

(No Model.)

3 Sheets—Sheet 1.

D. M. LESTER.
ENVELOPE MACHINE.

No. 394,586.

Patented Dec. 18, 1888.

Fig. 1.

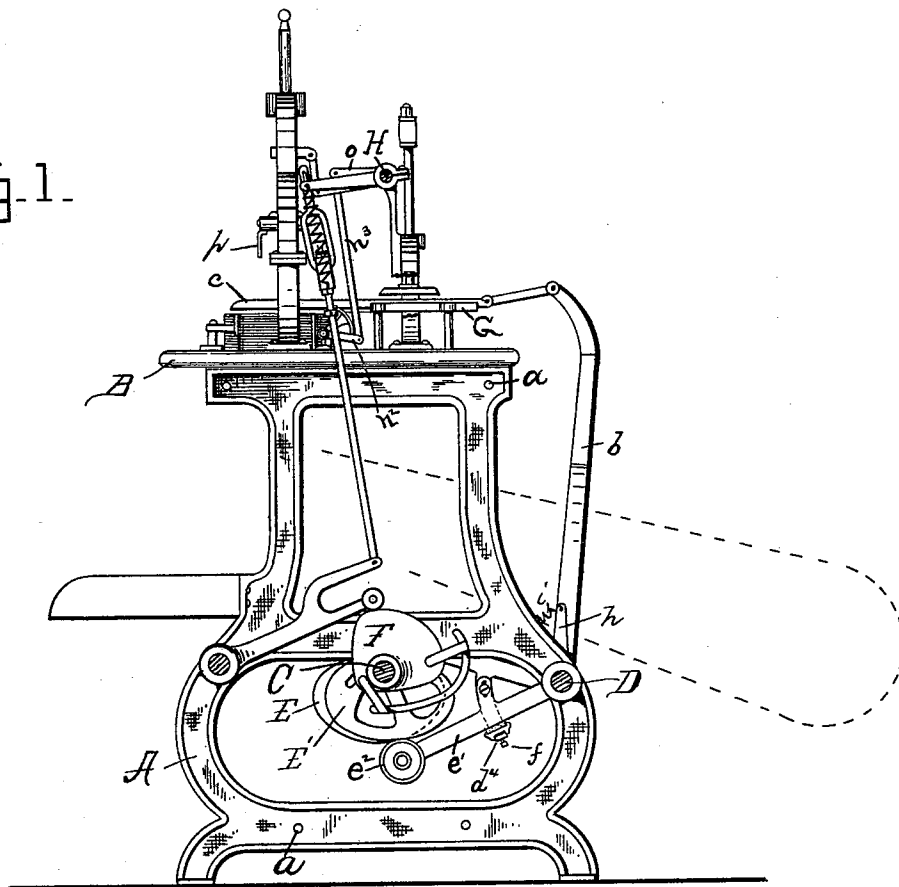
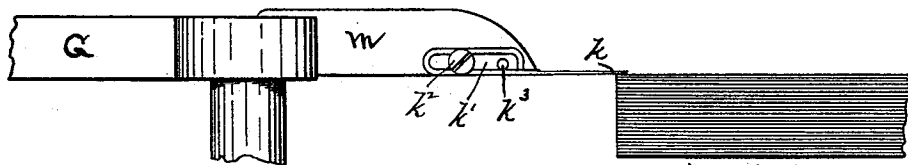


Fig. 2.



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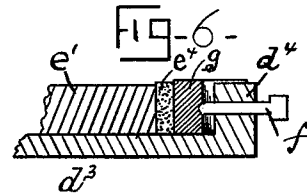
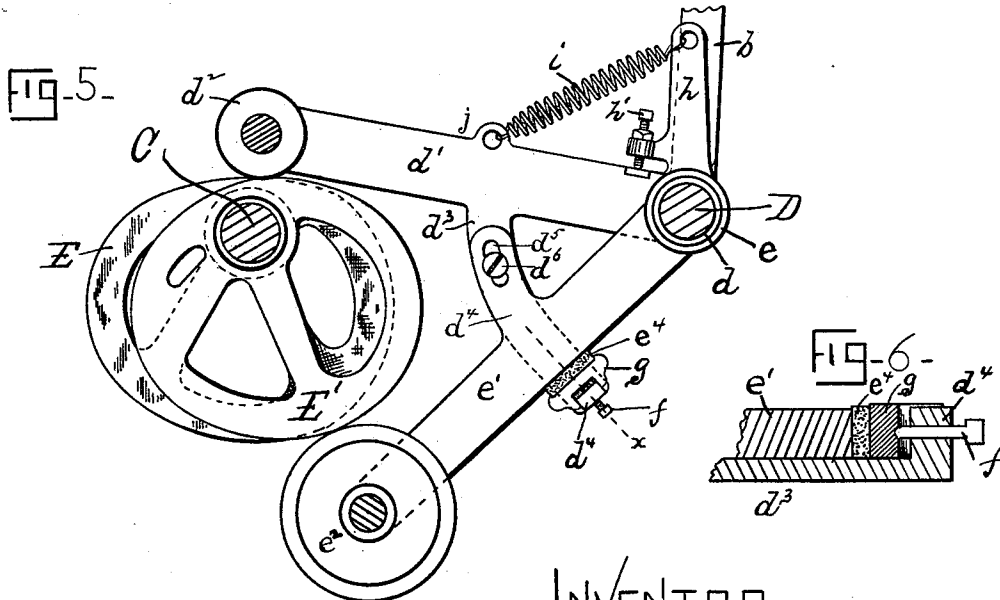
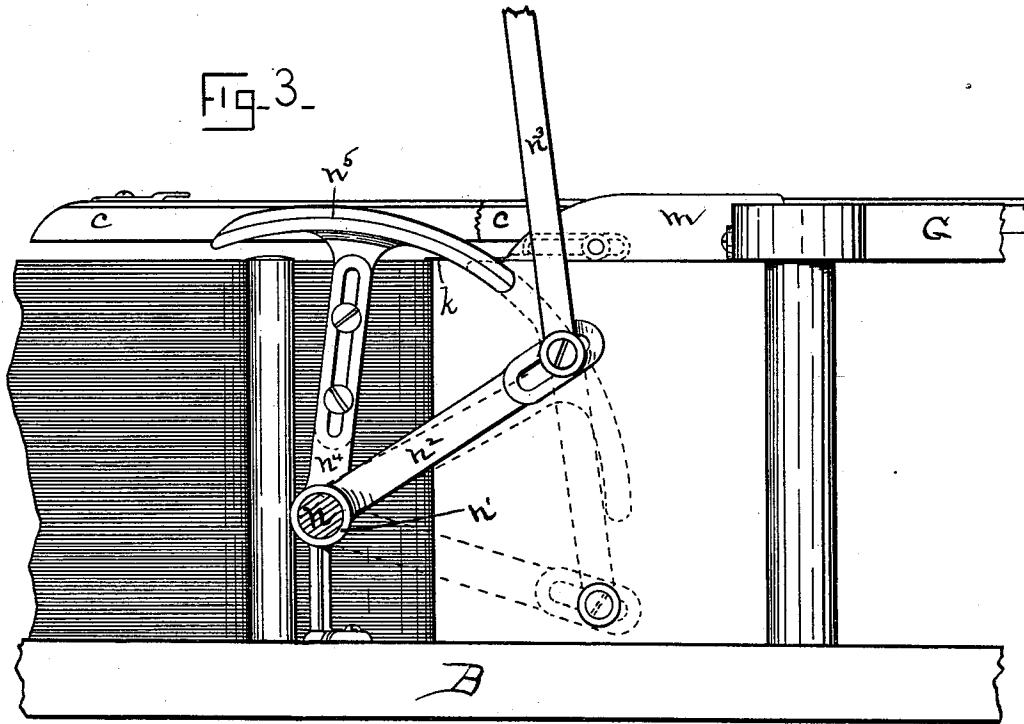
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3 Sheets—Sheet 3.

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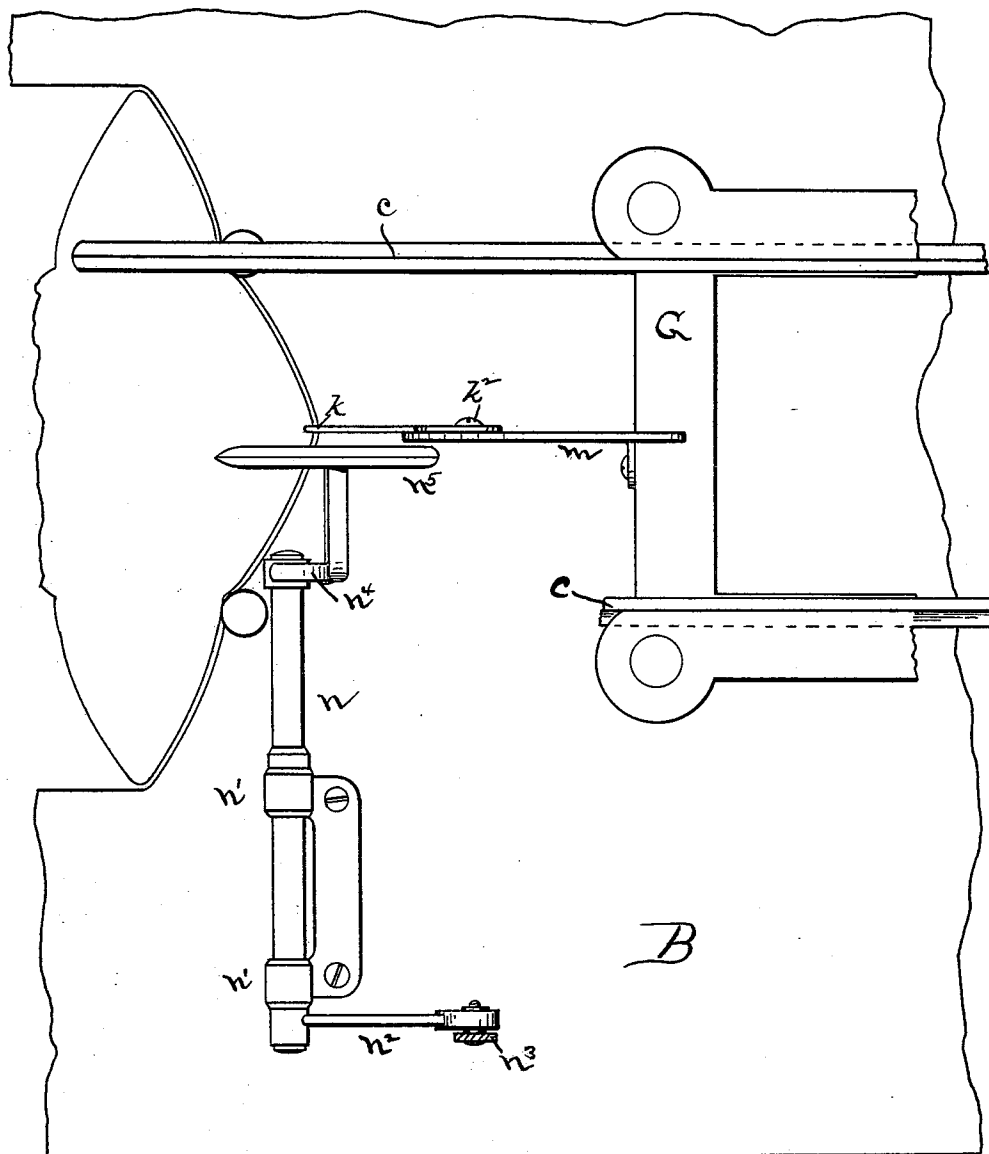


Fig-4-

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UNITED STATES PATENT OFFICE.

DANIEL M. LESTER, OF NORWICH, CONNECTICUT.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 394,586, dated December 18, 1888.

Application filed December 12, 1887. Serial No. 257,713. (No model.)

To all whom it may concern:

Be it known that I, DANIEL M. LESTER, a citizen of the United States, and a resident of the city of Norwich, county of New London, and State of Connecticut, have invented certain new and useful Improvements in Envelope-Machines, which improvements are fully set forth and described in the following specification, reference being had to the accompanying four sheets of drawings.

My said invention is in the class of machines that gum, pick up, carry, and fold envelope-blanks automatically; and my immediate object is, first, to provide a simple form of blank-separator; second, to provide a device for supporting and guiding the central portion of the blanks while they are in transit from the pile of blanks to the folders, and, third, to combine with the carrier mechanism an improved form of cam, by means of which I am able to increase the speed of such machines without fear of breaking or injuring the same. Each of said improvements is described in detail hereinafter, and is fully illustrated in the annexed drawings, in which—

Figure 1 is a side elevation of an envelope-machine frame, having in operative positions therein such portions of the picker and carrier mechanisms as are necessary to explain my said improvements. Fig. 2 is an enlarged detached view (reverse of Fig. 1) of the plate *m*, which guides the blank as it is moved toward the folders, and also shows my new separator. In Fig. 3 I have shown the pile of blanks, the separator, guide-plate *m*, a portion of the folder-die, and my new rocking device for supporting the blanks as they are carried one by one to the folder die-plate. Fig. 4 is a top or plan view of a portion of the table B, showing in position the pile of blanks, the carriers which convey said blanks to the folders, and my said rocking blank-supporter. Fig. 5 is an enlarged detached view of the cam which I employ to actuate the carrier mechanism of my machine. Fig. 6 is an enlarged sectional view taken on line *x* of Fig. 5, and illustrates the means employed to cushion the engaging portions of arms *d'* *e'*, as hereinafter described.

The supporting-frame in machines of this class consists commonly of a pair of uprights, A secured together and stiffened by girders

or tie-bolts *a*, and supporting a table, B, on or in which the gumming, feeding, and folding devices are located. Hung in bearings in said frame, below table B, is a shaft, C, which carries with it as it rotates a series of cams, so shaped and so timed relative to each other that they may move the said gumming, feeding, and folding mechanisms. When driven at a slow or moderate rate of speed, plain cams, of ordinary construction, may be used, the forks or levers which engage said cams being held in engagement with the edge of the cams by gravity or by springs; but when it is desired to speed up the machine it becomes unwise and in fact unsafe to depend on gravity or on springs, as they fail at times to hold the cams and their actuated parts in close engagement. This is especially objectionable in the case of the cam which actuates the mechanism by which the blanks are transferred from the pile, commonly known as the "carriers." To remedy this defect, I have substituted for the simple carrier-cam so long used one which acts positively in all positions to actuate its engaging lever-arm. I have illustrated and claimed said improved cam in this present specification only as applied to actuate the carrier mechanism of an envelope-machine; but the same movement may be advantageously used as an element of various classes of machinery; and I therefore have filed a separate application for patent, describing said cam and its necessary attachments, said application having been filed May 31, 1888, Serial No. 275,670.

Referring to Figs. 1 and 5, letter D indicates a shaft hung in frames A, having journaled thereon an arm, *b*, which projects upward in the rear of table B, and is connected at its free end with horizontal bars *c*, which serve to receive the blanks one at a time from the picker and carry them to a position over the folding mechanism.

Fitted loosely on shaft D is a collar, *d*, having an integral arm, *d'*, projecting toward shaft C, and having in or on its free end a roll, *d*². *e* indicates a collar bored to fit loosely on the loose collar *d*, above referred to. This collar *e* has an integral arm, *e'*, corresponding to arm *d'* and projecting at an acute angle to it. Arm *e'* carries at its free end a roll, *e*².

Arms *d'* *e'* are held in approximately the

same positions relative to each other by an arm, d^3 , which extends from arm d' past arm e' , and is provided with an upturned end, d^4 , to receive a set-screw, f . Between the upturned end of arm d^3 and the confronting edge of arm e' is a packing, e^4 , of rubber or similar yielding material, and also a block, g , which forms a gib against which the set-screw f may act. Arm e' has, preferably, a short arm, d^4 , projecting laterally over the arm d^3 , above referred to, and corresponding with said arm d^3 in curvature. Near the free end of said arm d^4 is a slot, d^5 , through which passes a screw, d^6 , that is tapped into the arm d^3 . The screw d^6 is not screwed home to clamp rigidly together the arms d^3 and d^4 , but simply serves to hold the main arms d' and e' at all times in the same plane, and thus prevent the rolls d^2 and e^2 from leaving the faces of their respective cams. When in use, the packing e^4 serves to relieve the rigidity which would naturally accompany a lever in which the arms d' and e' were integral with each other, and also acts to hold the rolls d^2 and e^2 in constant engagement with their respective cams, even if said cams or rolls were somewhat worn. Clamped fixedly to shaft D is an arm, h , whose free end is connected with arm d' by a spiral spring, i , arm d' being formed with an eye, j , for the purpose.

A convenient means of adjustment of spring i is provided in screw h' , which passes through a lug on arm h and engages a corresponding lug on arm d' . Under this provision the spring may be attached in its closed position with little effort and afterward strained to the desired degree by means of screw h' . As the arms d' and e' are moved by the duplex cam described in the following paragraph, they carry with them the spring-connected arm h , and thus rock the shaft D, to which said arm h is clamped.

Located on shaft C is a compound cam, whose sections E and E' are offset and overlap each other, being of such shape and size that they may engage, respectively, the rolls d^2 and e^2 , and each remain in such engagement throughout a complete revolution of shaft C, with which the said compound cam rotates. One section, E, of said cam acts to lift the arms d' and e' , and thus rock arm h and shaft D. The companion cam E' serves to move said rocking parts in the opposite direction.

When in use, if a blank should fail to feed properly and should become crumpled up in the path of the carriers the spring i would yield and the arm b and the carrier-bars c remain stationary, the compound cam meanwhile rotating and arms d' and e' oscillating without damage to the other parts of the machine.

Another feature of my invention consists of a simple form of blank-separator. This separator is formed of a single piece of spring-wire, one of whose ends k bears on the flap of the top blank and is reduced in thickness to give it the necessary elasticity, the opposite end being bent backward parallel with

said reduced portion to form a slot, k' , through which a binding-screw, k^2 , may pass, and by means of which (slot and screw) said separator may be readily adjusted. To prevent the displacement of said separator when a blank is removed from under its spring end, I provide, preferably, a fixed stud or pin, k^3 , whose perimeter is in the same horizontal plane as that of the binding-screw k^2 . The separator thus formed and supported is secured to one side of a plate, m , attached to the die-plate G, through which the blanks pass to the folders. This plate m is beveled or curved from its free end upward, so that the center of a blank as it is carried toward the die-plate G may gradually but certainly be raised to a level with said die-plate.

The spring-separator above described is not intended to take the place or perform the work of separators placed at the several corners of the pile of blanks, as shown in my patent, No. 221,835, of November 18, 1879, but is provided as an extra precaution to prevent the accidental displacement of the top blank.

A third and very important feature of my invention is a device for raising and supporting the center of the blanks as they are lifted one at a time from the pile and deposited on the carriers c . In working large blanks, especially those for making open-end envelopes, the center of the sheet naturally sags, and occasionally, when moved at high speed, does not rise readily on plate m , but catches on the end of said plate, resulting in loss of time and stock and possible damage to the machine. The device which I have now provided to overcome this annoying difficulty consists of a supporter formed, preferably, as an arc of a circle, which operates in unison with the pickers and passes under and supports the center of the blank as soon as said blank is raised from the pile. As said blank passes to the die-plate G and the pickers begin to descend, said supporter is moved out of the path of the pickers until the blank is lifted from the pile, when it (the supporter) immediately moves forward and upward beneath it.

Referring again to the drawings, n indicates a rock-shaft supported in bearings n' , secured to the bed of the machine, and having a radial arm, n^2 , whose free end is connected by rod n^3 with a similar arm, o , secured to the rock-shaft H, which also actuates the pickers p . On the inner end of shaft n is an arm, n^4 , to which is adjustably secured my arc-shaped supporter n^5 , above referred to. That portion of the supporter n^5 which engages the paper is preferably brought to an edge, so as to offer little resistance to the paper as it is carried along over it.

The pickers and my new supporter must work in unison—that is to say, when the pickers come down for a blank the supporter must recede out of their way, and when the pickers rise with a blank said supporter must immediately follow and take its position under said

raised blank; hence, by operating these two mechanisms from the same rock-shaft, H, I have found it a comparatively simple matter to time them correctly relatively to each other.

5 I claim as my invention—

1. In combination with mechanism, substantially as described, for carrying envelope-blanks to the folders, a rock-shaft connected to said carrier mechanism, as herein set forth, 10 a continuously-rotating shaft adjacent to said rock-shaft carrying a duplex cam formed of two offset overlapping sections, a pair of lever-arms loosely pivoted on said rock-shaft and carrying at their free ends rolls that en- 15 gage the perimeter of said cam, an arm fixed on said rock-shaft, and a spring connecting said fixed arm and the forked lever-arm, all being substantially as and for the object specified.

20 2. A separator formed of a single piece of spring-wire bent back upon itself, as described, and reduced in thickness at its free

end, in combination with plate *m* and a binding-screw for securing said separator to said plate, substantially as herein described, and 25 for the purpose specified.

3. In combination with mechanism, substantially as described, for picking up envelope-blanks, and mechanism, substantially as set forth, for carrying the same to folding 30 devices, a rock-shaft located adjacent to the pile of blanks having secured thereto a radial arm with curved crank-supporter, as set forth, for raising and supporting the center of a blank while in transit to the folders, and 35 mechanism, substantially as described, for actuating said rock-shaft and its connected parts, in the manner and for the purpose specified.

DANIEL M. LESTER.

Witnesses:

JONATHAN W. HOOKER,
FRANK H. ALLEN.