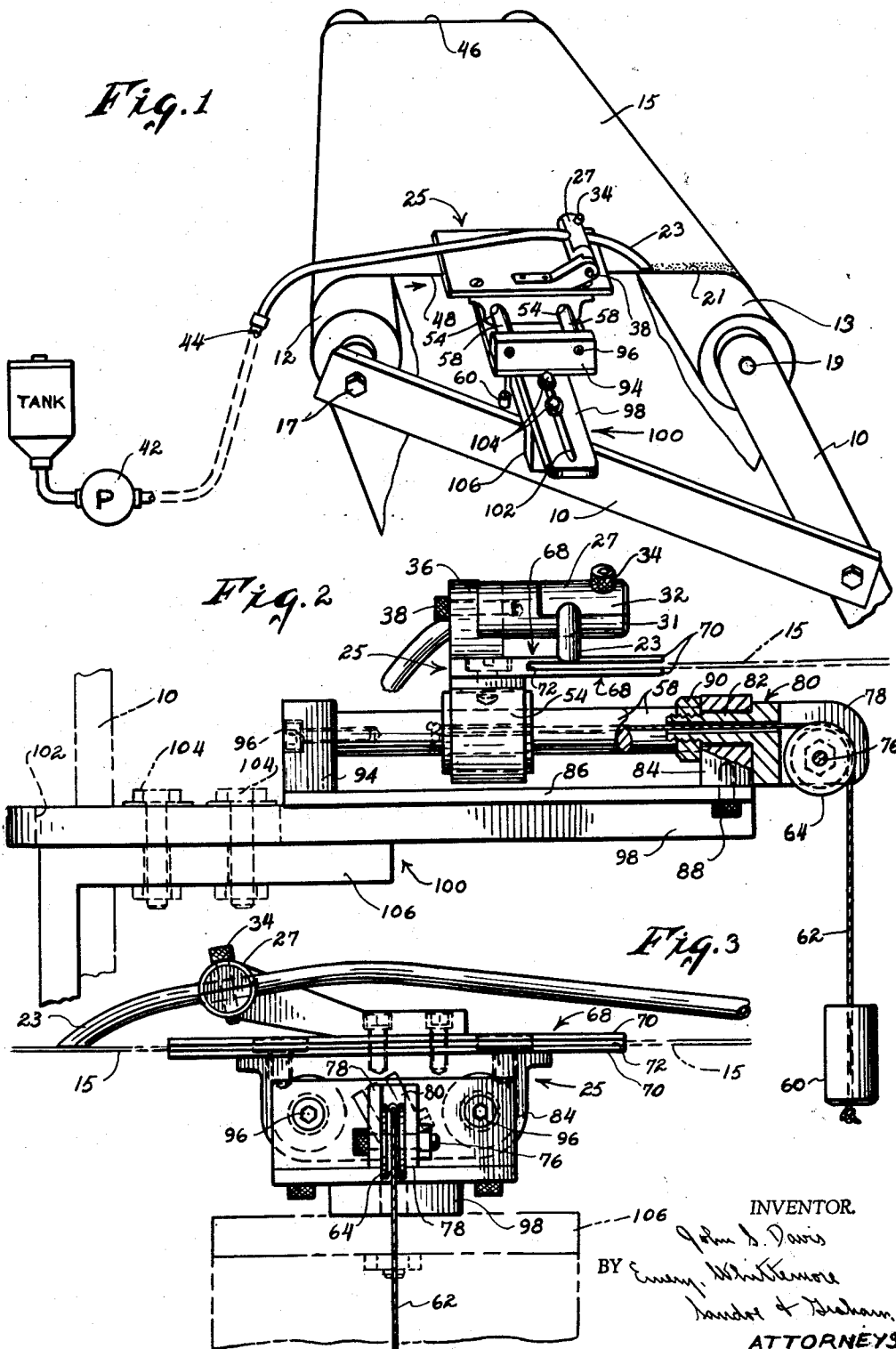


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COATING MATERIAL ALONG A WEB
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APPARATUS FOR APPLYING A LINE OR BAND OF COATING MATERIAL ALONG A WEB

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This invention relates to applicators for applying material to a line or narrow area or band along the length of a traveling web at a controlled distance from one edge of the web. The invention will be described as applied to machines that fold and seam the web with a lap seam at an area to which an adhesive has been applied.

It is an object of the invention to provide an improved applicator that applies ink, powder, adhesive or other material to a web at a constant distance from an edge of the web, and that shifts transversely of the direction of travel of the web to follow the web in the event that the web creeps one way or the other along the length of rollers or other supports over which the web passes. This obtains a constant relation between the edge of the web and the material applied thereto so that the material is always at the correct location when a web is folded and the edges are lapped to form a seam.

Another object is to provide an applicator of the character indicated with a support along which the applicator is movable into contact with an edge of a traveling web and with means for maintaining the applicator in contact with the edge of the web regardless of shifting of the web transversely.

The applicator of this invention requires no electric motor, vacuum pump, hydraulic or air cylinders or diaphragms for its operation. This not only makes the cost of manufacture extremely low, but results in substantially maintenance-free operation. Mechanics and electricians are not required for installation, maintenance or servicing.

The invention is particularly useful in applying adhesive to the web in machines for making paper bags, and it effects economy in the manufacture of bags in that a bag of given size can be made with a narrower lap seam because of the improved control of the adhesive application, and thus the width of the web used for making the bag can be somewhat narrower. This results in a substantial saving in paper.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views:

FIGURE 1 is a perspective view showing a portion of a bag making machine equipped with the applicator of this invention;

FIGURE 2 is an end view, partly broken away and in section, showing the applicator of FIGURE 1; and

FIGURE 3 is a side elevation of the applicator shown in FIGURES 1 and 2.

FIGURE 1 shows parts of a frame 10 of a bag-making machine. The machine includes two rollers 12 and 13 over which a web of paper 15 passes as it travels through the machine. The rollers 12 and 13 turn on axles 17 and 19, respectively, and in the construction illustrated these rollers 12 and 13 are idlers. It will be understood that there are other feed rolls in the machine which are driven by power and which advance the web of paper 15 at a substantially constant speed. The rollers 12 and 13 are representative of supports over which a web passes to change its direction of travel.

A band of adhesive 21 is applied to the web of paper

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15 near one edge of the web and along a narrow area extending lengthwise of the web and preferably spaced a short distance inward from the edge of the web. Adhesive 21 is applied to the paper 15 from a nozzle 23 attached to a holder 25 by a nozzle connector 27. This connector 27 includes a lower clamping element 31 (FIGURE 2) and an upper clamping element 32 which is attached to the lower clamping element 31 by a screw 34. The nozzle 23 is clamped between these clamping elements 31 and 32.

The clamping element 31 is attached to an upper bracket 36 by a screw 38. When this screw 38 is loosened, the clamping element 31 can be rotated to move the nozzle 23 toward and from the paper 15 and the screw 38 can be tightened to hold the nozzle 23 in any adjusted position. The apparatus can also be operated by leaving the screw 38 slightly loose so that the lower clamping element 31 can rock or oscillate on the screw 38 and thus maintain the nozzle 23 in contact with the top surface of the paper 15 to accommodate itself to any rise and fall in the level of the paper as it travels through the machine.

Ordinarily the nozzle 23 is set so as to clear the surface of the paper by a small amount and minor variations in the clearance between the nozzle 23 and the paper 15 do not affect the application of adhesive 21 since they do not change the spacing of the nozzle from the edge of the web of paper 15. A steady supply of adhesive 21 is supplied to the nozzle 23 from the pump 42 which is connected with the nozzle 23 by a flexible hose or tube 44.

The rollers 12 and 13 are longer than the width of the web of paper 15; and in high-speed machines it is substantially impossible to prevent the web of paper 15 from creeping one way or the other along the length of the rollers 12 and 13 during the operation of the machine. The extent of this creep may be within a relatively narrow range, but in conventional machines it does affect the spacing of the adhesive from the edge of the web and this means that the overlap of the edges of the web, when folded and seamed, must be sufficient to allow for the maximum variation in the spacing of the adhesive from the edge of the web.

The applicator holder 25 has two cylindrical openings 54 which have parallel axes and which serve as bearings on which the holder 25 slides along bearings or guides 58. The guides 58 are parallel rods or shafts which fit through the cylindrical openings 54 with the clearance necessary to move freely parallel to the axes of the shafts; and the openings 54 are long enough to provide bearing surfaces which cannot shift into oblique positions where the parts jam against movement along the guides 58.

The holder 25 slides freely along the guides 58, but it is provided with means urging it to move in one direction. This means includes a weight 60 at one end of a cord 62. The cord 62 passes over a pulley 64 and has its other end attached to the holder 25 at a location between the guides 58. The weight 60 is made heavy enough so as to overcome the friction of the holder 25 on the guides 58.

The weight 60 and pulley 64 are at the inner end of the guides 58 so that they urge the holder 25 to move along the guides 58 in a direction toward the edge of the web of paper 15. The movement of the holder 25 is limited by contact with the edge 48 of the paper.

The holder 25 has an abutment which contacts with the edge of the paper, and this abutment consists of a channel 68 which has side faces or sides 70 extending parallel to one another and one of which is located above the paper 15 while the other is below the paper 15. The bottom of the channel extends between the sides 70 as in-

dictated by the reference character 72, and it is the surface of this bottom 72 which serves as the actual area of abutment of the channel against the edge of the paper 15. The length of the channel bottom 72 is made substantial so as to distribute the pressure of the holder 25 along an extensive length of the edge 48; and the side faces or sides 70 of the channel 68 are of large area so as to prevent any wrinkling of the paper 15 in the region where the pressure is applied to the edge. It will be understood that the sides 70 of the channel 68 are parallel with one another and spaced apart by a distance somewhat greater than the thickness of the web of the paper so that the paper can move freely between the sides 70 but cannot distort to any substantial extent without striking against the sides 70.

The ends of the opening through the channel 68 are preferably flared for entrance of the paper into the end of the channel without danger of scraping on the ends of the channel; and by flaring both ends the channel is interchangeable in position; that is, can be mounted with either side uppermost.

The rollers 12 and 13 are relatively close together so that the edge of the web that regulates movement of the holder 25 and applicator nozzle 23 is supported both ahead of and behind the holder relatively close to said holder; and the discharge end of the nozzle 23 is close to the roller 13.

The weight 60 and cord or cable 62 are merely representative of means for giving the holder 25 a bias toward the web of paper which is traveling through the machine. A spring could be used but the weight 60 has the advantage that it exerts the same force at all locations along the guides 58 whereas the pressure of a spring changes as the length of the spring changes with resulting variations in the tension.

While it is true that the weight 60 and the supporting cable 62 must hang vertically below the pulley 64, the invention is constructed so that this is possible even though the applicator may be located along an ascending or descending run of the web of paper. For example, the pulley 64 rotates on an axle 76 extending between lugs 78 of a frame 80. This frame 80 has a stud 82 extending through an opening in a block 84 which is attached to a plate 86 by screws 88. The end of the stud 82 is threaded for receiving a nut 90.

The cable 62 extends through an opening along the axis of the stud 82 and this axis is tangent with the top of the pulley 64. When the nut 90 is loosened, the stud 82 can be rotated in the block 84 so as to give the axle 76 of the pulley 64 a horizontal orientation no matter what the upward or downward slope of the web of paper may be at the particular location where the applicator is attached to the machine. FIGURE 3 shows the way in which the pulley 64 and its supports can be rotated into different positions, one such position being shown in dotted lines in this figure.

The guides 58 are supported at one end by the block 84 and they are supported at the other end by a similar block 94. There are screws 96 connecting the guides 58 to the blocks 84 and 94. The guides 58, blocks 84 and 94, and the plate 86, together with the apparatus for the pulley and cable constitute a support for the applicator holder 25; and this support is attached to an upper part 98 of bracket means 100 by which the holder is attached to the frame 10 of the machine. There is a long slot 102 in the upper part of the bracket means 100. Bolts 104 extend through the slot 102 and through openings in a lower part 106 of the bracket means. This lower part 106 is rigidly secured to the frame 10.

By loosening the bolts 104, the upper part 98 of the bracket means can be shifted lengthwise of the slot 102 to move the support for the applicator holder transversely of the direction of travel of the web. Thus the applicator assembly can be adjusted for narrower or wider webs.

While it is true that the necessary adjustment for webs

of different widths could be obtained by having the guides 58 made longer, a simpler, lighter, and more economical construction is obtained by making the guides 58 long enough to accommodate the maximum transverse creep that can occur on any particular width of web, and then by providing the adjustable bracket means 100 for locating the guide 58 in different positions for webs of different widths.

In the preferred construction, which has been described, the rollers 12 and 13 are relatively close together and the applicator is located between these rollers where the unsupported run of paper 15 is relatively short. The paper is under some tension in machines of the character to which this invention relates. Nozzle 23 is located beyond the channel 68 and applies adhesive 21 to the paper 15 at a location close to the roller 13 where the paper is adequately supported. The channel 68 serves not only as a guide but in doing so acts as a hold-down for maintaining the paper 15 in a substantially level position at all times with respect to the nozzle 23. It will be understood, however that the invention is not limited to the embodiment illustrated and that various changes and modifications can be made, and some features can be used in different combinations without departing from the invention as defined in the claims.

What is claimed is:

1. In a machine in which a band of adhesive is applied to a region adjacent to an edge of a traveling web before the web is folded to include said edge in a lap seam, an applicator for applying the band of adhesive to the web along said region, a holder for the applicator located on one side and only one side of the web and movable in a direction parallel to the plane of the web at the region of the applicator, yieldable means all of which are remote from the web urging the applicator holder toward an edge of the web, and an abutment extending from the applicator holder and into contact with the edge of the web when the applicator is in position to apply said band of adhesive at the correct distance from the edge of the web.

2. The combination described in claim 1, and in which the web passes over rollers of greater length than the width of the web, and there is a support along which the holder is movable for a distance at least as great as the maximum range of any creep of the web back and forth along the length of the rollers during the operation of the machine.

3. The combination described in claim 2, and in which the support for the holder has guides extending transversely of the length of the web and along which the holder moves.

4. The combination described in claim 2, and in which the holder for the applicator is located between successive rollers that are relatively close together so that the edge of the web that regulates movement of the holder and applicator is supported both ahead of and behind the holder relatively close to said holder, and the applicator has a discharge end adjacent to the web and close to one of the rollers.

5. The combination described in claim 3, and in which the abutment is a channel with sides that confront the top and bottom of the web while the bottom of the channel between said sides contacts with the edge of the web.

6. The combination described in claim 5, and in which the channel extends for a substantial distance along the length of the web and inwardly for a substantial distance from the edge of the web and the channel has side faces confronting the opposite sides of the web over relatively large areas to prevent wrinkling of the web.

7. The combination described in claim 3, and in which the holder and the applicator are urged toward the web by a weight with a cable connected to the weight at one end and to the applicator holder at the other end.

8. In a machine in which a band of adhesive is applied to a region adjacent to an edge of a traveling web before

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the web is folded to include said edge in a lap seam, an applicator for applying the band of adhesive to the web along said region, a holder for the applicator movable in a direction parallel to the plane of the web at the region of the applicator, means urging the applicator holder toward an edge of the web, and an abutment extending from the applicator holder and into contact with the edge of the web when the applicator is in position to apply said band of adhesive at the correct distance from the edge of the web, and in which the web passes over rollers of greater length than the width of the web, and there is a support along which the holder is movable for a distance at least as great as the maximum range of any creep of the web back and forth along the length of the rollers during the operation of the machine, and the support for the holder has guides extending transversely of the length of the web and along which the holder moves, and in which there is a bracket connecting the guides to a fixed part of the machine, and the bracket has adjustable means for changing the position of the guides transversely of the web to shift the range and movement of the holder to accommodate webs of greater or lesser width.

9. In a machine in which a band of adhesive is applied to a region adjacent to an edge of a traveling web before the web is folded to include said edge in a lap seam, an applicator for applying the band of adhesive to the web along said region, a holder for the applicator movable in a direction parallel to the plane of the web at the region of the applicator, means urging the applicator holder toward an edge of the web, and an abutment extending from the applicator holder and into contact with the edge of the web when the applicator is in position to apply said band of adhesive at the correct distance from the edge of the web, and in which the web passes over rollers of greater length than the width of the web, and there is a support along which the holder is movable for a distance at least as great as the maximum range of any creep of the web back and forth along the length of the rollers during the operation of the machine, and the support for the holder has guides extending transversely of the length of the web and along which the holder moves, and in which the holder and the applicator are urged towards the web by a weight with a cable connected to the weight at one end and to the applicator holder at the other end, and in which a pulley is on an axle carried by supporting means that are rotatable about an axis which is substantially tangent to the top of the pulley to accommodate the pulley to orientation of the supports for upwardly and downwardly-sloping webs.

10. An applicator assembly for applying a coating of material to a relatively narrow area along the length of a traveling web and at a constant distance from one edge of the web while leaving the web beyond the area uncoated by said material, said applicator assembly including a nozzle from which the material is applied to the web, a nozzle holder including a connector by which the nozzle is secured to the holder, a support having a bearing extending transversely of the direction of travel of the web and along which the holder is freely slideable on said bearing, an abutment on the holder for contact with an edge of the web to move the holder along said support when the web shifts transversely in one direction, yieldable means remote from the web urging the holder to slide along the bearing when the web shifts transversely in the other direction and with a force insufficient to

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wrinkle the web, and means for attaching the support to a fixed part.

11. The applicator assembly described in claim 10, and in which the means for attaching the support to a fixed part include bracket means having two parts, one of which is adjustable with respect to the other to change the length of the bracket means in the direction of the movement of the holder on the guide to accommodate webs of different width.

12. The applicator assembly described in claim 11, and in which the bracket means include a part having an elongated slot therein, and clamping elements that extend from the other part and through the slot.

13. An applicator assembly for applying material to a relatively narrow area along the length of a traveling web and at a constant distance from one edge of the web, said applicator assembly including a nozzle from which the material is applied to the web, a nozzle holder including a connector by which the nozzle is secured to the holder, a support having a bearing extending transversely of the direction of travel of the web and along which the holder is freely slideable on said bearing, an abutment on the holder for contact with an edge of the web to limit the movement of the holder along said support, yieldable means urging the holder to slide along the bearing with a force insufficient to wrinkle the web, means for attaching the support to a fixed part, and a bearing on which the nozzle connector is movable with respect to the holder for changing the position of the nozzle to adjust it to the surface of the web to which material is to be applied.

14. An applicator assembly for applying material to a relatively narrow area along the length of a traveling web and at a constant distance from one edge of the web, said applicator assembly including a nozzle from which the material is applied to the web, a nozzle holder including a connector by which the nozzle is secured to the holder, a support for the holder having two parallel guides, bearing surfaces on the holder that move along the parallel guides, the support extending transversely of the direction of travel of the web and along which the holder is freely slideable, an abutment on the holder for contact with an edge of the web to limit the movement of the holder along said support, yieldable means urging the holder to slide along the bearing with a force insufficient to wrinkle the web, and means for attaching the support to a fixed part.

15. The applicator assembly described in claim 14, and in which the guides are shafts and the bearing surfaces on the holder are the sides of cylindrical openings through which the shafts extend with clearance for sliding movement.

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