Feb. 17, 1953

R. H. PENLEY

ENVELOPE LOADER

2,628,465

Filed Dec. 8, 1949

4 Sheets-Sheet 1

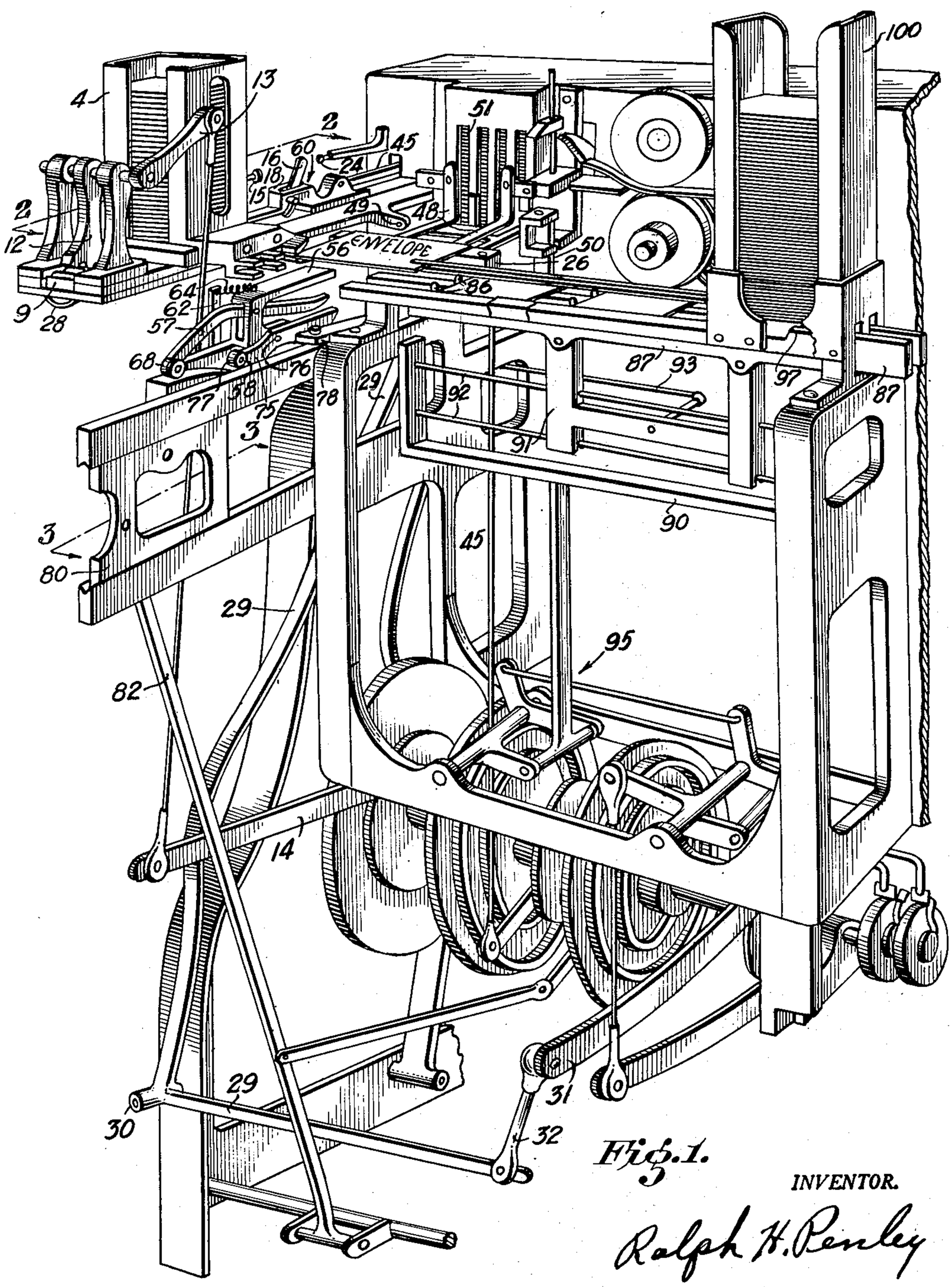

Fig. 1.

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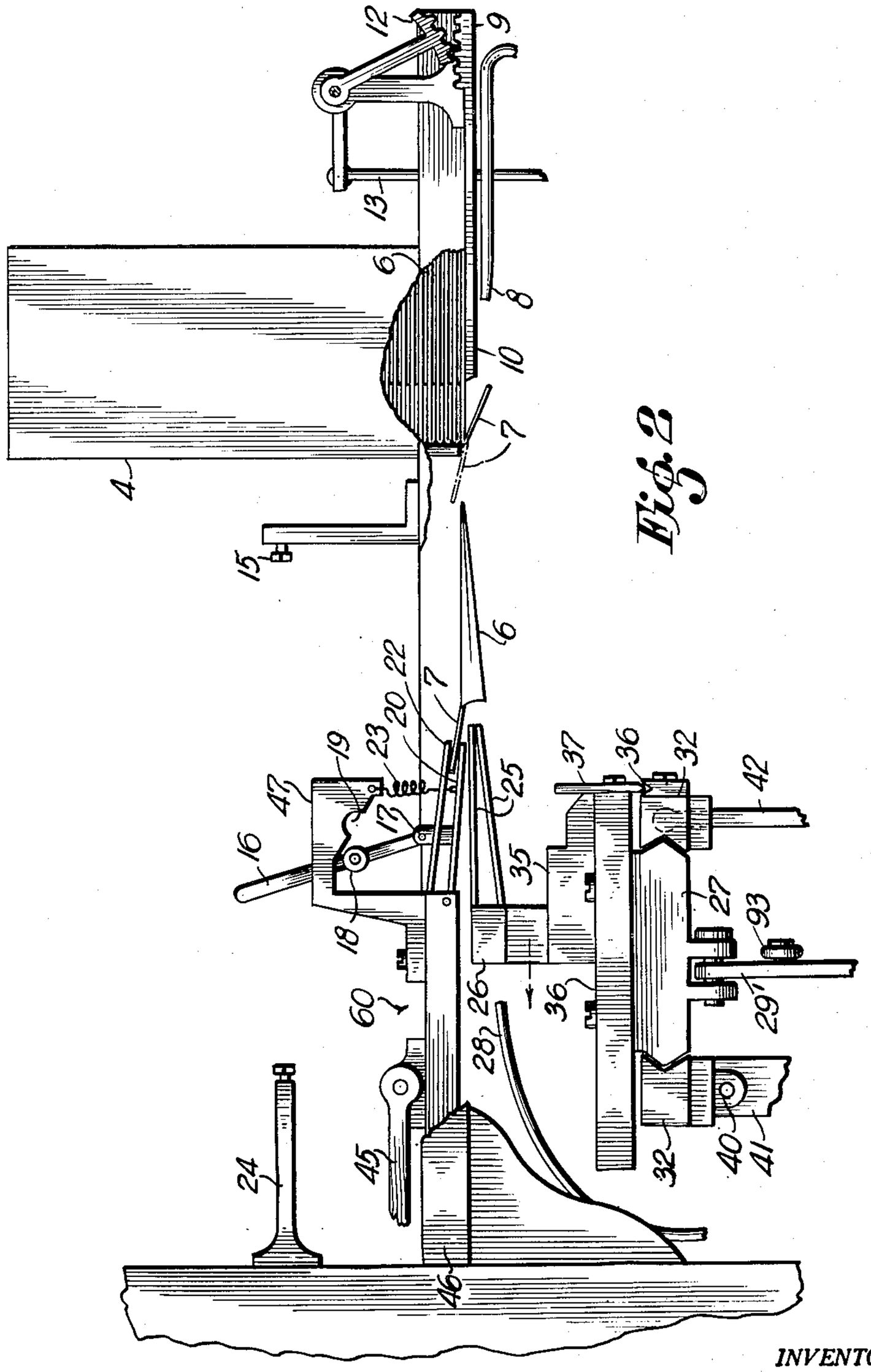

Fig. 2

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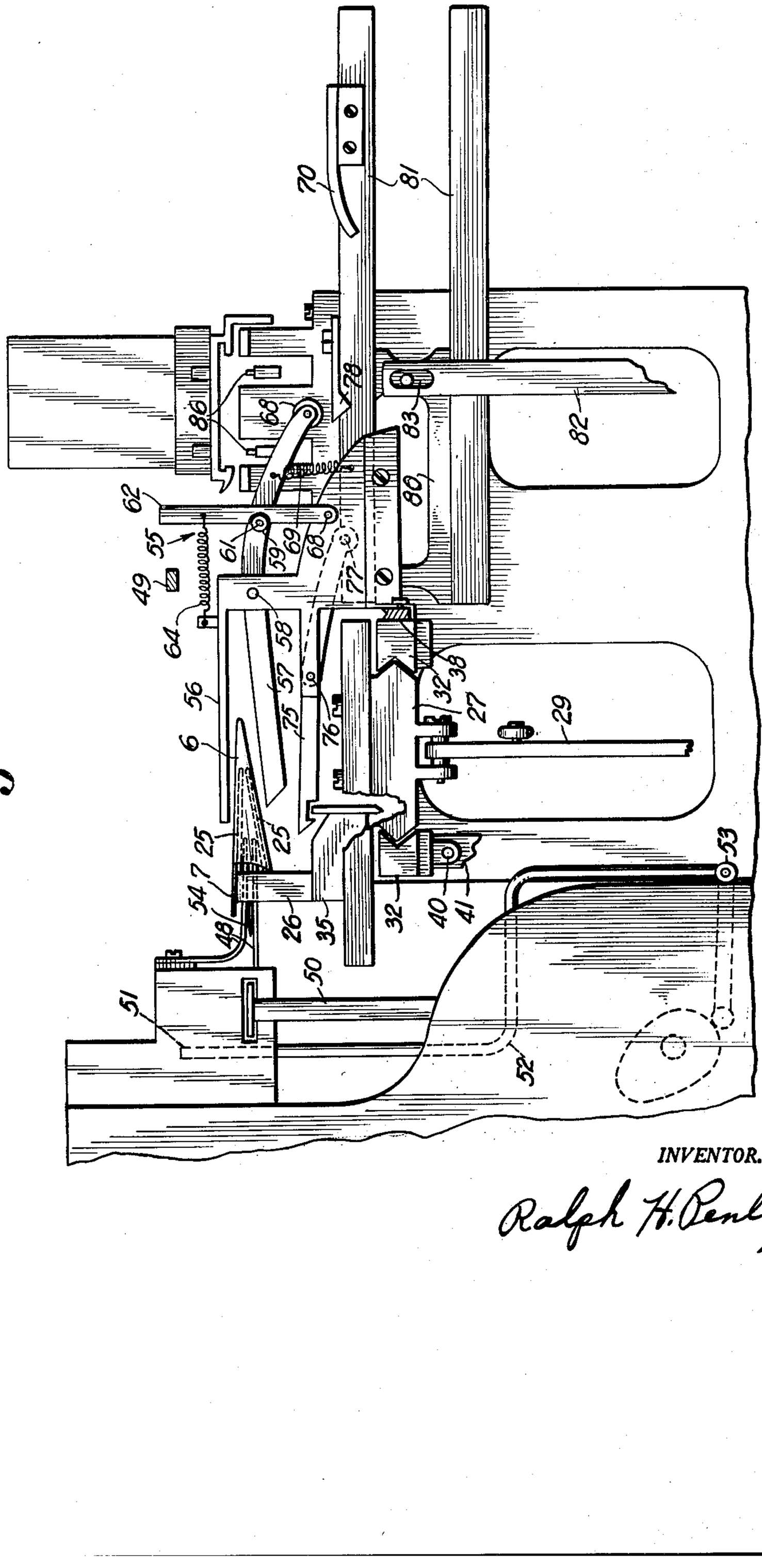

Fig. 3

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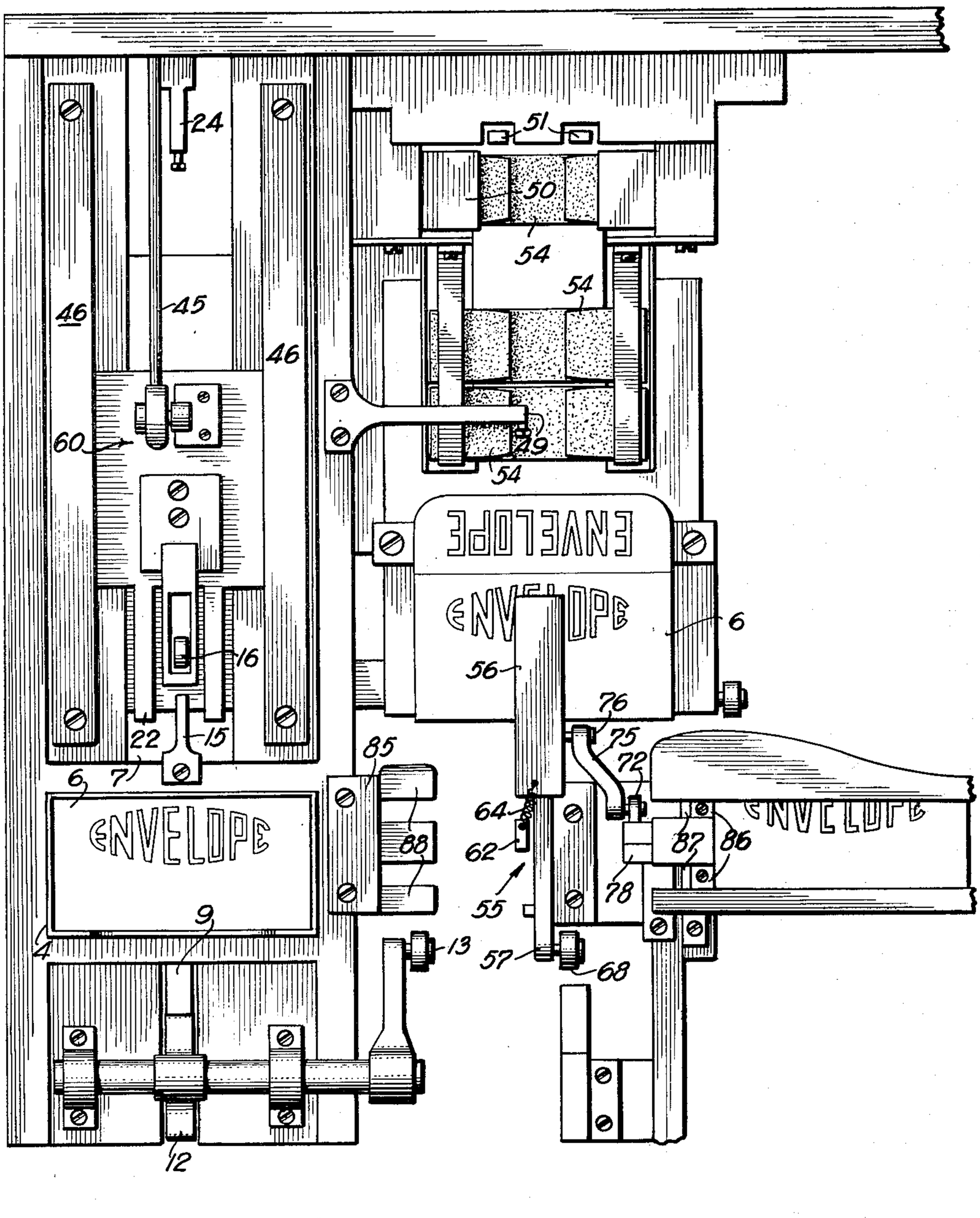

Fig. 4

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UNITED STATES PATENT OFFICE

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ENVELOPE LOADER

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Application December 8, 1949, Serial No. 131,710

6 Claims. (Cl. 53—136)

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This invention relates to an envelope loader for a packaging machine such as that disclosed in my application for patent S. N. 652,132, filed March 5, 1946, and now abandoned. In said application I have disclosed a machine for packaging powdered material in paper packets. The present invention is directed to an attachment which is especially adapted to place the paper packets of powdered material in envelopes, or in reality, to place envelopes, around said packets.

It is therefore an object of the present invention to provide a machine which is capable of selecting empty envelopes from a stack, opening said envelopes, surrounding the packets or other objects by said envelopes, closing said envelopes, and restacking the envelopes containing the packets or objects.

It is another object of the present invention to provide an automatic machine of the above specified type which is highly efficient, consists of a minimum of parts and is well adapted for the purposes for which it is intended.

A further object is to provide a machine as specified above which performs at a high rate of speed and is an excellent substitute for many man hours of work.

With the above and other objects in view the invention consists of the novel construction of parts as more fully set forth hereinafter. It is to be understood however, that the following is merely a description of a presently preferred embodiment of my invention and that this disclosure is not to be interpreted as limiting, but merely as descriptive and that modifications and alternatives of construction may be resorted to as fairly fall within the scope of the present invention as defined by the claims appended hereto.

Now turning to the accompanying drawings:

Figure 1 is a perspective view of my envelope loader as attached to my previously described packaging machine, a portion of said packaging machine appearing in the right background.

Figure 2 is an end elevation with parts broken away, taken substantially on a plane indicated by dashed line and arrows 2—2 on Figure 1.

Figure 3 is a sectional elevation with parts broken away, taken substantially on a plane indicated by dashed line 3—3 of Figure 1.

Figure 4 is a plan view of my machine with a portion of the final conveyor and the stacking magazine not shown.

Now, referring more specifically to the details of the drawings wherein like reference numerals indicate like parts, in Figures 1 and 2, numeral 4 indicates the empty envelope magazine containing envelopes 6 with flaps 7 extending from the edges of the envelopes. These envelopes are of a suitable type fashioned similarly to an ordinary

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stationery envelope and are placed in magazine 4 with flaps 7 on the lower left edge as viewed in Figure 2. An intermittently flowing jet of air from tube 8 is directed against flap 7 of the lowermost envelope 6 such that flap 7 assumes the full line position of Figure 2. Toothed sliding bar 9, having a beveled end 10 is operated by gear sector 12 which is rockably mounted and actuated by suitably timed cam means through arms and linkages 13, 14.

Sliding mechanism 60, slidably movable on tracks 46, is actuated by arm 45 and comprises arm 16 pivotally mounted at 17 on an upstanding arm carried by a pair of arms 20 which are pivotally mounted at 21 on the sliding mechanism. Arm 16 carries roller 18 which is adapted to releasably engage recess 19 in bracket member 47. Pivotal arms 20 are urged upwardly by spring 23 against the lower edge of a flap 7 which in turn bears against rigid arms 22. Lever 16 is tripped from right to left in Figure 2 by stop 15 when mechanism 60 moves to the extreme right position. This action occurs just as the ends of arms 20, 22 reach the opened flap 7 (represented by dashed lines in Figure 2), and arms 20 are allowed to move upwardly due to spring 23 to clamp flap 7 (roller 18 now having been disengaged from recess 19).

Mechanism 60 is now moved to the left in Figure 2, arms 20, 22 carrying an envelope 6 by flap 7. As the carried envelope approaches the plurality of prongs 25, carried by block 26, a timed jet of air from tube 28 aids gravity in opening the envelope such that said envelope will readily slip over prongs 25. Prongs 25 are raised slightly by 42 to a position adjacent prongs 20 in a manner to be described presently. As the assembly 60 approaches its extreme left position lever 16 is tripped from left to right such that 16, 17, 20 move downwardly until flap 7 is released and roller 18 rests in recess 19.

Block 26 is rigidly carried by a sliding assembly 35 which is slidable transversely in Figure 2 on tracks 36 and which is retained against sliding motion by guide 37 riding in track 38, until such time as it is desirable to have 35 move to the left in Figure 2. Thus, 25, 26, 35 would not be moved to the left in case of resistance to the passage of the envelope onto prongs 25.

The entire assembly 35—37 is mounted on block 27 which slides on tracks 32 extending rearwardly in Figures 2 and 3. The above described assembly is actuated by lever arm 29, said lever arm being pivotally mounted at 30 and connected to cam actuated arm 31 by linkage 32, said latter parts being more clearly shown in Figure 1. Lever arm 29 is slotted at its end 29' where it connects with block 27.

The aforementioned parts 26, 27, 32, 35—38 are pivoted as a unit at 40 on bracket 41. This assembly of parts is timely rocked by bar 42 about pivot 40. The pivotal movement of the assembly is not absolutely necessary, but is preferable as will now be described.

The entire assembly, including prongs 25, having been raised slightly to allow the envelope to slip freely over said prongs, is now lowered by bar 42 at which time lever arm 29 is actuated to slide block 27 rearwardly beneath mechanism 60 as seen in Figures 2 and 3. Block 35, tracks 36, stop 37 and arms 25 with the envelope are thus carried away from the observer in Figures 2 and 3.

Now turning to Figure 3 it is seen that the left edge of track 38 is cut away adjacent its distant end which allows 37 to be slipped to the left from said track. Also in Figures 3 and 4, element 50 is a tucking member adapted to fold the ends of the packets 54 inwardly in a manner more fully described in my copending application S. N. 652,132. After the ends of each packet 54 have been folded inwardly, arms 51 contact the packet 54 to slide said packet outwardly between spring arms 48. A predetermined plurality of packets, say two, for example, are forced between spring arms 48 in side-by-side relation, in nested relation or in a case where several packets are to be enveloped the packets may be both nested and side-by-side. Arms 51 are a continuation of, or are mounted on, lever 52 which is pivoted at 53 and is preferably cam actuated as seen clearly in Figure 3.

While the selected number of packets is being properly received between fingers 48 the assembly 26, 35, 36, 37, 27 is moved rearwardly in Figures 2 and 3 and thus prongs 25 along with the envelope are moved directly away from the observer. As the assembly reaches its rearmost position, i. e. a position in alignment with packets 54 as seen in Figures 4, guide 37 is no longer retained by track 38 since the inner edge of the latter is removed.

At this time the left end of lever 75, pivoted at 76 and carrying roller 77 at its right end as shown in Figure 3, engages guide 37 as the inverted cam 78 allows lever 75 to rotate counterclockwise due to its heavy left end.

Lever 75 is carried, along with the entire assembly 55, on a slide 80 moving on tracks 81 and actuated by rockably mounted lever 82, slotted at 83. As 80, 55, 76, 75 is moved to the left in Figure 3, 37, 35, 26, 25 and the opened envelope are likewise carried to the left. The envelope surrounds the plurality of packets with arms 48 holding the packets and protruding into the envelope.

As 55 moves to the left, rigid arm 56 goes above the envelope while 57, pivoted at 58 and carrying rollers 59 and 68 projects below the envelope. Roller 59 is presently releasably locked in recess 61 of lever 62, which is pivoted at 63. Lever 62 is spring urged counterclockwise by spring 64. As the entire assembly presently referred to approaches its extreme left position, lever 62 strikes stop 49 whereupon roller 59 is disengaged with recess 61 and spring 69 rotates lever 57 clockwise to grip the loaded envelope. Slide 80 and its associated parts now is returned to the right, the loaded envelope being held between fingers 56, 57 while 75 pulls 37, 35 back to its rightmost position, 75 then being disengaged as 77 strikes cam 78. (Lever 29 now returns 27, 35, 37, 26, 25 forward toward the observer to place 25 in position to receive another envelope from 20, 22.)

As fingers 56, 57 carry the loaded envelope rearwardly, roller 68 engages cam 70, rotates 57 counterclockwise, resets 59, 61 and releases the loaded envelope. Near the end of this stroke, just prior to the releasing of the envelope, said envelope's end slips into a guide retainer 85, seen in Figures 1 and 4, where it rests temporarily.

Now, looking at Figure 1 again there is seen a vertically floating framework 90 which carries 91 reciprocably mounted on guide rods 92. Sliding bars 87 are supported by 91 and bars 87 carry upward projections 86 in pairs throughout their length. Framework 90 is raised and lowered in properly timed motion by mechanism 95, which is believed to be adequately shown in Figure 1 and requires no description here since the operation thereof will be obvious to anyone skilled in the art. Rod 93 reciprocates frame 91, bars 87 and projections 86. In operation, mechanism 95 lowers the entire presently described assembly while 93 reciprocates 91, on bars 92, to the left in Figure 1. (Bar 93 is pivotally connected to arm 29 as seen in Figure 2.) The end set of projections 86 and the ends of bars 87 thus slip beneath the loaded envelope which is resting in retainer guide 85. Projections 86 rise in slots 88 of guide 85 just to the left of the end of the package. Rod 93 then reciprocates 91, 87, 86 to the right, thus moving the envelope one space to the right. With each successive movement, the envelope is progressed one space to the right until it reaches the loaded envelope magazine 100. The envelope is slipped under the stack of envelopes while such stack is held in a raised position due to stepped up portions 97 adjacent the right ends of bars 87.

A short summary of the operation of my machine will now be given. Empty envelope magazine 4 is filled with envelopes 6 having flaps 7 protruding from an edge thereof. A jet of air from tube 8 partially opens the flap of lowermost envelope 6, whereupon bar 9 moves to the left (see Figure 2), beveled end 10 pressing flap 7 fully open to the dotted line position. Mechanism 60 moves to the right until 16 strikes stop 15 releasing roller 18 from recess 19 and allowing spring 23 to lift arms 20 whereby flap 7 is clamped between 20 and 22. Mechanism 60 then moves to the left, carrying an envelope by its flap 7. As the envelope 7 approaches prongs 25, said arms 25 are raised slightly by rod 40 which indirectly supports the arms and a jet of air from tube 28 opens the envelope fully to allow the envelope to pass freely over 25. Lever 16 strikes stop 24 to re-set roller 18 in recess 19 and release flap 7 from arms 20, 22. With the envelope on prongs 25 it is to be understood that another envelope is being selected from magazine 4.

Lever arm 29 now moves block 27, tracks 36, sliding assembly 35, 37, block 26 and arms 25 with the envelope to the rear in Figures 2, 3. As the above mentioned parts recede to their limit, a break in track 38 allows guide 37 to become disengaged and lever 75 engages 37 to move sliding assembly 35, 37, along with arms 25 and the envelope, to the left. A plurality of packets has been forced between spring arms 48 by arms 51. As 35, 26, 25 and the envelope move to the left the packets 54 along with arms 48 are enveloped.

At this time lever 62 strikes stop 49 to disengage roller 59 and recess 61. Spring 69 urges 57 to clamping position with 56 to hold the loaded envelope. Slide 80 moves 56, 57, the loaded envelope, etc. to the right until the loaded envelope rests in retainer guide 85, whereupon roller 68 strikes cam 70 to release the envelope and reset

59, 61. (Slide 80 also returns 75, 37, 35 back to its right hand position such that 29 can slide 27, and parts carried thereby, forward to receive another envelope.)

As seen in Figues 1 and 4 the floating sliding mechanism 86—93 moves to the left under the loaded envelope, raises, moves to the right carrying the envelope, lowers and again moves to the left under the next envelope. As each envelope is moved into magazine 100 from the bottom, the stack is held up by raised portions 97 on the right ends of bars 87 until the new envelope is in place. Bars 87 then lower through the slotted bottom of magazine 100 and return to the left to be raised again as 87, 86 pick up another envelope along the way.

It is to be understood that this invention is not limited to the precise machine and operation thereof herein disclosed, nor is the use thereof limited to use with a machine as described in my copending application. It will therefore be obvious to those skilled in this and similar arts that modifications in construction, operation and use may be resorted to but such modifications are intended to be covered by this invention as claimed hereinafter.

I claim:

1. An envelope loader comprising a magazine for holding a stack of empty envelopes, a gear operated sliding bar cooperating with a device for delivering a timed jet of air for individually opening the flaps of said envelopes, a transversely movable plurality of arms automatically operated to grasp a flap and thus carry an envelope to a plurality of prongs, a second device for delivering a timed jet of air to aid gravity and said arms in placing said envelope on said plurality of prongs, said plurality of prongs being movable rearwardly and again transversely such that said envelope is positioned surrounding a set of spring arms; arms to move packets of materials between said set of spring arms such that said envelope surrounds said packets; a plurality of levers for clamping the now loaded envelope and moving said envelope transversely to a retainer guide and then releasing the loaded envelope; a plurality of bars carrying projections thereon, said bars being reciprocable and vertically floating, thus being movable to a position beneath said loaded envelope, being raisable and movable to a position laterally and vertically spaced from said first mentioned position.

2. An envelope loader comprising a magazine for holding empty envelopes, a sliding bar cooperating with a device for delivering a jet of air for opening the flap of the lowermost envelope, a plurality of movable arms automatically operable to grasp said flap and transport said envelope to a plurality of prongs, a second device for delivering a jet of air to aid said arms in mounting said envelope on said prongs, said prongs being movable to position said envelope surrounding a set of spring arms, arms to move packets of material between said set of spring arms such that said envelope surrounds said packets, an automatic clamping device for removing the now loaded envelope from said spring arms and moving said loaded envelope to a retainer guide where said envelope is automatically released, and a mechanism for removing said loaded envelope from said retainer guide and placing said loaded envelope in a magazine from its bottom end.

3. An envelope loader comprising a magazine for empty envelopes, a sliding bar and a device for delivering a jet of air for opening a flap of an envelope in said magazine, an automatically operated transporting device for moving said envelope to a plurality of prongs, means for moving said prongs to place said envelope around a plurality of articles to be packaged, means for holding said articles while the envelope is placed thereover, an automatic clamping device for transporting the now loaded envelope to a retainer guide and automatically releasing the envelope, and a mechanism for removing said envelope from said retainer guide and automatically stacking a succession of such loaded envelopes in a magazine.

4. An envelope loader for placing envelopes about articles to be packaged comprising a magazine for receiving empty envelopes, a bar arranged to reciprocate adjacent said magazine, a device for delivering an intermittent jet of air positioned adjacent said magazine, means including said air jet device to partially open the envelope flap, further means to cause full opening of said flap including said bar operable after the partial opening of the envelope flap by said first means, a transporting device arranged to grasp said open flap and to transport said envelope to a position surrounding articles, means for maintaining said articles stationary as said envelope is moved thereabout, and means to transport said envelope containing articles to an envelope receiving magazine.

5. An envelope loader as described in claim 4 wherein said last mentioned means comprises a reciprocating grasping means for grasping the loaded envelope and moving same to a retainer guide, means for operating said reciprocating grasping means, a vertically floating reciprocating bar arrangement and means for operating same in cycles to remove the envelope from the retainer guide and to move same step-by-step to a position adjacent a loaded envelope magazine and to place said envelope in said loaded envelope magazine.

6. An envelope selecting mechanism comprising a magazine to receive empty envelopes, a device for delivering a jet of air arranged adjacent said envelope magazine to direct intermittent blasts of air against the closed flap of an envelope in said magazine to bring such flap to a partially opened condition, futher means to cause full opening of said flap including a bar reciprocating adjacent said magazine after partial opening of the envelope flap by said jet of air such that said partially opened flap is moved to a completely opened condition by said bar so that said envelope may be removed from the envelope magazine by a grasping of said completely opened flap and a grasping mechanism for grasping said flap to remove said envelope from said magazine.

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