

Feb. 21, 1933.

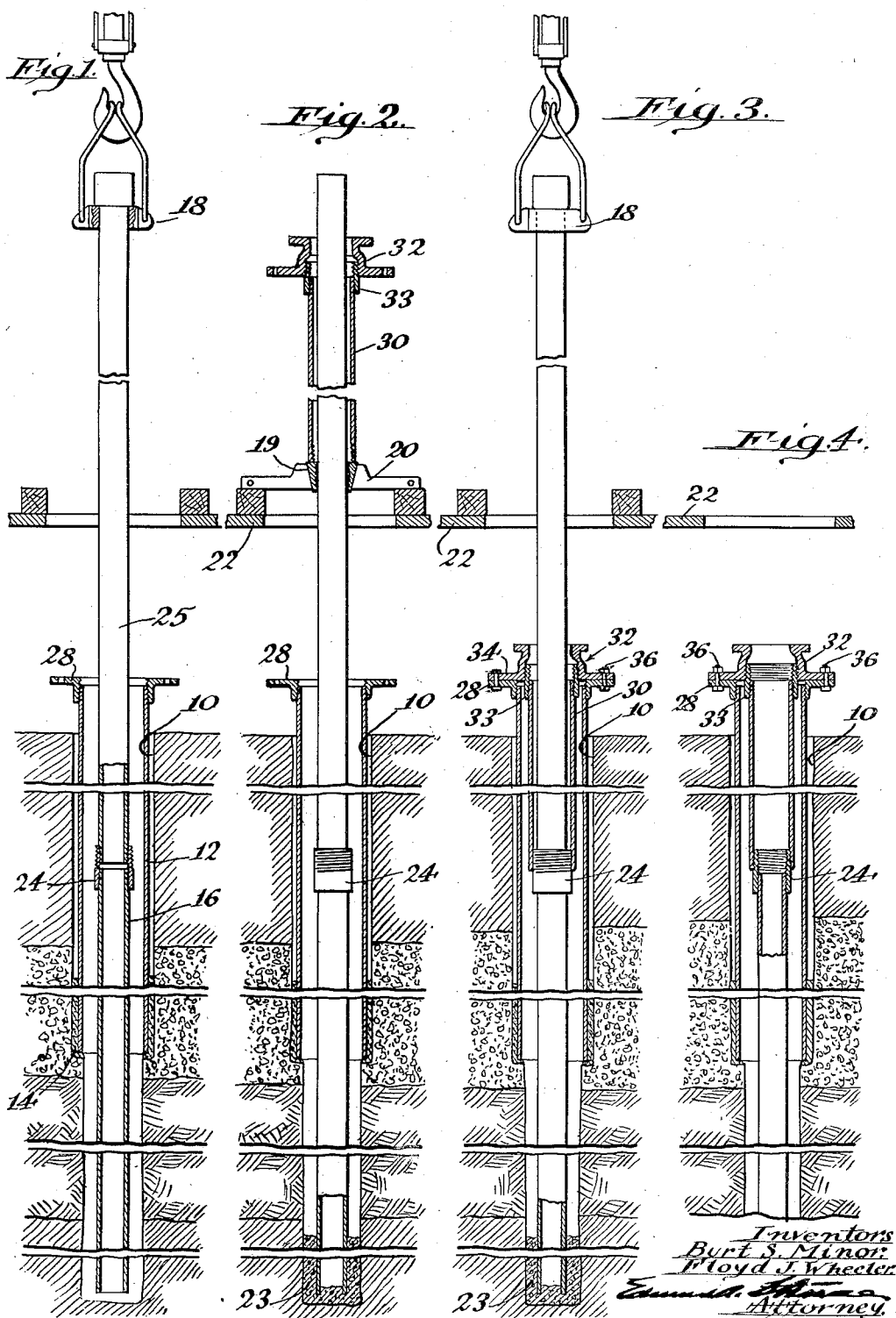
F. J. WHEELER ET AL

1,898,649

METHOD OF LANDING OIL WELL CASINGS

Original Filed March 28, 1930

4 Sheets-Sheet 1



Feb. 21, 1933.

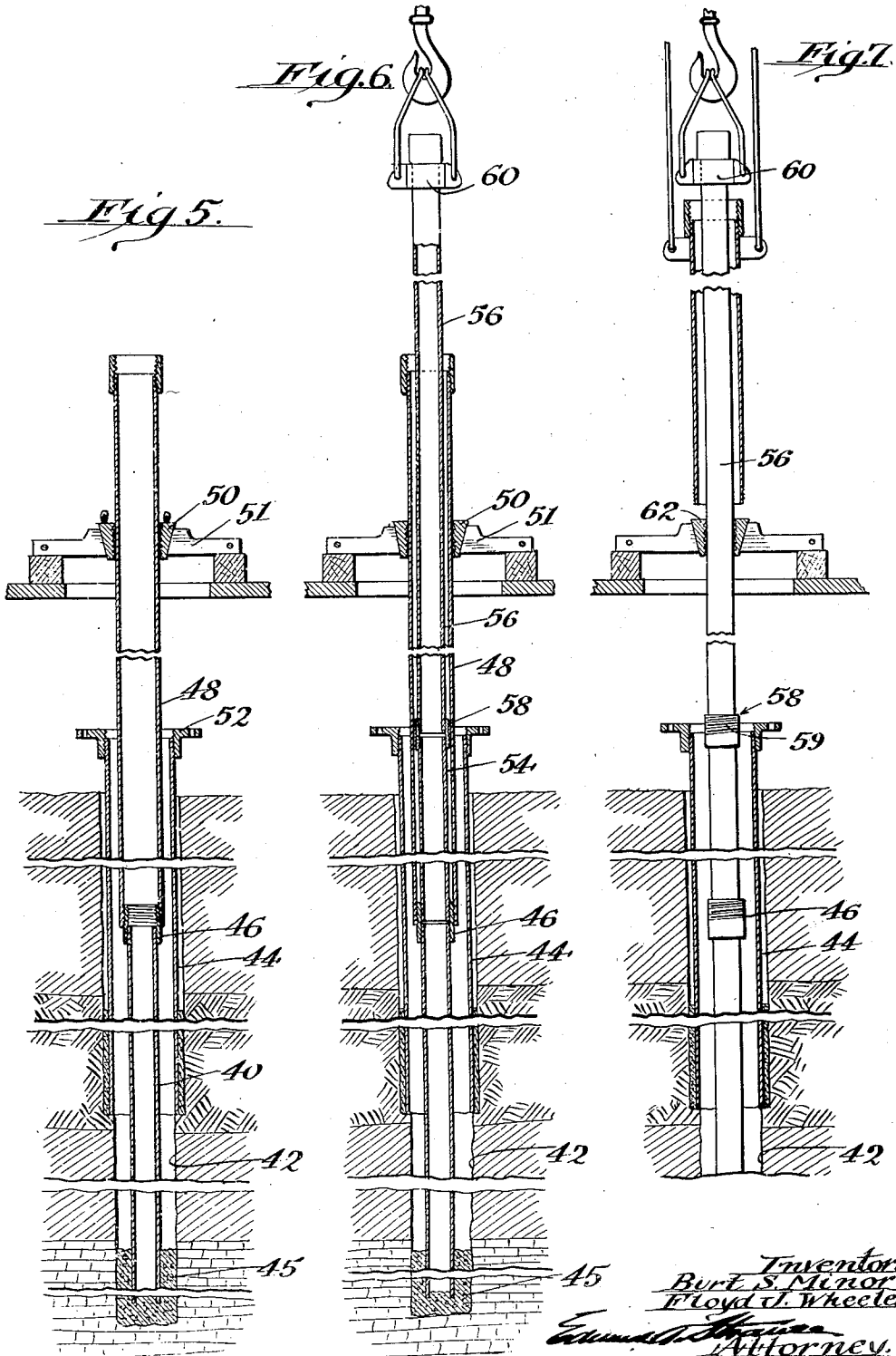
F. J. WHEELER ET AL

1,898,649

METHOD OF LANDING OIL WELL CASINGS

Original Filed March 28, 1930

4 Sheets-Sheet 2



Feb. 21, 1933.

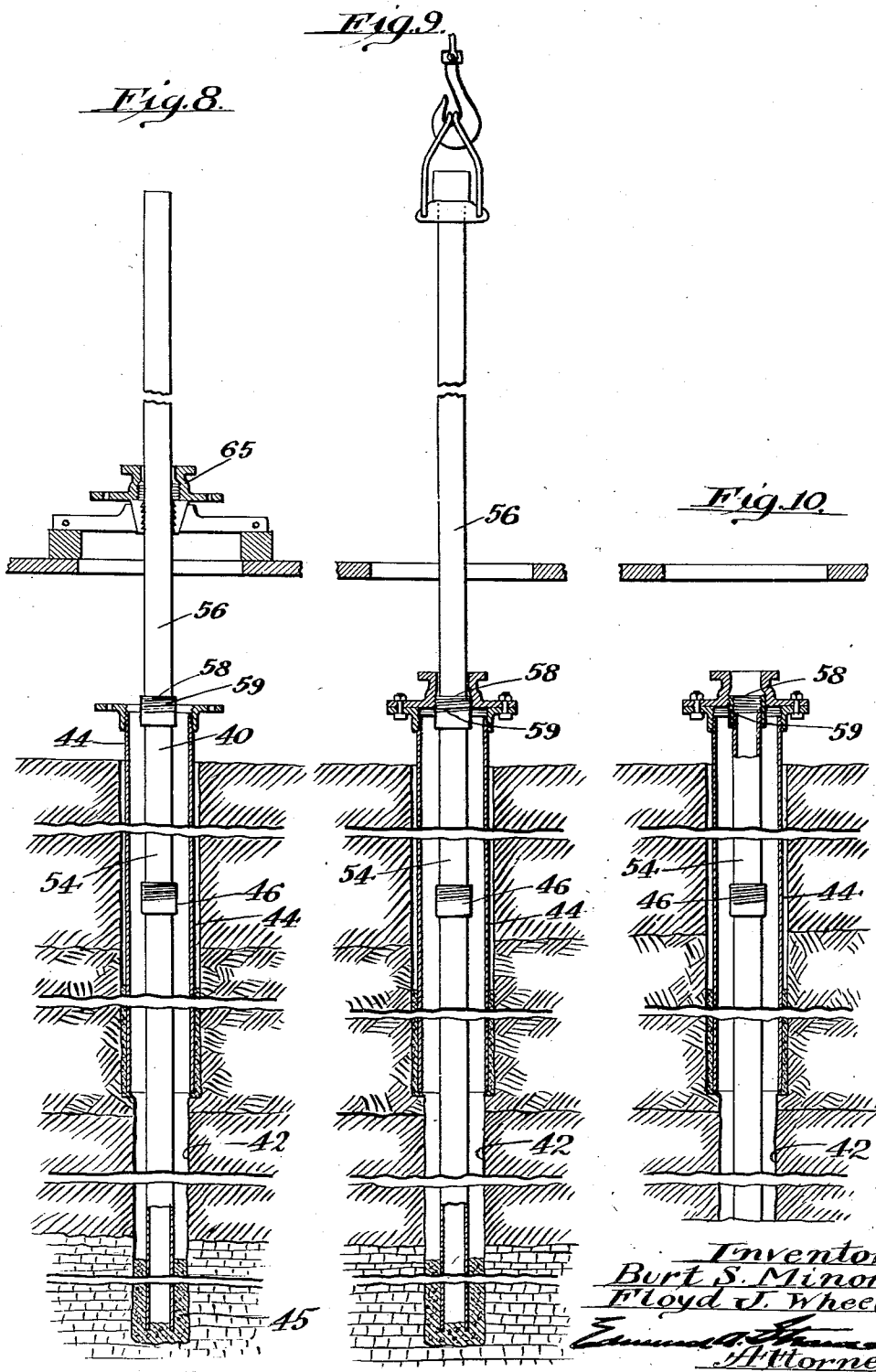
F. J. WHEELER ET AL

1,898,649

METHOD OF LANDING OIL WELL CASINGS

Original Filed March 28, 1930

4 Sheets-Sheet 3



Feb. 21, 1933.

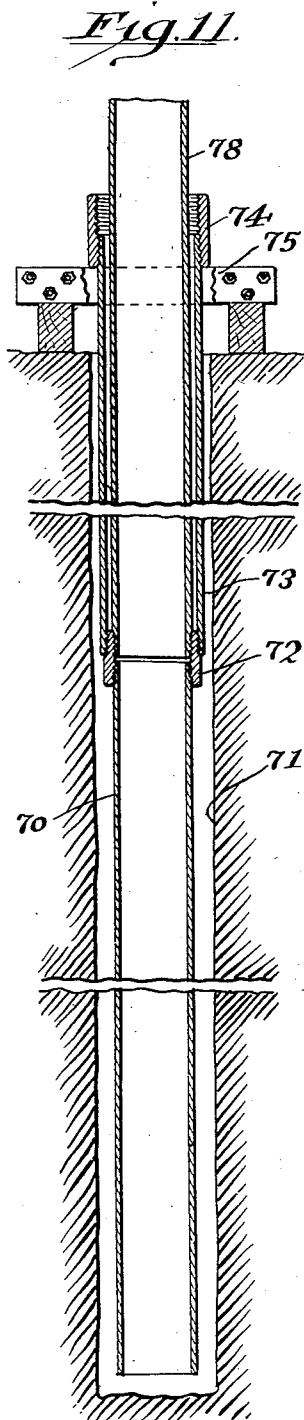
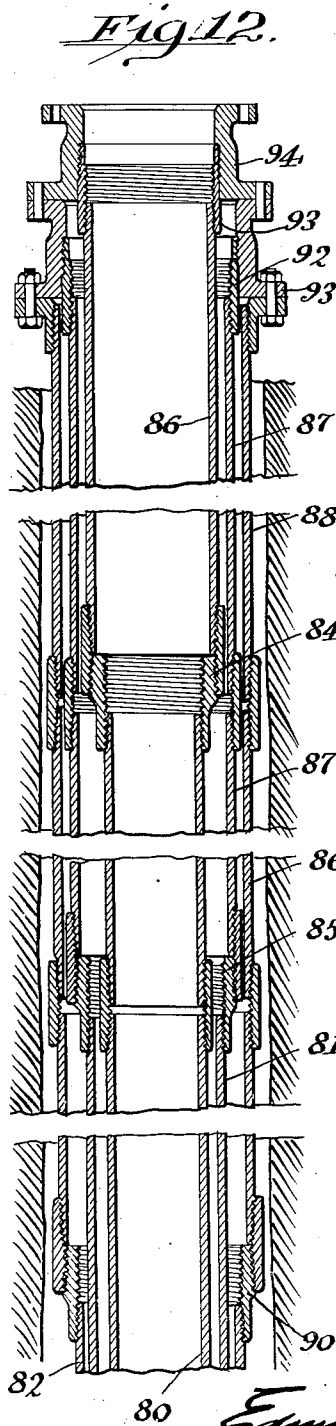
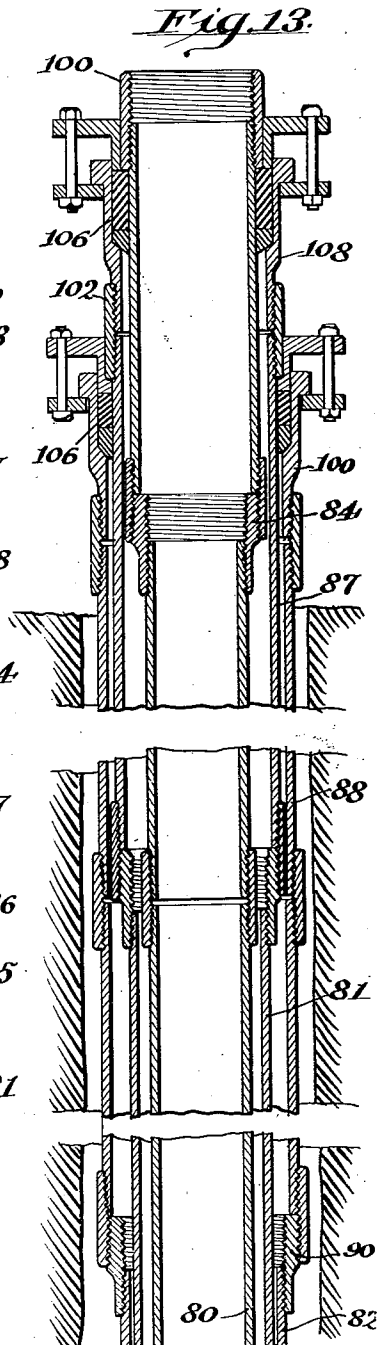
F. J. WHEELER ET AL

1,898,649

METHOD OF LANDING OIL WELL CASINGS.

Original Filed March 28, 1930

4 Sheets-Sheet 4



Inventor:
Burt S. Minor
Floyd J. Wheeler

Edmund G. Shaw
Attorney

UNITED STATES PATENT OFFICE

FLOYD JAMES WHEELER, OF LONG BEACH, AND BURT STANLEY MINOR, OF SAN PEDRO,
CALIFORNIA

METHOD OF LANDING OIL WELL CASINGS

Application filed March 28, 1930, Serial No. 439,843. Renewed July 14, 1932.

In landing a string of casing it is impossible to predetermine how much of the inner string will project above the casing or control head on the outer casing after the inner string has been cemented and stretched. Hence it is necessary to release the entire string in order to unscrew and remove the top joint and replace it with a nipple or joint of such length that may be connected with the control head.

It is more or less dangerous to release the inner string as its inherent weight often causes fracturing of the cement seal or bending or breaking of said inner string. If the string becomes badly bent permanent loss of the well results.

It is the object of this invention to provide a method whereby a string of casing may be suspended at all times during landing operations.

Another object of this invention is to provide a method whereby the last joint of string of the casing may be removed and a nipple of the required length be replaced therefor without releasing said string.

With the foregoing and other objects in view, the improved method will be more fully understood by the following description of the accompanying drawings, in which:

Fig. 1 is a sectional view taken through an oil well and casing showing the first step in carrying out the improved method of landing a casing;

Fig. 2 is a view similar to Fig. 1 showing the second step in the improved method;

Fig. 3 is a view showing the third step in landing a casing;

Fig. 4 is a view showing the casing landed in the well hole;

Figs. 5, 6, 7, 8, 9 and 10 illustrate the successive steps in landing a casing by the improved method in a slightly modified manner;

Fig. 11 is a sectional view taken through an oil well showing an outer or water string of casing suspended in the hole by the improved method;

Fig. 12 is a sectional view taken through a plurality of strings of casing illustrating

a practical hook-up when the improved method is employed;

Fig. 13 is a view similar to Fig. 11 showing another hook-up or assembly of casing with the improved method.

Referring more specifically to the drawings, particularly to Figs. 1 to 4 inclusive, 10 designates a well hole in which has been lowered the outer or first string of casing 12 and cemented as indicated at 14. This string is usually landed at a comparatively shallow depth and may be released without any danger after the cement has become hardened; however, it may be suspended by the improved method prior to cementing if desired.

Referring more specifically to Figs. 1 to 4 inclusive, an inner string designated at 16 is lowered into the portion of the hole extending below the outer string to the required depth by an elevator designated at 18 as shown in Fig. 1 and is then held suspended in this position by the usual slips 19 resting in a spider 20 mounted in the derrick floor 22. The lower end of the casing is then cemented as indicated at 23. It will be particularly noted that all of the inner string is made up with the usual couplings with the exception of the last two or three joints. At this point a forged steel coupling 24 internally and externally threaded is applied to the upper or top joint of the inner string, the remaining joints indicated at 25 are then made up and screw threaded into the upper end of said coupling.

After the cementing process has been completed the distance between the upper face of the casing flange 28 and the coupling 24 is determined, a section of casing one size larger in diameter is made up (with the usual couplings) corresponding in length to the above measurement, and a suitable control head fitting designated at 32 is applied to its upper end preferably by a coupling 33.

The section of casing 30 thus made up is first raised in the derrick to a point above the upper end of the joints 25, then lowered thereover until its lower end rests on the slips or spider 20 as shown in Fig. 2, and the

elevator again connected to the inner casing to suspend it as shown in Fig. 3.

Casing 30 is next raised by any suitable means and the slips and spider removed and said casing lowered into the hole and screw threaded to the coupling 24. When thus connected the flange 34 of the control head fitting will rest on or engage the upper face of the outer casing flange 28. The flanges 10 28 and 34 may then be secured together with bolts and nuts 36 as shown in Figs. 3 and 4. The joints 25 are now unscrewed from the coupling 24 as shown in Fig. 4, thus completing the landing operation.

15 Referring to Figs. 5 to 10 inclusive, a slightly modified method of landing a casing by the improved method is illustrated and carried out as follows:

The inner string generally designated at 40 is lowered into the well hole 42 through outer casing 44 to a position to be cemented, and is made up with the usual couplings except the last upper joint near the surface which is provided with a coupling 46 having 25 male and female threads, the remainder of the string is temporarily made up of one or more joints of larger diameter casing indicated at 48, the lower end of which is screw threaded to the coupler 46 and is held suspended by slips 50 in a spider 51 resting on 30 the derrick floor, the lower end of the casing is then cemented as indicated at 45.

The distance between the face of the casing flange 52 and the coupling 46 is determined (this may be easily done as the coupling is near the surface), a nipple 54 is then cut corresponding to this measurement and threaded at each end. A stand 56 made up 40 of one or more joints of casing is then connected to the nipple by a coupling 58 provided with external threads designated at 59. Stand 56 is next lowered through the casing 48 and screw threaded into the coupling 46 as shown in Figure 6.

45 The inner string is now suspended or carried by a usual casing elevator 60 and the temporary supporting string 48 disconnected from the coupling 46 and raised in the derrick to a point above the spider 51, the slips 50 50 are then removed and replaced with slips 62 which will grip the stand 56 as shown in Fig. 7.

After the inner string is suspended on the spider the elevator and stand 48 are then removed and a control head fitting 65 is lowered over the projecting end of the stand as shown in Fig. 8. The inner string is again suspended by the elevator, the spider and slips removed and the casing head fitting 65 screw threaded to the coupling 46 60 as shown in Fig. 9, the weight of the inner string will then be carried by the casing head fitting. Having the inner string suspended 65 the stand is now removed, thus completing

the operation of landing the casing as shown in Fig. 10.

Referring to Fig. 11 a single string of casing designated at 70 is shown suspended in a well hole 71. As previously stated the outer string is usually landed at a comparatively shallow depth and may be released without danger. However should it be necessary to land it a considerable depth, the improved method may be employed as above 70 described in which case the outer string 70 is made up with the usual couplings with the exception of the upper joint near the surface at which point a special coupling member 72 is applied, the string then being suspended by a larger diameter section of casing 73 with a coupling 74 engaging a casing clamp 75 resting on a suitable support 76. 75

The inner section of casing 78 extending above the coupling utilized to suspend the string while making up and connecting the casing 73 is then removed. The string 70 thus suspended may then be cemented (if required) and drilling continued for the next string. 80

In Figs. 12 and 13 a plurality of strings are shown in assembled relation which consist of a usual hook-up including, for example, an inner string of $9\frac{5}{8}$ " casing designated at 80, an intermediate string of $13\frac{3}{8}$ " 85 diameter casing indicated at 81, and an outer string 82 of 16" diameter casing, the threaded coupling members employed in carrying out the method being indicated at 84 on the inner string and at 85 on the intermediate string to which are connected sections 86 100 and 87 made to the measurement taken during the landing operation. When $13\frac{5}{8}$ " and 16" casings are telescoped it is necessary to provide larger diameter casings for the top joint in order to give sufficient clearance, therebetween to accommodate the couplings, this joint being indicated at 88 and consists of $18\frac{5}{8}$ " casing connected to the outer string by a suitable coupling 90, the upper ends of 105 the sections 86 and 87 being connected by couplings 90 and 92 to control heads 93 and 94. 110

Under certain conditions it is desirable to suspend the inner string of casing in casing heads having packing means, this form of head being illustrated in Fig. 13, the assembly of the various strings being the same as that shown in Fig. 12. In this instance the inner and intermediate strings are provided with couplings 100 and 102 respectively which compress packing 106 in the control heads 108 and 110 secured to the upper end of the outer and intermediate strings. 115

We claim:

1. A method of landing a well casing comprising making up a string of casing as the same is lowered in the well, applying a coupling member to the upper end of one of the joints of said casing, making up the re- 120 125 130

mainder of the string with additional joints of casing as it is lowered in the well, said coupling member being interposed in said string of casing at such point that when said casing has reached the desired depth it will be below the upper end of the well, providing a casing supporting member at the upper end of the well, measuring the distance between said coupling and the supporting member, making up a section of casing corresponding to the measurement taken, connecting the lower end of said section of casing to said coupling member and the upper end thereof to said supporting member, and finally removing that portion of the string of casing extending above said coupling member.

2. A method of landing a plurality of concentric strings of well casings in an oil well, comprising providing the outer string of casing with a top connecting flange, coupling up an inner string of casing and providing the upper end of said string with a coupling having internal and external threads, connecting an upper section of casing to said coupling and suspending said inner string, measuring the distance between the flange of the outer casing and the coupling at the upper end of the inner string, making up a second section of casing one size larger in diameter than said inner string and of a length corresponding to the measurement taken, connecting a control head to its upper end, connecting said second section of the casing to said coupling and the control head to the top flange on the outer casing.

3. A method of landing an inner string of well casing and connecting it to an outer casing previously landed in a well hole without releasing said inner string, comprising interposing a coupling externally threaded in the inner string at a point so that it will be located near the surface when the inner string has been lowered to the required depth in the hole, measuring the distance between the upper end of the outer casing and said externally threaded coupling, making up a second section of casing corresponding in length to the measurement taken and connecting it to said coupling while the inner string is suspended, and applying a member to said second section of casing and connecting it to the upper end of the outer string of casing.

4. A method of landing well casing including an outer casing, comprising making up a string of inner casing with the usual couplings except the upper joint near the surface, applying a coupling having internal and external threads to the upper joint of said casing, screwing an upper section of casing into said coupling and suspending the inner string of casing, measuring the distance between the upper end of the outer

casing and said internally and externally threaded coupling, lowering a second string of one size larger casing corresponding to the measurement taken over the upper section of casing, connecting said second string of casing to said coupling, applying a member to the upper end of said second string and connecting said member to the outer casing, and finally removing the upper section of casing from said coupling.

5. A method of landing a well casing including an outer casing having a top flange and an inner casing, comprising inserting a coupling internally and externally threaded in said inner string at such a point that it will be near the surface when the string has been lowered to the required depth in the well hole, suspending said inner casing by suitable stationary supporting means, measuring the distance between the top flange on the outer casing and the coupling and making up a second casing corresponding to the measurement taken, applying a control head to said second casing, lowering said second casing over the portion of said inner casing projecting above the supporting means and permitting it to rest thereon, suspending said inner string by an elevator, removing the supporting means, connecting said second string to said coupling and the control head thereon to the outer casing top flange, and finally removing the portion of the inner string extending above said coupling.

6. A method of landing a well casing comprising making up a string of casing with the usual couplings as the same is lowered in the well, applying an internally and externally threaded coupling to the upper end of one of the joints of said casing, making up the remaining string with additional joints of casing as it is lowered in the well, cementing said casing in the hole, providing a supporting member at the upper end of the well, said externally threaded coupling being interposed in said string of casing at such point that when said casing has reached the desired depth it will be below the upper end of the well, measuring the distance between said internally and externally threaded coupling and the supporting member, making up a section of casing corresponding to the measurement taken, connecting the lower end of said section of casing to said internally and externally threaded coupling and the upper end thereof to said supporting member, and finally removing the portion of the string of casing extending above said internally and externally threaded coupling.

7. A method of landing a well casing including an outer casing and an inner casing comprising connecting an internally and externally threaded coupling to the upper end of the inner string of a casing, temporarily connecting an upper string of larger diame-

ter casing to said inner string by screwing it
to the external thread on said coupling, low-
ering the inner string in the usual manner
until the coupling is a few joints below the
5 surface, suspending the string thus made up,
measuring the distance between the upper
end of the outer string and the coupling,
connecting the inner string with the larger
diameter upper casing, making up a nipple
10 corresponding in length to the measurement
taken, connecting a stand of casing to said
nipple by an external threaded coupling,
screwing said nipple into the coupling on the
inner string, suspending the inner string by
15 a casing elevator, engaging the portion of
the stand of casing projecting above the
upper end of the temporary supporting up-
per casing, disconnecting the temporary
supporting casing from the coupling on the
20 inner string, suspending the inner string by
a stationary supporting means engaging
said stand, lowering a control head over
said stand and allowing it to rest on the sup-
porting means, again suspending said stand
25 by the casing elevator, removing the sta-
tionary supporting means, screw threading
said casing head to the coupling connect-
ing the nipple and stand, connecting said
control head to the upper end of said outer
30 casing, and finally removing said stand from
said nipple.

In testimony whereof we affix our signa-
tures.

35

BURT S. MINOR.
FLOYD J. WHEELER.

40

45

50

55

60

65