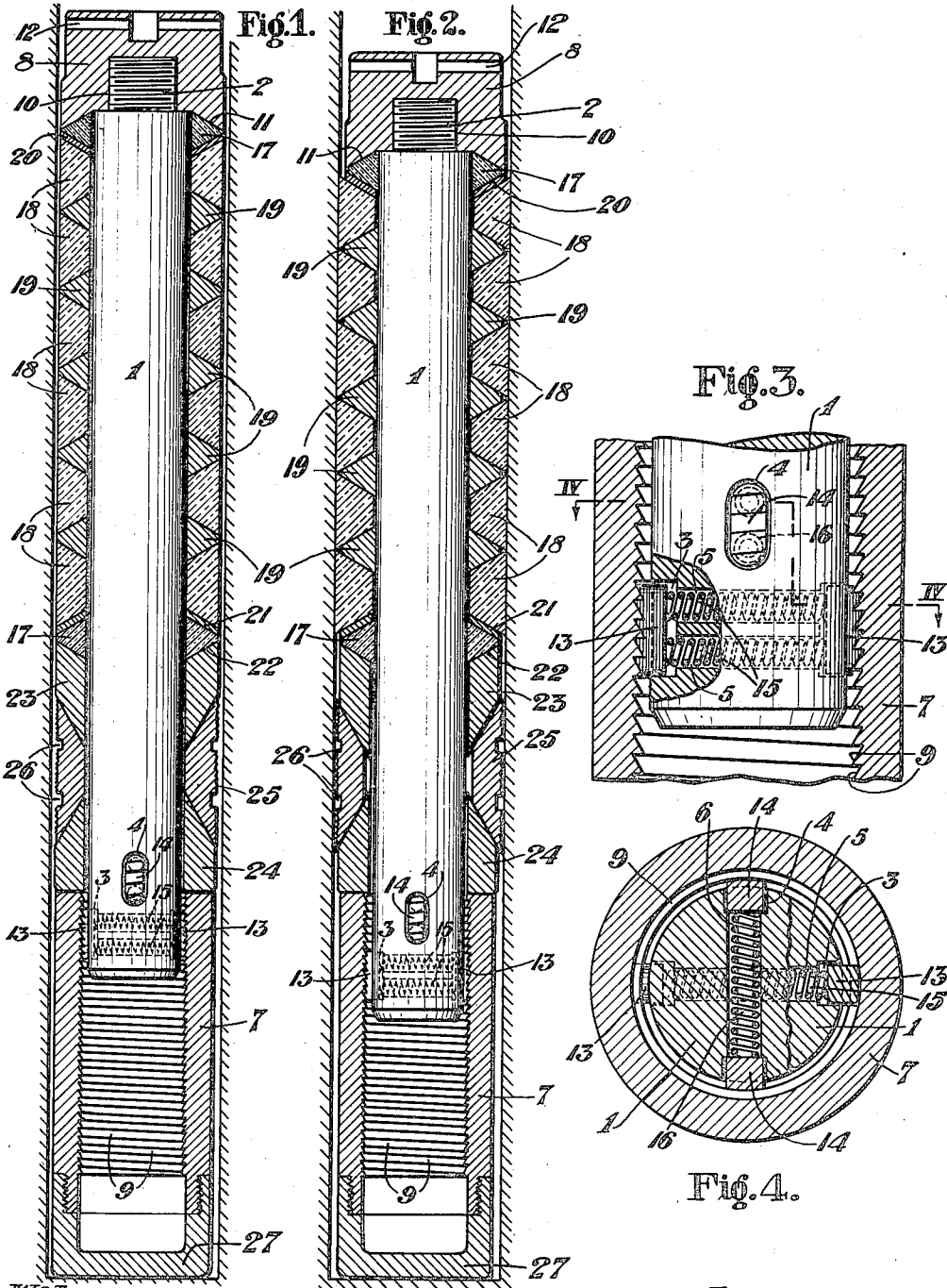


P. H. MACK.
OIL WELL PACKER.
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1,395,718.

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Witnesses:

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UNITED STATES PATENT OFFICE.

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OIL-WELL PACKER.

1,395,718.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PATRICK H. MACK, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Oil-Well Packers, of which the following is a specification.

The prime object of the present invention is to provide a new and improved well packer particularly designed so that the packer may be lowered into position in the well and also set by means of drilling tools, for example, a drill bit, etc., attached to the rope or cable.

It has heretofore been the practice to lower and position or set the packer by means of a string of casing or tubing, and the packers have been designed so as to be manipulated by the casing or tubing. In the operation of forming wells, I have discovered that it is very desirable to lower and set the packer by means of the tools rather than by means of the tubing or casing, and the present invention is particularly directed to a packer of simple and efficient construction enabling it to be lowered into the well and set by the tools rather than by the casing or tubing.

In the embodiment of my invention as illustrated by the drawings, I have shown a plug or bottom hole packer, but my invention is not limited to a packer of this type only, for it is evident that with the employment of an anchor structure in connection therewith, the packer may be lowered by the tools and set at the desired distance above the bottom of the hole.

In the accompanying drawings which illustrate an application of my invention,

Figure 1 is a central longitudinal sectional view of a packer constructed in accordance with my invention, showing the position of the parts before they are compressed;

Fig. 2, a similar view showing the position of the parts after compression;

Fig. 3, an enlarged detail view; and

Fig. 4, a sectional view, the section being taken on line IV—IV of Fig. 3.

Referring to the drawings and as preferred, the packer includes a body 1 preferably solid and of cylindrical form. The body at its upper end is provided with an ex-

ternally threaded projection 2, its lower end being formed with two sets of recesses 3 and 4, the latter being adapted to receive spring controlled engaging means, as hereinafter described. In addition to the recesses 3 and 4, the lower end of the body is formed with cylindrical openings 5 and 6, which extend through the body and communicate respectively with the recesses 3 and 4. It will be noted that the recesses 3 and 4 and the said openings are arranged in different horizontal planes, with the recesses of one set disposed at right angles with the other set of recesses.

The lower portion of the packer structure includes a telescopingly connected sleeve or hollow element 7, and 8 designates the upper end member or cap. Member 7, as shown, is formed with a bore, the wall of which is provided with teeth or serrations 9, which, as shown, are preferably arranged spirally on the interior of the bore and taper from the top toward the bottom. The upper opposing end member or cap 8 is provided with a threaded recess 10 adapted to receive the externally threaded extension 2 of the body, an annular inclined shoulder 11, and an opening 12, the latter being designed to receive a pin, not shown, whereby the packer may be attached to a set of tools by means of a wire or other suitable means.

Disposed within the recesses 3 and 4 of the body member 2, I employ two sets of toothed members or dogs 13 and 14, the members or dogs 13 being positioned below the members 14. 15 and 16 designate coiled springs disposed within the openings 5 and 6 and adapted to respectively cooperate with the members 13 and 14.

From the above described construction, it will be understood that as weight or pressure is applied to the upper end of the packer, the body 1 will be depressed, thereby causing the lower end of the body, together with its spring controlled toothed elements, to be lowered within the sleeve or lower end member 7, and the teeth of said toothed members to engage the teeth of member 7.

The arrangement of the toothed members 13 and 14 relatively to the teeth 9 of member 7 is such that a very slight movement of body member 1, say one-half the depth

of a tooth, will be sufficient to effect the desired action between the coacting locking means carried by the body and member 7.

The compressible packing element or elements surrounding the body, as illustrated and as preferred, include two sets of compressible elements 17 and 18. The elements 17, located at the upper and lower ends of the packing, are designed upon compression to be forced inwardly against the body for the purpose of forming seals at the upper and lower ends of the packing to prevent fluids working in between the body and the packing, while the elements 18 are designed to be forced outwardly against the wall of the well, as is usual.

Elements 18 have top and bottom faces inclined from the outer periphery inwardly, while the elements 17 have their top and bottom faces inclined in an opposite direction from the faces of elements 18. Interposed between the elements 18 are rigid ring members 19 having their faces inclined in opposition with the corresponding faces of the compressible elements 18. The upper packing element 17 is held between the shoulder 11 of cap or upper member 8 and a rigid member 20, and the lower element 17 between a similar rigid member 21 and an inclined face 22 of an annular wedge shaped abutment or member 23. The compressible elements may be formed of any suitable material; I have found lead to be a desirable material for some purposes.

Surrounding the body and interposed between the member 23 and a wedge member 24 are slips 25. 26 designates grooves for receiving flexible means (not shown) for retaining the slips in position prior to their being forced out into contact with the wall of the well.

The end of member 7 may be formed with an integral closure or, as shown, a cap 27 may be applied thereto. Prior to introducing the packer into the well, a pin is placed in the opening 12 of cap 8, and said pin is then connected by a wire leading from the pin to the bit or other tool. After this connection is made, the packer is lowered into the well until (in the form illustrated) the cap 27 or the lower end of the bottom member of the packer reaches the bottom of the hole. The weight of the tools on the upper end of the packer forces the packer downwardly; after the packer reaches the bottom of the hole the tools are raised sufficiently to break the connecting wire, or other means by which the packer structure is connected with the bit. The tools are then employed for pounding on the packer cap 8, thus forcing said cap, together with the body member, downwardly. This downward movement of the body and cap will compress and expand the packing elements and also cause the slips 25 to be forced outwardly against

the wall of the well. The automatically operable coacting locking means of the body and telescoping sleeve function to prevent a relative movement of these members after the packer is set.

What I claim is:—

1. In a well packer, a body member, a packing surrounding the body member, a telescoping member associated with the lower end of the body, said telescoping member having a serrated bore therein, and yieldable locking means on the body coacting with the serrations in the bore.

2. In a well packer, a body member, a packing surrounding the body member, a telescoping member into which the lower end of the body is entered, said telescoping member having a bore therein provided with spirally arranged serrations, and locking means on the body member coacting with the spirally arranged serrations to effect an engagement therebetween at varying elevations.

3. In a well packer, a body member, a packing surrounding the body, a lower member adapted to receive the body member and formed with a toothed bore, and toothed means carried by the body member and coacting with the teeth of the bore for locking said members together.

4. In a well packer, a body member, a packing surrounding the body, a lower member adapted to receive the body member and formed with a toothed bore, and spring pressed toothed means carried by the body member and coacting with the teeth of the bore for locking said members together.

5. In a well packer, a body member, a packing surrounding the body, a telescoping member associated with the lower end of the body, said body and telescoping member having coacting locking means, said coacting means including toothed elements carried by the body and arranged in different horizontal planes.

6. In a well packer, a body member, a packing surrounding the body, a telescoping member associated with the lower end of the body, said body and telescoping member having coacting locking means, said coacting means including two sets of toothed elements arranged at right angles to each other and disposed in different horizontal planes.

7. In a well packer, a body member, sectional compressible packing surrounding the body, slips surrounding the body, wedging means for expanding the slips, an upper end member, a lower telescoping member, said packing, slips and wedging means held between said upper and lower members and adapted to be set in packing position by the movement of the body member relative to the telescoping member.

8. In a well packer, a body member, a

packing surrounding the body member, a
telescoping member associated with the
lower end of the body, said body and tele-
scoping member having coacting locking
5 means, said coacting means including a plu-
rality of elements carried by the body and
arranged in different horizontal planes.

In testimony whereof I affix my signature
in presence of two witnesses.

PATRICK H. MACK.

Witnesses:

W. E. BURDICK,
RALPH WHEELER.