May 6, 1924. 1,493,061

A. M. BECKER

MACHINE FOR COATING WEBS WITH ADHESIVE

Filed Jan. 27, 1922 2 Sheets-Sheet 1

Fig. 1.

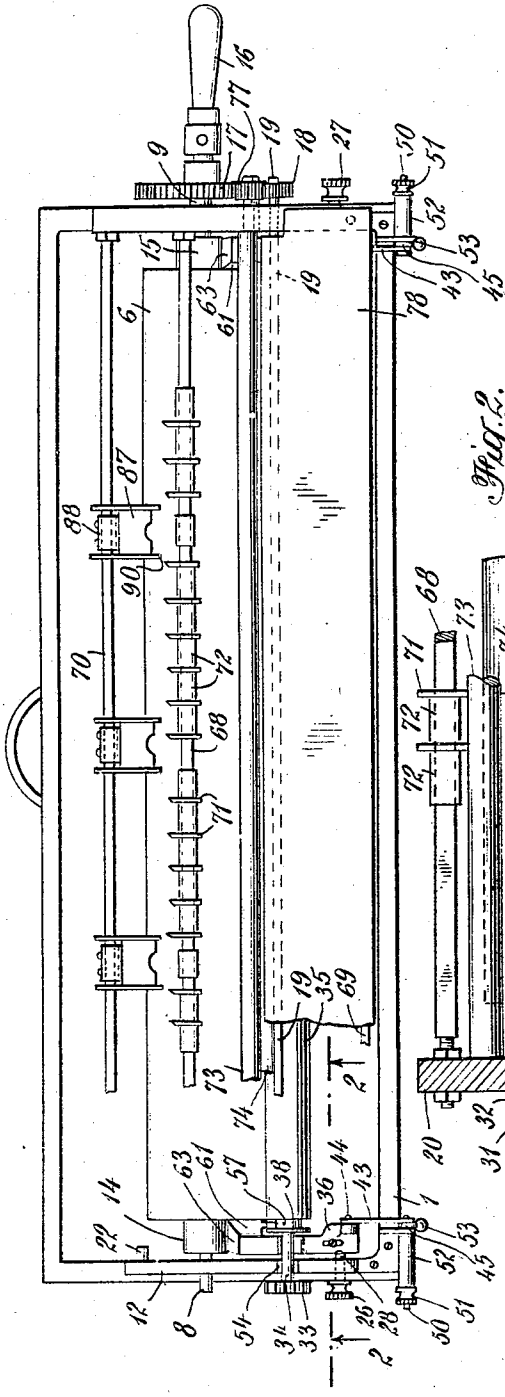
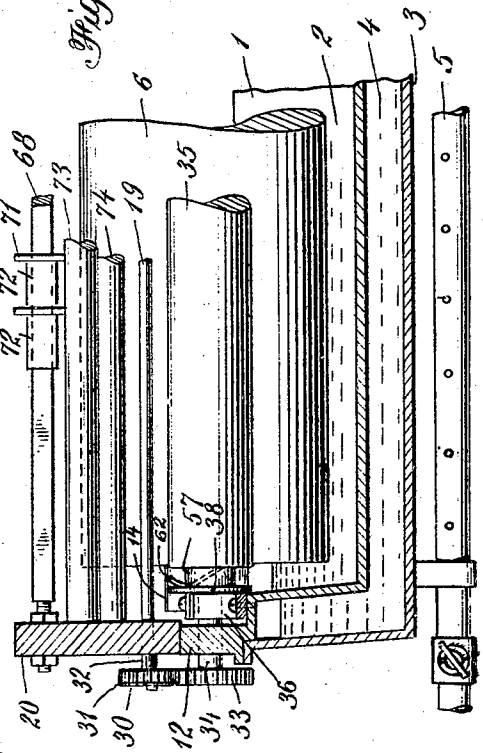


Fig. 2.



INVENTOR
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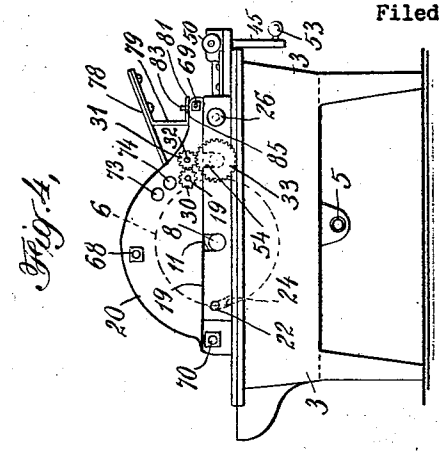


Fig. 4.

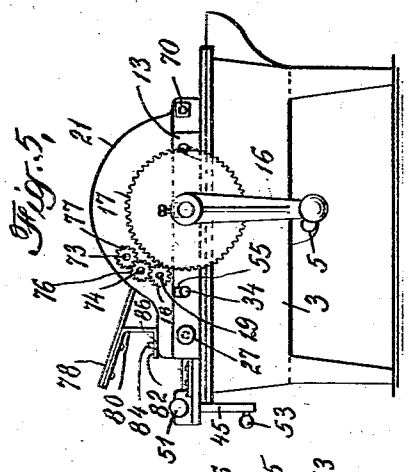


Fig. 5.

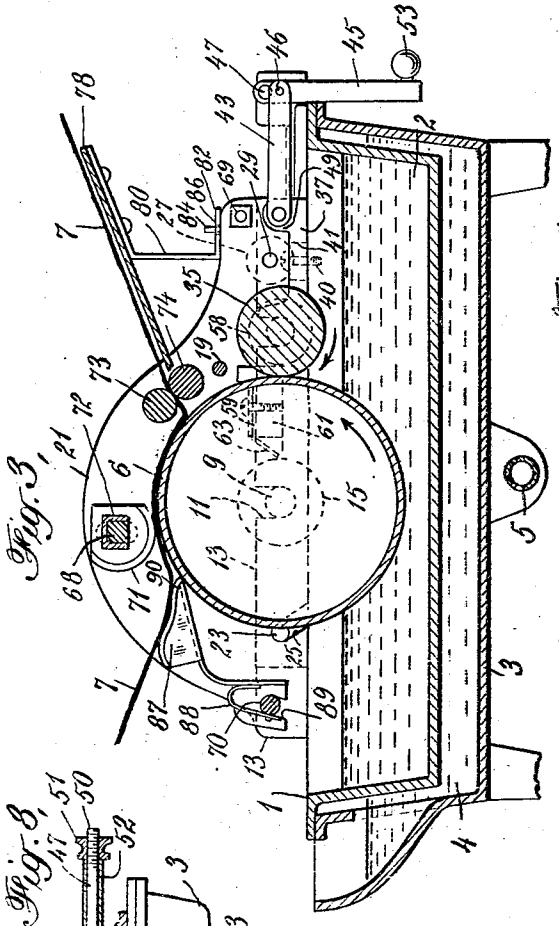


Fig. 3.

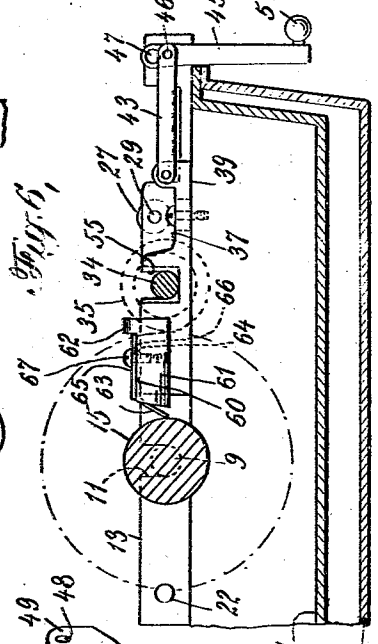


Fig. 6.

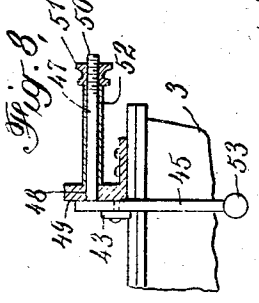


Fig. 8.

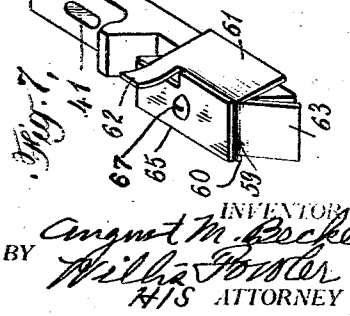


Fig. 7.

INVENTOR
BY August M. Becker
Wilbur Foster
HIS ATTORNEY

Patented May 6, 1924. 1,493,061

UNITED STATES PATENT OFFICE.

AUGUST M. BECKER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO MARTIN STEINTHAL, OF NEW YORK, N. Y.

MACHINE FOR COATING WEBS WITH ADHESIVE.

Application filed January 27, 1922. Serial No. 532,125.

To all whom it may concern:

Be it known that I, AUGUST M. BECKER, a citizen of the United States, and resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Machines for Coating Webs with Adhesive, of which the following is a specification.

My invention is directed to a particular arrangement, organization and construction of machines in which an adhesive substance is spread upon the surface of a sheet or web of material, so that it may be pasted or glued to a desired surface which it is to cover, and the novel features of the invention are particularly applicable for use in a glue applying machine using a rotating drum or cylinder for distributing or applying the glue as a coating on the sheet or web. In some of the glue machines heretofore in use, much difficulty has been experienced with the lodging of lumps or pieces of material occurring in the adhesive, upon the scraper device of the drum and thereby producing a thin place or streak in the coating of glue on the drum which is to be transferred to the sheet under treatment, and to this extent causing defects in the work of the machine. It has also been found most difficult to prevent the adhesive from accidently reaching the ends of the distributing-drum, also its bearings, and the ends of the scraper means and other parts adjacent the same, the accidental accumulation of which adhesive causes the clogging of the machine, delays the coating process and often times requires the stopping of the machine and taking it down to clean the various parts from the accumulated adhesive. These drawbacks are overcome by my present improvements and rid the scraper means of any defects arising from the presence of lumps or foreign material in the adhesive-layer, as well as guard the various parts from accidental accumulation of the adhesive material, so that the machine can be run continuously without interruption and valuable time thereby saved in its operation, as well as a better product being turned out by the improvement in the operation of the machine itself. Other important features of my improvements are the ready and nice adjustment of the doctor-roll, the means for directing the web or sheet of material onto the adhesive-distributing drum and the devices for lifting the coated web or sheet from the drum. With these and other improvements in view, my invention consists in the various novel and peculiar arrangements and constructions of the various different parts of the apparatus, all as hereinafter fully set forth and then pointed out in the claims.

I have illustrated a type of my invention in the accompanying drawings, wherein;

Fig. 1, is a top plan view of a machine embodying my improvements, with certain portions of some of the parts broken away at the left-hand end of the view.

Fig. 2, is an enlarged view of a section of the machine, at the left-hand end, the plane of the section being indicated by line 2—2, in Fig. 1.

Fig. 3, is an enlarged transverse vertical sectional view, of the machine.

Fig. 4, is a view in elevation of the left-hand end of the machine.

Fig. 5, is a view in elevation of the right-hand end of the machine.

Fig. 6, is an enlarged transverse vertical sectional view of part of the machine showing the adjustable bearings for the doctor-roll, the adjusting means and locking device and the scraper device.

Fig. 7, is a perspective view of one of the adjustable bearings with the scraper device mounted thereon.

Fig. 8, is a view of the locking means for the adjustable bearing, and shown in section.

Referring to the drawings, in which like numerals of reference designate like parts throughout, 1 indicates a removable tank or vessel for containing the adhesive substance 2, which may be kept hot by the water-bath 4, of the receptacle 3, beneath which is arranged a gas-burner, for heating the same.

A rotary adhesive-distributing drum or cylinder 6, is mounted in the tank 1, so that the lower part of the drum is maintained submerged in the adhesive and the drum acts to carry up a coating or layer of the adhesive with it as the drum turns on its axis in order to transfer the adhesive in a continuous layer to the underside of the sheet or web of material 7, which is brought into contact with the upper part of the drum. The trunnions 8 and 9, at the respective ends of the drum are mounted in bear-

ings 10 and 11, arranged in the flanges 12 and 13, at the respective ends of the tank 1. The trunnions 8 and 9, of the drum 6, are provided respectively with cylindrical enlargements or bosses 14 and 15, which serve to keep the ends of the drum spaced from the end walls of the tank and also act as surfaces upon which the scraper means acts, as hereinafter described.

One end of the drum 6, is provided with a crank 16, for turning the drum by hand to operate the machine and the same end of the drum has a gear-wheel 17, fixed to the trunnion 9, and meshing with a pinion 18, on the end of the transverse shaft 19, which is mounted in bearings in the end-frames 20 and 21, which carry certain other adjuncts and are detachably secured to the flanges 12 and 13, of the tank, by means of the fixed pins 22 and 23, projecting inwardly from said respective flanges, and the cooperating inclined slots 24 and 25, formed in the lower edges of said end-frames, and set-screws 26 and 27, mounted in the said end-flange and engaging with their inner ends the respective perforations 28 and 29, in the end-frames 20 and 21.

The transverse or counter shaft 19, has a pinion-wheel 30, fixed to the opposite end from where the pinion 18, is located, and the wheel 30, gears with an idle pinion 31, turning on a stud 32, projecting from the outside of one of the end-frames 20, and the idle-pinion 31, meshes with and drives a gear-wheel 33, which is keyed on the shaft 34, of the doctor-roll 35, the ends of said shaft 34, being mounted in horizontally sliding bearings 36 and 37, respectively, which are mounted adjustably on fixed parts 38 and 39, respectively, of the opposite ends of the tank 1. These adjustable bearings are constructed alike, and a description of one will serve for both. Each of said bearings consists of an elongated bracket with its under side constructed to slide on the fixed part of the side of the tank on which it is mounted and on which fixed part is a removable guide-screw 40, which passes loosely through a vertical slot 41, in the bracket and this arrangement serves to keep the bracket in its place and to guide it in its in and out movements. A forked or notched place 42, in the bracket receives the axle or end of the drum shaft 34, and serves as a bearing element for the same. A link 43, is pivoted at one end at 44, to the bracket and at the other end the link is pivoted to an adjusting-lever 45, at a point 46, which is located between the free end of said lever and the axis of motion of the pivot-pin 47, of the lever, the said pivot-pin turning in a perforation 48, in a lug 49, on the part 56. The pivot-pin is formed with a screw-thread 50, at its outer end for receiving a nut 51, and the nut bears against the outer end of a loose sleeve 52, which at its inner end abuts against the lug 49, so that by turning down the nut the sleeve 52, is jammed against the fixed lug and thereby acts to lock the pivot-pin 47, of the lever 45, against rotation, and in this way the adjustment of the connected bearing horizontally is controlled and held in locked position. The adjusting-lever 45, depends in a position that is out of the way and at the same time easily accessible to the operator, and its lower end is provided with a weight and handle 53. The pivotal connection 46, of the link 43, with the adjusting-lever 45, being below that of the pivot-pin 47, the adjusting action is quickened in the movement of the lever outwardly or inwardly and this movement when imparted to the connected bearing bracket 36, or 37, becomes gradual or of small degree which may be regulated and controlled to a nicety by the manipulation of the adjusting-lever. As the pull or push action of the adjusting-lever on the connecting link is directly in line with the endwise sliding movement of the bearing bracket, a smooth and easy action is thereby obtained in the gradual adjustment of the doctor-roll 35, laterally with respect to the drum 6, against which the periphery of the doctor-roll may be made to press with considerable force or moved away therefrom the desired distance, depending upon the thickness of the coating or film of adhesive which the operator wishes the drum to present to the web or sheet under treatment. When the doctor-roll, which acts as means for scraping the surplus adhesive from the drum and regulating the thickness of the layer of adhesive which is passed on to the web, is to be adjusted, the binding-nuts 51, of each of the adjusting-levers are released and the operator grasps one lever in each hand and simultaneously moves it in or out, according to whether the roll is to be adjusted closer to or further away from the periphery of the drum. When the desired adjustment has been effected, the binding-nuts are turned down hard so as to lock the lever and connected parts in adjusted positions. The connecting link 43, being horizontal and in line with the bearing-bracket the latter is guided in its sliding movements at the outer end by the link, so that the single guide-slot 41, and screw 40, at the inner end of the bracket is sufficient to give a smooth action to the bracket in sliding in and out, and prevents pinching or binding of the same. As the bearing brackets are each controlled by a lever 45, they are moved without difficulty and with much ease because of the leverage exerted by the swinging levers, and this is an advantage in a structure of this kind and affords quick action in mak-

ing the adjustment of the doctor-roll, and a well balanced movement of the parts, the weight of which is to be considered, as the doctor-roll and the brackets are made of solid metal in the machines which I have constructed. The end flanges 12 and 13, of the tank, are notched at 54 and 55, for the reception of the respective ends of the doctor-roll axle 34, and these notches are slightly wider than the diameter of the axle in order that the axle may have sufficient lateral play therein to permit of the full range of adjustment of the doctor-roll when the bearing-brackets are adjusted. The end of the axle 34, on which the gear-wheel 33, is secured projects a sufficient distance beyond the end of the tank through the notch in the flange 12, to receive said gear, as shown particularly in Figs. 1 and 2.

The counter-shaft 19, which receives its motion from the shaft of the drum, starting with the large gear 17, and the gearing is so arranged that the doctor-roll 35, to which the motion is finally transmitted, is revolved in the opposite direction to that of the drum, as indicated by the arrows in Fig. 3, and this relative movement of the doctor-roll serves to carry away from the periphery of the drum, a lump of adhesive or any foreign material that might be brought up from the supply 2, by the revolution of the drum which is submerged at its lower part therein, and at the same time the lump is crushed between the two peripheries of the moving parts. If the crushed lump does not fall off the roll with the dripping adhesive and again comes in contact with the drum periphery, the operator has access to the doctor-roll at all times and he may readily remove the lumpy pieces.

In order to prevent the adhesive substance from creeping over the ends of the doctor-roll and reaching the axle and bearings thereof, I provide the respective ends of the periphery with drain-grooves 57 and 58, see Figs. 1, 2, and 3, which extend around the periphery and are comparatively deep so that surplus adhesive may find its way into the same and be scraped therefrom and caused to drop back into the tank, by means of my novel form of scraper 59, one of which is mounted on each of the adjustable bearings 37. This scraper is made of resilient sheet-metal which is bent so as to provide a flat attaching-part 60, a lateral downwardly projecting flange or lip 61, with an upwardly projecting finger or strip 62, at one end, the finger being slightly curved as shown, while at the other end is another downwardly projecting flange 63. An attaching hole 64, is formed in the flat part 60, and a clamping-plate 65, having a similar hole 66, is laid on the part 60, and the scraper secured in fixed position by means of a screw 67, which is screwed into the upper side of the sliding-bearing 37, a suitable flat surface being provided thereon for the reception of said flat part, so that when the screw 67, is turned down hard it clamps the plate 65, firmly against the support and holds the scraper securely in position. This scraper device is so constructed and arranged that the flange or lip 63, of each, scrapes the periphery of the drum-hubs or bosses 14, and 15, while the main portion of the length of the edge of flange 61, acts upon the end of the drum lying between the boss thereof and the periphery, while in addition to this scraping action, the lower edge of the flange near one end also scrapes the inner wall of the drain-groove at the end of the doctor-roll, and the upwardly projecting finger 62, engages the outer wall of said groove and scrapes it, at the same time the forward edge or end of the flange 61 acts upon the bottom surface of the said groove with a scraping action. In this way, a thorough scraping of these several surfaces is provided and as the drain grooves are quite deep and comparatively narrow, the surplus adhesive is so concentrated thereby that the scraping action of the device quickly serves to rid the parts of the adhesive which may find its way thereto, and the scrapings are caused to at once drain directly back into the supply in the tank below. By this arrangement of scraping at multiple points so as to keep the several moving parts and bearings free from the presence of adhesive, the machine is made to run smoothly and continuously without the heretofore necessity of stopping to remove the accumulated adhesive which produces clogging of the machine.

The end-frames 20 and 21, are secured together in fixed relation by means of the upper cross arbor or tie member 68, and two lower tie-rods 69 and 70, substantially as set forth in my U. S. Letters Patent No. 1,435,197, granted November 14, 1922, for a machine of the same class as this, and in which a detailed description is given of the series of superposed guide-fingers 71, mounted on the arbor 68, so as to be laterally adjustable thereon and provided with removable spacing-members 72, slidably mounted on said arbor and U-shaped in cross-section, the said guide-fingers presenting small contacting surfaces to the back of the web 7, after being coated by the drum and is being raised therefrom for removal.

A pair of web-feeding rollers 73 and 74, are mounted parallel with the drum slightly to one side, and rotate in suitable bearings in the respective end-places 20 and 21, and the lowermost roller 74, has at one end a fixed pinion 76, which is in mesh with the pinion 18, which drives the counter-shaft 19, and this pinion 18, drives the pinion 76, and the roller 74, in the same direction as the drum

is driven. On the end of the roller 73, is a fixed pinion 77, which gears with the pinion 76, and is driven by the latter in the opposite direction to that of the roller 74, so that the rollers act to feed the web 7, between them and move it directly onto the periphery of the drum. It will be noted that the feed-rollers 73 and 74, are placed with their axes contained in an oblique plane with the upper roller 73, disposed inwardly nearer the top of the drum periphery, and that this arrangement makes the bite of the rollers lie in an oblique plane which practically contains the axis of rotation of the drum. By this arrangement, the web is fed to the drum surface in a downwardly inclined direction, so that when the leading edge of the web strikes the drum it is carried upwardly thereby while the on-coming portion of the web following is continued to be fed in a downward direction, thus causing the web to make more intimate contact with the drum than otherwise and to give it a hugging tendency on the drum periphery, and this feature is here shown in quite a pronounced form.

The web or sheet to be treated, is led to the feed-rollers by an inclined shelf or table 78, which extends across the machine parallel with the feed rollers and with its lower edge overhanging the lowermost roller 74, and with the plane of its upper surface such that when prolonged it would cut the roller 74, and the edge of the table is slightly removed from the roller. The underside of the table 78, is provided with a pair of widely spaced brackets 79 and 80, with their lower ends bent into flat parts 81 and 82, respectively, so as to fit upon the flat surface of the upper side of the end-frames 20 and 21, which latter are provided with fixed pins 83 and 84, for taking into perforations 85 and 86, formed in the feet or parts 81 and 82, respectively, of the brackets, thus providing a detachable mounting for the table. The inclined position of the table 78, permits the operator to readily view the doctor-roll as it turns in contact with the drum and to have manual access to the roll for removing any lumps or foreign matter therefrom during the action of the machine.

Upon the rear tie-rod 70, I mount a series of web-lifting devices 87, which in the main are constructed and operate like those set forth in my said pending application for patent, but have a different actuating spring. The spring here shown comprises a leaf 88, having its lower end riveted to the tie-rod and with its upper end bent over hook-shaped with the free end thereof bearing against the rear edge of the lifter 87, the forked lower end of which at 89, rides on the tie-rod loosely, so that the spring acts to constantly force the fingers 90, of the lifter against the periphery of the drum, from which the pointed fingers of the lifter may readily raise the adhering web or sheet 7, after it has traveled in contact with the drum for some distance and received the required coating of adhesive from the drum.

As in my former pending application for patent hereinabove referred to, the feed-rollers, the arbor or rod carrying the web-lifting fingers and the shelf or table for directing the web to the rollers, are all mounted upon the structure made up of the end-frames 20 and 21, and the arbor 70 and the two tie-rods, and this superstructure is detachably mounted upon the ends of the tank, so that it may be readily removed for the purpose of taking the machine apart when desired.

My improved machine may be used with hot or cold adhesive liquid and is most efficient in coating sheets or webs of paper or cloth, used in books or sample card cases or for gluing labels or like articles, and in fact may be used for applying paste or glue to any of the many kinds of articles in which pasted sheets are employed.

I wish to be understood that I do not limit my invention to the particular constructions and arrangements herein set forth, as it is manifest that various changes may be made in the same, without, however, departing from the spirit of the invention.

The operation of my improved machine is substantially the same as that described in my said pending application for patent. The web of material 7, which is to have one surface coated or covered with a layer of adhesive, is moved down the shelf 78, and introduced between the feed-rollers 73 and 74, the axes of which are arranged about the same distances from the periphery of the drum 6, so that the bight between the rollers will direct the web substantially towards the axis of the drum thereby giving a positive movement of the web against the drum-periphery at a low point thereon so as to cause the web to move fully in contact with the upwardly moving drum, in order to insure a thorough and uniform coating of the web with the adhesive by the contacting surface of the drum. The upper and uncoated side of the web is engaged by the super-posed series of guide-fingers 71, which present knife-like edges thereto and avoid any extended surface of contact at such points which might be accidently smeared with adhesive, so as to reduce the chances of getting adhesive on the wrong side of the web. The continued turning of the drum carries the web around to the lifting fingers 90, of the set of lifters 87, and these fingers serve to raise the web from the surface of the drum, and permit the operator to insert his finger between the pairs of fingers 90, seize the end of the web and pull it towards him from the drum.

Having thus described my invention, what

I claim and desire to secure by Letters Patent, is:—

1. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying adhesive substance to the drum periphery, a rotary doctor-roll arranged with its axis parallel with the drum axis and adjustable with reference to the periphery of said drum, means for adjusting said doctor-roll, said adjustment means comprising a rocking-member and pivoted connections between said rocking-member and the doctor-roll.

2. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying it with adhesive substance, a rotary doctor-roll disposed with its axis parallel with the axis of said drum and adjustable with respect to said drum, adjustable bearings in which said doctor-roll is mounted to rotate, and adjusting means for said bearings each having a lever and link connection for effecting the adjustment of the roll with respect to the drum.

3. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying adhesive substance thereto, an adjustable rotary doctor-roll having its axis parallel with that of said drum, adjustable journal-bearings for the respective ends of said doctor-roll, an adjusting lever for each of said bearings and pivoted link connections between the lever and bearing and said connections for effecting the adjustment of the bearing.

4. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying the same with an adhesive substance, an adjustable doctor-roll having its axis disposed parallel with that of said drum, adjustable journal-bearings for said doctor-roll, a pivoted adjusting-lever and connections between the same and a journal-bearing of said roll, said connections including a link jointed to said lever at a point between the axis of the pivot of the lever and the free end thereof.

5. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying adhesive substance thereto, a rotary doctor-roll having its axis parallel to that of said drum, adjustable journal-bearings in which said doctor-roll is mounted to rotate, each of said bearings being provided with a pivoted adjusting-lever and means for binding said pivot to hold the lever in adjustment, and connections between each lever and bearing.

6. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying the same with adhesive substance, a rotary doctor-roll arranged with its axis parallel with that of said drum, said doctor-roll being adjustably mounted to regulate its distance from said drum, the said bearing being controlled in its adjustment by a lever, a pivot-arbor secured to said lever and mounted to rock in a fixed part and having its end threaded, a sleeve mounted on said arbor and abutting said fixed part, a binding-nut on the arbor-thread for engaging the end of said sleeve, and connections between said mounting and said lever.

7. In a machine of the class described, the combination of a rotary adhesive-distributing drum, a rotary doctor-roll having its axis parallel with that of said drum, adjustable journal-bearings in which said doctor-roll is mounted and each bearing being provided with a depending adjusting-lever, a link connecting the respective levers with the respective bearings, for effecting the adjustment of said bearings.

8. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying adhesive substance to the drum, a rotary doctor-roll having its axis arranged parallel with that of said drum, the said two members being adjustable with respect to each other laterally to vary the distance between the two, and a scraper device arranged between the respective ends of said drum and roll and serving to scrape the adhesive from such ends in all positions of relative adjustment of said drum and doctor-roll and prevent the said adhesive from accidently reaching other places than the periphery of said drum.

9. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying adhesive thereto, a rotary doctor-roll arranged with its axis parallel with that of said drum and the two parts being relatively adjustable laterally with respect to each other, the respective ends of said doctor-roll beyond the point of peripheral contact with said drum being provided with annular grooves for diverting the adhesive from the bearings of said roll, and a scraper at each end engaging the respective grooves and serving to remove the adhesive from said grooves.

10. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying adhesive to its periphery, a rotary doctor-roll arranged with its axis parallel with that of said drum and the two parts being relatively adjustable to vary the contact or space between their peripheries, a scraper engaging the end of said drum and its axle and also engaging the end of said doctor-roll and its axle and serving to remove the adhesive from said engaged points and keep the same from the bearings.

11. In a machine of the class described,

the combination of a rotary adhesive-distributing drum and means for supplying adhesive substance thereto, a rotary doctor-roll disposed with its axis parallel with that of said drum, adjustable bearings for the respective ends of said doctor-roll, scraping means mounted upon each of said bearings and each means engaging the end of said drum and its axle, also the end of said roll and its axle, and means for holding the said bearings in adjusted positions.

12. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying adhesive thereto, a rotary doctor-roll mounted in parallel relation with said drum and the two being relatively adjustable to vary the distance between them, drain-grooves formed at the respective ends of said doctor-roll, and a scraper device at each end of said drum and roll mounted on the movable part by which said relative adjustment is effected and moving in response to the relative adjustment of said drum and roll and acting to scrape the ends of said drum and roll.

13. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying adhesive substance thereto, a rotary doctor-roll arranged with its axis parallel with that of said drum, and said roll and drum being relatively adjustable to vary the distance between their peripheries, the said doctor-roll having a peripheral drain-groove at each end, scraper means at the respective ends of said drum and roll and comprising a plate of resilient metal with a downwardly extending flange on two of its adjacent edges for scraping the end of the drum and roll, respectively, the end of one of said flanges being provided with an upwardly extending finger and said end and finger being adapted to take into the drain-groove of said roll and scrape the same.

14. In a machine of the class described, the combination of a rotary adhesive-distributing drum and means for supplying the same with adhesive substance, said drum being provided with journals at its respective ends, a cylindrical enlargement at each end of said drum disposed between the drum-end and the said journal, and a scraper at each end of said drum engaging the drum-end and the periphery of said cylindrical enlargement and acting to scrape the adhesive from said surfaces.

Signed at New York city, in the county of New York and State of New York, this 25th day of January, A. D. 1922.

AUGUST M. BECKER.