Jan. 1, 1935. A. J. PENICK ET AL 1,986,283

ELEVATOR

Filed Sept. 26, 1933 2 Sheets-Sheet 1

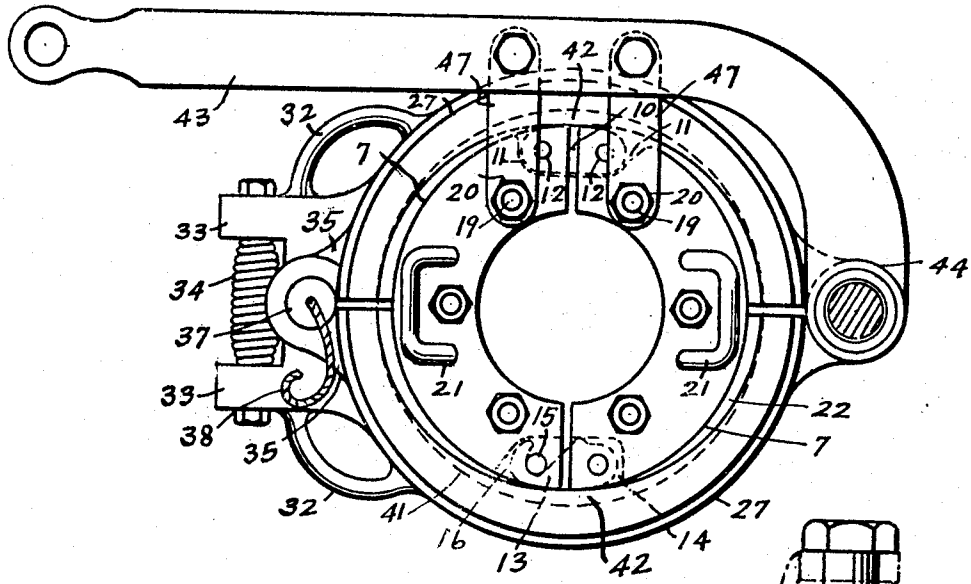


Fig. 1.

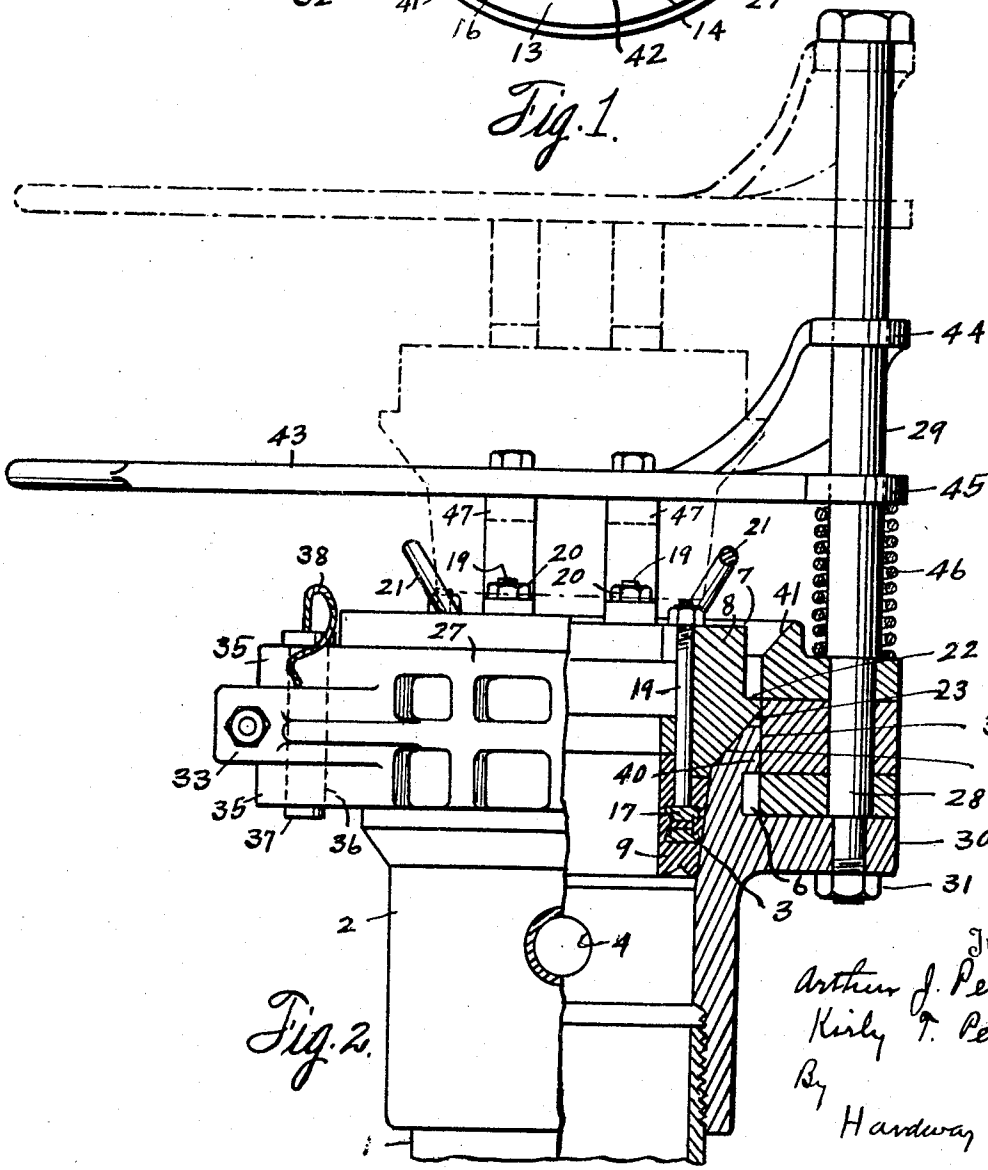


Fig. 2.

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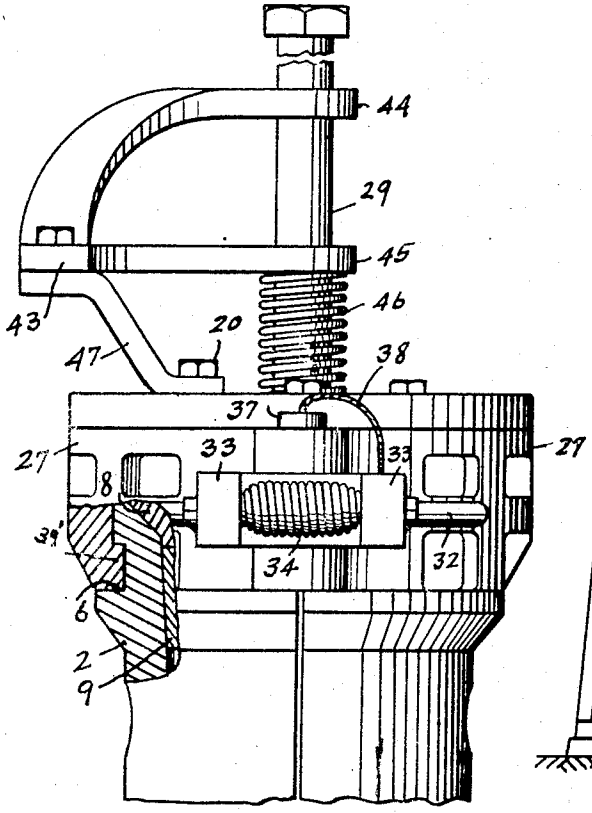


Fig. 3.

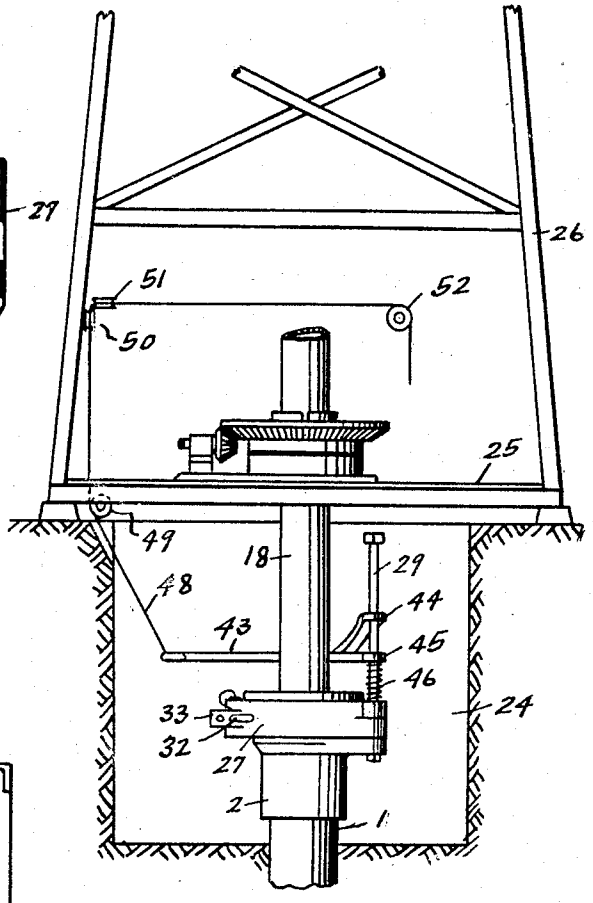


Fig. 4.

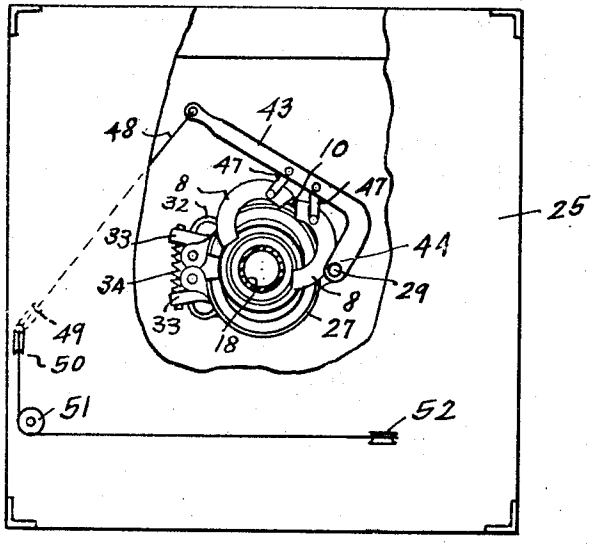


Fig. 5.

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UNITED STATES PATENT OFFICE

1,986,283

ELEVATOR

Arthur J. Penick and Kirby T. Penick, Houston, Tex.

Application September 26, 1933, Serial No. 691,020

10 Claims. (Cl. 166—14)

This invention relates to an elevator.

An object of the invention is to provide apparatus of the character described for elevating and handling the packing unit of a blowout preventer.

The elevator is particularly adapted for use with the packing unit of that type of blowout preventer disclosed in our copending application filed June 26, 1933, under Serial No. 677,656.

Another object of the invention is to provide an elevator whereby the packing unit of the blowout preventer may be maintained elevated when released from the casing head so that it may be readily swung away from the pipe extending through the blowout preventer.

A further object of the invention is to provide an elevator of the character described which may be readily manipulated by the operator from the derrick floor to carry the packing unit into position around said pipe whereby the packing unit may be again lowered with the pipe and seated in position on the casing head.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein:

Figure 1 shows a plan view of a blowout preventer, showing the elevator associated therewith.

Figure 2 shows a side view thereof partly in section.

Figure 3 shows a front elevation, partly in section.

Figure 4 shows a fragmentary side elevation of a drilling apparatus, showing the elevator applied to the casing head, and

Figure 5 shows a plan view of the elevator and blowout preventer.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the Figures, the numeral 1 designates the well casing having the casing head 2 secured to the upper end thereof and provided with a downwardly tapering seat 3. The casing head has a lateral tapped hole 4 beneath said seat for the connection of a pipe thereto through which the fluid in the well may be led off or through which fluid under pressure may be forced into the well as desired. At its upper end the seat 3 is outwardly flared as at 5 and beneath said flared portion the casing head has an annular external groove 6.

There is a packing unit or assembly formed of arcuate confronting segments indicated generally in Figures 1 and 5, by the numerals 7, 7. Each segment is composed of an arcuate metallic anchor 8 and an arcuate packing ring 9 secured to the underside of said anchor.

The anchors 8 are hinged together at one side by the means of hinge plate 10, whose ends are fitted into slots 11 at the adjacent ends of said anchors and pinned in place by the pins 12.

At the opposite side of the packing unit there is the latch 13, hooklike in form, one end of which is pivoted in a slot 14 in one of said anchors and whose hooked end is adapted to engage a pin 15 extending through the slot 16 in the adjacent end of the other anchor. The packing unit is so shaped that when latched around the drill stem it will completely surround said inner pipe and the outer surface of the packing 9 is tapered to conform to the shape of and to fit closely within the seat 3.

Embedded within the packing 9 of each segment there is a rigid reinforcing member 17 preferably formed of metal and upstanding from this reinforcing member are the anchor rods 19, 19 which extend up through the anchors 8 above and whose upper ends are threaded to receive the nuts 20 whereby the packing may be maintained in place. The segments 7, have the handles 21 by means of which the packing units may be handled.

The upper ends of the anchors 8 of the packing unit are reduced forming an annular external shoulder 22 all the way around said unit and beneath said shoulder the anchors 8 have the annular tapering face 23 shaped to conform to the contour of and to fit closely into the flared upper end 5 of the seat 3.

The casing head 2 will usually be located in the cellar 24 beneath the floor 25 of the derrick 26 and when it may be desired to seat the packing unit in the casing head, the segments of the packing unit may be closed around the inner pipe 18, in the manner hereinafter described, and latched, and the inner pipe then lowered and the packing unit will be carried downwardly into the casing head and seated therein with the packing seated securely in the seat 3 and completely closing the space between the inner pipe 18 and the casing head, and with the tapering face 23 seated on the flared portion 5 of the seat 3.

Novel means for securing the packing unit in place in the casing head and for releasing the same for withdrawal has been provided and which will now be described;—the securing

means referred to comprises the arcuate clamps 27, 27 which are hinged together at one side by the hinge pin 28 formed on the lower end of the upstanding post 29, said hinge pin passing also through the laterally extending ear 30 formed integrally with the casing head 2 whereby the clamps 27, 27 are supported and hingedly connected to the casing head. The pin 28 is secured in place by a suitable nut 31 screwed onto one end thereof.

At their other ends the clamps 27 have the grips 32, 32 and parallel outwardly projecting extensions 33, which are connected by means of a pull spring 34. Between the extensions 33 the clamps 27 have the intermeshing lugs 35 provided with the pin bearings 36 which register when the clamps are secured around the casing head and through which a pin 37 may be inserted to hold the clamps in securing position. This pin 37 may be secured against loss by means of a cable or other flexible tie member 38.

Each clamp member has an inside rib 39' to fit into the groove 6 and an inside groove 39 to receive an external annular rib 40 on the casing head 2 and the external shoulders 22 of the anchors 8 project into this groove 39 whereby said clamp members and the packing unit are secured in place on the casing head. The clamps 27 are flared upwardly as at 41 and when the packing unit is fastened around the pipe 18 and said pipe is lowered the packing unit will enter between the clamps 27 and the tapering faces 23 will contact with correspondingly flared portions 41 of said clamps and the packing unit will be guided into the casing head and the clamps 27 will be spread apart, the spring 34 yielding to permit this, and when the shoulders 22 of the packing unit register with the groove 39, said clamps will be drawn together by the spring 34, causing the upper side of the groove 39 to engage over the shoulders 22 whereby the packing unit will be locked in place and the pin 37 may then be inserted through the bearings 36 to secure said clamps against spreading whereby the packing unit will be secured in place against danger of displacement by the internal well pressure.

It should be noted, that the shoulders 42 forming the upper side of the groove 39 engage over the shoulders 22 of the packing unit at diametrically opposite sides of the packing unit only as shown in Figure 1, that is to say, at opposing points approximately midway between the hinged ends of the clamps 27 and the opposite ends thereof so that when it is desired to release the packing unit, the pin 37 may be withdrawn and the grips 32 pulled apart until the shoulders 22 are cleared by the shoulders 42, to the end that the clamps 27 need only be partially opened to release the packing unit.

There is an arm 43 mounted to swing in a horizontal plane. This arm is arranged alongside and slightly above the blowout preventer and at one end is bifurcated forming the upper and lower bearings 44, 45 which receive the upright post 29. Surrounding said post and interposed between the lower bearing 45 and the hinge between the clamp members 27 there is a strong coil spring 46 which is under compression when the packing unit is seated in the casing head. A pair of supporting links 47, 47 are pivoted at one end to the arm 43 and their other ends have bearings to receive the upper ends of the anchor rods 19 on opposite sides of the hinge plate 10 at the adjacent side of the packing unit and these links are retained on said rods by the corresponding nuts 20.

In operation when it is desired to release and elevate the packing unit, the pin 37 may be removed and the clamp members opened sufficiently to release the shoulders 42 from the shoulders 22 as illustrated in Figure 5 and thereupon the spring 46 will expand and the packing unit will be automatically elevated out of the casing head and the latch 13 may then be released and the sections of the packing unit swung open from around the pipe 18 as shown in Figure 5 and the arm 43 together with said packing unit may then be swung around out of the way and maintained in readiness to be again applied to the pipe and seated and secured in the casing head in case of an impending blowout. In case the packing unit is stuck in the casing head too tightly to be elevated by the spring 46, said unit may be manually released and elevated and the spring will maintain the same elevated.

A cable 48 is attached at one end to the free end of the arm 43 and this cable passes up through the derrick floor around the pulley 49 and over the pulleys 50, 51 and 52 in the derrick with its free end accessible to the operator. In case it is desired to apply the packing unit to the pipe 18, the operator may exert a pull on the cable 48 and the arm 43 will thereby be swung inwardly toward the pipe 18 carrying the sections of the packing unit about said pipe 18 and said packing unit may be latched about the pipe and the pipe then lowered to carry said unit downwardly with it until the unit seats within the casing head as hereinabove explained. When so seated the spring 34 will cause the ribs 39' to seat in the groove 6 and the shoulders 42 to engage over the shoulders 22 to maintain the packing unit in place and the pin 37 may then be reinserted through the bearings 36 to lock the clamps 27 against spreading.

The drawings and description disclose what is now considered to be a preferred form of the invention by way of illustration only while the broad principle of the invention will be defined by the appended claims.

What we claim is:

1. The combination with a blowout preventer having a removable packing unit, of an upstanding post, an arm swingable and vertically movable on the post, means connecting the arm to the packing unit and means for moving the arm yielding upwardly on the post.

2. The combination with a blowout preventer having a seat and a removable packing unit therein, means for releasably securing said unit on the seat, means for automatically elevating the unit from the seat upon release of said securing means, said elevating means being swingable about a vertical axis to carry the packing unit around out of alignment with the seat.

3. The combination with a packing unit shaped to be fitted to a seat about an inner pipe in a well, of releasable means for securing said unit on the seat, means connected to the unit and effective to automatically elevate the unit from the seat upon release of said securing means, said elevating means being also swingable about a vertical axis whereby said unit, when elevated, may be swung about horizontally.

4. The combination with a casing head on a well casing and having a seat thereon, and a packing unit shaped to surround an inner pipe and releasably mounted on said seat; of an upstanding post, an arm thereon, links connecting

the packing unit to said arm, said arm and unit being movable upwardly upon release of said unit and yieldable means for sustaining the arm and unit in upper position.

5. The combination with the head of a well casing and a blowout preventer on the head and having a removable, sectional packing unit shaped to surround an inner pipe in the casing, of means for releasably locking the packing unit in place, an upstanding post, an arm on said post, links connecting the arm to the respective sections of said unit, means tending to automatically elevate the arm and unit, upon release of the unit.

6. The combination with the head of a well casing and a blowout preventer on the head and having a removable, sectional packing unit shaped to surround an inner pipe in the casing, of means for releasably locking the packing unit in place, an upstanding post, an arm on said post, links connecting the arm to the respective sections of said unit, means for automatically elevating the arm and unit, upon release of the unit, said arm being swingable about a vertical axis whereby the unit may be swung away from or into position about said inner pipe.

7. In a blowout preventer having a head on a casing, in a well, said head having a seat and a removable sectional packing unit shaped to fit said seat and to surround an inner pipe in the casing and releasable means to retain said unit on the seat; an elevator comprising an upstanding support, means on said support and connected to said unit and normally tending to elevate said unit upon release of the unit.

8. In a blowout preventer having a head on a casing, in a well, said head having a seat and a removable, sectional packing unit shaped to fit said seat and to surround an inner pipe in the casing and releasable means to retain said unit on the seat; an elevator comprising an upstanding support, means on said support and connected to said unit and effective to automatically elevate said unit upon release of the unit, said elevator being turnable about a vertical axis and means to manually turn the elevator to swing said packing unit into position around the inner pipe.

9. The combination with a blowout preventer having a removable packing unit, of an upstanding support, means connected to the unit and vertically movable on the support and swingable thereon about an approximately vertical axis, and means for sustaining said first mentioned means and the unit connected thereto in their upper position.

10. In a blowout preventer having a packing unit shaped to be closed about a pipe in a well and to fit a seat around said pipe; an elevator comprising an upstanding support, unit-supporting means on the support connected to said unit, means for maintaining the unit-supporting means and unit elevated, said supporting means and unit being swingable about an approximately vertical axis to permit the unit to be swung away from or into position to be closed about the pipe, said unit-supporting means and unit, when in said last mentioned position, being movable downwardly to allow the unit to rest on said seat.

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