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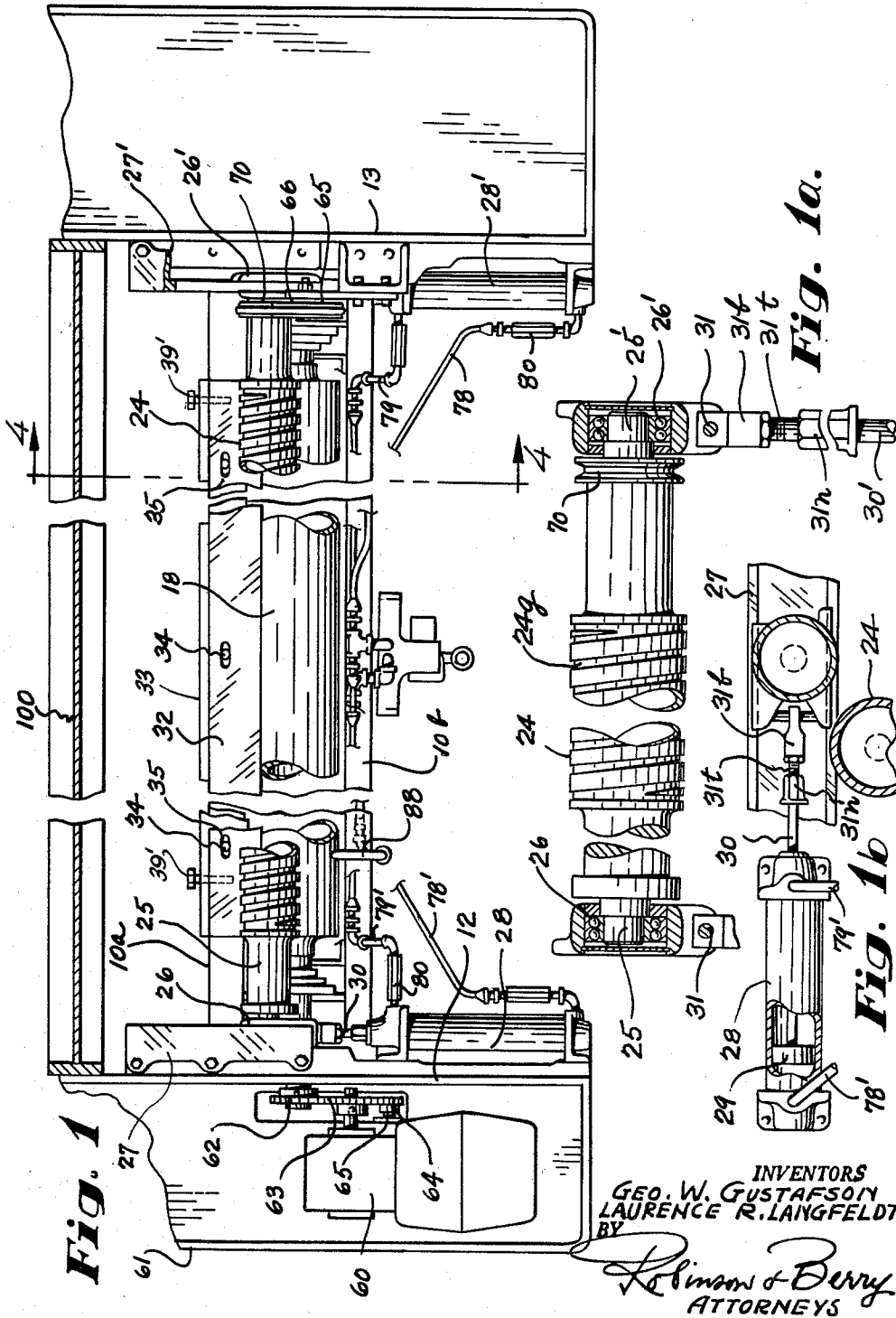
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3,063,408

TAIL GLUER

Filed Dec. 14, 1959

5 Sheets-Sheet 1



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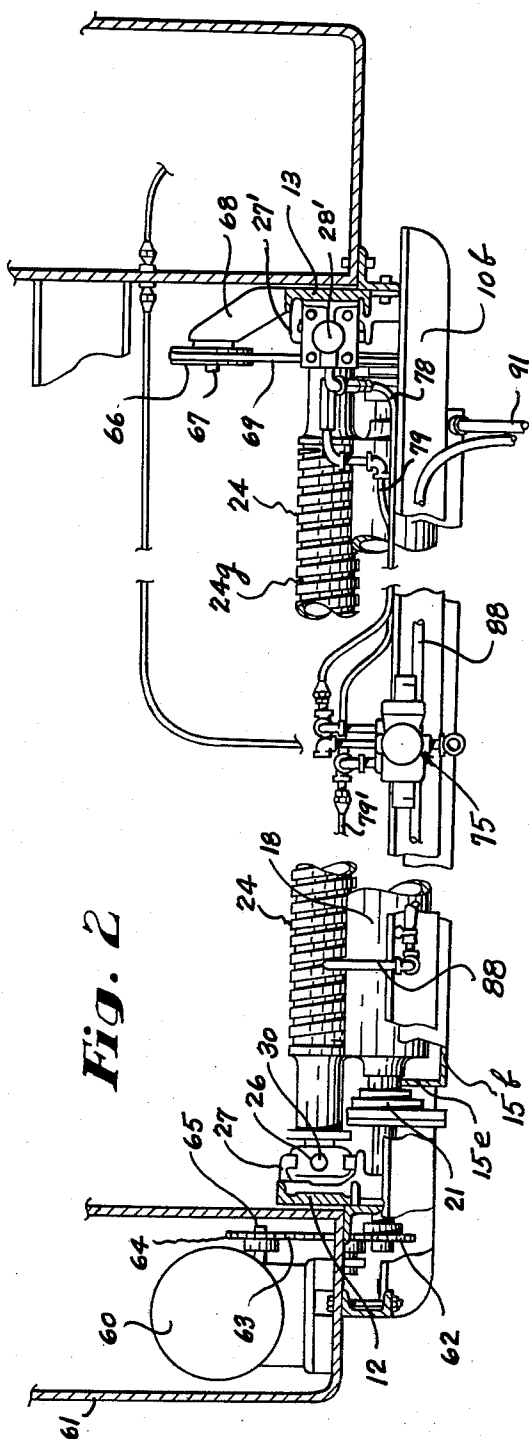


Fig. 2

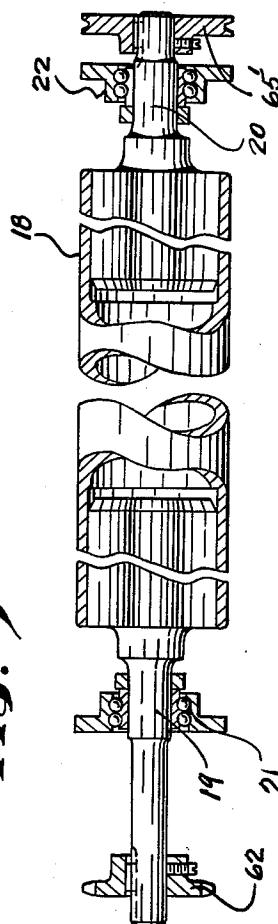


Fig. 3

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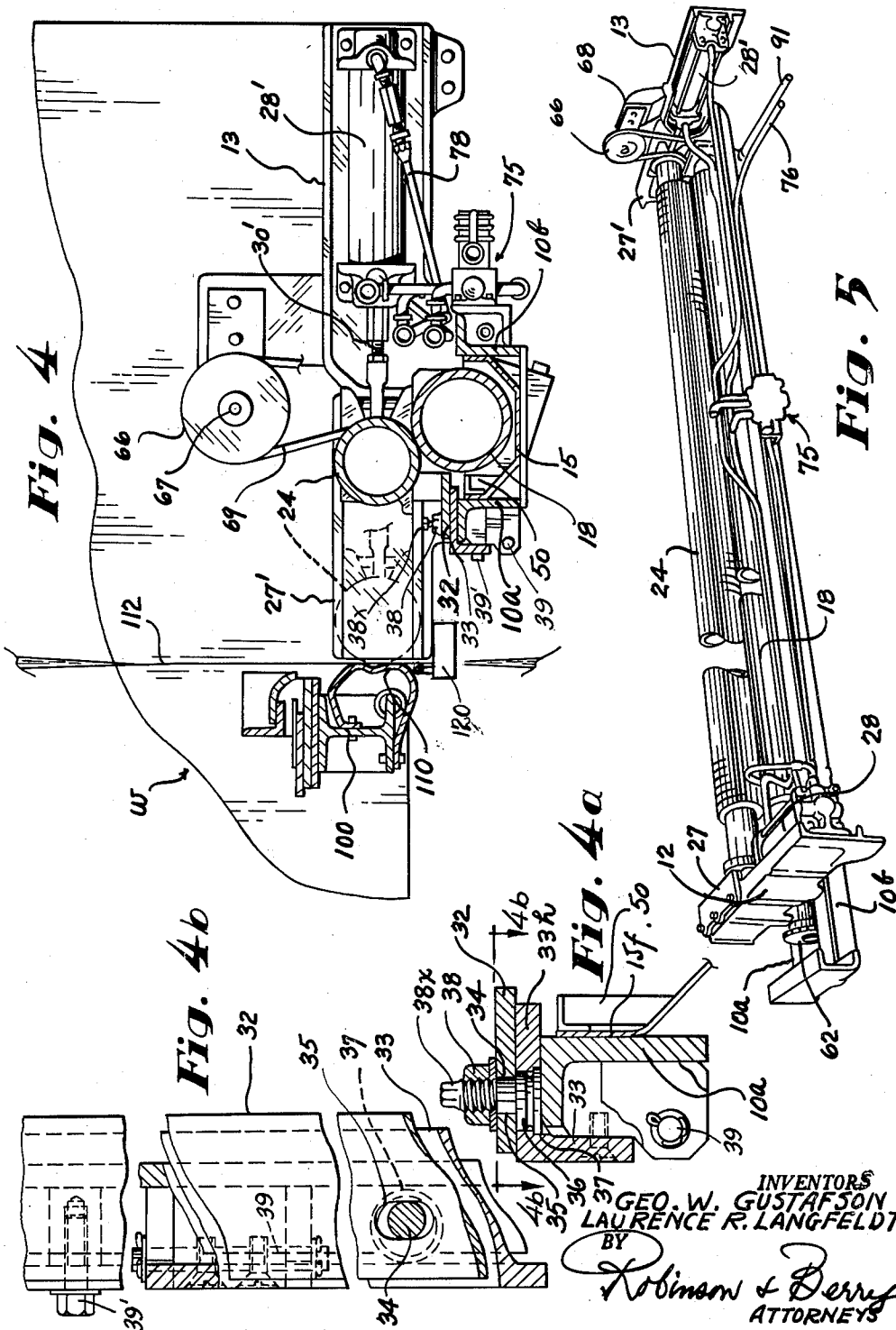
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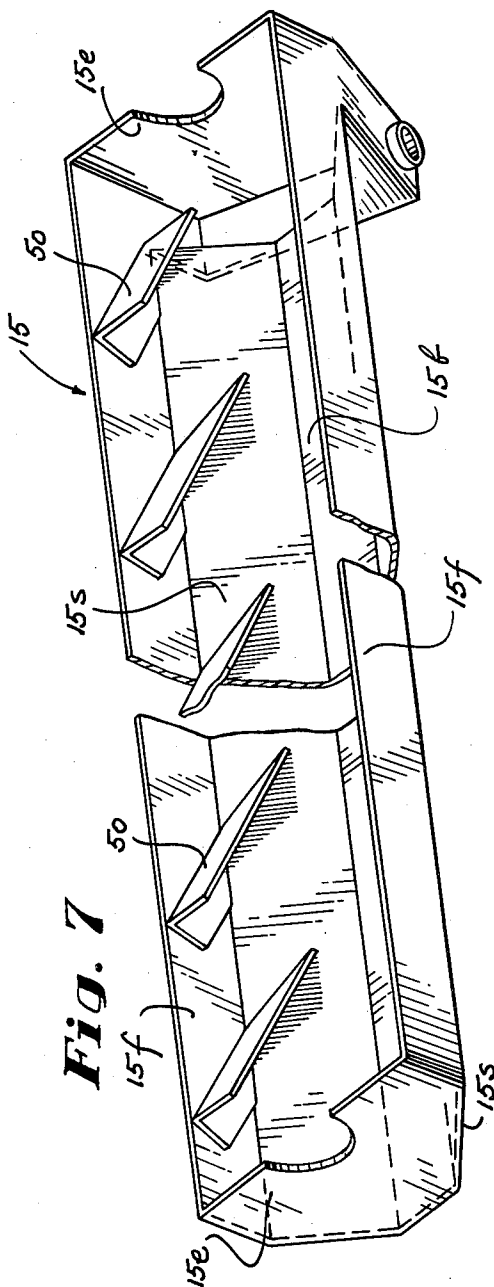
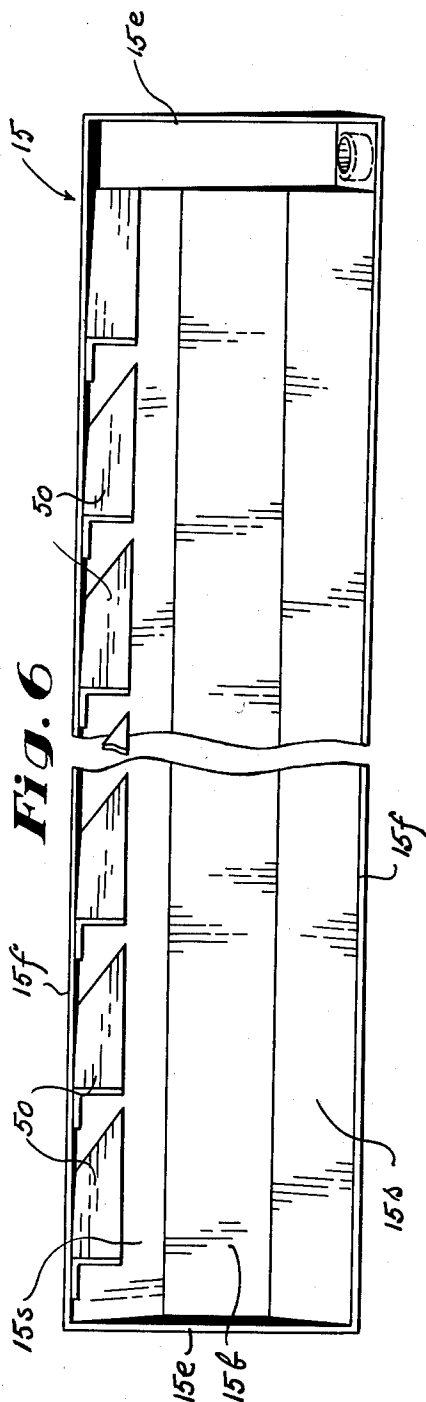
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Fig. 9

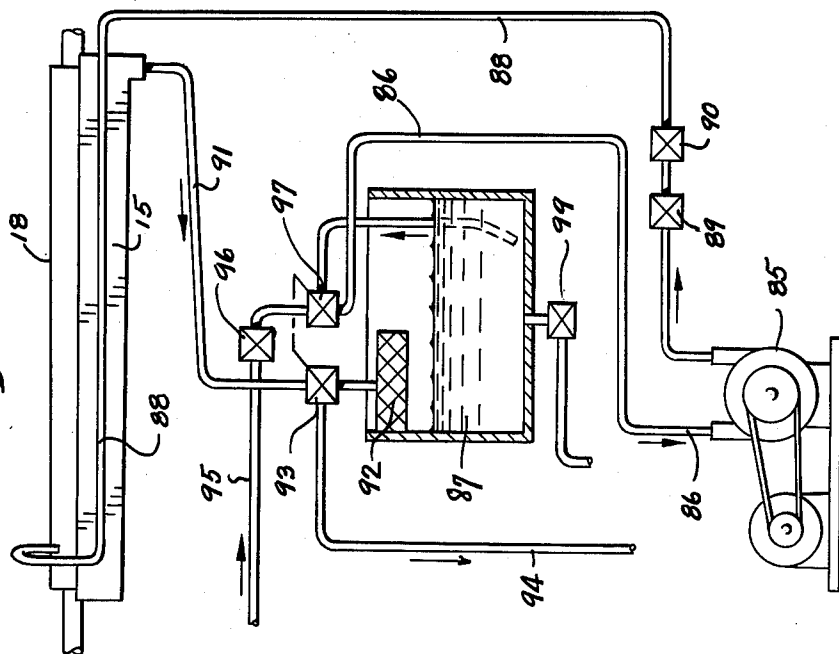
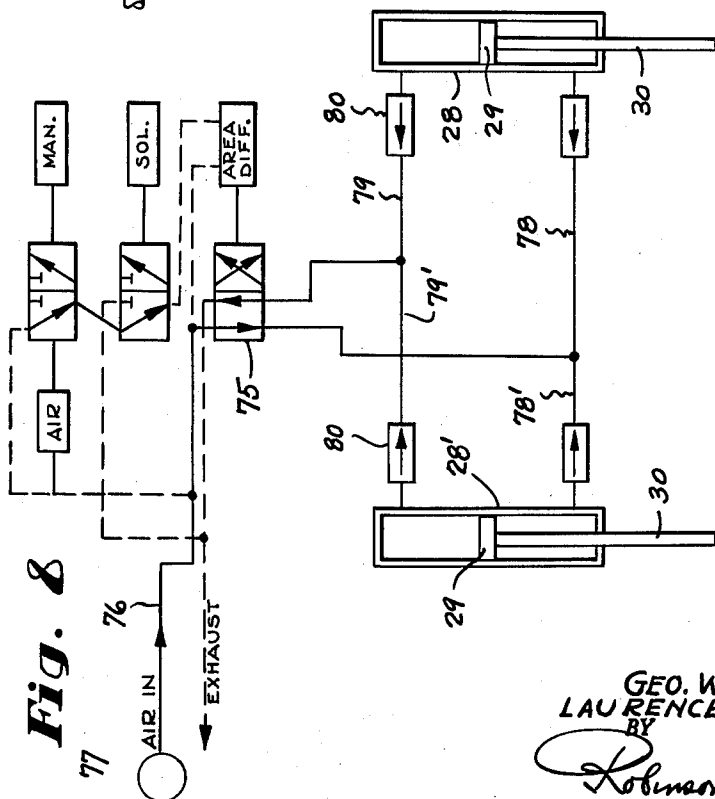


Fig. 8



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3,063,408

TAIL GLUER

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2 Claims. (Cl. 118—258)

This invention relates to glue applying apparatus. More particularly, it relates to what is known in the industry to which it pertains as a "tail gluer" and is designed especially for use in connection with the operation of applying and gluing protective paper wrappers about large rolls of news print paper.

It is now common for manufacturers of news print 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 form that are secured about the rolls by glue applied to the tag 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 an 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.

It is the principal object of this invention to provide an improved "tail gluer" that is novel, practical and most satisfactory, from the economical standpoint for its intended purpose.

It is a further object of the present invention to provide a tail gluer of the above stated character wherein liquid glue is caused to be continuously pump circulated from a source of supply to a glue roll operating in a glue pot for feeding a transfer roll which applies glue to the wrappers. Furthermore, to provide a machine wherein the glue pot is of trough form and is equipped with vanes of novel design that are so disposed therein relative to a doctor blade that is associated with the glue roll, as to accelerate the circulation of the pumped and normally slow flowing glue from the glue pot and to eliminate eddying of the glue stream in the glue pot.

Another object of the present invention is to provide a tail gluer wherein the shifting movement of the glue transfer roll, as effected for the application of glue to a wrapper, effects the energization of a "cut-off knife" whereby the glued wrapper is severed at the proper time from the supply roll.

It is also an object of this invention to provide the present machine with novel glue roll and doctor blade adjusting means that provides for quickly and accurately making those adjustments that determine the amount of glue applied to the wrapper.

Yet another object of the invention is to provide the glue transfer roll with novel surface grooving whereby certain advantages, later disclosed, in its use are attained.

Still further objects and advantages of the invention reside in its details of construction and in the mounting means for the doctor blade and parts associated therewith; in their combination and in the mode of operation of the machine as will hereinafter be fully described.

In accomplishing the above mentioned and other objects of the invention, we have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

FIG. 1 is a plan view of a glue applying mechanism embodying the improvements of the present invention therein; medial portions of the glue pot and rolls being broken away, to shorten the view.

FIG. 1a is an enlarged sectional detail of a bearing

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assembly at one end of the transfer roll and its adjusting means.

FIG. 1b is a side view, partly in section, of one of the transfer roll actuating cylinders.

FIG. 2 is an elevation of that side of the mechanism herein designated as the "rear elevation" with parts broken away.

FIG. 3 is an enlarged sectional detail of parts of the glue transfer roll showing its end mountings; supporting bearings and driving sprocket wheel and belt wheel, at its opposite ends.

FIG. 4 is a cross-section of the mechanism, taken on line 4—4 in FIG. 1, showing the relationship of the present mechanism to the wrapper dispenser which is located at the herein designated "forward side" thereof.

FIG. 4a is an enlarged cross-sectional view of the doctor blade showing its mounting and adjusting means.

FIG. 4b is a top view of fragmental portions of the doctor blade.

FIG. 5 is a perspective showing of the present tail gluer, in outline, and as seen from its rear side, merely to show relationship of its various parts.

FIG. 6 is an enlarged, plan view of the glue pot or trough, with a medial portion broken away to shorten the view, showing the present return flow accelerating vanes as applied therein.

FIG. 7 is a perspective view illustrating the disposition and relationship of the accelerating vanes as applied to the forward wall of the glue pot.

FIG. 8 is a schematic layout of the control system for the transfer roll shifting air cylinders.

FIG. 9 is a schematic layout of the glue circulating system employed with the machine.

Before giving a detailed description of the present machine, it will be mentioned that it has been so designed as to become an integral part of a roll wrapper dispenser mechanism and its function is to apply glue to the last five to twelve inches of that portion of the wrapper strip that is being dispensed by the dispensing mechanism just before it is severed from the supply for immediate application about a news print roll. The application about a news print roll of the wrapper to which the glue has been applied is accomplished by means of a mechanism not a part of this invention and therefore this mechanism has not been described or illustrated herein.

Briefly described, the present mechanism as observed in FIG. 5, comprises an elongated, horizontally disposed glue pot, of shallow trough-like form, in which a substantially co-extensive, rotatably driven glue roll is mounted. Glue is continuously pumped from a storage tank or supply and delivered into the pot near one end thereof to continuously supply the glue roll in its operation and the excess or unused portion is returned by gravity flow to storage for recirculation. Only slight clearance is allowed in the present instance between the pot walls and glue roll which makes possible the adequate wetting of the roll with a small volume of glue in the pot. However, the physical characteristics of the circulated glue cause a heavy film thereof to be carried upwardly on the surface of the rotating glue roll; the thickness of this film being established and controlled by adjustment of a doctor blade. The glue that is sheared off by the doctor blade to establish film thickness on the transfer roll is returned by gravity flow to the storage container for its recirculation; the return flow being accelerated in the present machine by the novel arrangement of vanes which are applied in the glue pot.

Associated with the glue roll, as rotatably contained in the glue pot and driven at the same peripheral speed thereof is a coextensive glue transfer roll which is adjustable from a position in rolling contact with said glue

roll, to a position at which it has momentary rolling contact with the advancing wrapper strip. The present operation provides that when an advancing section of the paper wrapper strip, as drawn from a supply roll, has reached the desired cut-off length, the present transfer roll is caused to move from contact with the glue roll into contact with the moving wrapper thus to transfer its film of glue thereto. The exact time of advancement of the transfer roll is usually controlled by the machine operator or by a wrapper dispenser sheet length control mechanism and in its advancement it is caused to actuate a time delay switch that sets a wrapper cut-off knife mechanism in motion to sever the glued wrapper from the supply roll and return the transfer roll to its normal position in rolling contact with the glue roll.

In FIG. 4 of the present drawings, the wrapper dispenser mechanism *w* which is shown only in part, is located at the left hand side of the present tail gluer mechanism, this being herein designated as the "forward" side of the tail gluer mechanism.

Referring more in detail to the drawings:

The tail gluer mechanism, in a preferred form of construction, comprises a glue pot supporting frame. This has two laterally spaced angle iron bars *10a* and *10b* which extend substantially the full length of the mechanism, at the same horizontal level and are rigidly joined in rather closely spaced relationship at their opposite ends by fixed connections with the lower edges of transversely directed plate-like members *12* and *13*, as has been illustrated best in FIG. 5. Opposite end portions of each of these transverse members *12* and *13*, are designed to be incorporated with other machines, attached rigidly thereto or to other forms of supports not herein shown, to secure the present mechanism in proper elevation and relationship to the machines with which it is associated.

Contained within the glue pot frame, as formed by these parts *10a*, *10b*, *12* and *13*, and extending to its full length, is the glue pot *15*. This, as has been well shown in FIGS. 4, 6 and 7 is of trough form and of rather shallow depth. It has a horizontal bottom *15b* and opposite sidewall portions *15s* and *15s'* which are directed upwardly at 45° angles from the opposite side edges of the bottom for a short distance and then continue as vertical flanges *15f*—*15f'* that lie flatly against and are fixedly secured to the inside surfaces of the frame bars *10a* and *10b* as seen in FIG. 4. The opposite ends of the glue pot or trough are closed by end walls *15e*, as observed in FIG. 7. In its mounting by the frame, this trough is given a very slight incline toward its right hand end, as shown in FIG. 2, to facilitate gravity flow of glue toward that end.

Disposed within the trough-like glue pot *15* and extending substantially to its full length, is the glue roll *18*. This has a smooth outside surface and is of uniform diameter. It terminates at its opposite ends in journals *19* and *20* which, respectively, are rotatably contained in bearings *21* and *22* bolted or otherwise rigidly fixed either directly or indirectly to the frame members *12* and *13*. The clearance space provided between glue roll *18* and the bottom and sidewalls of the glue pot is slight, as noted in FIG. 4, in order that the desired wetting of the roll with a small volume of glue in the pot may be effected.

Mounted parallel with the glue roll *18*, for horizontal movement into and from rolling contact therewith is the glue transfer roll *24*. This roll is coextensive with roll *18* as shown in FIGS. 1 and 2, and terminates at its opposite ends in journals *25*—*25'* that are revolvably contained, respectively, in bearings *26*—*26'* which are mounted for sliding travel in guides *27* and *27'* that are fixed horizontally to the inside faces of the frame plates *12* and *13*. Associated with these two bearings, for their controlled sliding travel in the guides, are paired

air cylinders *28* and *28'* fixedly attached, in horizontal positions, to the inside faces of parts *12* and *13*, as well shown in FIG. 1. Each cylinder has a piston *29* reciprocally fitted therein and from the pistons of these two air cylinders piston rods *30*—*30'* extend to and are connected, respectively, as shown at *31* in FIGS. *1a* and *1b* to the corresponding roll mounting bearings *26* and *26'*.

Application of operating air selectively to the forward or rearward ends of the two horizontally fixed cylinders *28*—*28'* is under valve control, as will presently be fully explained, and effects the shifting movement of the transfer roll between its position in rolling contact with roll *18*, as shown in full lines in FIG. 4, and the forwardly extended position, as indicated in dash lines in that same view; the movement of this roll *24* to its extended position being for the transfer of the glue film, picked up thereby from roll *18*, to the tag end of a section of the wrapper strip being advanced by the wrapper dispenser.

One of the novel features of the present machine resides in the grooving of the transfer roll *24*. It has been shown in FIGS. 1, *1a* and 2 to be formed with a continuous channel thread *24g* of about $\frac{1}{32}$ " pitch, which extends to the full length of the roll.

In its rolling contact with the perfectly smooth glue roll *18*, the roll *24* picks up the glue film therefrom. This film does not spread or extend into the spiral thread or channel and therefore, the transfer of the glue film to the wrapper strip is in a definite pattern of a succession of slightly spaced angularly directed glue strips. The thickness of the glue film applied to the glue roll *18* is established by the setting of a doctor blade *32* which has been shown in FIGS. 1, 4 and *4a* to extend the full length of roll *18* and to be adjustably mounted on the horizontal flange *33h* of an angle iron bar *33* that extends along and rests flatly upon the horizontal top flange of the angle iron frame bar *10a*. The doctor blade *32* is adjustably fixed to the bar *33* by a plurality of bolts *34* which are rotatably fitted in slots *35* formed in the doctor blade in its lengthwise direction as seen in FIG. 1, and which have enlarged heads *36* eccentrically thereof at their lower ends rotatably fitted in circular holes *37* formed in the flange *33h* of bar *33*. Inward or outward shifting of the doctor blade relative to the glue roll *18* is effected by rotative adjustment of the bolts *34* and the adjustment, upon being made, may be maintained by lock nuts *38* applied to the bolts and adapted to be clamped against the blade. The bolts have wrench heads *38x* at their upper ends to facilitate their rotative adjustment.

The angle iron bar *33* is pivotally hinged to the bar *10a*, as at *39* in FIG. *4a* for swinging the doctor blade bodily away from the glue roll and this adjustment may be secured by screws *39'* applied through the vertical flange of the angle bar *33* to engage with the vertical flange of bar *10a*, as shown in FIG. *4a*.

The adjustment of the doctor blade relative to the glue roll *18* is to establish the depth of the glue film on the roll when contacted by roll *24*. The depth of the glue film picked up by the roll *24* in its contact with roll *18* is established by the adjustment in the connection between the piston rods of the air cylinders *28*—*28'* with the bearing blocks in which the journals *25* and *25'* of roll *24* are contained. It has been shown in FIGS. *1a* and *1b* that each piston rod has a threaded connection *31t* with a block *31b* which in turn, is pivotally connected as at *31* with the corresponding bearing *26* or *26'*. Thus, after an adjustment has been made, which in effect increases or shortens the rod length, the adjustment may be retained by a lock nut *31n* that is threaded onto the piston rod for tightening against the block *31b*.

By reason of the provision for adjustment of the doctor blade relative to roll *18* and adjustment of roll *24* relative to its glue pick up position, the glue film to be transferred to the wrapper can be finely regulated to suit paper requirements.

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Ordinarily the return flow of glue, delivered into the glue pot at its slightly higher end, to its lower end is quite slow by reason of the viscosity of the glue. However, in the present instance we have provided certain improvements in the glue pot whereby the return flow has been materially accelerated. In this connection, attention is directed to FIGS. 4, 6 and 7 of the drawings. It is to be observed, particularly by reference to FIG. 4 that the spacing of the forward wall of the pot from roll 18 is substantially greater than that of the rearward wall and that the doctor blade has a substantial rearward overhang over the forward wall. The glue that is sliced from the film on roll 18 by the doctor blade drips through this wider space and is caught in the trough to be again picked up by the roll 18. The glues that are presently being used are slow flowing and it is quite desirable that the rate of flow be increased. To accomplish this, we have applied a succession of drip deflecting vanes 50 to the forward wall of the glue pot, to catch the drip from the doctor blade. These vanes slope downwardly and toward the discharge end of the pot at a rather steep angle and the spacing of vanes along the trough wall is such that the higher end of each is substantially directly above the lower end of the next preceding vane. This arrangement of vanes provides that all drip will be caught thereon for rapid gravity return toward the discharge end of the trough. This application and use of the vanes also eliminates the eddying of glue in the trough under influence of the rotating glue roll 18.

The driving of the rolls 18 and 24 is effected by means of a motor 60 which is mounted in a housing or cabinet 61 that is suitably fixed on the frame structure at the outside of the end plate 12, as observed in FIG. 1. A sprocket wheel 62 is keyed to the adjacent end of roll 18 and a sprocket chain belt 63, operates about the sprocket wheel 62 and a sprocket wheel 64 on the motor shaft 65 to complete the roll driving connection. At the end of roll 18, opposite that mounting sprocket wheel 62, the roll 18 has a small pulley belt wheel 65' fixed thereon in alignment with and below a larger belt wheel 66 revolvably supported by a spindle 67 fixed in a bracket 68 mounted on frame plate 13. A belt 69 operates about these wheels with one run thereof in frictional contact with a belt wheel 70 that is fixed on the adjacent end of roll 24. The diameter of these belt wheels is such as to cause rolls 18 and 24 to be turned at the same lineal speed while in rolling contact.

Referring now to the air cylinders 28—28' whereby the transfer roll 24 is shifted: Operating air is supplied to the two air cylinders under control of a solenoid valve, designated at 75, that is fixed to the frame member 10b medially of its ends at the rear of the machine as shown in FIG. 1. Air under pressure is brought to the valve through a pipe line 76 leading from a source of air supply designated in FIG. 8 at 77. From the valve 75, pipe lines 78—78' lead, respectively, to the forward ends of the two air cylinders and other pipe lines 79—79' lead, respectively, to their rearward ends. The valve circuit is under solenoid switch control as also has been schematically shown in FIG. 8. In these several air lines flow control valves 80 have been interposed and so adjusted that the pistons and rods operate together at the same fast speed outwardly but with a slow return stroke.

Glue is delivered to the glue pot by a pump 85 which is supplied through a pipe connection 86 leading from a source of supply, indicated at 87 in FIG. 9. Delivery from the pump is through a feed pipe 88 that leads along the pot and discharges onto roll 18 near its left hand end in reference to the showing in FIG. 1. The volume of delivery is regulated in accordance with requirements, viscosity of glue and various other factors that are taken into consideration in such an operation. The schematic view of FIG. 9 further shows the feed line 88 from pump 85 as being extended along the glue pot and equipped near the pump with a gate valve 89 and line drain valves

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90. It also shows the glue pot as having a drain pipe 91 leading from its right hand end back to the glue tank or source of supply through a strainer 92. The drain pipe 91 is equipped with a drain valve 93 from which excess water may be drained off to a sewer through waste line 94. It is also to be noted in this figure that the glue line 86 leading from supply to pump 85 has a warm water line 95 connected therewith through a valve 96 and intake valve 97 so that the glue can be maintained in the desired fluid condition by addition of water thereto. The glue supply is maintained at a suitable temperature by a heater 99 and water is added thereto as needed to compensate for evaporation.

Mounted in a fixed position parallel with the present mechanism along what has herein been designated as the forward side of the machine, is an I-beam 100. This might be a part of the wrapper dispenser mechanism and it is located substantially at the level of travel of the transfer roller 24 and extends with slight clearance past and somewhat beyond the forward ends of the bearing guides 27—27' as fixed to the frame plates 12 and 13 as shown in FIG. 1.

Mounted on the rearward face of the I-beam and extending substantially to its full length, is a paper guide plate 110 across the face of which the wrapper strip of paper 112, from which the roll wrappers are formed, is drawn. It is shown in FIG. 4, that when the transfer roll 24 is pushed forwardly for the applying of glue to the wrapper strip 112 from which the individual wrappers are formed, the engaged portion of the strip is backed up by this paper guide plate 110 which is seen to be slightly concaved in vertical cross-section to conform substantially to the curvature of the transfer roll.

In the operation of this mechanism, when a suitable length of wrapper strip has been drawn off from the supply, downwardly across plate 110, the operator or the control mechanism employed effects energization of the solenoid valve 75 and causes it to adjust itself to admit operating air to the pair of air cylinders 28—28', to actuate the transfer roll 24 from its position in rolling engagement with roll 18 forwardly against the moving wrapper strip. After the roll 24 leaves its contact with roll 18 it continues to revolve freely under its own inertia and, in contacting the wrapper strip, the glue film on roll 24 is wiped off onto the wrapper strip, leaving a glued area across the strip adjustable in length from 5 to 13 inches. At the instant the transfer roller 24 contacts the wrapper strip, the roller moving mechanism contacts and actuates a time delay switch, shown at 120 in FIG. 4, which operates to energize a cutoff knife to sever the glued wrapper from the supply roll; the tag end of the wrapper continuing in rolling engagement with the transfer roll 24 so that the glued area extends to the extreme edge of the tag and of the wrapper.

The time delay switch 120 also controls the return movement of the transfer roll against roll 18. The switch is set to cause the return of the transfer roll after the cut end of the paper wrapper has cleared the transfer roll. At the end of the time delay the valve 75 is actuated to admit pressure medium to cylinders 28—28' thereby moving the transfer roll against glue roll 18.

What we claim as new is:

1. A glue applying device comprising a fixed glue pot of elongated through-like form for containing a supply of glue within its bottom portion said glue pot having a glue receiving end and a discharge end, said glue pot including opposed longitudinally extending vertical walls, a glue roll extended along and supported for rotation within said glue pot with its lower peripheral surface in contact with the glue supply contained therein, means for continuously rotating the glue roll to cause it to pick up and maintain a film of glue thereon, a transfer roll in parallel relationship with the glue roll and adapted to pick up glue therefrom, a doctor blade adjustably

mounted for coaction with the glue roll to establish the thickness of the glue that is retained thereon for pick up by the transfer roll, a succession of glue deflecting vanes mounted on the upper portion of the inner surface of the vertical wall of the glue pot below the doctor blade, to receive the sliced-off film of glue from the doctor blade, said vanes extending longitudinally of said glue pot, parallel with the vertical wall and inclined downwardly in the direction of flow toward the discharge end of the glue pot and the lower end of each vane extending below the upper end of the next adjacent vane whereby the movement of excess glue toward the discharge end of the trough is accelerated.

2. A glue applying device as in claim 1 including a source of glue for supplying said glue pot and a pump interconnected with said source of glue for delivering glue to said glue pot at the receiving end thereof and a drain at the discharge end of said glue pot interconnected with said source.

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