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METHOD OF GUMMING AND DRYING ADHESIVE ON FLAT SURFACES

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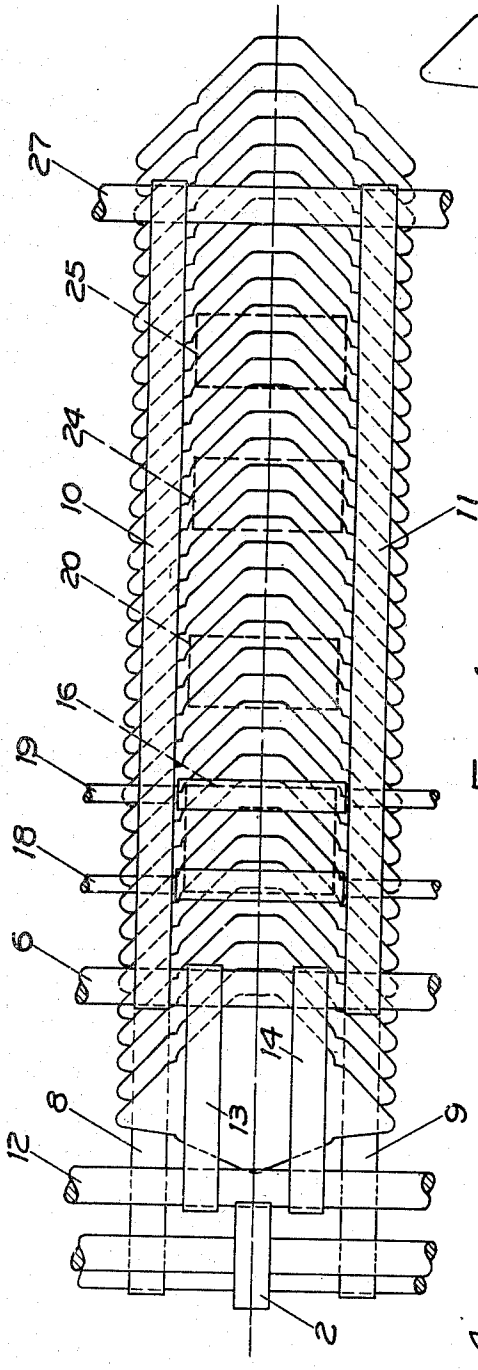

FIG. 1

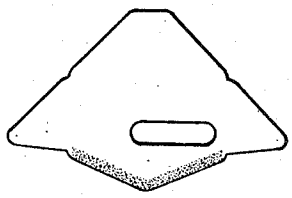

FIG. 3

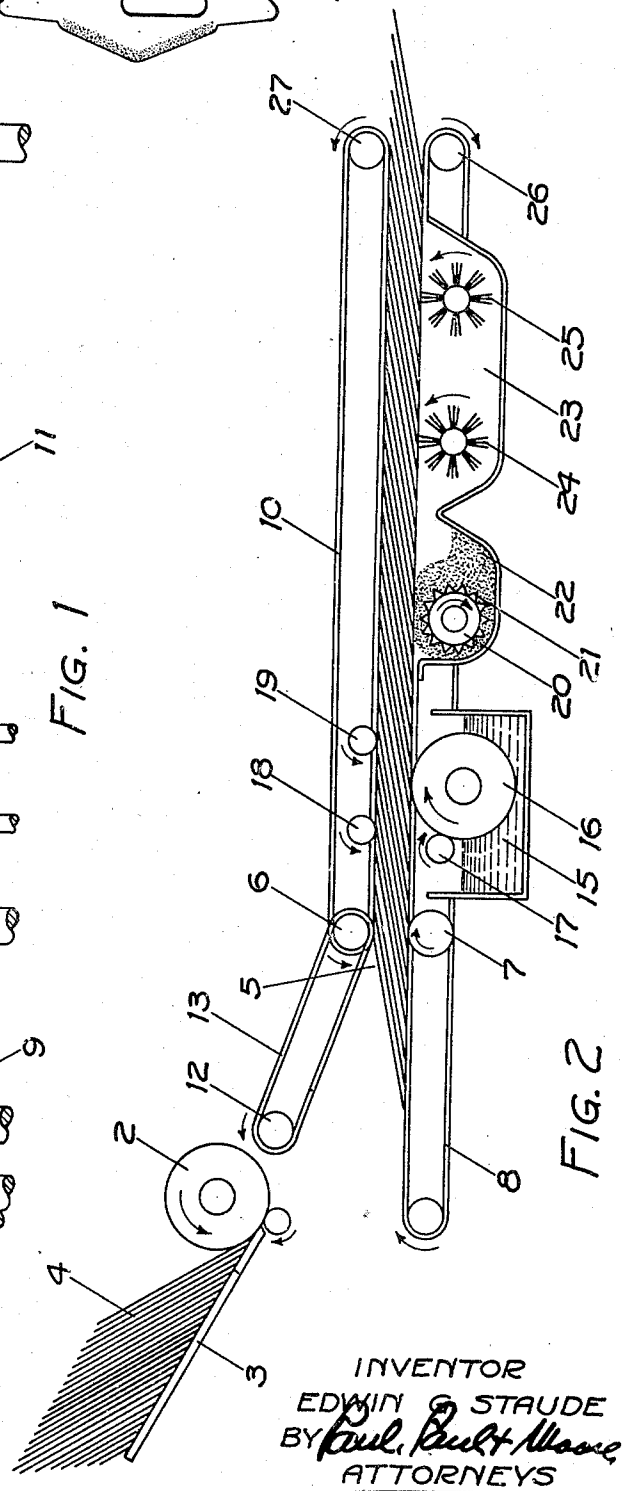

FIG. 2

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METHOD OF GUMMING AND DRYING ADHESIVE ON FLAT SURFACES

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4 Claims. (Cl. 91—68)

This invention relates to method and means for hastening drying of adhesive applied to articles while being fed toward a delivery point, an object being to obtain quick drying, so that it is unnecessary to reduce the speed of the machine in order that the articles may be perfectly dry before they reach the delivery end of the machine.

This invention also relates to mechanisms for applying adhesive to flat surfaces of paper blanks and the like, and for quickly drying the adhesive after application.

The particular application of this invention is for gumming and quickly drying the sealing flaps of open side or open end envelopes, but the invention is not entirely limited to the particular type of article handled.

The usual practice is to first feed the envelope blanks in overlapped relation and to gum the entire exposed sealing flap surface during feeding and later to expose the gummed surfaces to either gas or electric heat, supplemented by a fan to quickly remove the vapor or moisture dried out of the gum or adhesive by the heat. This procedure is quite unsatisfactory for various reasons.

It is necessary that the adhesive be of a smooth, even-flow consistency to obtain even application to the surface of the blank. This adhesive has a certain moisture content which must be absorbed by the paper or evaporated, to prevent accidental or premature sticking to the envelope, before use in the ordinary manner.

To carry out my process, I have devised a machine in which provision is made for handling envelope seals of varying widths up to two inches, and there is provided a "chain" or "pocket" into which each individual blank is delivered after the adhesive has been applied, and a distance of not less than two inches is allowed for each blank. Since it takes approximately one and a half minutes for the adhesive to dry under the present methods, and since the present high speed envelope machines are easily capable of feeding and folding five hundred envelopes per minute, it follows that the "chain" or "pocket" will have to include a sufficient number of "pockets" so as to provide a minute and a half's operation of the machine which, if running at 500 R. P. M., would mean seven hundred fifty "pockets." Since each "pocket" occupies a distance of two inches, the total length of the "chain" or "pockets" must therefore be fifteen hundred inches or one hundred twenty-five feet.

Inasmuch as the dried blank cannot be returned to its starting point in the "chain" or "pocket," it follows that the "chain" or "pocket" must be even longer. Such a mechanism is not only expensive, but occupies a great deal of space and requires considerable attention, particularly when the machine is stopped, because the heat must be turned off to prevent the adhesive on the sealing flap from drying too quickly and "curling." When there is a moist atmosphere, the drying is considerably slower and it is therefore common practice to reduce the speed of the machine so as to give sufficient time for proper drying.

In the practice of my method, herein described, I instantly absorb the extra moisture, by "dusting" powdered adhesive on the freshly gummed surface to absorb the moisture and dry the freshly gummed surface to prevent accidental adhesion when the sealing flap is folded over.

Features of the invention include the use of adhesive in two forms, respectively wet and dry; the use of one form of adhesive as a supplement of another form to increase the amount of adhesive and ultimate adhesive action and to hasten drying; the use of a common powder both as a base for liquid adhesive and as a drying powder, the one supplementing the other; the use of a powder to which water is added to make a liquid adhesive and the use of the same powder as a duster for drying; the consecutive application of wet adhesive and a dusting powder which will hasten drying but will not interfere with adhesive quality when the adhesive is subsequently moistened for use after drying, and broadly the scheme of hastening drying by the application of means other than hot air, which acts while the articles are being fed or are moving.

Objects, features and advantages of the invention will be set forth in the description of the drawing forming a part of this application, and in said drawing—

Figure 1 is a somewhat diagrammatic top plan view showing the relation of the blanks to the feeding means, and to the adhesive applying and adhesive drying means:

Figure 2 is a diagrammatic side view showing means by which my process is carried out; and

Figure 3 is a plan of the gummed side of a blank of the type shown in Figure 1.

In the drawing, 2 indicates a conventional type of feeder having a hopper 3 adapted for feeding the blanks 4 in overlapped relationship at the point 5 and between the rollers 6 and 7 which operate at a slower speed than the feeder 2, in order to produce the overlapped relationship of the blanks. The speed at which this feeder operates determines the distance of overlap.

Bottom carrier belts 8 and 9 are provided for supporting the outer edge of the blank, and these in turn have cooperating upper stretches of belts 10 and 11.

A guide roller 12 is provided, and a belt 13 and 14 passing around the guide roller 12 and the roller 6, serve to guide the blank into position, and said blanks are carried forward between the belts 8 and 9, and 10 and 11.

Numeral 15 indicates a glue reservoir in which operates a glue drum 16 having a rotary glue wheel scraper 17 for regulating the amount of flow on the surface of the glue drum 16. Suitable driven rollers 18 and 19 serve to hold the envelope blanks with the exposed sealing flaps in contact with the glue drum 16. The glue drum 16 is of the required width to apply adhesive over the entire exposed sealing flap. The rollers 18 and 19 are offset from the center of the adhesive applying glue drum sufficiently so that the adhesive will not transfer from the adhesive-applying glue drum to the rollers 18 and 19 when the machine is running empty, that is when no blanks are passing through same.

Directly after adhesive application, as just described, I apply dusting powder for which purpose I use a "spinner" or dusting wheel 20 having short pointed flutes 21, spaced a short distance away from the gummed surface of the blanks. The "spinner" wheel 20 operates in a hopper 22 and extends the same distance across the machine as the glue drum 16. The hopper 22 is filled with any sort of moisture absorbing material. I contemplate the use of gum or dextrine flour, or a dry composition of the same material from which the liquid sealing flap gum is made, except that it is in powdered form. These are features of the invention.

The "spinner" wheel 20 revolves in this powder, in receptacle 22, and the speed is sufficient to cause the flutes 21 to throw the powder against the freshly gummed surfaces of the blanks, by centrifugal force. By this method, the needed amount of applied liquid adhesive can be considerably less because of the added dry powdered adhesive base which supplements the previously applied adhesive to give the required total amount of adhesive necessary to give a quick and permanent seal after remoistening for use.

By this invention, the adhesive can be applied in a thinner film, and therefore contains less moisture. Therefore, less absorbent material is needed to dry the surface and moreover, the original wet adhesive application, with the addition of dry powdered adhesive, results in that thickness and amount of adhesive film which is necessary to make for perfect gummed sealing, when the gum is remoistened for ultimate use.

I may provide various means to remove the surplus dust or powder, either depending upon gravity or I may agitate the blank at this point and release the surplus powder by jarring. Also, I may use one or more brushes to remove the surplus powder.

In the drawing, I have provided a receptacle 23 in which receptacle are two revolving brushes 24 and 25. These brushes revolve in directions opposite to that of the directions of travel of the glue drum and the "spinner" wheel, and serve to remove the surplus dry adhesive which is not absorbed or will not adhere to the freshly gummed surface. The surplus material is collected in the bottom of the receptacle 23 and by suitable means (not shown) is transferred to the hopper 22. As the blanks leave the brushes 24 and 25, the gum on the sealing flaps is sufficiently dry so that it will not adhere to the envelope when the envelope fold is completed by closing the sealing flap against the body.

With this method, I am able to gum and dry the sealing flaps of either open end or open side envelopes almost instantly and at any speed, regardless of moisture conditions of the atmosphere, and drying takes place while the blank is traveling a distance not exceeding thirty-six inches. I have shown the gummed envelope blanks delivered between the rollers 26 and 27, which support the opposite ends of the upper belt 10 and the lower belt 8. It is understood that from this point the blanks are separated by another mechanism and the operation of creasing and folding the envelope is then completed.

Where I do the creasing and folding before gumming the sealing flap, the arrangement of advancing the blanks will, of course, be different, but it will not in any essential manner depart from my invention.

While I have shown in the drawing a series of overlapped envelopes being gummed, I, of course, can alter the arrangement of the blanks by having a gummer adapted to the exact outline and gumming the surface of the envelope blanks as they are being fed end to end, instead of overlapping, and even do this gumming after the envelope has been folded but before the sealing flap is folded.

I do not, therefore, confine myself to the axact manner of feeding the blanks to the gummer or the manner of delivering them after they are gummed and dried.

Instead of dusting on a dry powder, I may also spray the powder on and remove the surplus by vacuum means, or I may spray on a quick drying liquid to cover the adhesive with a film of non-sticking material which will either be on so thin as not to destroy the "sticking" qualities upon re-moistening or which will evaporate enough during the time that the adhesive dries naturally.

After applying the dry powder to the surface of the adhesive, I may spray a liquid mixture on the dry powder, which liquid may include glycerine or other non-adhesive agent which will penetrate the dry powder slowly without causing adhesive qualities unless remoistened but which will slowly convert the dry powder into the same adhesive characteristics as the liquid adhesive.

All of the above schemes are contemplated in my drying process, because I believe myself the first to quickly dry liquid adhesive by means other than heated air or air blast, while the blanks are moving, and the first to so materially reduce the time of drying, and yet obtain a good and even spread, and good adhesive quality in the final product.

I claim as my invention:

1. A process for quickly drying adhesive applied to articles in motion in a high speed machine comprising the steps of, applying consecutively to the same region of each article, a water soluble liquid adhesive, and a water soluble dry powdered adhesive of a character and in an amount sufficient to quickly dry the wet adhesive during the rapid motion of the article through the machine, and without the use of other drying means, and to obtain a needed total quantity of adhesive.

2. A process for quickly drying adhesive applied to articles in motion in a high speed machine comprising the steps of, applying consecu-

tively to the same region of each article, a water soluble liquid adhesive, and a dry powdered adhesive of a character and in an amount sufficient to quickly dry the wet adhesive during the rapid motion of the article through the machine, and without the use of other means, and to obtain a needed total quantity of adhesive, and removing any surplus powdered adhesive by brushing.

3. A process for quickly drying adhesive applied to articles in motion in a high speed machine comprising the steps of, applying consecutively to the same region of each article, a water soluble liquid adhesive, and a water soluble dry powdered adhesive of a character and in an amount sufficient to quickly dry the wet adhesive during the rapid motion of the article through the machine, and without the use of other drying means, and to obtain a needed total quantity of adhesive, and applying said powdered adhesive by throwing the same against the previously applied wet adhesive.

4. A process for quickly drying adhesive applied to articles in motion in a high speed machine comprising the steps of, applying consecutively to the same region of each article, a water soluble liquid adhesive selected from a group consisting of gum and dextrin, and a dry powdered adhesive selected from the same group, and of a character and in an amount sufficient to quickly dry the wet adhesive during the rapid motion of the article through the machine, and without the use of other drying means, and to obtain a needed total quantity of adhesive.

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