May 20, 1941. R. R. CAMPBELL 2,242,416

DEVICE FOR APPLYING ADHESIVE TO STRIP MATERIAL

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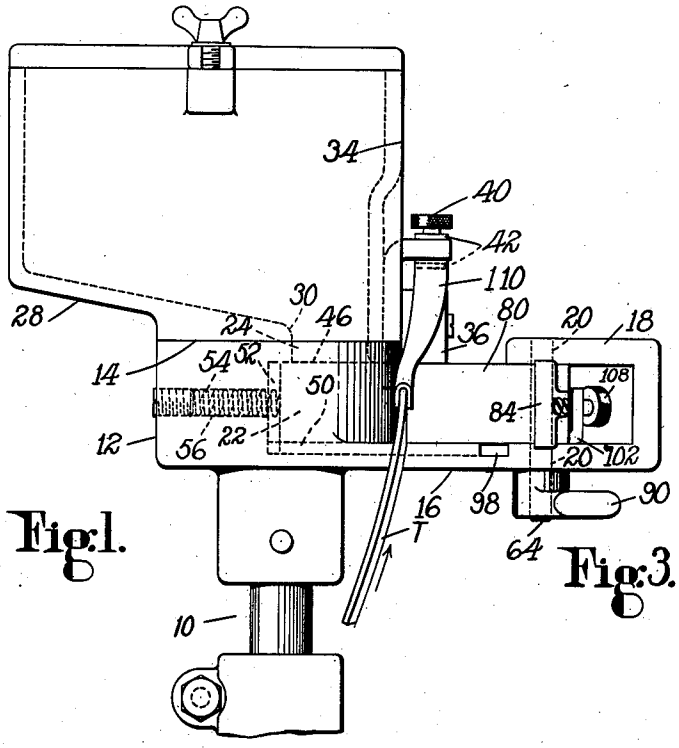


Fig. 1.

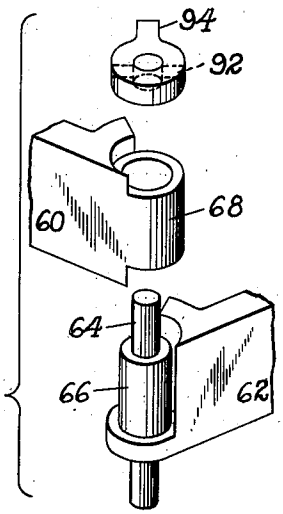


Fig. 3.

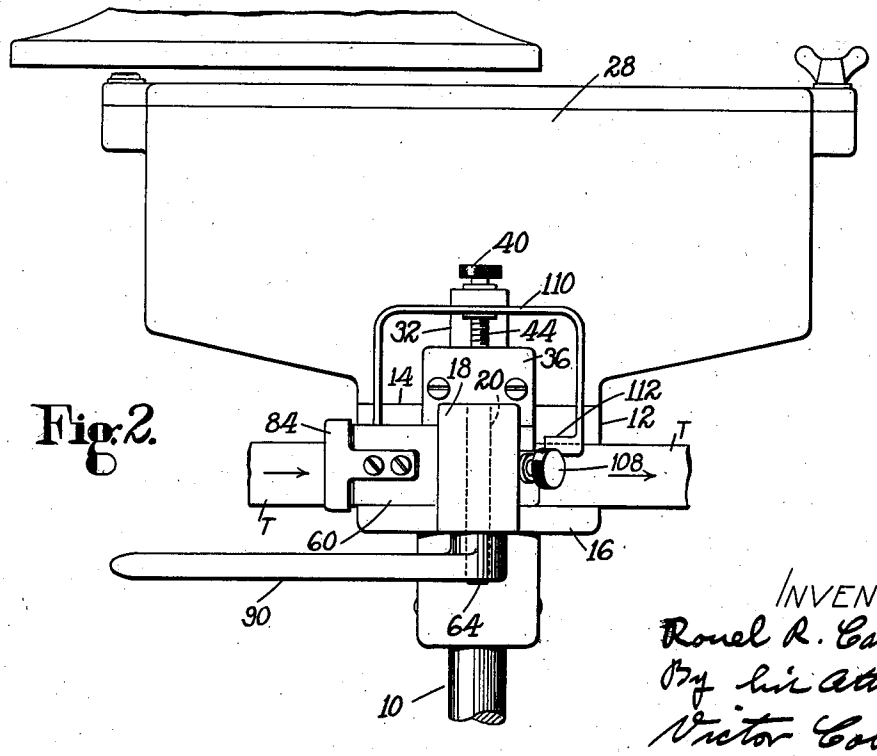


Fig. 2.

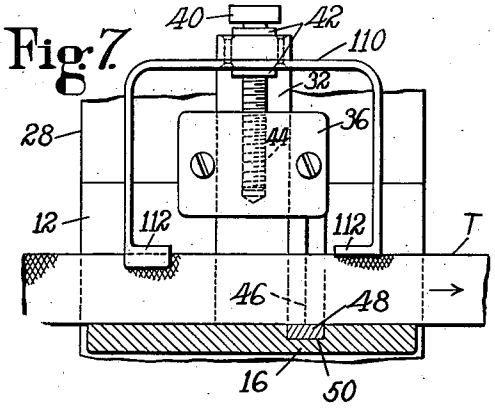
INVENTOR.
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Fig. 7.



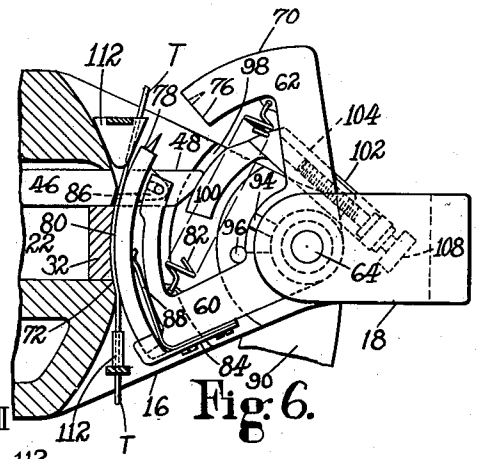


Fig. 6.

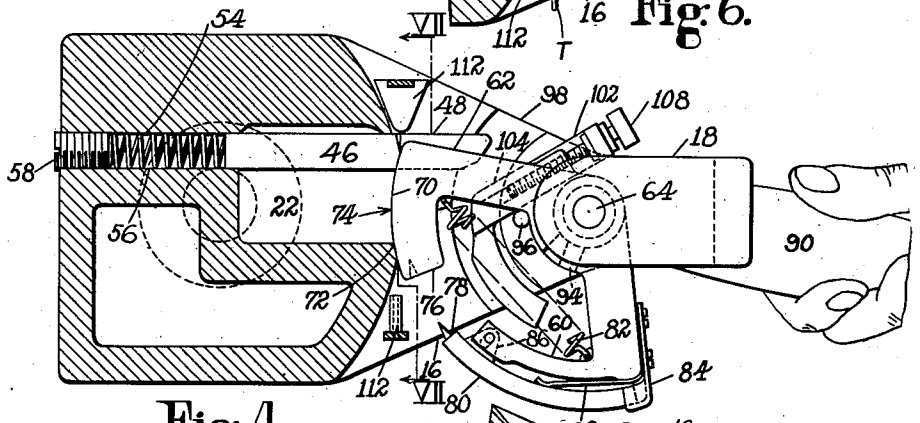


Fig. 4.

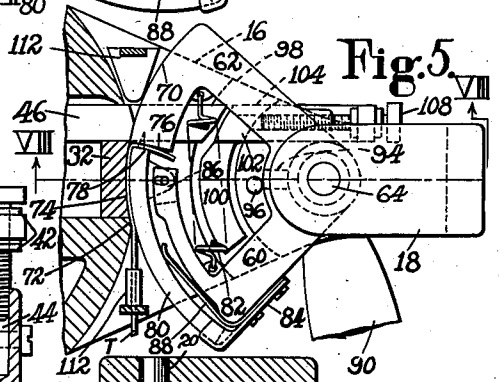
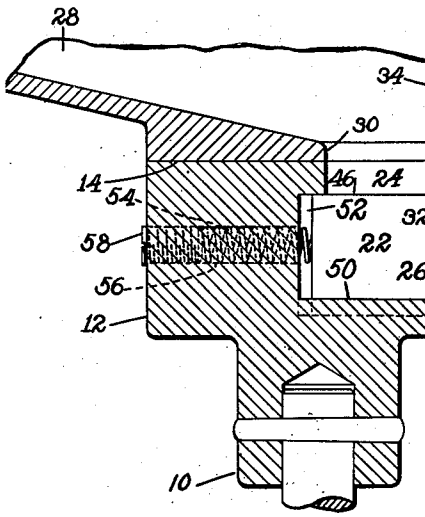


Fig. 5.

Fig. 8.



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UNITED STATES PATENT OFFICE

2,242,416

DEVICE FOR APPLYING ADHESIVE TO STRIP MATERIAL

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Application April 11, 1939, Serial No. 267,325

19 Claims. (Cl. 91—30)

The present invention relates to a device for applying adhesive to strip material and is particularly adapted to apply adhesive to tape, piping, welting and other strip material employed in the manufacture of shoes although it is in no way confined to strip material for such use.

Heretofore the serious problem in coating has been to construct a coating device which after several intermittent operations would not become so encrusted and gummed up with successive layers of adhesive as to be incapable of producing satisfactory work, if not inoperative. This evil, while present to some degree in the coating of continuous lengths of strip material, hereinafter called tape, becomes aggravated to such an extent in intermittent operations, as for example when coating numerous comparatively short lengths of tape, that the tape is often smeared and rendered unsatisfactory for use. In addition to the loss of tape from the unsatisfactory applications of the adhesive thereto, the operator must frequently stop his work to clean the coating device or apparatus with a consequent loss of time. Furthermore, since the operator feeds the tape to the device by hand and is constantly required to make adjustments and clean the various parts of the device, his hands accumulate considerable adhesive and dirt, which is inevitably conveyed to the tape.

The present invention has therefore been developed with a view to providing a device particularly suited for intermittent work, in which the adhesive is at no time exposed to the air or permitted to escape except when in direct contact with the tape, and to eliminate manual presentation of the tape to the adhesive supply.

One important feature of the invention resides in an improved mechanism for presenting a strip to adhesive-applying means, this mechanism, which comprises jaws movable independently with respect to the applying means, being arranged to move the end of a new strip past the adhesive-applying means into proper position for the application of adhesive to the remainder of the strip. Conveniently, and as illustrated, the jaws of the presenting mechanism are arranged to grip the incoming end of the strip and draw it past the discharge orifice of an adhesive-containing reservoir.

In accordance with other features of the invention, the illustrated strip-presenting mechanism comprises a pair of pivoted, sector-shaped jaws adapted to grip the end of a piece of tape and move it past a reservoir having in its side wall an adhesive discharge orifice opposite to the gripping jaws. One of the jaws is, moreover, provided with an arcuate surface which cooperates with the orifice to close the same, while the other jaw is provided with an arcuate yieldable support against which the work lies during its movement by the orifice, the support yieldably holding the work against the side edges of the orifice so that the latter is always covered either by the arcuate surface of the one jaw or the arcuate support and work thereon of the other jaw.

Another feature of the invention resides in a member for scraping excess adhesive from the work as it leaves the device and which, as illustrated, is disposed in the adhesive reservoir so as to be completely surrounded by adhesive thereby minimizing the danger of having the scraper become inoperative from sticking to a stationary part of the device. The scraper functions as a closure for the lateral edge of the orifice and is provided with an extension projecting from the orifice which engages a cam carried by one of the jaws and is movable thereby to move the member into scraping position.

Various features and objects of the invention will be described more particularly with reference to the accompanying drawings, in which

Fig. 1 is a side view of the device after a piece of tape has been drawn into operative position;

Fig. 2 is a front view showing the tape ready to be drawn from left to right;

Fig. 3 is a detail exploded view of a pivotal mounting for jaws of the presenting mechanism;

Fig. 4 is a horizontal section through the device taken just above the presenting mechanism with the jaws of the latter open ready to grasp the end of a newly presented strip of material;

Figs. 5 and 6 are similar views, in which the jaws are shown as moved into successive operating positions;

Fig. 7 is a fragmentary vertical section, taken on the line VII—VII of Fig. 4, to show the relation of a guide to the upper edge of the tape, as it is drawn past the orifice; and

Fig. 8 is a vertical section on the line VIII—VIII of Fig. 5, but with parts broken away.

The device of this invention may be employed as a unit in itself or in conjunction with other machines, such as the insole binder, and to this end the device may be designed for support as a unit or so constructed as to permit its attachment to the frame of the machine with which it will be employed. For the purpose of illustration, the device is shown as an individual unit and referring to Fig. 1 and Fig. 8 comprises a base 10 surmounted by a block 12 having a flat upper surface 14 and a platform extension 16 projecting from the front face thereof. The platform extension 16 is turned back upon itself to form a bracket 18, the bracket being provided with alined apertures 20 in which a pivot for the presenting mechanism is journaled as hereinafter described. The block 12 is recessed to provide a chamber 22 of generally rectangular configuration opening at its top in the flat surface of the block 12 and at its forward side onto the platform extension 16, thereby providing a passage 24 for the introduction of adhesive to the chamber 22 and an adhesive discharge orifice 26. A reservoir 28 of convenient size rests on the upper surface of the block 12 and is provided with an opening 30 registering with the opening 24 of the block 12.

It is frequently desirable to vary the height of the orifice 26 to accommodate it to different widths of tape and to this end a gate 32, arranged to cover the orifice, in part, is slidably mounted between the front wall 34 of the reservoir 28 and a guide block 36 bolted to the wall of the reservoir. The upper end of the gate 32 is bent at right angles to the body of the gate and has an aperture 38 therein through which an adjusting screw 40 may be passed. A pair of collars 42 prevent longitudinal movement of the screw in the aperture 38 while movement of the gate with respect to the orifice is accomplished by turning the screw 40 in the threaded aperture 44 formed in the guide block 36. It is to be observed here that the front face of the gate 32 is slightly concave for a purpose which will hereinafter be set forth.

The chamber 22 houses a scraper bar 46 of rectangular shape having an extension 48 at its lower edge, the lower edge of the bar and the extension being arranged to slide in a groove 50 formed in the lower wall of the chamber 22, said groove 50 being continued in the upper face of the platform 16 to accommodate the extension 48 of the bar. The upper edge of the bar engages the upper edge of the orifice while the side walls of the bar engage one edge of the gate 32 and the adjacent vertical edge of the orifice, respectively, thereby closing that portion of the orifice not covered by the gate 32. The rear end of the bar fits into a recess 52 formed in the rear wall of the chamber 22 and the front end of the bar, except for the extension 48 lying in the groove 50, projects only slightly beyond the face of the orifice and is concave in part to form a continuous concave surface in conjunction with the concave surface of the gate 32. The bar is backed up by a coiled spring 54 housed in a bore 56 formed in the block 12, said bore opening at its inner end in the recess 52 and at its outer end in the back side of the block, the outer end of the bore being closed by a plug screw 58.

The platform extension 16 carries the tape presenting mechanism which comprises a pair of jaws or sectors 60 and 62, forming a gripper, mounted to swing radially on a pivot 64 journaled in the apertures 20, the sector 62 being formed integral with a sleeve 66 and the sector 60 being formed integral with a sleeve 68, both of said sleeves being loosely mounted on the pivot 64 so that the sectors not only have rotary movement with respect to the shaft but are free to move relatively to each other.

The parallel top and bottom edges of the sector 62 engage the surface of the platform extension 16 and the under surface of the block 36 while the arcuate peripheral surface 70 of the sector is such as to permit sliding engagement with the vertical edge 72 of the orifice and the concave surface 74 of the gate and scraper whereby the orifice is sealed while the sector 62 is in engagement with the orifice. When the device is not in use the surface 70 of the sector 62 may be moved over the orifice to seal the same from the air.

The end face 76 of the sector 62 forms one element of the gripper while the other element of the gripper comprises the end surface 78 of a support 80 carried by the sector 60, said sector being of substantially less radius than the sector 62. The gripping faces 76 and 78 of the sectors may be provided respectively with prongs and corresponding apertures adapted to bite into the tape T, the gripping faces being held in engagement by means of a coiled spring 82 secured at its ends to the arms of the sectors.

The support 80 is arcuate in form and is mounted in spaced relation to the periphery of the sector 60, one end of the support being secured to the sector by means of a bracket 84 having a socket for the reception of the end of the support, the other end of the support being secured to the sector by means of a pin and slotted bracket 86 secured respectively to the sector and support. In order to hold the support away from the sector so that its arcuate surface will be approximately a continuation of the surface 70 of the sector 62, a leaf spring 88 is provided, secured at one end to the sector, the free end of the spring extending between the sector and support and bearing against the latter.

The pivot 64, upon which the sectors are mounted, projects from the lower side of the platform extension 16 to accommodate a handle 90 pinned thereto. The opposite end of the pivot terminates flush with the top surface of the bracket 18 and a collar 92 is pinned to the pivot just inside the bracket 16. The collar 92 carries a lug 94 projecting radially therefrom, the lug being adapted to engage the arms of the sectors 60 and 62 and to move them about the axis of the pivot 64 as a center. The movement of the sectors about said axis, however, is limited by a pin 96 projecting vertically up from the platform extension 16, said pin being positioned substantially on the center line of the machine and adapted to engage the inner surface of either sector, depending upon the position of the same.

The end of the extension 48, lying in the groove 50, of the previously described scraper 46, projects into an arcuate groove 98 formed in the platform extension 16. An arcuate cam 100 is disposed in the groove 98 and is arranged to move about the axis of the pivot 64 as a center. This cam is carried by an L-shaped member 102 the long arm of which extends along the platform extension 16 and through a slot 104 formed in the lower edge of the arm of the sector 62. The upturned short arm of said member 102 is provided with an aperture 106 through which passes a screw 108 threaded into the arm of the sector 62. A pair of collars carried by the screw 108 are provided to prevent axial movement of

the screw 108 with respect to the apertured arm of the member 102. It is apparent therefore that the cam may be moved radially to and from the pivot 64 by rotating the screw 106 whereby the scraper, the end 48 of which bears against the cam, may be adjusted relative to the work.

While the tape T is adequately guided and supported during its passage over the orifice it is necessary to provide some means for preventing the tape from moving upwardly from the platform and to guide the upper edge of the tape at each side of the orifice where its front and rear faces are unsupported. To this end, an inverted U-shaped member 110, having guides 112 formed at its free ends for engaging the upper edge of the tape, is secured to the bent-over portion of the gate 32, the bight of the U-shaped member 110 being provided with an aperture for the free passage of the screw 40. It is important to provide the guide 112 at the delivery side of the machine with a flat under surface so that the tape may be drawn off at the proper angle to insure uniform coating and so that the guide will not engage the adhesive wetted surface of the tape.

In operation the gate valve 32 is adjusted to provide an orifice whose height is equal to the width of the tape. Thereafter the handle 90 is swung in a counterclockwise direction, as viewed from above, until the lug 94 engaging the arm of the sector 60 moves the arm against the tension of the spring 82 away from the arm of the sector 62 which has come up against the pin 96, thereby disengaging the gripping surfaces 76 and 78 as shown in Fig. 3. The operator then hooks the end of the tape T over the prongs on the gripping face 78 and moves the handle in a clockwise direction thereby permitting the spring 82 to close the jaws and clamp the end of the tape T between the gripping surfaces. Continued movement of the handle in a clockwise direction moves the now closed jaws to the position shown in Fig. 6, in which the surface 74 of the sector 62 has uncovered the orifice and the tape T has been moved over the orifice by the sector 60. At the moment when the rotation of the sectors in this direction brings the strip substantially into contact with the edge of the scraper the cam 100 engages the lower end of the extension 48 and moves the scraper surface a predetermined distance from the surface of the work, the exact distance being determined by adjustment of the cam. Further movement of the sectors moves the end of the tape beyond the orifice and the lug 94 which now engages the arm of the sector 62 moves it against the tension of the spring 82 away from the arm of the sector 60, now stopped by the pin 96, thereby releasing the end of the tape.

In the position just described and as illustrated in Fig. 8, the top inner corner of the tape engages in substantially line-to-line contact the lower outer corner of the gate 32. With this arrangement, substantially the entire upper edge of the tape is free from engagement with any rigid guiding surface and yet is not exposed to the adhesive.

There is a tendency for tape pulled along between rigid guides engaging its edges to buckle transversely first because of irregularities along the edges of the tape and second because of the tensil pull exerted upon it to move it through the device. The least amount of support for the tape is at the orifice where the inner surface of the tape is exposed to the adhesive and there would therefore be a tendency for the tape to buckle at this point so that the edges thereof would move into the orifice. If any substantial amount of concavity occurs due to buckling at this point, narrow marginal openings will be formed at the top and bottom of the orifice through which adhesive would leak. This undesirable feature has been eliminated by arranging the device so that the upper edge of the tape is substantially unconfined as described above and by providing the gripping jaws with arcuate surfaces as previously described which counteract the tendency of the tape to curl transversely as it passes over the orifice.

The lower edge of the tape engages the lower wall of the orifice while the inner face of the tape at one side is pressed against the vertical edge of the orifice and at the other side is spaced from the concave surface of the scraper to permit the deposition of a film of adhesive of the requisite thickness.

The operation of the device is described above as applying adhesive to the entire width of the tape, but it is to be understood that this is by way of illustration only. If the lower edge of the gate is moved down so as to overlap the upper margin of the tape, the adhesive will be applied only to the uncovered portion of the tape. Thus, it is apparent that the device is suited to the manufacture of tape having adhesive applied to its entire surface or to striped tape, that is, tape having adhesive applied only along the margin thereof.

The free end of the tape being uncoated with adhesive may be grasped by the operator and the strip, if merely a short length, may be pulled through the machine and applied to the particular work for which it was designed or, if it is a continuous strip, the free end may be fed to a machine of the type desired and may be pulled through until the roll is exhausted, whereupon a new roll is substituted and the end thereof is started in the manner just described. As previously stated, however, the machine is particularly useful where it is desirable to apply adhesive to rather short pieces of tape and where it is desirable to eliminate frequent contact of the operator's hands with the adhesive employed.

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

1. A device for applying adhesive to strip material comprising, in combination, means for supplying adhesive to a strip, a support, and means for passing the strip over said support, said strip passing means comprising a pair of jaws, independently movable relatively to said adhesive supplying means, said jaws being constructed and arranged to grip and move with the strip past the discharge orifice.

2. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, said presenting means comprising two pivoted sectors, the arcuate periphery of one of the sectors being arranged in one position to close the discharge orifice.

3. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, said presenting means having one portion thereof arranged to close the discharge orifice and another portion thereof to present the strip to the discharge orifice.

4. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, movable means for presenting a strip to said orifice, the presenting means being arranged in one position to close the discharge orifice, and means carried by the presenting means yieldably to hold the strip in engagement with the adhesive discharge orifice.

5. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, the presenting means having an arcuate periphery arranged to close the discharge orifice, an arcuate periphery of substantially less radius than the radius of the first periphery, and means carried by the periphery of less radius yieldably to hold the strip in engagement with the adhesive discharge orifice.

6. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, the presenting means having an arcuate periphery arranged to close the discharge orifice, an arcuate periphery of substantially less radius than the radius of the first periphery, and an arcuate support mounted on the latter periphery yieldably to hold the strip in engagement with the adhesive discharge orifice.

7. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, said presenting means comprising two pivoted sectors movable relatively to each other, and means to urge the contiguous surfaces of said sectors together to provide gripping means.

8. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, said presenting means comprising two pivoted sectors movable relatively to each other, means for normally maintaining the contiguous surfaces thereof in gripping relation, and means for moving the engaged sectors relatively to the discharge orifice to move the strip over the discharge orifice.

9. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, said presenting means comprising two pivoted sectors movable relatively to each other, means for normally maintaining the contiguous surfaces thereof in gripping relation, means for moving the engaged sectors relatively to the discharge orifice to move the strip over the discharge orifice, and means arranged to disengage the gripping surfaces.

10. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, said presenting means comprising two pivoted sectors movable relatively to each other, means for normally maintaining the contiguous surfaces thereof in gripping relation, means for moving the engaged sectors relatively to the discharge orifice to move the strip over the discharge orifice, and means arranged to limit the movement of either of the sectors.

11. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, said presenting means comprising two pivoted sectors movable relatively to each other, spring means arranged to normally maintain the contiguous surfaces thereof in gripping relation, a handle for positively moving one of the two engaging sectors, and a pin to limit the movement of the other of the sectors.

12. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, and means operative by the movement of the presenting means to predetermine the thickness of the adhesive deposited on the strip as it is moved by said presenting means from one side of the orifice to the other side thereof.

13. A device for applying adhesive to strip material comprising a reservoir having a discharge orifice for supplying adhesive to the strip, means for presenting the leading end of a strip to said orifice, a combined yieldable closure and scraper means for closing the work-leaving side of the orifice, and means to move the combined means from closure position into scraping position as the leading end of the strip moves past said work-leaving side.

14. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, a yieldable scraper, and means operative by the movement of the presenting means to hold the scraper a predetermined distance from the surface of the strip.

15. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to the strip, a slidable, spring-pressed scraper bar housed in said reservoir, a portion thereof extending from said orifice, that portion of said scraper bar within the reservoir being completely surrounded with adhesive except at its inner end, and means operative by the movement of the presenting means to hold the scraper a predetermined distance from the surface of the strip.

16. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, a yieldably mounted scraper, and a cam carried by the presenting means constructed and arranged to engage said scraper and hold it a predetermined distance from the surface of the strip.

17. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip, means for presenting a strip to said orifice, said presenting means comprising two pivotally mounted sectors movable relatively to each other, the contiguous surfaces thereof providing a gripping means, the sectors being operative to grip and move the strip over the discharge orifice, the arcuate periphery of one of the sectors being arranged to close the discharge orifice and the arcuate periphery of the other of said sectors being constructed to guide the strip material over the discharge orifice, a scraper bar housed in said reservoir, said scraper bar yieldably engaging the peripheral surface of the one sector, and means carried by the presenting means to hold the scraper bar a predetermined

distance from the peripheral surface of the other sector.

18. A device for applying adhesive to strip material comprising a reservoir having a discharge orifice for supplying adhesive to a strip, means for varying the opening of the orifice and having a concave face, and an arcuate member cooperating with said face and arranged to support the strip regardless of the position of the opening-varying means.

19. A device for applying adhesive to strip material comprising, in combination, a reservoir having a discharge orifice for supplying adhesive to a strip drawn past the orifice, means to vary the opening of the orifice, guide means arranged to engage and guide an edge of the strip, said guide means being adjustable simultaneously with the opening-varying means.

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