Jan. 6, 1959 A. G. HERRMANN 2,867,155

APPARATUS FOR MAKING STENCILS

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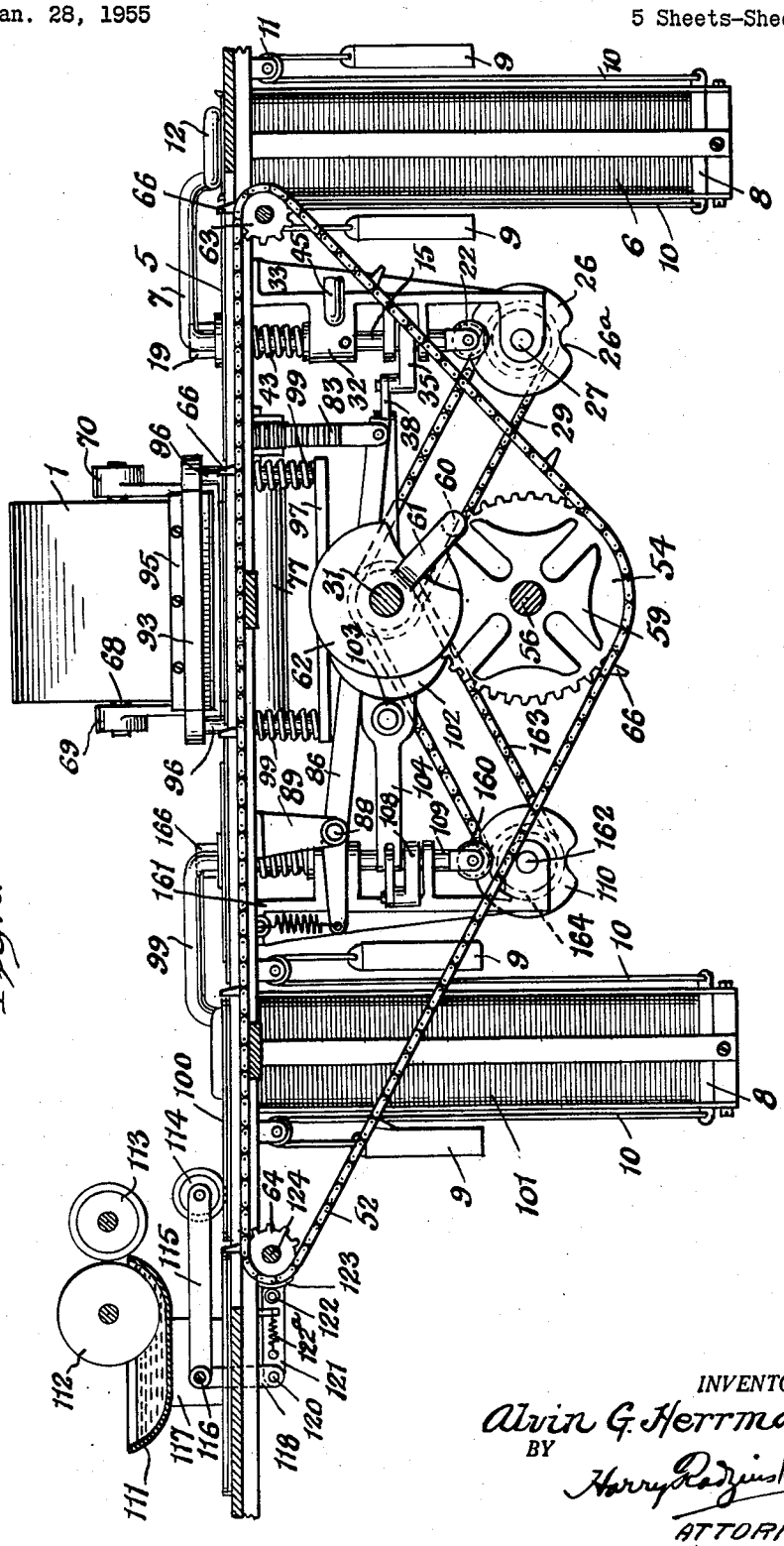

Fig. 1.

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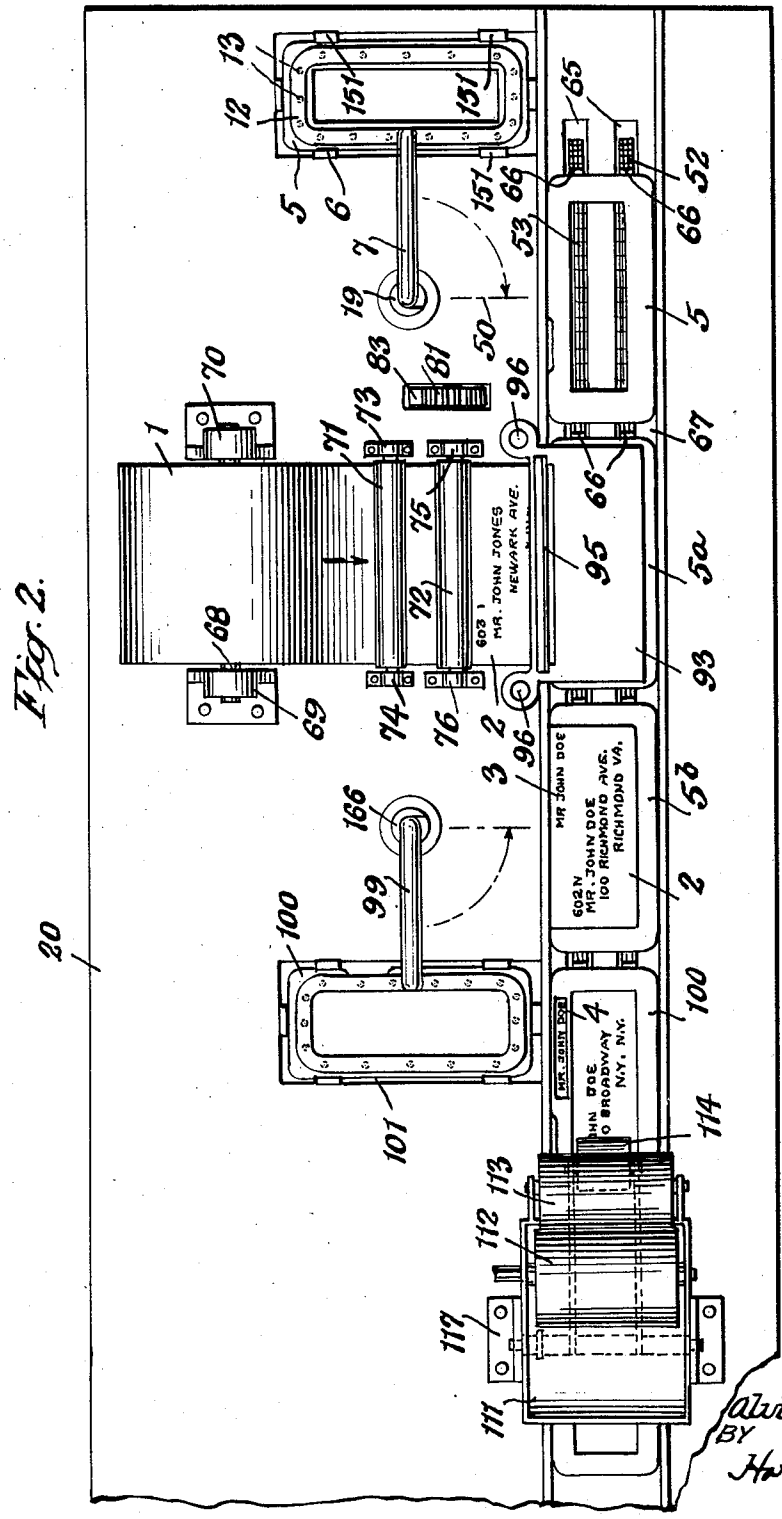

Fig. 2.

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APPARATUS FOR MAKING STENCILS

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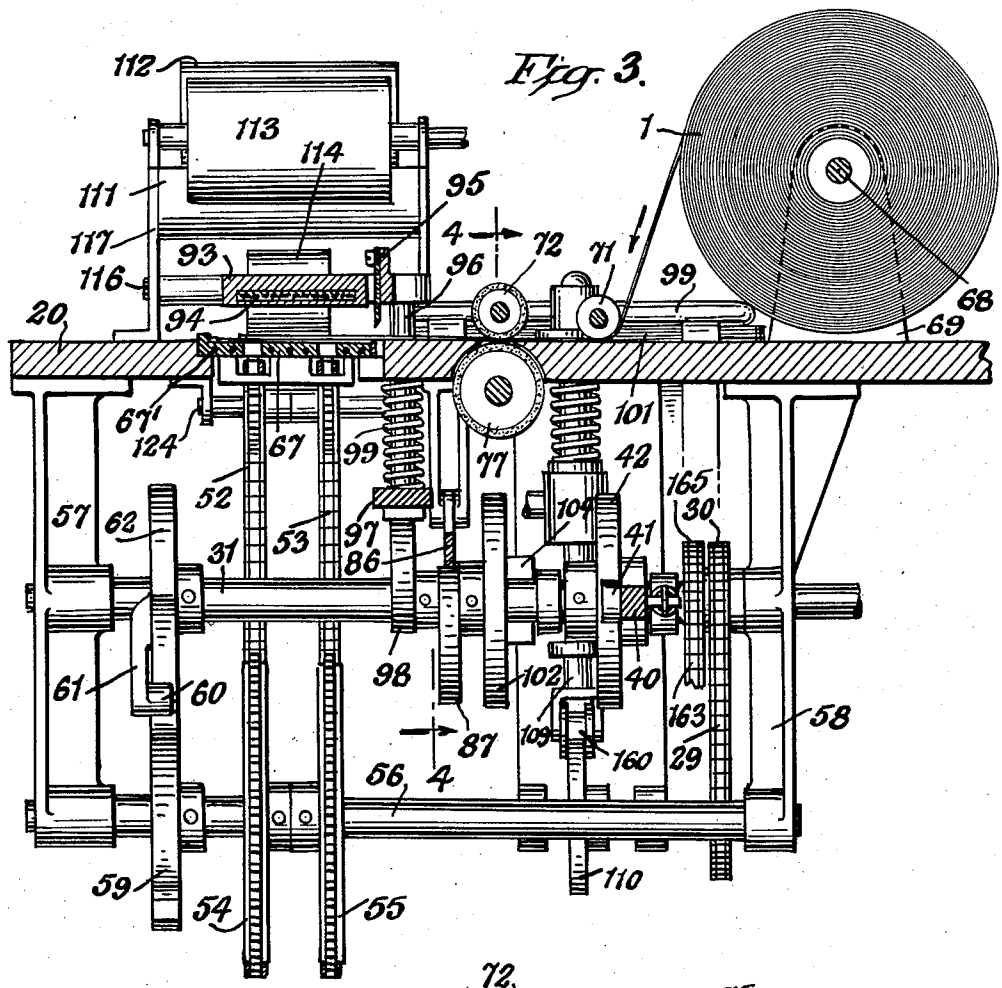
Fig. 3.



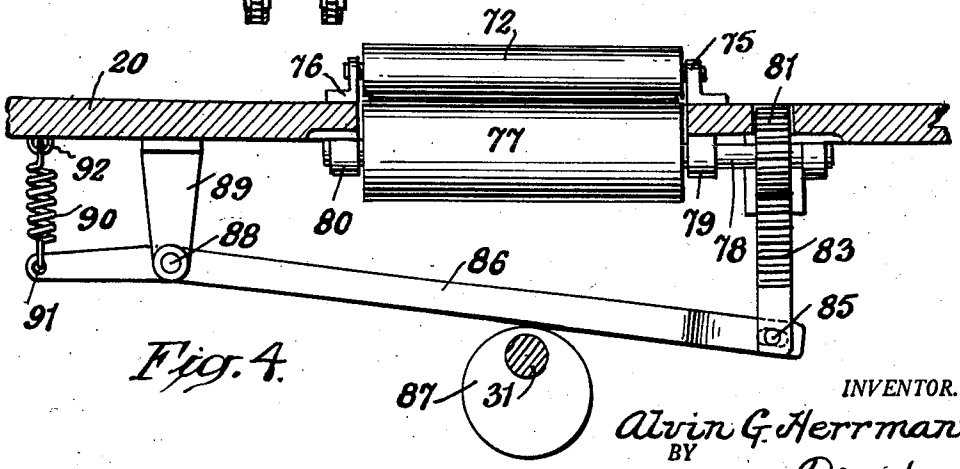


Fig. 4.

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APPARATUS FOR MAKING STENCILS

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Fig. 5.

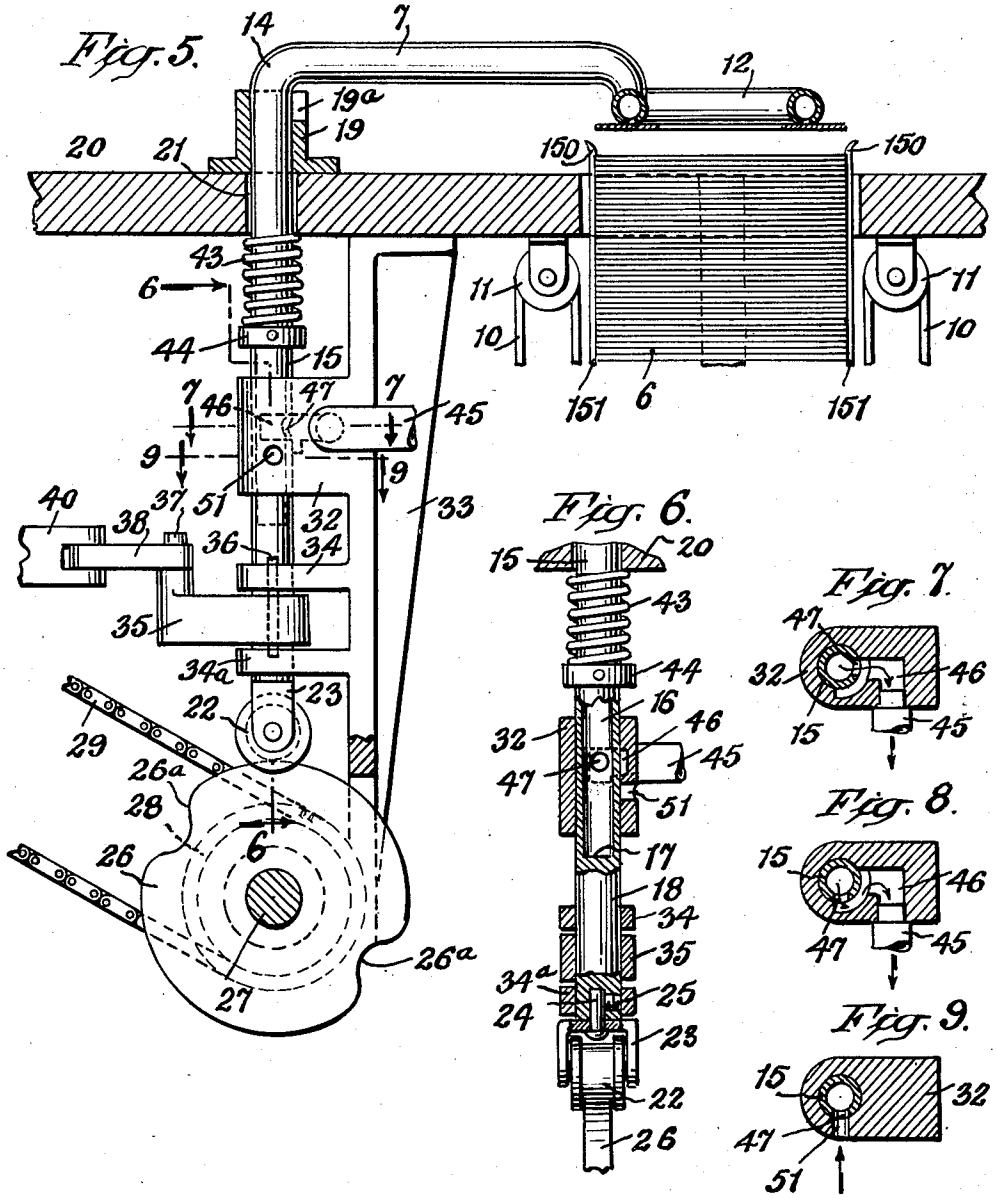

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

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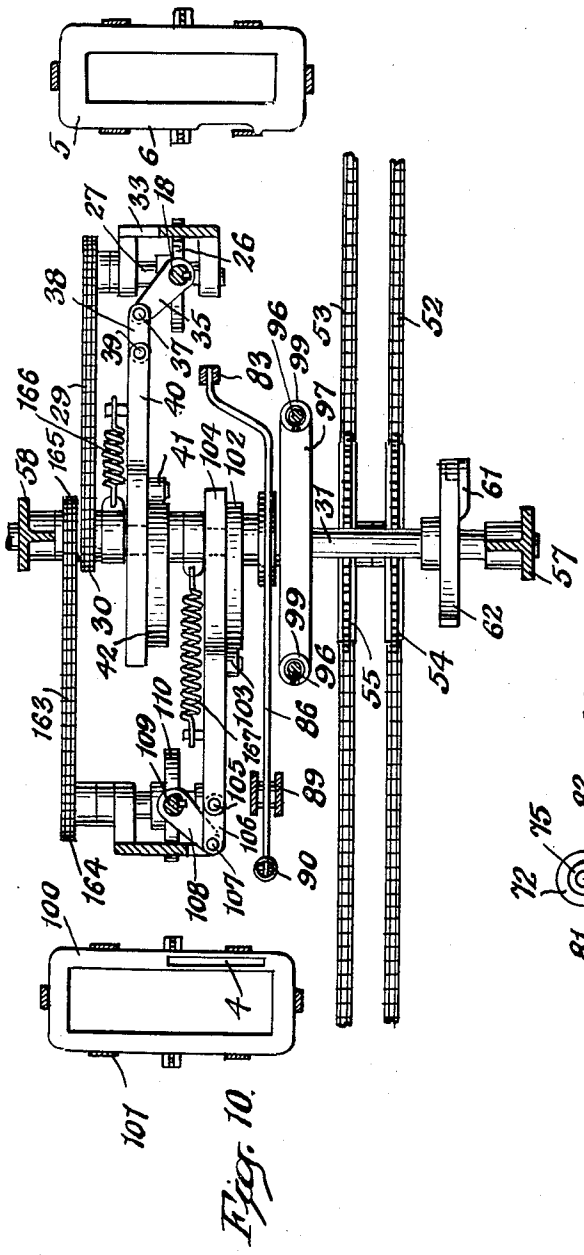

Fig. 10.

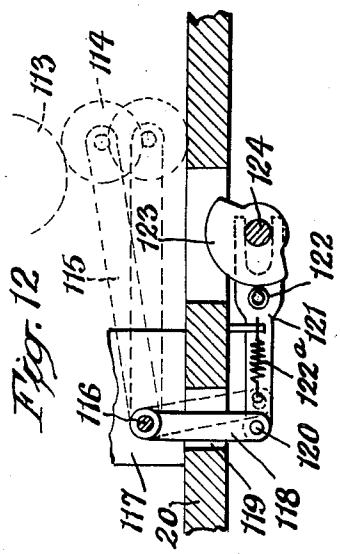

Fig. 12

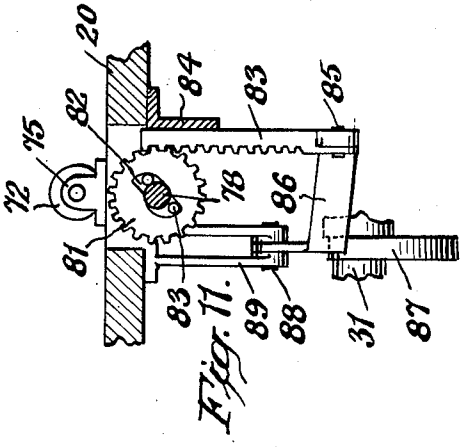

Fig. 11.

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APPARATUS FOR MAKING STENCILS

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Application January 28, 1955, Serial No. 484,671

7 Claims. (Cl. 93—1)

This invention relates to stencils and to an apparatus for making stencils and especially those of the type used in addressing machines. The invention has for its primary object the provision of means by which such stencils can be accurately, speedily and economically made.

Stencils of the type to which the present invention relates, usually consist of a substantially rectangular frame with rounded corners, and which is usually composed of two or more frame parts adhesively connected together with the stencil paper, which I herein refer to as "tissue," disposed between the frame parts and exposed through the central opening therein. The address is cut into the tissue by a typewriter or stencil-cutting apparatus, whereupon the stencil receives ink and is then ready for use in an addressing machine. The known methods of making stencils of this type are laborious, and a substantial number of steps of the method employed are performed by hand operation, or by separated devices which are spaced apart or separated and render the expense of manufacturing the stencils considerable.

In the use of the apparatus to be hereinafter described, the stencil paper or tissue which forms the body of the stencil is in roll form; the tissue is drawn as a web from the roll into a typewriter or stencil cutting machine and the names and addresses are typed thereon at predetermined distances apart. For this purpose it is proposed that typewriters of the type which include a mechanism used for the typing of shipping labels be used, and which would enable the names and addresses to be successively typed at the proper distances apart, and the paper bearing the names and addresses then re-rolled. The roll of name-and-address bearing tissue is thereupon placed in an apparatus for cutting it into the required sections, each bearing a single name and address; which apparatus acts to sandwich each tissue section between two halves of a cardboard or plastic-material windowed stencil frame, and also acts to adhesively unite the two halves of the frame together with the tissue section confined between them and with the name and address thereon exposed in the window of the two-part stencil frame. It is an object of the invention to provide an apparatus for producing stencils as above described; for applying ink to the stencils after the above production and for also producing an identifying marking in an opening provided in the stencil frame.

With these, and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

Fig. 1 is a front elevational view, with some parts in section, of an apparatus made according to the invention;

Fig. 2 is a top plan view of the same;

Fig. 3 is a transverse sectional view through the apparatus;

Fig. 4 is a sectional view, taken substantially on the line 4—4 of Fig. 3, looking in the direction of the arrows;

Fig. 5 is a detail view of the suction picker mechanism for removing successive frame sections from one of the stacks;

Fig. 6 is a sectional view, taken substantially on the line 6—6 of Fig. 5, looking in the direction of the arrows;

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 5, looking in the direction of the arrows, showing how suction is exerted through one of the picker tubes;

Fig. 8 is a similar view, showing how the suction is maintained while the picker tube is elevated and is swung from the stack to delivery position;

Fig. 9 is a sectional view taken substantially on the line 9—9 of Fig. 5, looking in the direction of the arrows;

Fig. 10 is a top plan view, with parts in section, of the mechanism for operating the two picker tubes;

Fig. 11 shows the mechanism for intermittently rotating one of the paper feed rolls, and

Fig. 12 is a detail view, with parts in section, of the mechanism for raising and lowering the inking roll.

Referring to the drawing, 1 indicates a roll of stencil paper or tissue of very substantial length and upon which the names and addresses have been typed in predetermined spaced relation, one of these name-and-address-bearing sections being indicated at 2 in Fig. 2. It will be noted that in addition to bearing the name and address, there is provided in close proximity thereto, as indicated at 3, a duplicate reproduction of the name of the addressee. In the finished stencil this identifying name is located in registration with and thus exposed through a small window opening indicated at 4, in front of the frame 100 of the stencil. This identifying marking 3 and which appears in a part of the tissue that is not subsequently covered by the ink, enables the user of the addressing machine to at once identify the addressee indicated on each stencil.

As previously explained, the frame in which the stencil tissue is mounted is composed of two sections or similar halves. One of these halves, which shall be herein referred to for convenience as the back half, is shown at 5, and a substantial number of these back halves 5 are arranged in a stack, as indicated at 6 in Fig. 1. The back-frame halves 5 are adapted to be successively removed from the top of the stack 6 by means of a suction picker generally indicated at 7 to be presently described. A follower 8 at the bottom of the stack, urges the stack upwardly to a point where the uppermost frame half in the stack is restrained by teeth 150 (Fig. 5) on the upper ends of the bars 151 which form the cage of the stack. The upward urge of the follower is produced by the weights 9 which are attached to one end of each of the cables 10, said cables extending over the pulleys 11 and each having its opposite end attached to the follower 8.

At its end, the picker tube 7 is provided with a substantially rectangular suction frame 12, formed in its under side with a plurality of suction holes 13 and which, when the picker tube is in its lowered position over the stack 6, are brought into contact with the uppermost back-frame in the stack. The suction frame 12 conforms in shape to the stencil back-frame 5 and it will be obvious that when a vacuum is produced in the picker tube 7 the suction frame 12 thereon will suctionally adhere to the back-frame 5 that is then uppermost in the stack 6. Therefore, when the picker tube is elevated by means to be described, it will lift the top back frame 5 out of the stack in the manner clearly seen in Fig. 5.

The picker tube 7 is downwardly bent as indicated at 14 to provide a vertical stem portion 15 which is hollow for a substantial portion of its length as indicated at 16 and which terminates at 17 so that the stem 15 has a solid lower end as indicated at 18. The stem portion 15 of the picker tube is slidably guided through a bush-

ing 19 fixedly secured on the top of the table 20 of the apparatus. Bushing 19 is formed with a notch 19a which restricts to the swinging movement of the picker tube 7. The table 20 is apertured as shown at 21 to permit of the vertical sliding movement of the stem 15. At its lower end, the solid portion 18 of the stem 15 carries a swivelly-mounted cam roller 22, said roller being rotatably carried in the clevis 23 which is rotatively mounted on a vertical pin 24, fixed by the set screw 25 in the end of the solid portion 18 of the stem 15. The cam roller 22 is operative against the periphery of a cam 26 secured on a short shaft 27 rotatively mounted in a bracket 33 and carrying a sprocket 28 driven by a chain 29 which extends around a sprocket 30 carried on the main shaft 31 of the machine. The main shaft 31 is driven at a suitable speed from any desired source of power.

The stem 15 of the picker tube 7 is slidably guided through a lug 32 formed on the bracket 33 which is secured to and extends downwardly from the underside of the table 20. Said bracket also includes a pair of spaced lugs 34 and 34a through which the stem 15 passes, and in which said stem is both axially slidable and rotative. A crank arm 35 surrounds the stem 15 between the lugs 34 and 34a, said crank arm being fastened to the stem 15 by the spline 36. As a result, when the crank arm is moved with an oscillatory movement, the stem 15 will be turned about its vertical axis so that the frame 12 can be swung away from a position over the stack 6 to the position indicated by the dotted line 50 in Fig. 2. The end of the crank arm 35 is connected by the pivot pin 37 to one end of a link 38 which has its upper end pivotally attached at 39 (Fig. 10) to a fork 40 which carries a cam roller 41 held by spring 166, against the periphery of a cam 42 secured on the main shaft 31 of the machine. Spring 152 holds cam roller 103 in constant contact with cam 102. The cam roller 22 is maintained in constant contact with the cam 26 by means of the coil spring 43 having one end bearing against the underside of the table 20 and its opposite end in contact with a collar 44 pinned on the stem 15 of the picker tube.

From the arrangement just described, it will be apparent that the picker tube 7 is raised at a predetermined time to lift a back frame 5 out of the stack 6 as shown in Fig. 5, and then by a swinging movement bring the lifted frame-half 5 to the position at 50 to enable the frame-half 5 to be deposited, by lowering movement of the picker tube 7, onto conveying means to be described. The raising and lowering movements of the picker tube 7 are attained by means of the cam 26, and the swinging movements of the picker arm result from cam 42 and the connections between the same and the stem 15.

The means for producing a vacuum in the picker tube 7 may consist of a vacuum pump not shown, or of any other known means for inducing suction through the picker tube 7. A flexible tube or similar conduit 45 extends from the suction-causing means and couples to a passage 46 formed in the lug 32. The hollow portion 16 of the stem 15 is formed with a port 47 which communicates with the passage 46 while the picker tube 7 is positioned over the stack 6; while the picker is elevated above the stack, and while the picker is swinging forwardly and until the picker descends to deposit its back frame 5 for conveyance. When the picker 7 is swung forwardly to its frame-depositing position, or as indicated by the dotted line 50 in Fig. 2, and the picker tube descends by the cam roller 22 entering one of the notches 26a in the cam 26, the stem 15 will be moved downwardly to cause the port 47 to be moved below the passage 46 and into registration with a port 51 extending through the lug 32. This connects the interior of the picker tube 7 to atmosphere and breaks the vacuum in the picker tube 7 and causes the back frame 5 held thereby to fall by gravity onto a conveyor channel 67 in which a pair of intermittently-moved, endless conveyor chains indicated at 52 and 53 are moved. These chains respectively extend about the sprockets shown respectively at 54 and 55, which sprockets are pinned on a shaft 56. Said shaft is rotatively mounted at its ends in the bearing brackets 57 and 58 secured to the table 20, which bearing brackets also rotatively support the main shaft 31. Secured on the shaft 56 is the slotted member 59 of a Geneva movement and which member 59 is engaged in the known manner to cause an intermittent movement of the shaft 56, by the pin 60 at the end of the arm 61 projecting from the disk 62 secured on and hence rotated with the main shaft 31.

The chains 52 and 53 also extend around the sprockets 63 and 64, the chains 52 and 53 thereby each presenting an upper stretch under the lengthy slots 65 provided in the conveyor channel 67. The chains 52 and 53 carry lugs 66 at suitably spaced intervals and said lugs pass along in the slots 65 to engage behind each of the back frames 5 to thereby move the back frames along on top of the channel 67. Said channel 67 contains inserted heating elements indicated at 67' in Fig. 3, which elements act to heat the channel to thereby heat the frames 5 and render adhesive a heat-responsive glue with which the upper face of each of the frame halves are coated. Hence, when each back frame 5 reaches the position indicated at 5a in Fig. 1, it will have its glue coating rendered adhesive or sticky and in readiness to adherently receive an address-bearing section 2 of the tissue web drawn from the roll 1.

The roll 1 containing the integrally-connected name and address sections 2 as heretofore explained, is supported on a spindle 68 rotatably and removably supported in brackets 69 and 70 mounted on top of the table 20. The web of tissue drawn from the roll 1 extends under guide rolls shown at 71 and 72. Roll shown at 71 is an idle roll, rotatively mounted in brackets 73 and 74. Roll 72 is rotatively mounted in brackets 75 and 76 secured to the table top 20, and roll 72 is positioned above an intermittently-rotated feed roll indicated at 77 (see Figs. 3 and 4).

The means for intermittently rotating the feed roll 77 to cause the same to feed during each of its rotative movements a given length of the tissue web containing a name and address and identifying name 3, is shown in Figs. 4 and 11. Roll 77 is mounted on a shaft 78 which is rotative in the bearings 79 and 80 secured to the bottom of the table 20. On an extended portion of the shaft 78 is mounted a gear 81 which is loose on the shaft 78 and is coupled to the shaft when the gear is rotated in a tissue-feeding direction by means of the clutch mechanism disclosed in Fig. 11. It will be therein noted that the gear 81 is slotted as indicated at 82, in which slot is located rollers or balls 83 which, when the gear is rotated in the tissue-feeding direction, will wedge between the wall of the slot 82 and the shaft 78 and will thus cause rotation of the shaft. On a reverse movement of the gear 81 the rollers will be thrown radially and the gear will thus reverse its movement without imparting a return rotative movement to the shaft.

The gear 81 is caused to be rotated in the manner just described by means of a rack 83 guided by the bracket 84. At its lower end, the rack is pivotally attached at 85 to one end of a cam lever 86, operative against the periphery of a cam 87, secured on the main shaft 31. Near its opposite end, the cam lever 86 is pivoted at 88 in bracket 89 secured to and extending downwardly from the lower side of the table 20. A coil spring 90, having one end attached at 91 to one end of the cam lever 86, and its other end attached at 92 to a loop secured in the top 20, retains the cam lever 86 in constant contact with the edge of the cam 87. It will be obvious that from the structure thus described, the upstroke of the rack 83 will cause the gear 81 to be rotated to a predetermined extent to drive shaft 78 and cause roll 77, in co-operation with roll 72, to feed a section of the tissue web across the top of the glue-bear-

ing frame back 5 then positioned at the point indicated at 5*a*. This positioned section of the web is then in readiness to be cut off and pressed down to adherently attach to the lower frame half 5, and the means for effecting that result will now be described.

Mounted for vertical raising movement above the table 20 at the point designated at 5*a*, is a pressure plate 93, which contains a heating element 94 and which is also provided with a cutter or knife blade 95. The pressure plate 93 and blade 95 operating in association therewith, are carried at the upper ends of two rods 96 guided through the table 20 connected at their lower ends by the bar 97 operative against a cam 98 secured on the shaft 31. A spring 99 surrounds each of the rods 96 and acts to hold the bar 97 in constant contact with the periphery of the cam 98. By means of the mechanism described, the pressure plate 94 will, upon its descent, press a section of the tissue web into contact with the glue-bearing upper face of the back frame 5 and cause it to adhere thereto, while the knife 95 operating in co-operation with an edge of the plate 93, will sever the applied tissue section from the rest of the web.

The back frame 5, now adherently bearing the address area of the tissue section 2, will be moved by the conveyor lugs 66, to the position shown at 5*b*, and at this point, a picker tube indicated at 99, will bring a top frame half 100 from the stack shown at 101 and deposit and press it down on top of the back frame 5 and the tissue section 2 that has been adhesively applied thereto.

The picker tube indicated at 99 is similar to that shown at 7 and it is operated by elements similar to those which operate the tube 7. That is to say, a cam shown at 102 and secured on main shaft 31 is held by spring 167 against cam roller 103 secured on the fork 104 which is pivotally connected at 105 to one end of the link 106 which has its opposite end connected at 107 to the end of a crank arm 108 secured to the stem 109 forming a downward extension of the picker tube 99 and which slides through boss 166. Stem 109 is raised and lowered by the cam 110 operating on swivelled roller 160 so that the picker arm 99 is operated as described in connection with the similar picker arm 7. Stem 109 is vertically guided through bracket 161, similar to that shown at 33 and secured to the table 20. Cam 110 is secured on shaft 162 rotative in bracket 161 and said shaft carries a sprocket 164 around which chain 163 extends and which chain passes around a sprocket 165 secured on the main drive shaft 31. When the picker tube 99, carrying a front frame 100 is moved to a position above the point 5*b*, the picker tube is caused to descend and place the front frame 100 on top of the back frame 5 and the tissue web adherent thereto. Then the picker tube 99 is raised and swings back to its position above the stack 101. It will be noted that each front frame 100 is provided with the window opening 4 which registers with the name 3 borne by each address section of the tissue so that when the front frame 100 is placed in position as above described, the identifying name 3 will be exposed through the window opening 4.

The stencil which now consists of the two frame sections 5 and 100, with the address-bearing tissue piece sandwiched between them, is ready to be inked, and accordingly it is now moved by the lugs 66 on the conveyor chains, to the inking mechanism shown at the left in Figs. 1 and 2. Said ink-applying mechanism includes an ink-containing fountain 111 supported above the top of the table 20. A roller 112 is rotated in the fountain and is rotated slowly by any suitable means from a source of power not shown. A distributing roller 113 is operative against the periphery of the roller 112 and receives a coating of ink therefrom. The ink-applying roller is indicated at 114, and the same is rotatably carried on the ends of the arms 115 secured on a shaft 116 mounted for oscillatory movement in the fountain-supporting bracket 117. Secured on the shaft 116 is an arm 118 which extends downwardly through a slot 119 in the table top 20 and has its lower end pivotally connected at 120 to a fork 121 carrying cam roller 122 held by spring 122*a* against the periphery of a cam 123 secured on shaft 124. Shaft 124 carries the sprocket 64 about which the conveyor chains 52 and 53 extend, and these chains intermittently rotate shaft 124 to cause raising movement of the roller 14 to first receive a charge of ink from contact with roller 113 and then descend to bring the inked roller 114 down against the tissue area of the stencil then positioned below it in conveyor channel 67. The roller 114 is relatively narrow, as will be seen in Fig. 2, so that its application of ink will be restricted to the tissue area visible through the window in the stencil frame and the ink consequently will not reach and soil the frame. The inked stencils, after passing from below the inking roller 114 are now ready for use in any known type of addressing machine.

From the foregoing the operation of the apparatus for making the stencils will be readily apparent. The back frame members taken from the stack 6 by the picker 7 are brought to a position above the conveyor chains 52 and 53 and deposited in channel 67 above the chains. The lugs 66 on the chains next move the back frames to the position 5*a* whereat an address-bearing section 2 of the stencil tissue is fed across the back frame 5 and pressed into intimate and adherent contact with the adhesive borne by the upper face of the back frame to thereby adhesively attach the tissue to the back frame. The knife 95 cuts off the applied tissue section from the roll 1. On the next advancing movement of the chains 52 and 53, the back frame and applied tissue will be carried to the point designated at 5*b* and here the picker tube 99 will swing forwardly to deposit the front frame carried by it to a position on top of the back frame and previously applied tissue. The picker 99 can firmly apply the front frame member and might also, by reversal of the suction through it, provide an air blast to firmly blow the frame member 100 down on top of the underlying rear frame member and the previously applied tissue. Now the stencil, consisting of the two adhesively-connected frame members with the addressed tissue insert between them, is carried by the conveyor lugs 66 under the inking roller 114 by which the tissue area is inked to complete the stencil.

While I have herein described a single embodiment of the invention, it is to be understood that the described structure is merely illustrative of the invention since it may be varied in many ways without departing from the spirit of the invention as is contemplated by the scope of the claims appended hereto.

What I claim is:

1. In an apparatus of the character described, supporting means for a stack of stencil frame halves, supporting means for a second stack of stencil frame halves, a support for a roll of stencil paper located between the stacks, means for drawing stencil paper from the roll, means for successively feeding stencil frame halves from the first stack to a position in front of the roll whereby tissue drawn from the roll will be extended across the top of the frame half so positioned, means for cutting off sections of the stencil paper when it is positioned above the frame half, means for pressing the cut-off stencil paper section into adherent contact with the upper face of the stencil half, and means for taking successive stencil frame halves from the second stack and applying the same over each of the first frames and the stencil paper that has been applied thereto.

2. In an apparatus as provided for in claim 1, and including inking means for applying ink to the stencil paper after each stencil leaves the means which applied the second frame half to it, and means for presenting the stencil to said inking means.

3. In an apparatus for making stencils, means for holding a stack of frame halves, means for successively taking frame halves from the stack and moving the same to a position of halt, means for supporting a roll of sten-

cil tissue, means for feeding a web of tissue directly from the roll to position the same over each frame half when said frame half is moved to a position of halt, means for severing successive lengths of tissue from the roll while each length is positioned over a frame half, means for intimately and adherently securing each severed tissue section to the face of a frame half, and means for thereafter applying a second frame half over the first half and over the tissue that has been applied thereto.

4. In an apparatus for making stencils, a support for a roll of stencil tissue, means for intermittently feeding a web of tissue from the roll and severing the same into sections of predetermined size at a position of application to a stencil frame half, means for feeding a frame half to position it beneath a severed section of the tissue, pressure means for pressing the severed tissue section into adherent relation with the frame half, and means for thereafter applying a second frame half on top of the first frame half and on top of the tissue applied thereto.

5. In an apparatus for making stencils, means for holding a stack of stencil frame halves, suction means operative relatively to the stack for removing successive frames from the stack, conveying means to which the frames are successively presented by the suction means, a tissue-applying station at which each frame is halted by the conveying means, a support for a tissue roll and means for feeding tissue therefrom across each frame half when the same is halted at the tissue-applying station, cutting means for severing a section of the tissue from the roll when said section is positioned above a frame half at the tissue-applying station, pressure means for adherently pressing the cut-off section of tissue against the frame half, a stack of second stencil frame halves, suction means for successively taking stencil frame halves from said last-mentioned stack and presenting them above the first frame sections and tissue thereon as the said tissue-carrying frame sections are halted after movement away from tissue-applying position.

6. In an apparatus for making stencils, means for holding a stack of stencil back frames, suction picker means for successively taking back frames from the stack and moving the same, conveyor means receiving the back frames from the suction picker means to move each back frame to a position of halt, a support for a roll of stencil tissue, means for feeding a web of tissue from the roll to position the same over each back frame when said back frame is located at a position of halt, means for severing successive address-bearing lengths from the roll at said position of halt, means for intimately and adherently securing each severed tissue section to the face of a back frame, and means for thereafter applying a front frame over the back frame and over the tissue that has been applied thereto.

7. In an apparatus from making stencils, a support for a roll of stencil tissue, means for intermittently feeding predetermined lengths of a web of tissue from the roll and intermittently halting the web and severing the same into the lengths which have been fed, means for feeding a back frame to position it beneath a severed section of the tissue, pressure means for pressing the severed section into adherent relation with the back frame, means for thereafter applying a front frame on top of the back frame and on top of the tissue applied thereto, means for thereafter inking the tissue that has been sandwiched between the frames, and means for moving the frame and its tissue to said inking means.

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