ADHESIVE DISPENSING MACHINE
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This invention relates to a machine for dispensing a liquid adhesive onto a sheet material.

Dispensing tissue makes common use of devices known as "tipping machines" which dispense a thin line of a liquid adhesive to a sheet of paper so that it may be joined to other sheets to form a pad. These machines commonly employ a reservoir full of the liquid adhesive and a bar containing a plurality of probes which extend downwardly from it. The machine acts to lower the bar into the reservoir until the probes come in contact with the surface of the liquid adhesive. The bar is then raised from the reservoir, moved from the reservoir and again lowered until the probes come in contact with a sheet of paper so as to deposit a plurality of points of adhesive on it. The sheet is then either manually or automatically removed and another sheet inserted in position while the bar passes through another cycle.

It is an object of the present invention to provide such a machine for dispensing the liquid adhesive which is simple in construction so as to be low in cost and dependable in operation.

The preferred embodiment of the present invention, which will subsequently be described in detail, broadly comprises a horizontal bar having a plurality of vertical probes extending from its lower end, which is supported by an arm pivotally connected to the bar in its horizontal position. The linkage is freely pinned so that it may be raised and lowered. It is supported on a slide which allows it to be displaced in a horizontal direction.

The bar is moved in the vertical direction by a cam that bears against one of the horizontal members of the linkage and is powered by an electric motor acting through a gear drive. Another cam powered by the same drive operates to slide the linkage in a horizontal direction.

The time relationship of the rotating of the cams is such that the linkage first lowers the bar into the reservoir containing the liquid adhesive; then vertically lifts the bar out of the adhesive; next moves the linkage in a horizontal direction so as to clear the bar from the reservoir; next lowers the bar until the probes contact the sheet of paper; then lifts the bar and again moves it horizontally to bring it back to the starting point of the cycle.

Since the level of adhesive in the reservoir gradually lowers as it is used, the machine provides means for bringing adhesive into contact with the probes as long as there is a small amount contained in the reservoir. This takes the form of a horizontal bar which is normally disposed at the top of the reservoir and is lowered once during each machine cycle so as to accumulate a film of adhesive on its top surface which is then contacting and removed by the probes.

Other objects, advantages and applications of the present invention will be made apparent by the following detailed description of the above-described preferred embodiment to the invention. The description makes reference to the accompanying drawings in which:

FIGURE 1 is a perspective view of the machine showing the bar in two alternate positions;
FIGURE 2 is an elevation view of the machine illustrated in FIGURE 1; and
FIGURE 3 is an end view of the machine again showing the bar in alternative positions.

The glue or other liquid adhesive which the machine dispenses is retained in an elongated rectangular reservoir 10. The reservoir is supported with respect to the base of the machine 12 by a pair of elongated members 14.

The reservoir 10 is manually filled with a suitable adhesive and at regular intervals must be refilled.

The adhesive is actually picked from the reservoir and deposited on to the paper by a plurality of vertical pins 16. The pins, and certain of the structure which supports them are shown in an alternative position in each of the three drawings. The numerals associated with the elements of the alternative position are indicated by the suffix "A." Thus the pins are designated 16A. Similarly, the pin 16B is the alternative view. Pins 16 are supported by a horizontally disposed rectangular bar 18 which has 3 rows of vertical holes 20 along its length. The pins 16 possess widened heads 22 which are incapable of passing through the holes 20. Thus the pins 16 which loosely fit in the holes 20 are supported therein by the heads 22 in such a manner as to be free for vertical movement though restrained into a lower position by the force of gravity.

As will be subsequently described the bar 18 is lowered a sufficient distance to allow the lower ends of the pin 16 to come into contact with the adhesive level and the reservoir 10 when it is at its low point. When the adhesive level is higher it causes the pin 16 to raise in the bar 18 so that only their lower ends come in contact with the material. Similarly if the level of the paper to which the adhesive is to be applied is higher than normal it again cause the pins 16 to raise in the holes 20.

The bar 18 is supported by a vertically aligned yoke 24. The yoke 24 is actuated and supported by an upper pair of arms 26 and a lower pair of arms 28. The arms 26 encompass the yoke at both its sides at its upper end and are connected therein to a pivotable member. Similarly, the two ends of the yoke 28 are pivotably connected to mid-points on opposite sides of the yoke 24. The arms 26 and 28 are disposed parallel to one another and their other ends are each pivotably connected to points on opposed sides of a slidable housing 30.

The housing 30 is movable along the base 12 in a direction perpendicular to the extension of the bar 18 on four wheels 32 which are disposed at the corners of its lower ends. The two wheels farthest away from the bar 18 move on pads 34 disposed on the base 12 and they are retained in a downward position by a cover plate 36 that bears on their top sides. This plate is supported above the base 12 by two legs 38. Similarly, the front wheels move on pads 40 and are retained in a downward position by cover plate 42.

The slidable housing 30 is normally biased to a position toward the end of the machine adjacent the reservoir 10 by a tension spring 44 which extends between the front cover plate 42 and a plate of the housing and acts to bias the housing toward the reservoir end.

The gradual lowering of the adhesive level in the reservoir 10 is compensated by a horizontal bar 48 which is disposed within the reservoir 10. The bar is supported by a pair of linkage members 52 which are pivotably supported about a pair of points 54 on opposed points of the inner walls of the housing 30. The bar 48 is normally disposed at a position adjacent to the top of the reservoir 10 by a spring 56 which is disposed between one of the members 52 and the wall of the housing 30. When the linkage member 28 is lowered to place the bar 18 in position over the paper a contact button 58 on its lower end pressed the bar 52 downwardly so as to lower the bar 48 into the reservoir to pick up adhesive. When the linkage 28 rises, the bar 48 is allowed to return to its normal position at the top of the reservoir 10 where it awaits the probe 16.

The operation of the machine is energized by an electric motor 60 which has its shaft connected to a geared speed reducer 62. As may be seen in FIGURE 3 the reducer has two output shafts 64 and 66 on opposite sides of its housing. These shafts rotate at the same speed but...
are at different elevations. The shaft 64 drives a cam 68 which is constantly in pressured contact with a cam follower 70 as a result of the spring 44 urging the follower 70 against the cam. The follower is rotatably supported on an interior wall of the housing 30. The rotation of the cam 68 thus drives the housing 30 along a reciprocating path in a direction transverse to the extension of the reservoir 10.

Both the motor 60 and the reducer 62 are supported in a stationary position with respect to the machine base 12; the motor being supported on a shelf 70 which projects from the reducer 62.

The second shaft 66 drives a cam 72. A cam follower 74 which is rotatably supported on the upper linkage member 26 continually bears against the cam 72 by the force of gravity. The rotation of the cam 72 causes the linkage 24, 26, 28 to be reciprocally raised and lowered about its hinge points on the housing 30.

The timed relation and the shapes of the cams 68 and 72 is such as to provide the desired motion which may be summarized as follows:

1. Starting with the bar 18 in a lowered position over the reservoir 10, the linkage 24, 26 and 28 is first lifted by the high point of the cam 72;

2. The cam follower 74 then dwells on the cam 72 while the rotation of the cam 68 allows the carrier 30 to move in the direction of the reservoir 10 under the force of the spring 44;

3. The follower 70 then dwells on the cam 68 while the rotation of the cam 72 allows the linkage 24, 26, 28 to lower the bar into the position indicated on 18A where it deposits a plurality of points of adhesive on the sheet of paper disposed beneath it.

4. The linkage 24, 26, 28 then rises under the rotation of the cam 72;

5. The housing 30 then slides away from the reservoir 10 under the force of the cam 68;

6. The linkage 24, 26, 28 then lowers as the result of the rotation of the cam 72, placing the ends of the probes into contact with the bar 48 where they pick up adhesive.

As previously noted when the linkage 24, 26, 28 lowers to bring the bar 18 into contact with the paper the button 58 presses the bar 48 into the reservoir 10 so as to pick up adhesive. When the linkage rises away from the paper the bar 48 rises to the top of the reservoir 10.

Having thus described my invention I claim:

1. A machine for dispensing liquid adhesive, comprising: a base; an elongated adhesive reservoir fixed with respect to said base; a gear reducer fixed with respect to said base and having two output shafts on its opposite sides; an electric motor drivingly connected to said gear reducer; dissimilar cams connected to each of the output shafts of said reducer; a housing member slidably along said base in a direction transverse to the extension of said reservoir; a first cam follower rotatably supported on said housing member and adapted to engage one of said cam members; spring means connected between said base and said housing member and adapted to maintain said first cam follower in pressured contact with such cam; a linkage including a pair of parallel members each having one of their ends pivotably connected to said housing; a cam follower disposed on one of said linkage members and adapted to bear against the other of said cams; a vertical support member pivotably connected to the extreme ends of each of said linkage members so as to be disposed in a vertical position; and a horizontal bar having a plurality of vertically depending probes retained on said support member parallel to said reservoir.

2. A machine for dispensing liquid adhesive, comprising: a base; an elongated adhesive reservoir fixed with respect to said base; a gear reducer fixed with respect to said base and having two output shafts on its opposite sides; an electric motor drivingly connected to said gear reducer; dissimilar cams connected to each of the output shafts of said reducer; a housing member slidably along said base in a direction transverse to the extension of said reservoir; a first cam follower rotatably supported on said housing member and adapted to engage one of said cam members; spring means connected between said base and said housing member and adapted to maintain said first cam follower in pressured contact with such cam; a linkage including a pair of parallel members each having one of their ends pivotably connected to said housing; a cam follower disposed on one of said linkage members and adapted to bear against the other of said cams; a vertical support member pivotably connected to the extreme ends of each of said linkage members so as to be disposed in a vertical position; and a horizontal bar having a plurality of vertically depending probes retained on said support member parallel to said reservoir.

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