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3 Sheets-Sheet 1

Fig.1

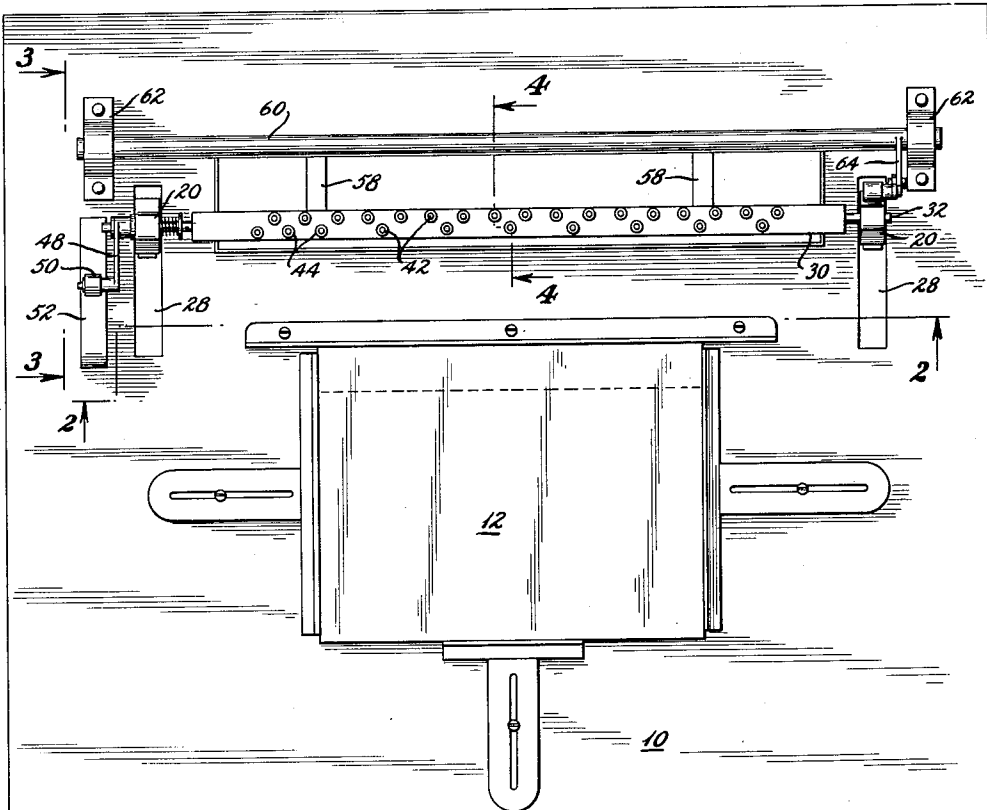
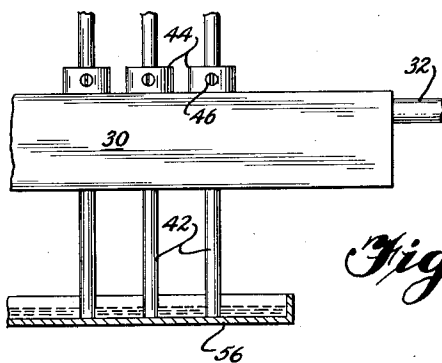


Fig. 5

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March 20, 1962

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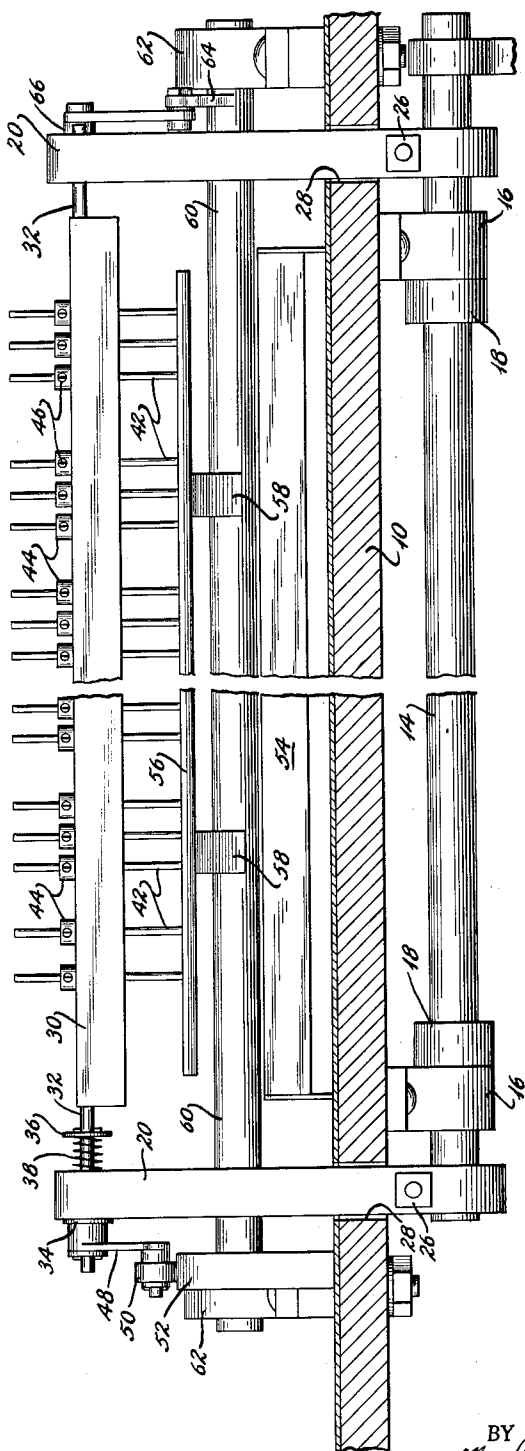
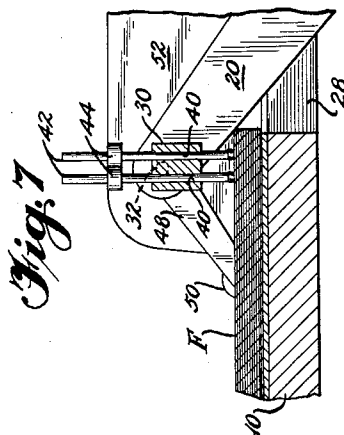
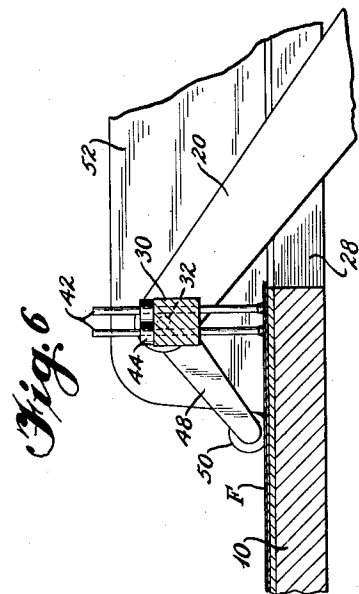
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ADHESIVE APPLICATOR

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3 Sheets-Sheet 2

Fig. 2



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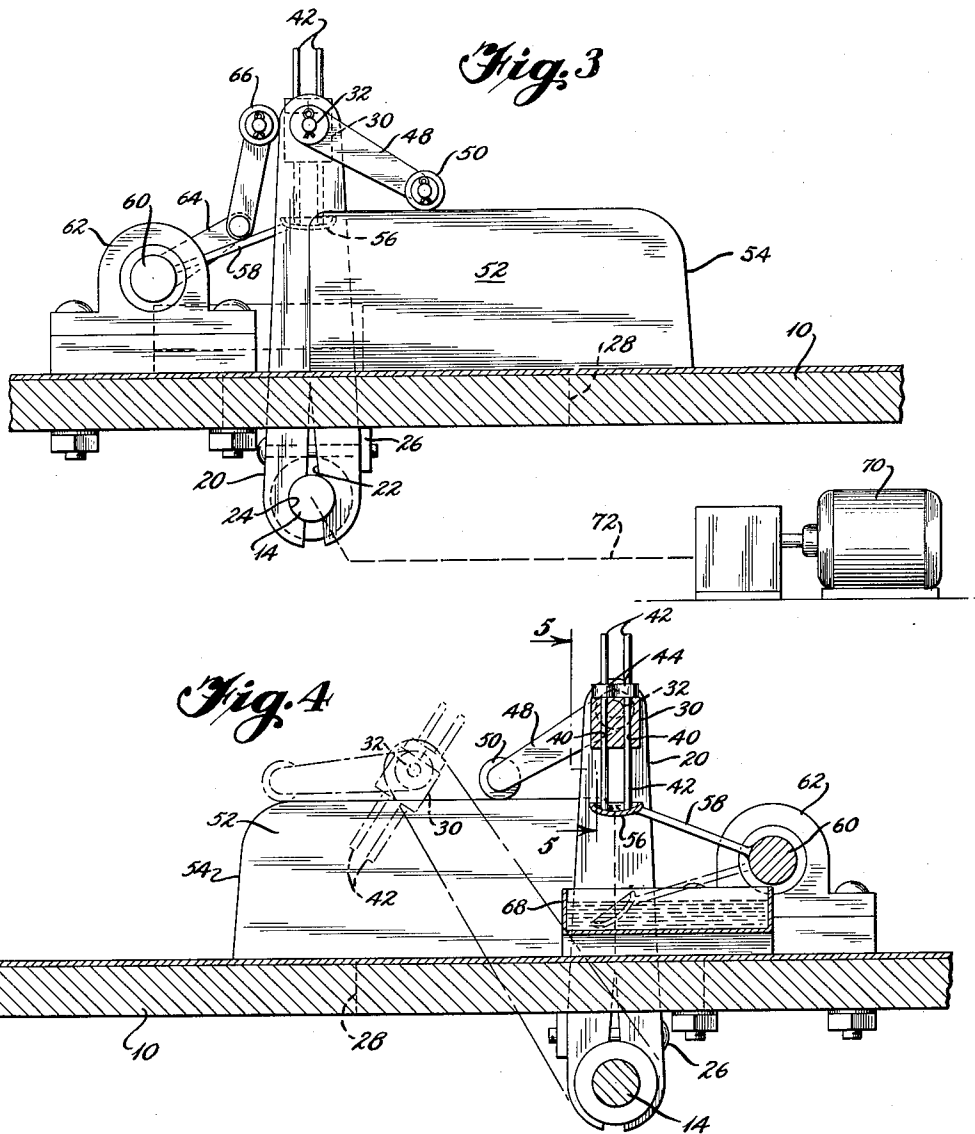
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3 Sheets-Sheet 3



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3,025,830

ADHESIVE APPLICATOR

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2 Claims. (Cl. 118-243)

This invention relates to adhesive applicators, and more particularly for applicators adapted to apply liquid adhesive to selected locations on a surface as in the preparation of snap-out forms.

In the preparation of snap-out forms, the individual sheets of the forms are attached to each other by applying adhesive to various spots along one edge of the form to join the adjacent layers to each other. Machines for performing this operation are generally designed to be operated continuously on a mass production basis, and hence are frequently so complex and expensive that they can economically be used only by concerns having a large volume of requests for forms of this type. Frequently, operators of smaller printing shops are requested to supply snap-out forms, but because of the relatively small volume of this type of business cannot justify the expenditure necessary to obtain presently available machines for assembling such forms.

It is a primary object of the invention to provide an adhesive applicator for use in the manufacture of snap-out forms of a simplified yet extremely efficient construction.

The foregoing and other objects are achieved in a construction wherein a pair of crank members are mounted upon a shaft for rotation with the shaft. An applicator bar is pivotally supported between the distal ends of the cranks above a table and has its center of gravity located below its axis of pivotal support. Thus, as the cranks are rotated with the shaft, a vertical side surface of the applicator bar remains in a vertical plane. A plurality of vertically extending bores pass through the applicator bar at spaced locations. Each of the bores receives a rod-like applicator member which is positioned within the bore by means of a clamped collar engageable with the upper surface of the applicator bar. The tips of the applicator members project downwardly below the bar. A container for liquid adhesive is located on the table, and a dipper plate is pivotally supported for movement on the table. The dipper bar is coupled to one of the cranks so that movement of the applicator bar away from a glue applying position elevates the dipper bar from the tank into the path of the applicator tips to place a controlled charge of liquid adhesive on each tip. Work material to which the adhesive is to be applied is located in position to be contacted by the tips of the applicator members upon rotation of the crank arms in the opposite direction. Suitable guide means may be located to engage the applicator bar to be sure that the applicator members remain vertical as they approach the paper. The tip of each applicator member deposits a small drop of liquid adhesive upon the surface of the paper at the end of the forward stroke of the cranks. The cranks are then rotated in the reverse direction to pick up another charge of adhesive from the dipper bar.

The members are free to move up and down within the bores of the applicator bar. Thus, as the stack of paper builds up, the applicator members may slide upwardly in their bores to accommodate the increased height of the stack.

Other objects and features of the invention will become apparent by reference to the following specification taken in conjunction with the accompanying drawings.

In the drawings:

FIG. 1 is a plan view of an applicator embodying the invention;

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FIG. 2 is a cross-sectional view of the structure of FIG. 1 taken on the line 2-2 of FIG. 1;

FIG. 3 is a detailed cross-sectional view of the structure of FIG. 1 taken on the line 3-3 of FIG. 1;

FIG. 4 is a detailed cross-sectional view of the applicator assembly of FIG. 1 taken on the line 4-4 of FIG. 1;

FIG. 5 is a detailed view of the applicator tip structure assembly during a later stage of operation;

FIG. 6 is a partial cross-sectional view of certain parts during one stage of operation; and

FIG. 7 is a view similar to FIG. 6 at a later stage of operation.

The applicator of the present invention includes a flat work supporting surface or table 10 upon which sheets of paper to be assembled into snap-out forms may be located as adjustable guides.

A shaft 14 is supported from the under surface of table 10 by a pair of spaced bearing blocks 16, axial movement of shaft 14 relative to the bearing blocks being limited by suitably located stop collars 18 fixed to and rotatable with shaft 14. A pair of angularly aligned cranks 20 are clamped to shaft 14 at axially spaced locations for rotation with the shaft. The couplings between cranks 20 and shaft 14 may take the form of a radially extending notch 22 including concave seating surfaces such as 24 which are firmly clamped to shaft 14 by means of a nut and bolt assembly 26.

Table 10 is formed with a pair of slots 28 through which the respective cranks 20 project to locate the distal ends of cranks 20 above the surface of table 10.

An elongated applicator bar 30 is pivotally supported between the distal ends of cranks 20 by means of projecting stub shafts 32 which are loosely received within bores passing through the distal ends of the cranks. Bar 30 is axially positioned between cranks 20 by a pair of washers 34, 36 pinned to the left-hand (FIG. 2) stub shaft 32. A spring 38 is mounted in compression between washer 36 and the left-hand crank 20 to bias washer 34 against the opposite side of the crank.

The axis of rotation of applicator bar 30 about the axis defined by shafts 32 passes above the center of gravity of bar 30, hence bar 30 hangs freely between cranks 20 in such a manner that the vertical front and rear faces of bar 30 tend to remain in a vertical plane as cranks 20 are rotated about the axis defined by shaft 14.

Applicator bar 30 is constructed with a plurality of spaced vertically extending bores such as 40 which pass entirely through the bar at selected locations and are adapted to loosely receive rod-like applicator members 42. Each member 42 includes a stop collar 44 having a set screw 46 by means of which stop collar 44 may be clamped to member 42 at selected axial positions on the member. As best seen in FIG. 2, the engagement of stop collars 44 with the upper surface of applicator bar 30 determines the distance which applicator members 42 project below the lower surface of bar 30. Because of the relatively loose fit between members 42 and bores 40, applicator members 42 may move upwardly with respect to bar 30 quite freely (compare FIGS. 6 and 7).

To assist in controlling movement of applicator members 42 with respect to the fixed parts of the apparatus, an arm 48 which is fixedly secured to one of the subshafts 32 at the outer side of the adjacent crank 20. A roller 50 rotatably mounted at the outer end of arm 48 rides along the surface of a guide member 52 fixedly secured to the surface of table 10. The roller engaging surface of guide 52 is generally horizontal along its upper edge but terminates in a steeply inclined portion 54 along which roller 50 travels as crank 20 moves toward the

glue applying end limit shown in FIGS. 6 and 7. The relationship between the path of movement of cranks 20 and guide 52 is such that roller 50 is gravitationally maintained in engagement with guide 52.

As best seen in FIG. 4, pivotal movement of arm 20 about the axis of shaft 14 between the full line and broken line position of FIG. 4 drives roller 50 along the horizontal upper surface of guide 52 and pivots applicator bar 30 and hence applicator members 42 from the vertical position shown in full line to the inclined position shown in broken line. As roller 50 passes from the horizontal upper edge of guide 52 downwardly along the inclined edge 54, applicator bar 30 pivots back into a position where the applicator tips extend in a vertical direction. The intermediate tilting action shown in broken line in FIG. 4 controls the applicator bar in such a fashion that the tips travel in a substantially vertical direction as they approach the paper forms F supported upon table 10.

Shaft 14, and hence cranks 20, are driven from a motor 70 through a suitable mechanical transmission designated schematically at 72 in such a fashion that continuous rotation of motor 70 oscillates shaft 14 to drive cranks 20 between the generally vertical position shown in FIG. 4 and the inclined position shown in FIGS. 6 and 7. At the forward limit of each stroke the tips of applicator members 42 contact the surface of a paper form F to apply a small drop of glue to the form at each point on the form contacted by an applicator tip. At the opposite limit of stroke of cranks 20—that is the limit shown in FIG. 4—a controlled amount of glue is applied to each tip.

The application of glue to the applicator tips during each cycle of oscillation of the assembly is accomplished by a dipper bar 56 which is supported at the outer end of a pair of arms 58 fixedly secured to a shaft 60 supported for rotation above the surface of table 10 by a pair of pillow blocks 62. As best seen in FIGS. 2, 4 and 5 dipper bar 56 takes the form of an elongated tray having a longitudinal extent encompassing all of applicator members 42 supported in applicator bar 30.

Dipper bar 56 is driven between the full line position of FIG. 4 and the broken line position of FIG. 4 by a bent link assembly 64 which is fixed to shaft 60 and supports a roller 66 at its outer end in position to be contacted by the rear surface of one of cranks 20 when the crank is generally between the full line position of FIG. 4 and the broken line position of FIG. 4. Although bent link 64 is shown as being constructed of two members in FIG. 3, the two portions of the link are rigid with each other and hence act as a single rigid link. As crank 20 is driven from the broken line position of FIG. 4 to the full line position of FIG. 4, roller 66 engages the rear surface of the crank 20 shown in FIG. 3. As the crank moves into the vertical position shown in FIG. 3, roller 66 rolls up the rear surface of the crank and rotates shaft 60 in a counterclockwise direction as viewed in FIG. 3 (clockwise as viewed in FIG. 4) to elevate dipper bar 56 upwardly from the broken line position in FIG. 4 wherein the dipper bar is immersed within a storage container 66 containing a supply of liquid adhesive into the position shown in FIG. 3 and the full line position in FIG. 4. The depth of the tray-like dipper bar 56 thus regulates the amount of liquid adhesive applied to the tips of applicator member 42.

To summarize the operation of the device, motor 56 is energized to drive cranks 20 between the glue applying position shown in FIGS. 6 and 7 and the glue receiving position shown in FIGS. 3 and 4. When cranks 20 are at the end limit of rotary movement shown in FIGS. 6 and 7, the tips of applicator members 42 contact the uppermost sheet of a stack of forms F and apply a small drop of glue to the form at each point contacted by the

tip of an applicator member 42. Each time cranks 20 are returned to the vertical position shown in FIGS. 3 and 4, dipper bar 56 is driven upwardly from the broken line position of FIG. 4 to the full line position to transfer a small charge of glue or liquid adhesive from container 68 to the tip of each applicator member. While the assembly is in the glue receiving position shown in FIGS. 3 and 4, an additional form F is manually placed upon the stack of forms. As the thickness or height of the stack builds up, the applicator members are free to slide upwardly within their respective bores 40 in the fashion shown in FIG. 7 to accommodate for the increased height of the stack. As the cranks 20 are pivoted away from the glue applying position as in FIG. 7, the applicator members slide freely down through bores 40.

To accommodate for different sized forms or to regulate the number of spots of glue application to each form, the number and location of applicator members 42 supported within applicator bar 30 may be varied at will.

While we have disclosed but a single embodiment of the invention, it will be apparent to those skilled in the art that the disclosed structure may be modified. Therefore, the foregoing description is to be considered exemplary rather than limiting and the true scope of the invention is that defined in the following claims.

We claim:

1. An applicator for applying liquid adhesive to selected locations on a work material surface comprising a frame adapted to support work material with the surface to which adhesive is supplied being in a horizontal position, a pair of aligned crank arms each pivotally mounted at one end upon said frame for rotation at spaced locations upon a common horizontal axis, an elongate applicator bar, means pivotally supporting said applicator bar between the other ends of said crank arms for pivotal movement relative to said crank arms about an axis parallel to said common axis, said bar having a plurality of parallel bores extending downwardly therethrough, a rod-like applicator member slidably received in each of said bores and having a tip projecting downwardly below said bar, means for simultaneously oscillating said crank arms about said common axis between a first position wherein said applicator tips engage the surface of work material on said frame and a second position wherein said applicator members are spaced from said work material surface, a control arm fixedly coupled at one end to said applicator bar and having a guide roller rotatably mounted at its other end, a stationary guide member on said frame engageable with said guide roller to pivot said bar relative to said crank arms during oscillation of said crank arms to cause the tips of said applicator members to move vertically downwardly throughout the final portion of movement onto said work material, and means for applying a predetermined quantity of liquid adhesive to each applicator tip when said tips are in said second position.

2. An applicator as defined in claim 1 wherein said means for applying liquid adhesive to said tips comprises a dipper tray, a supply container of liquid adhesive, means supporting said dipper tray for movement between a normal position wherein said tray is located in said container and a second position wherein said tray is in contact with the applicator tips when the tips are in their second position, the quantity of liquid adhesive applied to said tips being determined by the depth of said tray.

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