June 24, 1941. A. J. MATTER 2,246,525

AUTOMATIC WRAPPING MACHINE

Filed April 26, 1938 5 Sheets-Sheet 1

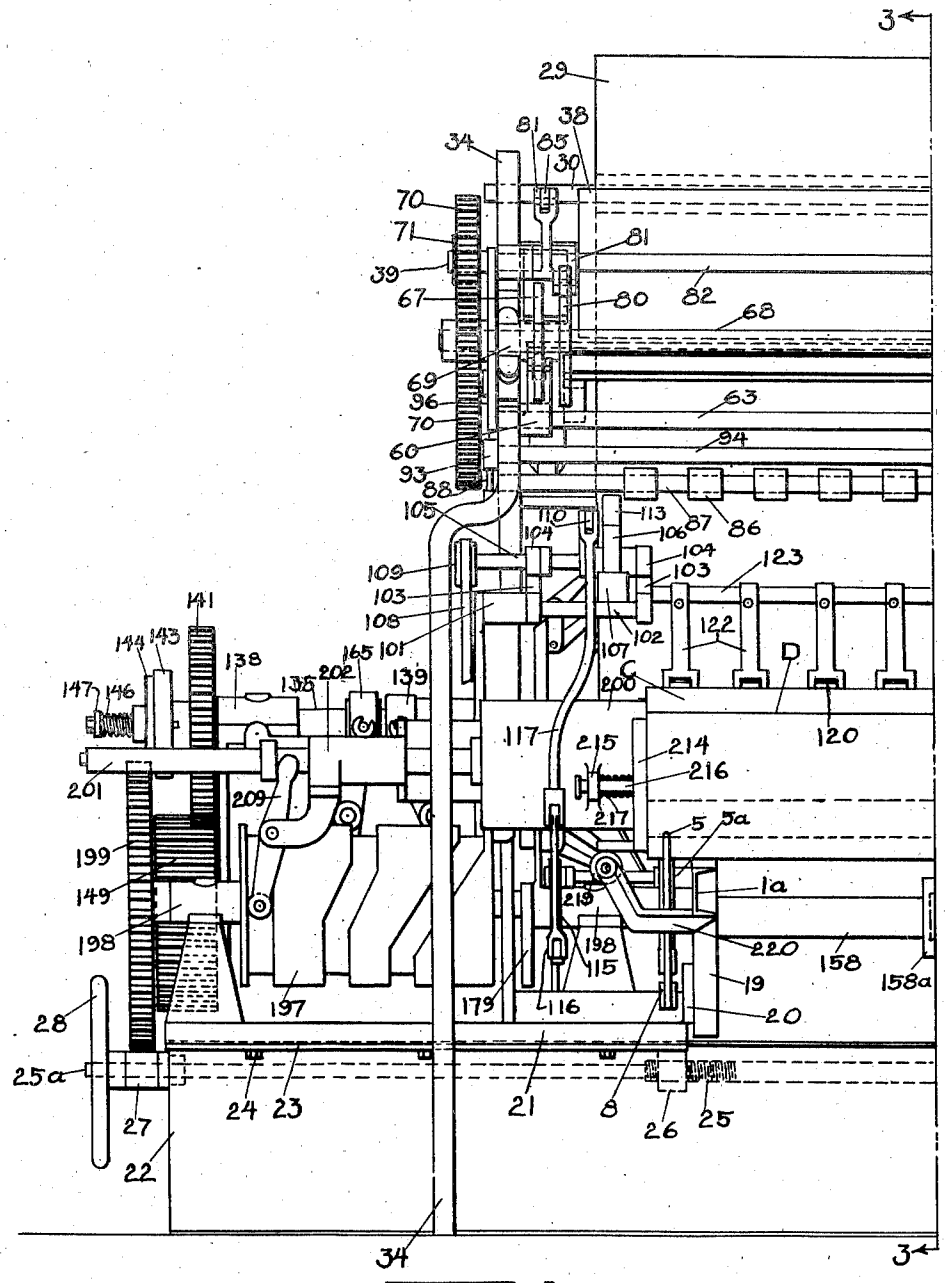


Fig. 1

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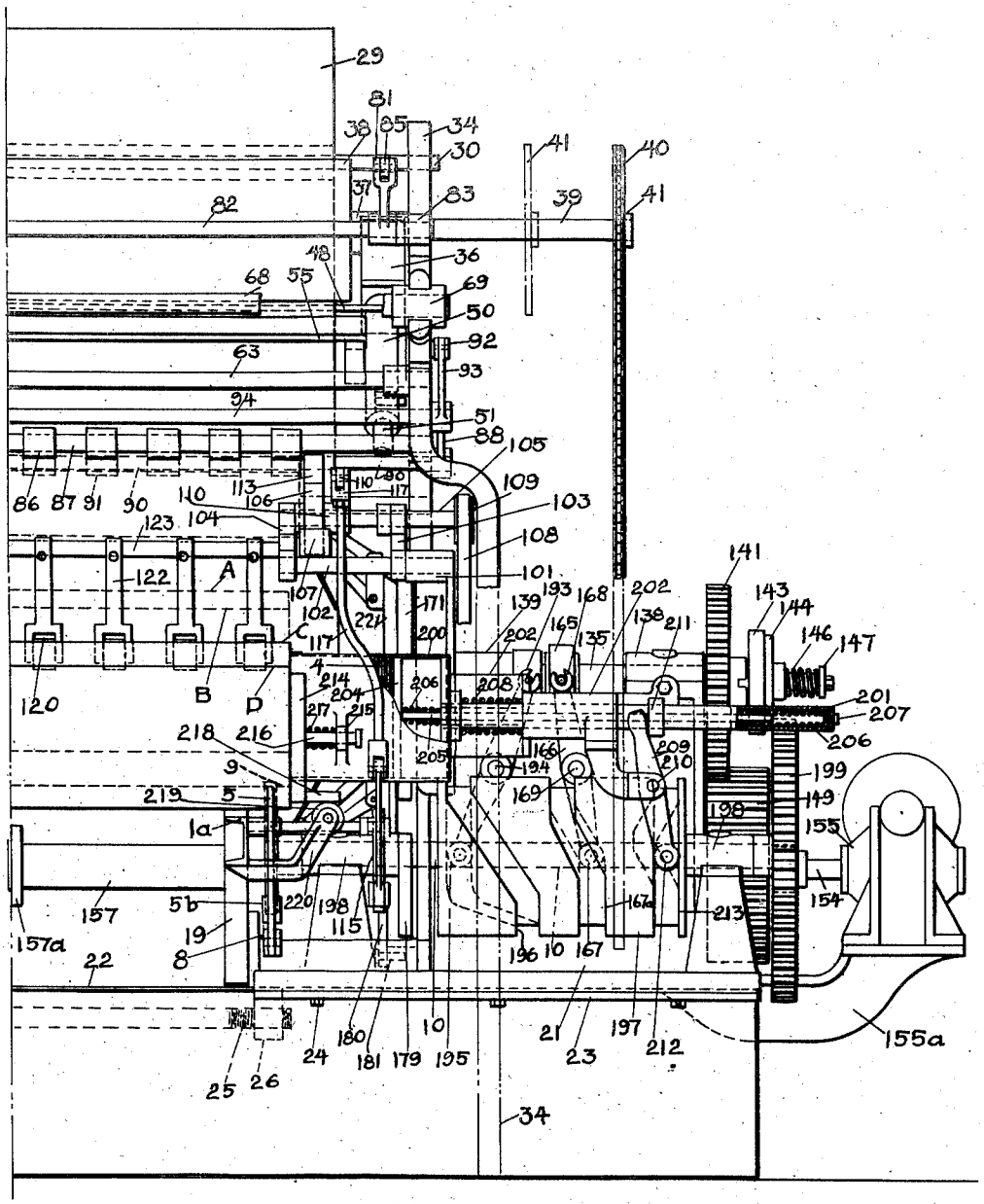


Fig. 2

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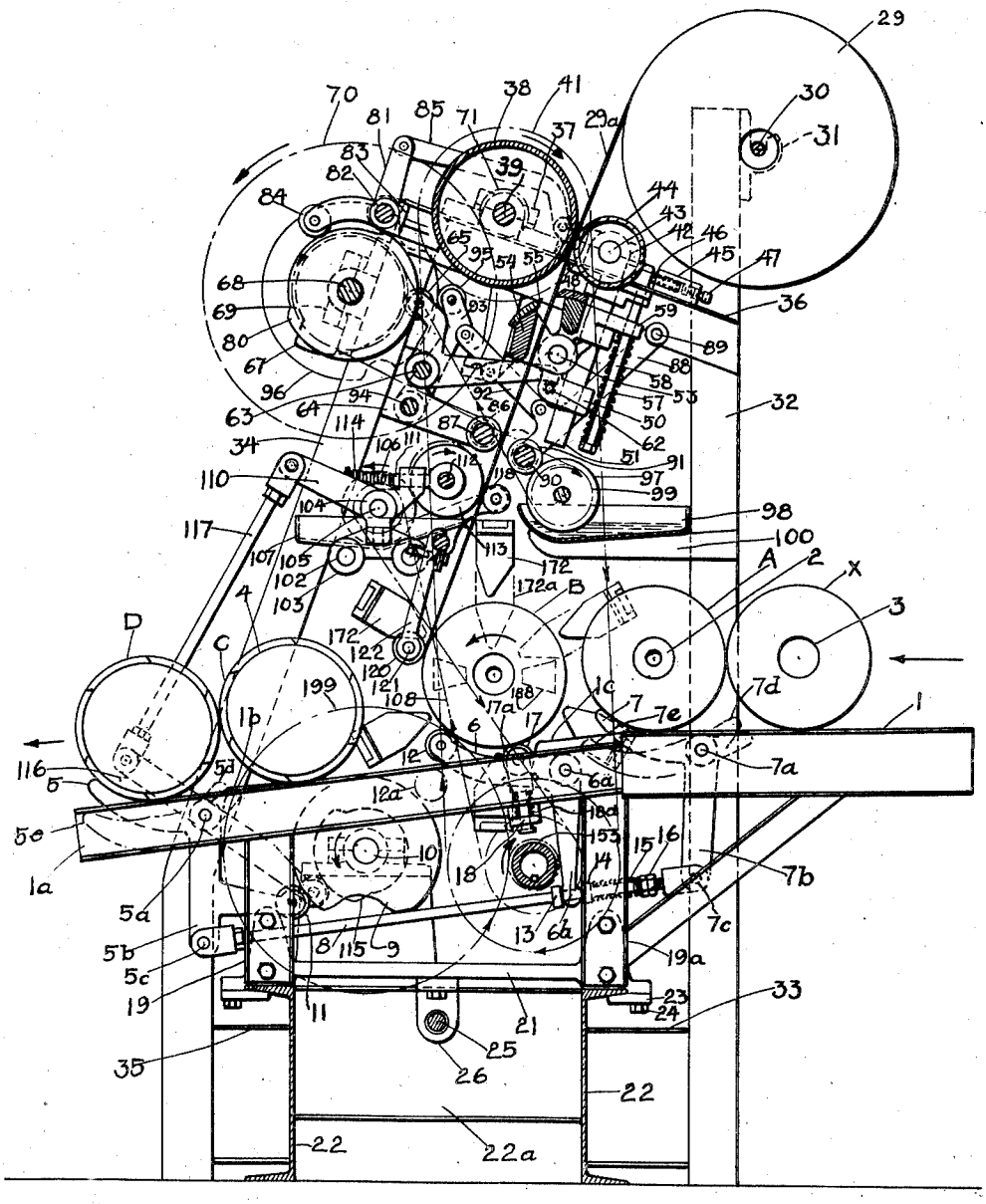


Fig. 3

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AUTOMATIC WRAPPING MACHINE

Filed April 26, 1938 5 Sheets-Sheet 4

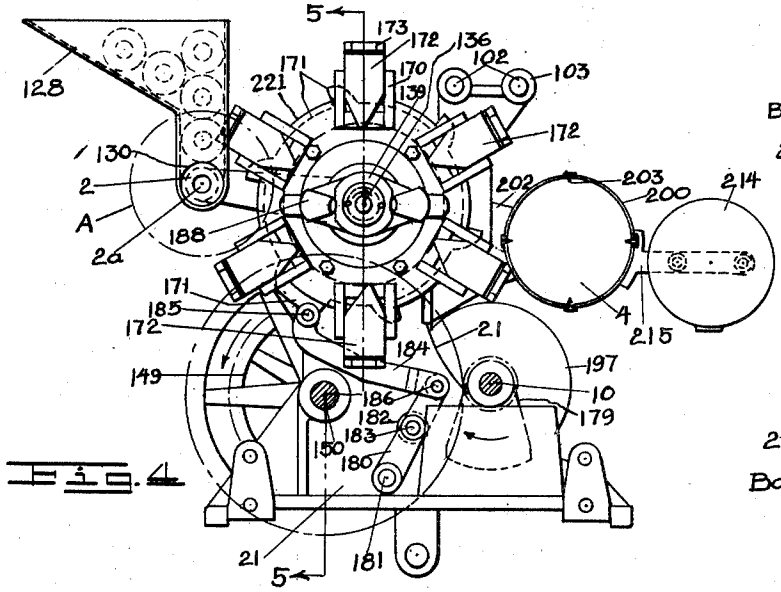


Fig. 4

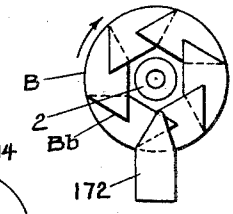


Fig. 7

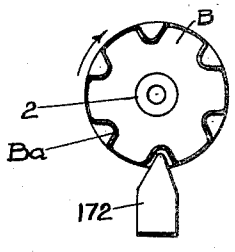


Fig. 8

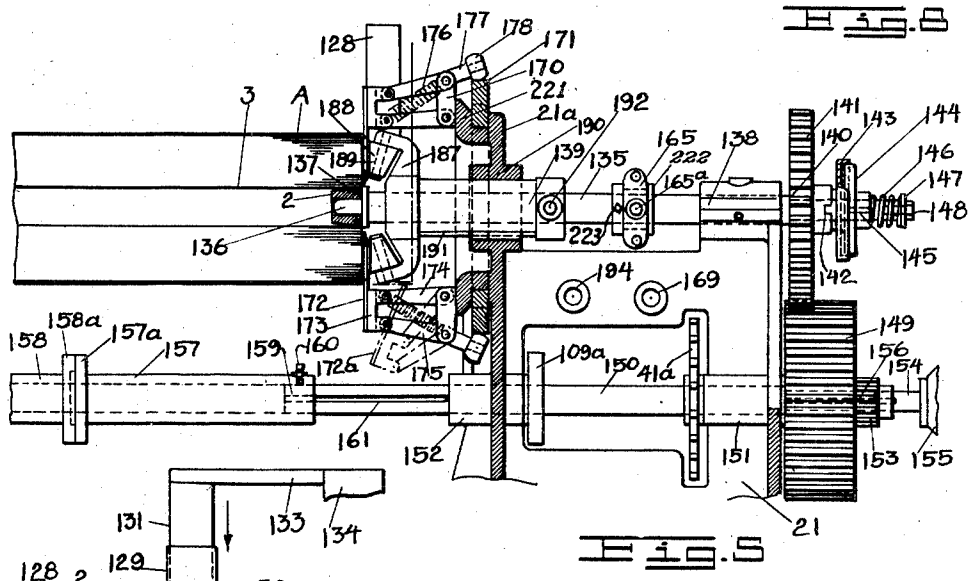


Fig. 5

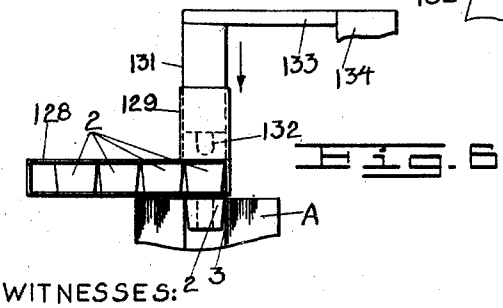


Fig. 6

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AUTOMATIC WRAPPING MACHINE

Filed April 26, 1938 5 Sheets-Sheet 5

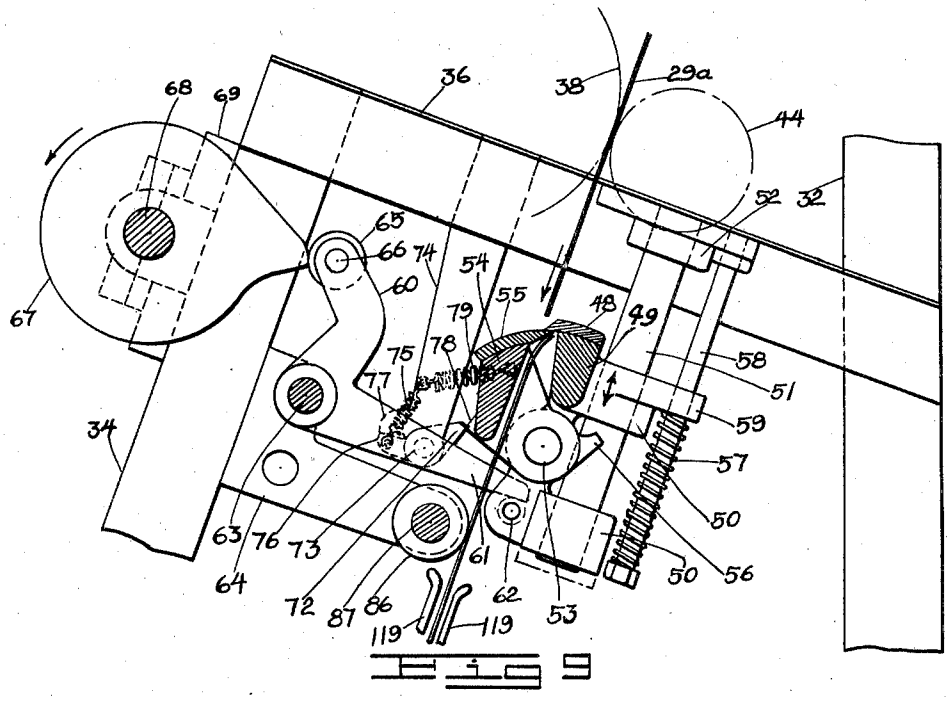


Fig 9

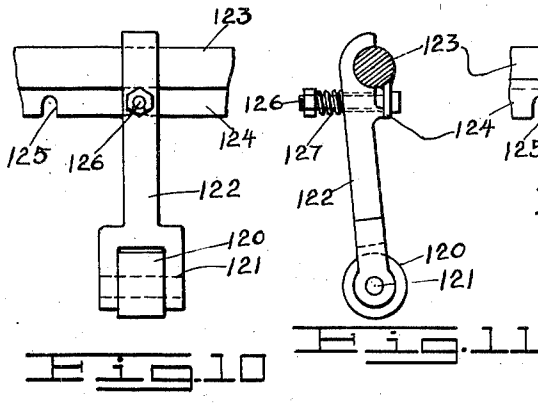


Fig. 10

Fig. 11

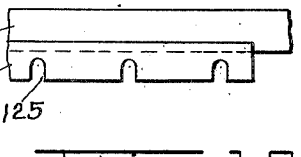


Fig. 12

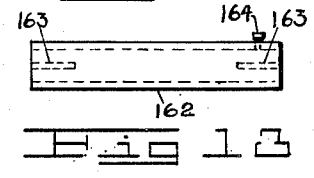


Fig 13

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Patented June 24, 1941 2,246,525

UNITED STATES PATENT OFFICE

2,246,525

AUTOMATIC WRAPPING MACHINE

Albert John Matter, Park Ridge, Ill., assignor of one-half to E. B. Fallon, Chicago, Ill.

Application April 26, 1938, Serial No. 204,341

29 Claims. (Cl. 93—2)

This invention relates to machines for automatically wrapping rolls of paper or similar articles and has for its object to provide a machine of this character which will automatically feed rolls through the machine in a step by step manner and at the first step or position insert wooden plugs in a roll and simultaneously wrap a roll in the second position, apply adhesive to the ends and overhanging edges of the wrapper, and fold in the overhanging portion of the wrapper; in the third position apply and attach paper caps to the adhesived end of a roll; and in the fourth position apply heat and pressure to the end caps to firmly set them in place.

Another object is to provide adjustment of the plugging, folding, edge-gluing, cap-applying and heat-applying mechanism so that the rolls of various widths may be wrapped.

I attain these objects by means of the mechanism shown in the attached drawings in which I provide a main bed or runway upon which two opposed, preferably cast, carriages are slidably mounted so that they may be moved to or from one another in order to adjust the space therebetween to suit the width of the rolls to be wrapped. These carriages carry the mechanism for inserting plugs, rotating the roll while wrapping, applying adhesive to the wrapper edges, folding in the overhanging wrapper edges, applying caps, heating and pressing caps in place and feeding the rolls through the machine. The mechanisms mounted on the two carriages are driven by a main shaft from a motorized speed reducer or other power source.

An inclined table for the rolls and a step by step feed mechanism are also mounted upon the carriages and are adjustable therewith.

A structural frame work, preferably attached to the bed and supported on the foundation or floor extends above the roll table and carriages, and supports a wrapping paper supply roll and mechanism for feeding, and cutting off wrapping paper and applying adhesive to the front and rear ends of the wrapper. This mechanism is operated preferably by a chain drive from the main drive shaft.

Paper rolls have a cylindrical opening through the longitudinal center into which tapering wooden plugs are forced at each end of the roll. This is accomplished in my machine by means of two reciprocating plungers which take plugs from a magazine located at each end of the roll and force them into place.

The roll is then moved to second position where revolving reciprocatingly mounted spindles enter the plugs and engage them so as to rotate the roll.

In the meantime wrapping paper is fed from an overhead supply roll and adhesive applied to the front end of the sheet on its inner side and along the outside of both edges of the wrapper which is wide enough to overhang the ends of the roll about three inches.

As the wrapper reaches the roll it passes under pressing rollers which cause it to adhere to the rotating roll and wrap around it.

At a predetermined point the advancing sheet of wrapping paper is severed by a traveling knife adapted to move downward at the same speed as the paper while it is cutting and then open up and return to its starting position.

As the rear end of the severed sheet reaches the end gluer adhesive is applied to the inner face of the wrapper end.

Immediately after the roll is wrapped the overhanging ends of the wrapper are indented and folded against the ends of the roll by means of tilting blades mounted on the carriages. Adhesive which has already been applied to the overhanging wrapper edge causes the folds to adhere to one another. After the tilting blades have folded the ends the blades return to starting position and reciprocating sleeves mounted on the spindles and carrying conical rollers move forward and press these rollers against the folds in order to more firmly glue them into place.

Step by step movement of the rolls along the inclined table is accomplished by means of pivotly mounted retaining arms which stop and hold the rolls in position on the table and release them for movement by gravity, alternately.

When wrapping and folding is completed on a roll the spindles move outwardly so as to release the wrapped roll which is then shifted to the third position where reciprocating magazines apply the circular paper caps to the adhesived ends.

The roll is next moved to the fourth position where heating pads are pressed against the end caps to more firmly and smoothly set them against the roll ends.

The wrapped and capped roll is now ejected from the machine as a finished product.

Details of construction are hereinafter more fully described and illustrated in the accompanying drawings in which—

Fig. 1 is a rear elevation of one half of the machine.

Fig. 2 shows a rear elevation of the other half of the machine.

Fig. 3 is a sectional elevation taken on the line 3—3 Fig. 1, with the ends of the rolls shown in full.

Fig. 4 shows in detail an end elevation of the plug magazine, folding and lap rolling mechanism, header magazine and heating pad illustrated in Fig. 2.

Fig. 5 is a sectional elevation on the line 5—5 Fig. 4.

Fig. 6 is a plan view of the plug magazine and plug applying plunger.

Fig. 7 illustrates the method of folding in the overhanging wrapper end.

Fig. 8 shows the wrapper edge partially dented prior to folding.

Fig. 9 illustrates the wrapper severing mechanism with the knives closed and at the bottom of their travel ready to open and return to top position.

Fig. 10 is a detail view of one of the roller arms for pressing the wrapper against the roll being wrapped.

Fig. 11 shows an end elevation of the roller arm in Fig. 10.

Fig. 12 is a detail view of the roller arm supporting bar.

Fig. 13 illustrates a short connecting drive sleeve.

In the drawings, like reference numerals indicate similar parts in the several views.

Step by step roll travel

Referring to Fig. 3, X indicates a roll of paper or other material placed on the inclined table 1 ready to travel through the machine in the direction shown by the adjacent arrow.

A, indicates another roll in the first operating position with a plug 2 inserted in the orifice 3 which extends through the roll.

At B is shown a roll in the rotating, wrapping and end-folding position.

C indicates a roll with a paper-disc cap 4 applied to the adhesived end.

The roll shown at D is in the fourth operating position where heat and pressure are applied to the end caps.

Similar operations are applied to both ends of each roll simultaneously.

Movement of the rolls from one position to the next along the inclined table 1 is accomplished by means of release levers 5, 6 and 7 which are pivotally mounted on the table at 5*a*, 6*a* and 7*a* respectively. Levers 5 and 7 are provided with operating arms 5*b* and 7*b* respectively and are operated in unison through a connecting rod 8 pivotally mounted at 5*c* and 7*c*. The levers 5 and 7 are further provided with retarding fingers 5*d* and 7*d* respectively which serve to retard advancing rolls when the release levers are dropped as shown at 5*e* and 7*e* to release rolls D and A.

The incline of section 1*a* of the table is greater than that of section 1 in order to maintain the proper relation of travel speed of the rolls but at 1*b* this incline is shown slightly less in order to retard the roll at C.

Operation of levers 5 and 7 is accomplished by means of cam 9 mounted on a rotating shaft 10 and actuating cam roller 11 carried by an extension arm on lever arm 5*b*.

Lever 6 is provided with a roller 12 adapted to support roll B in position until it is engaged and rotated by a drive spindle, described hereinafter, and also serves to press the wrapper into close contact with the roll B. Lever 6 also has an operating arm 6*b* arranged for engagement with collar 13 fixed on connecting rod 8 and is resiliently held against the collar 13 by a sliding collar 14 and spring 15. This arrangement allows roller 12 to maintain constant tension against roll B regardless of variations in the contour of the roll and this tension may be adjusted by means of adjusting nuts 16 on the threaded portion of connecting rod 8. Lever 6 is also operated in unison with levers 5 and 7 as shown.

For the purpose of further supporting roll B and applying pressure on the wrapper as it wraps about the roll a vertically movable roller 17 carried by roller support 17*a* is spring mounted at 18*a* on bracket 18 attached to the table as shown in Fig. 3. To guide a roll traveling from position A to B over roller 17 a raised portion 1—*c* is provided on the table. 12*a* indicates the position of roller 12 when the release levers are in release position. As shown in Figures 1 and 2 the release levers, table sections, rollers and cams are provided in pairs to accommodate both ends of the rolls passing through the machine.

Table sections 1—1*a* are supported by vertical legs 19 and 19*a* carried by brackets 20 on carriages 21 which latter are slideably mounted on a horizontal bed 22 consisting preferably of two channel sections connected by cross members 22*a*. Clamp bars 23 are attached to carriages 21 by screws 24 for the purpose of clamping the carriages in any desired position. Adjustment of the carriages for the proper spacing of the table sections to suit various widths of rolls is accomplished by means of adjusting screw 25 carried by threaded extensions 26 attached to the carriages as shown in Figs. 1, 2 and 3. The screw is threaded right hand at one end and left hand at the other end so that rotation of the screw tends to move the carriages together or apart as desired. One end 25*a* of the screw is revolvably mounted in bearing 27 attached to the bed member 22 with a fixed collar at one side of the bearing and a fixed hand wheel 28 at the other side of the bearing thus holding the screw against axial movement when operated by the hand wheel.

Wrapping paper supply and feed mechanism

In Fig. 3 is shown a roll of wrapping paper 29 mounted to rotate freely on shaft 30 carried in open bearings 31 attached to upright frame members 32. This wrapping paper is usually about six inches wider than the rolls to be wrapped so as to provide an overhanging edge of about three inches at each end of the roll being wrapped. Frame member 32 is shown attached to the bed 22 by cross member 33. Another frame member 34 is shown attached to the bed by cross member 35. An upper cross member 36 is attached to the upright frame member 32 and 34 and with them comprises a stationary supporting frame for the wrapping paper supply roll, wrapper feeding and severing mechanism and the end gluing mechanism. Two such frames are provided as shown in Figs. 1 and 2. Upon the cross members 36 are mounted bearings 37 in which a shaft 39 carrying feed roller 38 revolves. This feed roller 38 is driven, preferably by a chain 40 from the main drive shaft, over a sprocket 41 mounted on shaft 39 and adjustable thereon for alignment with sprockets 41*a* on the main drive shaft which latter is mounted on the adjustable carriage. Bearings 42 are slidably mounted on cross members 36 and carry a rotatable shaft 43 on which is fixed an idler tension roller 44. Blocks 45 carrying compression springs 46 and tension adjusting

screws 47 are mounted on members 36 so as to press roller 44 against feed roller 38. The free end 29a of wrapping paper from the roll 29 passes between feed roller 38 and idler roller 44, as shown in Fig. 3, and thence downwardly to the roll to be wrapped in position B.

Wrapping paper severing mechanism

Illustrated in Fig. 3 and in enlarged view, Fig. 9, is shown a traveling knife 48 attached to a cross bar 49 having bearings 50 slidably mounted on shafts 51 carried by brackets 52 attached to the underside of cross members 36. Pivotally mounted on the traveling knife side members at 53 is a cross bar 54 on which is fixed a rocking knife 55 adapted to engage traveling knife 48 in shearing action. Opening movement of the rocking knife is limited by stop lugs 56. The traveling knife is normally held in upward position by springs 57 mounted on bolts 58 and pressing upwardly against projections 59 on the upper bearings 50.

After sufficient wrapping paper has been fed between the knives for wrapping a roll the knives travel downwardly at the same speed as the wrapper travels and on the way down close so as to shear off the wrapping paper, the rocking knife moving from the open position shown in Fig. 3 to the closed position shown in Fig. 9 and back again to the open position. The knives then return upwardly to starting position shown in Fig. 3. Traveling knife 48 is actuated by means of arms shown at 61, disposed in engagement with pins 62 carried by the traveling knife assembly. Arms 61 are fixed to rocking shaft 63 carried in brackets 64 mounted on frame members 34. Integral with one arm 61 is a roller arm 60 carrying a roller 65 mounted for rotation on pin 66 and adapted to engage cam 67 which is mounted on cam shaft 68.

Shaft 68 rotates in bearings 69 attached to frame members 34 and carries gear 70 which meshes with a pinion 71 on shaft 39 with which it rotates continuously.

Rocking movement of knife 55 is accomplished by means of a pawl 72 pivotally mounted at 73 on bracket 74 attached to frame member 36. Pawl 72 is held normally in the position shown in Fig. 9 by means of spring 75 so that the extension 76 of the pawl abuts stop 77 on bracket 74. In this position the pawl engages projection 78 on the knife bar 54, causing it to rock inwardly so as to bring knife 55 in engagement with knife 48 during the downward travel of the knives. A spring 79 holds the rocking knife normally in open or retracted position. After projection 78 passes pawl 72 the knife 55 is quickly retracted just before the traveling knife reaches the bottom of its downward stroke and remains in open position as it travels upward and passes over the spring actuated pawl.

During the interval between wrapping of a roll and start of wrapping the next roll it is desirable to stop the forward feed of wrapping paper and this is accomplished by means of cam 80 (shown in Fig. 3) mounted on cam shaft 68 so as to operate a bell crank 81 mounted on shaft 82 pivotally carried in bearings 83. Bell crank 81 is provided with a roller 84 for engagement with the cam. The upright arm of bell crank 81 and a similar arm mounted on the opposite end of shaft 82 are connected with sliding bearings 42 by means of connecting rods 85 so as to move idler roller 44 away from feed roller 38 when it is desired to stop the feeding of wrapping paper through the machine.

End gluing mechanism

Referring to Fig. 3, 86 indicates backing rollers carried by shaft 87 rotatively mounted in brackets 64. At 88 are shown swinging arms pivotally mounted at 89. Shaft 90 carrying glue-applying rollers 91 is rotatively mounted at the end of arms 88. Connecting rods 92 are pivotally attached at one end to arms 88 and at the other end to levers 93 which are mounted on a shaft 94 rotatively carried in brackets 64. As shown in Fig. 3 lever 93 is provided at its extremity with a cam roller 95 positioned to engage a cam 96 mounted on cam shaft 68. A glue-supply roller 97 rotatively mounted in a glue pan 98 is shown driven by a belt 99 from cam shaft 68, the glue pan 98 being mounted on brackets 100 attached to frame 32. Through cam 96 the glue-applying rollers 91 are operated so as to swing first into contact with glue-supply roller 97 and then in contact with the wrapping paper 29a so as to deposit a strip of glue along the forward end and then along the rearward end of each sheet of wrapping paper.

Edge gluers

Two complete edge-gluers are mounted on and adjustable with carriages 21 for the purpose of applying adhesive to the outside of the overhanging portion at both edges of the wrapping paper. These are best illustrated in Figs. 1, 2 and 3. Attached to carriages 21 are brackets 101, each supporting two horizontally disposed rods 102 on which are mounted cross members 103. Each cross member 103 carries a bearing 104 rotatively supporting glue-roller shafts 105 on which are mounted glue-supply rollers 106, adapted to rotate in glue pans 107 and driven by belts 108 on pulleys 109 and 109a from the main drive shaft.

Pivotally mounted on shafts 105 are rocking frames 110 which support sliding shafts 111 having bearing ends rotatively supporting shafts 112 on which are mounted glue-applying rollers 113 held in contact with glue-supply rollers 103 by means of springs 114.

Cams 115 actuate rocking arms 116 pivotally mounted on pins 5a and connected with rocking frames 110 by connecting rods 117 so as to move glue-applying rollers 113 into and out of contact with the outside edge of wrapping paper 29a. To support the wrapper edges during contact of rollers 113 supporting rollers 118 are disposed as shown in Fig. 3 on bracket extensions carried by cross members 103.

Guides and wrapping rollers

To guide the wrapping paper on its course from the supply roll 29 to the roll to be wrapped in position B, I provide guide bars 119 indicated in Fig. 9, which may be spaced at intervals between the various mechanisms, as best suited in machines of various dimensions. These may be stationary or removable and have no other function than to guide the wrapping paper after it passes through the feed rollers.

Illustrated in Figs. 1, 2 and 3 and in greater detail in Figs. 10, 11 and 12 are wrapping rollers 120 rotatively mounted at 121 on arms 122 which are removably attached to shaft 123. These are made removable in order to accommodate various widths of rolls and are resiliently mounted to maintain pressure against rolls being wrapped,

regardless of the uneveness of the surface of the rolls. For this purpose shaft 123 is provided with an outstanding flange 124 having slots at 125 adapted to receive the headed ends of bolts 126 which pass through arms 122. Springs 127 surrounding bolts 126 as shown in Fig. 11 tend to hold arms 122 against shaft 123 and flange 124 when the shaft is rotated so as to swing the arms away from the roll at B. When the shaft is rotated to swing the arms toward the roll at B far enough to move flange 124 away from the arms each arm will be held resiliently against the roll. Shaft 123 may be adjusted in this latter position and fixed in cross members 103 or in some other similar support or it may be mounted to rock therein and arranged for actuation to and from roll B by means of a cam in order to better clear rolls passing from position B to position C.

Plug inserting mechanism

In Figs. 4 and 6 are shown the plug inserting mechanism comprising magazines 128 containing a supply of tapered wooden plugs 2 having co-axial orifices 2*a*. The lower portions of the magazines have cylindrical extensions 129 and an opening 130 of slightly larger diameter than the plugs. Plungers 131 having pins 132 are mounted in cylindrical extensions 129 and adapted to reciprocate therein. As shown in Fig. 6 the plungers may be actuated by means of arms 133 attached to spindle sleeves 134 or they may be otherwise operated in unison with the general mechanism of the machine while a roll is stationary in position A. Movement of plungers 131 in the direction of the arrow causes pins 132 to enter orifices 2*a* in the lowermost plugs 2 and thereby guide them through openings 130 in the magazines into the co-axial orifice 3 in roll A, where it is firmly pressed into place.

Driving spindles and end folders

When a roll reaches position B it is held in position by means of rollers 12 and 17, ready to be picked up and rotated by the driving spindles, which consist of shafts 135, having end pins 136 and driving-points 137, rotatively mounted in bearings 138 on carriages 21 in axial alignment with the orifice 3 in a roll in position B. Spindles 135 are also adapted for reciprocal movement in bearings 138 and through sleeves 139 as shown in Fig. 5. The outer ends of the spindles are reduced in diameter to provide shoulders at 140 and carry gears 141 registering with said shoulders and having grooves in their hubs as at 142 adapted to engage tongues on the hubs of friction discs 143 also mounted on the reduced section of the spindles and free to turn with the gears upon the spindles. Gears 141 and discs 143 may be made integral. Outer friction discs 144 are slideably mounted on the spindles and keyed thereto at 145. Discs of fiber or other friction material are held between the discs 143 and 144.

Springs 146 surround the spindle ends and are held against the gear and disc assembly by washers 147 and screws 148 with sufficient tension to turn the spindles when the gears are rotated under normal operation but enabling the gears to slip on the spindles when encountering abnormal spindle resistance. Gears 141 mesh with wide faced gears 149 mounted on main drive shafts 150 rotatively carried in carriage bearings 151 and 152. At 153 cam shaft driving pinions are keyed to shafts 150 and overhang the ends of the shafts to provide a coupling for shaft 154 of motor reducer 155 mounted on bracket 155*a* attached to carriage 21, one key 156 serving to connect them.

To connect the two drive shafts 150 two-piece sleeves are provided as shown in Figs. 1, 2 and 5 for use when carriages 21 are widely separated for wrapping wide rolls, or as shown in Fig. 12, a single sleeve is used when carriages 21 are placed closely together for wrapping narrow rolls. Two-piece sleeves 157 and 158 are provided with flanges 157*a* and 158*a* respectively, adapted for bolting together, and keys 159 are fixed in the end of each sleeve section 157 and 158 so as to slideably engage keyways 161 in drive shafts 150. Set screws 160 hold the sleeves in place on shafts 150 after adjustment of the carriages and sleeves.

As shown in Fig. 13 a short sleeve 162 is also provided with fixed keys 163 and a set screw 164. To remove sleeves 157 and 158, the set screws are released and the sleeves moved toward one of the bearings 152 to permit unbolting and removal of one of the sleeve sections and then the other. For this purpose the carriages must be separated sufficiently to allow space between the inner ends of shafts 150, slightly greater than the overall length of sleeve sections 157, 158 or 162. Sleeve 162 may then be put in place and the carriages closed together for narrow rolls or vice-versa.

Returning now to the description of the driving spindles 135, grooved collars 222 fixed on the spindles by set screws 223 are adapted to revolve in yokes 165 seated in said grooves and provided with two diametrically opposed pins 165*a* in each yoke. Cam levers 166 having cam rollers 167 and slotted ends 168 are pivotally mounted at 169 on carriages 21 so as to engage pins 165*a* which are free to move in the aforesaid slots at 168, pivotal movement of levers 166 tending to slide spindles 135 longitudinally in their bearings while rotating. Cam rollers 167 engage cam slots 167*a* in cams 197.

At 221, more clearly shown in Figs. 4 and 5, are indicated folder supporting ring-shaped bases, each having a plurality of integral arms 170. Folder bases 221 are rigidly attached to carriage frames 21*a* in co-axial alignment with the spindles 135 and are so shaped as to provide annular grooves adapted to rotatably support ring-cams 171. A plurality of folder blades 172 mounted on bearing blocks 173 are pivotally carried by arms 174 and 176 on folder base arms 170 as shown in Fig. 5. 172*a* shows the position into which the folder blades swing when moved to outward position by action of springs 176. Arms 175 are provided with extensions 177 carrying rollers 178 adapted to engage cams 171.

Ring-cams 171 are actuated by cams 179 through the medium of cam levers 180 pivotally mounted on carriages 21 at 181 and carrying cam rollers 182 engageable by cam 179 and rotatably mounted on the cam levers at 183. Connecting rods 184 are pivotally carried by ring-cams 171 at 185 and by levers 180 at 186 as illustrated in Fig. 4. Rotary movement of ring-cams 171 causes the folder blades to swing in unison from position 172 to 172*a* or vice versa.

Immediately after wrapping paper has been applied and glued in place on roll B folder blades 172 move inwardly so as to indent the overhanging edges of the wrapper as shown in Fig. 8 at B*a*. Further inward movement of blades 172 and rotation of roll B, in the direction of the arrow in Fig. 7, causes the indented portions B*a* to lap over into folds as at B*b*. As the folded portions

of the wrapper have previously been coated with adhesive the folds are held in place thereby after the blades 172 recede to outward position 172a, due to reverse motion of ring-cam 171.

It will be noted that the inner ends of blades 172 travel at an angle of about 45° to the axis of the roll and spindle in a slightly arced path, due to arrangement of arms 174 and 175 which are more closely spaced at their pivotal connections on blocks 173 than at their pivotal connections on arms 170. This is very important as it improves the process of indentation and folding which may be done while the roll B is in continuous rotation.

For the purpose of more firmly pressing the folds against the ends of the roll roller sleeves 139 having arms 187 supporting conical rollers 188 rotatably mounted on pins 189 are slideably mounted on spindles 135 in bearings 190 which are integral with frames 21. Roller sleeves 139 are provided with keys 191 which slideably engage keyways in bearings 190 and are further provided with two opposed pins in each sleeve at 192. It will be noted that in Fig. 4 the roller axes are disposed in a horizontal plane whereas in Fig. 5 they are shown in a vertical plane for the purpose of better illustrating the form and position of the rollers. They are preferably disposed horizontally as shown in Fig. 4 in order to permit the blades 172 to swing outward before the rollers have receded from pressing position.

Reciprocating movement of the roller sleeves is accomplished by means of cam levers 193 pivotally mounted on frame 21 at 194 and having slotted ends adapted to engage sleeve pins 192. At 195 rollers are provided on levers 193 adapted to engage cam grooves 196 in cylindrical cams 197 which are mounted on cam shafts 10 rotatably carried in bearings 198 and driven by spur gears 199 in mesh with gears 153 on drive shafts 150.

Header magazines and heating pads

Paper caps 4 shown in position on roll C are applied to the rolls by reciprocating cylindrical magazines 200 carried by tubular shafts 201 slideably mounted in brackets 202 attached to carriages 21. Retainers 203 are attached to the magazine cylinders around their open ends and are so shaped as to retain the caps within the magazines in a manner permitting removal of one cap at a time when it has adhered to the adhesived end of the roll, the end cap slipping out from under the retainers, or the retainers may tear through the cap as it is pulled from the magazine. The supply of caps in a magazine are resiliently held against the retainers by plungers 204 attached to rods 205 on which are mounted springs 206 within tubular shafts 201. Springs 206 are held against plungers 204 by plugs 207 carried in tubular shafts 201.

Movement of the magazines 200 toward the roll ends is provided by springs 208 surrounding tubular shafts 201. Opposite or retracting movement is provided by levers 209 pivotally mounted at 210 on brackets 202 and engageable with collars 211 carried by the tubular shafts 201. Levers 209 are actuated by cams 197 through rollers 212 carried by said levers and engaging grooves 213 in cams 197. The cam timing is such that the magazine pressure against caps being applied to a roll is maintained during most of the stand-still time of the roll when in position C.

In order to insure complete adhesion of caps 4 to rolls C and for the purpose of setting the adhesive and ironing out any wrinkles in the end caps, heating pads 214 are resiliently mounted on brackets 215 attached to magazines 200, by means of pins 216 and springs 217. For further support, pads 214 are provided with foot pieces 218 adapted to ride on rollers 219 carried by brackets 220 attached to table 1. The heating pads may be electrically heated or otherwise and are adapted to reciprocate in unison with magazines 200.

It is understood that modifications may be made in the specific construction shown without departing from the spirit of the invention.

What is claimed is:

1. In a machine for applying wrappers with overhanging edges and having mechanism for folding said overhanging edges onto the ends of a roll having a co-axial opening therethrough and registering co-axially with said wrapping and folding mechanisms, a pair of rotatable spindles co-axially reciprocal and having ends with toothed driving points adapted to enter said opening at both ends and support and rotate said rolls during both the wrapping and folding operation.

2. In a machine for wrapping rolls having a co-axial opening therethrough, a pair of rotatable spindles having means for co-axially reciprocating them in unison and having ends with toothed driving means adapted to enter said opening at both ends and support and rotate said rolls during the wrapping operation.

3. In a machine for applying wrappers with overhanging edges and having mechanism for folding said overhanging edges onto the ends of a roll having a co-axial opening therethrough, a pair of rotatable spindles having means for co-axially reciprocating them in unison and having ends with toothed driving means adapted to enter said opening at both ends and support and rotate said rolls during both the wrapping and folding operation.

4. In a machine for wrapping rolls having a co-axial opening therethrough, reciprocating plungers adapted to automatically insert co-axially orificed plugs into both ends of said opening, and a pair of rotatable spindles co-axially reciprocal and having ends adapted to enter said plugs at both ends and support and rotate said rolls during the wrapping operation.

5. In a machine for wrapping rolls having a co-axial opening therethrough, mechanism adapted to automatically insert co-axially orificed plugs into both ends of said opening, a pair of rotatably mounted spindles arranged to reciprocate on a common axis adjacent to the axis of the plug inserting mechanism and having ends adapted to enter said plug orifices and engage said plugs so as to support and rotate said roll while being wrapped, and means for automatically transferring a roll from the plug inserting axis to the spindle axis.

6. In a machine for wrapping rolls with paper having extending edges overhanging the ends of the rolls, a roll supporting and rotating mechanism in combination with a plurality of radially tiltable folding blades mounted adjacent both ends of the roll being wrapped and equi-distant from the roll axis and provided with means for radially tilting said blades so as to indent and fold said overhanging wrapper edge onto the roll ends, said radially tilting means comprising an inner series of arms pivotally mounted on a frame surrounding said roll axis and an outer series of arms pivotally mounted on said frame, all of said arms being pivotally attached to said

blades, the pivotal mountings on said frame being further apart radially than the pivotal mountings on said blades so as to cause the inner ends of the blades to move radially at an angle to the roll axis.

7. In a machine for wrapping rolls with paper having extending edges overhanging the ends of the rolls, a roll supporting and rotating mechanism in combination with a plurality of radially tiltable folding blades mounted adjacent both ends of the roll being wrapped and equidistant from the roll axis and provided with means for radially tilting said blades so that their inner ends move toward the roll axis at an angle of approximately 45° to said axis so as to indent and fold said overhanging wrapper edge onto the roll ends, said radially tilting means comprising an inner series of arms pivotally mounted on a frame surrounding said roll axis and an outer series of arms pivotally mounted on said frame, all of said arms being pivotally attached to said blades, the pivotal mountings on said frame being further apart radially than the pivotal mountings on said blades so as to cause the inner ends of the blades to move radially at an angle to the roll axis.

8. In a machine for wrapping rolls with paper having extending edges overhanging the ends of the rolls, a roll supporting and rotating mechanism in combination with a plurality of radially tiltable folding blades mounted adjacent both ends of the roll being wrapped and equidistant from the roll axis and provided with means for radially tilting said blades so as to indent and fold said overhanging wrapper edge onto the roll ends and rollers adapted to roll the folds firmly into place.

9. In a machine for wrapping rolls with paper having extending edges overhanging the ends of the rolls, a roll supporting and rotating mechanism in combination with a plurality of radially tiltable folding blades mounted adjacent both ends of the roll being wrapped and equidistant from the roll axis and provided with means for radially tilting said blades so that their inner ends move toward the roll axis at an angle of approximately 45° to said axis so as to indent and fold said overhanging wrapper edge onto the roll ends and rollers adapted to roll the folds firmly into place.

10. In a roll wrapping machine an inclined table in combination with co-operating stop and release levers adapted to stop and hold a series of rolls in adjacent positions for simultaneous operations and then release the series of rolls to permit them to move by gravity to the next adjacent positions, said levers alternately stopping and releasing said series of rolls.

11. In a roll wrapping machine an inclined table in combination with co-operating stop and release levers adapted to stop and hold a series of rolls in adjacent positions for simultaneous operations and then release the series of rolls to permit them to move by gravity to the next adjacent positions, said levers alternately stopping and releasing said series of rolls, said table being adjustable in width and said levers being adjustable therewith to accommodate rolls of various widths.

12. In a machine for wrapping a roll while mounted on a pair of rotating spindles, a plurality of rollers carried on arms pivotally mounted on a cross shaft and independently held against said roll by resilient means while wrapping.

13. In a machine for wrapping a roll while mounted on a pair of rotating spindles, a plurality of rollers carried on a pivotally mounted shaft and independently held against said roll by resilient means while wrapping, said arms being quickly detachable to provide for adjustment to various widths of rolls to be wrapped.

14. A roll wrapping machine comprising an inclined table, means for traversing rolls thereon in a step by step progression from one station to another, plug inserting reciprocating plungers located at the first station, a wrapping material supply source, wrapper feeding rolls for delivering wrappers to the roll to be wrapped, wrapper severing shears, adhesive applying means for gluing wrapper edges, wrapping mechanism and wrapper edge folding mechanism at the second station, and cap applying mechanism at the third station, in combination with means for co-ordinating the movement of the various mechanisms for automatic operation in proper sequence.

15. A roll wrapping machine comprising an inclined table, means for traversing rolls thereon in a step by step progression from one station to another, plug inserting reciprocating plungers located at the first station, a wrapping material supply source, wrapper feeding rolls for delivering wrappers to the roll to be wrapped, wrapper severing shears, adhesive applying means for gluing wrapper edges, wrapping mechanism and wrapper edge folding mechanism at the second station, and cap applying mechanism at the third station and cap pressing mechanism at the fourth station, in combination with means for co-ordinating the movement of the various mechanisms for automatic operation in proper sequence.

16. A roll wrapping machine comprising an inclined table, means for traversing rolls thereon in a step by step progression from one station to another, plug inserting reciprocating plungers located at the first station, a wrapping material supply source, wrapped feeding rolls for delivering wrappers to the roll to be wrapped, wrapper severing shears, adhesive applying means for gluing wrapper edges, wrapping mechanism and wrapper edge folding mechanism at the second station, and cap applying and hot pressing mechanism at the third and fourth positions respectively, in combination with means for co-ordinating the movement of the various mechanisms for automatic operation in proper sequence.

17. A roll wrapping machine comprising an inclined table, means for traversing rolls thereon in a step by step progression from one station to another, plug inserting reciprocating plungers located at the first station, a wrapping material supply source, wrapper feeding rolls for delivering wrappers to the roll to be wrapped, wrapper severing shears, adhesive applying means for gluing wrapper edges, wrapping mechanism and wrapper edge folding mechanism at the second station, and cap applying mechanism at the third position, in combination with means for co-ordinating the movement of the various mechanisms for automatic operation in proper sequence, said mechanism being adapted for adjustment to accommodate rolls of various widths.

18. A roll wrapping machine having a wrapper supply source, wrapper feeding and severing means, and means for applying adhesive to the forward and rearward ends of a wrapper, mounted on a stationary frame, roll supporting runways, means for shifting rolls along said runways, plug inserting mechanism at the first station

along said runways, wrapping and end folding mechanism at the second station along said runways, end cap applying means at the third station, and end cap pressing means at the fourth station, carried by two opposed carriages mounted on a bed in co-axial alignment.

19. A roll wrapping machine having a wrapper supply source, wrapper feeding and severing means, and means for applying adhesive to the forward and rearward ends of a wrapper, mounted on a stationary frame, roll supporting runways, means for shifting rolls along said runways, plug inserting mechanism at the first station along said runways, wrapping and end folding mechanism at the second station along said runways, end cap applying means at the third station, and end cap pressing means at the fourth station, carried by two opposed carriages slideably mounted on a bed in co-axial alignment for adjustment in various positions along said bed so as to accommodate rolls of various widths.

20. A roll wrapping machine having a wrapper supply source, wrapper feeding and severing means, and means for applying adhesive to the forward and rearward ends of a wrapper, mounted on a stationary frame, roll supporting runways, means for shifting rolls along said runways, plug inserting mechanism at the first station along said runways, wrapping and end folding mechanism at the second station along said runways, end cap applying means at the third station, and end cap pressing means at the fourth station, carried by two opposed carriages slideably mounted on a bed in co-axial alignment and adapted for co-axial adjustment along said bed, and means for moving said carriages simultaneously to or from each other to provide adjustment for rolls of various widths.

21. A roll wrapping machine having a wrapper supply source, wrapper feeding, and severing means, and means for applying adhesive to the forward and rearward ends of a wrapper, mounted on a stationary frame, roll supporting runways, means for shifting rolls along said runways, plug inserting mechanism at the first station along said runways, wrapping and end folding mechanism at the second station along said runways, end cap applying means at the third station, and end cap pressing means at the fourth station, carried by two opposed carriages mounted on a bed in co-axial alignment, and means for operatively co-ordinating the movement of the various mechanisms for automatic operation of the several mechanisms in proper sequence.

22. A roll wrapping machine having a wrapper supply source, wrapper feeding and severing means, and means for applying adhesive to the forward and rearward ends of a wrapper, mounted on a stationary frame, roll supporting runways, means for shifting rolls along said runways, plug inserting mechanism at the first station along said runways, wrapping and end folding mechanism at the second station along said runways, end cap applying means at the third station, and end cap pressing means at the fourth station, carried by two opposed carriages slideably mounted on a bed in co-axial alignment for adjustment in various positions along said bed and means for operatively co-ordinating the movement of the various mechanism for automatic operation of the several mechanisms in proper sequence.

23. A roll wrapping machine having a wrapper supply source, wrapper feeding and severing means, and means for applying adhesive to the forward and rearward ends of a wrapper, mounted on a stationary frame, roll supporting runways, means for shifting rolls along said runways, plug inserting mechanism at the first station along said runways, wrapping and end folding mechanism at the second station along said runways, end cap applying means at the third station, and end cap pressing means at the fourth station, carried by two opposed carriages slideably mounted on a bed in co-axial alignment and adapted for co-axial adjustment along said bed, and means for moving said carriages simultaneously to or from each other to provide adjustment for rolls of various widths, and means for operatively co-ordinating the movement of the various mechanisms for automatic operation of the several mechanisms in proper sequence.

24. In a roll wrapping machine having a wrapper supply source, wrapper feeding and severing means, means for applying adhesive to the forward and rearward ends of a wrapper, plug inserting plungers, wrapping arms, end folding means, end-cap applying means, wrapper edge adhesive applying means, the combination therewith of an inclined table, and stop and release levers adapted to hold a series of rolls in various operating positions and then shift them along the inclined table to the next operating position so that the operations of plugging, wrapping, end folding, gluing and capping are performed on the series of rolls simultaneously and on each roll in each operating position as the rolls pass through the machine, all mechanisms being driven from a main power source so as to properly time the movements of the various mechanisms relative to each other for automatic operation.

25. A roll wrapping machine comprising a stationary frame carrying wrapping material supply source and wrapper feeding, severing and end-gluing mechanism, in combination with a pair of co-axially adjustable carriages mounted on a bed and each carrying rotatable roll supporting and turning spindles having toothed roll driving means, roll supporting table sections, step by step roll shifting levers, wrapping arms, edge gluing rollers, wrapper edge folding mechanism comprising radially tiltable folding blades, and means for driving and operating the various mechanism in proper sequence for continuous automatic operation.

26. A roll wrapping machine comprising a stationary frame carrying wrapping material supply source and wrapper feeding, severing and end-gluing mechanism, in combination with a pair of co-axially adjustable carriages mounted on a bed and each carrying plug inserting plungers, rotatable roll supporting and turning spindles, roll supporting table sections, step by step roll shifting levers, wrapping arms, edge gluing mechanism, wrapper edge folding mechanism comprising radially tiltable folding fingers, and means for driving and operating the various mechanism in proper sequence for continuous automatic operation, substantially as described in in the specifications.

27. In a roll wrapping machine having means for feeding wrappers to and around a roll so as to leave an overhanging portion of the wrapper at the roll ends, and folders comprising radially tiltable folding blades for indenting and folding the said overhanging portion onto the ends of the roll, the combination therewith of glue applying rollers disposed and operated so as to apply glue

on the outer surface of said overhanging edge portions of the wrapper prior to wrapping about the roll, and magazines containing non-glued roll caps and adapted to reciprocate in co-axial alignment with the roll ends and apply said caps to the glued, folded ends of said wrapper and roll.

28. In a machine for wrapping rolls having a co-axial opening therethrough and provided with orificed plugs pressed therein, a pair of rotatable spindles co-axially reciprocal and having ends adapted to enter said plug orifices at both ends of said rolls and support and rotate said plugs and the rolls mounted thereon during the wrapping operation, the end of said spindles having driving points (137 Fig. 5) adapted to engage and rotate said plugs and the rolls mounted thereon when the spindles are rotated.

29. A roll wrapping machine comprising a stationary frame carrying wrapping material supply source and wrapper feeding, severing and end-gluing mechanism, in combination with a pair of co-axially adjustable carriages mounted on a bed and each carrying rotatable roll supporting and turning spindles having toothed roll engaging and driving ends, roll supporting table sections, step by step roll shifting levers, wrapping arms, edge gluing rollers, wrapper edge folding mechanism comprising radially tiltable folding fingers, co-axially reciprocable magazines for applying end caps, heated reciprocating plates for hot-pressing the caps in place, and means for driving and operating the various mechanisms in proper sequence for continuous automatic operation.

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