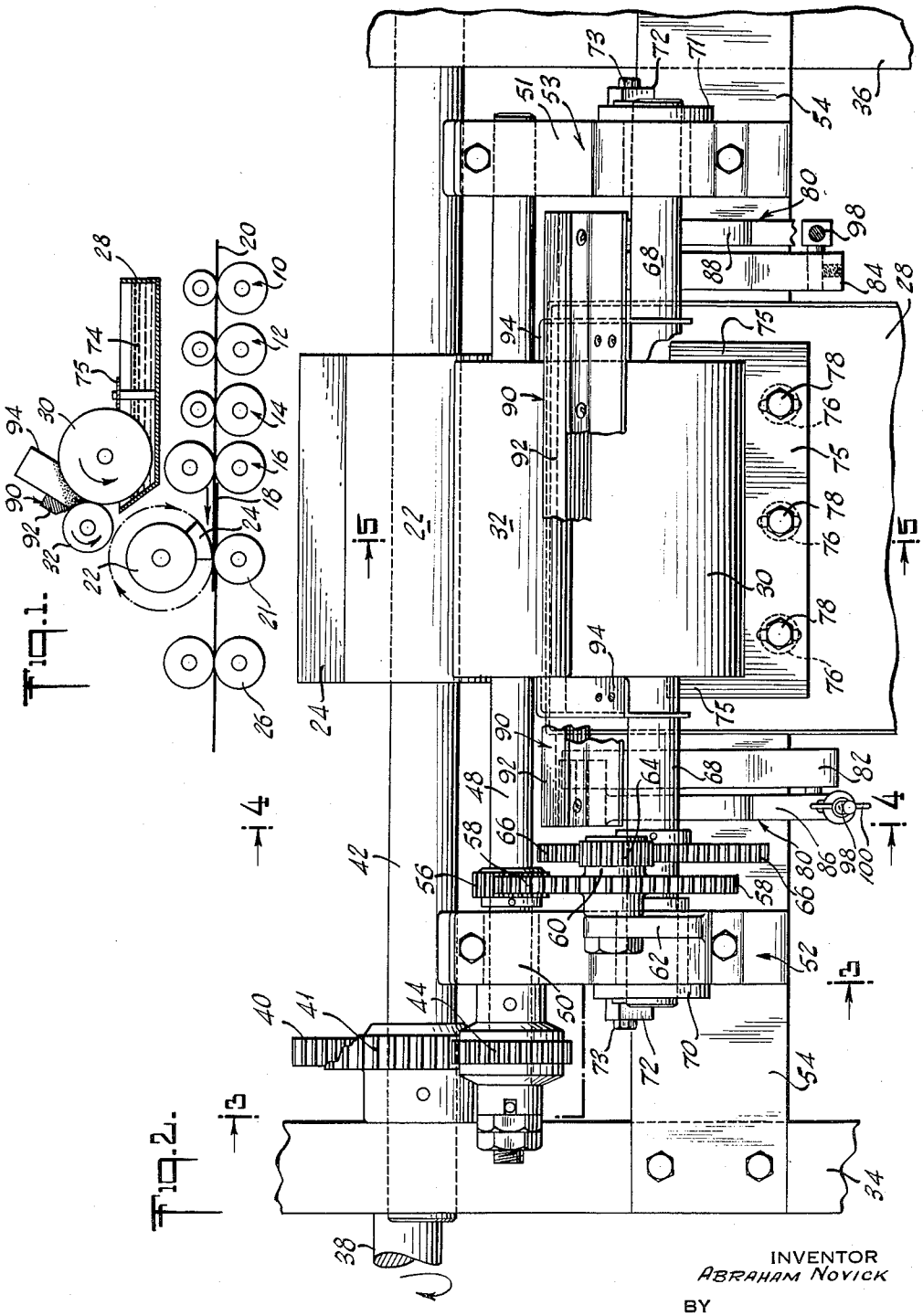
Dec. 19, 1961 A. NOVICK 3,013,527

COATING APPARATUS

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Fig. 3.

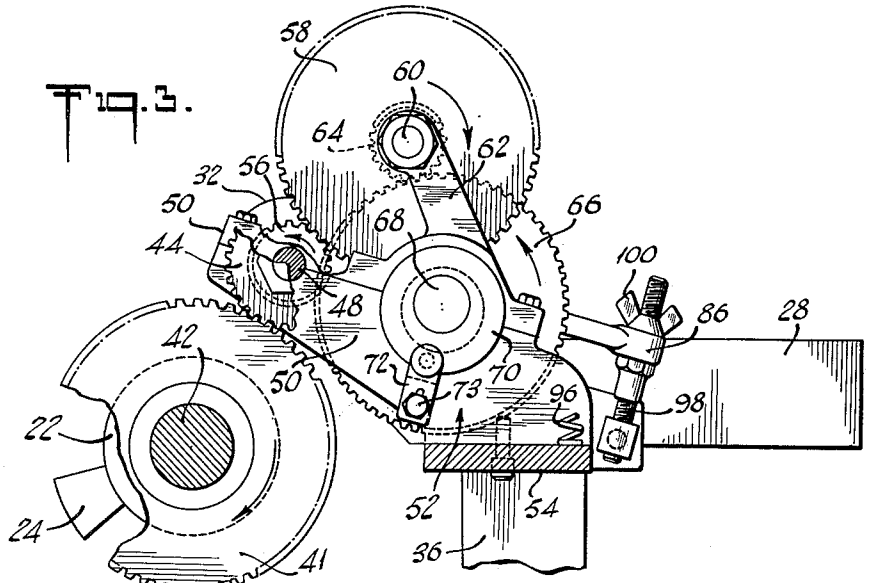


Fig. 5.

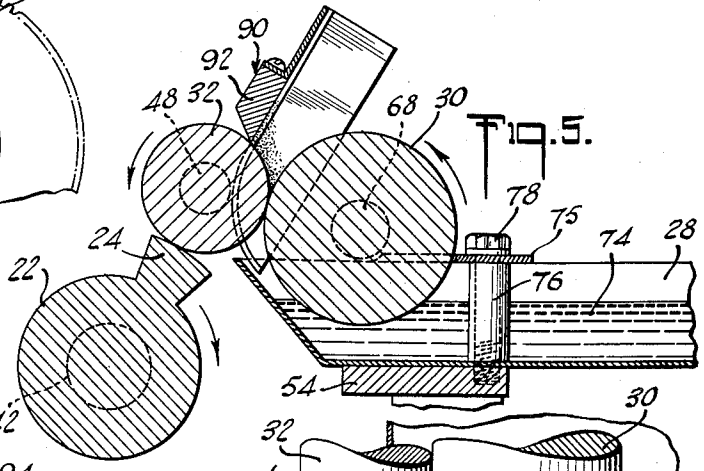


Fig. 4.

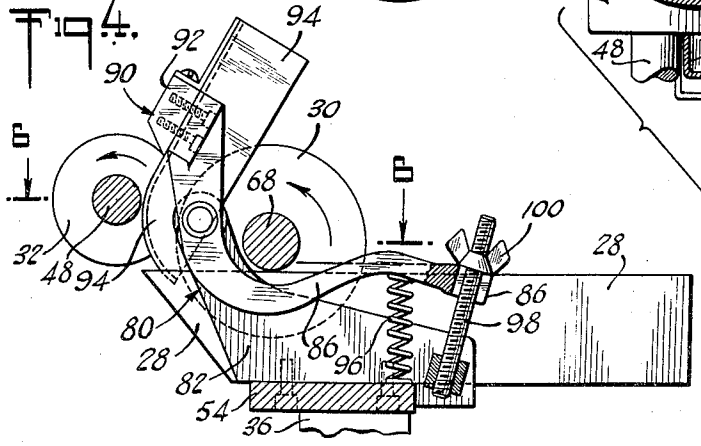
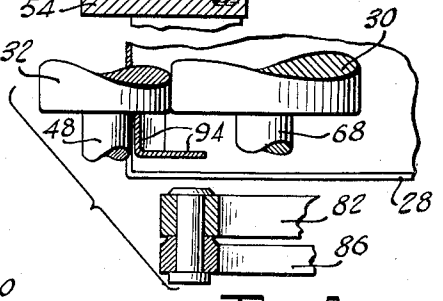


Fig. 6.



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COATING APPARATUS

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6 Claims. (Cl. 118—262)

This invention relates in general to viscous material applicators and in particular to a new and useful high speed automatic adhesive or glue applicator, capable of transferring glue or similar viscous material at high transfer speed rates without clogging the parts or spattering the material over the working area and without heating or whipping the material.

This invention finds particular application, but is not limited to, automatic machinery for applying an adhesive gum to envelopes. Envelopes may be fed at very high rate, and, therefore, the glue applicators for such machines must deliver a thin layer of glue to a specific location on each envelope as it is fed past a gluing station. With automatic glue applying machines of this type in present day use, great difficulty is experienced in handling the glue. The glue supplying rollers are rotated at high speeds in a glue reservoir to feed the glue to fast rotating applicators. The rotation of these rollers whips and heats the glue changing its consistency and causes the scattering of large quantities of the glue about the moving parts of the machine and the working area. This scattering of glue causes the machines, the working space and sometimes the work to become clogged and dirty and requires a costly shut down to clear away the mess.

In accordance with the present invention means are provided to transfer glue, adhesives or similar viscous materials, from a reservoir to an applicator without wasting any of the material or scattering it about. Such a machine is capable of continuous long periods of operation without shut down for cleaning or to change the adhesive, and the operation provides for economical but efficient distribution of glue to the desired area of a rapidly advanced article, such as an envelope.

In an envelope making machine it is important that the applicator supply only a very thin layer of glue to each envelope blank. In accordance with the invention, an applicator die is supplied with an evenly distributed thin layer of glue for application to each envelope once during each die revolution. The glue is supplied from a reservoir to the rapidly revolving applicator die by a novel arrangement, including a slowly revolving reservoir roller which picks up glue on its surface, and transfers a quantity of it to a rapidly revolving transfer roller. Only a very thin layer of glue is applied to each envelope.

The slow rotational speed of the reservoir roller has very beneficial results in respect to the continuous operation of such a device. The glue temperature is not increased to any extent and evaporation is minimized. In addition, the reservoir roller is rotated slowly enough to eliminate any tendency toward whipping or churning of the glue. Both of these effects prevent undesirable changes in the glue formulation, the former by cutting down on evaporation and the latter by preventing foaming or separating of the constituents.

Accordingly, it is an object of this invention to provide a high speed glue applicating device which will operate without whipping, heating or scattering glue during its operation.

A further object of this invention is to provide a glue applicator having a novel blade doctor and shielding device.

A further object of this invention is to provide a

glue applicator which is simple in design, rugged in construction, and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of the specification. For a better understanding of the invention, its operating advantages and specific results obtained by its use, reference should be had to the accompanying drawings and descriptive matters in which there is illustrated and described a preferred embodiment of the invention.

In the drawings:

FIGURE 1 is a somewhat schematic end view partly in section showing the moving parts of a portion of an envelope machine having a glue applicator constructed in accordance with the invention;

FIGURE 2 is an enlarged top plan view of the glue applicator shown in FIGURE 1;

FIGURE 3 is a vertical section taken along the line 3—3 of FIGURE 2;

FIGURE 4 is a vertical section taken along the line 4—4 of FIGURE 2;

FIGURE 5 is a vertical section taken along the line 5—5 of FIGURE 2; and

FIGURE 6 is a horizontal section taken on the line 6—6 of FIGURE 4.

Referring to the drawings in particular, the invention is embodied therein on an envelope making machine having means including a series of rotary feed couples generally designated **10**, **12**, **14** and **16**, for advancing envelope blanks **18** continuously at a fast uniform speed along a table support **20** in the direction of the arrows as shown in FIGURE 1 (right to left).

The envelope blanks **18** are fed into operative engagement with a roller or cylinder **21** which is rotating at the same speed as the feed couples **10** to **16**. Arranged in operative cooperation with, and directly above the cylinder **21**, is a segmental glue applicator roller **22** having a segmental glue applicator die **24**, which cyclically rotates in contact with the cylinder **21**, and is effective to apply glue in desired die-outline locations to envelopes being advanced therebetween. Envelopes advanced between the cylinder **21** and the glue applicator die **24** are fed along the table **20** by a cooperating feed couple **26**. Envelopes leaving the neck of the feed couple **26** are advanced to other portions of the envelope making machine where further operations are there performed.

In accordance with the invention, glue is continuously supplied to the peripheral surface of the glue applicator die **24**, once during each revolution, as it is rotated at the same high linear speed as the envelope blank is advanced. The glue is supplied in desired quantities to the surface of the applicator die **24** from a glue reservoir supply **28**. The glue is transferred to the die **24** by means of a slow moving reservoir roller **30** which rotates in a bath of the glue and transfers a quantity of it to the surface of the transfer roller **32**, the transfer roller **32**, in turn, is effective to distribute a quantity of the glue along the surface of the glue applicator die **24**. The applicator die **24** is arranged to rotate in an arc bringing its outer surface into contact with the roller **32** during each revolution.

The driving mechanism and the speed ratios of the drive for the rollers **30** and **32** (which will be described more fully hereinafter) are such that desired quantities of glue may be supplied to the fast moving glue applicator die **24** without rotating the reservoir roller **30** at a speed which would cause either churning, heating or splattering of the glue.

The glue applicator mechanism is located between two longitudinal frame members **34** and **36**, in which is rotatably mounted, in suitable bearings, a main drive shaft **38**. A large driving gear **40** is affixed to the drive shaft **38** adja-

cent the frame 34, and it mates with a slightly smaller gear 41, affixed to an applicator shaft 42, to rotate the latter at the same speed as the roller 21 and the feed couples 10 to 16. The applicator shaft 42 is journalled in suitable bearings in the frame 34 and 36, and the applicator roller 22 is affixed to the central portion of the shaft 42.

The gear 41 also mates with a smaller gear 44 to rotate a shaft 48 to which the latter is affixed. The shaft 48 is rotatably mounted in suitable bearings on arms 50 and 51 of spaced bearing members generally designated 52 and 53, respectively. The bearing members 52 and 53 are mounted at each end of a cross plate 54 which is supported by the longitudinal frame members 34 and 36. The transfer roller 32 is affixed to the shaft 48 for rotation therewith.

A smaller gear 56 as affixed to the shaft 48 adjacent the arm 50 and on the opposite side thereof from the gear 44, meshes with and rotates a large gear 58 which is affixed to a stub shaft 60, rotatably mounted in suitable bearings on an arm 62 of the Y-shaped bearing member 52. The gear 58 is a double gear having a small diameter gear-portion 64 which mates with and rotates a large diameter gear 66. The gear 66 is affixed to a shaft 68 which is rotatably mounted in adjustably-positioned split bearings 70 and 71 of the bearing members 52 and 53, respectively. The bearings 70 and 71 are eccentrically mounted so that the portions holding the shaft 68 may be shifted by loosening a clamping bar 72, 72 which is fastened to each bearing and is bolted to respective bearing members 52 and 53 by a bolt 73 extending through a slot on the clamping bar. The adjustment is necessary to shift the position of the reservoir roller 30 which is affixed to the shaft 68 for rotation therewith.

The applicator roller 22, the transfer roller 32, and the reservoir roller 30 are of substantially the same lateral dimensions. The roller 30 is mounted for rotation in the reservoir 28 and a small area of the roller is always maintained below the surface of a supply of glue 74. From the gear sizes indicated in the drawings (FIGURE 3) it can be seen that the transfer roller 32 rotates at a faster angular speed than the glue applicator roller 22 having the applicator segment 24. The reservoir roller 30 operates at much slower angular speed than the transfer roller 32 and the applicator roller 22. The arrangement is such that any tendency for the reservoir roller 30 to splatter glue above the machinery parts is eliminated.

As the reservoir roller 30 rotates in the bath of glue 74, it picks up glue on its surface. In order to prevent excessive pick-up of glue by the roller 30 and the possibility of splashing, there is provided in accordance with the invention a substantially U-shaped doctor-blade and shield 75 which is mounted on three hollow cylindrical spacers 76, 76, 76 arranged in the reservoir 28. The combination doctor-blade and shield 75 fits snugly against the sides and the front of the reservoir roller 30 and is in close, almost touching, contact therewith. The combination doctor-blade and shield is adjustably positioned adjacent the roller 30 and bolted in place on the spacers 76 by bolts 78 which extend through adjustment slots on the shield and the reservoir bottom and are threaded onto the cross plate 54. The surface of the roller 30 which moves upwardly past the combination doctor-blade and shield 75 carries a substantial portion of glue on its surface to the transfer roller 32, but a substantial quantity is scraped off and returned to the reservoir by the doctor blade. The transfer roller 32 picks up a quantity of this glue as the latter is rotated in contact with the reservoir roller but in the opposite direction therefrom (see FIGURE 5).

In order to insure that the transfer roller 32 does not pick up an excessive quantity of glue from the reservoir roller 30, nor splatter is about the working surface, the invention provides an adjustable transfer roller doctor-knife and shield mechanism generally designated 80. The adjustable doctor-knife and shield mechanism 80 includes a pair of spaced substantially L-shaped mounting brackets 82 and 84 upon each of which is pivotally mounted substantially U-shaped blade supporting pieces 86 and 88, respectively. Affixed to the upper extremity of the U-shaped supporting pieces 86 and 88 and held therebetween, is a doctor blade knife assembly generally designated 90, which comprises a knife blade 92 which is co-extensive with and normally is biased against the surface of the transfer roller 32. The doctor blade assembly 90 also includes a side shielding plate extension 94 which extends laterally from, but in close contact with, the sides of the roller 32 and is curved at the lower portion thereof in a direction toward the reservoir 28, in order to direct any surplus glue back thereto.

The doctor blade assembly 90 is biased against the roller 32 by a set of compression springs 96, 96 held between the opposite end of the associated U-shaped pieces 86 and 88 and the face of the cross plate 54. These ends of the U-shaped piece 86 and 88 are drilled to receive a bolt 98, 98. The bolts 98, 98 are secured at one end to an associated bracket 82, 84 and extend upwardly through an associated slot on the U-shaped supporting pieces 86 and 88. The force exerted by the springs 96, 96 to urge the doctor blade knife 92 into contact with the roller 32 is limited by a set of wing nuts 100, 100 which are secured to a respective bolt 98 above the U-shaped supporting piece and limit movement of the arm of the U-shaped piece upwardly under the urging of the spring. The advantages of having the roller 30, which initiates the supply of glue from the reservoir 28, rotate at a substantially slower speed than the glue applying die 24 are many: First, the slow rotation eliminates the possibility of the glue mixture being churned or heated to an extent which would change its consistency. Further, the slower rotation prevents splattering and splashing and the resulting mess. The novel doctor-blade and shield arrangement in conjunction with the slow roller rotation and the fast transfer roller rotation provides for an effective means for transferring large or small quantities of the glue to a fast moving applicator. A machine constructed in accordance with this invention is capable of operation at extremely high speeds with an envelope feed of over 800 ft. per minute.

From the foregoing, it will be understood that the apparatus embodying the present invention described above are well suited to provide the advantages set forth, and, since many possible embodiments may be made of the various features of this invention and as the apparatus herein described may be varied in various parts without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth as shown in the accompanying drawings is to be interpreted as illustrative, and that in certain instances, some of the features of the invention may be used without a corresponding use of other features, or without departing from the scope of the invention.

What is claimed is:

1. An apparatus for applying viscous material, such as adhesive, to articles being continuously advanced in succession at high rates of speed, comprising a supporting member, an applicator rotatably mounted on said supporting member and having an arcuate outer surface rotating in substantial peripheral contact with said advancing articles, a material transfer roller rotatably mounted on said supporting member and arranged to rotate in substantial peripheral contact with said applicator, a viscous material reservoir, a reservoir roller arranged to rotate at a relatively slow peripheral speed in relation to the peripheral speed of said transfer roller with a portion submerged in said reservoir and with a portion in substantial contact with said transfer roller whereby said reservoir roller picks up a substantial quantity of material from said reservoir at its slow rota-

tional speed and transfers a portion of said material onto said transfer roller, a substantially U-shaped combination doctor blade and shield mounted above the nip between said reservoir roller and said transfer roller, including a front portion adjacent the transfer roller to doctor material therefrom into the nip between said rollers, side portions extending on each end of said transfer roller and end shield portions attached to said side portions.

2. An apparatus for applying viscous material, such as adhesive, to articles being continuously advanced in succession at high rates of speed, comprising a supporting member, an applicator rotatably mounted on said supporting member and having an arcuate outer surface rotating in substantial peripheral contact with said advancing articles, a material transfer roller rotatably mounted on said supporting member and arranged to rotate in opposite direction and at substantially the same surface speed as said applicator in substantial peripheral contact therewith, a viscous material reservoir, a reservoir roller arranged to rotate at a relatively slow peripheral speed in the same direction as said transfer roller with a portion submerged in said reservoir and with a portion in contact with said transfer roller whereby said reservoir roller picks up a substantial quantity of material from said reservoir at its slow rotational speed and wipes a portion of said material onto said transfer roller, a substantially U-shaped combination doctor blade and shield mounted above the nip between said reservoir roller and said transfer roller, including a front portion adjacent the transfer roller to doctor material therefrom into the nip between said rollers, side portions extending on each end of said transfer roller, and end shield portions attached to said side portions.

3. An apparatus according to claim 2, wherein said side portions are curved and operate to doctor material from the ends of said transfer roller.

4. An apparatus according to claim 3, including a doctor blade and shield supporting arm pivotally mounted on said supporting member, said doctor blade and shield being affixed to one end of said supporting arm, and resilient means biasing the other end of said arm in a direction urging said doctor blade and shield against said transfer roller.

5. An apparatus according to claim 4, including additional U-shaped doctor blade means arranged about the withdrawing peripheral and end surfaces of said reservoir roller above the level of said viscous material in said reservoir.

6. An apparatus according to claim 4 wherein the combination doctor blade and shield overlies the reservoir so that all material doctored thereby is returned to said reservoir.

References Cited in the file of this patent

UNITED STATES PATENTS

577,683	Heim	Feb. 23, 1897
600,191	Buell	Mar. 8, 1898
904,231	Schou et al.	Nov. 17, 1908
1,580,829	Lengel	Apr. 13, 1926
1,799,769	Thompson	Apr. 7, 1931
1,932,727	Faulkner	Oct. 31, 1933
1,960,228	Milmoe	May 22, 1934
2,185,223	Paynter	Jan. 2, 1940
2,198,066	Staude	Apr. 23, 1940
2,344,427	Staude	Mar. 14, 1944
2,498,667	Fischer	Feb. 28, 1950
2,579,802	Derderian	Dec. 25, 1951
2,690,732	Weber et al.	Oct. 5, 1954
2,821,161	Winkler et al.	Jan. 28, 1958

FOREIGN PATENTS

15,439	Great Britain	July 11, 1904
458,686	Great Britain	Dec. 21, 1936
703,932	Great Britain	Feb. 10, 1954