Jan. 4, 1955 G. R. TREMOLADA ET AL 2,698,734

ROTARY MACHINE WITH SLIP OPERATING MECHANISM

Filed Feb. 6, 1951 4 Sheets-Sheet 1

Fig. 1.

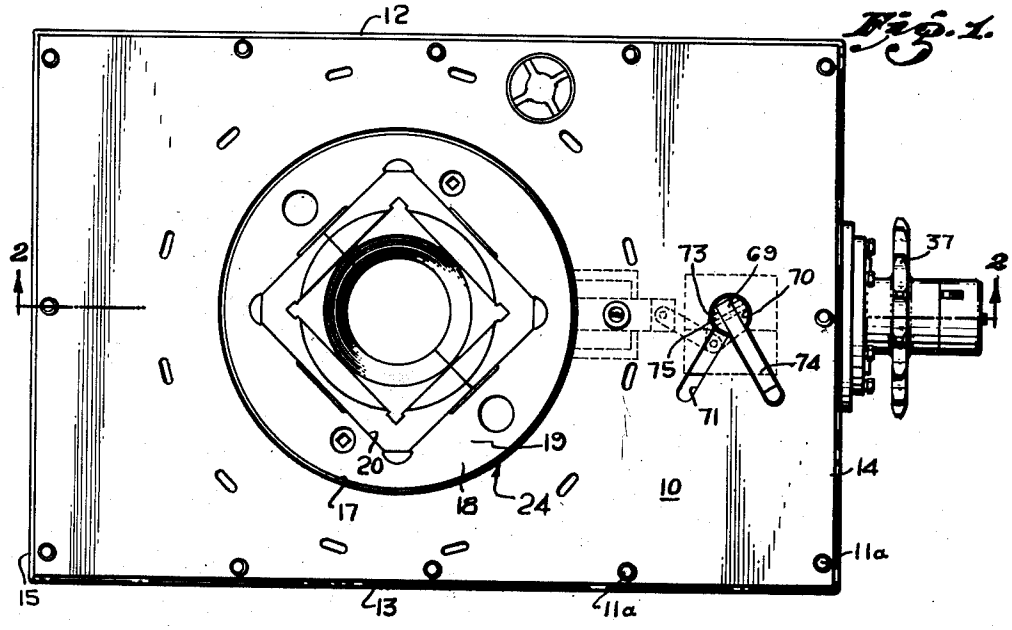
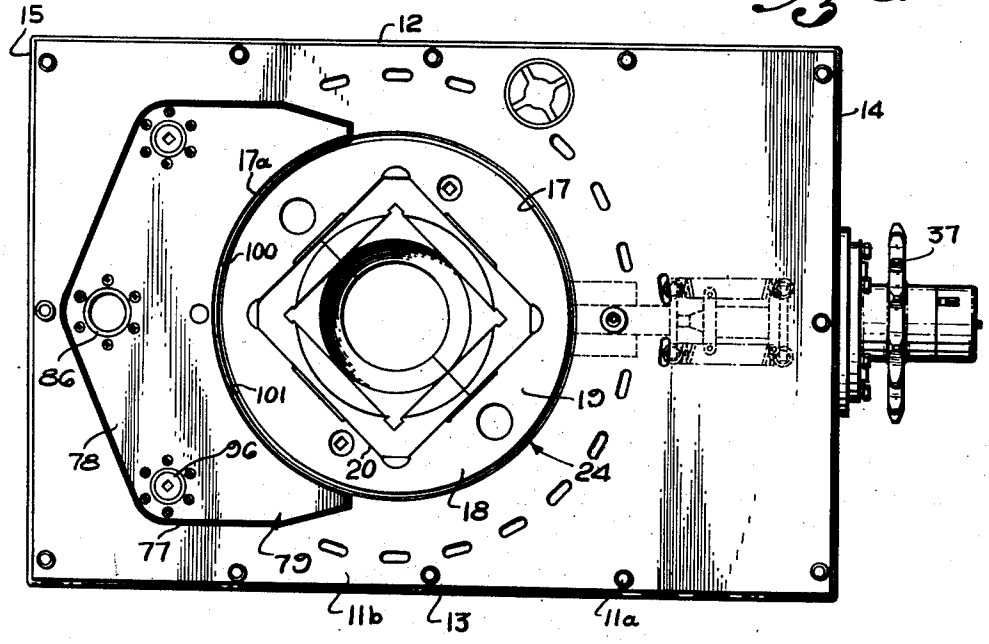


Fig. 3.



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Fig. 2.

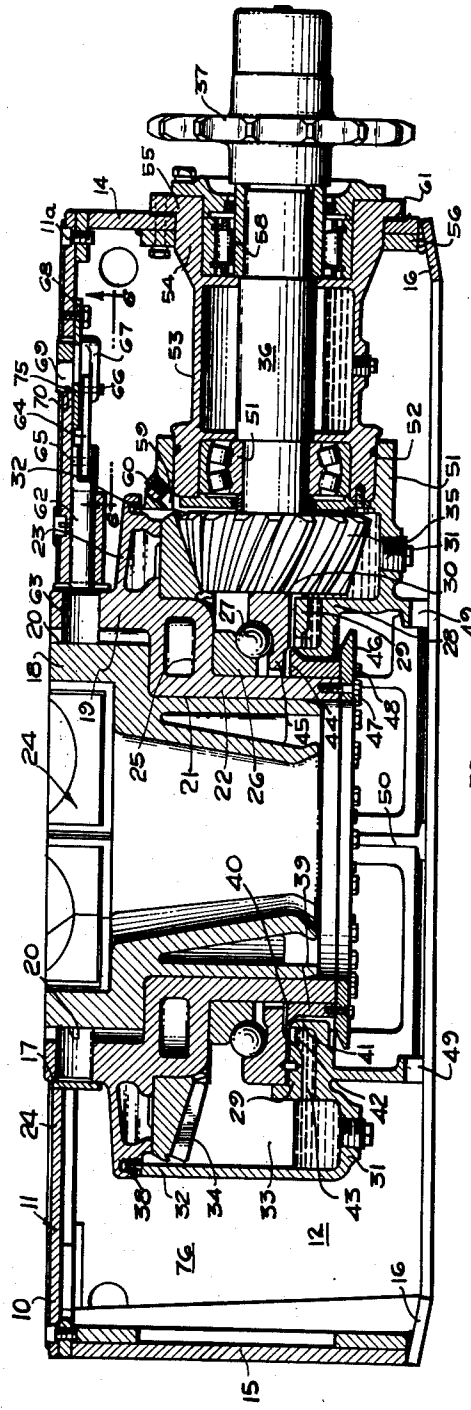
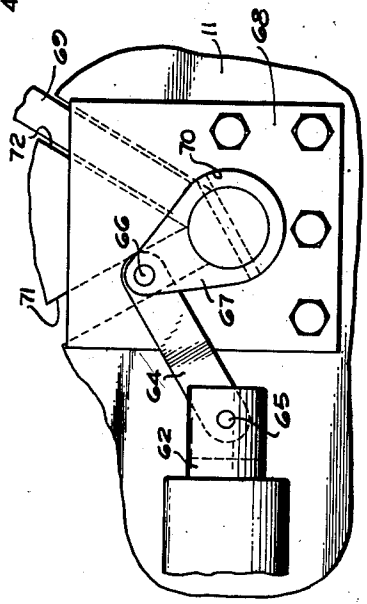


Fig. 6.



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ROTARY MACHINE WITH SLIP OPERATING MECHANISM

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Fig. 4.

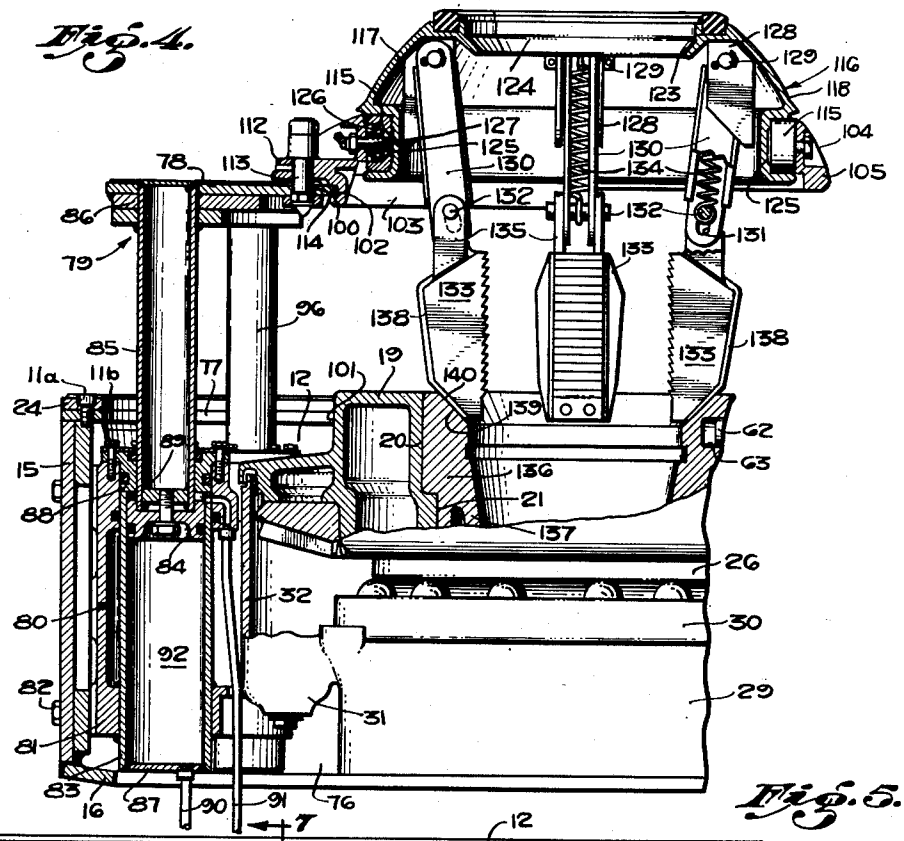
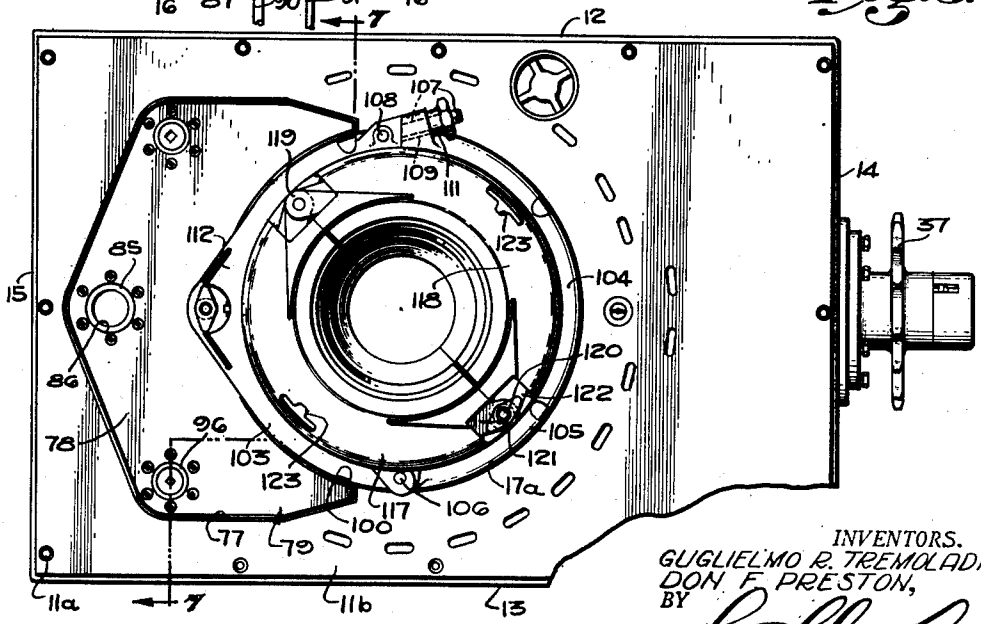


Fig. 5.



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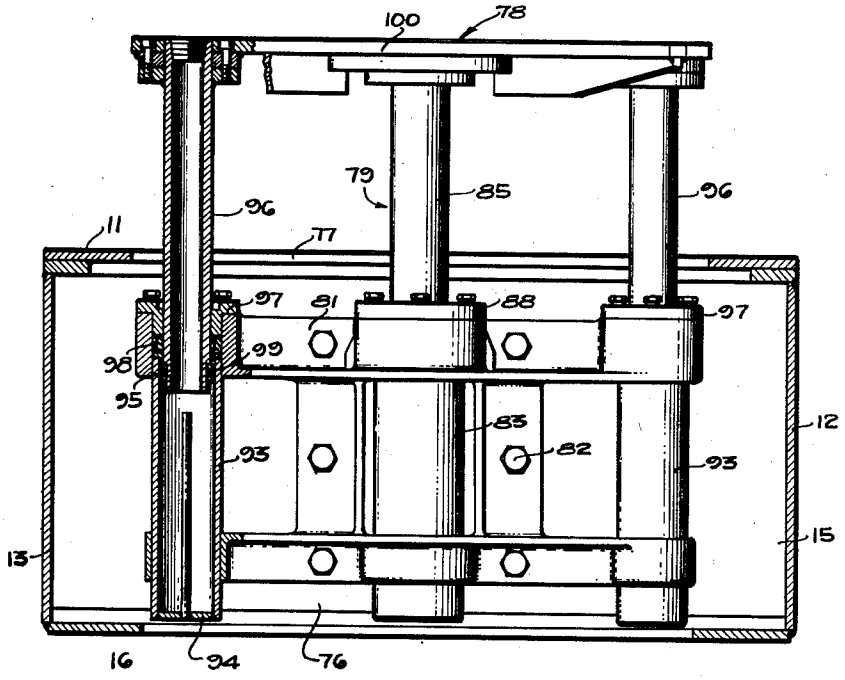
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ROTARY MACHINE WITH SLIP OPERATING MECHANISM

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Fig. 7.



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United States Patent Office 2,698,734 Patented Jan. 4, 1955

2,698,734

ROTARY MACHINE WITH SLIP OPERATING MECHANISM

Guglielmo R. Tremolada and Don F. Preston, Los Angeles, Calif., assignors to Emsco Manufacturing Company, a corporation of California

Application Feburary 6, 1951, Serial No. 209,670

11 Claims. (Cl. 255—23)

Our invention relates to well drilling and servicing equipment and relates in particular to a rotary machine and pipe gripping means in association with the rotary machine.

For the supporting of a pipe in suspension in a well, which is necessary during the running in or breaking out of drill pipe or tubing, wedges or slips are employed which are arranged around the pipe in a tapered opening in the rotary table or spider, the weight of the suspended pipe acting downwardly on the slips so that they are firmly seated in the tapered opening customarily provided by a bushing supported by the rotary table. It is an object of the present invention to provide a means carried by the housing of the rotary machine or applying power to place and remove the slips from gripping position around a pipe which is extended through the opening of the rotary table or spider.

It is an object of the invention to reduce hazards by removing objects from the derrick floor. The old practice of using slips was to supply the slips with handles so that they could be lifted from the tapered bushing of the rotary table and laid to one side upon the derrick floor. Our present invention takes these slips from a hazardous disposition on the derrick floor and supports them above or in the tapered bushing of the rotary table by use of a mechanism which is carried by the rotary machine and is therefore not another object arranged upon the derrick floor near the rotary machine.

A further object of the invention is to provide a rotary machine having slip operating mechanism a feature of which is the conservation of space. In the simple form of the invention disclosed in this application, the height of the upper face of the slip operating mechanism is at no time greater than 22½ inches above the table top. Accordingly, the slip operating mechanism does not interfere with a good view of the derrick interior by the driller.

It is an object of the invention to provide a rotary machine of simple and durable form which may be readily recessed into the derrick floor so as to substantially eliminate hazards resulting from projections and improper fitting of flooring around curved surfaces presented by rotary machines. The present invention comprehends a rotary machine which is flat on top and in its simplest form is rectangular, avoiding intricate designs or outlines to which the adjacent edges of the derrick floor must be adapted in order to avoid openings.

A further object of the invention is to provide a rotary machine having power operated slip operating means, which may be controlled by the driller from his position at one side of the draw works, this power operated means being disposed within the housing of the rotary machine adjacent the rotary table.

A further object of the invention is to provide a rotary machine having power means for the operation of pipe gripping means, equipped with a member which is moved from a retracted position within the housing to an external position wherein it transmits force and movement to the pipe gripping means.

A further object of the invention is to provide a rotary machine having in its housing adjacent the rotary table, a power mechanism with a movable member adapted to be raised and lowered and means arranged to be removably connected to this removable member, such means having parts for engagement of the pipe which is to be gripped.

A further object of the invention is to provide a rotary machine having a housing including a wall portion upwardly movable by power means within the housing, this upwardly moving wall being adapted for connection to one of the movable members of the pipe gripping means.

A further object of the invention is to provide a rotary machine having at one side of the rotary table, a vertical movable part arranged to be connected to one side of a ring element which in turn supports an annular body from which slips are suspended in positions for entry into the tapered bushing of the rotary table, and it is a further object of the invention to make the annular body rotatable in the supporting ring so that this annular body may rotate with the pipe when the slips are engaged with the pipe.

It is an object of the invention to provide a rotary machine which may be readily converted into a rotary machine having means for automatic operation of slips, this rotary machine having a housing arranged with an upper removable wall which conceals a chamber adapted to receive power means for a slip operating mechanism.

A further object of the invention is to provide a slip operating mechanism having an annular body arranged to support the links in raised position and spaced outwardly from the surface of the pipe which is to be gripped, there being means for rapidly moving the slips radially inwardly into engagement with the surface of the pipe as the slips are lowered.

A further object of the invention is to provide a supporting member and links depending therefrom so as to support slips in a position surrounding the pipe which is to be gripped, there being means for permitting relative vertical movement of the slips after they have been brought into engagement with the pipe, thereby enabling an equalized gripping effect of all of the slips with the pipe.

A further object of the invention is to provide a slip operating mechanism having power means and a complete chain of transmitting members from the power means to the slips whereby the slips are forced downwardly around a pipe in such a manner that centralization of the pipe in the tapered opening of the table or bushing is effected.

A further object of the invention is to provide a rotary machine of simplified construction having simplified means for adjustment of the drive pinion with relation to the cable gear and an arrangement of parts enabling visual checking of the operative relation of the pinion and gear, and it is a further object to provide in this rotary machine a simple hold down means for the rotary table.

Further objects and advantages of the invention will be brought out in the following part of the specification wherein we have described a preferred embodiment of the invention in detail for the purpose of completeness of disclosure, but without limitation of the invention defined in the appended claims.

Referring to the drawings which are for illustrative purpose only:

Fig. 1 is a plan view of our rotary machine without the slip operating mechanism which forms a part of the invention;

Fig. 2 is a section taken as indicated by the line **2—2** of Fig. 1;

Fig. 3 is a plan view showing the rotary machine equipped with arcuate lifting yoke at side of rotary table of the machine;

Fig. 4 is an enlarged fragmentary sectional view corresponding to the leftward portion of Fig. 2, but showing the slip operating mechanism and slips of the invention;

Fig. 5 is a plan view corresponding to Fig. 4;

Fig. 6 is a fragmentary view taken from the position of the line **6—6** of Fig. 2; and

Fig. 7 is a transverse sectional view taken substantially as indicated by line **7—7** of Fig. 5.

The rotary machine shown in Figs. 1 and 2 has a housing **10** with a flat top plate **11**, side walls **12**, **13**, **14** and **15**, and inwardly turned flanges **16** at the lower edges of the side walls. The top wall or plate **11** comprises an upper part of the housing **10** which is removable from the remainder or lower part of the housing **10** consisting of the side walls **12—15** and the inwardly turned flanges **16**. The top wall **11** has a circular opening **17** in which the upper part **18** of a rotary table **19** operates.

The rotary table **19** has a recess **20** which is square,

as viewed from above in Fig. 1, this square recess 20 merging with a cylindric opening 21 defined by a cylindrical wall or skirt 22. The rotary table includes a circular flange 23 which projects outwardly under the circular lip 24 of the top plate 11 defining the opening 17. Around the upper portion of the cylindric wall 22, Fig. 2, there is a radial wall 25 forming a shoulder to engage the upper face of the upper race ring 26 of the table bearing 27.

Within the housing 10 there is a support 28 for the rotary table 19, this support having an annular wall 29 to receive the lower race 30 of the table bearing 27. The support 28 includes walls 31 and 32 defining an oil chamber 33, the upper portion of which chamber houses that portion of the rotary table 19 which supports a ring gear 34 through which the rotary table is driven by pinion gear 35 mounted on the inner end of a shaft 36 so that it may be rotated by power delivered to the outer end of the shaft 36 through a sprocket 37 arranged to be rotated by a chain, not shown. The wall 32 is cylindrical and its upper edge lies inwardly of an overlapping skirt 38 which projects downwardly from the periphery of the circular flange 23.

A simple hold-down means for the rotary table 19 is provided. This hold-down means comprises a ring 39 which fits around the lower portion of the cylindric wall 22. Around the upper portion of the ring 39 there is a flange 40 which projects over the inner annular portion 41 of the supporting wall 29. The flange 40 is of such radial dimension that the peripheral portion thereof projects over an annular oil channel 42 formed in the upper face of the annular bearing supporting wall 29. This annular oil channel 42 communicates with the surrounding oil chamber 33 through a number of radial oil ducts 43. The upper face 44 of the ring 39 overlaps a downwardly presented base 45 of the lower bearing race 30. In the operation of the rotary machine, the pinion 35 picks up oil from the oil chamber 33 and transfers it to the ring gear 34 from which oil drips down into the bearing 27. Some of this oil passes between the upper and lower races 26 and 30 and flows downwardly on to the upper face of the ring 39, by which it is deflected into the oil channel 42 so that it may return to the oil chamber 33 through the radial ducts 43. A flange 46 is secured to the lower face of the cylindric wall 22 of the rotary table 19 by bolts 47. The lower portion of the ring 39 is secured to a portion of the upper face of the flange 46 by bolts 48. The flange 46 is of such external diameter that it projects outwardly under a portion of the supporting wall 29, and therefore this flange cannot be moved upwardly more than a short distance afforded by the play between the parts 46 and 29. The annular supporting wall 29 is connected to the housing through supporting members 49 and 50.

On that portion of the cylindrical wall 32 supporting structure 28 for the rotary table which faces the side wall 14 of the housing, there is a horizontally directed boss 51 having a bore 52 to receive the leftward end of a tubular bearing support 53 which at its rightward end has a cylindric wall 54 and a flange 55, the cylindric wall 54 fitting into an opening 56 in the wall 14, aligned with the opening 52 of the boss 51. The shaft 36 is supported within the member 53 by bearings 57 and 58. In the upper portion of the boss 51, or at the juncture of the boss 51 with the cylindrical wall 32 there is an opening 59 arranged to be closed by a plug 60. When the top plate 11 is removed from the remainder of the housing 10, and the plug 60 is removed from the opening 59, the adjustment of the upper teeth of the pinion gear 35 with relation to the engaged teeth of the ring gear 34 may be observed so that it may be determined whether the pinion gear 35 should be shifted axially, which may be accomplished by changing the thickness of the shim 61 which is disposed between the flange 55 of the tubular bearing support 53 and the contiguous portion of the wall 14.

A locking pin 62, Figs. 1, 2 and 6, is supported on the lower face of the upper plate 11 in a position radially of the upper portion 18 of the rotary table 19 so that this pin 62 may be projected into openings or notches 63 in the rotary table 19. The pin 62 is adapted to be shifted into or out of engagement with the rotary table 19 by a link 64 which is connected by pin 65 to the rearward end of the locking pin 62 and to a crank pin 66 carried by a rotatable body 67 which is held by a plate 68 secured to the lower face of the plate 11, and which has a cylindric portion 69 which projects upwardly into an opening 70 in the plate 11. As shown in Figs. 1 and 6, channels 71 and 72 extend radially from the opening 70, and the cylindrical portion 69 has a transverse slot 73 to receive a portion of a handle member 74 which is swingable on a pin 75 carried by the cylindrical portion 69. When the handle 74 is in the recess or channel 72, the locking pin 62 is retracted. It may be projected into an opening 63 in the rotary table by lifting the handle 74 from the channel 72 and swinging it in clockwise direction to the channel or recess 71, thereby rotating the body 67 and carrying the crank pin 66 through an arc of movement to transmit movement through the link 64 to the locking pin 62.

The leftward portion of the housing 10 is of such size as to provide a space or chamber 76 therein adjacent leftward portion of the rotary table 19, Fig. 2. This chamber 76 is closed by a portion of the top plate or wall 11. When it is desired to install our slip operating mechanism in the rotary table, the plate 11 is removed, thereby providing access to the chamber 76. As shown in Figs. 3, 4 and 5, the plate 11 is subsequently replaced by a plate 11*b* which is secured to the upper edges of the wall 12—15 by the same screws 11*a* formerly employed to secure the plate 11. This plate 11*b* has therein an opening 77 to accommodate the yoke portion 78 of a lifting member 79. Power means 80 are installed in the chamber 76, this power means comprising a casting 81 arranged to be secured to the wall 15 of the housing by bolts such as indicated at 82. The casting 81 has, substantially in the center thereof a vertically disposed air cylinder 83 which receives a double acting piston 84 from which a hollow piston rod 85 extends, to form a part of the lifting member 79. As shown in Figs. 4 and 5, the upper end of the hollow piston rod 85 is secured in an opening 86 in the yoke 78 which comprises a horizontal wall which fits into the opening 77 when the lifting means is lowered to its fullest extent, and its upper surface is continuous with the surface of the plate 11*b*. Accordingly, the yoke 78, when the slip operating mechanism is not in use, forms a part of the top wall of the housing 10.

The lower end of the cylinder 83 is closed by a wall 87, and at the upper end of the cylinder 83 there is a guide bushing 88 for the piston rod 85 and which guide bushing 88 defines an air chamber 89 above the piston 84. Air connections 90 and 91 are made respectively with an air chamber 92 below the piston 84 and the chamber 89 so that air pressure may be employed to supply power in the chamber 92 to lift the member 78, and pressure air may be applied to the air chamber 89 above the piston 84 to supply power to forcibly move the lifting member 78 downwardly, for a purpose which will be later described. The casting 81, shown in Fig. 7, supports guide cylinders 93 on opposite sides of the air cylinder 83. These guide cylinders 93 are closed at the lower ends by walls 94 and are arranged to receive enlargements 95 which are secured upon the lower ends of hollow guide rods 96. Bushings 97 are secured in the casting 81 above the upper ends of the cylinders 93, these bushings 97 making guiding engagement with the piston rods 96. Sealing means 98 are installed at the lower ends of the bushings 97. The enlargements 95 have therein channels 99 through which oil, contained in the cylinders 93 may pass, this flow of oil controlling rate of travel of the lifting member 78.

The guide means represented by the rods 85 and 96 are arranged in an arc around the center of the table 19 as will be perceived in Fig. 5 to improve the guiding effect of these parts.

The yoke 78 has an edge 100 which is curved to correspond to the peripheral surface 101 of the rotary table 19. This curved edge 100, therefore, cooperates in the forming of the opening 17*a* of the housing of the rotary machine in which opening 17*a* the upper portion of the rotary table 19 is exposed. At least a portion of the edge 100 of the yoke 78 is adapted for engagement with an arcuate groove 102 in the semi-circular part 103 which cooperates with a semi-circular part 104 in forming a ring member 105. At one side the semi-circular part 103 and 104 are connected by hinge 106 and at the other side these parts 103 and 104 are releasably connected by a screw and nut means comprising a screw 107 connected by a pin 108 to the part 103, so that the screw may swing in to a slot 109 formed between lugs 110 on the portion of the ring member 104 adjacent thereto. A nut 111

which is threaded on the screw **107** may be tightened against the lugs **110** thereby tightly closing the ring **105**. As shown in Figs. 4 and 5 the semi-circular member **103** has a wall portion **112** which projects over a portion of the yoke **78** adjacent the curved edge **100** thereof. This projecting portion **112** of the member **103** supports a pin **113** adapted to be extended down to a opening **114** in the yoke adjacent the edge **100**, this pin **113** preventing lateral movement of the semi-circular part **103** so that the channel **102** thereof cannot become disengaged from the edge **100** of the yoke **78**. The yoke **78** and the part **103** of the ring **105** are arranged so that they are brought into engagement by horizontal movement of the ring **105**. When this engagement between the parts **100** and **103** is made, the part **103** cannot be moved vertically due to the inner-engagement, and after the pin **113** is lowered into the opening **114** lateral movement of the ring part **103** relative to the yoke **78** is prevented, thereby locking the yoke **78** and part **103** rigidly together. The ring **105** is arranged through the use of rollers **115**, to support an annular body **116** which is of hollow construction and is composed of semi-circular parts **117** and **118** connected at one side by the hinge **119** so that they may be swung apart. Oppositely from the hinge **119** the parts **117** and **118** are connected firmly together by a removable pin **120** which passes through openings in overlapping parts **121** and **122**. The semi-circular parts **117** and **118** have openings **123** therein adapted to be engaged by hooks so that the annular body **116** or the assembly comprising the annular body **116** and the ring **105** with slips suspended from the annular body **116** may be lifted by hoist means of the derrick.

As shown in Fig. 4, the annular body **116** has the general shape of a dome with an inner lip **123** defining an opening **124** through which a pipe may pass. Around the lower portions thereof the semi-circular members **117** and **118** have arcuate channel parts **125** which receive the rollers **115** when the parts **117** and **118** are closed together as shown in Fig. 5 and the parts **103** and **104** or the ring **105** are closed therearound. The rollers **115** are supported by ball bearings **126** on the inner ends of the pins **127** which are spaced around the ring **105**.

Within the annular body or dome **116** plates **128** support pins **129** from which links **130** are suspended. At their lower ends the links have short longitudinal slots **131** which receive pins **132** by which slips **133** are connected to the lower ends of the links **130**. Springs **134**, arranged within the links **130** are connected to the central portions of the pins **132** and act in tension to hold the pins **132** in the upper ends of the slots **131**. The slips **133** have upwardly projecting ears **135** which engage the pins **132**.

In Fig. 4, we show within the opening **21** of the rotary table **19** a bushing **136** having a tapered wall **137** which converges downwardly and is adapted to receive the outer faces **138** of the slips **133**. Superimposed above the tapered wall **137** there is a tapered wall **139**, this superimposed wall **139** diverging upwardly and outwardly at an angle considerably greater than the angle of the wall **137**. Each of the slips **133** has at its lower end a sloping face **140** to cooperate with the superimposed wall **139** to produce a rapid inward movement of the slips **133** when the dome **116** is lowered from the position in which it is shown in Fig. 4. The angle of the wall or face **139** is substantially 45° from the axis of the tapered seat or wall **137**. The slips **133** are in relatively widely separated positions when they are raised and the lower portions thereof engage the space **139**. Accordingly, a pipe may be moved through the opening **124** of the annular body **116** and through the opening of the bushing **136** without interference by the slips **133**. During the first part of the downward movement of the annular body **116**, the superimposed flaring surface **139** will cause the slips **133** to move rapidly inwardly; whereupon, further downward movement of the annular body **116** will carry them into the tapered seat defined by the wall **137**.

Air pressure applied to the chamber **89** above the piston **84** will move the dome **116** downwardly with such force that as the slips **133** move downwardly within the tapered seat **137** of the table bushing **136**, a positive centralizing action of the slips on the pipe will be effected. At the time the slips are lowered down around the pipe, as described in the foregoing, the pipe is ordinarily suspended by an elevator which is then lowered so that the weight of the pipe is transferred to the slip. Due to unevenness in the surface of the pipe engaged by the slips, one or two of the slips **133** may settle in the table bushing seat **137** to a greater extent than the remaining slip or slips. This difference in vertical movement of the slips is permitted by the play afforded by the slots **131** in the lower ends of the links **130**.

After completion of the operation requiring use of the slips **133**, the pin **113** may be lifted, making it possible, by rightward lateral movement, to disengage the ring member **105** from the yoke **78**. If the top end of the pipe projecting upward through the rotary table is free, the assembly consisting of the slips **133**, the dome **116** and the ring **105** may be lifted off over the upper end of the pipe. If the pipe is not free, that is to say, if it has an elevator or other device connected to its upper end, the ring **105** may be opened, by swinging the part **104** outwardly on the hinge **106**, whereupon the dome **116** may be disengaged from the open ring **105** and itself opened by disengagement of the pin **120** so as to permit the parts **117** and **118** to be swung apart on the hinge **119**. These opened members **105** and **116** may be readily removed from around the pipe. Air pressure, applied to the space **89** above the piston **84** may be then employed to move the lifting means **79** down into fully retracted position relatively to the housing of the rotary machine, with the upper surface of the yoke **78** flush with the upper surface of the plate **11***b*. Setting up of the slip operating mechanism for use is accomplished by raising the yoke **78** by application of air pressure to the chamber **92**, after which the parts **116** and **105** are placed in operative position by reversal of the process just described with relation to removal of the slips **133** and the parts **105** and **116**.

We claim:

1. In a rotary machine: a housing having an opening leading downward from the top thereof; a rotary table in said housing having at least a portion thereof in said opening; means operative to drive said table; lifting means in said housing, said lifting means having a lifting member arranged to move upwardly and downwardly, said lifting member having a horizontal wall portion at its upper end which lies at one side of the upper face of said rotary table when said lifting means is in lowered position; pipe gripping means having parts arranged to grip a pipe in response to vertical movement of said gripping means; and means connecting said lifting member and said pipe gripping means so that movement of said lifting member will be transmitted to said pipe gripping means.

2. In a rotary machine: a housing having an opening in the top wall thereof; a rotary table in said housing having a portion thereof in said opening; means operative to drive said table; lifting means in said housing, said lifting means having a lifting member arranged to move upwardly and downwardly through a side portion of said opening adjacent said rotary table, said lifting member having a horizontally disposed wall portion thereon arranged to close said opening adjacent said rotary table when said lifting member is in lowered position; pipe gripping means including slip means arranged with relation to said rotary table to grip a pipe which extends through the table upon being lowered and releasing the pipe upon being raised; and means releasably connecting said lifting member and said pipe gripping means so that movement of said lifting member will be transmitted to said pipe gripping means.

3. In a rotary machine: a housing having an opening in the top wall thereof; a rotary table in said housing having at least a portion thereof in said opening; means operative to drive said table; lifting means in said housing adjacent said rotary table, said lifting means having a lifting member arranged so that a portion thereof will move upwardly and downwardly above the top of said housing, said lifting member having a horizontally disposed wall positioned adjacent the outer edge of said rotary table when said lifting member is in lowered position and forming a floor surface adjacent the top surface of said rotary table; pipe gripping means including slip means arranged with relation to said rotary table to grip a pipe which extends through the table upon being lowered and releasing the pipe upon being raised; and means releasably connecting said lifting member and said portion of said pipe gripping means so that movement of said lifting member will be transmitted to said pipe gripping means.

4. In a rotary machine: a housing having an opening in the top wall thereof; a rotary table in said housing having at least a portion thereof in said opening; means

operative to drive said table; lifting means in said housing adjacent said rotary table, said lifting means having a lifting member arranged to be raised and lowered, said lifting member having an upper portion which lies contiguous to the top of said housing when said lifting member is lowered and is elevated above said top of said housing when said lifting member is raised and said upper portion having a curved inner edge which lies adjacent the periphery of said rotary table when said lifting member is in lowered position; pipe gripping means including slip means arranged with relation to said rotary table to grip a pipe which extends through the table upon being lowered and releasing the pipe upon being raised; and means releasably connecting said lifting member and said portion of said pipe gripping means so that movement of said lifting member will be transmitted to said pipe gripping means.

5. In a rotary machine: a housing having an opening in the top wall thereof; a rotary table in said housing having at least a portion thereof in said opening; means operative to drive said table; lifting means in said housing, said lifting means having a lifting member arranged to be raised and lowered, said lifting member having an upper portion which lies contiguous to the top of said housing when said lifting member is lowered and is elevated above said top of said housing when said lifting member is raised; said upper portion having an arcuate edge adjacent to the periphery of said rotary table; pipe gripping means including slip means arranged with relation to said rotary table to grip a pipe which extends through the table upon being lowered and releasing the pipe upon being raised; and means releasably connecting said lifting member and said portion of said pipe gripping means, said connecting means including a part having an arcuate portion to engage said edge of said upper portion of said lifting member and releasable means for preventing disengagement of said arcuate portion of said connecting means and said upper portion of said lifting member.

6. In a rotary machine: a base; a rotary table carried by said base; means operative to drive said table; lifting means supported by said base having a lifting member arranged to be raised and lowered, the upper portion of said lifting member comprising an arcuate edge disposed contiguous to one side of said rotary table when said lifting member is in lowered position; pipe gripping means including slip means arranged with relation to the table to grip a pipe which extends through the table upon being lowered and to release said pipe upon being raised; and connecting means for connecting said lifting member and said pipe gripping means comprising a ring member arranged so that one side thereof will engage said arcuate edge of said upper portion of said lifting member, said connecting means including means to hold said ring member in engagement with said lifting member.

7. In a rotary machine: a base; a rotary table carried by said base; means operative to drive said table; lifting means supported by said base having a lifting member arranged to be raised and lowered, the upper portion of said lifting member comprising a floor member positioned contiguous to the rotary table when said lifting member is in lowered position and having engagement means; pipe gripping means including slip means arranged with relation to the table to grip a pipe which extends through the table upon being lowered and to release said pipe upon being raised; and connecting means for connecting said lifting member and said pipe gripping means comprising engagement means at one side of said pipe gripping means to engage said engagement means of said lifting member and releasable means for preventing disengagement of said engagement means, there being means to prevent disengagement of said engagement means.

8. In a rotary machine: a base; a rotary table carried by said base having an opening through which pipe may pass and adapted to receive slips; means operative to drive said table; lifting means supported by said base having a lifting member arranged to be raised and lowered; pipe gripping means comprising an annular body adapted to be disposed above said rotary table and having an outwardly faced annular channel therein, links depending from said body around the axis of the table, and slips connected to said links; a ring having means adapted to run in said channel of said body; and means adapted to connect said ring to said lifting member so that it will raise and lower said body and said slips as a result of the raising and lowering of said lifting member.

9. In a rotary machine for accommodation of slip operating mechanism; a housing having a lower part; a rotary table carried by the lower part of said housing; means supported by the lower part of said housing for driving said rotary table; an upper detachable part for the housing, removal of said upper part leaving an opening adjacent said rotary table; and supporting means for said slip operating mechanism carried by said lower part of said housing laterally of said rotary table, said supporting means being positioned so that it will support said slip operating mechanism in a position to operate in the open space left by removal of said upper part of said housing.

10. In a rotary machine equipped for the operation of pipe gripping means: a rotary table; means for driving said rotary table; a housing having a support for said table and means to support said driving means at a side of said table, said housing providing a chamber at a side of said table; a motor in said chamber; and a member connected to said motor and adapted to be thereby raised, said member having thereon a horizontal wall which moves up and down with said member and is positioned so as to form a floor adjacent said rotary table when said member is in lowered position, and said member being adapted to be connected to said pipe gripping means so that movement of said member will be transmitted to said pipe gripping means.

11. In a rotary machine equipped for the operation of pipe gripping means; a rotary table; means for driving said rotary table; a housing having a support for said table and means to support said driving means at a side of said table, said housing providing at a side of said table a chamber having an opening in its top; a motor in said chamber; a member extending arcuately along one side of said table and being connected to said motor and adapted to be thereby raised, said member being adapted to be connected to said pipe gripping means so that movement of said member will be transmitted to said pipe gripping means; and guides for said member disposed in said chamber on opposite sides of said motor and on an arc described around said rotary table, said member being arranged to close said opening when said member is in lowered position.

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