U. C. DAVIS.

FEED DEVICE FOR ENVELOPE MACHINES.

APPLICATION FILED DEC. 30, 1902.

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4 SHEETS—SHEET 1.
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To all whom it may concern:

Be it known that I, Ulysses C. Davis, a citizen of the United States, and a resident of Pittsfield, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Feed Devices for Envelop-Machines, of which the following is a specification.

My invention relates to the class of machines in which envelop-blanks are gummed and folded into an envelop; and the object of my invention is to improve machines of this class, so that they may be run at a much higher speed than heretofore, thus increasing the capacity; and a further object is to simplify the construction of such machines and reduce the number of parts that constitute the machine as a whole; and a further object is to improve the quality of the work turned out by the machines.

A form of machine in the use of which the above objects may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a view in front elevation of a portion of an envelop-machine embodying my invention with parts broken away to show construction. Fig. 2 is a top or plan view of a portion of an envelop-machine embodying my invention. Fig. 3 is a detail top or plan view showing the carrier. Fig. 4 is a detail view, on enlarged scale, showing the elevator-operating mechanism. Fig. 5 is a detail view, on enlarged scale, showing the trip of the elevator mechanism. Fig. 6 is a detail face view, on enlarged scale, of the ratchet-clutch. Fig. 7 is a detail view, in side elevation, of the plunger and its mount. Fig. 8 is a detail view, on enlarged scale, showing the connection between the plunger-lever and its operating-cam. Fig. 9 is a detail view, on enlarged scale, showing the construction of the connecting-rod between the ratchet-operating lever and the picker-slide lever, the lower end of the rod being broken away. Fig. 10 is a view in central longitudinal section through said rod. Fig. 11 is a detail side view of the clutch-collar, showing the method of securing the clutch thereto.

My improvement relates more especially to the devices for delivering the envelop-blanks to the mechanism for gumming, folding, and sticking the blanks, thus producing an envelop, these improvements having been applied to a machine of well-known construction, and only so much of the machine as is required to clearly illustrate my invention has been illustrated in the drawings, the omitted parts of the machine being well understood by those skilled in the construction and operation of machines of this class.

In the accompanying drawings the numeral 1 indicates the legs or standards, 2 a table supported on the standards, and 3 a strut for securing the rigidity of the frame composed of the standards and table. A cam-shaft 4 is mounted in the standards near the lower part thereof, and this cam-shaft may be driven from any suitable source of power, as by a belt passing over pulleys secured to the shaft, the belt and pulleys not being shown. The standards and table may be constructed of any suitable material, as iron east to shape.

A plate 5 is mounted on posts 6, rising from the table 2, and on this plate a gumming mechanism is supported, this consisting of a box 7 for the reception of mucilage or like gum, in which a distributing-roll 8 is mounted and turned, as by means of a belt passing over a pulley 9, secured to the shaft 10, the latter being secured to this distributing-roll, also a gum-roll 11, mounted in bearings 12, supported on the arms 13, secured to the rock-shaft 14. This rock-shaft is mounted in bearings on a yoke 15, located on the table 2, this shaft being rocked as by means of a rod 16 in engagement with a cam on the cam-shaft, the cam and greater portion of the rod not being shown.

A picker-slide 17 is mounted in the yoke 15 and has on its lower end pickers 18, adapted to pass through openings in the plate 5. The picker-slide has a link connection with a picker-slide lever 19, pivoted on a standard 20, supported on the table 2. This lever consists of two sections secured to a shaft, one section of the lever being connected, as by means of the link, with the picker-slide 17 and the other section of the lever being connected, as by a connecting-rod 21, with a cam on the cam-shaft. A carrier is mounted on carrier-supports 22, which consist of posts secured to the table 2 by means of outturned feet, these posts supporting guideways 23, in which the car-
rier is mounted to have a reciprocating sliding movement. This carrier consists of the side parts 24, the forward ends of which bear fingers 25, adapted to slide under an enveloping blank and to retain it, the blank being held under projections at the back of the fingers and between the back edge of the fingers and the edge of the holders 26. The carrier is reciprocated, as by means of a carrier-lever 27, rigidly secured to a rocker-shaft 28, supported on the frame of the machine and actuated, as by means of an arm 29, extending to the cam-shaft on the machine and connected with a cam thereon. As the rocker-shaft is given a reciprocating turning movement the upper end of the lever is carried forward and backward, thus reciprocating the carrier in a manner common to machines of this class.

An envelop-opening 30 is formed between the upper end of the rocker-shaft and extends downward through the table 2. Folders 31 are arranged about this opening, the latter being of rectangular form, and a folder being located at each of the four sides of the opening.

Folder-shafts 32 are suitably supported in bearings secured to the under side of the table 2, these shafts being arranged in the form of a rectangle and having a rocking motion imparted thereto, as by means of a rod 33, passing downward and operated by cams 34 on the cam-shaft.

A bottom plunger 35 is mounted on a rod 36, having a reciprocating movement in a bearing on the strut 3. This rod is reciprocated as by means of a cam 37 on the cam-shaft. The plunger is of corresponding shape and size as that of the envelop-opening 30 through the table, the plunger being adapted to fit quite closely within this opening at certain times, but having a free movement therein.

All of the parts above described form no part of my invention, except, possibly, in combination, said parts operating, however, in connection with the mechanism forming my invention and hereinafter specifically described. For this reason a brief description only has been given of the above-described mechanism; but its operation and construction will be readily understood by those skilled in the art from the brief description in connection with the drawings filed herewith.

An elevator 38 is arranged to hold a pile of envelop-blanks 39. This elevator is supported from a spindle 40 and is of dovetailed shape and has a sliding movement in grooves in the bracket 41. This bracket is secured to the under side of the table 2. Feed mechanism for the elevator includes a lifting-shaft 42, which is mounted in the bracket 41, and this shaft supports a ratchet-wheel 43, a sprocket-wheel 44, and a hand-wheel 45. The ratchet-wheel 43 is secured to the shaft, as by a key or the like, as is also the hand-wheel 45; but the sprocket-wheel 44 is free to rotate on the shaft. A rocking arm 46 is mounted on the shaft 42, and a connecting-rod 47 connects this rocking arm with the picker-slide lever 19. A pawl 48 is pivoted to the arm and engages the teeth on the ratchet-wheel 43. A chain 49 is secured at one end to the sprocket-wheel 44 and at the other end to a lug 50 on the elevator-shaft 40.

The lifting-shaft 42 is formed with a central opening for a portion of its length, as shown in Fig. 4 of the drawings. A slot 51 is formed through the shaft, and a clutch 52 extends through and has a movement lengthwise of the slot 51. This clutch is provided with teeth on its face adapted to engage the teeth 53 on the hub of the sprocket-wheel 44, the engagement of the teeth on the several parts locking together the shaft and the sprocket-wheel and causing the same to rotate simultaneously. The clutch 52 is secured to a collar 54, mounted and having a sliding movement on the lifting-shaft 42. A groove is formed in the face of this collar 54, extending, preferably, across the face, as shown in Fig. 6, and a clutch part 52 is secured within this groove. A clutch-rod 55 is secured at one end to the clutch 52, this rod being located in the central opening in the shaft. A spring 56 is also located in the central opening in the shaft and presses with one end against a shoulder on the rod, the opposite end of the spring resting against a shoulder in the central opening of the shaft.

A trip-lever 57 is pivoted to the bracket 41, one end of this lever being located in the path of movement of a trip-pin 58, located on the slide 40, and the other arm of the lever is located in position to be interposed behind the collar 54 and hold the clutch in engagement with the sprocket 44.

The connecting-rod 47 has a slot a, in which a guide-pin b from the picker-slide lever 19 is located. A lip c is formed on the rod 47, and this lip bears a stop d. This stop is of the form shown consists of a screw threaded into the lip c and having a set-nut e for holding it in place. By means of this stop the point at which the connecting-rod 47 will be struck by the picker-slide lever 19 is determined, and the amount of longitudinal movement given to the connecting-rod may be thus varied, the pin b fitting loosely in the slot a, so that the picker-slide lever 19 may have a certain movement independent of the connectingrod 47.

The blanks operated upon by a machine of the class herein described usually have that part of the blank which is to form the flap of the completed envelop supplied with gum, and the edge of the pile containing this portion of the blank is therefore somewhat thicker than the opposite edge which is operated upon by the pickers. The thickness of the flap portion of the blank, as also the blank itself, may vary in the succeeding piles.
placed upon the elevator, and in order to
compensate for this difference in thickness
and allow the elevator the proper amount of
feed in each instance, the loose connection
and adjustment of the rod 47 with the picker-
slide lever 19 is provided. This construction
affords means whereby the extent of throw of
the lever may be increased or decreased to
cause a faster or slower feed that may be re-
quired to present the envelop to the pickers
at the proper rate.

A plunger-support 59 is mounted on the
top of the table 2, the base being secured near
one side of the table. The support extends
upward and toward the center of the table,
terminating in a head 60, located over the en-
velop-opening 50 through the table. A plun-
ger-slide 61 is located and has a reciprocating
movement in the head 60, a plunger 62 being
secured to the lower end of the slide. A link
63 connects the upper end of the slide with a
plunger-lever 64, that is pivoted in an open-
ing in the support 59. To the opposite end
of this lever is secured a connecting-rod 65,
the lower end being in engagement with a
cam 66, located on the cam-shaft and by
means of which the rod, and consequently
the plunger, is operated.

The connecting-rod 65 has a yielding con-
nection with the plunger-lever 64. This is
obtained by means of a socket-piece 67, which
is pivoted to the plunger-lever 64 and
within which the end of the rod 65 extends,
this end of the rod being preferably smaller
in diameter than the main part. This socket-
piece 67 has a slot 68, in which a pin 69 is lo-
cated, this pin projecting into or through the
end of the connecting-rod 65. A recessed
nut 70 is secured to the enlarged portion of
the rod 65, as by means of interengaging
screw-threads, and between this nut and the
end of the socket-piece 67 a tension-spring 71
is located. A spring 72 is secured to the pin
69 and to the strut 3 and serves to hold the
lever downward against its operating-cam.

In the operation of the device the blanks
are fed upward by the elevator feed mechan-
ism, as hereinbefore described, to the pickers,
which successively remove the blanks from
the pile, carrying them upward against the
under surface of the plate 5. This plate re-
moves the blank from the pickers, which re-
treat upward, and at the same time the car-
rier mechanism is interposed underneath the
blank and receives it and delivers it to the
folding mechanism. The bottom plunger 35
and the plunger 62 are simultaneously moved
toward each other, the latter engaging the
envelop-blank and presenting it downward
through the opening 50, the several flaps of
the envelop projecting upward and lying on
the several sides of the plunger. The en-
velop is thus delivered to the bottom plunger
and located thereon. The plunger 62 is now
moved backward for an instant under the
operation of its cams, and the folders 31 op-
erate to press the flaps down in proper posi-
tion, that flap on which the gum has been
deposited being located on top and securing
all except the loose flap together. The plun-
erg is then given another downward move-
ment to press the flaps firmly together. This
operation will be readily understood by those
skilled in the art.

In prior devices the connection between
the plunger and its operating-cams has been
such that the plunger is operated by gravity,
and this final downward movement of the
plunger has been caused by a sudden drop in
the cam, which allowed the plunger to fall
quickly. This causes a hammering of the
machine and prevents its operation at high
speed, for the reason that the plunger cannot
act quickly enough at high speed to press the
flaps together before it is raised and, further,
for the reason of the objectionable hammer-
ing, which racks the machine. By my im-
provement it will be noted that this down-
ward movement of the plunger is caused by
a rise in the cam, so that the movement is
positive, and the machine can therefore be
run at any rate of speed. This means of
operating the plunger also avoids the objec-
tionable hammering present in prior machi-

When the elevator has reached such height
that the last blank is removed therefrom, the
trip-lever 57 is engaged by the pin 58 and
thrown out of engagement with the collar 54,
the latter being thrown backward under the
influence of the spring 56, so that the
sprocket-wheel 44 is free to rotate on its
shaft, and the elevator thus descends to its
lowest point in position to receive another
pile of blanks. When the new pile of blanks
has been placed on the elevator, the push-
button on the end of the clutch-rod 55 is
pushed inward, engaging the clutch parts,
and the trip-lever falls into position between
the collar, holding the parts in engagement.

What I claim as my invention, and desire
to secure by Letters Patent, is—
1. In an envelop-machine, in combination
with a carrier for delivering blanks to a
folder, an elevator, a picker for removing
blanks from the elevator and delivering them
to said carrier, means for operating the
picker, a lifting-shaft, lifting means loosely
mounted on the shaft and positively con-
ected with the elevator, a clutch to secure
the lifting means to rotate with the shaft,
means for releasing the clutch, and means
for operating the shaft.

2. In an envelop-machine, in combination
with a carrier for delivering blanks to a
folder, an elevator, a picker for removing
blanks from the elevator and delivering them
to said carrier, means for operating the
picker, a lifting-shaft, lifting means loosely
mounted on the shaft, a flexible member
positively connecting the elevator and lifting means, a clutch for securing the lifting means to rotate with the shaft, means for operating the clutch, and means for feeding the shaft.

5. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker for removing blanks from the elevator and delivering them to said carrier, means for operating the picker, a lifting-shaft, lifting means supported by the shaft and positively connected with the elevator, feed mechanism supported by the shaft, a clutch for securing the lifting means to rotate with the shaft, and means for operating the clutch.

4. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker for removing blanks from the elevator and delivering them to said carrier, means for the picker, a reciprocating picker-slide supported above the elevator, a lever for operating the picker-slide, a lifting-shaft, feed mechanism supported by the shaft, operative connections between said lever and shaft, a lifting device supported on the shaft and connected with the elevator, a clutch for securing the lifting means to rotate with the shaft, and means for operating the clutch.

3. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker for removing blanks from the elevator and delivering them to said carrier, means for operating the picker, a lifting-shaft, lifting means supported by the shaft and positively connected with the elevator, feed mechanism supported by the shaft, a clutch for securing the lifting means, and means for operating the clutch.

2. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker for removing blanks from the elevator and delivering them to said carrier, means for operating the picker, a lifting-shaft, lifting means supported by the shaft and positively connected with the elevator, feed mechanism supported by the shaft, a clutch for securing the lifting means to rotate with the shaft, and means for operating the clutch.

1. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker for removing blanks from the elevator and delivering them to said carrier, means for operating the picker, a lifting-shaft, lifting means supported by the shaft and positively connected with the elevator, feed mechanism supported by the shaft, a clutch for securing the lifting means, and means for operating the clutch.
nected to have a limited movement independent of the latter.

13. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker for removing blanks from the elevator and delivering them to said carrier, means for operating the picker, lifting-shaft operatively connected with the elevator, feed mechanism appurtenant to said shaft, a lever for operating the feed mechanism, and a rod connecting said lever and picker-operating means and adjustably connected with the latter to have a limited movement independent thereof.

14. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker for removing blanks from the elevator and delivering them to said carrier, a lever for operating the picker, a shaft operatively connected with the elevator, feed mechanism appurtenant to said shaft; a lever for operating the feed mechanism, a connecting-rod between said lever and the picker-operating lever and having a slot, a pin projecting through said slot into the picker-operating lever, and a stop mounted on the rod to engage the lever.

15. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker for removing blanks from the elevator and delivering them to said carrier, a lever for operating the picker, a shaft operatively connected with the elevator, feed mechanism appurtenant to the shaft, a lever for operating the feed mechanism, a connecting-rod extending between said lever and picker-operating lever and having a slot, a pin projecting through the slot into the picker-operating lever, and a stop located in a lip on the connecting-rod and underlying the picker-operating lever.

16. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, an elevator, a picker-slide located over the elevator for delivering blanks therefrom to said carrier, a lever for operating the slide, a lifting-shaft, lifting means supported by the shaft and operatively connected with the elevator, a feed mechanism appurtenant to said shaft, a connecting-rod extending between said lever and feed mechanism and having a slot and a lip, a pin projecting through the slot into the lever, and a stop adjustably mounted in said lip.

17. In an envelop-machine, in combination with a carrier for delivering blanks to a folder, mechanism for removing blanks from an elevator and delivering them to said carrier, means for operating said mechanism, the elevator, a shaft operatively connected with the elevator, a member loosely mounted on the shaft and having a clutch part, a collar mounted to slide on the shaft and having a dovetailed groove on one edge, a dovetailed-shaped guide projecting through slots in the shaft and secured in said groove and forming a clutch part, and a rod projecting into the shaft and secured to said guide.

Witnesses:

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