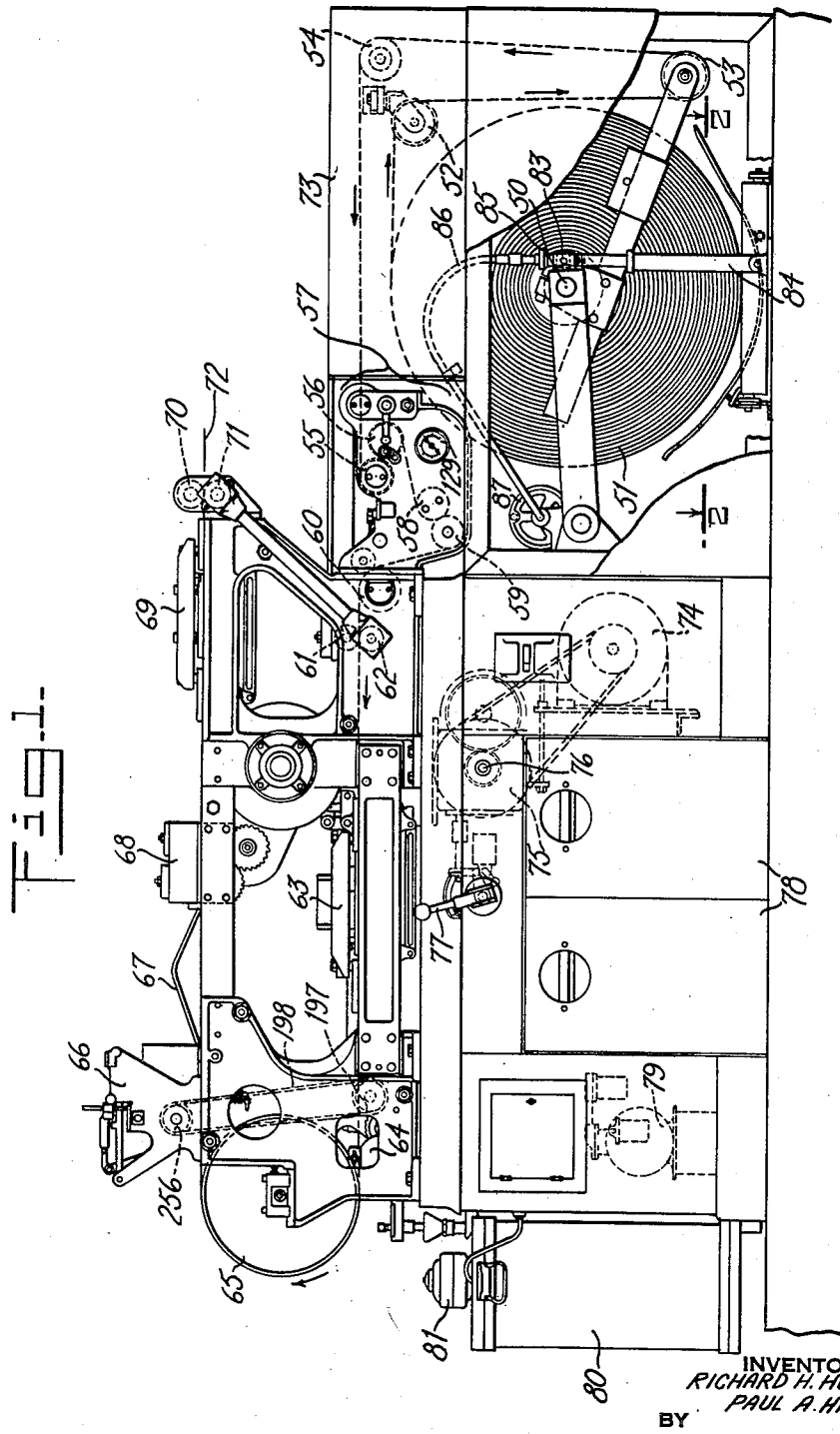
Oct. 28, 1952 R. H. HOLMWOOD ET AL 2,615,492

STRIP APPLYING DEVICE

Original Filed Feb. 12, 1947 4 Sheets-Sheet 1

Fig. 1.



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STRIP APPLYING DEVICE

Original Filed Feb. 12, 1947 4 Sheets-Sheet 2

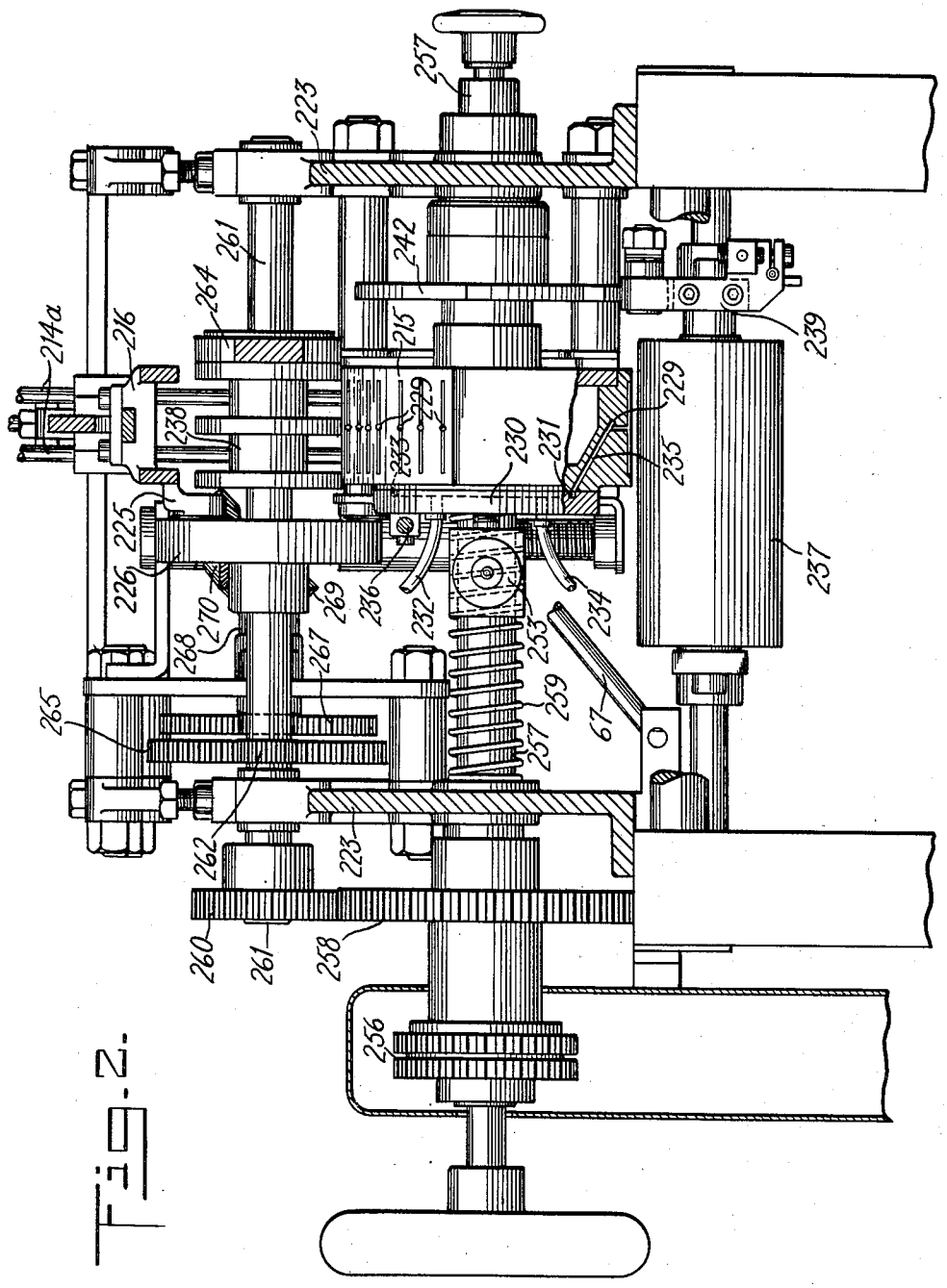


Fig. 2.

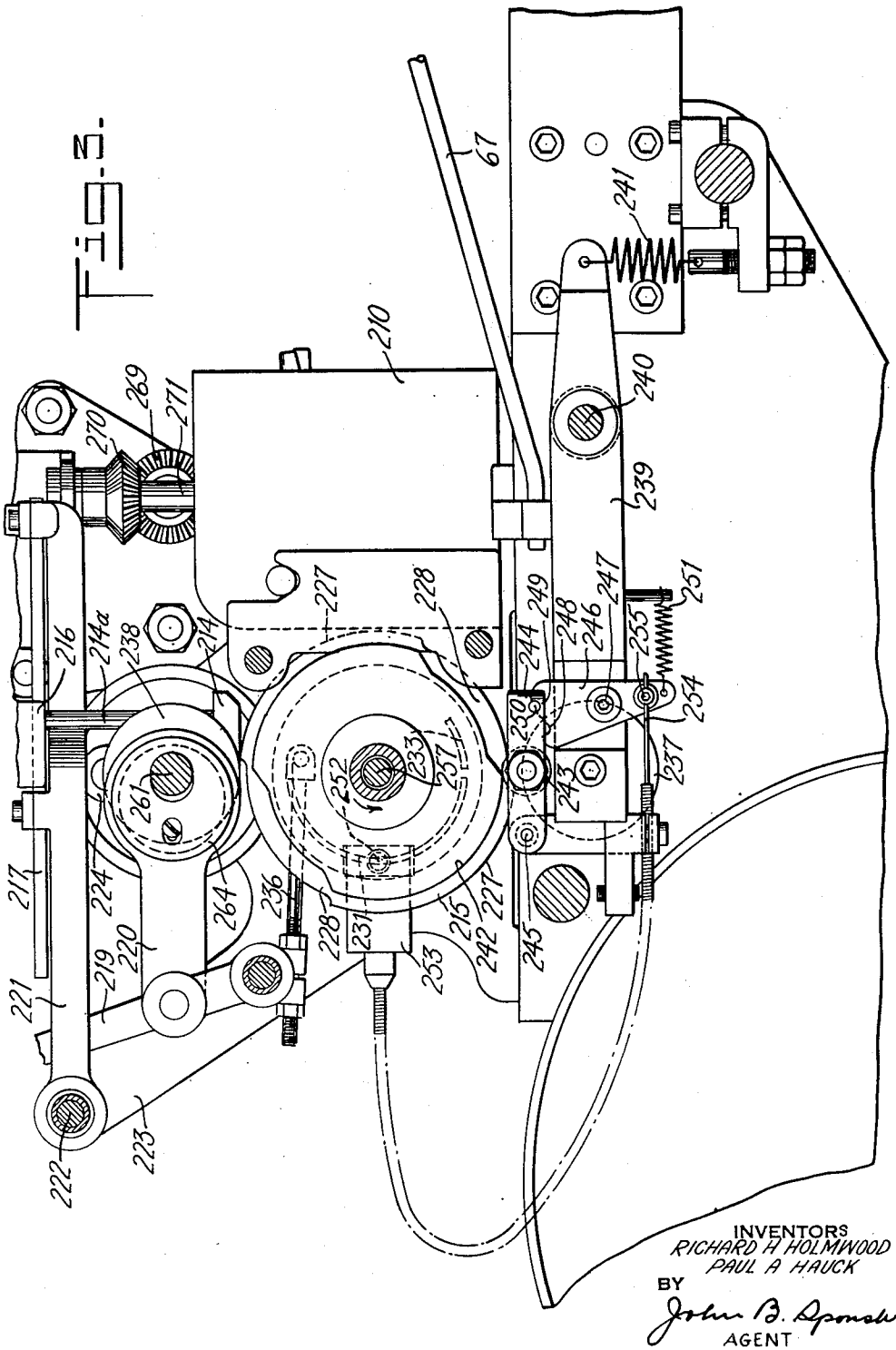
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Fig. 11.



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Fig. 4.

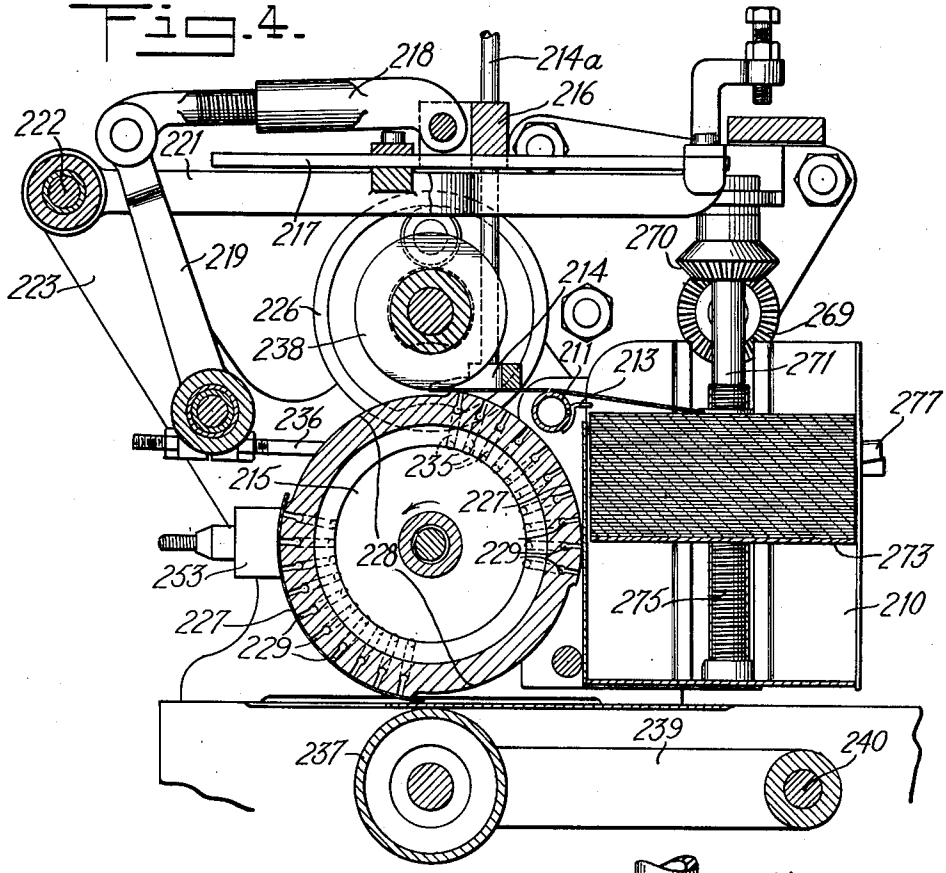


Fig. 5.

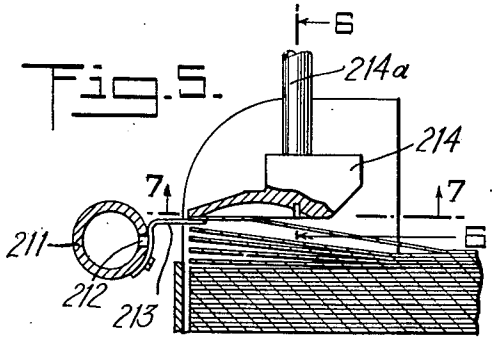
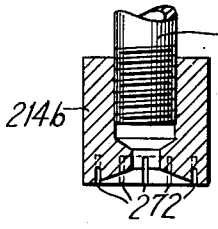


Fig. 6.



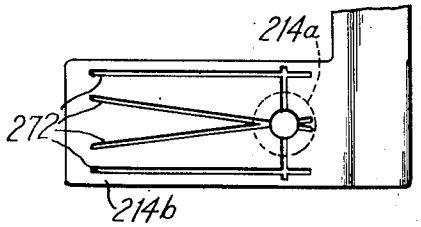


Fig. 7.

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UNITED STATES PATENT OFFICE

2,615,492

STRIP APPLYING DEVICE

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Original application February 12, 1947, Serial No. 728,050. Divided and this application April 20, 1948, Serial No. 22,068

2 Claims. (Cl. 154—36)

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This invention relates to a device for applying strips of material to cover apertures in a web, and more particularly to a device for applying strips of stencil material to stencil cards produced in machines of the type illustrated in a copending application, Serial No. 728,050, filed February 12, 1947, now Patent No. 2,518,010, of which this application is a division.

An object of the invention is to provide a device for attaching portions of stencil material to windows or apertures in a moving web.

Another object of the invention is to provide a stencil picker for removing singly a stencil sheet from a stack of such sheets and delivering it to an attaching mechanism.

A still further object of this invention is to provide means for preventing adhesive material from contaminating operating components in a strip applying device when the supply of strips becomes exhausted.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a side elevation view of a stencil card producing machine into which the features of the present invention have been incorporated.

Fig. 2 is a sectional view of the stencil material feeding mechanism shown under the reference number 66 of Fig. 1.

Fig. 3 is a sectional view showing the mechanism, which prevents contamination of certain of the working parts by the adhesive.

Fig. 4 is a sectional view illustrating certain components of the tissue feeding mechanism.

Fig. 5 is a detail view of the tissue picker and the tissue supply magazine.

Fig. 6 is a sectional view of the tissue picker along the line 6—6 of Fig. 5.

Fig. 7 is a detail view of the bottom of one of the two toes of the tissue picker, along the lines 7—7 of Fig. 5.

The overall layout of a stencil card machine in which the present invention is embodied is illustrated in Fig. 1.

A spindle 50 carries a roll of double width card stock 51 which is fed over an idler roll 52 to be engaged by a tensioning roller 53 and thence over a guide roller 54 to a pair of feed rollers 55 and 56 in a stock feeding and inking mechanism 57. The strip of card stock is then fed over tension measuring rollers 58 and 59 and a platen 60 between the feed rolls 61 and 62 to a piercing and slitting die 63, thence to an adhesive applicating roller 64 and a reversing drum 65 to a stencil tissue feeding mechanism 66. The tissue feeding mechanism 66 operates to apply sheets of stencil tissue to the strip of card stock which thereafter passes over a folding rod 67 where the strip is folded longitudinally to form a two ply strip to pass between rollers in the closing and pressing mechanism 68. The strip is then fed by the last mentioned rollers under the press and cut off die 69, which severs the strip into card lengths each containing a stencil tissue portion. The card 72, thus formed, is thereafter fed between the ejector rolls 70 and 71 onto a table 73.

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With further reference to Fig. 1, the prime mover for the machine is an electric motor 74 which drives a pulley 75 attached to a shaft 76. A dual speed drive assembly, provided with the necessary gearing, is connected to the shaft 76 by a clutch mechanism under control of a handle 77 to provide low speed and high speed machine operation. The drive mechanism will be described in detail later herein. Hoppers 78 are provided in the base of the machine to receive the cuttings from the card stock under action of the die 63. A necessary accessory to the subject machine is a pump 79, capable of providing both suction and compressed air, which is also located in the base of the machine. A reservoir 80 is located at one end of the machine for containing liquid adhesive such as glue. A pump 81 is provided for pumping the adhesive to the adhesive roller 64, located near one end of the machine.

Reference is made to Figs. 2, 3, 4, and 5 relative to the tissue feeding mechanism 66. Sheets of stencil tissue are supplied from a stack in a hopper 210. A jet of air from a pipe 211 is blown through an orifice 212 to fan the edges of the top sheets against a retaining catch 213 (see Fig. 5). A suction foot 214, due to motion imparted to it, dips into contact with the top sheet withdrawing the sheet from under the catch 213. The foot 214 then rises and moves in the opposite direction (to the left as viewed in Fig. 4) drawing the sheet to a position above a hollow feed drum 215, which seizes the sheet in a manner to be explained later herein, and the foot 214 returns to its original position above the hopper 210.

The foot 214 is mounted by means of the tubes 214a on a carriage 216. The carriage 216 is connected by a link 218 to an arm 219, which is oscillated by an eccentric strap 220, thereby reciprocating the carriage over a slide 217 carrying it.

The slide 217 is carried by an arm 221 pivoted at 222 on a bracket 223 and has a cam follower 224 supported upon it by a foot 225. The follower 224 rides a cam 226, which raises the slide 217, or lowers it. The motion of the foot 214 thereby is made up of the composite motions of the reciprocating carriage 216 and the raising and lowering of the slide 217.

The feed drum 215 is a semi-hollow roller provided with two active sectors 227 and two inactive sectors 228 (see Figs. 2 and 4). The active sectors 227 have a series of holes 229, the axes of which are parallel with radii of the drum 215. Striating channels 235 are provided on the periphery of the drum 215 extending laterally from each hole 229. A circular face valve 230 has an elongated arcuate port 231 (Fig. 2) which is maintained at a pressure below atmospheric by a pipe 232 leading to a suction pump 79 (see Fig. 1). The valve 230 also has a port 233 (Fig. 2), which is maintained at a pressure above atmospheric by a pipe 234 leading to the high pressure side of pump 79. The holes 229 in drum 215 (see Fig. 2) are arranged to have channels 235 which connect with the ports 231 and 233 so that, as the drum 215 is rotated, each hole 229 via its channel 235 will communicate with the port 231 from the time it passes the top center line of the drum 215 until it reaches the bottom center line of the drum 215 (see Fig. 4), and thereafter for a fraction of the drum's cycle of rotation each hole 229 via its channel 235 will communicate with the port 233.

Normally when air pressure is suddenly applied through an opening in a member against a thin diaphragm applied thereto, as for example, a stencil sheet covering one of the holes 229 of the drum 215, momentarily the diaphragm is displaced from the opening; however, immediately thereafter the velocity of air escaping from the opening between the diaphragm and the member reduces the pressure below the normal pressure on the outside of the diaphragm so that the diaphragm is forced back against the member. In the subject device this phenomenon is averted by having a portion of the stencil sheet overhanging the area of an active sector 227 of the drum 215, the overhanging portion of the stencil sheet being seized by the adhesive surface of the card stock upon coming into contact therewith.

In the manner just described a sheet of stencil tissue delivered to the drum 215 by the foot 214 will be held to the periphery of the drum by the suction from the holes 229 for a predetermined period as the drum is rotated, and then gradually forced from the periphery of the drum by successive blasts of air from the holes 229, the stencil sheet being seized after each blast by the adhesive coating on the card stock, thereby effecting a peeling of the sheet from the drum 215. The valve 230 is adjusted by a rod 236 so that a sheet of stencil tissue is forced from the drum as the sheet passes the bottom center line of the drum 215 (see Fig. 4) where the card stock passes over a counterroller 237, the adhesive surface of the card stock contacting a stencil tissue for the first time in that location. The card stock is fed between the drum 215 and the roller 237 so that a stencil tissue delivered from the drum 215 is superimposed upon an aperture in the card stock. It is to be noted that the striating channels provided with the holes 229 on the periphery of the drum 215 are to prevent the deformation of the thin stencil sheets. It is to be noted further that suction is constantly applied to the foot 214 and that a stencil tissue is removed from the foot 214 by being seized between the drum 215 and a feed roller 238 which together form a feeding couple (see Fig. 2), the stencil sheet passing under the roller 238 onto the periphery of the drum 215 and being adhered thereto by suction from the holes 229.

The counterroller 237 is journalled on a rocking frame 239 (see Fig. 3) which is supported on a shaft 240, and is urged to rotate about the shaft in a clockwise direction by a spring 241, thereby holding the roller 237 against the drum 215. A cam 242 of similar contour is mounted, coaxially, to the drum 215. Cam 242 coacts with a roller 243 journalled on an arm 244 pivoted on the frame 239 by a stud 245. An interposer 246 pivoted on another stud 247 on the frame 239 is provided with two notches 248 and 249 to coact with a pin 250 on the arm 244. The interposer 246 is biased by a spring 251 so that the roller 243 will be positioned to cause the rocking frame 239 to be displaced by the cam 242 withdrawing the roller 237, and the strip of card stock passing over it, from contact with the drum 215.

The exhaust 252 of a normally expanded bellows 253 is connected with the port 231. A Bowden wire 254, attached to the diaphragm of the bellows, is fastened to the interposer 246 by a clamp 255 so that when the bellows is expanded the interposer is held with the notch 249 engaging the pin 250 (as shown in Fig. 3). The bellows 253 will be expanded by atmospheric pressure when there is no sheet of stencil tissue covering the holes 229, when the valve 230 is improperly adjusted, or when the vacuum suction of pump 79 fails. In any of these events the peripheral surface of the drum 215 will not be contacted by the adhesive material on the card stock since the roller 237, which supports the card stock under the drum, is cammed away. Normally, however, when the machine is operating there will be sufficient suction from the port 231 to hold the bellows 253 in a collapsed state thereby tensioning the Bowden wire 254 to pull the interposer 246 to engage the notch 248 with the pin 250 whereby the roller 237 is no longer cammed away from the drum 215.

The drive for the tissue feeding mechanism 66 is provided by the chain 198 (see Fig. 1) which engages and drives the sprocket 256 (Fig. 2). The sprocket 256 is fixed to a shaft 257 which carries a gear 258, the drum 215, and the cam 242. The spring 259 shown about shaft 257 is for the purpose of holding the drum 215 against the valve 230, a type of face valve. The gear 258 drives a gear 260 which is fixed to a shaft 261 carrying a gear 262, the cam 226, the feed roll 238, and a cam 264 (which operates the eccentric strap 220). The gear 262 drives the hopper feed gearing via idlers (not shown) and a bevel gear 269 which drives another bevel gear 270 attached to a hopper feed shaft 271.

Details of the suction foot 214 are shown in Figs. 6 and 7. It is to be noted that the views in Figs. 6 and 7 represent approximately one half of the suction foot, there being two such sections 214b per suction foot. The bottom of the foot is made concave as shown (see also Fig. 5) so that not more than a single sheet of stencil tissue is picked each time the foot engages the stack in the hopper 210. Striations 272 are provided in the bottom of each section of the foot to insure uniform gripping of the stencil sheet and to prevent its becoming deformed due to the action of atmospheric pressure.

In order that the stack of sheets of stencil material is presented properly to the suction foot **214**, as a result of the jet of air blown from the orifice **212**, the top of the stack must be kept constantly at a uniform distance from the catch **213** (Fig. 5). A hopper feed is provided as shown in Fig. 4. A platform **273** is provided and arranged to be elevated within the hopper **210** to lift the stack of sheets as they are withdrawn by the foot **214**. An extension of the platform **273** is attached to a collar which rides on a threaded part **275** of the hopper feed shaft **271**. The collar is provided with a toothed lug which is spring urged against the threaded part **275** to advance the collar and its associated platform as the shaft rotates. A handle **277** serves to release the lug so that the platform **273** may be lowered when a freshly filled hopper is placed in the machine.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. In a machine of the class described wherein a web is fed between pairs of rollers, a pair of rollers, one of the rollers of said pair being provided with a series of air ports having peripheral openings, means for producing a suction in the said ports for causing a piece of tissue to adhere thereto at the said openings, a pivoted arm for supporting the other roller of said pair, a spring normally biasing the second said roller against the first said roller to contact the web between them, means for displacing the second said roller against the bias of the said spring,

and means under control of the said openings for actuating the said roller displacing means whereby the absence of a piece of tissue adhering to the first said roller causes the second said roller to be displaced therefrom thereby breaking its contact with the said web.

2. In a machine of the class described wherein a web is fed between pairs of rollers, a pair of rollers, one of the rollers of said pair being provided with a series of air ports having peripheral openings, means for producing a suction in the said ports for causing a piece of tissue to adhere thereto at the said openings, a pivoted arm for supporting the other roller of said pair, a spring normally biasing the second said roller against the first said roller to contact the web between them, a cam on the first said roller for displacing the second said roller therefrom, a bellows cooperating with the said suction means, an interposer for disabling the said cam, and a Bowden wire connecting the said interposer and the said bellows whereby a contraction of the latter due to the presence of a piece of tissue covering the said openings retains the said interposer operative for separating the said rollers and releasing the contact with the said web.

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