Aug. 1, 1933. F. J. YOUNG ET AL 1,920,617

DOOR TYPE SLIP ELEVATOR

Filed June 30, 1931 3 Sheets-Sheet 1

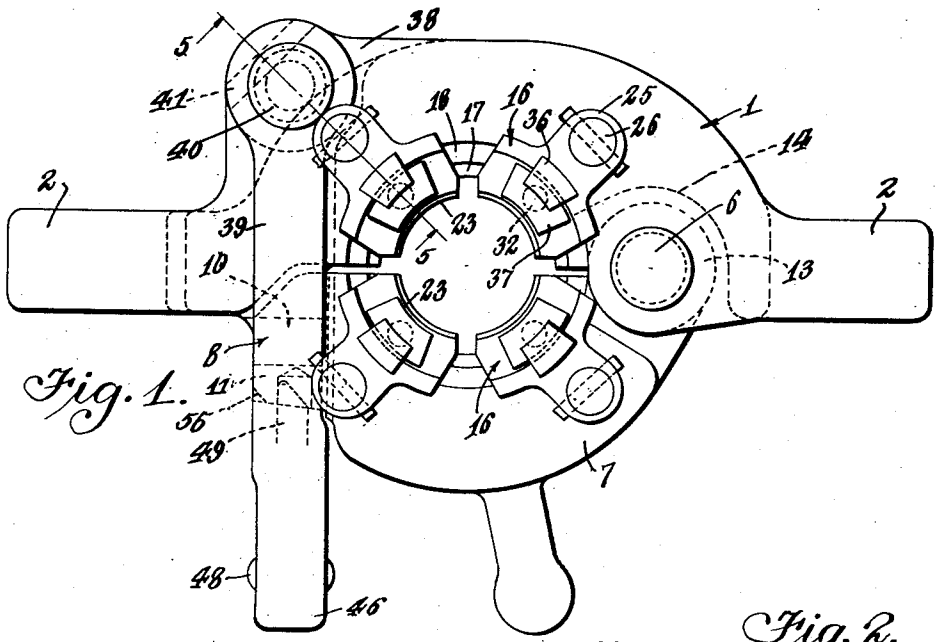

Fig. 1.

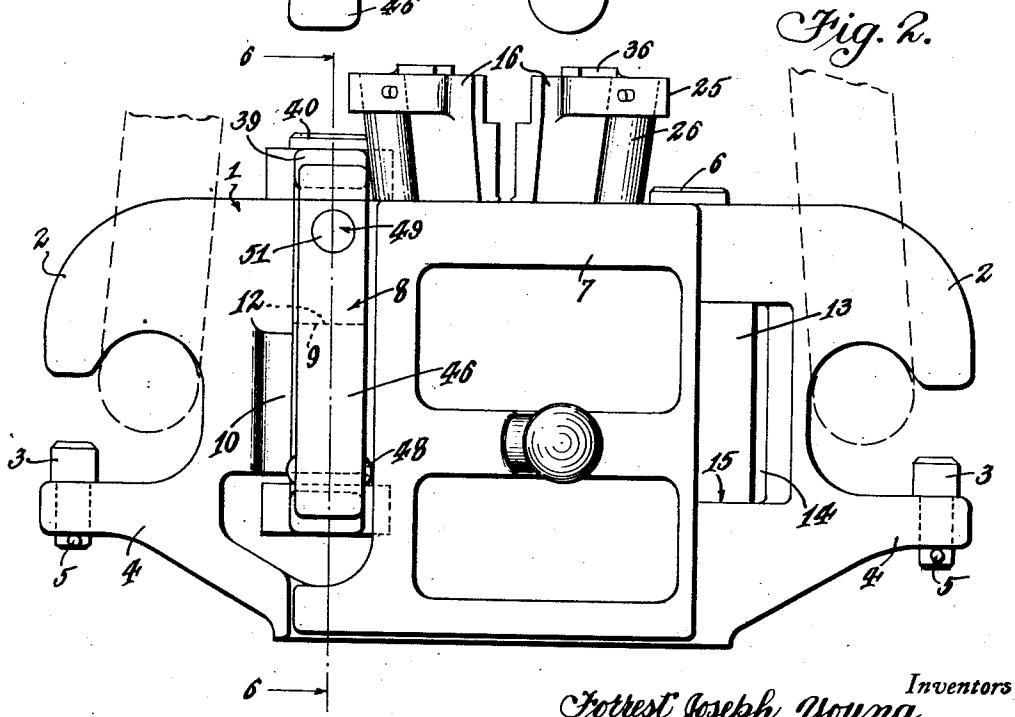

Fig. 2.

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Filed June 30, 1931 3 Sheets-Sheet 2

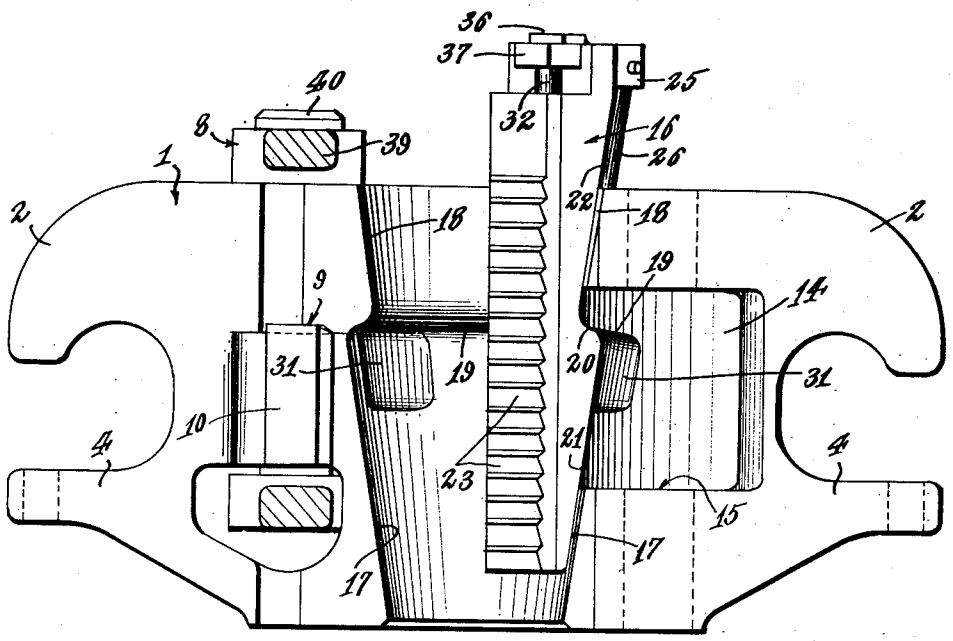

Fig. 3.

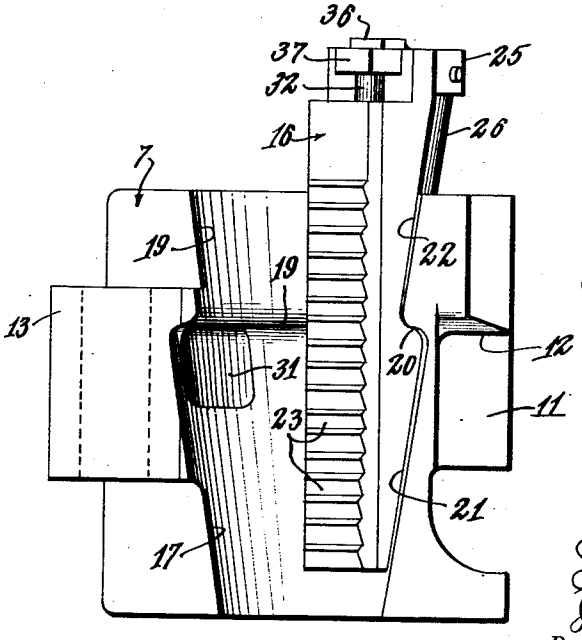

Fig. 4.

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DOOR TYPE SLIP ELEVATOR

Filed June 30, 1931 3 Sheets-Sheet 3

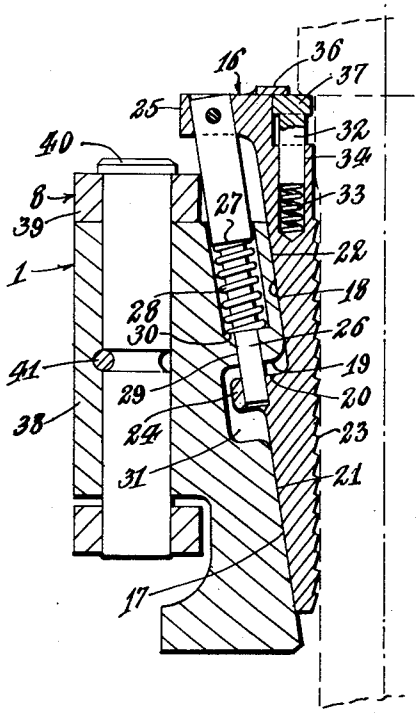

Fig. 5.

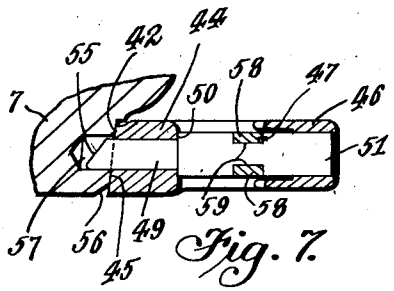

Fig. 7.

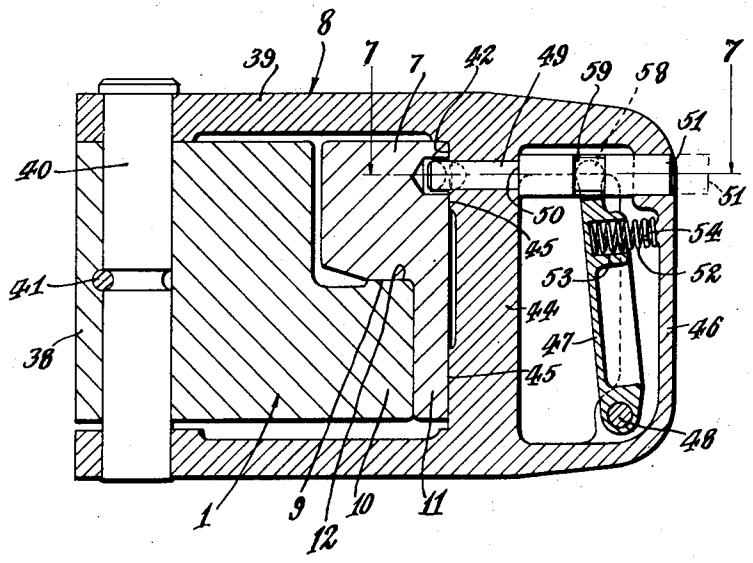

Fig. 6.

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UNITED STATES PATENT OFFICE

1,920,617

DOOR TYPE SLIP ELEVATOR

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Application June 30, 1931. Serial No. 547,870

10 Claims. (Cl. 24—263)

This invention relates to well elevators, and particularly to the side door slip type elevator for use in handling pipes, casing and the like, during the drilling of wells.

An object of this invention is to provide a door type slip elevator including a body having a gate hinged thereto at one side of the body and a latch means at the other side of the body for holding the gate closed, which latch is of the yoke type mounted on a hinge pin at the back of the body to pass over the free end of the gate.

Another object of this invention is to provide a gate type slip elevator including a body having a gate pivotally mounted at one side of the body, the free end of the gate being formed to rest upon a heavy shoulder protruding from the body at the opposite side of the body, and which body and gate are so formed to provide a tapered bore through the elevator in which bore segmental slips are yieldably mounted.

Another object of this invention is to provide a door type slip elevator including a body having a pivotally mounted gate, the body and gate being formed to provide a tapered bore axially of the elevator in which bore segmental slips are mounted on stepped slip seats, and which slips are yieldably held out of pipe-engaging position by spring members mounted within the body to yieldably urge the slips upwardly out of pipe engaging position.

Another object of this invention is to provide a slip type elevator in which segmental slips are provided, each of which slips is provided with a spring bumper pin on its upper end and which permits the elevator to be closed around a pipe or tube, and then to be raised until the bumper pins of the slips are engaged by the collar on the pipe or tube, the bumper pins serving to stop the upward travel of the slips as the elevator is raised until the slips are set into gripping position against the pipe or tube, the bumper pins being held yieldably upwardly with sufficient force to set the slips before the yieldable means for said bumper pins have been depressed to their limit so that a load of the string pipe or tubing can never come upon the pipe or tubing collar. The bumper pins being yieldably held in position and engaging the fairly true shoulder of the collar of the pipe or tubing, all the slips are set evenly due to the yieldable engagement of the bumper pins with the collar.

Another object of this invention is to provide a gate type slip elevator including a body having a gate pivoted at one side thereof and being provided with a latch of heavy construction provided with a latch pin which is visible at all times to the operator of the elevator, enabling a visual determination as to whether the latch pin itself is in latching or unlatching position.

Other objects and advantages of this invention it is believed will be apparent from the following detailed description of a preferred embodiment thereof as illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a top plan view of a gate type slip elevator embodying our invention.

Figure 2 is a front elevation thereof.

Figure 3 is a front elevation of the body of the elevator with the gate removed and with one sectional slip removed, looking outward from the bore of the elevator.

Figure 4 is a side elevation of the gate of the elevator removed from the body and with one sectional slip of the gate removed, looking outward from the bore of the elevator.

Figure 5 is a sectional elevation taken on substantially the line 5—5 of Figure 1 of the slip and body assembly.

Figure 6 is a sectional elevation taken substantially on the line 6—6 of Figure 2 taken through the latch mechanism and illustrating the latch pin as moved to disengaging position.

Figure 7 is a fragmental sectional plan view illustrating the latch pin and latch lug construction embodied in our elevator.

In the preferred embodiment of our invention, 1 indicates the body of an elevator having elevator link receiving ears 2 for the reception of standard elevator links.

The ears 2 are closed by means of closure cap pins 3 which are passed through the lower projections 4 of the ears 2 and retained in position by means of transverse pins 5.

Pivotally secured to one side of the elevator on a pivot pin 6 is a gate 7. The gate 7 is adapted to be latched in closed position relative to the body 1 by means of a yoke type latch 8. When in closed position the gate 7 is supported with relation to the body 1 on a gate supporting shoulder 9 provided by the upper surface of a gate lug 10 which protrudes from and is formed integral with the body 1. The gate protruding lug projects into the cut-away portion 11 of the gate 7 so that the plane surface 12 of the gate rests upon the gate supporting shoulder 9. By this construction the weight of the gate and the structure supported by the gate is taken not only by the pivot pin 6, but also at

the opposite side of the body 1 upon the shoulder 9 of the body 1.

The gate 7 is provided with a hinge lug 13 formed with a vertical bore through which the hinge pin 6 passes when the hinge lug 13 is positioned within the hinge recess 14 of the body 1. The lower surface 15 of the hinge recess 14 provides a thrust-receiving surface through which the load imposed upon the gate 7 by the weight of the pipe or tubing being supported is transmitted from the gate 7 to the elevator links mounted within the ears 2 of the elevator.

The body 1 and the gate 7 of the elevator are formed to provide the tapered axial bore of the elevator within which segmental slips 16 are positioned. The bore of the elevator thus formed is stepped to provide two stepped tapered slip seats 17 and 18, and the body of the elevator is formed with the stepped seats 17 and 18 in order to enable the slips 16 to be formed light in weight, and also to enable the bore of the elevator body to be maintained as small as possible. The stepping of the bore of the elevator to provide the two stepped tapered slip seats 17 and 18, also provides an upthrust stop shoulder 19 within the bore of the elevator which cooperates with the stop shoulder 20 formed intermediate the stepped tapered surfaces 21 and 22 at the rear of the segmental slips 16 to hold the segmental slips 16 from being thrust upwardly out of the bore of the elevator.

Each of the four segmental slips 16 is of the same construction and is mounted in the same manner within the body 1 or the gate 7 of the elevator and the interior surface of the body 1 and gate 7 are formed in the same manner.

The construction and mounting of only one of the segmental slips need therefore be described.

In Figure 5 there is illustrated in section the mounting and construction of one of the segmental slips 16 mounted in the body 1, and the slips 16 are herein illustrated as including a body having on its inner periphery a serrated pipe-engaging surface 23 and having its rear surface tapered in stepped fashion to form the two stepped seats 21 and 22 which seat upon the stepped tapered seats 17 and 18 of the body 1 and gate 7 respectively.

The slip 16 has at its rear surface a guiding lug 24 and at its upper end a pin lug 25. A stepped slip pin 26 is passed through the lugs 24 and 25. The stepped pin 26 is stepped to provide a spring stop shoulder 27 and a spring 28 is mounted on the portion of reduced diameter of the stepped pin 26 within a pin bore 29 formed in the body 1 so that the spring engages the lower end seat 30 of said bore to yieldably urge the pin 26, and hence the segmental slip 16 upwardly in the bore of the body.

The guiding lug 24, which projects from the rear surface of the segmental slip 16 adjacent the stop shoulder 20, fits within a guide lug recess 31 formed in the body to receive the portion of reduced diameter of the slip pin 26.

The slip pin 26 is secured to the pin lug 25 by means of a pin which is removably passed transversely through the pin lug 25 and the slip pin 26. The segmental slips 16 are thus normally held by means of the spring 28 normally thrust upward in the bore of the elevator out of pipe-engaging position to where the shoulder 20 of the slips 16 engages the shoulder 19 of the body 1.

Each slip 16 is permanently equipped with a spring bumper pin 32 at its upper end. The spring bumper pin 32 is provided to allow the elevator to be closed on the pipe or tube and then to be raised against the collar of the pipe or tube, and serves to stop the upward travel of the slips 16 as the elevator is raised, setting the slips 16 into gripping position against the pipe or tube.

The bumper pins 32 are yieldably urged upwardly by means of bumper pin springs 33, which have sufficient force to set the slips 16 before the springs 33 are completely depressed so that the load of the string of pipe or tubing can never come directly upon the pipe or tubing collar. As the collar of the pipe or tube forms a uniformly annular shoulder, all the slips 16 are evenly set due to the yieldable mounting of the bumper pins 32.

The bumper pins 32 are mounted in bores 34 formed in the body of the slips 16 and are mounted in bumper pin recesses formed at the upper ends of the body of the slips 16. The bumper pins 32 at their lower ends engage the upper ends of the bumper pin springs 33 which are seated within the bumper pin bores 34 formed in the body of the slips to urge the bumper pin yieldably upwardly. The bumper pins 32 are retained in position by means of bumper pin stop pieces 36 which are welded to the upper face of the body of the slips to project over the bumper pin recesses and engage the outer portion of the T-shaped heads 37 formed integral with the bumper pins 32.

The latch 8 is preferably of the following construction:

The rear portion of the body 1 is formed with a latch pin projection 38 and the latch yoke 39 projects above and below the body 1 and is pivotally secured to the body 1 by means of the pivot pin 40 which passes through the eye ends of the yoke latch member 39 and is secured in position by means of a transverse pin 41 which passes through the latch pin projection 38 of the body 1.

The door 7 is formed with a plane latch face 42 which extends substantially parallel with the plane passed through the ears 2 and the axial center of the elevator so that the latch yoke 39, when in latched position, projects across the said plane in position substantially at right angles from the said plane passing through the center of the ears 2 and the axial center of the elevator. In this manner the entire load or force tending to open the gate 7 is transmitted directly by the latch yoke 39 through the hinge pin 40 to the body 1, and is not supported on the latch pin 49 in any way.

The latch yoke 39 is formed with a transverse latch bar 44 having gate-engaging faces 45 which pass over and seat upon the plane latch face 42 of the gate 7. A U-shaped handle 46 projects outwardly from the ends of the latch bar 44 and carries a latch actuating lever 47. The latch actuating lever 47 is pivotally supported on a pin 48 upon the inner surface of the vertically extending portion of the U-shaped handle 46 to be protected from accidental actuation. The latch actuating lever 47 is operatively connected with the latch pin 49 which is mounted to move in a horizontal direction in guide bores formed in the U-shaped handle 46 and in the latch bar 44.

The latch pin 49 is of reduced diameter where

it passes through the latch bar 44 so as to provide a stop shoulder 50 which limits the inward projection of the latch pin 49 to where the outer end 51 of the latch pin 49 is substantially flush with the outer surface of the U-shaped handle 46.

A latch spring 52 is mounted in a cylindrical spring recess 53 formed in the latch lever 47 and is passed over a latch spring trunnion 54 mounted on the inner hollow surface of the vertical branch of the U-shaped handle 46. The latch spring 52 yieldably urges the latch pin 49 into latching position. The face of the latch pin 49 is beveled as indicated at 55 so that as the latch yoke 39 is swung over the tapered latch pin face 56 of the gate 7, the latch pin 49 will be moved inwardly against the pressure of the latch spring 52, permitting the latch to pass into a latch pin bore 57 formed from the latch face 42 of the gate 7. The latch lever 47 is operatively connected with the latch pin 49 by having its yoke projecting ends 58 fitting in recesses 59 formed in the latch pin 49. When the latch pin 49 is moved outwardly to unlatched position, the rear end 58 will project from the vertical portion of the U-shaped handle 46, giving to the operator a visual indicator of when the latch pin 49 is, and when it is not, engaged.

Having fully described our invention, it is to be understood that we do not wish to be limited to the details herein set forth, but our invention is of the full scope of the appended claims.

We claim:

1. In a device of the class described, the combination of a body, a gate pivotally supported by the body, the body and the gate being formed to provide a tapered bore, tapered segmental slips mounted within the bore, means for yieldably supporting the slips, and yieldably mounted bumper pins carried by the segmental slips for seating the slips in pipe-engaging position within the bore of the elevator.

2. In a device of the class described, the combination of a body, a gate pivotally supported at one side of the body, means for supporting the gate at the opposite side of the body, means for latching the gate in closed position, the gate and the body being formed to provide a tapered bore, a plurality of segmental slips mounted on the gate and body respectively within the tapered bore of the elevator, means for yieldably urging the said segmental slips from pipe-engaging position, and a bumper pin yieldably mounted in each of said slips on the upper end thereof to seat the slips in pipe-engaging position within the bore of the elevator.

3. In a device of the class described, the combination of a body, a gate pivotally supported at one side of the body, means for latching the gate in closed position, the gate and the body being formed to provide a tapered bore, segmental slips mounted in the tapered bore of the elevator, means for yieldably supporting the slips within the bore of the body out of pipe engaging position, means for guiding the slips, and bumper pins for each of said slips at the upper end thereof.

4. In a device of the class described, the combination of a body, a gate pivotally supported at one side of the body, means for supporting the free end of the gate at the opposite side of the body, means for latching the gate in closed position, the gate and the body being formed to provide a tapered vertical bore, a plurality of sectional slips, slip pins secured to the slips at their upper ends and fitting into guide projections formed integral with the slips at their lower ends, springs mounted on the slip pins to yieldably urge the slips out of pipe-engaging position, bumper pins mounted in bumper pin bores formed through the upper surface of the sectional slips, means mounted within the bumper pin bores for yieldably urging the bumper pins upward from the slips, and means secured to the sectional slips for retaining the bumper pins in position.

5. In a device of the class described, the combination of a pair of hingedly connected members which in closed position form a body having a stepped tapered bore, a plurality of stepped tapered slips mounted in the stepped tapered bore of the body, and means mounted in the upper stepped portion of the body for yieldably urging said slips outwardly from the bore of the body.

6. In combination with a tube gripping device having tapered openings disposed one above the other in axial alignment and forming a downwardly-facing stop shoulder between them, sectional slips arranged in said opening, each said slips having upper and lower stepped exterior bearing faces forming an upwardly facing shoulder between them and arranged to engage the downwardly facing stop shoulder of said openings, a plurality of stepped recesses in the upper portion of said device immediately above the downwardly facing stop shoulder, a pin mounted within each recess having a shoulder opposed to the shoulder formed by the stepped recess in the device, means connecting said pins with the slips, spring means mounted between the opposed shoulders of the pins and recesses to yieldably urge said slips outwardly from the bore of the tube gripping device.

7. In combination with a tube gripping device having tapered openings disposed one above the other in axial alignment and forming a downwardly facing stop shoulder between them, sectional slips arranged in said openings, each of the slips having upper and lower stepped exterior bearing faces forming an upwardly facing shoulder between them and arranged to engage the downwardly facing stop shoulder of the openings, said slips having lateral projections at the upper ends of the stepped exterior bearing surfaces, a plurality of bores in said device immediately above the downwardly facing stop shoulder, guide pins aligned with the bores and fitted within the lateral projections on said slips, and means to yieldably urge said slips outwardly from the bore of the tube gripping device.

8. In combination with a tube gripping device having tapered openings disposed one above the other in axial alignment and forming a downwardly facing stop shoulder between them, sectional slips arranged in said opening, each of the slips having upper and lower stepped exterior bearing faces forming an upwardly facing shoulder between them and arranged to engage the downwardly facing stop shoulder of said openings, the slips having each a lateral projection at the upper end of the upper stepped exterior bearing surface, a bore in the device immediately above the downwardly facing stop shoulder corresponding to each sectional slip, a guide pin aligned in the bore, and means connecting the guide pin with the lateral projection on the slips, and spring means mounted on said guide pins to yieldably urge the slips out-

wardly from the bore of the tube gripping device.

9. In combination with a tube gripping device having tapered openings disposed one above the other in axial alignment and forming a downwardly facing shoulder between them, sectional slips arranged in the openings having complementary upper and lower stepped exterior bearing faces forming an upwardly facing shoulder between them, a plurality of bores in a portion of said tube gripping device above the downwardly facing shoulder, a slip guide pin mounted in each bore, means connecting the guide pins with the slips, and spring means mounted within the bores to yieldably urge the slips outwardly from the openings in said tube gripping device.

10. In combination with a tube gripping device having a tapered bore, tapered sectional slips mounted within the bore, means for yieldably supporting the slips and yieldably mounted bumper pins carried by the sectional slips for seating the slips in pipe engaging position within the bore of the said tube gripping device.

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