Jan. 12, 1954 R. M. CLAYPOOL ET AL 2,665,888

DEVICE FOR UNSCREWING PIPE

Filed May 10, 1948

3 Sheets-Sheet 1

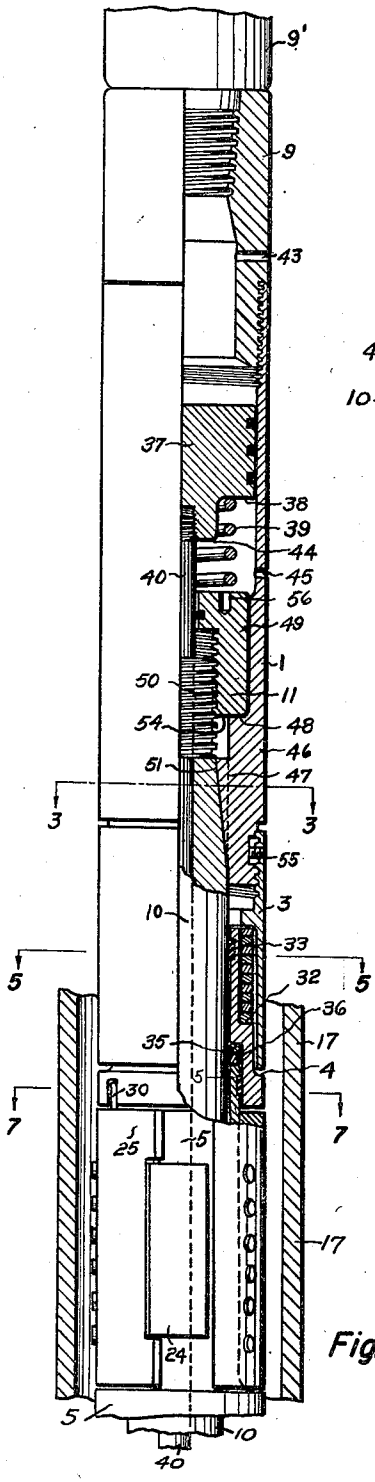


Fig. 1

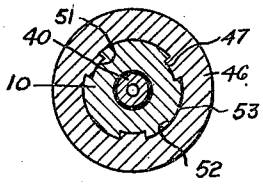


Fig. 3

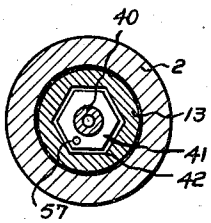


Fig. 4

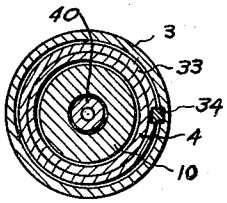


Fig. 5

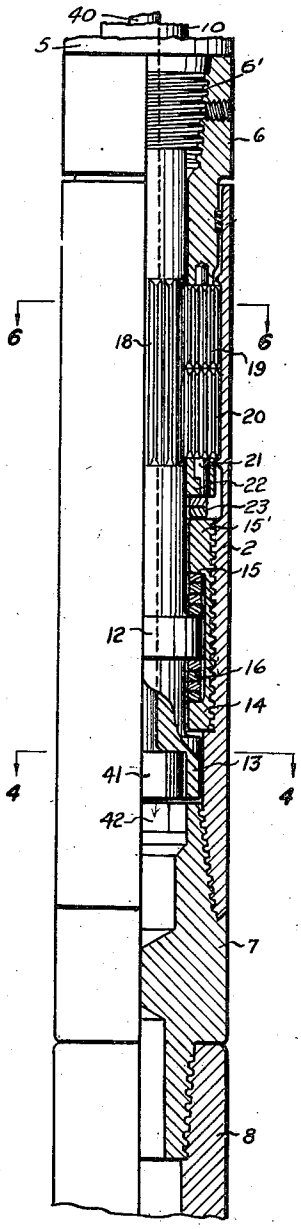


Fig. 2

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3 Sheets-Sheet 2

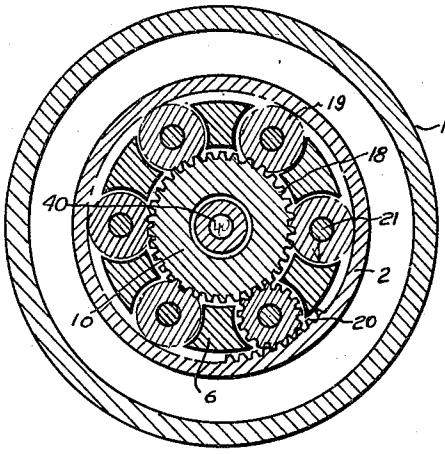


Fig. 6

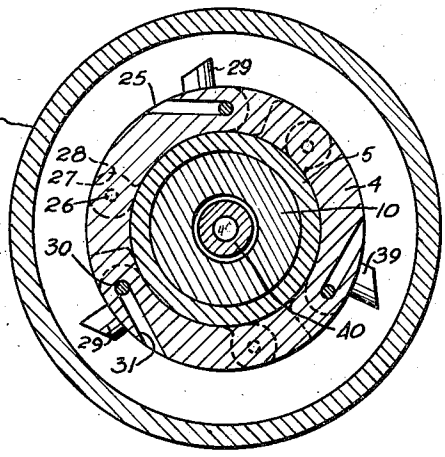


Fig. 7

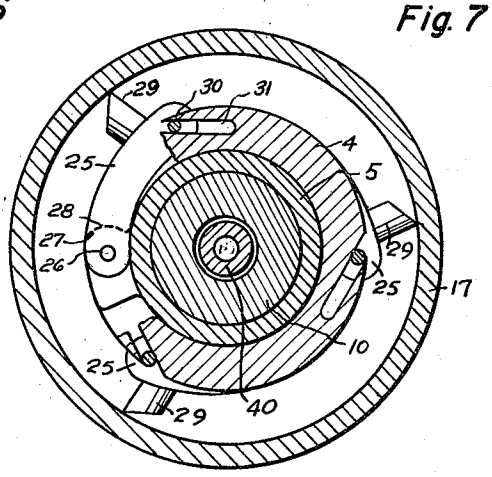


Fig. 8

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DEVICE FOR UNSCREWING PIPE

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Fig. 10

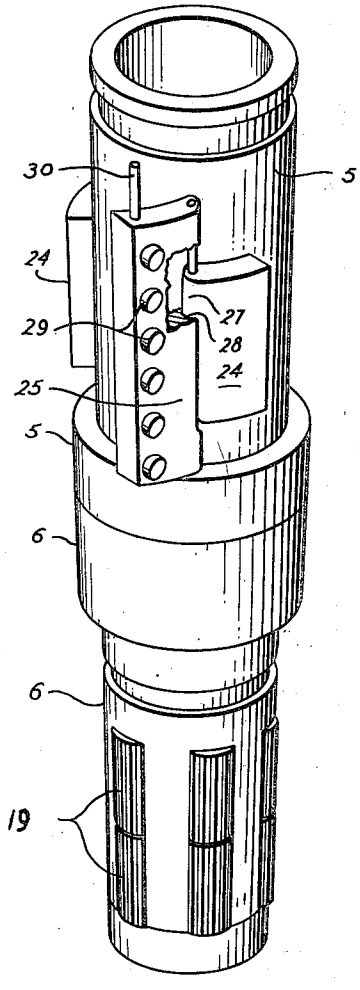
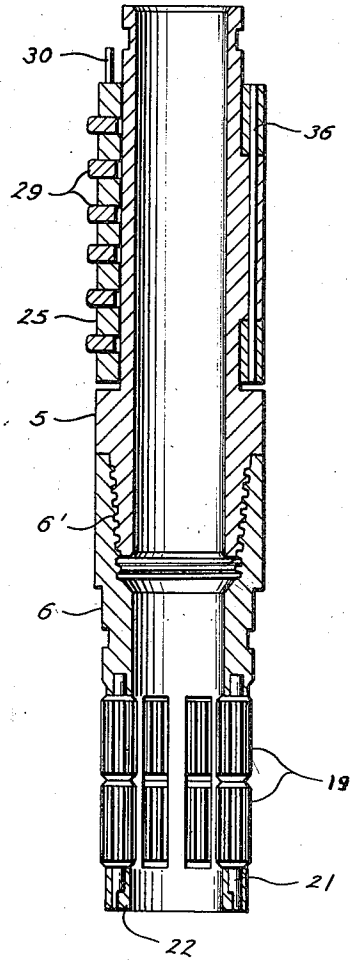


Fig. 9



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DEVICE FOR UNSCREWING PIPE

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Application May 10, 1948, Serial No. 26,094

16 Claims. (Cl. 255—35)

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This invention relates to new and useful improvements in devices for unscrewing pipe joints.

In drilling operations a drill string is used which is normally made up of sections of pipe connected by couplings threaded in a righthand direction. Similarly casing, tubing, liners, drill rods and the like are so connected at adjacent ends.

In the event a string of pipe becomes stuck or lost in a well bore, one of the methods of recovering or removing the same is to unscrew the joints of such pipe, and withdraw them from the well bore, the lost or stuck pipe being commonly known as a "fish." In order to accomplish this purpose without uncoupling the sections of pipe to which the device is connected, it is necessary to provide a turning movement at the lower end of the device opposite to that applied to the pipe to which the device is attached.

An object of this invention is to provide a device of the character described of fewer parts that is stronger, lighter, less expensive to make, easier to assemble, disassemble and repair than similar devices used for a common purpose.

Another object of the invention is to provide a device of the character described having a single set of gears to provide a "back-up" mechanism for the tool and to effect reverse rotation of a portion of the tool. A further object is to provide a novel thrust arrangement to actuate the back-up members of the tool and to eliminate one of the elements of the "back-up" members.

A further feature resides in the provision of a novel locking arrangement so that the tool may be rotated as a unit, readily detached from the stuck or lost pipe if the same cannot be unscrewed and withdrawn from the well bore. A further feature is the provision of a by-pass for drilling fluid to avoid attrition and washing away of parts of the tool which occurs when drill fluid passes through the tool. This by-pass feature provides equalization of the weight of the drill fluid which lessens the danger of blowouts and lessens the possibility of the fishing string of pipe becoming stuck in the well bore. Another feature of the by-pass arrangement is that a dry string of pipe may be pulled out of the hole.

In devices of like character certain connections are subjected to bending or deflecting, compressive, torque and tensile forces and, in order for such connections to be strong and stable, are inherently pre-loaded or pre-stressed when made up. A feature of the invention is the provision of a connection whereby such forces are separated at their point of application and the connection is not pre-loaded or pre-stressed, which results in a strong, stable connection for the desired purpose. Such a connection is peculiarly adaptable to this character of tool wherein all such forces may be taken by a single connection.

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Other and further objects will appear from the following preferred example which shows novel features of operation, construction and arrangement of parts, which is by way of description and not limitation.

Figures 1 and 2 are longitudinal views of the upper and lower parts of the mechanism respectively, partly in section, and show the wing assembly in retracted position.

Figure 3 is a cross-sectional view taken along the line 3—3 of Figure 1, showing the novel connection.

Figure 4 is a cross-sectional view taken along the line 4—4 of Figure 2 and shows the lower portion of the locking arrangement,

Figure 5 is a cross-sectional view taken along the line 5—5 of Figure 1, and shows the clutch arrangement,

Figure 6 is a cross-sectional view taken along the line 6—6 of Figure 2 and shows the gear assembly,

Figures 7 and 8 are taken along the line 7—7 of Figure 1 and show cross-sections of the wing arrangement showing the wings in retracted and expanded positions, respectively,

Fig. 9 is a longitudinal sectional view through the backup or wing assembly and a portion of the planetary gear arrangement, and

Fig. 10 is a perspective view, with parts broken away, of the structure illustrated in Fig. 9.

Referring more particularly to the drawings, the device comprises an upper tubular section 1 and a lower tubular section 2. A tubular coupling 3 is threaded to the lower end of member 1, having a tubular sleeve 4 releasably rotatable in the lower end of the former. A wing or back-up section 5 is connected, as hereinafter described, to the lower end of sleeve 4, the former having a spider 6 threadedly secured at 6' to the lower end thereof and rotatable in the upper end of member 2. A sub 7 is threaded to the lower end of member 2 and a grappling tool of any desired type, the upper connecting portion thereof 8 being shown, may be threaded to the bottom of sub 7. A sub 9 is threaded to the upper end of member 1 by right-hand threads and such sub is connected to the lower end of a string of drill pipe 9' extending to the surface which in turn

is joined together at adjacent ends by threads in a righthand direction.

In order that the planetary gear arrangement might be actuated by the turning of the drill string, a central driving mandrel 10 connected by novel connection, generally indicated as 11 and described in detail later herein, extends downwardly through sections 1 and 2 and has annular flanges 12 and 13 at the lower end thereof. A sleeve 14 is threaded in lower tubular member 2 having bearing surfaces 15 and cooperating bearing rings 16 whereby sections 1 and 2 are rotatably secured by central mandrel 10. For assembly purposes sleeve 14 and bearing rings 16 are longitudinally split. Vertical holes (not shown) are drilled through flange 13 into the lower portion of the sleeve 14 in order that pins (not shown) may be inserted therein to hold the sleeve 14 against rotation as the member 2 is threaded over the latter while in place on the mandrel 10. The pins are then withdrawn, and, if desired, set screws (not shown) may be utilized to prevent untimely unthreading of the sleeve 14 and the member 2.

In order that the planetary gear assembly may operate upon turning of the drill string to provide reverse rotation to the lower part of the device, it is necessary to establish a part of the assembly in fixed relation with respect to the wall of the well 17, for the assembly is normally carried by the drill string and would turn as a unit therewith. For this purpose a central gear 18 is provided on the lower portion of mandrel 10 which meshes with pinion 19 which are rotatably mounted in spider or ring-like member 6 rotatably disposed in the upper end of member 2 and intermediate tubular member 2 and mandrel 10. The central gear 18 may be completely undercut on mandrel 10 thereby giving added strength to the gear inasmuch as approximately 70% of the load is carried by approximately 20% of the upper end of such gear. A rack or internal gear 20 which meshes with pinions 19 is provided in the upper end of member 2. Pinions 19 are rotatably secured to spider 6 by means of shafts 21 and cap 22 which may be bolted to the lower end of spider 6 (not shown). As here shown pinions 19 are in two sections to provide better meshing with gear 18 and rack 20. Bearing rings 23 are disposed between the lower end of cap 22 and the upper shoulder 15' of sleeve 14.

The upper end of spider 6 is threadedly secured to the lower end of wing assembly 5. Longitudinal ribs 24 are provided on wing asesmbly 5 which do not extend the full length of wings or back-up members 25 which are pivotally secured to such ribs by pins 26. Ribs 24 have longitudinal arcuate shoulders 27 to provide stops for cooperating shoulders 28 of wings 25 when wall engaging lugs 29 of the latter frictionally engage the wall or the casing of the well bore 17. At the upper end of wings or dogs 25 pins 30 are disposed to slidably fit in slots 31 of sleeve 4. While in Figure 8, which shows the wings expanded into engagement with the casing 17 diagrammatically, the wings 25 do not appear to be fully expanded, it it obvious in practice that the wings must expand to a point where the wings will be forced into the casing rather than back into the tool. During such expansion, pins 30 must not move out of slots 31.

The upper end of tubular sleeve 4 is of smaller diameter than the lower end thereof and upwardly facing shoulder 32 provides a seat for friction rings 33 which are keyed to coupling 3 by key 34, see Figure 5, and bear against the downwardly facing shoulder of coupling 3. Downwardly facing shoulder 35 of sleeve 4 provides a bearing surface for bearing rings 36 disposed between the upper end of wing assembly 5 and shoulder 35.

When it is desired to disengage the device from the fish a locking device is provided comprising a piston 37 slidable in the upper portion of member 1 having downwardly facing shoulder 38 which provides a stop for spring 39. The spring seats on the upper portion of conection assembly 11 and a rod or tubular mandrel 40 is threaded to the lower end of piston 37 and extends downwardly through the tool ending in a multi-sided or hexagonal nut 41 adapted to be received in cooperating multi-sided or hexagonal box 42 in the upper part of sub 7.

Spring 39 normally holds piston 37 in an uppermost position as indicated in the drawings, but if pump pressure is applied to the drilling fluid, piston 37 will be urged downwardly by the differential pressure caused by the passing of fluid through port 43, locking mandrel 40 will likewise be urged downwardly, and nut 41 will enter box 42 thereby locking the lower section of the tool to the upper section in order that the upper and lower sections will rotate together rather than in opposite directions or will swivel. The tool would then be locked as a single unit against independent rotation of any of its parts with relation to each other. The locking arrangement is so constructed that the bottom face 44 of piston 37 will stop against the upper surface of connection 11 thereby limiting the downward movement of rod 40 and avoiding setting up stresses therein. A port 45 is provided to permit ingress and egress of fluid as piston 37 is actuated.

Connection 11 comprises a novel means of connection whereby compressive, tensile, bending and torque forces are separated at their points of application that is strong and stable without being inherently pre-stressed or pre-loaded.

A cylinder 46 is provided integral with the lower end of tubular member 1 having upwardly and inwardly tapering keys 47 and upwardly facing shoulder 48 upon which tension nut 49 seats. The upper end of driving mandrel 10 is provided with a coarse thread 50 and has upwardly and inwardly tapered keyways 51 below said thread into which keys 47 of cylinder 46 fit. An extended annular area 52 is provided on the periphery of mandrel 10 between keyways 51 and a cooperating area 53 is provided between keys 47 in the inner surface of cylinder 46.

In making up this connection, cylinder 46 is placed over the top of driving mandrel 10 until tapered keys 47 seat firmly in keyways 51 of mandrel 10. Tension nut 49 is then threaded onto the top of driving mandrel 10 until the lower shoulder 54 of such nut seats on upwardly facing shoulder 48 of cylinder 46. Thus, it is seen that the transmission of torque forces is applied through that area formed by the sides of the tapered keys 47 of cylinder 46 and the matching tapered keyways 51 of driving mandrel 10. The transmission of tension forces is applied through the straight threaded portion of the driving mandrel 10 and of the tension nut 49, and the lower face 54 of the tension nut which seats against shoulder 48 of cylinder 46. The area for application of compression forces comprises the bottom of the tapered faces of the keyways 51 and the matching top faces of keys 47. The area for application of bending forces is annular areas 52 and 53 pro-

vided on driving mandrel 10 and in cylinder 46, respectively. It is unnecessary to pre-load or prestress this connection and thus it is apparent that the above four forces are separated at their points of application resulting in a strong, stable connection which is free of freezing, easy to make up and disengage.

In operation the tool is threadedly secured by righthand threads to the lower end of a string of drill pipe 9' and lowered into a well bore until grappling means connected to the bottom of lower sub 7 engages a fish. Obviously a fishing tool or grappling device of any desired configuration may be attached to the lower end of the sub 7. Obviously the lower section of the tool comprising lower sub 7 and lower member 2 will be anchored with respect to the fish. The drill string is then rotated to the right and such rotation is transmitted to the tool through sub 9, upper tubular member 1, cylinder 46, coupling 3 and tubular sleeve 4. As stated heretofore, coupling 3 has the friction springs 33 keyed to it by the key 34 secured to the coupling 3, as best seen in Fig. 5. Thus, sleeve 4 rotates with coupling 3 by frictional contact with the springs 33, a friction clutch, in effect, being provided between coupling 3 and sleeve 4. Such rotation is further transmitted to driving mandrel 10 through connection 11. Thus, inasmuch as body member 2, carrying rack 20, is anchored to the fish (by means of the grappling tool engaging the fish and the connecting sub 7), rotation of the driving mandrel 10 causes the pinions 19 meshing with the gear 18 and the rack 20 to rotate and thereby causes the spider 6, having the pinions 19 rotatably secured therein to rotate in the same direction. It will be seen that in order for the pinions 19 to rotate, either the spider 6, in which the pinions are rotatably connected, must rotate or the body member 2 must rotate because of the meshing of the pinions 19 with the rack 20. The single gearing unit illustrated is a reduction type gearing, and, as the spider 6 rotates, the holding or backup section 5 threaded to the spider 6 will be rotated with the spider. The wings 25 pivoted to the backup section 5 will, of course, rotate with the backup section. As stated heretofore, rotation of the manipulating pipe 9' will be imparted from body member 1 and the coupling 3 threaded thereto through the friction clutch arrangement 33 to the clutch sleeve 4. Thus, both the clutch sleeve 4 and the wing assembly 5 will be rotated in the same direction but at different speeds due to the reduction gearing described above. The dogs or wings rotating with the wing assembly 5 rotate at a lower rate of speed than the tubular clutch sleeve 4, and the pins 30, upstanding from such wings and slideable in the slots 31 disposed in the lower portion of the clutch sleeve 4, will rotate in the same direction as the sleeve 4 but at a slower rate of speed. Thus, the pins 30 will lag behind the sleeve 4 and move backwardly and outwardly in the slots 31 of the sleeve 4 until the wall engaging lugs 29 disposed on the outer surface of the wings 25 frictionally engage the inner surface of the well bore or the casing 17. The arcuate shoulders 27 of the wings 25 engage or are stopped by the co-fitting arcuate shoulders 28 of the wing stop members 24. Thus, the pins 30 upstanding from the wings 25 do not absorb the force applied to the wings in frictionally engaging the inner surface of the casing 17, but absorb only such force necessary to stop the rotation of the friction clutch sleeve 4 when the wings 25 engage and are anchored in their outward movement to the casing 17.

When wings 25 are anchored with respect to the wall of the casing, sleeve 4 of the friction clutch arrangement will likewise remain fixed due to the pins 30 in slots 31 of sleeve 4 fixing the latter against rotation and overcoming the friction of the friction rings 33. The spider 6, threaded to the now anchored wing assembly 5 and the shafts 21 of the pinions 19 rotatably mounted in the spider 6 are similarly anchored or fixed against rotation about the driving gear 18 on the mandrel or driving shaft 10. Inasmuch as the driving mandrel 10 continues to rotate the gear 18 thereon, and the pinions 19 are thereby rotated about their individual shafts 21 by the gear 18 but the shafts 21 are prevented from rotating circumferentially about the gear 18 because the shafts 21 are rotatably mounted in the gear ring 6 and are fixed or anchored with the gear ring 6 threaded to the anchored wing assembly 5, as best seen in Fig. 9. Thus, the lower tubular element 2 having the rack 20 meshing with the pinions 19 must rotate upon continued rotation of the gear 18 on the driving mandrel 10. The rotation of the lower tubular element 2 will be in a direction opposite to that of the driving mandrel 10 or the upper body member 1 and will thereby impart reverse rotation to the grappling tool connected to the sub 7, which sub 7 is threaded to the lower portion of the lower tubular element 2. Thus sections of pipe below this tool are readily uncoupled without uncoupling sections of pipe above the device.

In the event the fish will not uncouple, the wings 25 may be retracted by reversing rotation of the drill pipe 9' and, thereafter pump pressure may be applied to the drilling fluid which will urge piston 37 downwardly until stopped at the point of maximum travel by bottom face 44 of piston 37 seating against the upper surface of connection 11 thereby lowering locking rod 40 so that hex nut 41 will enter hex box 42 thereby locking the tool against independent rotation of its members. Thus the tool is rotated as a unit in a righthand direction and grappling devices may be readily disengaged from the fish and withdrawn from the well bore.

All parts are packed off by suitable packing rings as indicated in the drawings and a set screw 55 may be provided to prevent untimely uncoupling of the device as provided for coupling 3. Further, recesses 56 may be provided in tension nut 49 to aid in assembling or disassembling the device, and similarly, such recess may likewise be provided in piston 37 (not shown). A by-pass 57 is provided in hex nut 41 to prevent a wash action.

While we have described a preferred embodiment of our invention it is obvious that certain changes might be made within the scope of the invention as set forth in the claims. For example, a weight bar or go-devil might be dropped to actuated the locking device in the absence of drilling fluid pressure. It is obvious that other parts, elements or mechanisms which may be used in substantially the same manner to accomplish substantially the same results are encompassed in the scope of the following claims.

We claim:

1. A pipe unscrewing device comprising, anchor means rotatable in one direction, a drive shaft extending through said anchor means, a sleeve member rotatably surrounding said drive shaft, a single set of planetary gears connecting the drive shaft to said sleeve member, said single set of planetary gears including a gear element con-

nected to said anchor means, backup members carried by said anchor means, and means connected between said backup members and said drive shaft for moving the backup members to engage a wall of a well bore and thereby anchor said anchor means and said gear element against rotation for rotating said sleeve member reversely with respect to rotation of said drive shaft.

2. A pipe unscrewing device comprising, an upper anchor member rotatable in one direction, a drive shaft extending through said anchor member, a sleeve member below said anchor member and rotatably surrounding the drive shaft, a single set of planetary gears connecting the drive shaft to said sleeve member, said single set of planetary gears including a gear element connected to said anchor member, backup members carried by said anchor member, and means connected between said backup members and said drive shaft for moving the backup members to engage a wall of a well bore and thereby anchor said member and said gear element against rotation for rotating said sleeve member reversely with respect to rotation of the drive shaft.

3. A pipe unscrewing device comprising, an upper tubular member adapted to be connected to a string of pipe and rotated thereby, an anchor member and a lower sleeve member, a drive shaft connected to and rotated by said upper tubular member and extending through said anchor member, a single set of planetary gears connecting the drive shaft to the lower sleeve member, such single set of planetary gears including a gear element connected to said anchor member, backup members carried by said anchor member, means connected between said drive shaft and said backup members for moving the backup members to engage a wall surrounding the device and thereby anchor said anchor member and said gear element against rotation, rotation of the drive shaft after anchoring said anchor member and said gear element rotating said lower sleeve member reversely of said upper tubular member, and slip clutch means connected between said anchor member and said upper tubular member whereby rotation of said upper tubular member is permitted while said anchor member is anchored.

4. A pipe unscrewing device comprising, an upper anchor member rotatable in one direction, a drive shaft extending through said anchor member, a lower sleeve member rotatably surrounding such drive shaft, a single set of planetary gears connecting the drive shaft to said lower sleeve member, said single set of planetary gears including gear teeth on said drive shaft and on said lower sleeve member, a ring member rotatably disposed between the drive shaft and the lower sleeve member, and gears in the ring member meshing with said gear teeth on said drive shaft and said lower sleeve member to communicate rotation from said drive shaft to said lower sleeve member, said ring member being secured to and rotatable with said upper anchor member, backup members carried by said upper anchor member, means connected between said drive shaft and said backup members for moving the backup members to engage a wall surrounding the device and thereby anchor the upper anchor member and the ring member against rotation for rotating the lower sleeve member reversely with respect to rotation of said drive shaft.

5. A reversing tool comprising, an upper tubular member, an anchor member and a lower sleeve member, a drive shaft connected to and rotated by said upper tubular member and extending through said anchor member, a single set of planetary gears connecting the drive shaft to the lower sleeve member, said single set of planetary gears including gear teeth on the drive shaft and on the lower sleeve member, a ring member rotatably disposed between the drive shaft and the lower sleeve member, and gears in said ring member meshing with the gear teeth on the drive shaft and the lower sleeve member, said ring member being secured to and rotatable with said anchor member, backup members carried by said anchor member, means connected between said drive shaft and said backup members for moving the backup members to engage a wall surrounding the tool and thereby anchoring said anchor member and said ring member against rotation, rotation of said drive shaft after anchoring said anchor member and said ring member rotating said lower sleeve member reversely of said upper tubular member, and slip clutch means connected between said anchor member and said upper tubular member whereby rotation of said upper tubular member is permitted while said anchor member is anchored.

6. A reversing tool comprising, an upper tubular member, an anchor member and a lower sleeve member, a drive shaft connected to and rotated by said upper tubular member and extending through said anchor member, a single set of planetary gears having a gear reduction connecting the drive shaft to the lower sleeve member, said single set of planetary gears including a gear element connected to said anchor member for rotating said anchor member in the same direction as but at a slower rate of speed than said upper tubular member, single wing elements pivoted to said anchor member, slip clutch means connected to said anchor member and in frictional contact with said upper tubular member whereby rotation of said upper tubular member is permitted while said anchor member is anchored, slots in the lower portion of said slip clutch means, and projections on upper ends of said single wing elements slidable in said slots whereby rotation of said anchor member and said slip clutch means in the same direction but at different rates of speed moves said projections along said slots and thereby expands said wings into engagement with a surface surrounding the tool for anchoring said anchor member and said gear element against rotation, rotation of said drive shaft after anchoring said anchor member and said gear element rotating said lower sleeve member reversely of said upper tubular member.

7. In a device for unscrewing pipe in a well bore, an upper tubular member, an anchor member and a lower sleeve member, a drive shaft connected to and rotated by said upper tubular member and extending through said anchor member, a single set of planetary gears having a gear reduction connecting the drive shaft to the lower sleeve member, said single set of planetary gears including a ring member secured to and rotating said anchor member in the same direction as but at a slower rate of speed than the upper tubular member, friction clutch means connected to said anchor member and in frictional contact with said upper tubular member, such friction clutch means including a sleeve having slots, single wing elements pivotally carried by said anchor member, and pins disposed at upper ends of said wing elements slidable in said slots whereby rotation

of said anchor member and sleeve in the same direction but at different rates of speed moves said pins in said slots and thereby expands said single wing elements into engagement with a surface of the well bore thereby anchoring said anchor member and said ring member, rotation of said drive shaft after anchoring said anchor member and said ring member rotating said lower sleeve member reversely of said upper tubular member, said friction clutch means permitting rotation of said upper member when said anchor member is anchored.

8. A reversing tool for unscrewing pipe in a well bore comprising, an upper tubular member, an anchor member and a lower sleeve member, a drive shaft connected to and rotated by said upper tubular member and extending through said anchor member, a single set of planetary gears connecting the drive shaft to the lower sleeve member, said single set of planetary gears including a gear element secured to and rotating said anchor member, backup members carried by said anchor member, means connected between said drive shaft and said backup members for moving the backup members to engage a wall of the well bore and thereby anchoring said anchor member and said gear element against rotation, rotation of said drive shaft after anchoring said anchor member and said gear element rotating said lower sleeve member reversely of said upper tubular member, slip clutch means connected between said anchor member and said upper tubular member whereby rotation of said upper tubular member is permitted while said anchor member is anchored, and locking means adapted to fix said upper tubular member and said lower sleeve member against independent rotation.

9. A pipe unscrewing device adapted to be secured to a string of pipe and lowered into a well bore for unscrewing pipe therein comprising, in combination, an upper tubular member adapted to be connected to said string of pipe and rotated thereby, an intermediate member and a lower sleeve member, a drive shaft connected to and rotated by said upper tubular member and extending downwardly through said intermediate member and into said lower sleeve member, a single set of planetary gears connecting the drive shaft to the lower sleeve member, said single set of planetary gears including a ring member secured to the intermediate member, backup members carried by said intermediate member, means connected between said backup members and said drive shaft for moving the backup members for engaging a wall of the well bore and thereby anchor said intermediate member and said ring member against rotation, rotation of said drive shaft after anchoring said intermediate member and said ring member rotating said lower sleeve member reversely of said upper tubular member, and slip clutch means connected between said intermediate member and said upper tubular member whereby rotation of said upper member is permitted while said intermediate member is anchored.

10. A pipe unscrewing device adapted to be connected to a string of pipe and lowered into a well bore and rotated thereby for unscrewing pipe therein comprising, in combination, an upper tubular member adapted to be connected to said string of pipe and rotated thereby, an intermediate tubular member and a lower tubular member, a drive shaft connected to and rotated by said upper tubular member and extending through said intermediate tubular member and into said lower tubular member, a single set of planetary gears connecting the drive shaft to the lower tubular member, said single set of planetary gears including gear teeth on said drive shaft and on said lower tubular member, a ring-like member rotatably disposed between the drive shaft and the lower tubular member, gears in said ring-like member meshing with said gear teeth on said drive shaft and on said lower tubular member to communicate rotation from said drive shaft to said lower tubular member, said rotatable ring-like member being connected to said intermediate member, backup members carried by said intermediate member, means connected between said backup members and said drive shaft for moving the backup members for engaging a wall of the well bore and thereby anchor said intermediate member and said ring-like member against rotation, rotation of said drive shaft after anchoring said intermediate member and said ring-like member rotating said lower tubular member reversely of said upper tubular member, and slip clutch means connected between said intermediate member and said upper tubular member whereby rotation of said upper tubular member is permitted while said intermediate member is anchored.

11. A pipe unscrewing device adapted to be connected to a string of pipe and lowered into a well bore and rotated to unscrew pipe therein comprising, in combination, an upper tubular member, an intermediate tubular member and a lower tubular member, said upper tubular member adapted to be connected to said string of pipe, a drive shaft connected to and rotated by said upper tubular member and extending downwardly through said intermediate member and into said lower tubular member, a single set of planetary gears having a gear reduction connecting the drive shaft to the lower tubular member, said single set of planetary gears including a ring member secured to and rotating said intermediate member in the same direction as but at a slower rate of speed than the upper tubular member, friction clutch means connected between said intermediate member and said upper tubular member, said friction clutch means including a sleeve disposed between said upper and intermediate members and having slots in its lower portion, single wing elements pivotally carried by said intermediate member, pins disposed at upper ends of said wing elements and slidably disposed in said slots, whereby rotation of said intermediate member and said sleeve in the same direction but at different rates of speed moves said pins in said slots and thereby expands said single wing elements into engagement with a wall of the well bore and thereby anchors said intermediate member and said gear ring against rotation, rotation of said drive shaft after anchoring said intermediate member and said gear ring rotating said lower tubular member reversely of said upper tubular member, said friction clutch means permitting rotation of said upper tubular member when said intermediate member is anchored.

12. The device of claim 11 which includes locking means to fix the upper and lower tubular members against independent rotation.

13. The locking means of claim 12 where the locking means comprises a mandrel extending from the upper tubular member through said intermediate tubular member and into the lower tubular member, a piston chamber in the upper tubular member, a piston fluid inlet means in said piston chamber for actuating said piston,

cofitting locking means on the lower end of said mandrel and in said lower tubular member, and spring means normally holding said cofitting locking means out of engagement but yieldable by fluid pressure against said piston to permit engagement of said cofitting locking means.

14. A pipe unscrewing device comprising, in combination, an upper tubular member, an anchor member and a lower sleeve member, said members being independently rotatable, a drive shaft connected to and rotated by said upper tubular member and extending through said anchor member and into said lower sleeve member, a single set of planetary gears connecting the drive shaft to the lower sleeve member, said single set of planetary gears including a gear element connected to said anchor member, backup members carried by said anchor member means connected between said backup members and said drive shaft for moving the backup members to engage a wall of a well bore and thereby anchor said anchor member and said gear element against rotation, rotation of said drive shaft after anchoring said anchor member and said gear element rotating said lower sleeve member reversely of said upper tubular member.

15. A pipe unscrewing device comprising, anchor means rotatable in one direction, a drive shaft, a sleeve member rotatably surrounding the drive shaft, a single set of planetary gears connecting the drive shaft to said sleeve member, said single set of planetary gears including a gear element connected to said anchor means, backup members carried by said anchor means, and means connected between said backup members and said drive shaft for moving the backup members to engage a wall of a well bore and thereby anchor said anchor means and said gear element against rotation, rotation of the drive shaft after anchoring said anchor member and said gear element rotating said sleeve member reversely with respect to rotation of said drive shaft.

16. A reversing tool for unscrewing pipe in a well bore comprising, an upper tubular member, an anchor member and a lower sleeve member, a drive shaft connected to and rotated by said upper tubular member and extending through said anchor member, a single set of planetary gears

connecting the drive shaft to the lower sleeve member, said single set of planetary gears including a gear element secured to and rotatable with said anchor member, backup members carried by said anchor member, means connected between said drive shaft and said backup members for moving the backup members to engage a wall of the well bore and thereby anchor said anchor member and said gear element against rotation, rotation of said drive shaft after anchoring said anchor member rotating said sleeve member reversely of said upper tubular member, slip-clutch means connected between said anchor member and said upper tubular member whereby rotation of said upper tubular member is permitted while said anchor member is anchored, and locking means adapted to fix said upper tubular member and said lower sleeve member against independent rotation, such locking means comprising a mandrel extending from the upper tubular member, through said anchor member and into the lower sleeve member, a piston chamber in the upper tubular member, a piston at the upper end of the mandrel slidably disposed in the piston chamber, fluid inlet means in said piston chamber for admitting fluid for actuating said piston, cofitting locking means on the lower end of said mandrel and said lower sleeve member, and spring means normally holding said cofitting locking means out of engagement but yieldable by fluid pressure against said piston to permit engagement of said cofitting locking means.

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