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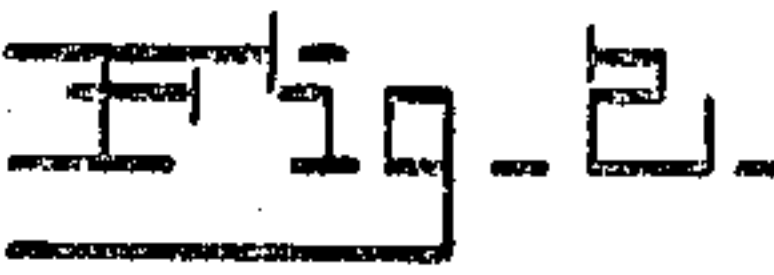
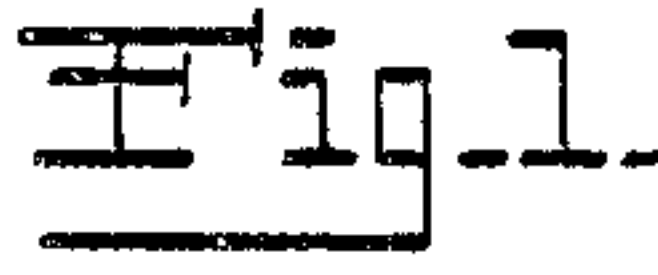
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CHOKES FOR OIL WELLS

Filed April 21, 1930

2 Sheets-Sheet 1



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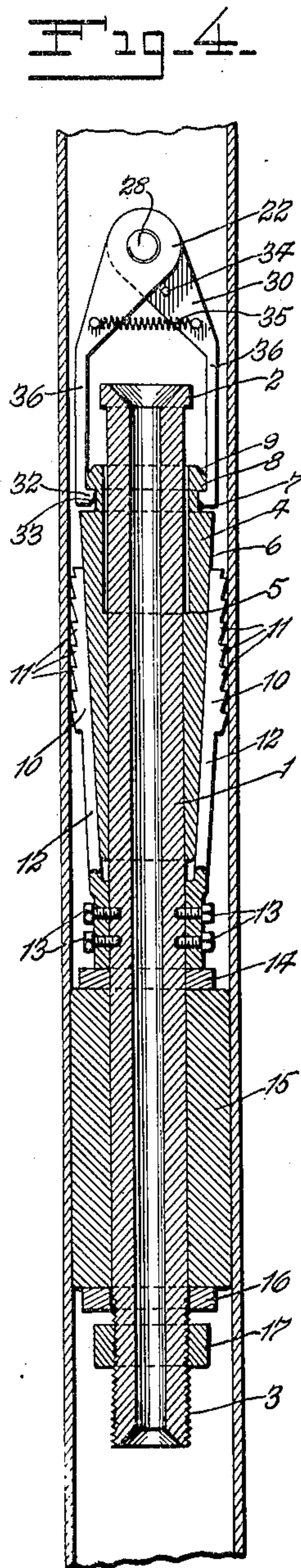
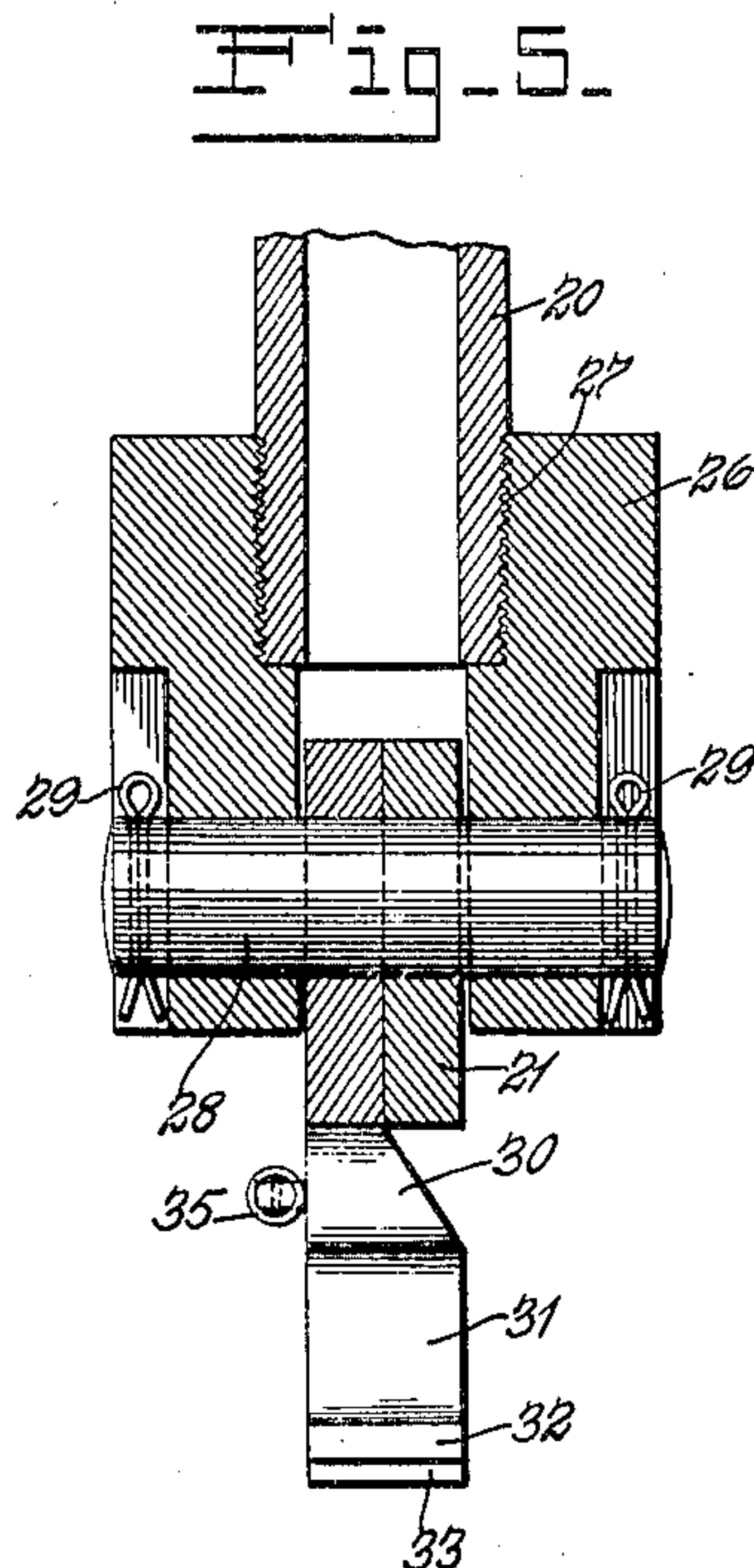
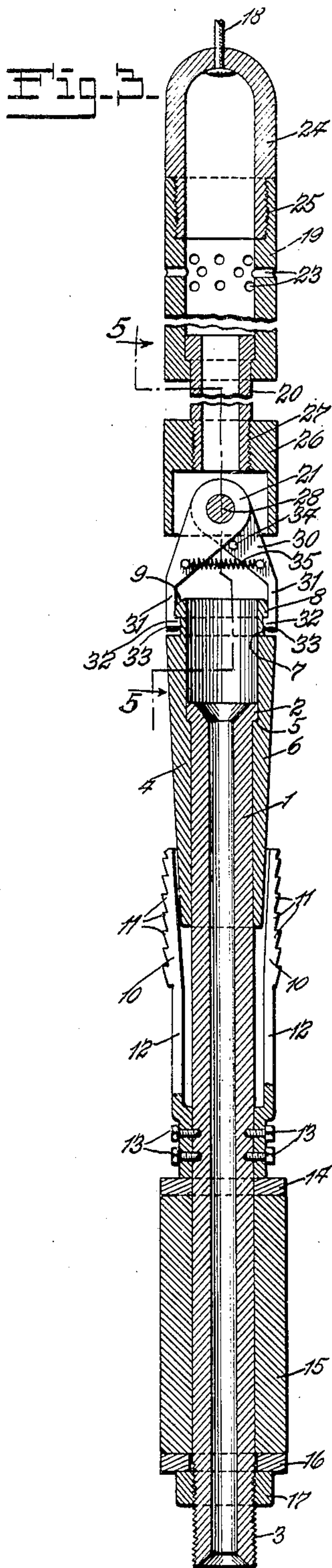
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UNITED STATES PATENT OFFICE

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CHOKE FOR OIL WELLS

Application filed April 21, 1930. Serial No. 445,963.

This invention relates to chokes for oil wells.

One of the objects of this invention is to provide a choke tube for oil wells which has means whereby the device will be secured in position within the well when it is lowered.

Another object of this invention is to provide a choke tube which may be easily and conveniently removed from the well.

Another object of this invention is to provide a choke tube having self-adjusting packing means.

Another object of this invention is to provide suitable apparatus for placing and removing such a choke or like device.

Further objects will appear from the detail description taken in connection with the accompanying drawings in which:—

Fig. 1 is an elevation showing the device with the lowering mechanism.

Fig. 2 is a view partly in section showing the device in position in a well and engaged by lifting tongs.

Fig. 3 is a vertical cross-section, Fig. 1.

Fig. 4 is a vertical cross-section, Fig. 2.

Fig. 5 is a sectional view of lowering tongs on line 5—5, Fig. 3.

A cylindrical choke tube 1 has at its upper end a circumferential flange 2, and has at its lower end exterior threads 3.

A sleeve mandrel 4 is positioned about and in sliding engagement with the tube 1 and is reamed to provide a shoulder 5 adapted to engage the flange 2 on the tube. The outer circumferential surface has a taper 6, and at its upper end a circumferential groove 7 which forms the top flange 8. The outer surface of the mandrel is bevelled as shown at 9.

A plurality of slips 10, having teeth 11, are resiliently attached to the tube 1 by leaf springs 12, which may be secured to the tubes in any convenient manner as by the screws 13.

The taper 6 of the mandrel 4 is such that downward movement of the mandrel from its initial position in which the shoulder 5 of the mandrel is in engagement with the flange 2 of the tube, will force the slips 10 outward against the casing, causing the engagement

of the teeth 11 to prevent upward movement of the tube.

A ring 14 is secured to the tube 1, as by welding, and forms an abutting surface for a packing sleeve 15 of yielding material, which may preferably be of rubber. Beneath the packing sleeve 15, a collar 16 is mounted on and in sliding engagement with the tube 1. The collar 16 is secured against downward movement displacement by a nut 17 in engagement with the threads 3.

The arrangement of the packing sleeve 15 and the collar 16 is such that, when the tube is in position in the well and a fluid pressure is being exerted on it from the bottom, the collar 16 will be forced upwardly compressing the packing material 15 and forcing it out against the casing, thus forming a fluid seal between the tube and the casing.

The apparatus for lowering and raising the choke includes a cable 18, a set of jars 19 and 20, a pair of tongs 21 for lowering and a pair of tongs 22 for raising the choke. The jar elements 19 and 20 are in telescopic engagement as shown in the drawings. The jar elements are hollow and the upper element 19 has perforations 23. The cable 18 may be secured to a separate detachable element 24 which is fastened by a threaded connection 25 to the upper jar element 19.

The tongs 21 and 22 are preferably pivoted to a separate detachable element 26, which is secured to the lower jar element 20 by a threaded connection 27. The legs of the tongs are mounted on pivot pins 28 secured in the element 26 by the cotters 29. Each leg of the tongs 21 has an oblique section 30 and a vertical section 31 carrying an engaging jaw 32 having a bevelled surface 33. Co-operating stops 34 are placed on each of the legs to limit their inward movement, and a spring 35 holds the tongs in a fixed position.

The tongs 22 are similar to tongs 21 except that longer vertical sections 36 are provided on the legs. Otherwise, in the drawings, the reference characters used in connection with the tongs 21 are used to identify the respective parts of the tongs 22. The vertical section 36 is of such a length as to accommodate the full travel of the mandrel

4 with respect to the tube 1, the function of which will be more apparent from the following description of the manipulation, and operation of the apparatus and choke.

5 If it is desired to set the choke at the base of the casing, a shoulder on which to set the tube must be provided. In such a case a perforated anchor of the desired length is connected to the lower end of the tube by the
10 threads 3. If, however, it is desired to set the tube at an intermediate point in the hole, no anchor or distance piece is necessary. The tongs 21 are attached to the mandrel and the assembly is lowered into the well by
15 the steel cable 18. The steel cable is run through a stuffing box at the casing head and all the flow through the tubing is cut off during the operation. Displaced fluid passes both around the entire assembly and up
20 through the orifice in the tube 1, through the center orifice in the jars 19, 20, and through the perforations 23. If the assembly is lowered until its lower end rests upon a liner in the well or until the perforated anchor
25 reaches the bottom of the well or tubing, the continued travel of the weighted jars 19, 20, will press the mandrel 4 downward, forcing the slips 10 outward and against the casing. This movement may be assisted by spudding
30 with the jars 19 and 20.

When the mandrel 4 has traveled downward with respect to the tube 1 a sufficient distance as to force the slips 10 in engagement with the casing, the top of the tube 1 will
35 come into engagement with the oblique sections 30 of the tongs 21 and force their opening, releasing the mandrel. The lowering mechanism may then be removed from the hole and flow permitted from the well by
40 opening the surface gate valves. The differential set up at the base of the tube assembly forces the collar 16 upward, extending the packing sleeve 15 against the casing, and extends the slips 10 still more tightly against
45 the casing.

If it is desired to set the choke at a point some distance from the bottom, the assembly is lowered to that point and flow from the well slowly started. The fluid movement will
50 tend to raise the tube with its integral elements upward while the jars hold the mandrel in a fixed position, thus causing the slips 10 to engage the casing wall and release the tongs. If the teeth on the slips are sharp
55 no further upper movement of the tube will occur. The movement of the fluid moves the collar 16 upward compressing the packing sleeve 15. If the well is allowed to flow for a few hours the slips will become tightly
60 engaged with the casing and the packing sleeve will be tightly wedged between the tube and the casing so that the choke will not move downward if the flow is stopped.

When it is desired to remove the choke
65 from the hole the jar assembly is equipped

with the tongs 22 having the longer vertical legs 36 and the assembly is lowered into the well. The bevelled surface 33 on the tongs engage with the bevelled ring 9 on the mandrel and the jaws 32 then grasp the top flange
70 8 of the mandrel. A pull on the cable will raise the mandrel bringing its shoulder 5 into engagement with the top flange 2 of the tube, releasing the slips 10 causing them to move toward the tube and away from the casing.
75 The assembly is then in condition to be raised from the well. The packing sleeve 15 will not wedge the tube sufficiently tight to prevent removal, especially since an upward pull will elongate the packing sleeve by reason
80 of the sliding connection of the lower collar 16 with the tube.

It will thus be seen that a choke tube has been provided which has means readily operable to hold it in position after it is lowered
85 into the well, in connection with means for packing between the tube and the casing so as to make the choke effective. The choke has been provided with means which, taken in connection with novel apparatus also provided, enables the choke to be readily placed
90 in and removed from a well.

This application is related to my application Serial No. 558,208, filed August 20, 1931, in which application I have claimed the
95 method disclosed herein.

It is obvious that various changes may be made in the details of construction within the scope of the appended claims, without departing from the spirit of this invention;
100 and that various parts may be used separately without the whole.

I claim:

1. A choke for oil wells comprising, a tube smaller in exterior diameter than the well casing, a plurality of slips arranged circumferentially about the tube, a tapered mandrel in sliding engagement with the tube and tapered to force the slips outwardly against the casing, means on the mandrel for engaging tongs and means actuated by downward travel of the mandrel for releasing the tongs.
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2. A choke for oil wells comprising, a tube smaller in exterior diameter than the well casing, a plurality of slips arranged circumferentially about the tube, a tapered mandrel in sliding engagement with the tube adapted to force the slips outwardly against the casing, and means on the mandrel for engaging tongs; the tubes, mandrel and tongs being arranged and adapted so that full downward movement of the mandrel causes the top of the tube to engage the legs of the tongs to release them from the mandrel.
110 115 120

3. A choke for oil wells comprising, a tube smaller in exterior diameter than the well casing, a plurality of slips adapted by outward movement to engage the well casing, a tapered mandrel about and in sliding engagement with the tube adapted by downward
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movement to force the slips outward, in combination with a pair of lowering tongs having means to engage the mandrel and means cooperating with the tube to release the tongs when the mandrel has been moved to a securing position.

4. A choke for oils wells comprising, a tube smaller in exterior diameter than the well casing, a plurality of slips adapted by outward movement to engage the well casing, a tapered mandrel about and in sliding engagement with the tube adapted by upward movement to release the slips, in combination with a pair of tongs having means to engage the mandrel for placement of the choke.

5. A choke for oil wells comprising a cylinder smaller in exterior diameter than the well bore, a plurality of slips arranged about the cylinder, a mandrel between the cylinder and slips arranged when depressed to spread the slips, and means on the mandrel for engaging tongs whereby the choke may be lowered to position.

6. A choke for oil wells comprising a cylinder smaller in exterior diameter than the well bore, a plurality of slips arranged about the cylinder, a mandrel between the cylinder and slips arranged when depressed to spread the slips, means on the mandrel for engaging tongs whereby the choke may be lowered to position, and an abutment on the cylinder adapted to engage the mandrel and prevent its displacement.

7. A choke for oil wells comprising a cylinder smaller in exterior diameter than the well bore, a plurality of slips arranged about the cylinder, a mandrel between the cylinder and slips arranged when depressed to spread the slips in combination with weighted tongs adapted to engage the mandrel, and jars from which the tongs are suspended and adapted to force the mandrel in downward position.

8. A device for insertion in a well including a vertical shaft on the device, slips for engaging a well casing disposed about said shaft and resiliently attached thereto, and a tapered mandrel mounted between said shaft and said slips whereby a downward movement of the mandrel on the shaft will spread the slips to engage the well casing, in combination with lowering tongs adapted to engage the mandrel, said lowering tongs having oblique leg sections arranged and adapted to engage the top of the shaft to spread the legs of the tongs and release the device when the mandrel has been lowered to spread the slips.

9. A device for insertion in a well including a vertical shaft on the device, slips for engaging a well casing disposed about said shaft and resiliently attached thereto, and a tapered mandrel mounted between said shaft and said slips whereby a downward movement of the mandrel on the shaft will spread

the slips to engage the well casing, in combination with apparatus for removing the device comprising tongs adapted to engage the mandrel and having vertical leg sections of a sufficient length to accommodate the full length of travel of the mandrel on its shaft.

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