upon the insertion of an envelope or the like into a chute provided for that purpose, will perform one complete cycle of operation, resulting in the shearing of a predetermined portion from the inserted material.

Other objects and advantages of this invention relating to the arrangement, operation and function of the related elements of the structure, to various details of construction, to combinations of parts and to economies of manufacture, will be apparent to those skilled in the art upon consideration of the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Referring to the drawings:

Fig. 1 is a perspective view of the apparatus;

Fig. 2 is a section centrally through the apparatus, intermediate its length, as indicated by line II—II, Fig. 6;

Fig. 3 is a side elevation of the knife operating mechanism (III—III, Fig. 6);

Fig. 4 is a side elevation of the starting switch reset control (IV—IV, Fig. 6);

Fig. 5 is a section through the starting switch showing the initial position of its control cam in relation thereto (V—V, Fig. 6);

Fig. 6 is a plan view of the machine, the housing being broken away to expose the operating mechanism;

Fig. 7 is a front elevation of the device with the housing parts removed;

Fig. 8 is a partial rear elevation of the shear and shield construction including a showing of the control switch and its operating mechanism (VIII—VIII, Fig. 6); and

Fig. 9 is a side elevation of a portion of the trigger or switch operating mechanism (IX—IX, Fig. 8).

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Plate 10 is mounted on resilient button supported floor 12, and this base plate carries opposing side plates 14, 16, which serve as the supports for the major portion of the mechanism as well as means to which the main housing member 18 may be attached. This housing element 18 is a sheet hood defining the overall appearance of the apparatus and includes a top 20, sides 22, 24, and rear 26 and has an open front 28 in turn closed by plate 30 having its lower edge engage in seat 32 formed by a reverse bend extending from the floor 12 along the front of the machine. The front plate 30 is releasably attached to the housing 18 by a spring finger 34 having snap coaction with a portion of the top 20. Screws 36 may be employed to mount the housing over the main frame and afford means for an easy access to the housing interior.

The front plate 30 mounts a downwardly inclined chute 38 into which the sheets to be sheared are placed, herein shown as an envelope 40. The edge to be sheared passes through aperture 42 in the cover plate and engages the upper face of blade 44 mounted on the cross portion 46 of an H-shaped frame construction 48 in turn mounted by and between the side plates 14, 16.

The inner sides of the frame 48 also form one side of opposing slideways 50, the opposite sides being defined by bars 52. These slideways provide the tracks for reciprocatory carrier 54. The carrier in turn, mounts a sheet metal unit 56 therebetween which unit provides a pocket 58 for inclined knife 60, a depending shield or stop 62, and a plurality of upwardly extending plate portions 64. The knife is L-shaped in cross-section and has its cutting edge 66 disposed to cooperate with the cutting edge 68 of the blade 44. The opposite ends of this inclined knife ride against the inner faces of the frame 48 of which, one at least is slightly canted and provides a cam surface along which the knife slides during its descent thereby imparting a true shearing action between the blade and knife. Springs 70 carried by the unit 56, urge the knife toward the blade at all times.

The knife is reciprocated by the carrier, in turn operated by mechanism hereinafter described. The carrier is normally returned to and held adjacent the top of the slideway by means of springs 72 attached between the side plates 14, 16, and arms 74 fixed at their inner ends to a common shaft 76, and their opposite or free ends

bifurcated to receive pins 78 fixed with the carrier 54.

This arrangement not only returns the carrier to the start or rest position, but due to the arms 74 being fixed to the common shaft 76, insures an even or stabilizing drive to both ends of the frame 54. Stops 80 are provided adjacent the tops of the slideways 50 which may include resilient bumpers minimizing any shock from the impact of the returning and resetting carrier.

The envelope is inserted into the chute 38 and moved across the blade 44 toward the cutting edge 68 and beyond to skirt or shield 62 which serves as the stop or positioning means determining the extent of the envelope to be sheared therefrom. Disposed across this envelope insertion path, are a pair of wings 82 which the envelope must engage and shift in order to reach the stop 62. These wings 82 extend away in each direction from the central portion of the shear region so that any of the standard or normal envelopes up to the capacity of the machine, must move this trigger arrangement before reaching the shear position. These wings 82 are connected by linkage 84 to cam or rock shaft 86. Slides 88, carried by member 56, serve as supports for the free wings ends of this linkage. The shaft 86 is mounted by and between the ends of the carrier 54 and extends substantially parallel to the line of shear in a spaced position therefrom. This cam shaft 86 mounts a lock arm 90, a switch cam 92, a lock insuring cam 94, a pair of carrier reciprocating cams 96, and a pair of reset cams 98, the operation and function of each being described in order.

The lock arm 90 is fixed with the shaft 86 and extends downwardly therefrom to carry pin 100 resting in seat 102 of rock arm 104 pivotally mounted on the member 56. A spring 106 between the outer end of the rock arm 104 and lug 108, also fixed with member 56, releasably holds the pin 100 in the seat 102 to hold the shaft against any rotation other than predetermined and definitely driven and controlled. When the shaft is rocked by action of the trigger mechanism, the pin 100 is moved from seat 102 into seat 110 and the shaft is definitely held in the rocked position.

When the shaft 86 is rocked, the cam 92 bends spring finger 112 to engage and shift plunger 114 to close micro-switch 116.

The apparatus has lines 118, 119 extending thereto from a suitable power source, the line 118 extending directly to motor 120, while the line 119 extends through manually operable service switch 122' extending through the housing top 20, and thence to switch 116 mounted on the member 56, and from this switch to the motor 120. With the service switch closed, closing of switch 116 energizes the motor 120 and shaft 122 is rotated thereby through speed reduction transmission 124, herein shown as a speed reducing gear train.

The shaft 122 mounts trigger locking cam 126, which, during the initial movement of the shaft 122, contacts the lock insuring cam 94. If the thrust of the envelope against the trigger mechanism has been insufficient to throw the pin 100 from seat 102 into seat 110, the cam 126 in its action against cam 94 completes this operation by rocking shaft 86. Hence, the trigger is certain to be drawn clear from the shear line and so held until the shear is complete and the mechanism returns to its position of rest.

With the rocking of the shaft 86, the carrier reciprocating cams 96 are swung into the path of the motor driven coacting cams 128 in the form of a pair of rollers. Further rotation of the shaft 122 following the trigger lock, brings these rollers 128 into contact with the cams 96 and forces the frame 54 downwardly to carry the knife 60 into cutting operation with the blade 44. The cams 96 traveling in a vertical line and the rollers 128 swinging through a circle, the rollers 128 ride off the cams 96 at the lower position of the frame 54 following the shear, and the springs 72 immediately lift the frame to starting or up position.

As the shaft 86 travels upward with the frame and just before it reaches its uppermost position, the reset cams 98 engage spring fingers 130 carried from the side plates 14, 16. This causes the shaft 86 to be rocked back to its original position, thereby releasing the switch cam 92 from the finger 112 which springs outwardly from the plunger 114 to open the switch 116. The motor 120 stops. The cams have all assumed their original relative positions. Counterweights 132 adjustable as to the transmission, bring the parts to rest at their same stations following each cycle of operation. The cams 96 have oppositely extending fingers 134 which normally lie in the path of the cams 128 and should the cams 96 fail to be engaged on the first rotation of the shaft 122, these fingers 134 will be shifted to positively throw the cams 96 into the operating path where they will be engaged by the succeeding revolution of the rollers. This provides a double check in insuring full operation of the shaft 86 before the shear operation, thus protecting the cutting elements against possible injury through contact with the trigger mechanism.

At the start of the shear, the skirt 62 determines the proper positioning of the envelope and as the knife progresses along the cut, the plate portions 64 continue to serve as an abutment for the envelope.

The inclined chute 38 feeds the envelopes on an angle so that the cut therefrom leaves the opposing faces of the envelope uneven as an aid to separation for access to the contents. The shearings are collected in a suitable pan-like receptacle 136, accessible for removal and emptying through the door 30.

An extensible rack 138 may have a slip mounting with the floor 12 to provide a storage space for cut or untrimmed items.

It is to be understood that the above detailed description of the present invention is intended to disclose an embodiment thereof to those skilled in the art, but that the invention is not to be construed as limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of being practiced and carried out in various ways without departing from the spirit of the invention. The language used in the specification relating to the operation and function of the elements of the invention is employed for purposes of description and not of limitation, and it is not intended to limit the scope of the following claims beyond the requirements of the prior art.

What is claimed and is desired to secure by United States Letters Patent:

1. In an envelope opener a frame providing a pair of opposed vertically disposed slideways having a horizontally disposed cross-portion therebetween, a carrier reciprocably mounted in said slideways, means for reciprocating said carrier including a motor, a switch for controlling said motor mounted on said carrier, a first cutting element mounted on said cross-portion,

a second cutting element mounted on said carrier for cooperating with said first cutter element during the reciprocation of said carrier to shear an envelope disposed therebetween, a rock shaft carried by said carrier spaced from said cutter elements, a trigger disposed between said cutter elements to be engaged and shifted by the envelope to be sheared as said envelope is being positioned between said cutting elements, linkage between said trigger and said rock shaft for rotating said shaft in response to trigger movement, means co-acting between said shaft and carrier to resiliently hold said shaft in increments of rotation about its axis, and means on said shaft for operating said switch at a predetermined selection of the increments of rotation.

2. In an envelope opener of the class described, a frame including a base with a pair of opposed vertical slideways upwardly extending therefrom having a cross-portion therebetween, a carrier reciprocably mounted in said slideways, a first cutting element mounted on said cross-portion, a second cutter element mounted on said carrier for cooperating with said first cutter element during the reciprocation of said carrier to shear an envelope deposited therebetween, a rock shaft carried by said carrier spaced from said cutter elements, a first cam on said rock shaft, means for reciprocating said carrier including a motor mounted on the base, a control circuit for said motor, a shaft rotatable by said motor, said shaft being mounted by said frame

in substantial parallelism as to the rock shaft, a driving cam on said shaft, a trigger disposed between said cutter elements to be engaged and shifted by the envelope to be sheared as said envelope is being deposited in shearing position, linkage between said trigger and the rock shaft to rotate said rock shaft as the trigger is shifted, said rock shaft thereby moving the first cam into the path of the driving cam on said motor driven shaft, and an open switch on said carrier closed by the movement of the rock shaft, said switch being in said control circuit for the motor the closing of said switch thereby energizing said motor to cause the reciprocation of the knife carriage.

3. The structure set forth in claim 1 wherein said switch control comprises a second cam on said rock shaft.

4. The structure set forth in claim 1 wherein a third cam is mounted on said rock shaft to be engaged by said drive cam to rock said shaft independently of the trigger control linkage.

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