Feb. 13, 1940. J. E. LE BUS 2,190,547

COMBINATION ELEVATOR AND WRENCH

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Fig. 1

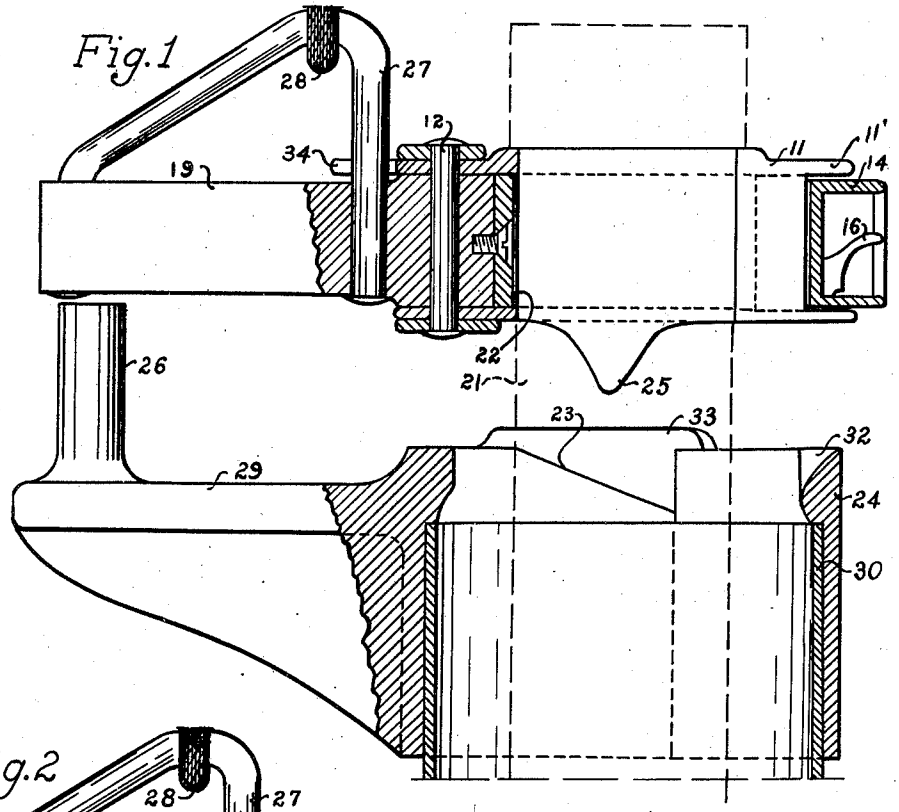
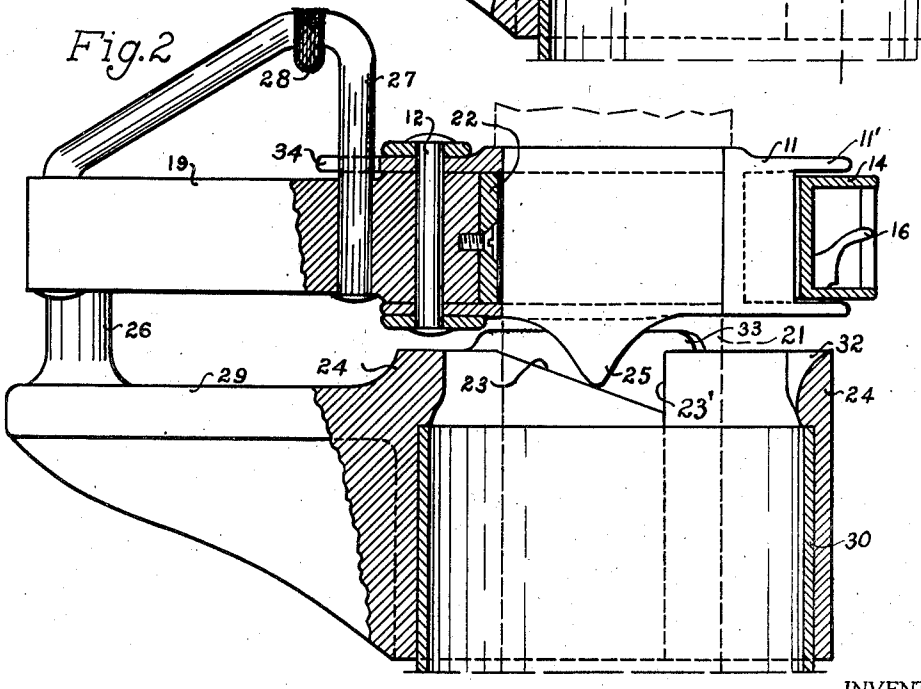


Fig. 2



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Fig.4

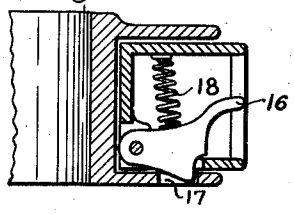
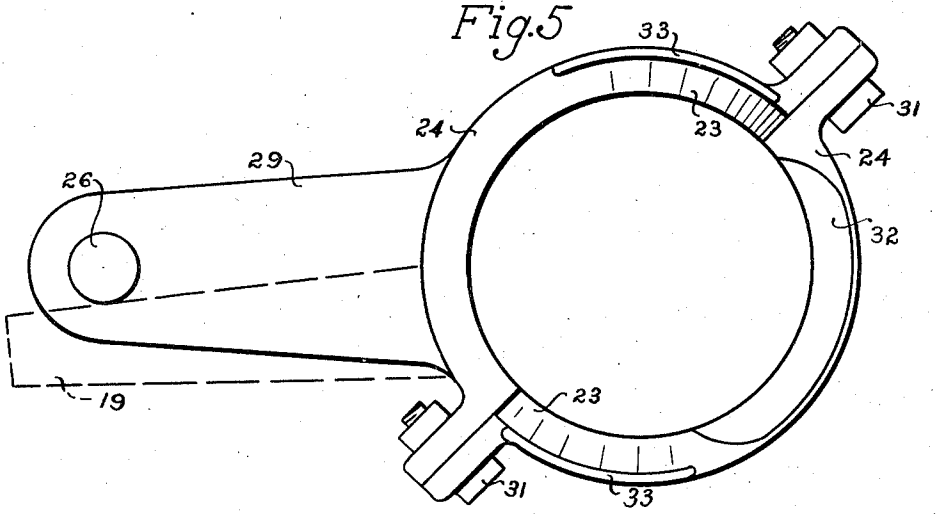


Fig.3

Fig.5



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COMBINATION ELEVATOR AND WRENCH

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Fig. 6

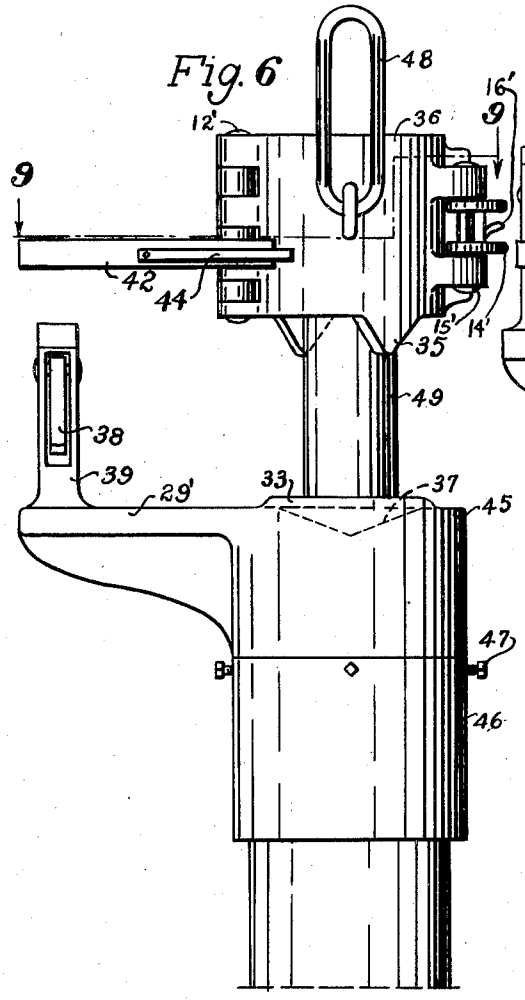


Fig. 7

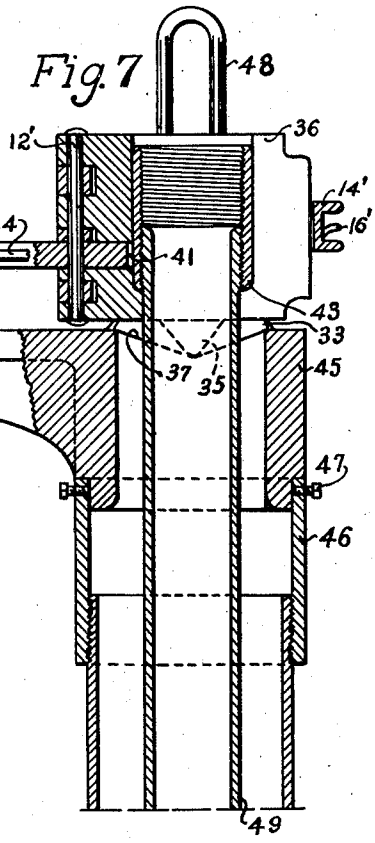


Fig. 9

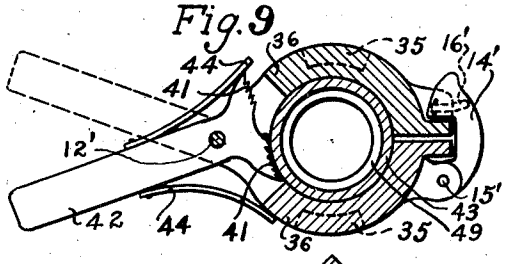


Fig. 8

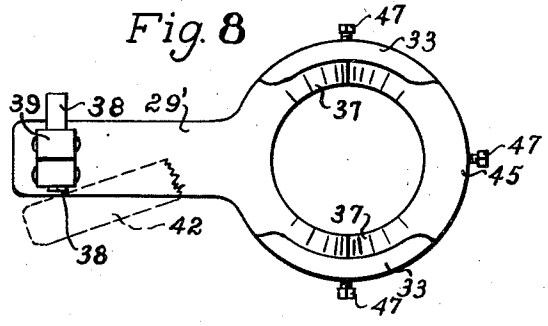
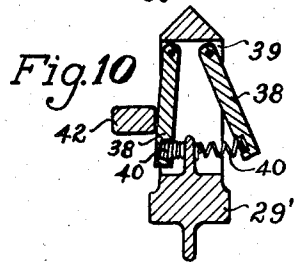


Fig. 10



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Patented Feb. 13, 1940 2,190,547

UNITED STATES PATENT OFFICE

2,190,547

COMBINATION ELEVATOR AND WRENCH

John E. Le Bus, Electra, Tex., assignor to David Erickson, Wichita Falls, Tex.

Application May 7, 1937, Serial No. 141,367

10 Claims. (Cl. 255—35)

This invention relates to improvements in a combination elevator and wrench, particularly for placing and connecting pipe such as is used in the drilling and tubing of oil wells.

The primary object of this invention is to engage a pipe and elevate it into a position for turning engagement with another pipe joint by the provision of a combination elevator and wrench.

Another object of this invention is to provide for automatically gripping the pipe by coaction of a companion member with the combination elevator and wrench.

Still another object of this invention is to generate the proper torsion on a coacting wrench handle by the provision of lugs on an elevator member coacting with an inclined spiral.

Another feature of this invention is the provision of a back-up post coacting with a lug and spiral arrangement on the elevator and its coacting member in such manner as to hold a pressure upon the wrench handle, regardless of the weight of the suspended pipe.

While the drawings illustrate a preferred embodiment of the invention it is to be understood that in adapting the same to meet specific needs and requirements, the design may be varied and changes in the minor details of construction resorted to within the scope of the invention as claimed without departing from the spirit thereof.

In the accompanying drawings:

Fig. 1 is a vertical sectional view through the combination elevator and wrench, partly in elevation, showing the coacting parts separated;

Fig. 2 is a view similar to Fig. 1, but with the two co-acting elements in a seated relation.

Fig. 3 is a plan view of the elevator with parts broken away and in section to show details of construction;

Fig. 4 is a cross section on the line 4—4 of Fig. 3, looking in the direction indicated by the arrows;

Fig. 5 is a plan view of the casing-engaging member showing the outline of the wrench handle in dotted lines;

Fig. 6 is a side elevation of a modified form of the invention;

Fig. 7 is a view similar to Fig. 2 of said modification;

Fig. 8 is a view similar to Fig. 5, of the modified form of casing-engaging member;

Fig. 9 is a horizontal section on the line 9—9, of Fig. 6; and

Fig. 10 is a detail cross section of the resilient back-up post taken on the line 10—10 of Fig. 7.

With more detailed reference to the drawings, the numeral 11 represents the annular body of an elevator which is constructed in two parts hinged together by the pin 12. The elevator body 11 may be provided with handles 13 attached to the parts thereof for greater ease in handling. A latch 14 pivoted to one part on a pin 15 is provided to embrace coacting flanges 11' on the elevator parts 11 to hold the same in a closed relation when they are engaged with a piece of pipe. An auxiliary safety catch 16 is pivoted on latch 14, and engages in a hole 17 in the lower flange of one member of the elevator to prevent the accidental opening of the elevator parts 11. A spring 18 bears on the catch 16 to insure positive action thereof. The catch 16 may be easily raised with the finger when it is desired to release the latch 14.

A wrench handle 19 is also pivoted on hinge pin 12 and has an offset portion 20 projecting from a side of the hinge pin 12 and forming a cam to engage a pipe 21 extending through and supported by the elevator. A serrated jaw 22, which is preferably removable, is provided to engage the pipe to prevent slipping.

Lugs 25 are formed on and extend downwardly from the sections of the body 11 and are arranged on diametrically opposite sides of said body.

The wrench handle 19 has a bail 27 attached thereto for attachment of a cable or rope 28 to support the elevator.

The pipe 21 is adapted to be inserted into a well casing 30 having a casing cap member 24 attached to the upper end thereof. The cap member 24 is formed of sections, as shown in Fig. 5, secured together by bolts 31 which clamp said member firmly on the casing 30. One section of said member 24 has a notch 32 formed therein so as to permit easy sliding of pipe 21 into the casing 30.

The upper edges of the cap member sections 24 have diametrically opposite inclined spiral tracks 23, each of which tracks extends downwardly in a clockwise direction to an end of the corresponding section, at the lower end of which track the adjacent end of the other section forms a shoulder 23'. A guide wall 33 extends upwardly beside each track 23 to prevent sidewise slipping of the lugs 25 of the elevator and insures positive engagement with the track 23.

As shown in Fig. 5, one section 24 has an arm 29 projecting outwardly therefrom, which arm 29 carries an upstanding back-up post 26 on the

outer end thereof adapted to extend in the path of wrench handle 19 for engagement thereby.

The elevator body 11 is mounted upon pipe section 21 and lowered into the casing 30 in position such that the lugs 25 will contact the inclined spiral tracks 23 on the casing cap member 24. Upon contacting of the lugs 25 with the spiral inclined tracks 23, as shown in Fig. 2, the elevator body 11 has a tendency to travel downward along the spiral inclined tracks, which will impart a rotary motion to the elevator body 11 and will cause wrench handle 19 to contact and engage back-up post 26.

At the point of engagement the weight of the pipe upon the elevator body 11 will swing the wrench handle 19 and cause engagement of the serrated jaw 22 with the pipe 21. When the jaw 22 is fully engaged the lugs 25 normally will not have traveled to the bottom of tracks 23 in the form shown in Figs. 1 to 5. Due to the normal tendency of lugs 25 to slide downward on these inclined spiral tracks 23, a pressure is exerted by wrench handle 19 against back-up post 26. By holding a pressure upon the wrench handle 19, the pipe 21 will be prevented from turning while a coacting pipe section is screwed thereto.

To prevent arm 19 from swinging too far to the side, stops 34 are provided on elevator body members 11 as shown in Figs. 1 and 2 and in dotted lines in Fig. 3, on opposite sides of and in position to engage the bail 27.

The form of the invention shown in Figs. 1 to 5, inclusive, is preferably used to pick up sections of drill pipe and place them in a "rat hole" preparatory to engagement with a "kelly" joint. After these drill pipe sections are engaged with a "kelly" joint they are raised from the "rat hole" and connected with the drill pipe in the well. The use of an elevator thus constructed together with a coacting casing cap member dispenses with the use of a back-up wrench as the back-up wrench is constructed within the elevator and automatically puts the correct amount of pressure on the jaw 22, and thereby on the pipe, obviating the crushing of the pipe or slipping thereof that is often experienced in some types of back-up post wrenches.

The modification of the invention shown in Figs. 6 to 10, inclusive, preferably is used for running tubing or pipe directly into the well. Due to the varying weights of pipe, the modification differs slightly from the preferred form shown in Figs. 1 to 5, in that lugs 35 on elevator sections 36 are permitted to travel to the bottom of double inclined tracks 37. Upon placing lugs 35 on spiral inclines 37, the lugs will travel downward and in rotary motion until they reach the bottom of tracks 37, at which time they cause wrench handle 42 to engage and depress a spring actuated lever 38 on back-up post 39 mounted on arm 29'. A spring 40 bears against each lever 38 to hold the correct tension on the respective pipe engaging jaw 41.

The form of elevator shown in Figs. 6 to 10, inclusive, may be used either for fitting pipe sections together or unscrewing them, as desired, as it is only necessary to swing the back-up wrench handle 42 to the opposite side of back-up post 39, which will position the lugs 35 on the opposite set of inclines of tracks 37 and cause the elevator to rotate against the back-up post 39 in a reverse direction. Double jaws 41 are provided on the wrench handle 42 to screw or unscrew the pipe sections.

A latch 14' is provided to connect elevator sections 36, said latch having a safety catch 16' pivoted at 15' in the manner described above in connection with the form shown in Figs. 1 to 5, inclusive. The elevator 36 may be recessed to receive a pipe collar 43 therein, so that the wrench jaws 41 may act directly thereon. The wrench and elevator sections 36 are hinged together by pin 12' to permit opening and closing. Resilient springs 44 are preferably attached to the handle 42 on opposite sides thereof normally tending to hold the handle in a central position radially of the elevator body members 36.

A casing cap 45 is secured to casing collar 46 by set screws 47 to prevent casing cap 45 from turning when pressure is applied by wrench handle 42. The collar 46 supports the well casing, having screw-threaded connection therewith. In the modified form the bails 48 are centrally attached to elevator 36 to insure proper alignment when lowering the tubing or pipe into the well.

I claim:

1. In a combined wrench and elevator, the combination of an elevator body constructed for supporting a pipe section, a wrench lever hinged to said elevator body and having a jaw in position to engage and hold a pipe section, said wrench lever extending outwardly from the body, a support, a back-up post carried by the support in position to engage the wrench lever, and interengaging means between the elevator body and the support whereby the weight of the pipe section on the body causes bodily turning movement of the body relative to the support and causing pressure of the wrench lever against the post to tighten the jaw against the pipe section.

2. In a combined wrench and elevator, the combination of an elevator body constructed for supporting a pipe section, a wrench lever hinged to said elevator body and having a jaw in position to engage and hold a pipe section, said wrench lever extending outwardly from the body, a support, a back-up post carried by the support in position to engage the wrench lever, said support having an inclined spiral track thereon, and means on the body in position to bear upon the track whereby the weight of the pipe section on the body causes bodily turning movement of the body relative to the support pressing the wrench lever against the post and tightening the jaw against the pipe section.

3. In a combined wrench and elevator, the combination of axially aligned members, pipe gripping means carried by one of said members and having gripping teeth extending axially thereof, one of said members having an inclined trackway and the other member having a portion bearing on said trackway for causing relative turning movement of said members by the weight of the pipe carried by the gripping means, and means interconnected with said members and operated by said relative turning thereof for actuating the pipe gripping means to engage the teeth with the pipe for rotary action on the pipe.

4. In a combined wrench and elevator, the combination of axially aligned members, pipe gripping means carried by one of said members and having gripping teeth extending axially thereof, the other of said members having an inclined spiral trackway in the upper portion thereof, the first-mentioned member having a portion bearing on said trackway for causing relative turning movement of said members by the weight of the pipe carried by the gripping means, and means interconnected with said

members and operated by said relative turning thereof for actuating the pipe gripping means to engage the teeth with the pipe for rotary action on the pipe.

5. In a combined wrench and elevator, the combination of hinged elevator members, a wrench lever pivotally mounted on one of said elevator members, lugs on one of said members, an inclined spiral track upon another member coacting with the last-mentioned member and registering with said lugs, and means for turning said wrench lever upon relative turning of the members.

6. In a combined wrench and elevator, the combination of hinged elevator members, a wrench lever pivotally mounted on one of said elevator members, lugs on one of said members, an inclined spiral track upon another member coacting with the last-mentioned member and registering with said lugs, means for turning said wrench lever upon relative turning of the members, and means for limiting the turning of said wrench lever.

7. In a combined wrench and elevator, the combination of an elevator, a wrench lever pivotally mounted thereon, a coacting member having spiral inclined tracks, means engageable with said wrench lever to prevent the turning thereof, lugs on said elevator coacting with the spiral inclined tracks, and means on said wrench lever engageable with a pipe to prevent the turning thereof.

8. In a combined wrench and elevator, the combination of an elevator, a wrench lever pivotally mounted thereon, a coacting member having double tracks each inclined in opposite directions, lugs on said elevator coacting with the double inclined tracks when the elevator is in different positions, dual engagement jaws on said wrench lever for engagement with a pipe to permit screwing or unscrewing of said pipe.

9. In a combined wrench and elevator, the combination of an elevator, a wrench lever pivotally mounted thereon, a coacting member having double tracks each inclined in opposite directions, lugs on said elevator coacting with the double inclined tracks when the elevator is in different positions, dual engagement jaws on said wrench lever for engagement with a pipe to permit screwing or unscrewing of said pipe, and resilient back-up means for said wrench lever.

10. In a combined wrench and elevator, the combination of an elevator, a wrench lever pivotally mounted thereon, a coacting member having double tracks each inclined in opposite directions, lugs on said elevator coacting with the double inclined tracks when the elevator is in different positions, dual engagement jaws on said wrench lever for engagement with a pipe to permit screwing or unscrewing of said pipe, and a back-up post having spring-pressed members in position to act on the wrench lever in different positions to turn the same.

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