Dec. 17, 1968 R. F. TURNBULL ET AL 3,416,491

LEADING EDGE GLUER

Filed Oct. 20, 1966 4 Sheets-Sheet 1

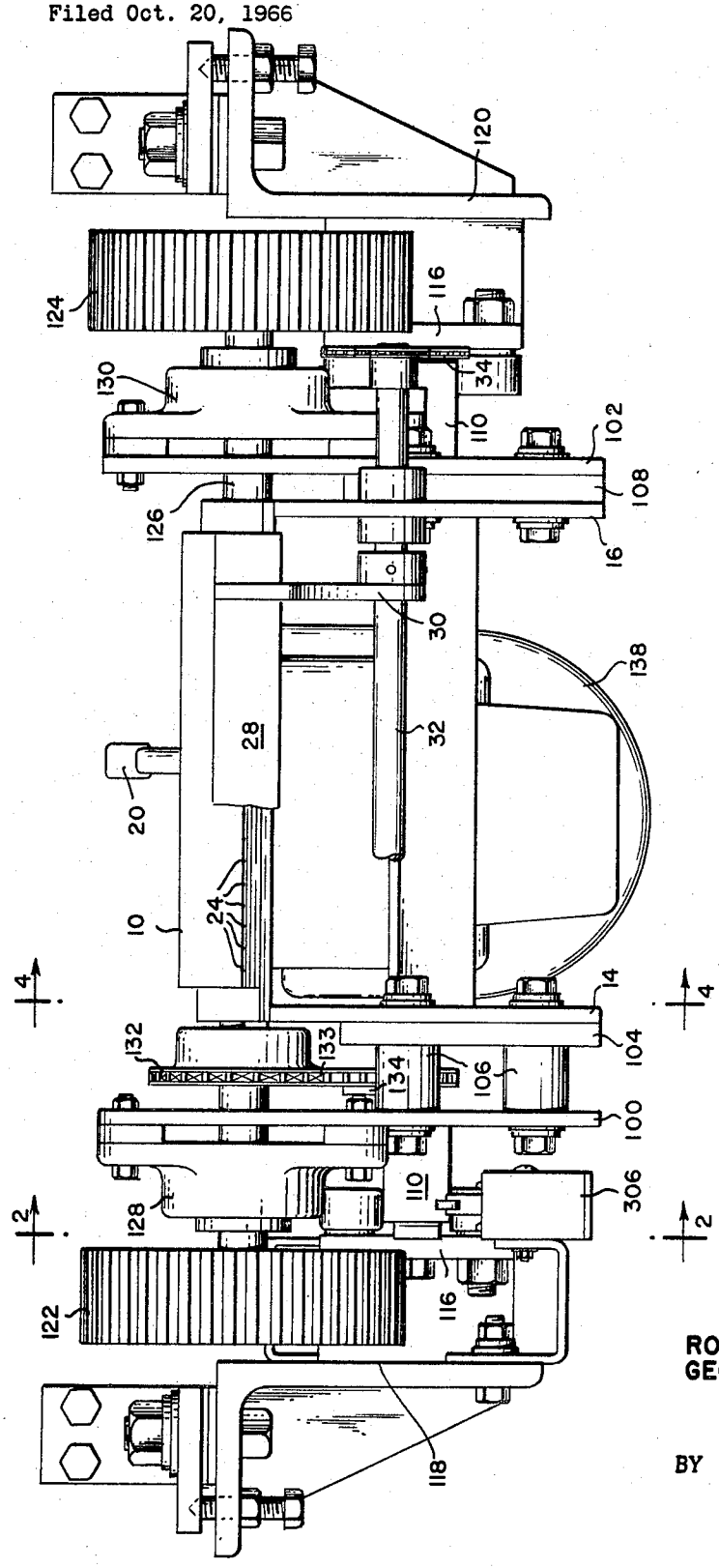


FIG. 1

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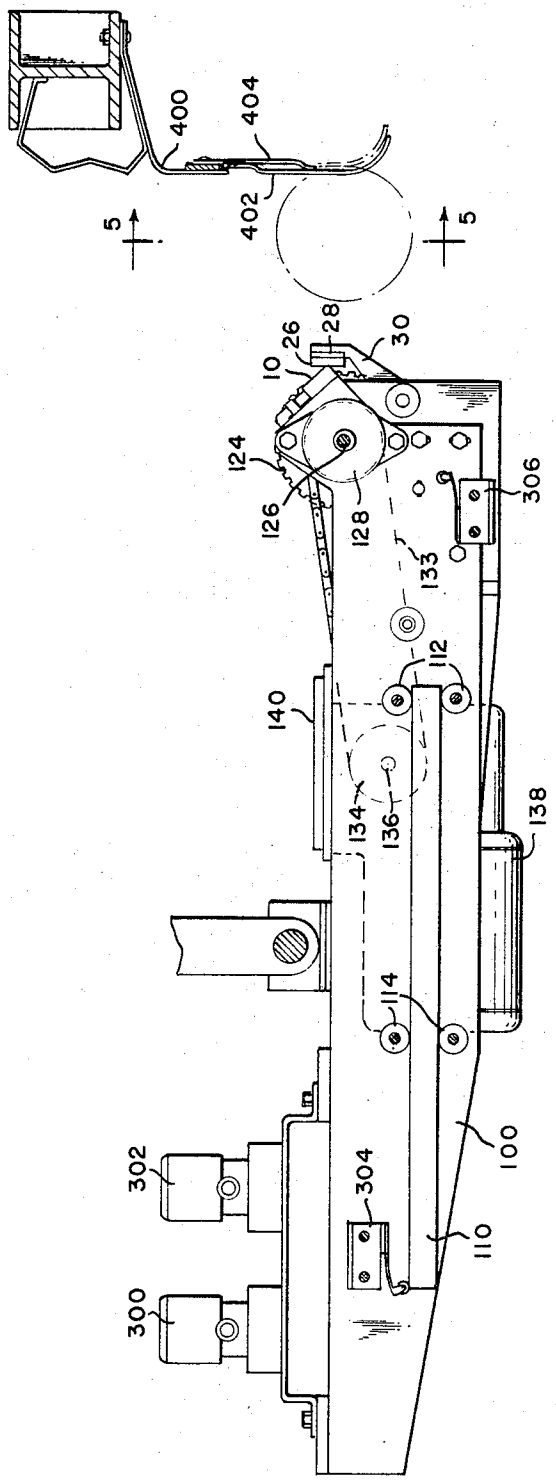


FIG. 2

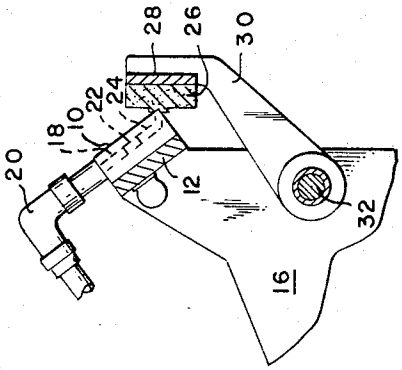


FIG. 3

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FIG. 4

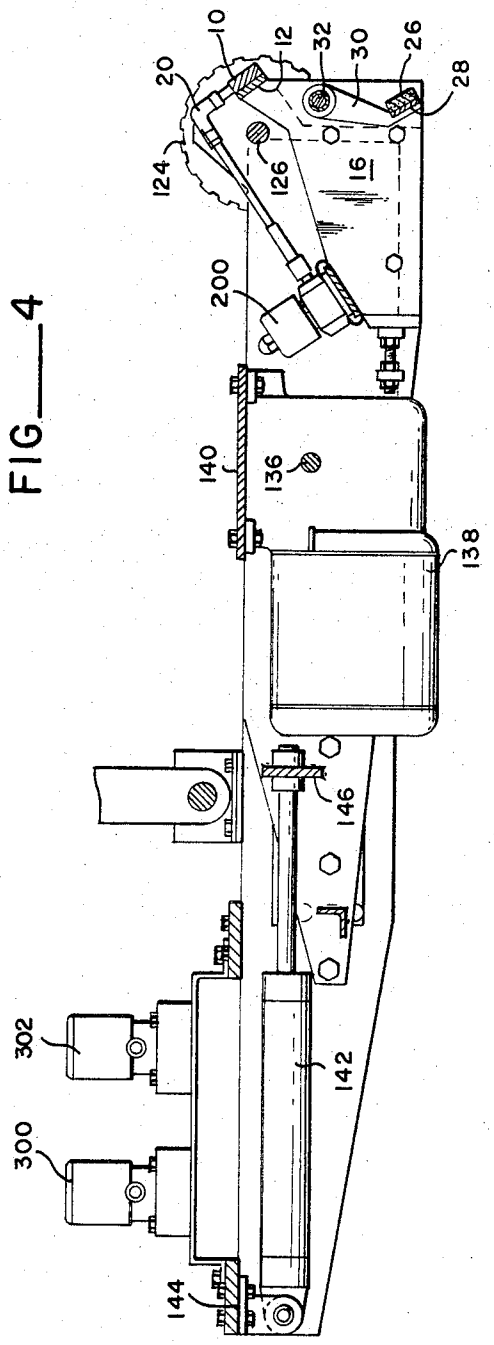
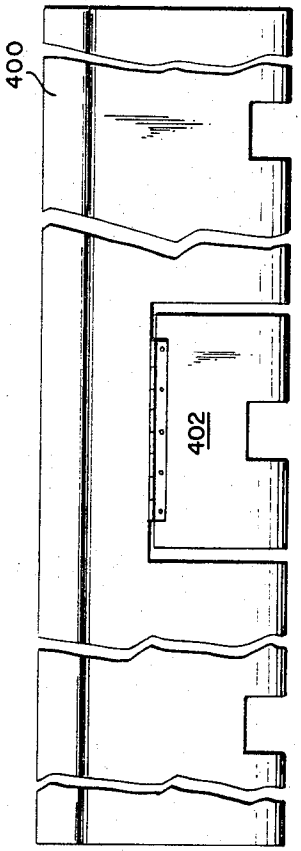


FIG. 5



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FIG. 6

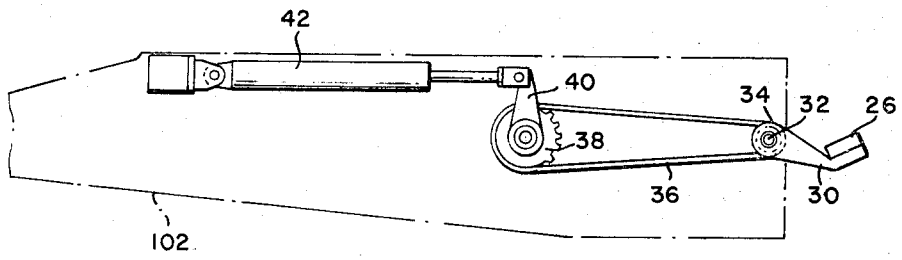
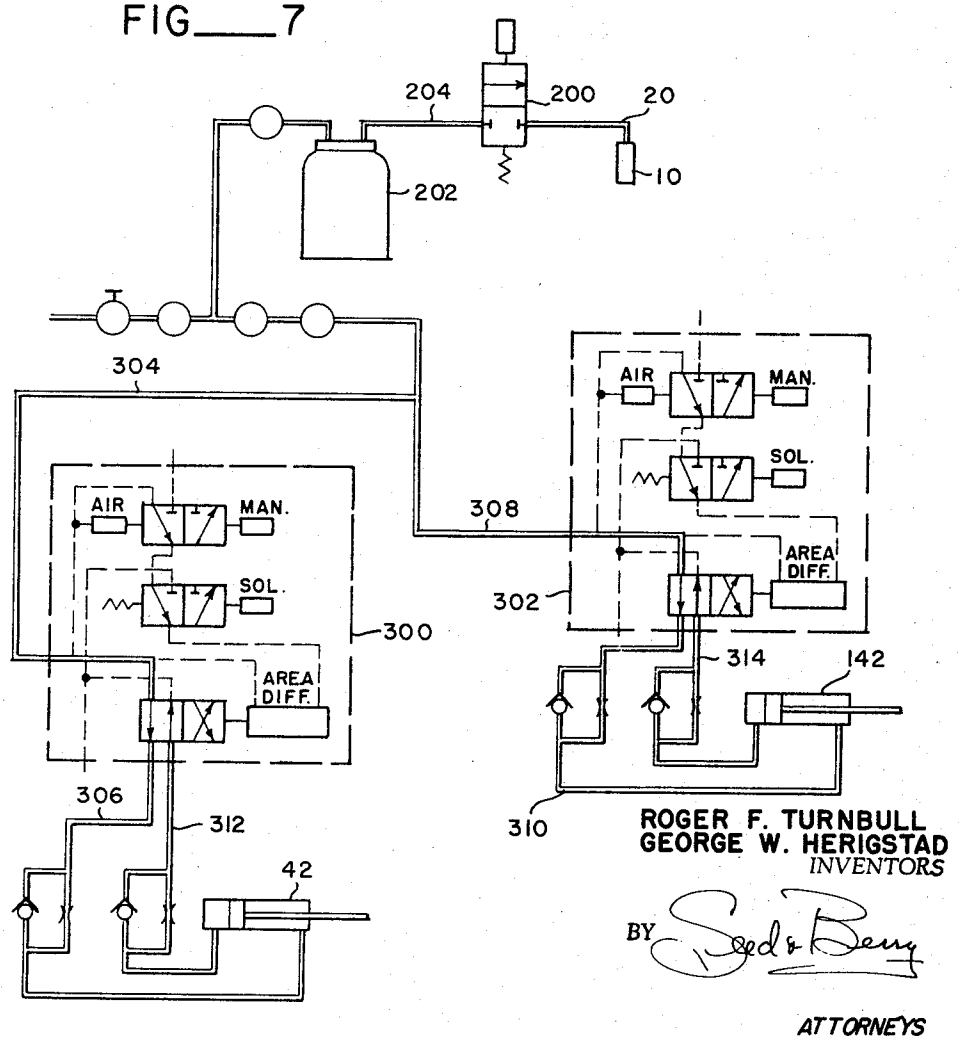


FIG. 7



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3,416,491

LEADING EDGE GLUER

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7 Claims. (Cl. 118—411)

ABSTRACT OF THE DISCLOSURE

An automatically operable leading edge gluer for wrapping paper suitable for mounting overhead wrapper dispenser station is provided with adhesive extruding means shielded from the surrounding atmosphere except when adhesive is to be deposited on a wrapper sheet. The leading edge gluer of this invention includes a carriage means for transporting the adhesive extrusion means into and out of contact with a wrapper sheet.

This invention relates to an adhesive applying system. More particularly, it relates to a "leading edge gluer" designed especially for use in connection with the operation of applying and gluing protective paper wrappers about large rolls of paper.

It is common to manufacturers of paper such as newsprint paper to supply it to the trade in large rolls which, for their protection during shipment and prior to use, are individually enclosed in paper wrappers of strip from that are secured about the rolls by glue adhesive applied to the tail ends thereof. In the roll wrapping operation, a paper strip is drawn from a supply roll in a machine known as a "wrapper dispenser" and after a predetermined length thereof has been drawn out, glue is applied to a tail end portion thereof and the glued length is then severed from the supply roll thus providing a wrapper of such length as to permit its glued end portion to overlap a part of the wrapper as the latter is applied about the roll, thus to secure the wrapper in place.

The paper roll is typically supported on its underside by two rotating drums which rotate the roll as the wrapper is applied thereto. The non-glued leading edge of a wrapper sheet is guided to the paper roll by strip guides which channel the wrapper leading edge between the paper roll and the forward rotating drum. The leading edge passes between the paper roll and the two rotating drums and is then guided manually up around the rearward top and forward portions of the paper roll until the leading edge is caught in its own nip. This manual guiding requires at least two men stationed on opposite sides of the roll.

A primary object of this invention is to provide a leading edge gluer for wrapping paper that will permit automatic nonmanual application of wrapper sheets to paper roll stock. A further object is to provide such a leading edge gluer wherein liquid adhesive is uniformly extruded onto portions of a wrapper leading edge. Another object is to provide apparatus wherein the adhesive and the adhesive extruding means is shielded from the surrounding atmosphere except when adhesive is to be deposited on a wrapper sheet. A still further object is to provide such apparatus suitable for mounting to an overhead wrapper dispenser station such that wrapper paper may be passed vertically from the station to the paper roll to be wrapped.

These and other objects of this invention will become apparent from the following description taken in conjunction with the appended drawings of which:

FIG. 1 is a forward end elevation view of the apparatus of this invention;

FIG. 2 is a side view taken along the line 2—2 of FIG. 1;

FIG. 3 is a detail view of the adhesive extrusion means incorporated in the FIGS. 1 and 2 apparatus;

FIG. 4 is a side view taken along the line 4—4 on FIG. 1;

FIG. 5 is a front view of a wrapper backing plate taken along the line 5—5 on FIG. 2;

FIG. 6 is a side detail view illustrating another feature of the adhesive extrusion means; and

FIG. 7 is a pictorial diagram of a pneumatic control circuit for the system of this invention.

In brief the apparatus of this invention is designed to deposit a film of adhesive onto a moving wrapper sheet in such a manner that the wrapper can adhere to the item being wrapped. The adhesive supply system is sealed from the atmosphere except when adhesive is being deposited onto a wrapper sheet. The invention comprises adhesive extrusion means for depositing a film of adhesive onto a moving wrapper sheet, carriage means for transporting the adhesive extrusion means into and out of contact with a wrapper sheet, and adhesive supply means for feeding adhesive to the adhesive extrusion means when the latter is in contact with a wrapper sheet.

With reference to FIGS. 1–4 and 6, a preferred adhesive extrusion means comprises an elongated, rectangular cross-sectioned extrusion head **10** mounted on the non-vertical mounting face of a cross-member **12** that is connected at mounting ends to parallel left and right hand plates **14** and **16**. Extrusion head **10** is provided with an interior centrally located transverse bore **18** that communicates with an adhesive supply line **20** at its outer end and with an interior longitudinal bore **22** which extends substantially across the width of the extrusion head in communication with a plurality of downwardly and outwardly directed extrusion jets or orifices **24**, jets **24** terminating in the outer lower edge of the extrusion head. A sealing pad **26**, which may be felt, rubber or other suitable material, is mounted on a cross member **28** connected at opposite end sections to the outer ends of a pair of swing lever arms **30**, the inner ends of which are pinned to a cross shaft **32** for pivotal rotation therewith. Cross shaft **32** is journalled to plates **14** and **16** and has an end section extending through plate **16** with a drive chain sprocket **34** axially mounted on such extended end. Sprocket **34** is driven through a chain **36** and another sprocket **38** by a lever arm **40** connected to the shaft which mounts sprocket **38**, such shaft being journalled to a carriage frame member **102**. A cylinder and cylinder rod assembly **42** are pivotally connected to the carriage frame member **102** at the cylinder blind end and to the lever arm **40** at the cylinder rod end.

The carriage means comprises a pair of parallel left and right hand side frame members **100–102** to which the plates **14** and **16** of the adhesive extrusion means are mounted at the forward inner ends thereof by left hand mounting plate **104** and spacers **106** which are bolted between frame member **100** and plate **14** and by right hand mounting plate **108** which is bolted to frame member **102** and plate **16**, respectively. Each frame member has an elongated, rectangular cross-sectional rail **100** horizontally bolted to the outer side thereof and adapted to ride on and between the rollers of forward and rearward roller pairs **112** and **114**. The rollers of roller pairs **112** and **114** on the side of each carriage frame **100–102** may be mounted on left hand or right hand brackets **116**, respectively, as shown with horizontal axis of rotation, each bracket **116** being supported by one leg of a left or right hand angle beam **118** or **120**, respectively. The placement of rails **110** on the frame members **100–102** and the relative spacing between roller pairs **112–114** is such that the carriage means will be adequately supported throughout its traverse of a horizontal course toward or away from an adhesive-depositing position. Treaded left and right hand wrapper sheet feed wheels **122** and

124 are mounted on a cross shaft 126 outside of the respective frame members 100–102. Cross shaft 126 is journalled in left and right hand pillow blocks 128 and 130 that are bolted to the respective exterior sides of frame members 100–102 at the forward end section thereof such that the peripheries of drive wheels 122–124 extend slightly rearward of the forward lower edge of the extrusion head 10. Plates 14 and 16 of the extrusion means are cut away along their upper edges to clear the cross shaft 126. A drive chain sprocket 132 is mounted on cross shaft 126 inwardly of the left hand frame member 100 and driven through chain 133 by a second chain sprocket 134 mounted in line with sprocket 132, on shaft 136 connected to a motor 138 that is suspended from member 140, member 140 being end supported by frame members 100–102. The carriage means is shifted on its horizontal course by a cylinder and cylinder rod assembly 142. The blind end of the cylinder is pivotally connected to the rearward end of the angle beams 118–120 by a cross member 144 and the cylinder rod is connected to the rearward ends of the frame members 100–102 by a cross member 146 at the midpoint thereof.

With reference to FIGS. 4 and 7, the adhesive supply system comprises a solenoid operated adhesive supply valve 200 connected to extrusion head 10 by line 20 and to an adhesive supply vessel 202 by line 204. Adhesive is supplied from vessel 202 by pressurized air delivered from an external source through air line 206. When valve 200 is open, the air supply forces adhesive from vessel 202 through lines 204 and 20 into extrusion head 10.

The sequence of operation is controlled by air valves 300 and 302 mounted on angle beams 118–120, limit switches 304 mounted on angle beam 118 for actuation by carriage rail 110 when the carriage means is in rearward position, limit switch 306 mounted on angle beam 118 for actuation by carriage rail 110 when the carriage means is in forward position, and a manually actuated starting switch (not shown).

A wrapping paper dispenser (not shown) is adapted to feed a wrapping paper sheet W downward past a backing plate 400 (shown in FIGS. 2 and 5), the center portion 402 of which is hinged across the top and spring loaded from behind by spring clip 404. The center portion 402 is positioned opposite, and at the same elevation as, the extrusion head 10. Because the feed wheels 122–124 project reawardly of the extrusion head 10, when the carriage means is moved forward to an adhesive-depositing position, the feed wheels 122–124 will bear against the backing plate 400 and the lower forward edge of extrusion head 10 will bear against the backing plate center portion 402 urging that portion forward from the dotted line position to the position shown in solid line in FIG. 2.

When the leading edge of a wrapping paper sheet is to have adhesive applied thereto, the system of this invention would function as follows.

The starting switch would be manually actuated to effectuate the steps of: (a) feeding the leading edge of a wrapping paper sheet downward along backing plate 400 to a point just below the centerline of feed wheels 122–124; (b) opening air valve 300 to pass pressurized air from lines 304 and 306 into the blind end of the cylinder 42 causing cylinder 42 to stroke out to rotate sealing pad 26 downward (to the position shown in FIG. 4) away from the extrusion head 10; (c) opening air valve 302 to pass pressurized air from lines 308 and 310 into the blind end of cylinder 142 causing cylinder 142 to stroke out to move the carriage means forward until the drive wheels 122–124 contact backing and the extrusion head 10 is seated firmly against the center portion 402 of plate 400 and the wrapper sheet surface (as shown in dotted line in FIG. 2). When the carriage means reaches this forward position, the left hand rail 110 contacts the actuating arm of limit switch 306 and actuates limit switch 306 to: (a) open adhesive supply valve 200 to permit adhesive to pass through lines 204 and 20 and to be extruded out through the jets 24; (b) actuate motor 138 to rotate drive wheels 122–124 to pull the wrapper sheet past the extrusion head 10. Opening adhesive supply valve 200 actuates a timer (not shown) which automatically closes valve 200 after a predetermined adhesive-depositing period and reverses air valve 300 to retract the carriage 110 to (a) trip limit switch 304 to reactuate motor 138; (b) reverse air valve 300 to swing sealing pad 26 up into sealing engagement with extrusion head 10. The cycle is then completed.

It is thought that the invention will have been clearly understood from the foregoing detailed description. Changes in the details of construction will suggest themselves and may be resorted to without departing from the spirit of the invention, wherefore it is my intention that no limitations be implied and that the hereto annexed claims be given a scope fully commensurate with the broadest interpretation to which the employed language admits. For example, the air cylinders and cylinder rod assemblies could be replaced by any motive force causing forward and reverse motions; hydraulic apparatus, for example.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Apparatus which comprises adhesive extrusion means for depositing a film of adhesive onto a moving wrapper sheet; carriage means for transporting said adhesive extrusion means into and out of contact with a wrapper sheet, said carriage means comprising a frame mounting said extrusion means at a forward end section thereof, a rail and roller assembly mounting said frame such that said frame can traverse a course to and away from an adhesive-deposting position, means for moving said frame forward and rearward along such course, and wrapper sheet feed wheels rotatably mounted on said frame with the wheels periphery slightly rearward of the extrusion head forward edge and means for rotating said wheels; and adhesive supply means for feeding adhesive to the adhesive extrusion means when the latter is in contact with a wrapper sheet.

2. Apparatus according to claim 1 wherein said adhesive extrusion means comprises an extrusion head provided with internal porting to distribute adhesive from an inlet to a plurality of outlet orifices distributed across said extrusion head, such orifices opening at an outer edge of said extrusion head; a sealing pad adapted to contact the orifice openings to seal the orifices from the surrounding ambient atmosphere; and mounting means for said sealing pad adapted to serving said sealing pad into and out of contact with the orifices.

3. Apparatus according to claim 1 wherein said adhesive supply means comprises an adhesive supply vessel; and a solenoid-operated supply valve means communicating with the supply vessel and with said extrusion means to control adhesive transfer from said supply vessel to said extrusion means; and means for actuating said valve means when said apparatus is in an adhesive-depositing position.

4. Apparatus comprising adhesive extrusion means for depositing a film of adhesive onto a moving wrapper sheet which comprises an extrusion head provided with internal porting to distribute adhesive from an inlet to a plurality of outlet orifices distributed across said extrusion head, such orifices opening at an outer edge of said extrusion head; a sealing pad adapted to contact the orifice openings to seal the orifices from the surrounding ambient atmosphere; and mounting means for said sealing pad adapted to swing and sealing pad in and out of contact with the orifices;

carriage means for transporting said adhesive extrusion means into and out of contact with a wrapper sheet which comprises a frame mounting said extrusion means at a forward end section thereof; a rail and

roller assembly mounting said frame such that said frame can traverse the course to and away from an adhesive-depositing position; and means for moving said frame forward and rearward along such course; and wrapper sheet feed wheels rotatably mounted on said frame with the wheel peripheries slightly rearward of the extrusion head forward edge; and

adhesive supply means for feeding adhesive to the adhesive extrusion means when the latter is in contact with a wrapper sheet which comprises an adhesive supply vessel; and a solenoid-operated supply means communicating with the supply vessel and with said extrusion means to control adhesive transfer from said supply vessel to said extrusion means; and means for actuating said valve means when said apparatus is in an adhesive-depositing position.

5. A system for applying adhesive to the leading edge of a wrapper sheet which comprises

a wrapper backing plate having a spring-loaded and top-hinged center portion;

carriage means comprising a pair of frame members, horizontal rails mounted on the outer sides of the frame members for horizontal movement between roller assemblies mounted on fixed support members, means for horizontally moving said frame members forward and rearward, a pair of treaded wrapper sheet feed wheels, a feed wheel cross shaft rotatably mounting said feed wheels on the outer sides of the forward end section of said frame members; and means for rotating said feed wheels;

adhesive extrusion means comprising a pair of mounting plates each mounted to the forward edge section inner side of one of said frame members, a first cross member mounted between the upper forward end sections of said mounting plates and having a longitudinal flat non-vertical mounting face therein, an extrusion head mounted on the first cross member mounting face and provided with internal porting to distribute adhesive from an inlet to a plurality of outlet orifices which open at a forward edge of said extrusion head, a cross shaft journalled between the lower forward end sections of said mounting plates, a pair of lever arms connected to said cross shaft at their inner ends for pivotal rotation with said cross shaft, a second cross member mounted on the outer ends of said lever arms, a sealing pad mounted on said second cross member and adapted to seal the orifices from the surrounding ambient atmosphere, said lever arms having sufficient length to swing said sealing pad into contact with the extrusion head orifices, and means for rotating said cross shaft to swing said sealing pad into and out of contact with said orifices; and

adhesive supply means comprising a solenoid-operated adhesive supply valve having an inlet, and an outlet in communication with the extrusion head inlet.

6. The system of claim 5 wherein the means for moving said frames forward and rearward comprises a cylinder and cylinder rod assembly connected between the rearward end section of said frame members and the fixed support members and having an extended stroke length sufficient to contact said feed wheels against said backing plate and said extrusion head against the backing plate center portion.

7. The system of claim 5 wherein the means for rotating said second cross shaft comprises a crank arm, a cylinder and cylinder rod assembly connected between the rearward end section of one of said frame members and said crank arm, and a chain and sprocket assembly interconnecting said crank arm and said second cross shaft such that cylinder rod extension and retraction will rotate said second cross shaft.

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