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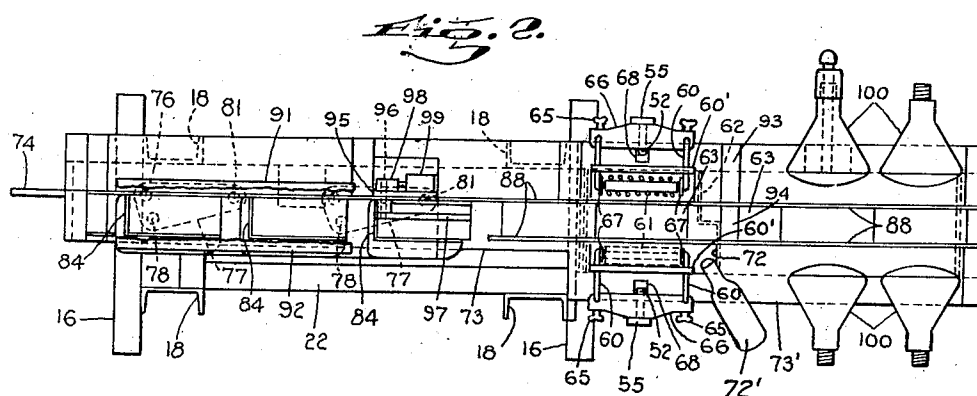
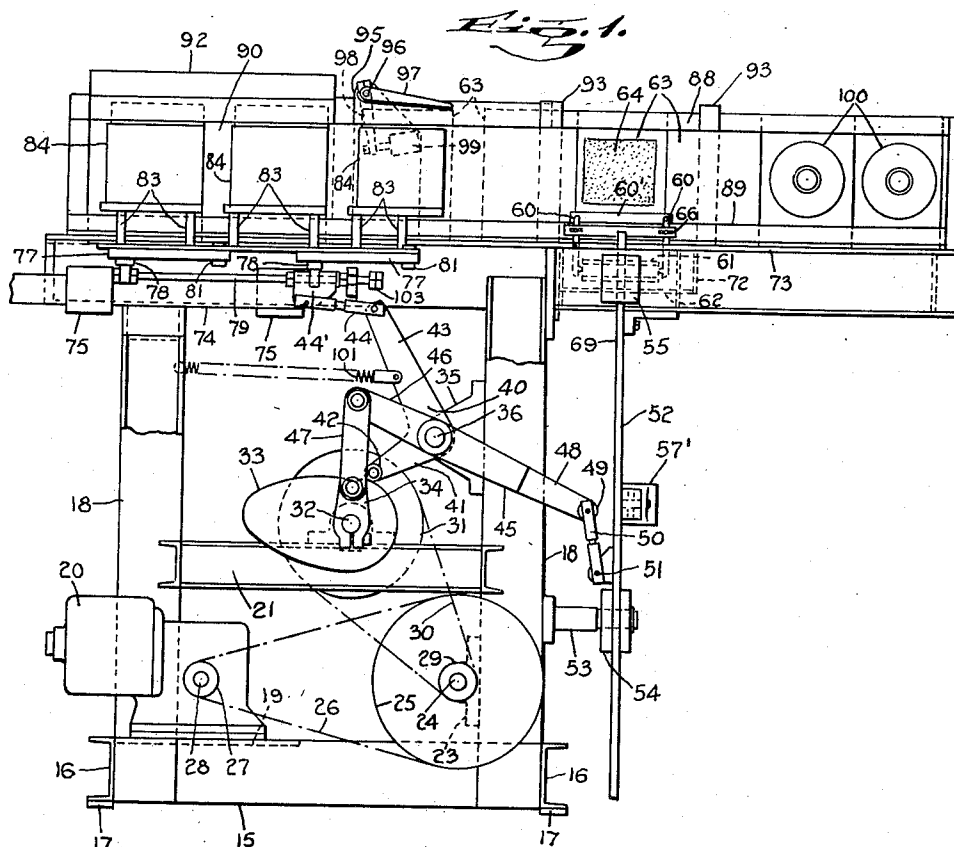
L. H. MORIN

2,805,638

MACHINE FOR ADHERING FOLDED PAPER TOWEL BUNDLES

Filed Sept. 16, 1954

3 Sheets-Sheet 1



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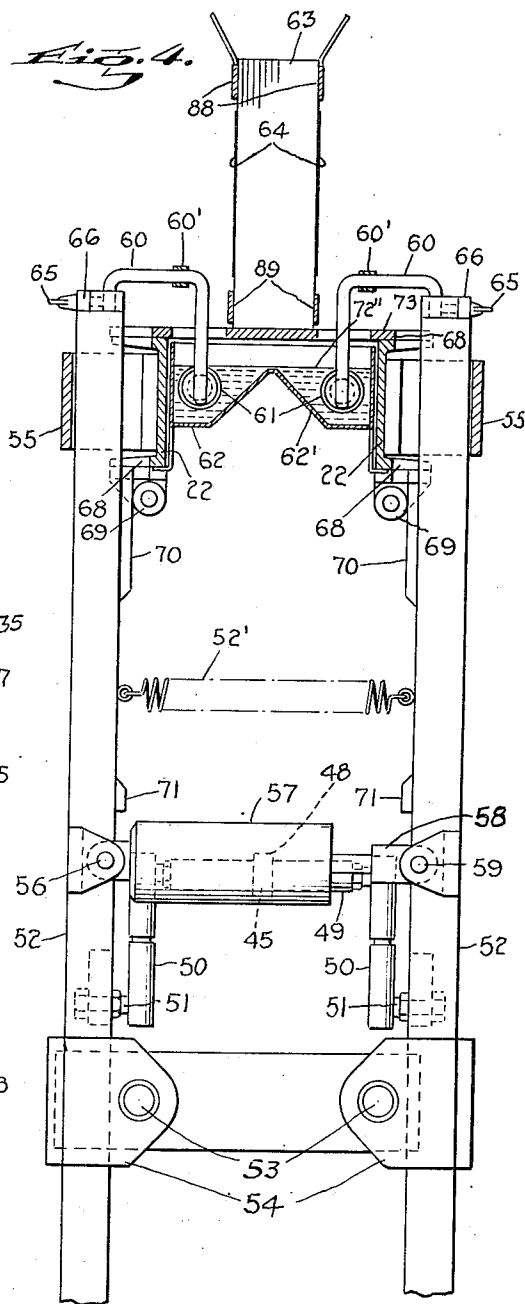
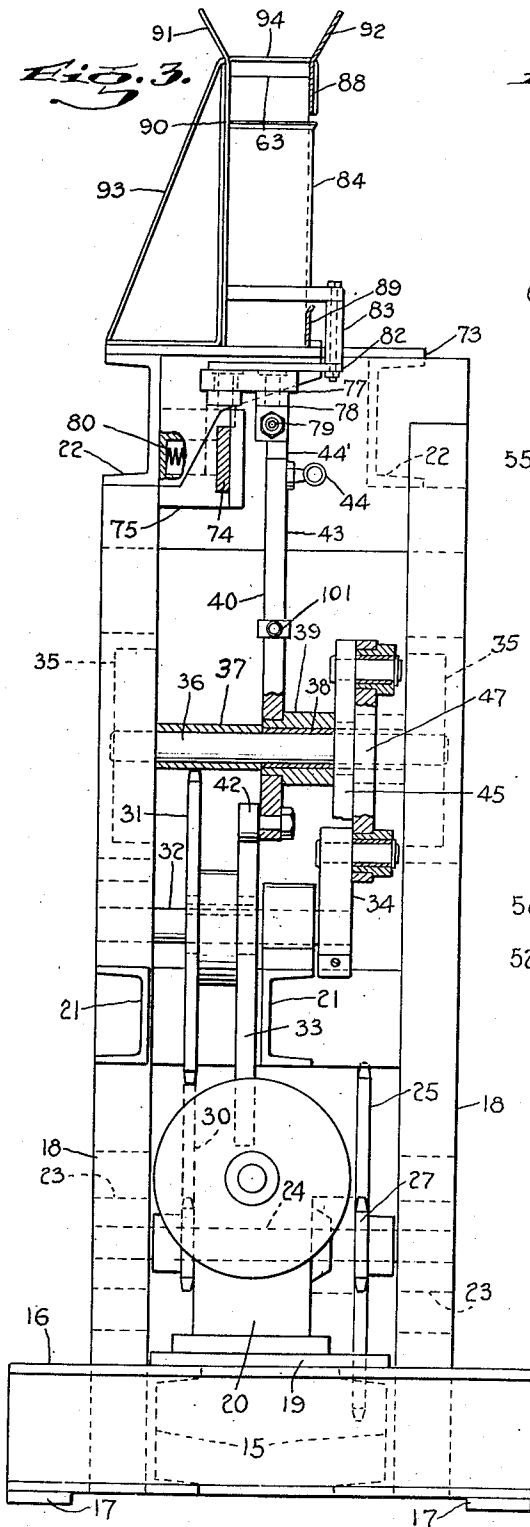
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MACHINE FOR ADHERING FOLDED PAPER TOWEL BUNDLES

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3 Sheets-Sheet 2



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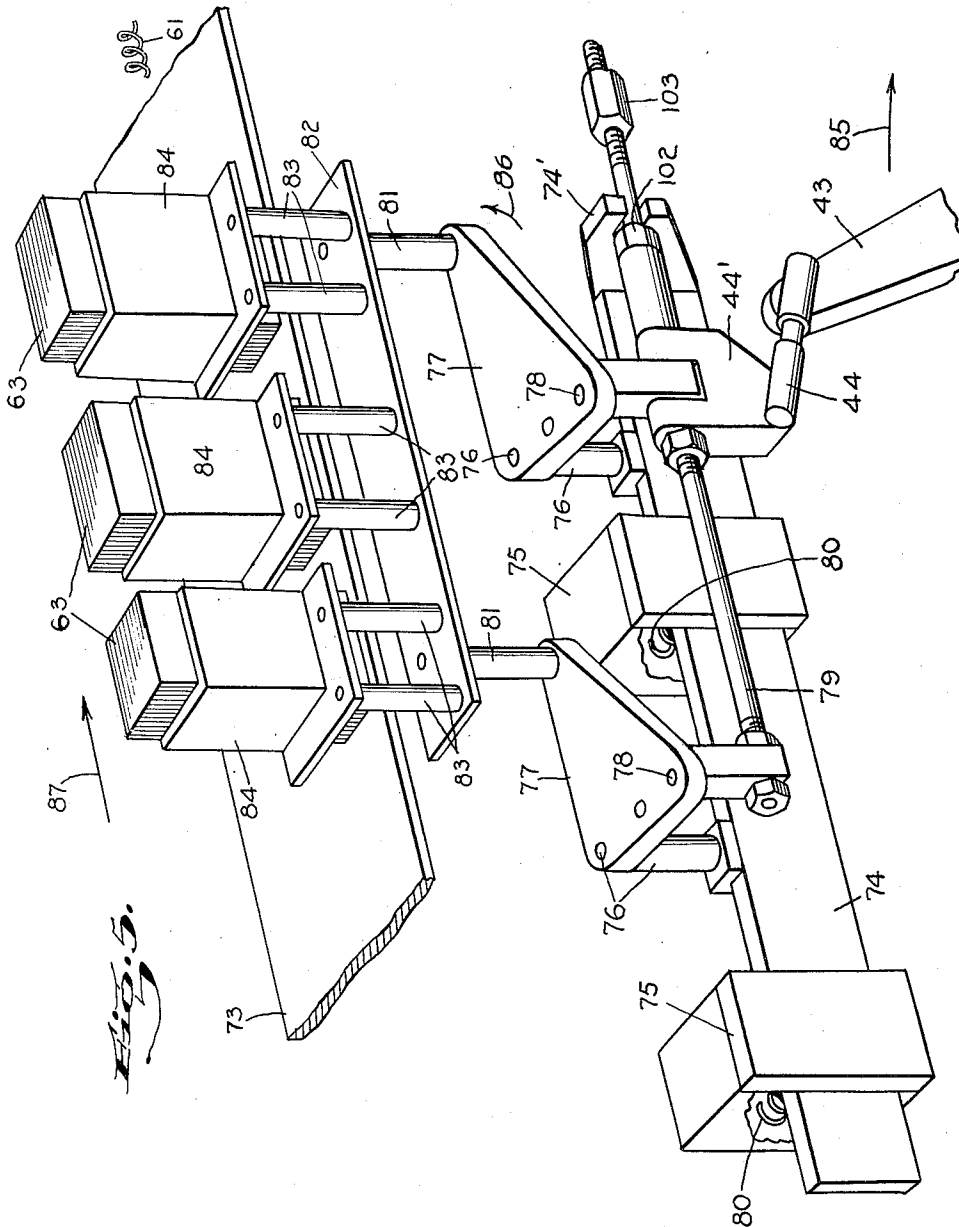
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MACHINE FOR ADHERING FOLDED PAPER TOWEL BUNDLES

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3 Sheets-Sheet 3



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2,805,638

MACHINE FOR ADHERING FOLDED PAPER TOWEL BUNDLES

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Application September 16, 1954, Serial No. 456,392

13 Claims. (Cl. 118—1)

This invention relates to the production of folded paper towels, which are assembled in packages or bundles comprising a predetermined number of folded sheets. More particularly, the invention deals with a machine for automatically feeding paper towel bundles to a gluing station, at which station glue or a suitable adhesive, having predetermined properties, is applied to a surface of a bundle for adhering one bundle to an adjacent bundle in a dispenser in providing, in the dispensing of the paper towels, a substantially continuous paper towel sheet.

Still more particularly, the invention deals with a machine of the character described, wherein the adhesive is dried at a drying station prior to discharge of the product from the machine.

The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and in which:

Fig. 1 is a diagrammatic side view of the machine, with parts of the construction broken away and in section.

Fig. 2 is a diagrammatic plan view of the structure, as seen in Fig. 1, with parts of the construction broken away and in section.

Fig. 3 is a diagrammatic end view of the machine, with parts of the construction broken away and in section and omitting background showing.

Fig. 4 is a diagrammatic view of the other end of the machine, with parts of the construction broken away and in section and also omitting background showing; and

Fig. 5 is a diagrammatic perspective view, illustrating the workpiece feed mechanism of the machine.

The machine comprises an openwork frame or base, comprising two longitudinal bottom rails 15, joined at their ends by cross-rails 16, the latter having downwardly protruding feet 17. Adjacent the cross-rails 16 are upright rails or columns 18 disposed inwardly of the ends of the cross-rails 16.

Supported upon the rails 15 at one end of the frame is a plate 19, on which a motor drive unit 20 of the ratio-type is mounted. Secured to the rails or columns 18 is a horizontal bearing platform 21 and fixed to the upper ends of the rails or columns 18 are top horizontal rails 22 forming an upper platform of the frame. The latter rails are greater in length than the rails 15, as will appear from Fig. 1 of the drawing.

Supported in suitable bearings 23 on two of the columns 18 is a driven shaft 24 having a sprocket 25 with a chain drive, diagrammatically shown at 26 to a sprocket 27 on the motor drive shaft 28, as clearly noted in Fig. 1. On the shaft 24 is another sprocket 29, having a chain drive, diagrammatically shown at 30, to a sprocket 31 on a shaft 32 supported in suitable bearings on the platform 21. Note Fig. 3. On the shaft 32 is fixed a cam 33 and a crank 34.

Mounted in suitable bearings 35 fixed to two of the columns 18, is a shaft 36. On the shaft are spacer sleeves

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37 and 38, note Fig. 3. Mounted on the sleeve 38 is a bushing 39, on which is rotatably mounted a carriage cam follower 40. The follower has a short arm 41 with a roller 42 at its end, which operates upon the cam 33; whereas, the long arm 43 has a link 44 pivoted thereto.

Also rotatably mounted on the sleeve 38 is a slide actuating lever 45, the short end 46 of which is pivoted to a link 47, the latter being also pivoted to the crank 34, as clearly seen in Figs. 1 and 3 of the drawing. The other end 48 of the lever 45 is offset to centralize the same, as noted in Fig. 4 of the drawing, and coupled with this end is a cross-rod 49, to the ends of which are pivoted links 50 which, in turn, are pivoted, as seen at 51, to glue actuating slides 52 arranged vertically at one end of the machine.

Fixed to two of the columns 18 are bearing posts 53, with which bottom slide bearings 54 are rotatably mounted. These bearings form supports for lower end portions of the slides 52, as clearly noted in Fig. 4 of the drawing. At 55 are shown upper bearings for the slides 52, the latter bearings being supported on the rails 22, as clearly noted in Fig. 4 of the drawing.

Pivoted to one of the slides 52, as seen at 56, is an air cylinder 57, the clevis 58 of which is pivoted to the other slide 52, as seen at 59; also, as clearly shown in Fig. 4 of the drawing. It will appear from Fig. 4 of the drawing that a spring 52' couples the opposed slides 52 to normally urge the slides to each other.

Supported in connection with the upper ends of the slides 52 are roller supporting rods 60 which are substantially L-shaped in form, the rods 60 having spacers 60'. The downwardly extending ends of the rods 60 support spring-type glue rollers or applicators 61.

One of the workpieces employed is shown at 63 in Fig. 4 of the drawing and the glued portions of opposed side surfaces of the workpiece being diagrammatically indicated at 64 in said figure. The workpieces in the construction shown are in the form of fanfold towels, wherein a section of glue or adhesive is applied to opposed surfaces of a stack of folded towels, the glue or adhesive having the characteristic of adhering to itself, but not to any other surface. This construction is desirable in the handling of folded towels of this type and kind in maintaining a substantially continuous uninterrupted series of tear sheets in vending or dispensing machine. The workpieces 63 are intermittently fed to the gluing station defined by the rollers 61 and pot 62 in the manner later described. It will be understood, at this time, that the upward and downward feed of the slides 52 is controlled by the lever 45, the link 47 and the crank 34.

Considering Fig. 2 of the drawing, it will appear that the rods 60 are adjustably fixed, by set screws 65, in crossheads 66 welded or otherwise secured to the upper ends of the slides 52. The screws 65 also facilitate removal of the rods 60 and the applicators 61 mounted thereon for cleaning or other purposes. It will also appear from this figure that the lower ends of the rods 60 support spring seat discs 67. By utilizing spring types of rollers 61, a minimum amount of glue is delivered to the workpieces and, by virtue of the contour of the spring, a film deposit of the glue is spread over the surfaces of the workpiece, as will be apparent. The glue or adhesive used is of a viscous nature and has the characteristics when dry of adhering to itself, but not adhering to other things.

The pot 62 is supported in connection with the rails 22 in the manner clearly illustrated in Fig. 4 of the drawing and it is preferred that the central portion of the pot includes a raised V-shaped portion 62' so as to keep the glue at opposed sides of the pot, in which sides the spring applicator rollers 61 are arranged. This also minimizes the volume of glue utilized in the pot 62.

It will appear from a consideration of Figs. 2 and 4 of the drawing that the rails 22 are recessed, as seen at 68, to compensate for the inward and outward movement of the slides 52.

It will appear from a consideration of Fig. 4 of the drawing that rollers 69 are supported on the lower surfaces of the rails 22 and these rollers operate upon cam surfaces 70 on slides 52 to normally support the slides with the applicator rollers 61 in spaced relation to the workpieces 63 until such time as the applicator rollers 61 reach a position to apply the glue, as at 64; whereupon, the slides 52 move inwardly by the spring 52' and stay inwardly for the full height of the application 64 and, whereupon, the rollers 69 strike other cams 71 on the slides 52 and move the slides outwardly to break contact of the roller 61 with the workpiece 63. In the downward movement of the slides 52, the above operation is reversed. The rollers 61 again move inwardly to contact the workpiece 63 and, then, are separated from the workpiece by the rollers 69 passing over the cam 70. The purpose of this operation is to spread or distribute the glue. In this connection, it will also be apparent that the springs 61 are free to rotate to some extent in the application of the glue.

Considering Fig. 2 of the drawing, it will appear that the pot 62 has an extension 72 at one side of the machine and a glue supply bottle 72', diagrammatically shown in Fig. 2 of the drawing, can be suitably supported to dispose the discharge end in the extension 72 of the pot in order to maintain a level of glue, substantially as seen at 72' in Fig. 4 of the drawing.

Supported upon the upper surface of the rails 22 is an elongated top plate 73, one end portion 73' of which is of greater width as noted in Fig. 2. A carriage unit is movably mounted over the narrow end portion of this plate and this unit comprises a slide 74 which is actuated by the link 44 and lever 40. The slide 74 slides in two bearing blocks 75 arranged longitudinally of one of the rails 22. Mounted on said slide 74 are two upwardly extending pivot posts 76. Oscillating on said posts are triangular levers 77, note Fig. 5. One corner of the levers at the pivot point 78 is connected through a rod 79 to a block 44'. It will be observed that the blocks 75 are spring-loaded by springs 80, note Fig. 3, thus creating a friction on the slide 74.

Mounted on the third corner of the levers 77 are two upright studs 81 and mounted on the studs 81 is a plate 82, supporting three pairs of upright studs 83, each pair of studs supporting pushers 84, as diagrammatically seen in Fig. 5.

When the lever 40 is actuated in the direction of the arrow 85, it oscillates the levers 77 so that they move inwardly in the direction of the arrows 86, the reason for this being is that a friction is created in the friction blocks 75 by virtue of the friction springs 80. When the workpiece feeders 84 have moved inwardly in the direction 86 to the prescribed distance, they can no more move further inwardly, thus the lever 40 carries the entire three workpiece feeders forwardly in the direction of the arrow 87. When the lever 40 is reversed by virtue of the cam action, the first thing that happens is that the workpiece feeders 84 move outwardly in a direction opposite to the arrow 87 to be ready at the next cycle in order to repeat the inward and forward motion which propels the individual packages of towels fed toward the gluing station described.

Supported upon and extending longitudinally of the top plate 73 are pairs of longitudinal workpiece upper and lower guides 88 and 89. The upper and lower guides at one end of the machine, the left end as noted in Figs. 1 and 2, include a solid vertical plate 90 having an outwardly flared upper end portion 91. At said end of the machine, the forward upper guide 88 also includes an upwardly flared extension 92. These extensions form a

hopper-like structure at the normal position of two of the lefthand pushers 84 for loading of the workpieces 63 therein. The guides 88 and 89 including the solid portion 90 are provided with suitably spaced supports and some of these supports will be of the type shown at 93 in Fig. 3 of the drawing, including cross-straps 94 for support of the upper forward guide 88. It will appear that the cross-straps are disposed above the upper edges of the workpieces 63. The pushers 84 operate between the upper and lower guides 88 and 89, as will clearly appear from a consideration of Fig. 3 of the drawing.

The guides 88 and 89 form what may be said to be a workpiece guide frame and secured to this frame is a bracket 95, in which is mounted a pin 96 and secured to the pin is a feeler finger 97 which is adapted to bear upon the upper edges of the workpieces 63, as indicated in Fig. 1 of the drawing, in support of a valve actuated lever 98 in inoperative position, that is to say, the position which maintains an air valve 99 in inoperative position. In the event that a workpiece fails to come beneath the finger 97, the finger will automatically drop; thus freeing the lever 98 from the valve 99, permitting the valve to move into position to pass air to the cylinder 57, which operation forces the slides 52 outwardly and maintains these slides in this position so that, in upward and downward movement of the slides, the applicator rollers 61 will not come into contact with a workpiece which may be then arranged at the gluing station. This operation will continue until the machine is stopped or additional workpieces are fed into the machine.

Suitably supported at the right end of the guide frame are two pairs of infra-red or similar heater lamps 100, as diagrammatically seen in Fig. 8 of the drawing. The lamps are disposed at opposed sides of the path of travel of the glued workpieces and are adapted to set the glue on the workpieces, preparatory to discharge of the workpieces from said end portion of the machine.

Considering Fig. 1 of the drawing, it will appear that a spring 101 is coupled with the end 43 of lever 40 and to one of the upright rails 18, this spring operating to maintain the roller 42 in constant engagement with the cam 33.

Also considering Fig. 1 of the drawing, it will appear that the rod 79 has, at one end, adjustable screws 102 and 103 cooperating with an angular offset 74' on the slide 74 in properly positioning or aligning the workpieces at the gluing station so that gluing will be applied to side surfaces of the workpieces inwardly of side edges thereof. In this connection, it will be understood that a large substantially square section of the side surfaces of the workpieces will have the glue or adhesive applied thereto and, considering Fig. 4, it will appear that these glued sections 64 also terminate short of upper and lower edges of the workpieces 63.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A machine for gluing paper towel bundles, comprising an openwork frame, a gluing station at one side of the upper portion of the frame, means at the other side of the upper portion of the frame for intermittently feeding bundles of paper towels toward said gluing station and positioning at said station, means comprising openwork applicators movable vertically at the gluing station for applying glue to opposed side surfaces of a bundle positioned at said station in applying a film deposit of glue to a substantial area of each side of the bundle, means, beyond and in close proximity to the gluing station, for setting the glue applied to opposed surfaces of each bundle, preparatory to discharging the bundles from the machine, said openwork applicators being normally submerged in glue of a glue pot, said applicators being supported upon upper portions of vertically movable slides, means controlling movement of said slides in moving the applicators toward and from opposed surfaces of

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a bundle positioned at the gluing station, said last named means including an air cylinder, and means including a valve actuated upon failure of delivery of bundles to the gluing station to maintain the applicators out of operative engagement with a bundle at the gluing station.

2. A package gluing machine of the character described, comprising a frame, a driven shaft supported in the frame, means supported in the frame and in operative engagement with said shaft for driving the same, a cam and crank fixed to said driven shaft, a cam follower pivoted in the frame and operatively engaging said cam, a gluing station at the upper portion of the frame, glue applicator means at said station, said applicator means being supported on and movable with a swingable slide, a slide actuating lever pivoted in the frame and in operative engagement with said crank and slide in controlling vertical reception of the slide in moving the applicator means of said station in operative engagement with a package supported at the station, means engaging the slide controlling swinging movement of the slide in movement of the applicator toward and from a package at said station, and means comprising package pushers for feeding packages toward and positioning the same at said station.

3. A package gluing machine of the character described, comprising a frame, a driven shaft supported in the frame, means supported in the frame and in operative engagement with said shaft for driving the same, a cam and crank fixed to said driven shaft, a cam follower pivoted in the frame and operatively engaging said cam, a gluing station at the upper portion of the frame, glue applicator means at said station, said applicator means being supported on and movable with a swingable slide, a slide actuating lever pivoted in the frame and in operative engagement with said crank and slide in controlling vertical reception of the slide in moving the applicator means of said station in operative engagement with a package supported at the station, means engaging the slide controlling swinging movement of the slide in movement of the applicator toward and from a package at said station, means comprising package pushers for feeding packages toward and positioning the same at said station, levers for actuating said pushers to move along the path of feed of the packages and transversely of said feed, and means actuated by said cam follower for operating said levers in controlling operation of said pushers.

4. A package gluing machine of the character described, comprising, a frame, a driven shaft supported in the frame, means supported in the frame and in operative engagement with said shaft for driving the same, a cam and crank fixed to said driven shaft, a cam follower pivoted in the frame and operatively engaging said cam, a gluing station at the upper portion of the frame, glue applicator means at said station, said applicator means being supported on and movable with a swingable slide, a slide actuating lever pivoted in the frame and in operative engagement with said crank and slide in controlling vertical reception of the slide in moving the applicator means of said station in operative engagement with a package supported at the station, means engaging the slide controlling swinging movement of the slide in movement of the applicator toward and from a package at said station, means comprising package pushers for feeding packages toward and positioning the same at said station, levers for actuating said pushers to move along the path of feed of the packages and transversely of said feed, means actuated by said cam follower for operating said levers in controlling operation of said pushers, said levers being pivotally mounted upon a slide, and said last named means including a rod pivotally coupled with said levers and operatively engaging said last named slide.

5. A package gluing machine of the character described, comprising a frame, a driven shaft supported in the frame, means supported in the frame and in operative engagement with said shaft for driving the same, a

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cam and crank fixed to said driven shaft, a cam follower pivoted in the frame and operatively engaging said cam, a gluing station at the upper portion of the frame, glue applicator means at said station, said applicator means being supported on and movable with a swingable slide, a slide actuating lever pivoted in the frame and in operative engagement with said crank in controlling vertical reception of the slide in moving the applicator means of said station in operative engagement with a package supported at the station, means controlling swinging movement of the slide in movement of the applicator toward and from a package at said station, means comprising package pushers for feeding packages toward and positioning the same at said station, levers for actuating said pushers to move along the path of feed of the packages and transversely of said feed, means actuated by said cam follower for operating said levers in controlling operation of said pushers, said levers being pivotally mounted upon a slide, said last named means including a rod pivotally coupled with said levers and operatively engaging said last named slide, and means in operative engagement with packages fed to said station maintaining the applicator means in operative position with respect to a package positioned at said station.

6. A package gluing machine of the character described, comprising a frame, a driven shaft supported in the frame, means supported in the frame and in operative engagement with said shaft for driving the same, a cam and crank fixed to said driven shaft, a cam follower pivoted in the frame and operatively engaging said cam, a gluing station at the upper portion of the frame, glue applicator means at said station, said applicator means being supported on and movable with a swingable slide, a slide actuating lever pivoted in the frame and in operative engagement with said crank in controlling vertical reception of the slide in moving the applicator means of said station in operative engagement with a package supported at the station, means controlling swinging movement of the slide in movement of the applicator toward and from a package at said station, means comprising package pushers for feeding packages toward and positioning the same at said station, levers for actuating said pushers to move along the path of feed of the packages and transversely of said feed, means actuated by said cam follower for operating said levers in controlling operation of said pushers, said levers being pivotally mounted upon a slide, said last named means including a rod pivotally coupled with said levers and operatively engaging said last named slide, means in operative engagement with packages fed to said station maintaining the applicator means in operative position with respect to a package positioned at said station, and means beyond and adjacent said gluing station for setting glue applied to packages removed from said station.

7. A machine for gluing paper towel bundles, comprising an openwork frame, a gluing station at one side of the upper portion of the frame, means at the other side of the upper portion of the frame for intermittently feeding bundles of paper towels toward said gluing station and positioning at said station, a pair of spaced slides vertically movable in the frame at said gluing station, means in the frame for guiding said slides, openwork applicators carried by said slides and movable vertically at the gluing station for applying glue to opposed side surfaces of a bundle positioned at said station in applying a film deposit of glue to a substantial area of each side of the bundle, means directly engaging said slides for moving the same and the applicators thereon toward and from sides of the bundle, and means, beyond and in close proximity to the gluing station, for setting the glue applied to opposed surfaces of each bundle, preparatory to discharging the bundles from the machine.

8. A machine for gluing paper towel bundles, comprising an openwork frame, a gluing station at one side of the upper portion of the frame, means at the other side of the upper portion of the frame for intermittently

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feeding bundles of paper towels toward said gluing station and positioning at said station, a pair of spaced slides vertically movable in the frame at said gluing station, means in the frame for guiding said slides, openwork applicators carried by said slides and movable vertically at the gluing station for applying glue to opposed side surfaces of a bundle positioned at said station in applying a film deposit of glue to a substantial area of each side of the bundle, means directly engaging said slides for moving the same and the applicators thereon toward and from sides of the bundle, means, beyond and in close proximity to the gluing station, for setting the glue applied to opposed surfaces of each bundle, preparatory to discharging the bundles from the machine, said first named means comprising a plate supporting a series of bundle pushers, and means comprising a pair of oscillating levers coupled with the plate for intermittently actuating said plate and pushers in feeding bundles in the direction of said gluing station and in moving the pushers toward and from the path of movement of the bundles in intermittently picking up and feeding successive bundles through the machine.

9. A machine for gluing paper towel bundles, comprising an openwork frame, a gluing station at one side of the upper portion of the frame, means at the other side of the upper portion of the frame for intermittently feeding bundles of paper towels toward said gluing station and positioning at said station, a pair of spaced slides vertically movable in the frame at said gluing station, means in the frame for guiding said slides, openwork applicators carried by said slides and movable vertically at the gluing station for applying glue to opposed side surfaces of a bundle positioned at said station in applying a film deposit of glue to a substantial area of each side of the bundle, means directly engaging said slides for moving the same and the applicators thereon toward and from sides of the bundle, means, beyond and in close proximity to the gluing station, for setting the glue applied to opposed surfaces of each bundle, preparatory to discharging the bundles from the machine, said first named means comprising a plate supporting a series of bundle pushers, means comprising a pair of oscillating levers coupled with the plate for intermittently actuating said plate and pushers in feeding bundles in the direction of said gluing station and in moving the pushers toward and from the path of movement of the bundles in intermittently picking up and feeding successive bundles through the machine, said levers having pivotal mountings on a slide, means comprising an intermittently reciprocated rod having a pivotal coupling with said levers for operating said pushers toward and from said bundles, and said slide moving the pushers and bundles in said path of movement.

10. In machines of the character described for intermittently feeding workpieces to and through one or more stations, a workpiece pickup and feed unit comprising a plurality of spaced pushers, a pair of triangular levers coupled with said pushers, a slide supporting and operating said levers, means for actuating said levers and slide in actuating said pushers to intermittently pick up and deliver workpieces to and positioning the same in said stations in a predetermined path, and said levers and slide moving the pushers relatively to said path in engaging successive workpieces for feed delivery to said stations.

11. In machines of the character described for intermittently feeding workpieces to and through one or more stations, a workpiece pickup and feed unit comprising a plurality of spaced pushers, a pair of triangular levers

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coupled with said pushers, a slide supporting and operating said levers, means for actuating said levers and slide in actuating said pushers to intermittently pick up and deliver workpieces to and positioning the same in said stations in a predetermined path, said levers and slide moving the pushers relatively to said path in engaging successive workpieces for feed delivery to said stations, one of said stations including means movable at the station to operatively engage a workpiece supported at said station, and means adjacent the last named station and interengaged by a workpiece for maintaining said movable workpiece engaging means in operative position with respect to a workpiece supported at said station.

12. In a machine for applying an adhesive to a surface of a workpiece, said machine having an adhesive applicator station, a drying station and a carriage unit for intermittently delivering workpieces to and positioning the same in the gluing station and in said drying station, the applicator station including applicator means movable over and engaging the major portion of the surface of a workpiece supported at said gluing station in two reverse passes of the applicator means with respect to said major portion of the surface of the workpiece, means for actuating said last named means, said carriage unit comprising a plurality of workpiece pushers, and means for imparting rotary reciprocating movement to said pushers to move longitudinally of the path of movement of the workpieces in delivery to said stations and out of the path of movement of the workpieces in intermittently picking up and engaging successive workpieces delivered to the machine.

13. In a machine for applying an adhesive to a surface of a workpiece, said machine having an adhesive applicator station, a drying station and a carriage unit for intermittently delivering workpieces to and positioning the same in the gluing station and in said drying station, the applicator station including applicator means movable over and engaging the major portion of the surface of a workpiece supported at said gluing station in two reverse passes of the applicator means with respect to said major portion of the surface of the workpiece, means for actuating said last named means, said carriage unit comprising a plurality of workpiece pushers, means for imparting rotary reciprocating movement to said pushers to move longitudinally of the path of movement of the workpieces in delivery to said stations and out of the path of movement of the workpieces in intermittently picking up and engaging successive workpieces delivered to the machine, and means operatively engaging a workpiece adjacent, but spaced from, the applicator station controlling an air cylinder which normally maintains the applicator means in operative engagement with a workpiece supported at the applicator station.

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