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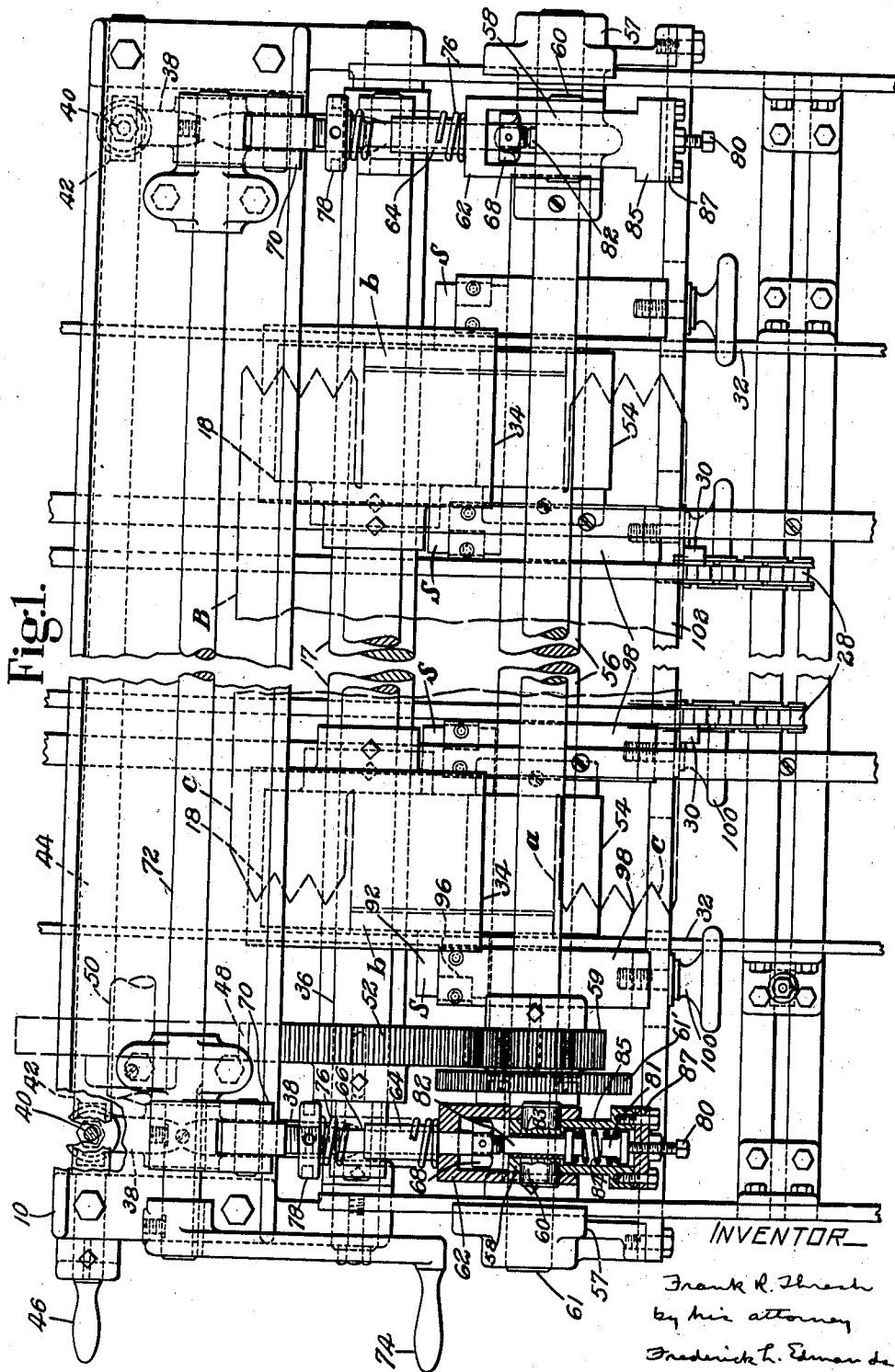
F. R. THRESH

2,303,513

ADHESIVE-APPLYING APPARATUS

Filed Sept. 27, 1939

2 Sheets-Sheet 1



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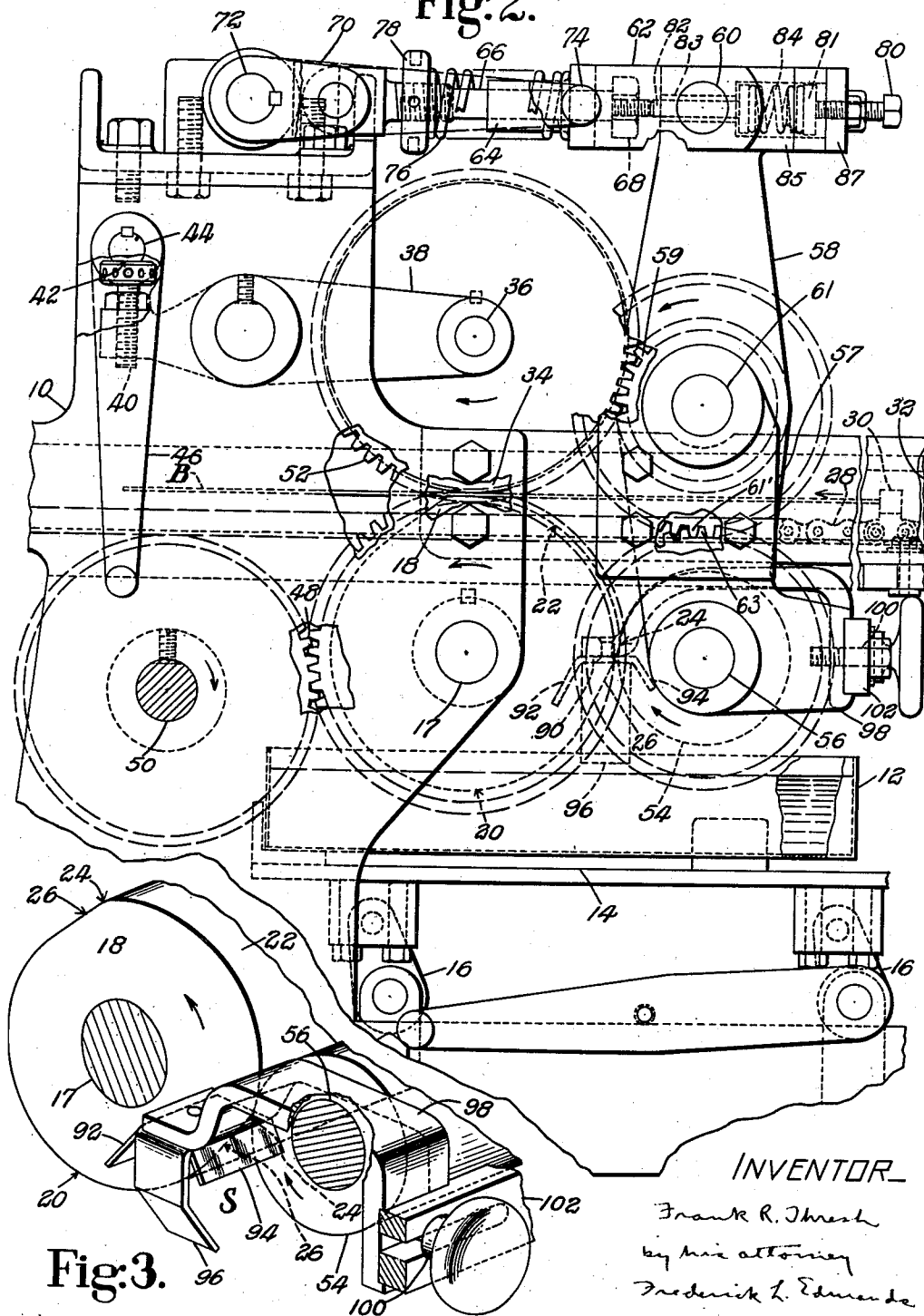
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Fig. 2.



UNITED STATES PATENT OFFICE

2,303,513

ADHESIVE-APPLYING APPARATUS

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Application September 27, 1939, Serial No. 296,780

9 Claims. (Cl. 91—51)

My invention relates to apparatus by which an adhesive may be applied over predetermined areas of such objects as box-blanks, an example of the work for which the invention is especially adapted being furnished by the flat blanks for boxes of the corner-lap type. In connection with these, it is customary to coat with glue the inner faces of the opposite end-wings and their extensions, while leaving uncoated the corner-laps which lie at opposite sides of each end-wing.

For work of the above character, there is often employed what is called a stencil-roll for applying the adhesive, this having from its periphery a projection to which the adhesive is supplied and which contacts with the chosen work-area, while the remaining body-portion of the roll has a smaller radius so it is inactive. As such a roll is used, there is forced over the angular shoulder, where the stencil-projection meets the surface of the body-portion of the roll, the excess of the adhesive which a co-operating roll distributes over the applying or stencil-surface. As this gathers at the rear edge of said stencil-surface it tends to be deposited upon the work in a ridge, this in box-blanks being at one edge of the end-wing. This will show and deface the boxes when the blanks are set up, and there may be a sufficient quantity to be transferred to the pressure-head of the setting-up machine, and, being thereby applied to succeeding blanks, will spoil these and will interfere with the operation of the machine. Further, as the adhesive accumulates, it may be thrown off into the air in threads, which will cause trouble by gathering upon the work and upon the surrounding portions of the machine. It is an object of my invention to prevent this accumulation of the adhesive at the edge of the applying surface and its transfer to other objects. To gain this end, I combine with a rotatable roll, having an adhesive-applying projection extending about a portion of its periphery while the remainder of said periphery is out of engagement with the work, a member which not only distributes the adhesive over the surface of the projection but contacts with the roll about its entire periphery. The applying roll preferably has two arcuate peripheral surfaces of different radii, these gradually merging into each other by connecting surfaces. With these surfaces the distributing roll is in continuous contact. The effect of this is to produce a uniform distribution of the adhesive over the entire periphery of the applying roll, so there can be no uncontrolled accumulation. Any adhesive which is forced over the ends of the rolls is removed there-

from. The applying and distributing rolls are maintained in yieldable engagement, to permit the latter roll to follow unfailingly the changing curvatures of the former and to control the thickness of the adhesive-coating upon the projection of the applying roll, this yield being preferably against a plurality of successively acting means. The resistance to yield of such successive means may be variable. As herein illustrated, there is an applying or stencil-roll rotatable in an adhesive-receptacle and having a work-abutment-roll situated above and co-operating with it, and a distributing roll rotatable above the adhesive in the receptacle, it being in continuous contact with the stencil-roll. This continuity of contact is facilitated by reversely curved surfaces which join the stencil-surface to the body-portion of the applying roll. The distributing roll is preferably journaled in the lower extremity of spaced levers fulcrumed at the entering side of the applying and abutment-rolls, with an extensible connection joined to the upper extremities of the levers and to a normally fixed point, a spring acting to extend the connections and force the distributing roll toward the applying roll. Another spring may resist movement of the distributing roll after the extension of the connections. The end surfaces of the applying and distributing rolls are shown as lying in the same plane and having scrapers contacting with them to dispose of the excess of adhesive forced from the peripheral surfaces of these rolls.

In the accompanying drawings,

Fig. 1 is a broken top plan view of a particular embodiment of my invention;

Fig. 2 a side elevation thereof; and

Fig. 3, a fragmentary perspective showing one end of the applying and distributing rolls, with their scraper.

At each side of a frame 10 a receptacle 12 for glue or other adhesive is carried by a platform 14, which is supported at 16 so it may be lowered and raised to facilitate removal of the receptacle. Rotatable in the frame is the shaft 17 of an applying roll 18 of the stencil-type, this having a body-portion presenting an arcuate peripheral surface 20 from which is an arcuate projection 22, the periphery of which is of such extent that it will coat the desired area of the object being operated upon. These rolls and co-operating elements are duplicated at the opposite side of the frame, because of the character of the work operated upon. The two mechanisms are the same and but one will be described in detail. In the present instance, the work consists of the well-known form

of box-blank B, having projecting from its opposite ends wings *a*, with extensions *b* and a corner-lap *c* at each side of each end-wing. The outer faces of the end-wings and their extensions are to receive a coating of an adhesive, and the dimensions of the projection 22 are such that the peripheral length of its surface is just sufficient to coat the corresponding end-wing and its extension from side to side without acting upon the corner-laps, while its width corresponds to the length of the end-wing plus that of the extension. The applying surface of the projection 22 merges gradually into the roll-surface 20 by reversely curved convex and concave portions 24 and 26, respectively.

The blanks are presented to the applying roll, in timed relation with the revolution of the projection 22, by spaced conveyor-chains 28, 28 upon which are lugs 30 to positively advance the work. Edge-gages 32 position the blanks transversely with respect to the projection 22. As the blanks are conveyed over the roll 18 they are held down to receive the action of the projection 22 by a cylindrical abutment-roll 34, the shaft 36 of which is rotatable in arms 38. These arms are adjustable to alter the distance between the abutment-roll and the applying roll, by a screw 40 threaded through each arm and having its head contacting with a flattened surface 42 upon a spindle 44 rotatable in the frame 10. When the spindle is turned by an arm 46 fast upon it, the cylindrical surface will cam down the screws 40 to lift the abutment-roll away from the applying roll, thus relieving the pressure upon the work. The rolls 18 and 34 are rotated in opposite directions at equal speeds, as indicated by the arrows in Fig. 2. This may be effected by gearing 48 joining the shaft 17 to a power-shaft 50, and a gear 52 upon the shaft 36 meshing with the gearing 48.

To cause the applying projection 22 to present to the work a uniform coating of the adhesive, and to guard generally against an uneven accumulation of the adhesive upon any portion of the periphery of the roll 18, there co-operates with it a cylindrical distributing roll 54 situated at one side of the applying roll above the receptacle 12. The roll 54 may be formed of somewhat yieldable material, as hard rubber, and is carried by a shaft 56 rotatable in the lower extremities of a pair of vertical levers 58 fulcrumed upon brackets 57 rising from opposite sides of the frame. It is rotated in a direction opposite to that of the applying roll by a connection including a gear 59 upon a shaft 61 rotatable in the brackets 57, this gear meshing with the gear 52 upon the shaft 36 and a gear 61' on the shaft 61, which meshes with a gear 63 on the shaft 56. To the upper extremity of each of the levers 58 is a yieldable connection by which the distributing roll 54 is held continuously against the periphery of the applying roll, so it has unbroken contact with the surface 20 of the body-portion, that of the projection 22 and the connecting surfaces 24 and 26. Considering one of these duplicate connections, the upper end of the lever 58 is pivoted through a pin 60 to a yoke 62, a tubular extension 64 from the yoke furnishing, in effect, one section of an extensible rod, the other section of which is shown at 66 telescoping with the yoke-section, and held against separation by a nut 68 upon the end of the rod and contacting with the inner side of the cross-bar of the yoke. The opposite end of the rod 66 is joined to a normally fixed point furnished by an arm 70 fast upon a shaft 72 which is mounted to rotate upon the frame. The arm 75

70 may be moved by a crank-arm 74 upon the shaft from its normal position, illustrated in Fig. 2, in which it is horizontally aligned with the extensible connection, to one in which it is displaced upwardly, so the roll 54 is withdrawn from the roll 18, as for cleaning. An expansion-spring 76 surrounds the rod 64, 66, abutting at one end against the cross-bar of the yoke 62, and at the other against a collar 78 threaded upon the rod-section 66. With the arm 70 down in horizontal operating position, the spring 76, by its expansion, extends the rod 64, 66 to force the lower extremity of the lever 58 toward the applying roll 18, and, as this rotates, it causes the distributing roll 54 to maintain its desired continuous contact with all the portions of the periphery of said applying roll. The force which the spring 76 exerts to extend the connections, and therefore press the distributing roll against the applying roll, may be varied by altering the position of the collar 78. This continuous contact of the distributing roll with the applying roll will result in leaving a film of adhesive upon the whole periphery of the applying roll which will be of approximately the thickness desired. When the distributing roll is engaged and forced outwardly by the projection 22 of the applying roll, the end of a spring-pressed plunger 82 will come into contact with the end of the rod 66, which forms a stop. This furnishes a resistance to displacement of the distributing roll which will reduce the thickness of the film upon this projection to that appropriate for application to the work. This thickness may be varied by adjusting the pressure applied to the plunger 82. It is movable within a tube 83 passing through the pin 60 and has a head within an extension 85 from the upper end of the lever 58. Across the outer end of the space within this extension is a plate 87, and within the space is a comparatively stiff spring 84 interposed between an abutment 81 and the head of the plunger 82. The compression of this spring may be adjusted to determine the thickness of the film on the projection 22 by a screw 80 threaded through the plate 87 and engaging the abutment. The arrangement is such that the head of the plunger and the abutment are never in contact nor is the spring 84 fully compressed. As a consequence, if through accident a blank, or other article being coated, should stick to the applying roll 18 and be carried between it and the distributing roll 54, no parts would be broken, because the spring 84 would yield sufficiently to permit this additional movement of the distributing roll and its carrier-lever 58.

A certain amount of the adhesive displaced by the roll 54 from the periphery of the roll 18 in its distributing action will pass over the roll-ends. To prevent accumulation here, these surfaces at each end preferably lie in the same vertical plane and have contacting with them a scraper S. This may consist of a plate 90 extending horizontally over the end surfaces of both rolls, and having downwardly diverging wings 92 and 94 contacting respectively with the rolls 18 and 54, which rise against their inner ends. The dislodged material is held within this inverted trough-shaped scraper to drip back into the receptacle 12. A downwardly and inwardly extending wing 96 from the outer extremity of the plate 90 guards against the removed material being thrown outside the receptacle. The scraper S is mounted upon an arm 98 by a slot-and-screw connection 100 to a bracket 102, which is secured to the corresponding lever 58. The scraper is thus held in a definite relation to the roll 54 in its movement and

may be adjusted toward and from both rolls to insure the proper removal of the material.

In the use of the apparatus, the blanks B are advanced by the lugs of the chains 28 in synchronism with the revolution of the stencil-projection 22. This projection takes its coating of adhesive directly from the receptacle 12, and, as it rises, its applying surface, and all of the periphery of the roll 18 are subjected to the distributing effect of the roll 54. The latter roll, urged forward by the spring 76 and the extensible connection upon which it acts, passes smoothly from the applying surface over the gradually reversed connecting walls 24 and 26 and the surface 20 of the body-portion, leaving thereon a coating of the adhesive entirely without thickened accumulations, as at the junctures of the two arcuate surfaces, to be deposited upon the work, thrown into threads or to drip. With each blank held against upward displacement by the abutment-roll 34, the projection 22 coats uniformly the end-wing and its extension, leaving the corner-laps uncoated. The thickness of the applied adhesive will be determined by the resistance of the spring 84, the yield of which also provides for the passage between the applying and distributing rolls of such solid bodies as the box-blanks, without injury to the machine.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an adhesive-applying apparatus a rotatable roll having an adhesive-applying projection extending about a portion of its periphery, the remainder of the periphery of the roll being out of engagement with the work, an abutment roll situated above and co-operating with the applying roll, spaced levers fulcrumed at the entering side of the rolls, a distributing member journaled between said spaced levers for spreading the adhesive over the surface of the applying roll, means joined to the upper extremity of each lever and to a normally fixed point, and a spring acting to extend said means to force the distributing member toward the applying roll.

2. In an adhesive-applying apparatus, a rotatable adhesive-applying roll having a raised adhesive-applying projection extending about a portion of its periphery, the remainder of the periphery having a radius less than that of the applying projection, a movable support, a rotatable adhesive-distributing roll mounted on the support, said support being displaceable by the raised projection on the applying roll, yieldable means engaging said support and urging it in a direction to hold the distributing roll in unbroken contact with the adhesive-applying roll during the rotation thereof, a stop, and other yieldable means carried by said support and spaced from the stop, the displacement of said support by said raised projection moving the second-named yieldable means into contact with the stop, said second-named yieldable means resisting movement of the distributing roll away from the adhesive-applying roll.

3. In an adhesive-applying apparatus, a rotatable roll having an adhesive-applying projection extending about a portion of its periphery, the remainder of the periphery having a radius less than that of the applying projection, a rotatable adhesive-distributing roll moving in unbroken contact with the periphery of the applying roll, yieldable means for maintaining such contact, other yieldable means for forcing the distributing roll against the applying projection, and means

arranged to vary the resistance of each of the yieldable means.

4. In combination, an adhesive-receptacle, an applying roll provided with a stencil-projection raised from and extending about a portion of the peripheral surface of the applying roll, said applying roll being rotatable in the receptacle, an abutment-roll situated above and co-operating with the applying roll, an adhesive-distributing roll rotatable above the adhesive in continuous contact with the periphery of the stencil-roll, yieldable means for maintaining such contact, other yieldable means for forcing the distributing roll against the stencil-projection, and means arranged to vary the resistance of each of the yieldable means.

5. In combination, an adhesive-receptacle, an applying roll rotatable in the receptacle, said roll being provided with an arcuate body-portion, a stencil-projection therefrom and reversely curved surfaces connecting the body-portion and stencil-projection, an abutment-roll situated above and co-operating with the applying roll, a rotatable adhesive-distributing roll having continuous contact with the body-portion, the stencil-projection and connecting surfaces of the applying roll, the applying and distributing rolls having their surfaces at each extremity lying in substantially the same plane, and scrapers contacting with such end surfaces.

6. In combination, an adhesive-receptacle, an applying roll provided with a stencil-projection rotatable in the receptacle, an abutment-roll situated above and co-operating with the applying roll, spaced levers fulcrumed at the entering side of the rolls, a distributing roll journaled in the lower extremities of the levers and rotating in continuous contact with the periphery of the applying roll, an extensible connection joined to the upper extremity of each lever and to a normally fixed point, and a spring acting to extend the connection and force the distributing roll toward the applying roll.

7. In combination, an adhesive-receptacle, an applying roll provided with a stencil-projection rotatable in the receptacle, an abutment-roll situated above and co-operating with the applying roll, spaced levers fulcrumed at the entering side of the rolls, a distributing roll journaled in the lower extremities of the levers and rotating in continuous contact with the periphery of the applying roll, an extensible connection joined to the upper extremity of each lever, and to a normally fixed point, a spring acting to extend the connection and force the distributing roll toward the applying roll, and a spring acting to resist movement of the distributing roll after the extension of the connection.

8. In combination, an adhesive-receptacle, an applying roll provided with a stencil-projection rotatable in the receptacle, an abutment-roll situated above and co-operating with the applying roll, spaced levers fulcrumed at the entering side of the rolls, a distributing roll journaled in the lower extremities of the levers and rotating in continuous contact with the periphery of the applying roll, a rod having sections movable upon each other and connected at their opposite ends to the upper extremity of each lever and to a normally fixed point, a spring interposed between the rod-sections, and a yieldable member into engagement with which one of the rod-sections is movable.

9. In combination, an adhesive-receptacle, an applying roll provided with a stencil-projection

rotatable in the receptacle, an abutment-roll situated above and co-operating with the applying roll, spaced levers fulcrumed at the entering side of the rolls, a distributing roll journaled in the lower extremities of the levers and rotating in continuous contact with the periphery of the applying roll, a rod having sections movable upon

each other, one section being connected to the upper extremity of each lever, a pivoted arm to which the other section is connected, said arm being movable from alinement with the rod-sections to a position at an angle thereto, and a spring interposed between the rod-sections.

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