Jan. 25, 1966 R. C. STANLEY 3,230,668

INTERIOR SURFACE PIPE GRINDING AND CLEANING MACHINE

Filed Jan. 23, 1964 4 Sheets-Sheet 1

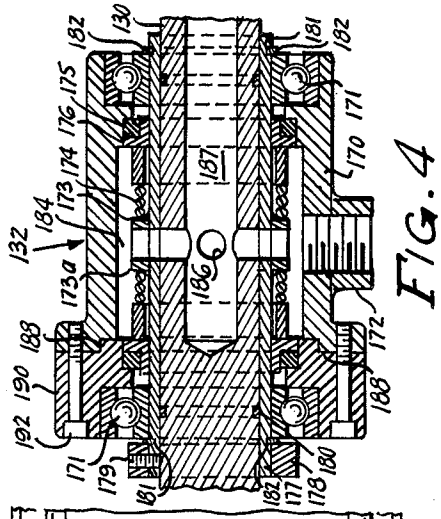

FIG. 4

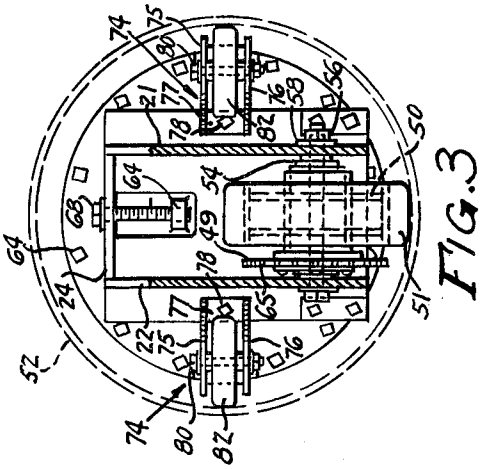

FIG. 3

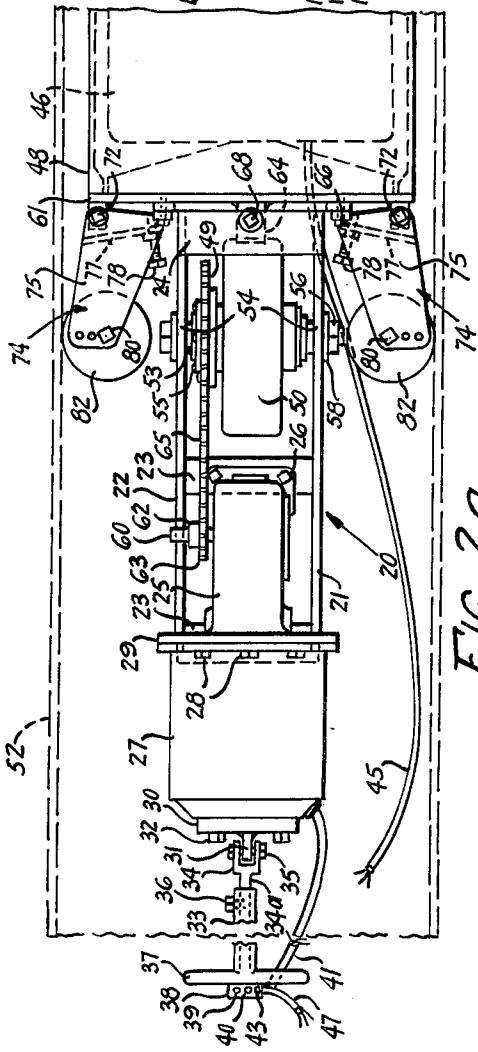

FIG. 2a

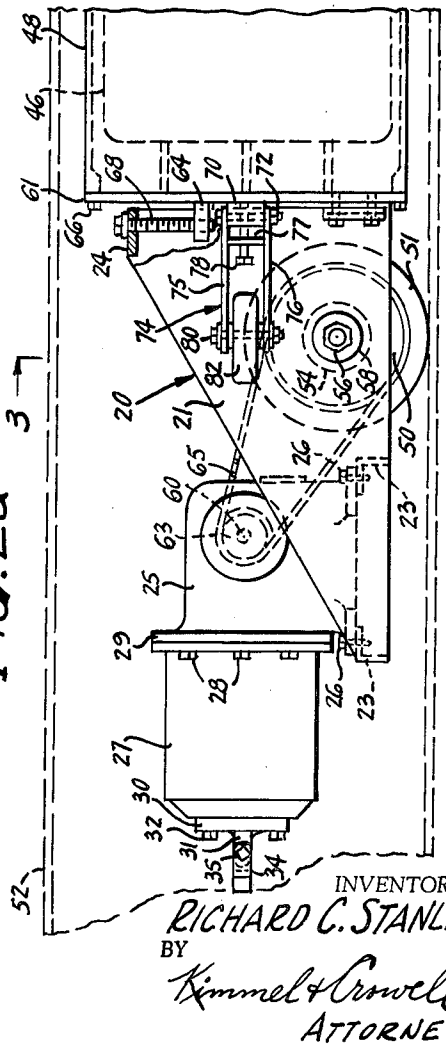

FIG. 1a

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INTERIOR SURFACE PIPE GRINDING AND CLEANING MACHINE

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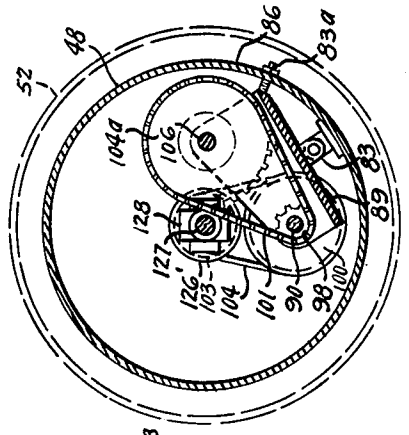

FIG. 6

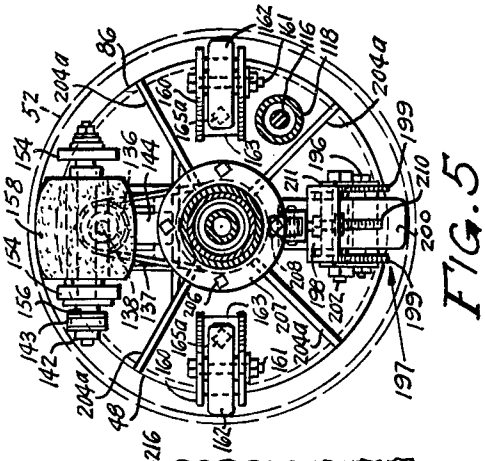

FIG. 5

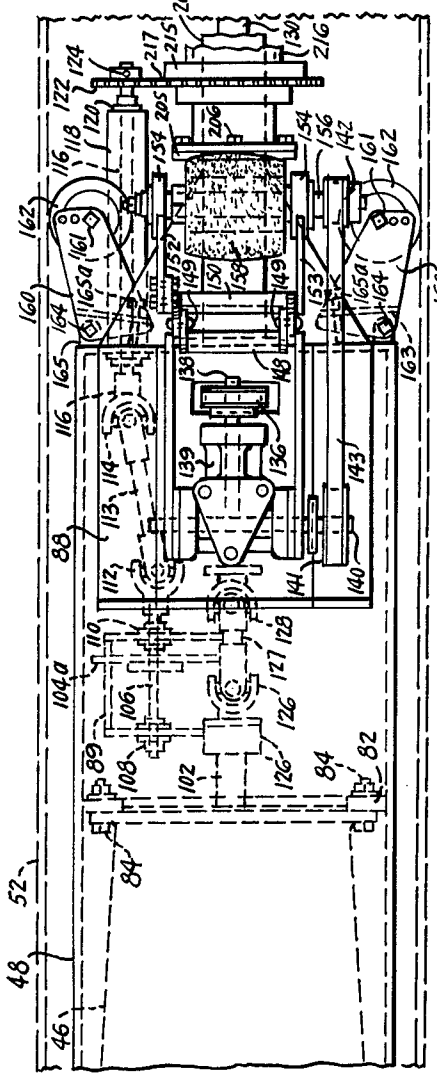

FIG. 2b

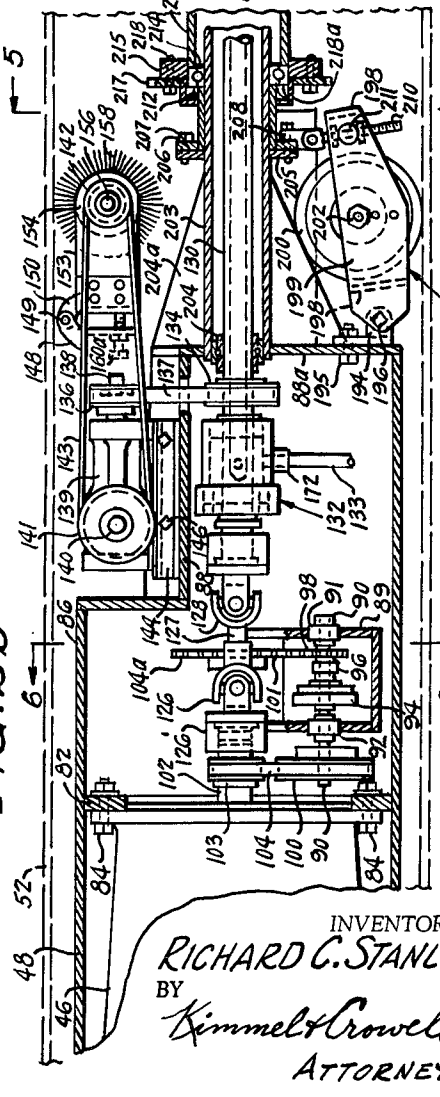

FIG. 1b

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INTERIOR SURFACE PIPE GRINDING AND CLEANING MACHINE

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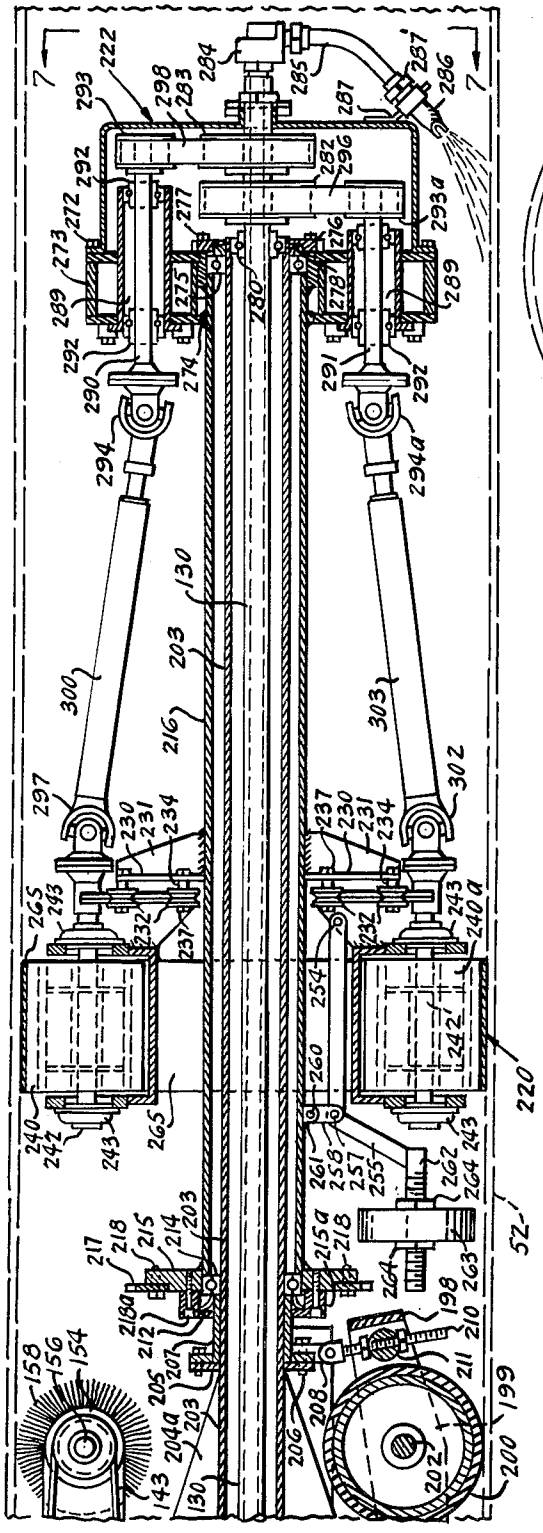

FIG. 1C

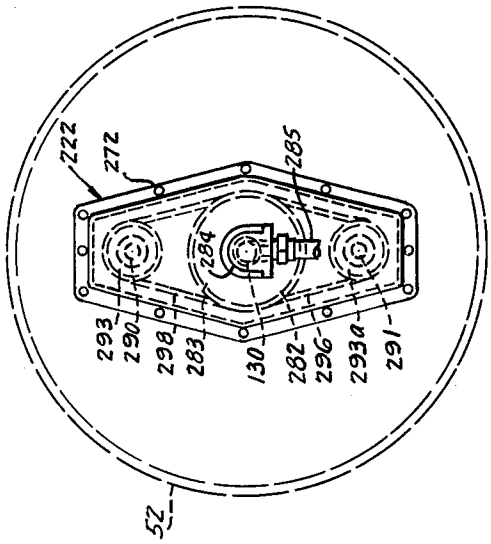

FIG. 7

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INTERIOR SURFACE PIPE GRINDING AND CLEANING MACHINE

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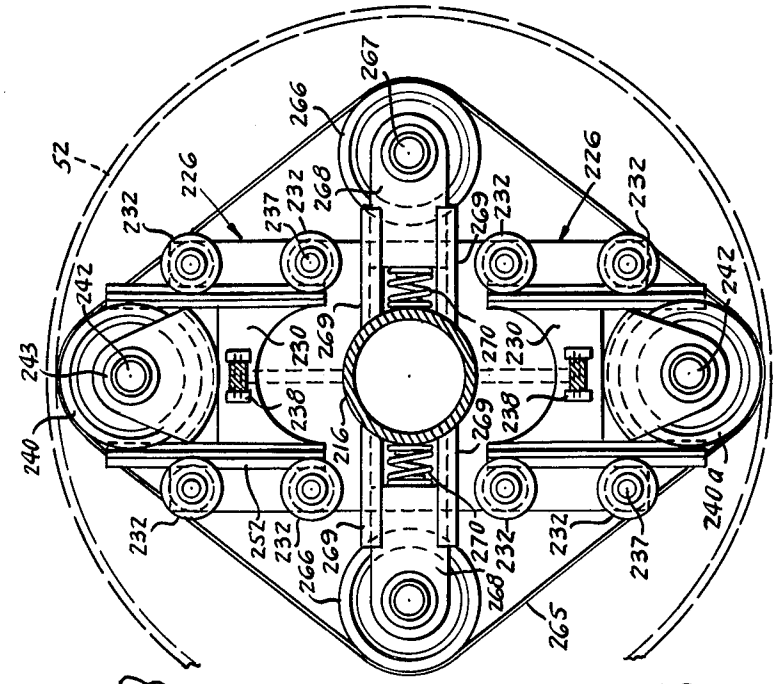

FIG. 9

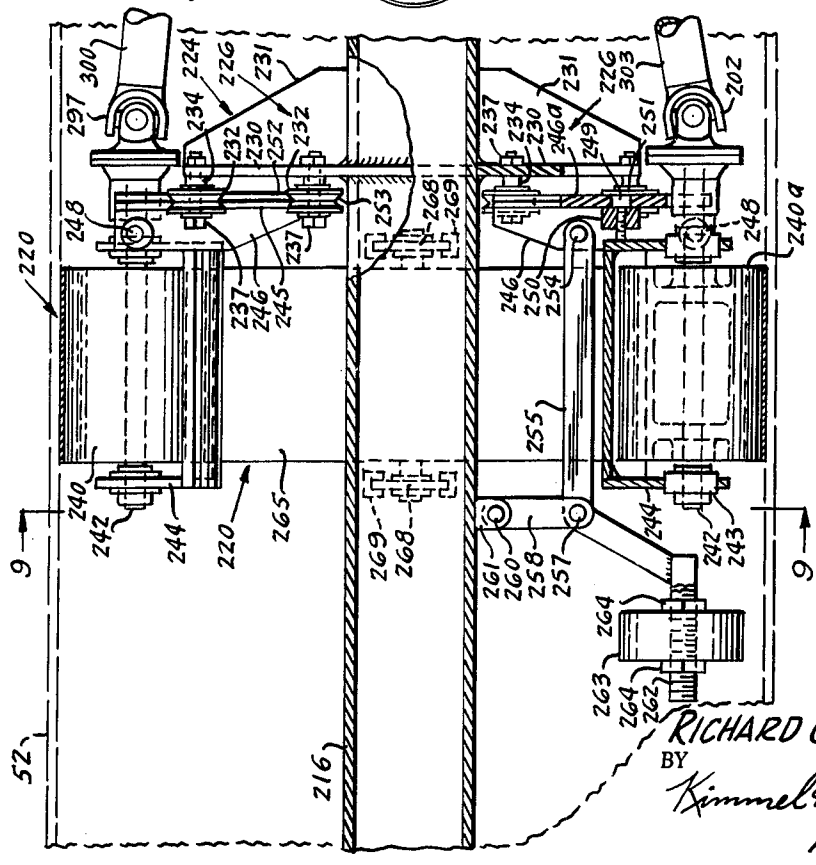

FIG. 8

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United States Patent Office 3,230,668 Patented Jan. 25, 1966

3,230,668

INTERIOR SURFACE PIPE GRINDING AND CLEANING MACHINE

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Filed Jan. 23, 1964, Ser. No. 339,750
11 Claims. (Cl. 51—5)

This invention relates to improvements in pipe cleaning machines, and more particularly to a machine adapted to improve the internal surface of a pipe by grinding with abrasive coated belts powered by driven pressure wheels which orbit about the pipe axis so that a helical grinding pattern is generated as the self propelled machine proceeds through the pipe. The pitch angle of the helical grinding pattern is a function of the number of pressure wheels used and the width of abrasive belt. As the grinding operation proceeds through a pipe, compressed air is injected ahead of the grinding belt to remove all accumulated dirt, grit and scale material.

The fluid flow characteristics of large diameter pipes such as used in pipe lines are influenced to a large degree by the interior surface roughness of the pipe line. To improve this situation, many pipe line owners are coating the interior of their pipes with various types of paints or resins, a number of different methods being employed to prepare the interior surface of the pipe line to receive the paint. Most of these methods fail by a wide margin. Some methods even aggravate the above problem by leaving surface "whiskers" or splinters projecting from the internal surface of the pipe line.

The instant invention solves the above problems economically and efficiently by multiple grinding, cleaning and removing scale, burrs, dirt and grit from the pipe line without the additional expense of coating the interior of the pipe line.

A primary object of this invention is to provide a new internal surface pipe grinding and cleaning machine for improving the surface of a pipe line.

Another object of the invention is to provide a machine for helically grinding and cleaning the internal surface of a pipe line.

A further object of the invention is to provide an improved powered abrasive belt grinding means for the internal surface of a pipe line which orbits the longitudinal axis of the pipe so that a helical grinding pattern is generated as the machine proceeds through the pipe line.

A still further object of the invention is to provide an improved self-propelling means for an internal pipe grinding and cleaning machine.

Another object of the invention is to provide an improved means including power rotated pressure wheels which force an abrasive belt against the internal pipe surface and cause it to grind and clean the same.

A further object of the invention is to provide counterweight to eliminate the effect of centrifugal forces and gravity forces of orbiting belt grinders including spring actuated or pneumatic cylinder actuated idler roller to tension the grinding belt so as to maintain a uniform grinding pressure on all points of the internal circumferential surface of the pipe line as the novel machine travels forward and backward through the same.

A still further object of the invention is to provide an electrically driven mechanism adapted to allow passage of compressed air to remove grinding residue.

Another object of the invention is to provide a powered nonorbiting wire brush adapted to improve the internal cleaning action of an internal longitudinal weld bead of a pipe line.

Another object of the invention is to provide an improved internal surface pipe grinding machine provided with hinged linkage means between the components of

the machine to follow the internal surface contour of a curved pipe line.

A further object of the invention is to provide an improved internal surface pipe grinding machine adapted to be adjusted to various internal sizes of pipe lines.

A still further object of this invention is to provide a new internal pipe surface grinding and cleaning machine including manually controlled electrical energy means adapted to selectively self propel the machine forwardly and backwardly in a pipe line during internal grinding and cleaning of the same.

The nature of the invention and its further advantages and features of novelty will become apparent to those skilled in the art from the following detailed description and discussions of the exemplary embodiment of the invention shown in the accompanying drawings wherein:

FIGURE 1*a* is a fragmentary view in elevation of the rear self-propelling portion of the machine connected to the intermediate portion or grinding motor cage of the machine, certain hidden parts and a pipe line in which the machine is operating being shown in dotted lines;

FIGURE 1*b* is a fragmentary sectional view in elevation of the machine taken at the forward end of the grinding motor carriage showing the power take-off shaft, adjustable support rollers, rotary compressed air supply means surrounding the power take-off shaft including drive means connecting the power take-off shaft to a nonorbiting cleaning brush adapted to clean the internal welded seam of a pipe line, shown in dotted lines;

FIGURE 1*c* is a fragmentary sectional view in elevation of the front end of the machine of the instant invention connected to its intermediate portion to illustrate the rotary universal joint and power shaft take-off connections between the grinding belt head and the front end of the supporting carriage and the rotary belt and pulley take-off of the propelling shaft from the grinding motor, the shaft serving as a rotating conduit for the air supply and a dispensing nozzle therefor secured to the belt head, the pipe line and certain hidden parts being shown in dotted lines;

FIGURE 2*a* is a top plan view of FIGURE 1*a*;

FIGURE 2*b* is a top plan view of FIGURE 1*b*;

FIGURE 3 is a transverse sectional view taken substantially on line 3—3 of FIGURE 1*a* in the direction of the arrows;

FIGURE 4 is a cross-sectional view of the rotary compressed air supply gland connected to the tubular propelling shaft of FIGURE 1*b*;

FIGURE 5 is a transverse sectional view of FIGURE 1*b* taken substantially on line 5—5 in the direction of the arrows;

FIGURE 6 is a transverse sectional view of FIGURE 1*b* taken substantially on line 6—6 in the direction of the arrows;

FIGURE 7 is a front end elevational view of FIGURE 1*c*;

FIGURE 8 is an enlarged fragmentary sectional view in elevation of the rotating belt head and driven roller means, spring tensioned idlers of the abrasive belt including an actuating counterweight therefor connected to the belt head secured to a rotating carrier tube which concentrically surrounds the tubular propelling tube energized by the grinding motor; and

FIGURE 9 is a partial sectional view of FIGURE 8 taken substantially on line 9—9 in the direction of the arrows.

Referring more specifically to the drawings, in which like reference numerals represent like parts, FIGURES 1*a*, 2*a* and 3 disclose the rear end of an exemplary embodiment of the new machine showing the propulsion unit mechanism 20 comprised of substantially triangular side support frame members 21 and 22 having a pair of bottom

angles 23 and a top bar means 24 welded or suitably secured therebetween.

Bottom angles 23 support gear and cone drive means 25 by bolts 26.

A propelling motor 27 is supportably connected by screw bolts 28 to the back plate portion 29 of drive means 25.

A plate 30 includes a lug 31 welded or suitably attached thereto and is secured by screw bolts 32 to the back portion of the housing of motor 27. A manually operated handle or boom 33 is pivotally secured by clevis 34 and bolt 35 to lug 31. Handle 33 is telescopingly secured to extension rod 34*a* of clevis 34 by screw bolt 36. Handle 33 terminates in a hand grip 37 to which is centrally attached to an electrical control box 38 having control buttons 39 and 40 for electrically energizing, by cable 41 motor 37 for forward and backward travel of the machine respectively in a pipe line. Control push button or switch 43 may be used to electrically energize, by cable 45, grinding motor 46 in casing or carriage 48. Control box 38 is energized by electrical cable 47.

Propulsion wheel 50 is mounted in a rubber tire 51 of desired type to frictionally contact the inside surface of a pipe line 52 shown in broken lines in FIGURES 1*a*, 2*a* and 3. Propulsion wheel 50 is suitably mounted on axle 53 which is mounted in bearing 54 of structural side 21 by a nut and washer 56 and 58, respectively. Propulsion wheel 50 is secured to sprocket 49 by bolt 55.

Gear box 25 is operatively connected by shaft 60 and nut 62 to sprocket 63.

Sprocket 49 is driven by belt or chain means 65 connected to sprocket 63 to drive propulsion wheel 50.

An end plate 61 of carriage 48 has an apertured coupling lug 64 welded or suitably attached thereto and is secured by bolt 66 to motor casing 48.

Propulsion unit 20 is pivotally secured by screw bolt 68 and bar 24 to lug 64 of plate 61.

The plate 61 carries an additional apertured lug 70 which is pivotally connected by a bolt 72 to roller block 74 comprising side members 75 and 76 and cross member 77 welded or suitably connected together. Cross member 77 threadably carries screw 78 which adjustably contacts face plate 61 to pivot block 74 about bolt 72.

Block 74 carries in suitable bearing bolt 80 which serves as an axle for roller 82 which contact the sides of pipe line 52 and serve as a guiding means for the back portion of the pipe grinding and cleaning machine.

FIGURES 1*b*, 2*b*, 4, 5 and 6 disclose an intermediate portion of the new machine. A flange 82*a* interiorly of the grinding motor carriage 48 is secured by bolt 84 to the grinding motor 46.

Carriage 48 extends as a circular section 86 and flat offset section or deck 88. Carriage portion 86 houses a gear box 89.

Gear box 89 is suitaby secured by pivoted bracket 83 and adjustment screw 83*a* to the circular side portion of housing 86 as best shown in FIGURE 7. Gear box 89 carries shaft 90 mounted in bearings 91 and 92. A suitable clutch 94, of a commercial type, is fixed by a spline and key or other suitable means to shaft 90. The outer portion 96 of clutch 94 is integrally attached to sprocket 98 rotatably carried on shaft 90. Shaft 90 carries pulley 100 secured thereto by set screw or other suitable means.

Shaft 102 of motor 46 fixedly carries pulley 103 thereon. Pulley 103 drives pulley 100 by belt 104. Sprocket 98 drives by timing belt 101 sprocket 104*a* carried by shaft 106. Shaft 106 is rotatably supported in bearings 108 and 110 of gear housing 89, as best shown in FIGURE 2*b*.

Shaft 106, shown in broken lines of FIGURE 2*b* fixedly carries at one end a universal joint 112 connected to shaft 113 further connected to universal joint 114 secured to shaft 116 supported by bearing 120 in side carrier tube 118. The outer end of shaft 116 has secured thereto sprocket 122 by set screw 124.

Motor shaft 102, of FIGURE 1*b*, is connected by universal joint 126 and intermediate shaft 127 to universal joint 128 connected to tubular propelling shaft 130.

Propelling shaft 130 rotatably carries compressed air supply joint and gland 132 attached to a supply conduit 133 as hereinafter explained in connection with FIGURE 4.

Propelling shaft 130 fixedly carries pulley 134 which drives pulley 136 by belt 137, as shown in FIGURE 1*b*. Pulley 136, of FIGURES 1*b* and 2*b*, is secured by set screw or other suitable means to shaft 138 of gear box drive means 139 of a conventional type.

Gear box drive 139 carries a transverse shaft 140 securely connected to pulley 141 which drives at a desired ratio of rotation a pulley 142, carried on shaft 156, by belt 143. An abrasive roller or brush 158 is fixedly secured to shaft 156 by screw or other desired means.

Gear box drive 139 is mounted on base 144 secured by screw bolt 146 to flat deck portion 88 of housing 86 as best seen in FIGURES 1*b* and 2*b*.

The flat deck portion 88 fixedly supports by welding an upstanding bracket 148 pivotally connected by rivet 149 to bracket 150 secured by side support members 152 and 153 and bearing 154 surrounding shaft 156 carrying intermediate its ends pipe seam abrasive roller or brush cleaning 158 for cleaning the longitudinal welded seam of pipe line 52. Tensioning on belt 143 is adjusted by screw 160*a* between brackets 148 and 150, as best shown in FIGURES 1*b* and 2*b*.

The front end 88*a* of motor housing 48 pivotally supports roller guiding side block 160 which pivotally carries by bolts 161 side roller 162 which contacts the internal side surfaces of pipe line 52. Block 160 is secured internally by welded intermediate bar 163 and is further pivotally connected by bolt 164 to lug 165 welded to housing 88. Roller 162 are laterally adjusted by screw and bolt 165*a* for contact with the internal side surfaces of pipe line 52, as best shown in FIGURES 2*b* and 5.

Referring more specifically to FIGURE 4, compressed air rotary gland 132 is comprised generally, of gland housing body 170, bearing 171, spacer 173, nut 173*a*, packing 174, sealing 175, packing gland 176, tubular shaft 177 secured on shaft 130 by collar 178, set screw 179, and O-ring seal 180. Gland body 170 has an intermediate supply connection 172 adapted to be connected to the compressed air supply hose 133 shown in FIGURE 1*b*.

Gland body 170 is longitudinally secured on tubular shaft 177 by spring-like snap ring 182 in recess 181 of tubular shaft 177.

Body member 170 has a recess 184 communicating with compressed air supply connection 172 and aperture 186 communicating with the hollow air conduit 187 of power shaft 130.

For servicing of packing 174 and seal 175, body member 170 is secured by recessed steps 188 to end body member 190 by screw bolt 192 as shown in FIGURE 4.

Referring more specifically to FIGURES 1*b* and 5, cage 88*a* is secured to lug 194 by bolt 195. Lug 194 is secured by bolt 196 to roller block 197 comprising crossbar 198 shown in broken lines welded to lateral side members 199. Pulley block 197 carries support roller 200 by bolt 202.

Dead axle 203 is fixedly secured by welding to end housing 88*a*. Dead axle 203 supports internally propelling tubular shaft 130 by bearing 204, radial support elements 204*a* being provided to assist in carrying dead axle 203.

Dead axle 203 has fixed or welded thereto ring 205 which is further secured by bolt 206 to collar and ring flange 207. Flange 207 is secured at its lower portion to lug 208 to toggle bolt 210 which is in turn pivotally secured to bolt 211 of block 199 to adjust supporting pulley 200 to contact the various bottom internal surfaces of different sizes of pipe line 52.

As seen in FIGURES 1*b* and 1*c*, seal 212 mounted in housing 218*a* surrounds the end circumferential portion

of collar **207** to seal a bearing **214** in hub **215**. The upper race portion of bearing **214** is pressed or suitably secured into central hub **215** secured to carrier tube **216**.

Sprocket **217** is suitably attached by bolt **218** to hub **215**.

Sprocket **122** (FIGURE 2*b*) by a suitable chain (not shown) drives sprocket **217** to rotate carrier tube **216** carrying belt head **220** to generate a spiral grinding pattern on the internal surface of pipe line **52** as will be hereinafter explained.

Referring to FIGURES 1*c*, 7, 8 and 9, housing **215***a* is secured by bolts **218***a* to central hub **215** as best seen in FIGURE 1*c*. Housing **215***a* encloses seal **212**, as shown.

FIGURE 1*c* shows an extension of propelling tube **130**, concentric dead axle **203** and rotary concentric carrier tube **216** connected to belt grinding head **220** and belt and pulley housing **222** connected by a driving universal joint and shaft to abrasive belt grinding head **220**, as hereinafter explained in detail.

Referring to FIGURES 8 and 9, abrasive belt grinding head **220** is comprised of a central segmented spider **224** fabricated by welded plate and structural shapes of a suitable metal material welded to rotary carrier tube **216**. Each segmented spider **224** is comprised of plates **230** and angles **231**.

Plates **230** each support four rollers **232** by standoff collar **234** and eccentric bolt **237**. Each plate **230** has welded thereto apertured lug **238**.

Each energized or powered roller **240** and **240***a* is rotatably supported by a shaft **242** in bearing **243** in a U-shaped member **244** pivotally secured at the forward end to side angle **246** by pivot bearing **248**.

U-shaped member **244** is longitudinally adjusted by screw **249** and block **250** through aperture **251** in angle **246**. Each outward edge portion **245** of angle **246** is ground in a longitudinal V-shape **252** to fit the internal groove **253** of roller **232**, as best seen in FIGURES 8 and 9.

Referring to FIGURE 8, the lower angle portion **246***a* of angle **246** is pivotally connected by bolt **254** to rigid off-set lever **255** pivotally connected by bolt **257** to lever **258** further pivotally connected by bolt **260** to lug **261** welded to carrier tube **216**. The off-set portion of lever **255** terminates in a screw bolt **262** welded or suitably fixed thereto which carries a counterweight **263** held rigidly thereon by screw nut members **264**.

Abrasive belt energizing rollers **240** and **240***a* carries abrasive belt **265** of a desired width.

The tension on abrasive belt **265** is automatically maintained by roller **266** mounted by bolt **267** in reciprocating roller block **268** mounted side guide angle **269** welded to carrier tube **216**. Spring **270** is mounted between roller block **268** and carrier tube **216**, as best shown in FIGURE 9. Spring **270** serves as a biasing means to force roller **266** against belt **265** to insure that belt **265** is always properly tensioned against powered rollers **240** and **240***a*.

In use, grinding head **220** rotates with counterweight **263** and tube **216**. Rollers **240** and **240***a* are heavy and their centrifugal forces during their planetary rotation tend to throw both of these rollers and the counterweight **263** radially outwardly simultaneously. The centrifugal force of counterweight **263** reacts on lever **255** about fulcrum bolt **257** tending to slide the mounting **252** of roller **240***a* radially inwardly to oppose the gravity and centrifugal forces due to the weight of the rollers and their mounting, which force is radially outwardly. By properly adjusting the weight of counterweight **263**, its centrifugal forces are sufficient to smooth out or eliminate the damaging centrifugal and gravity forces of the orbiting belt grinding means during spiral grinding of the internal surfaces of pipe line **52** by the relative rotations of belt **265** about carrier tube **216**.

Referring more specifically to FIGURES 1*c* and 7, belt and pulley housing **222** is secured by bolts **272** to

double support ring **273** suitably fabricated from structural shapes and welded at point **274** to carrier tube **216** rotatably supported on dead axle **203** by bearing **275**. End housing ring **276** is secured by bolts **277** to the front portion of structural double support ring **273** to enclose air sealing **278**. Propelling tube **130** is supported in dead axle **203** by end bearing **280**.

Propelling tube **130** fixedly carries pulleys **282** and **283** thereon and terminates in a rotary compressed air union **284** connected to a hose **285** connected to nozzle **286** secured in holder **287** welded to pulley and belt housing **222**.

Double support ring **273** carries a tube **289** welded or suitably secured therein.

Tube **289** carries shaft means **290** and **291** in bearing **292**, as best shown in FIGURE 1*c*.

Shafts **290** and **291** carry pulleys **293** and **293***a*, respectively, on one end and universal joints **294** and **294***a*, respectively, on the other end thereof, as best shown in FIGURE 1*c*.

Pulley **282** drives pulley **293***a* by belt **296**.

Pulley **283** drives pulley **293** by belt **298**.

Shaft **290** drives abrasive roller **240** by universal joints **294** and **297** and shaft **300**.

Shaft **291** drives abrasive belt roller **240***a* by universal joints **294***a* and **302** and shaft **303**.

During operation, air is supplied to dispensing nozzle **286** through rotary air supply joint **132**, tubular propelling shaft **130**, rotary air union **284** and hose **285** connected to dispensing nozzle **286** so that as pulley housing **222** is rotated by carrier tube **216** energized by sprocket **217**, air nozzle **286** circumscribes the internal circumferential surfaces of pipe line **52** periodically as the inventive machine travels back and forth through the internal surfaces of the same.

During operation of the inventive machine, motor **27** energizes propulsion wheel **50** through gear and cone drive **25**, sprocket **49** and **63** and chain **65** connected by sprocket **49** to traction wheel **50** to selectively propel the machine forwardly and backwardly through pipe line **52**.

As the machine is propelled through pipe line **52**, grinding motor **46** energizes rollers **240** and **240***a* by propelling shaft **130** and differential shaft **300** and **303**. Cleaning brush **158** is rotated by pulley **134** on propelling shaft **130**. Carrier tube **216** is energized by motor shaft **102**, belt **104**, gear box **89**, differential shaft **113** connected to shaft **116** connected to sprocket **122** and by a belt (not shown) connected to sprocket **217** secured to rotary carrier tube **216** which rotates belt grinding head **220**.

A particular novelty of the new machine resides in its many cooperating modes of operation during internal travel through pipe line **52**.

To cover the full interior surface of pipe line **52**, belt grinding head **220** is energized by motor **46** to orbit or rotate about the pipe line axis while its belt rollers **240** and **240***a* are independently energized by propelling tube **130** and differential shafts **300** and **303**, so that a helical grinding pattern is generated on the internal surface of the pipe line **52** as the machine proceeds through pipe line **52**.

More specifically, abrasive belt grinding head **220** rotates with carrier tube **216** and sprocket **217** which is energized by motor shaft **102** connected by belt **104**, gear box **89**, shafts **113** and **120**, and sprocket **122**.

As grinding head **220** rotates with tubular carrier shaft **216**, rollers **240** and **240***a* and abrasive belt **265** are energized by motor **46** and by propelling tubular shaft **130** carrying pulleys **282** and **283** connected by belts **296** and **298** to pulleys **293** and **293***a*, respectively, which energize rollers **240** and **240***a* by universal joints **294** and **297** connected by shaft **300** and by universal joints **294***a* and **302** connected by shaft **303**, respectively, as best shown in FIGURE 1*c*.

Belt and pulley housing **222** is secured to carrier tube **116** and rotates in concert therewith during passage of the inventive machine through pipe line **52**.

In summary, the new machine of the present invention is reversing and self-propelling through control switches **38** and **39**, cleans longitudinal seams in pipe line **52** by energized brush **158**, radially grinds the internal circumferential pipe surfaces by abrasive belt **265** which is also rotated with respect to the pipe line axis to generate a helical grinding pattern on the internal surface of pipe line **52** to give a multiple cleaning and grinding effect as air nozzle **286** and housing **222** is rotated in unison with carrier tube **216** and grinding belt head **220**.

From the foregoing it will now be seen that there is herein provided an improved self-propelled pipe line grinding and cleaning machine which will internally follow the contour of a straight or uniformly curved pipe line and accomplishes all the objects of this invention, and others including many advantages of great practical utility and commercial importance.

Many and varied embodiments may be made of this inventive concept as obtained within the purview of this invention as desired by those skilled in the art without departing therefrom. Therefore, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. Apparatus for grinding and cleaning the interior surface of pipes comprising, in combination, a carriage, means for movably supporting said carriage interiorly of a pipe, a propulsion unit including a propulsive wheel adapted to engage a pipe interior, a motor carried by said propulsion unit for driving said wheel, means connecting said propulsion unit to said carriage at one end thereof, a second motor mounted on said carriage, a dead tubular axle extending from the other end of said carriage, a power shaft universally connected to said second motor concentrically mounted for rotation interiorly of said dead axle, a carrier tube concentrically mounted for rotation exteriorly of said dead axle, a belt head connected to said carrier tube, rotatable about said dead axle, means connected to said second motor for rotating said carrier tube and hence said belt head, roller drive shafts extending from said belt head, belt and pulley connections between said power shaft and said roller drive shafts in said belt head for rotating said drive shafts independently of the rotation of said belt head, plate means carried by said carrier tube, belt rollers supported by said plate means radially about said carrier tube, means connecting said drive shafts to said belt rollers, and an abrasive pipe cleaning belt extending around said belt rollers and adapted to abrasively engage the interior of said pipe.

2. The structure of claim **1** wherein said means connecting said propulsion unit to said carriage comprise a pivotal connection permitting lateral pivotal movement of said carriage and propulsion unit relative to each other to facilitate the passage of the apparatus through uniformly curved pipes.

3. The structure of claim **2** wherein said means for introducing compressed air into said hollow shaft includes an air sealed gland surrounding said hollow power shaft adjacent its connection to said second motor, said hollow shaft being rotatable in said gland, said gland and hollow shaft having registering air openings therein and an air conduit extending to the interior of said gland.

4. The structure of claim **1** wherein said power shaft is hollow, means are included for introducing compressed air into said hollow shaft, and an air nozzle, connected to the hollow interior of said hollow shaft, is positioned on the outer surface of said belt head and rotatable with said belt head.

5. The structure of claim **1** wherein said means for movably supporting said carriage interiorly of a pipe include a support roller and adjusting screw means for varying the relative height of the apparatus in accordance with the diameter of the pipe in which it is adapted to operate.

6. The structure of claim **5** wherein said means for movably supporting said carriage interiorly of a pipe further include guiding side rollers and adjusting means for varying the relative position of said guiding side rollers to said carriage to center the apparatus in a pipe.

7. The structure of claim **1** wherein said first motor is reversible, an elongated handle extends from the end of said propulsion means remote from said carriage, and control means for said first and second motors are mounted on the extending end of said handle.

8. The structure of claim **7** wherein said elongated handle comprises a plurality of telescopic sections and means for securing said sections in fixed relation to each other to vary the effective length of said handle.

9. The structure of claim **1** wherein said belt rollers include driven belt rollers and idler belt rollers and said plate means for supporting the belt rollers includes multiple guide means, support brackets for said belt rollers linearly adjustable in said guide means, and independent spring biasing means mounted on the guide means of said idler rollers for maintaining tension in said abrasive belt.

10. The structure of claim **9** wherein said driven rollers are connected by linkage to counterweights, to counteract centrifugal and gravitational forces.

11. The structure of claim **1** wherein said carriage includes a supporting bracket on its upper side, an axle carried by said supporting bracket, a seam cleaning brush rotatably mounted on said axle and drive means connected to said power shaft for rotating said brush.

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