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2,674,974

APPARATUS FOR FORMING SPOTS OF ADHESIVE ON A MOVING WEB

Filed March 16, 1953

2 Sheets-Sheet 1

Fig. 1

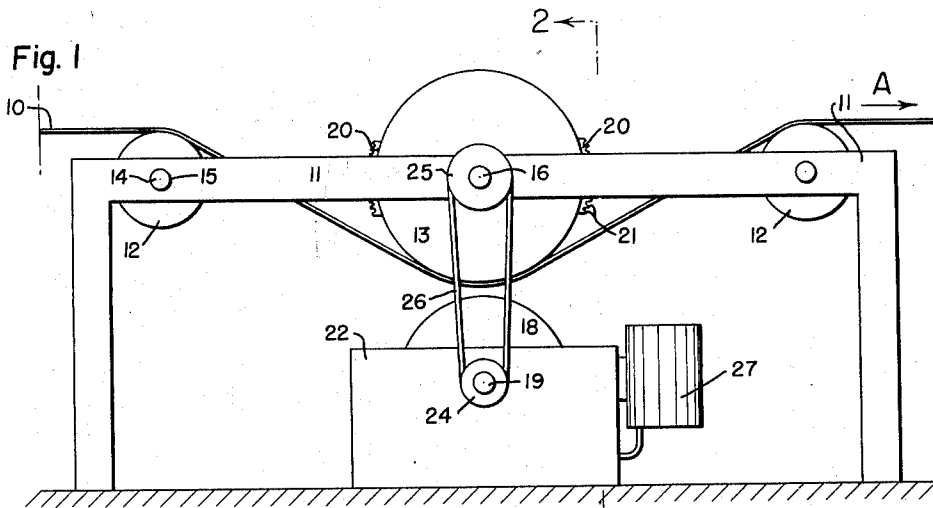


Fig. 2

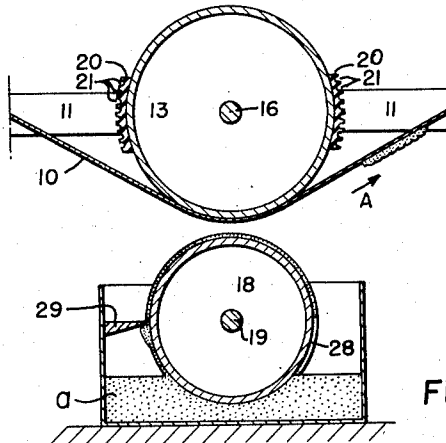
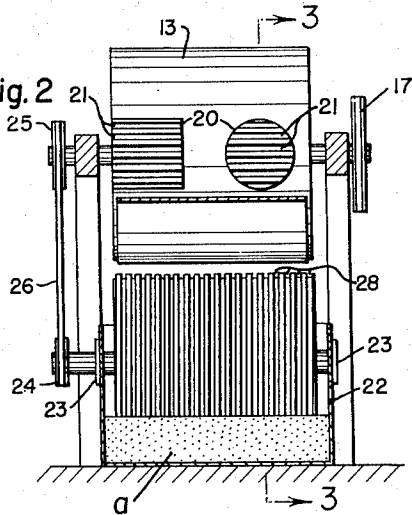


Fig. 3

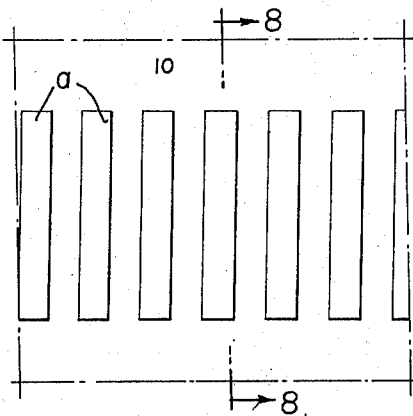


Fig. 7

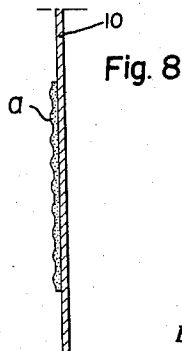


Fig. 8

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Fig. 4

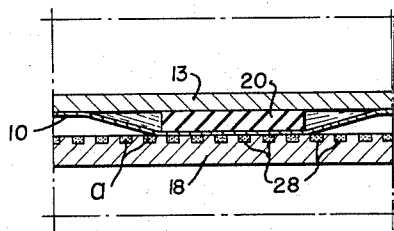
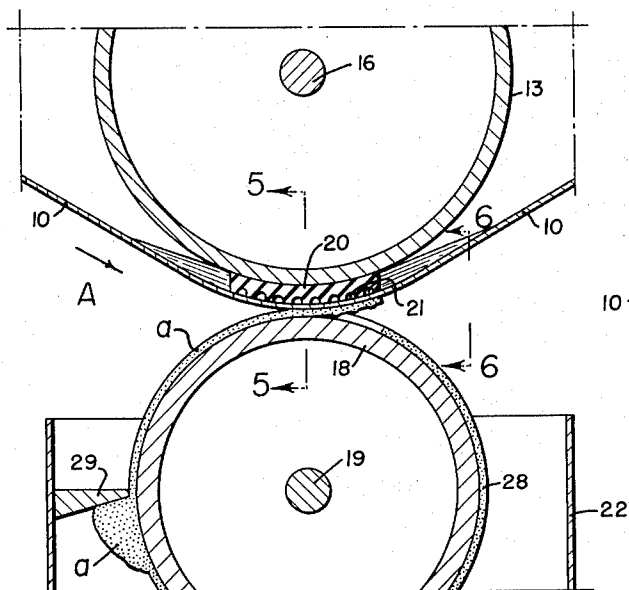


Fig. 5

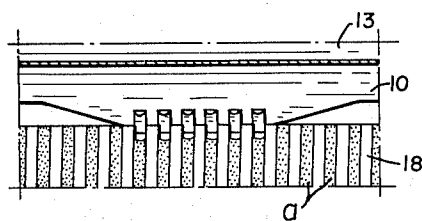


Fig. 6

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APPARATUS FOR FORMING SPOTS OF
ADHESIVE ON A MOVING WEBMyron B. Gwinn, Denver, Colo., and Donald E.
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Application March 16, 1953, Serial No. 342,646

6 Claims. (Cl. 118—210)

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This invention relates to means and apparatus for applying viscous liquid adhesive to the surface of paper or similar sheet material, and more particularly to apparatus for applying viscous liquid adhesive to the surface of a paper sheet at selected areas or spots, an object of the invention being to provide new and improved apparatus which is especially adapted to apply liquid adhesive at selected areas or spots upon a continuously moving web of paper.

Other objects of this invention are to provide such new and improved apparatus for the application of liquid adhesive at selected areas or spots upon a continuously moving web of paper which: (a) is adapted to apply the adhesive spots in a selected continuous cyclic pattern along the web in synchronism with other fabrication machinery which operates upon the web to form a series of units of paper articles; (b) is adapted to apply the adhesive to the web in a coating of uniform thickness without any pile-up of adhesive material at any part of the spot; (c) is particularly adapted for applying viscous adhesives, such as latex, which will vary in viscosity as from evaporation of thinner; (d) is adapted to be integrated into other paper working machinery as a part thereof; (e) minimizes the use of adhesive; and (f) is simple and economical in construction and economical and long lived in operation.

With the foregoing and other objects in view, all of which more fully hereinafter appear, our invention comprises certain novel constructions, combinations and arrangements of parts and elements as hereinafter described and as defined in the appended claims and illustrated, in preferred embodiment, in the accompanying drawing, in which:

Figure 1 is a side elevation view of my improved apparatus illustrating a web of paper moving therethrough.

Figure 2 is a sectional elevation as viewed from the indicated line 2—2 at Fig. 1.

Figure 3 is a sectional elevation as viewed from the indicated line 3—3 at Fig. 2.

Figure 4 is a fragmentary portion of the showing at Fig. 3 but on an enlarged scale and illustrating the elements in an alternate position from that shown at Fig. 3.

Figure 5 is a fragmentary sectional detail as viewed from the selected line 5—5 at Fig. 4.

Figure 6 is a fragmentary sectional detail as viewed from the indicated line 6—6 at Fig. 4.

Figure 7 is a fragmentary portion of a sheet of web with adhesive applied thereto in accordance with the invention.

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Figure 8 is a fragmentary section as viewed from the indicated line 8—8 at Fig. 7.

The manufacture of paper articles, such as covers, bands etc. for clothes hangers and various other articles, is often a large scale operation in which thousands or even millions of units will be made in a short period of time. The raw material, the paper, is furnished as large rolls to provide a continuous web which may be fed into cutting, forming and printing machinery, all as a continuous process. Also, in the manufacture of many paper articles it is necessary to apply adhesives to the paper surface at selected areas for joining such areas with other paper surfaces during the manufacturing process or subsequently thereto.

Liquid adhesives used for this purpose include water soluble glues and natural or synthetic latex solutions, each type having characteristics which makes it best suited for selected purposes. The apparatus hereinafter disclosed is especially adapted for the application of viscous types of latex adhesive which are often difficult to use because of the tendency of the adhesive to stick to apparatus and thicken during an operation through evaporation of thinning elements and because of the necessity for applying comparatively thick layers of latex to the paper. Such latex adhesive is commonly applied to a moving web of paper as a continuous strip or strips at selected portions of the web before the web enters the cutting and fabricating machinery. Where a continuous strip is unnecessary and where only spotted areas of adhesive are required for each article a considerable waste of adhesive occurs, especially when the production of thousands of articles is considered.

With these problems in mind, the present invention was conceived and developed, and comprises, in essence, an improved spot application apparatus which may be interposed along the path of a web of paper which moves into fabricating and/or printing machinery, including an adhesive supplying roll adapted to bring adhesive into proximity to the web and a drum having protuberances which move selected areas or spots of the paper against the adhesive supplying roll for transfer of the adhesive from said roll to the paper.

Referring to the drawing, a web 10 of paper moves through our improved spot applicator in the direction of the indicated arrow A. This apparatus may be positioned at any convenient location with respect to other paper working machinery so long as the adhesive may be applied before the paper web is cut into various articles.

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The apparatus is mounted upon any suitable framework 11 which includes a pair of horizontally disposed members adapted to carry a guide roll 12 at each end and a drum 13 at the center between the guide rolls. The web 10 passes over the guide rolls and under the drum 13 and it is contemplated that normal operative tension in the web will pull the web against the drum as necessary for proper functioning of the apparatus.

The guide rolls 12 may be of any simple construction, including journals 14 extending from each side of the rolls and into bearing sockets 15 in the members 11. Likewise, the drum includes journals 16 mounted in similar bearing sockets in the frame members 11. These journals are mounted in spaced parallelism, and while the bearing sockets 15 are shown as simple orifices through the frame members it is contemplated that such bearings may include any conventional type of adjusting means if this be required for web alignment purposes.

The manufacturers of large numbers of an article from a continuous web of paper necessitates cutting the web according to a predetermined spacing plan or pitch along the web which is dependent upon the size of the article. It follows that the diameter of the drum 13 must be such that its circumference is equivalent to such pitch or to a multiple of such pitch, and that the rate of rotation of the drum must be such that its periphery moves along with the web and in synchronism with other elements and machinery, not herein shown, which operate upon the paper web. Suitable driving means to rotate this roll are indicated by pulley 17 which is mounted upon an extension of the journal 16, and it is to be understood that this drive may be positively interassociated with other elements and machinery not herein shown.

The liquid adhesive is carried by a cylindrical applicator roll 18 which is mounted upon a shaft 19 below the drum 13 with the axes of the drum and roll 18 in spaced parallelism and with the upper point of the applicator roll 18 slightly below the lower point of the drum 13 so that the web 10 is close to but normally out of contact with the applicator roll 18. The drum and roll 18 operate together as hereinafter described and adhesive application is affected by tabs 20 which lie upon the surface of the drum and periodically, as the drum rotates, lift the web or a portion thereof from the drum periphery and into contact with the applicator roll 18.

The tabs 20 are of any predetermined shape and size and are positioned at any selected point or points on the drum periphery, in correspondence with the pitch required by the article being manufactured from the paper, to provide adhesive spots at desired locations on the finished paper article. It is to be noted, as indicated at Figs. 4, 5 and 6 that the elasticity of the web will permit that portion of the web underenath the tab to be moved against the applicator roll without materially disturbing the position of the remainder of the paper normally against the drum roll 13. Each tab 20 is formed of resilient material such as rubber and is necessarily yieldable to pressure encountered when the web 10 is pushed against the roll 18.

It was discovered that a series of corrugations 21 on the tab surface, transversely disposed with respect to the web movement, will prevent a pileup of the liquid adhesive as the adhesive-carrying surface of the applicator roll 18 con-

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tacts the web at the area defined by the tab. With the corrugated tab surface the pressure of contact is disrupted as each valley portion of a corrugation 21 moves across the point of contact between the tab-projected spot of the web and applicator roll thereby reducing the contact pressure which would otherwise cause an extrusion of the adhesive from out the area of contact.

The applicator roll 18 is mounted within a box-like container 22 with its shaft 19 extending through bearings 23 in the side walls of the container 22. A pulley 24 is mounted upon one extension of the shaft 19 and is operatively connected with a pulley 25 mounted upon an extension of the journal 16 of the drum 13 as by belt 26, the pulley diameters being such that the peripheral movement of the applicator roll 18 will correspond with that of the drum 13.

Liquid adhesive, indicated at *a*, such as latex, is supplied to the lower portion of this container 22 as from a reservoir 27, of any conventional type, which is adapted to regulate the adhesive level to keep the lower portion of the applicator roll submerged in adhesive. It follows that rotation of the roll 18 carries a layer of latex on its surface which is transferred to the web at the spot areas defined by the tabs 20.

Since latex type adhesives vary in viscosity the layer clinging to the roll may become excessively thick or it may be too thin. Therefore, our improved construction contemplates means for controlling the amount of latex which will be carried to the top of roll 18 and there applied to the web. This control is effectuated by a series of circumferential grooves 28 in the roll 18 combined with a scraper blade 29 which is held against the crests of the ridges between the grooves to remove all latex from the roll excepting that in the grooves 28. It is to be noted that the size and depth of the grooves 28 may be varied as desired and that these grooves may be formed as a series of circumferential cuts or they may be formed as a closely spiralled helix as shown to provide uniform wear upon the blade 29.

In operation of the apparatus, the movement of a tab 20 under the drum 13 causes the web 10 to be distended and contact the applicator roll 18 to pick up the latex in the grooves 28 as the latex will adhere to the web whenever the contact is made. Because of the slot-like construction of the roll 18 the adhesive will be deposited in a plurality of ridges and grooves, as clearly indicated at Figs. 7 and 8, and not as a solid, smooth surfaced spot.

While we have herein illustrated and described in detail a preferred construction of our invention, it is apparent that alternatives and equivalents of construction can be devised by those skilled in the arts which are within the scope and spirit of our invention, and hence, it is our desire that our protection be limited, not by the details of constructions herein illustrated and described but only by the proper scope of the appended claims.

We claim:

1. Apparatus for forming spots of adhesive on a moving web, including, in combination, a drum whose periphery bears against one side of the web, means for rotating the drum synchronously with the web movement, an applicator roll carrying adhesive on its peripheral surface and rotatably mounted in spaced parallelism with the drum on the opposite side of the web and having its periphery closely adjacent to but normally out

of contact with the web, and means for rotating said roll synchronously with the web movement, the drum periphery having a protuberance on its surface adapted to push the web against the roll, periodically responsive to drum rotation, and thereby cause transfer of adhesive from the roll to the web at the area of said protuberance.

2. Apparatus as defined in claim 1 wherein the protuberance has corrugations disposed transversely of the path of movement of the web.

3. Apparatus as defined in claim 1 wherein the applicator roll has a circumferential series of grooves therein.

4. Apparatus as defined in claim 3 in combination with means for removing from the periphery of the applicator roll, all adhesive not within the grooves.

5. Apparatus as defined in claim 3 wherein the grooves are formed as a helix.

6. Apparatus for continuous and cyclic appli-

cation of spots of adhesive to a moving web comprising a drum adapted to bear against the upper side of the web and rotate synchronously with the web movement, an applicator roll underneath the drum having its upper periphery closely adjacent to but normally out of contact with the underside of the web and being adapted to rotate synchronously with the web movement, a tab on the surface of the drum and adapted to push the web against the applicator roll as the tab moves between the drum and roll, and a body of adhesive contacting the underside of the applicator roll whereby rotation of said roll causes adhesive to be carried upon the roll periphery and movement of the web against the applicator roll causes a shifting of the adhesive from the roll to the web responsive to movement of the tab between the drum and roll.

No references cited.