Oct. 10, 1944. J. D. CUMMINGS ET AL 2,359,751

PIPE PROTECTION MACHINE

Filed Oct. 7, 1942 7 Sheets-Sheet 1

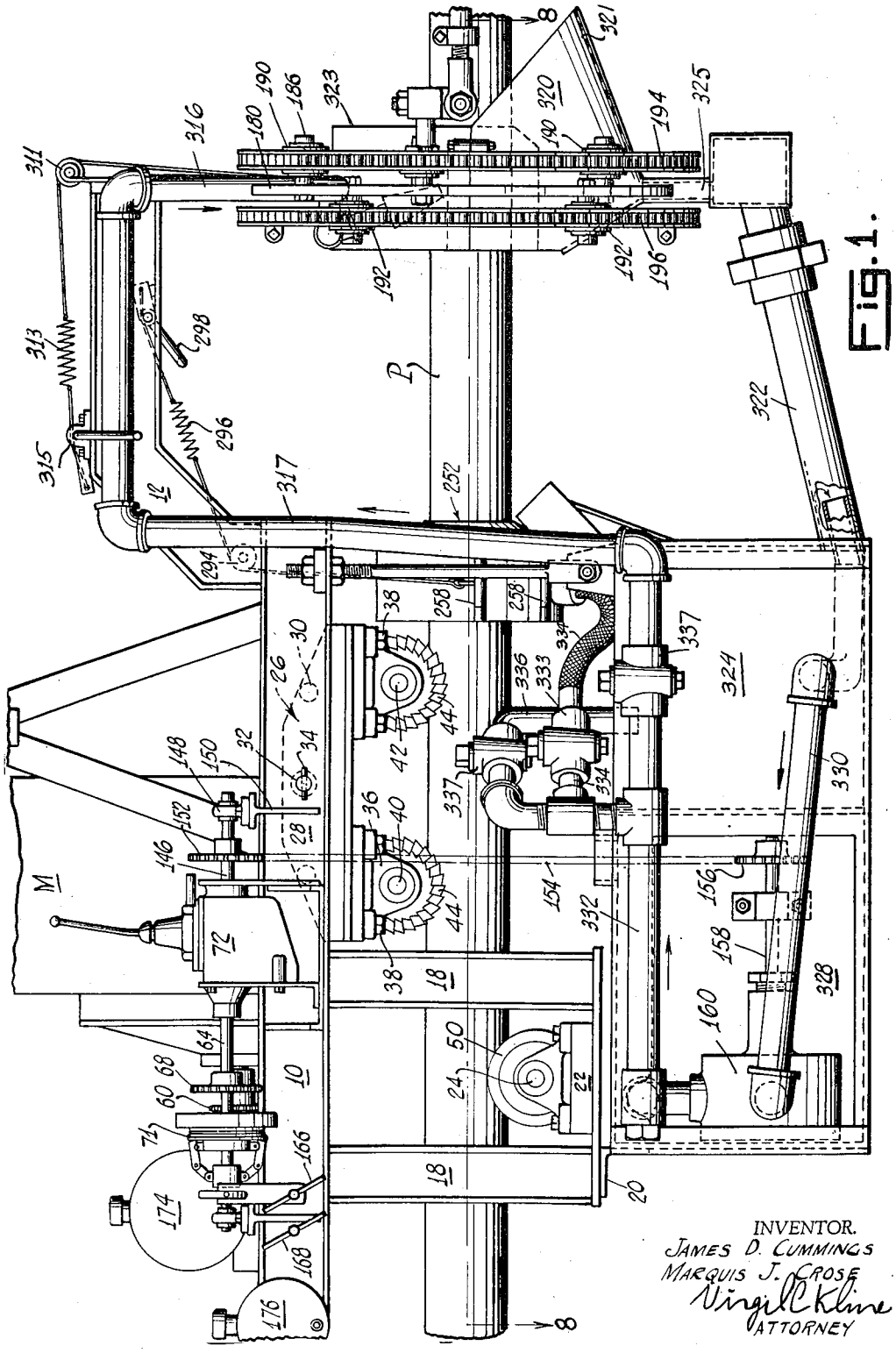


Fig. 1.

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PIPE PROTECTION MACHINE

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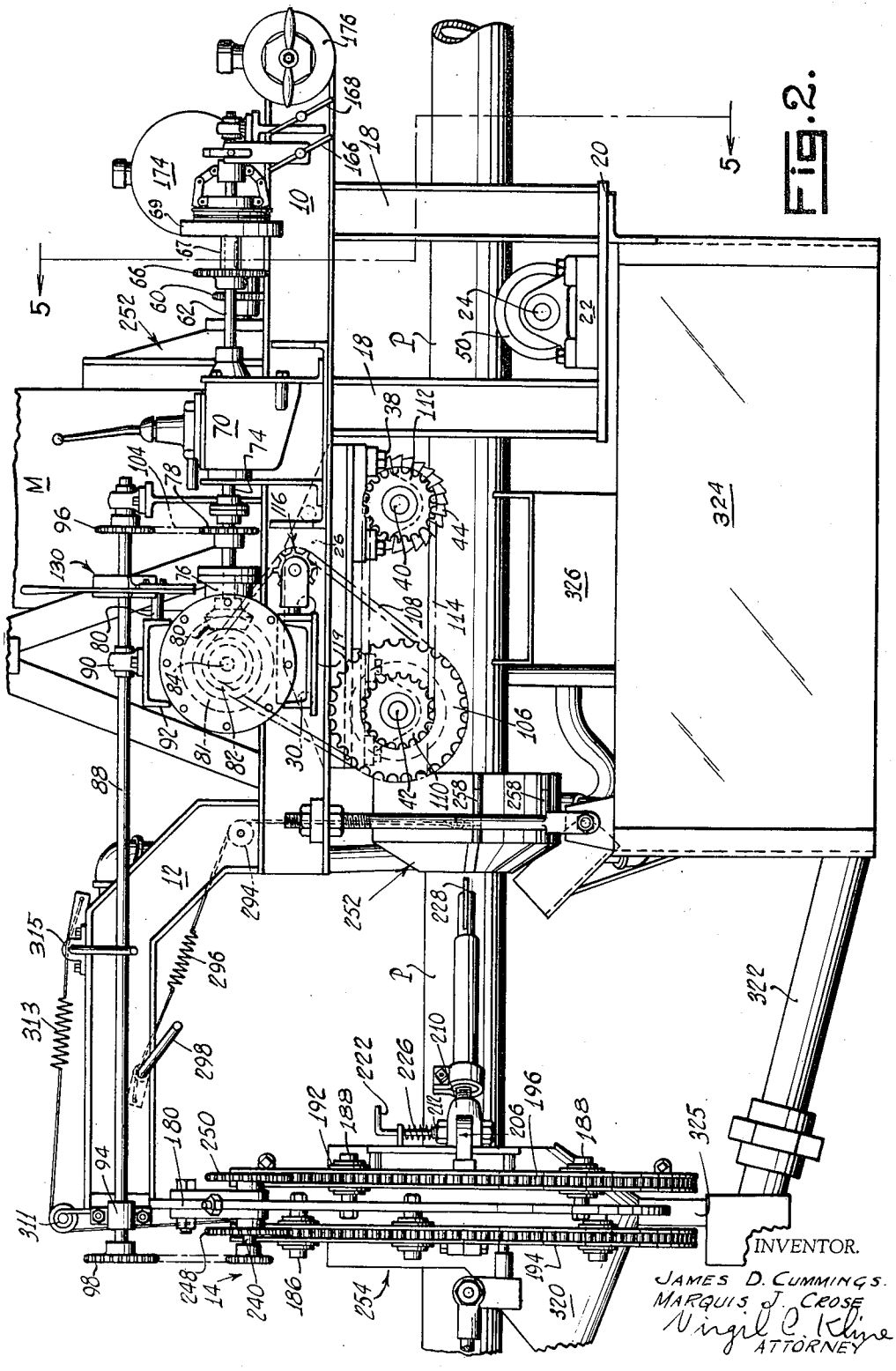


Fig. 2.

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PIPE PROTECTION MACHINE

Filed Oct. 7, 1942 7 Sheets-Sheet 3

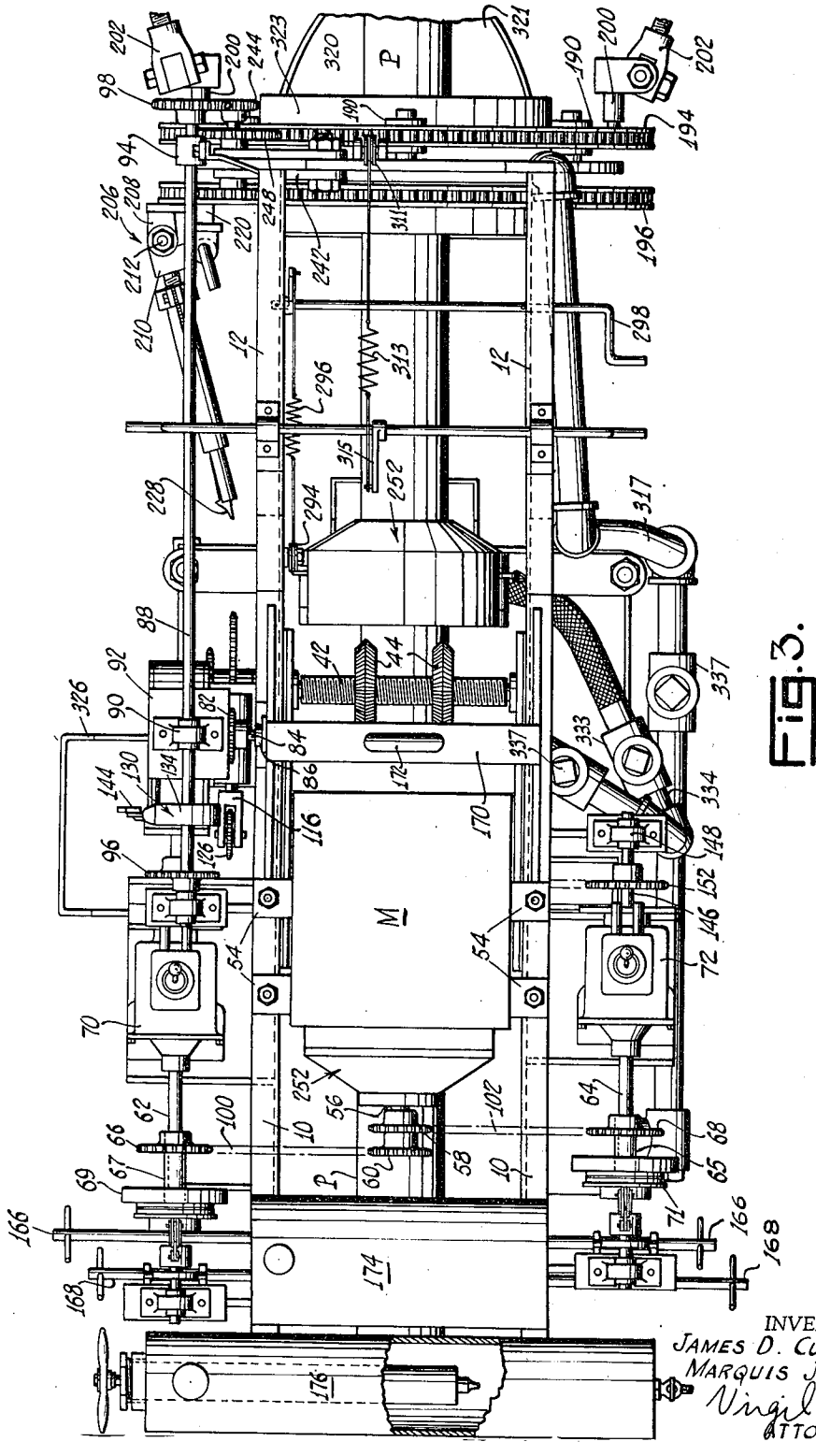


Fig. 3.

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PIPE PROTECTION MACHINE

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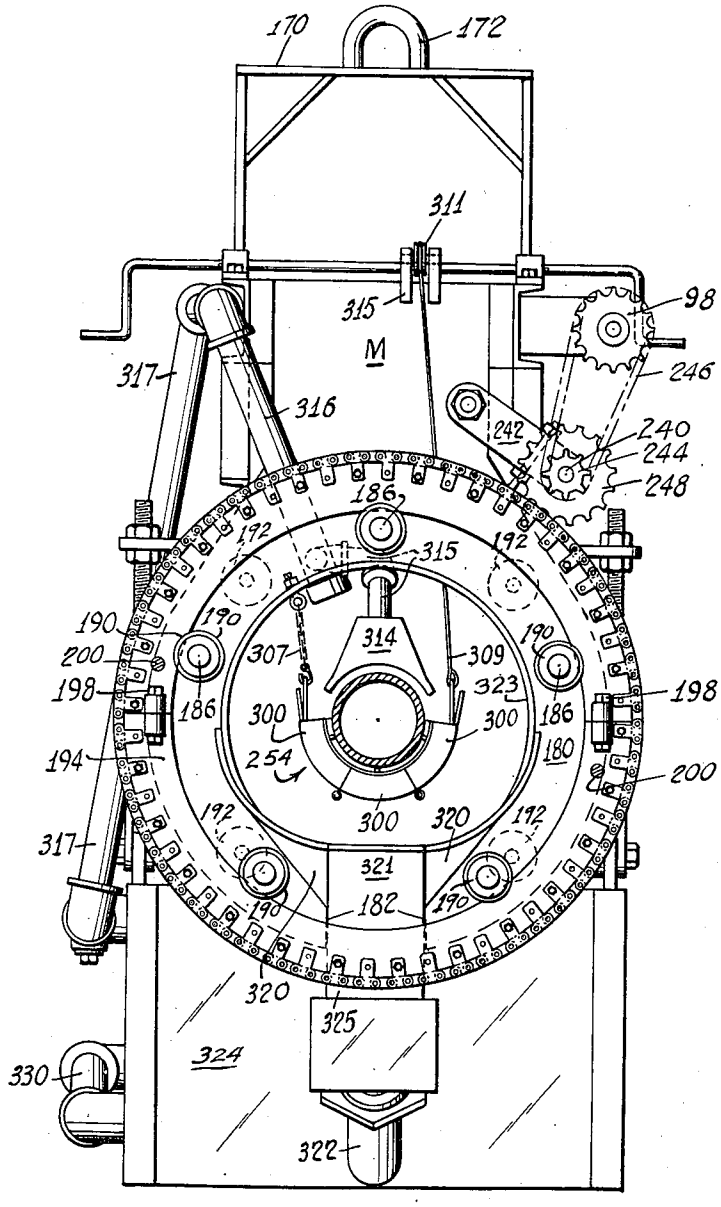


Fig. 4.

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PIPE PROTECTION MACHINE

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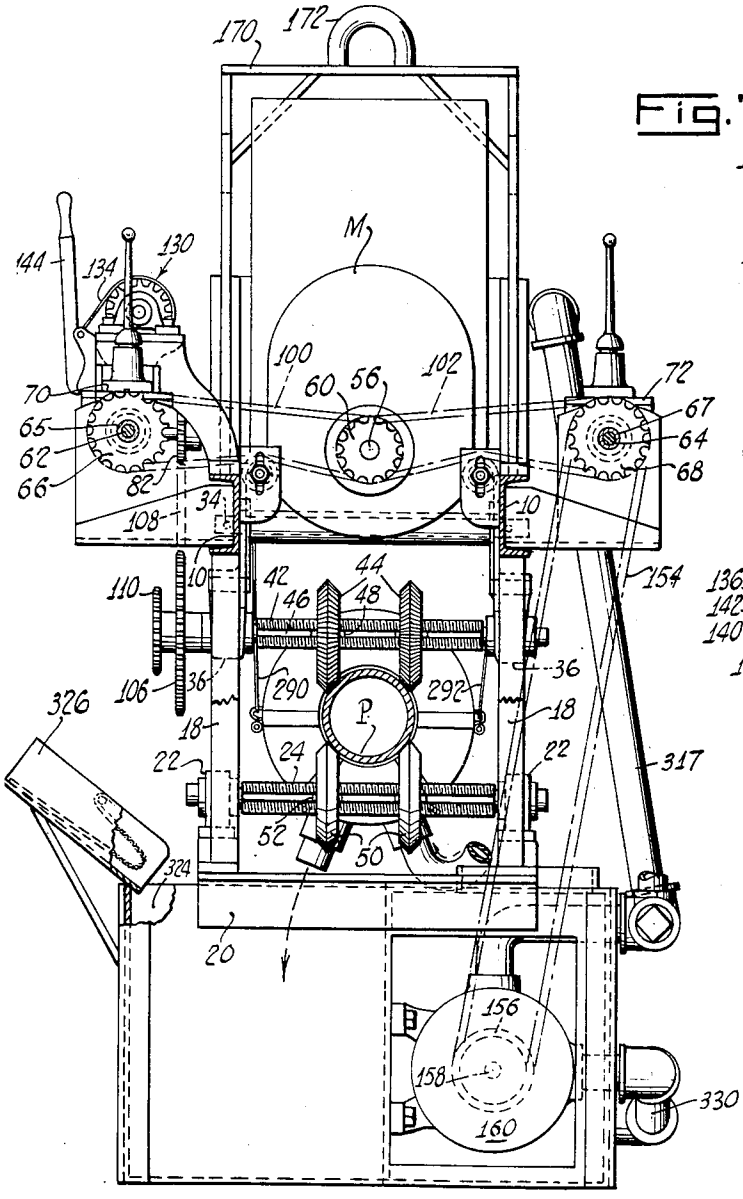


Fig. 5.

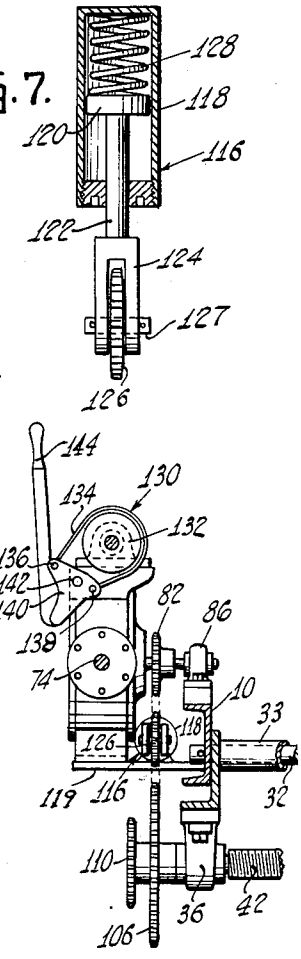


Fig. 6.

Fig. 7.

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PIPE PROTECTION MACHINE

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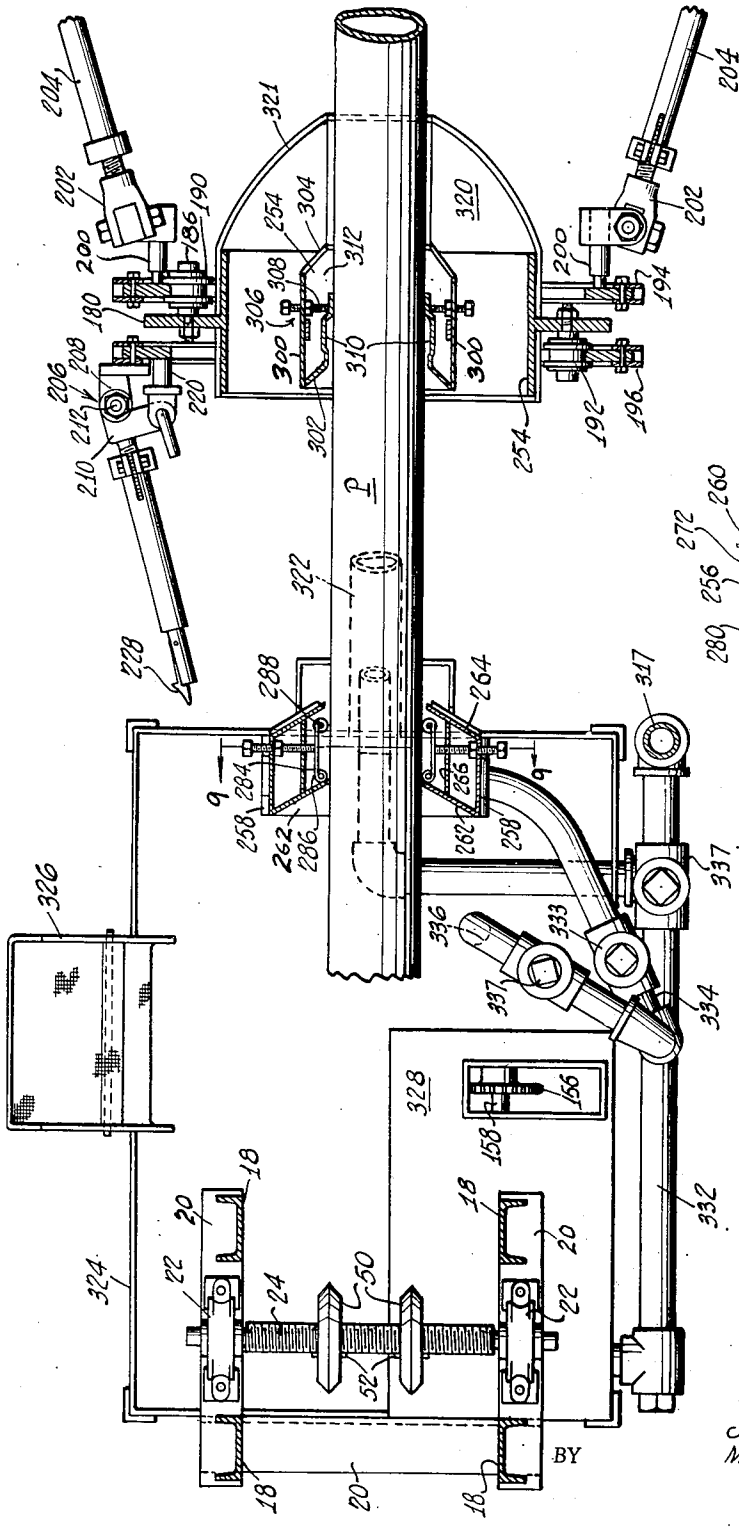


Fig. 8.

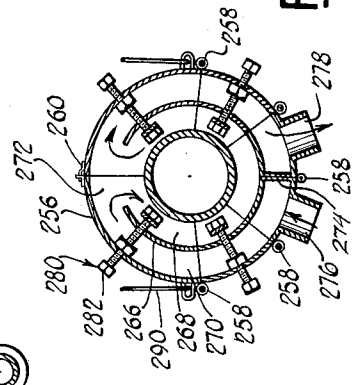


Fig. 9.

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PIPE PROTECTION MACHINE

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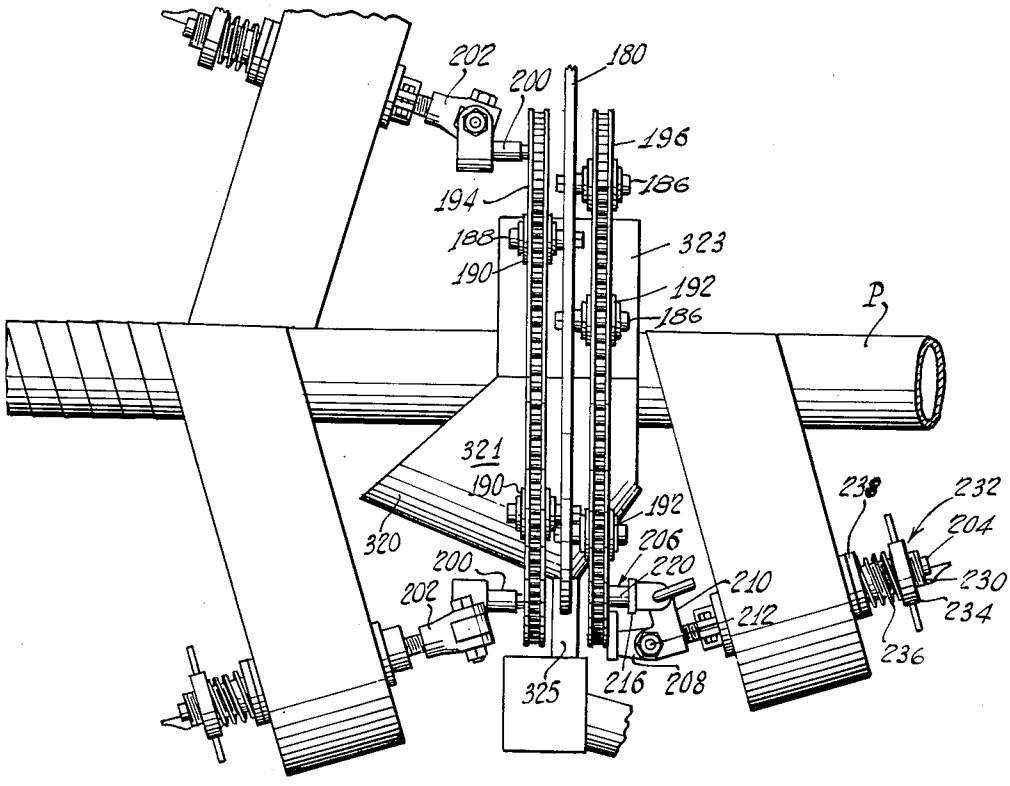


Fig. 10.

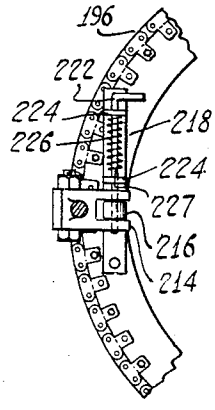


Fig. 11.

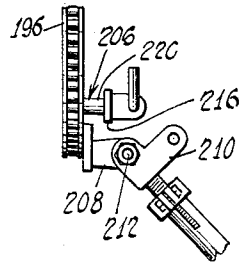


Fig. 12.

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Patented Oct. 10, 1944

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UNITED STATES PATENT OFFICE

2,359,751

PIPE PROTECTION MACHINE

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Application October 7, 1942, Serial No. 461,176

16 Claims. (Cl. 242—11)

Our present invention relates to improved traveling type machines for applying protective materials to pipes, extended pipe lines, and the like.

The principal object of the invention is the provision of a machine of the general type of those heretofore proposed, but of a character to provide for the application of a plurality of successive layers of coating and wrapping materials, the invention relating more particularly to the provision of such machine of a construction permitting it to operate successfully over bends, curves, pipe irregularities, and the like.

A still further object of the invention is the provision of a self-propelled traveling type combination pipe coating and wrapping machine having a plurality of coating heads and a plurality of wrapping heads, the machine being so compactly arranged as to avoid excessive length of the machine and to promote ease of operation in the field.

Our invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description thereof which is to follow and to the accompanying drawings, in which:

Fig. 1 is an elevational view of one side of a machine in accordance with the invention;

Fig. 2 is a similar elevational view of the opposite side of the machine;

Fig. 3 is a top plan view of the machine of Figs. 1 and 2;

Fig. 4 is an elevational view of the rear end of the machine;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 2;

Fig. 6 is a detail view of a portion of the drive mechanism;

Fig. 7 is a detail view, partially in elevation and partially in section and on an enlarged scale, of a belt or slack take-up employed in the drive mechanism;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 1;

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 8;

Fig. 10 is a side elevational view of the wrapping mechanism;

Fig. 11 is a detail front elevational view of a part of the wrapping mechanism; and

Fig. 12 is a detail side elevational view of the device of Fig. 11.

In the drawings in each of several views, parts have been shown broken away or have been diagrammatically indicated for purposes of clarity of illustration as will be understood.

General construction and drive mechanism

Referring now, particularly, Figs. 1, 2, 3, 5, and 8, the general construction of the machine and its drive mechanism will be described. The machine comprises a frame including side members 10 to extend longitudinally of the pipe to be covered, connected by cross frame members and other elements of the apparatus as will be understood as the description proceeds. The frame includes a rearward extension formed by channel members 12, the extension supporting the wrapping heads and a rearward coating shoe later to be specifically described. Adjacent the opposite end of the frame are downwardly extending hangers or legs 18 connected by cross members 20 supporting bearings 22 for shaft 24.

Supporting the frame is a carriage 26 comprising side plates 28 held in spaced relationship by rods 30, or the like. Carriage 26 is pivoted to the main frame members 10, at a point intermediate the opposite ends of the frame, by pivot rod 32 received in sleeve 33 and extending through openings in the carriage side plates 28 and through corresponding openings in the channels 10 (see Figs. 1 and 6). Suitably, the pivot rod is pinned in position as indicated at 34. Side plates 28 carry bearings 36 secured thereto by bolts 38, or the like, and shafts 40 and 42, respectively, are freely rotatable in the bearings.

Shafts 40 and 42 are preferably threaded as illustrated, and mounted thereon are traction wheels 44 including threaded central bores in threaded engagement with the shafts. The shafts have keyways 46, and corresponding keyways are provided in the traction wheels. By the construction thus defined, traction wheels 44 may be adjusted longitudinally of their shafts to accommodate different sizes of pipe, and secured in adjusted position by keys 48 occupying aligned keyways of the shaft and traction wheels.

Shaft 24 carried by bearing members 22 is likewise threaded substantially throughout its length and carries wheels 50 having internally threaded bores in engagement with the threads of the shaft, whereby the position of the wheels may be adjusted longitudinally of the shaft. The wheels 50 are similarly held in adjusted position by keys fitting in aligned keyways in the wheels and shaft. Traction wheels 44 suitably have their pipe-contacting edges serrated or toothed as illustrated to insure against slippage of the wheels relative to the pipe. The pipe-contacting edges

of wheels 50 may be smooth or similarly serrated if desired.

Bolted or otherwise secured to frame members 10 are hangers 54 supporting a power source which may be any known type of internal combustion engines, electric motor, or other prime mover, all of which are hereinafter designated by the term "motor." The motor drive includes a power output shaft 56 carrying sprocket gears 58 and 60 (see particularly Fig. 3) secured thereto for rotation therewith as by keys, or the like. Carried by suitable brackets supported from the frame are counter shafts 62 and 64 on opposite sides of the machine. Mounted on shafts 62 and 64 are sleeves 65 and 67 carrying sprocket wheels or pulleys 66 and 68, respectively. Sleeves 65 and 67 are keyed or otherwise secured to the driving sides of clutches 69 and 71, respectively, the driven sides of the clutches being secured to countershafts 62 and 64, whereby the countershafts are driven from the motor "M" under clutch control. Countershafts 62 and 64 are connected to transmission gear boxes indicated generally at 70 and 72, both of conventional type, whereby the R. P. M. of the output shafts of the gear boxes, relative to the R. P. M. of the motor shaft 56, may be controlled within predetermined ratios. The output shaft 74 of gear box 70 is supported in a suitable bearing 76, and between the gear box and bearing is a gear 78 keyed or otherwise secured to the shaft for rotation therewith. The end of the shaft opposite the bearing also carries a bevel gear 80 in meshing engagement with a bevel gear 81 keyed to a transverse stub shaft 84 supported on the frame in a bearing 86. Shaft 84 has sprocket gear 82 keyed thereto.

A line shaft 88 is rotatably supported adjacent one end in a suitable bearing 90 on supporting frame member 92. The other end of shaft 88 is similarly carried by a bearing 94 adjacent the end of the frame extension formed by channel members 12. Line shaft 88 carries a sprocket gear 96 in alignment with sprocket gear 78 on stub shaft 74 and likewise carries a sprocket gear 98 at its other end in line with a driving gear for the wrapping heads later to be described. Sprocket chains 100 and 102 provide driving connections between the gears 58 and 60 on the motor shafts, and gears 66 and 68 on countershafts 62 and 64, respectively. Sprocket chain 104 provides a driving connection between gear 78 on stub shaft 74 and gear 96 on drive shaft 88.

Shaft 42 supported from carriage 26, previously referred to, includes an extension having keyed thereto gear 106 connected by a sprocket chain 108 with sprocket gear 82 to be driven thereby. Shaft 42 also has keyed thereto a gear 110 in alignment with gear 112 of the same diameter keyed to an extending end of shaft 40 at the other end of the carriage. Gears 110 and 112 are connected by sprocket chain 114. As will be readily understood, shaft 42 will be driven through chain 108, and in turn shaft 40 will be driven at the same speed through chain 114, traction wheels 44 keyed to the shafts 40 and 42 rotating with the shafts and carrying the machine along the pipe. Chain 108 is provided with a suitable slack take-up 116 as illustrated more particularly in Figs. 6 and 7. The slack take-up may be of any suitable construction, but, as illustrated, comprises a cylinder 118 supported on shelf 119 carrying a follower 120 carried by the end of a rod 122. Rod 122 includes a forked end 124 carrying gear 126 rotatable on shaft 127, the gear meshing with the sprocket chain 108. A spring 128 bears against follower 120 to force gear 126 outwardly to take up the slack in the chain.

A brake is provided for the machine operative on line shaft 88. The brake, as illustrated at 130 (see Fig. 6), comprises a drum 132 keyed to shaft 88; a brake band 134 having its ends connected at 136 and 138, respectively, to a toggle 140 which in turn is pivoted at 142 to an extension of the frame. A handle lever 144 is connected to the toggle 140 for manual brake control.

On the opposite side of the machine, a stub shaft 146 extends from gear box 72 with its free end supported in bearing 148 carried from a frame member 150. Stub shaft 146 has keyed thereto a gear 152 connected by a sprocket chain 154 with a gear 156 keyed to a shaft 158 constituting the drive for a pump 160.

Clutches 69 and 71 are provided with manual controls 166 and 168, respectively, manipulatable as illustrated from either side of the machine for convenience in the operation of the machine. The frame of the machine carries a yoke 170 connected to the main frame members 10, the yoke including an anchor ring or eye 172, whereby the machine may be picked up by a derrick, crane, or the like and lowered into position on, or removed from, a pipe line. Also supported by the main frame are a fuel supply, such as a gasoline tank 174, and a portable burner and auxiliary fuel tank 176 therefor. The portable burner is employed in the preliminary heating of the coating devices, pump, coating lines, etc.

Wrapping head

Referring now, particularly, to Figs. 1, 2, 3, 4, 9, 10, and 11, the wrapping mechanism and its attendant parts will be described. Suspended from the frame extension is a yoke 180 having an opening or gap 182 at its lower side to permit it to be lowered onto an extended pipe line. Yoke 180 carries a plurality of equally spaced stub shafts 186 projecting from its outer face, and a plurality of similar, equally spaced stub shafts 188 projecting from its inner face. Stub shafts 186 and 188 carry grooved rollers 190 and 192, respectively. Mounted for rotation on the rollers 190 and 192 are ring gears 194 and 196 of any suitable type, but which may preferably comprise sprocket chain ring gears. Each of the ring gears is made in a plurality of sections, for example, two, as illustrated, secured together as at 198 to permit the lower halves of the ring gears to be removed for mounting of the machine on the pipe. Connected to outer ring gear 194 are one or more pins 200 comprising wrapping spool mounting devices. The number of spool mountings required is, of course, dependent upon the number of wraps to be applied. Pins 200 are secured by universal connections to spindles 202 carrying spindles 204 for the reception of spools of the wrapping material.

Inner ring gear 196 similarly supports wrapping material mounting devices 206. In this instance the mounting device includes a bracket 208 fixed to the ring gear having an arm 210 hingedly connected thereto as by bolt 212. Arm 210 includes a fork 214 (see particularly Figs. 11 and 12) embracing a lug 216 carried by a bar 218 which in turn is supported from the ring gear by pin 220. A locking pin 222 extends through aligned holes in flanges 224 of bar 218 and is spring pressed forwardly by a spring 226 having an end 227 bearing on or connected to the

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pin. The pin projects through aligned openings in fork 214 and lug 216. As will be understood, by moving pin 222 endwise against the action of the spring 226, fork 214 is released from its engagement with lug 216, and the spindle 204 may be swung outwardly for ready application of a spool of wrapping material.

Each of the spindles 204 for the wrapping material may include detent locking devices 228 for engagement over the end of a spool retainer member 230. A friction drag device 232 (see particularly Fig. 10) includes a member 234 threaded on retainer 230. A spring 236 has its ends bearing against member 234, and a friction member 238 which in turn bears against the end of the spool. By the described means, the pull required for removal of the wrapping material from the spools may be varied by screwing member 234 inwardly or outwardly on retaining member 230 as will be understood.

Ring gears 194 and 196 are driven from line shaft 88 by suitable mechanism including a counter shaft 240 rotatably supported in a bracket 242 (see Figs. 2 and 4). Shaft 240 carries gear 244 keyed thereto in alignment with gear 98 on the end of shaft 88. Gears 244 and 98 are operatively connected by chain drive 246. Shaft 240 has keyed thereto gears 248 and 250 in meshing engagement with ring gears 194 and 196, respectively.

Coating mechanism

The coating heads and their attendant mechanism will next be described. Two coating heads indicated generally at 252 and 254 are located to apply a layer of a suitable liquid or semi-liquid coating material to the pipe prior to the first wrapping and prior to the second wrapping, respectively. Coating shoe 252, referred to as the forward shoe, comprises a substantially cylindrical jacket 256 (see particularly Figs. 8 and 9) formed of a plurality of segments hingedly connected as indicated at 258. A yieldable catch 260 is employed instead of a hinge to join the segments at the upper side of the jacket whereby, when the catch is released, the jacket may be opened out and inserted around the pipe. The segments making up the jacket are each provided with end members 262 and 264, respectively, end members 262 lying closely adjacent the surface of the pipe. End members 264 surround the pipe with an adjusted clearance to serve as spreaders for the coating material.

Each of the segments also includes an inner member 266, these members together forming an inner partition dividing the space between the jacket and the pipe into inner and outer compartments 268 and 270, respectively, having a communicating opening adjacent the upper side of the jacket as indicated at 272. A partition is provided in the outer compartment as shown at 274 approximately opposite to communicating opening 272. This partition may suitably be provided by walls closing the adjoining sides of the two lower segments. Connections are provided at 276 and 278 in the sub-compartments of the outer compartment for the entrance and return, respectively, of the coating material. Each of the segments carries an adjusting device 280 comprising a stud 282 threaded through the jacket or through a nut, or the like, welded or otherwise secured to the jacket wall, and bearing against a strap 284 hingedly connected as at 286 to the forward jacket wall 262. The outer end of the strap has a bearing member 288 which may be a roller, or the like, resting against the surface of the pipe. Adjustment of stud 282 will move the rearward walls 264 of the segments toward or away from the pipe to provide the desired coating thickness.

Coating shoe 252 is supported in position by a link 290 connected to the frame and a second link or cable 292 extending around a roller 294 and connected through a spring 296 to toggle lever mechanism 298. Through the toggle and cable connection with the shoe, the several segments may be brought into proper cooperating engagement under the yielding pressure of spring 296, the latter permitting the shoe to expand slightly as may be necessary to pass over welds and other irregularities of the pipe. Release of the toggle device allows the shoe to be removed from the pipe.

Rearward coating shoe 254 is preferably of the half shoe type and includes a plurality of hingedly connected segments 300 (see Figs 4 and 8). Segments 300 include forward and rear walls 302 and 304, respectively, the former closely approaching the surface of the first wrapping applied to the pipe. Walls 304 serve as coating spreaders to provide a coating layer of the desired thickness. A means for adjusting the position of the spreaders is indicated at 306 and is somewhat similar to that employed in the other coating shoe. This means comprises a stud 308 threaded through the wall of each segment or through a nut, or other member secured thereto for reinforcement, and bearing against a strip or fin 310, which slides on the surface of the wrapped pipe. Fin 310 is secured to the forward end walls of the segment. Turning of studs 308 will move the spreader segments toward or away from the pipe depending upon the direction that the studs are rotated.

Above the coating shoe is a coating material distributor 314 connected through suitable fittings into a coating supply lead 316. An opening or gap is made in the yoke 180 through which lead 316 extends, the separated portions of the yoke preferably being welded to opposite sides of the lead. The lead is connected into a supply line 317 extending above the orbit of the first wrapping head to avoid interference with the wrapping operation. Secured to yoke 180 as by welding is a drip pan 320 having a rearwardly projecting snout 321. A splash guard 323, supported from the yoke, extends around the sides and upper portion of the coating device. Drip pan 320 carries a drain 325 projecting between the wrapping heads and through the gap 182 in the lower side of yoke 180. Drain 325 forms part of a return line 322.

The coating shoe 300 is suspended at one side from yoke 18 as by link or chain 307. The other side of the shoe is supported by a cable, or the like, 309 connected to the shoe and passing over a pulley 311 supported on the frame extension 12. Cable 309 is connected through a spring 313 to a toggle device 315 (see particularly Fig. 2). When the toggle device is in the position illustrated in Fig. 2, the coating shoe segments are maintained in cooperating engagement and with the bearing ends of the adjusting devices held against the pipe. The spring, however, allows the shoe to yield as may be necessary in the event of welds, or other irregularities of the pipe. Release of the toggle device permits the shoe to drop away from the pipe.

The means for supplying coating material to the coating heads includes a main coating tank

or sump 324 suspended from the frame of the machine, the sump including a filler chute 326. Sump 324 is partitioned to provide a pump chamber 328 in which is located a pump of any suitable type 160 which is driven from the motor "M" through the drive mechanism previously described including sprocket wheel 156 and shaft 158. Suction lead 330 for the pump extends into the main part of the sump and projects for a short distance into return line 322, as illustrated. As will be understood, the return line is made of substantially larger diameter than the suction lead. For example, the suction lead may be 1½ to 2" pipe and the return line 4" pine. By arranging the suction lead in this manner, a sufficient suction is created in the return line to draw the surplus coating material from drip pan 320, and, at the same time, coating material is drawn into the suction lead from the sump.

The pressure side of the pump is connected into a main lead 332 which in turn is connected into line 317 leading to coating nozzle 314 for supplying coating material to the rearward shoe. A branch 334 from the main lead is coupled into connection 276 of the forward coating shoe. The coating return outlet 278 of the forward coating shoe preferably discharges directly into the sump. A by-pass line 336 is connected into the main lead 332 to relieve pressure in the supply lines where necessary or desirable. Each of the supply lines, and the by-pass line includes a valve 337 of any suitable type, whereby the flow through the line may be controlled.

Operation

In preparation for the operation of the machine described above, the same is mounted on an extending pipe line P in any suitable manner; for example, by threading the end of the pipe line through the coating and wrapping devices, or by releasing the same and reassembling them about the pipe. Traction wheels 44 mounted on carriage 26 are placed in engagement with the upper surface of the pipe, and wheels 50 in contact with the lower surface of the pipe. As will be noted, notwithstanding the fact that the center of gravity of the machine is to the right (see Fig. 1) of the pivot 32 for carriage 26, tipping of the machine is prevented, and the same is maintained in operative position by wheels 50 bearing against the underside of the pipe and serving as a counterpoise.

A suitable coating material in molten condition, if a thermo-plastic coating is employed, is poured into sump 324 through filler chute 326. Supplies of wrapping material are mounted upon spindles 204, and friction drags 232 are adjusted to provide a suitable tension on the wrapping material as it is unwound. The positions of the spool supporting spindles are adjusted on stud spindles 202; for example as illustrated in Fig. 12, so that the wrapping material will be applied to the pipe with the desired amount of overlap.

Motor M is then started, and clutches 69 and 71 engaged to start the travel of the machine along the pipe and, at the same time, to begin the circulation of the coating material to the coating shoes and the rotation of the wrapping heads about the pipe. As the machine travels along the pipe line P, a uniform layer of coating material is first applied to the pipe from shoe 252, the thickness of the layer being determined by the setting of adjusting device 280. One or more layers of wrapping material, depending upon the number of spindles employed and the degree of overlap desired, are then applied by the wrapping head comprising ring gear 196 and its attendant parts. A second coating is applied over the first wrapping by coating shoe 254 and a final wrapping applied by the rear wrapping head defined by ring gear 194. The speed of travel of the machine along the pipe and of the rotation wrapping heads may be varied, depending upon conditions, by shifting the gears in transmission or gear box 70, and likewise the amount of coating material supplied may be controlled by speeding up or slowing down the action of the pump through transmission or gear box 72.

Due to the compactness of the machine and the pivotal mounting of the carriage 26 with respect to the frame, the machine may negotiate conventional pipe lines having numerous vertical bends without binding, notwithstanding the presence of the dual coating and wrapping devices. In the event that the machine is required to pass over welds and other variations in the diameter of the pipe, the operations are not interfered with, as the forward wheels of the carriage may first swing upwardly to pass over such obstruction, and the rear wheels similarly thereafter pass over them. Likewise, the pivotal mounting of the carriage permits the machine to tilt sufficiently to allow bottom wheels 50 to pass over such obstruction. The slack take-up device 116 compensates for movement of gears 82 and 106 relatively to each other during rocking of the carriage.

The coating devices provide for the application of uniform thickness layers of the coating material. The special construction of the forward coating shoe 252 particularly insures against "holidays" or other imperfections in the coating. Thus, the coating material entering into the outer compartment 266 must flow upwardly to communicating opening 272 before it comes in contact with the pipe, whereby the dangers of froth or bubbles in the material applied to the pipe are substantially eliminated. The coating material fills the inner compartment to insure complete coating of the pipe. In both shoes, and particularly in the rearward shoe, the means shown for adjusting the position of the rearward walls or wiping blades is of particular importance in that it provides the desired positive adjustment without injury to the applied wrapping material.

Having thus described our invention in rather full detail, it will be understood that these details need not be strictly adhered to, but that various changes and modifications will suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What we claim is:

1. A combination pipe coating and wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame, wrapping and coating mechanisms carried by said frame, a unitary carriage supporting said frame from the pipe and connected to the frame by a pivot means to be rockable thereon, traction wheels on said carriage in driving engagement with said pipe, and a wheel carried by said frame for contacting the underside of said pipe the pivotal connection of said carriage to said frame lying between said last named wheel and the gravitational center of said coating and wrapping mechanisms.

2. A machine for applying protection materials to a pipe or the like, said machine comprising a

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frame adapted for movement longitudinally of the pipe, a carriage supporting said frame from the pipe, a unitary transverse pivotal connection between said frame and carriage, traction wheels carried solely by said carriage for driving engagement with the upper side of said pipe, protection-material applying devices carried by said frame at one side of said pivotal connection, and a wheel carried by said frame at the other side of said pivotal connection for bearing contact with said pipe on the underside thereof.

3. A combination pipe coating and wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, a carriage supporting said frame from said pipe, a unitary transverse pivotal connection between said frame and said carriage, traction wheels spaced longitudinally of said pipe and carried solely by said carriage for driving engagement with the upper side of said pipe, coating and wrapping devices supported from said frame at one side of said pivotal connection, a wheel supported from said frame at the other side of said pivotal connection for contacting said pipe on the underside thereof, and means carried by said frame for driving said traction wheels and said wrapping devices.

4. A pipe wrapping machine adapted for longitudinal movement relatively to a pipe, said machine comprising a frame to extend longitudinally of the pipe, a carriage supporting said frame from the pipe, a unitary transverse pivotal connection between said frame and carriage, traction wheels spaced longitudinally of the pipe mounted on said carriage for driving engagement with the upper surface of the pipe, an extension at one end of said frame, wrapping devices suspended from said extension, and a wheel carried by said frame adjacent its other end for bearing contact on the underside of said pipe.

5. A pipe wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, a carriage supporting said frame from said pipe, a unitary transverse pivotal connection between said frame and carriage, traction wheels carried by said carriage for driving engagement with the upper side of said pipe, an end extension of said frame, a yoke suspended from said extension, ring gears supported on said yoke for rotation around said pipe, wrapping material holders supported by said ring gears, a wheel carried by said frame adjacent its other end for bearing contact with the underside of said pipe, a motor carried by said frame, and driving connections between said motor and said traction wheels and ring gears.

6. A pipe wrapping machine adapted for longitudinal movement relatively to a pipe or the like comprising a frame to extend longitudinally of the pipe, a carriage supporting said frame from the pipe, a unitary transverse pivotal connection between said frame and carriage intermediate the ends of said frame, said frame including an end extension, a yoke suspended from said extension, rollers carried by said yoke on opposite sides thereof, ring gears carried by said rollers for rotation around said pipe, members extending from said frame adjacent the other end thereof and supporting a wheel for contact with the lower side of said pipe.

7. A pipe wrapping machine adapted for longitudinal movement relatively to a pipe or the like comprising a frame to extend longitudinally of the pipe, a carriage supporting said frame from the pipe, a unitary transverse pivotal connection between said frame and carriage intermediate the ends of said frame, said frame including an end extension, a yoke suspended from said extension, rollers carried by said yoke on opposite sides thereof, ring gears carried by said rollers for rotation around said pipe, members extending from said frame adjacent the other end thereof and supporting a wheel for contact with the lower side of said pipe, a motor carried by said frame, and driving connections between said motor and said traction wheels and ring gears.

8. A pipe wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, means supporting said frame for movement therealong, a yoke suspended from said frame, ring gears supported from opposite faces of said yoke for rotation around said pipe, wrapping material holders carried by said ring gears, and means carried by said frame for propelling said machine along the pipe and for rotating said ring gears.

9. A pipe wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, traction wheels supporting said frame for movement therealong, a yoke suspended from said frame, supporting rollers on opposite faces of said yoke, ring gears on said supporting rollers for rotation around the pipe, wrapping material holders carried by the ring gears, a motor on said frame, and driving connections between said motor and ring gears and said traction wheels.

10. A combination pipe coating and wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, means supporting said frame for movement along said pipe, a yoke suspended from said frame, ring gears carried by the opposite faces of said yoke for rotation around said pipe, wrapping material holders carried by said ring gears, a coating applying device carried by said frame forwardly of said ring gears, a second coating applying device supported by said yoke, means carried by said frame for propelling said machine along the pipe and for rotating said ring gears, and means for supplying coating material to said coating devices.

11. A combination pipe coating and wrapping machine, said machine comprising a frame, means supporting said frame for movement relatively to the pipe, a yoke suspended from said frame, ring gears supported from the opposite faces of said yoke for rotation around said pipe, wrapping material holders carried by said ring gears, a coating applying device supported by said yoke, and means for supplying coating material to said applying device, said last-named means including a lead passing between said ring gears.

12. A combination pipe coating and wrapping machine, said machine comprising a frame, means supporting said frame for movement along the pipe, a yoke suspended from said frame, ring gears supported from the opposite faces of said yoke for rotation around said pipe, a coating applying device supported by said yoke, means for supplying coating material to said applying device, said last-named means including a lead extending through a gap in, and secured to, said

yoke, and means for propelling said machine along the pipe and for rotating the ring gears.

13. A combination pipe coating and wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, means supporting said frame for movement along the pipe, a yoke suspended from said frame, supporting rollers on opposite faces of said yoke, ring gears supported on said rollers for rotation around said pipe, wrapping material holders carried by said ring gears, a coating device carried by said frame forwardly of said ring gears, a second coating device supported by said yoke, a motor on said frame, driving connections between said motor and ring gears, a pump for supplying coating material to said coating devices, and means for driving said pump from said motor.

14. A combination pipe coating and wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, a carriage supporting said frame from the pipe, a transverse pivotal connection between said frame and carriage, traction wheels carried by said carriage for driving engagement with the upper side of said pipe, a yoke suspended from said frame adjacent one end thereof, ring gears supported from opposite faces of said yoke for rotation around said pipe, wrapping material holders carried by said ring gears, a coating device carried by said frame forwardly of said ring gears, a second coating device supported by said yoke, means for supplying coating material to said coating devices, a wheel carried by said frame adjacent the other end thereof and in bearing contact with the underside of said pipe, and means carried by said frame for driving said traction wheels and for rotating said ring gears.

15. A combination pipe coating and wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, a carriage supporting said frame from the pipe, a transverse pivotal connection between said frame and carriage, traction wheels carried by said carriage for driving engagement with the upper side of said pipe, a yoke suspended from said frame adjacent one end thereof, ring gears supported from opposite faces of said yoke for rotation around said pipe, wrapping material holders carried by said ring gears, a coating device carried by said frame forwardly of said ring gears, a second coating device supported by said yoke, a pump for supplying coating material to said coating devices, a wheel carried by said frame adjacent the other end thereof and in bearing contact with the underside of said pipe, a motor carried by said frame, a driving connection between said motor and said traction wheels, a driving connection between said motor and said ring gears, and means for driving said pump from said motor.

16. A pipe wrapping machine adapted for longitudinal movement relatively to a pipe or the like, said machine comprising a frame to extend longitudinally of the pipe, means supporting said frame for movement along said pipe, an upwardly and rearwardly projecting extension on said frame, a yoke suspended from said extension, supporting rollers on opposite faces of said yoke, ring gears on said supporting rollers for rotation around the pipe, wrapping material holders carried by said ring gears, and means for rotating said ring gears.

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