

**No. 706,173.**

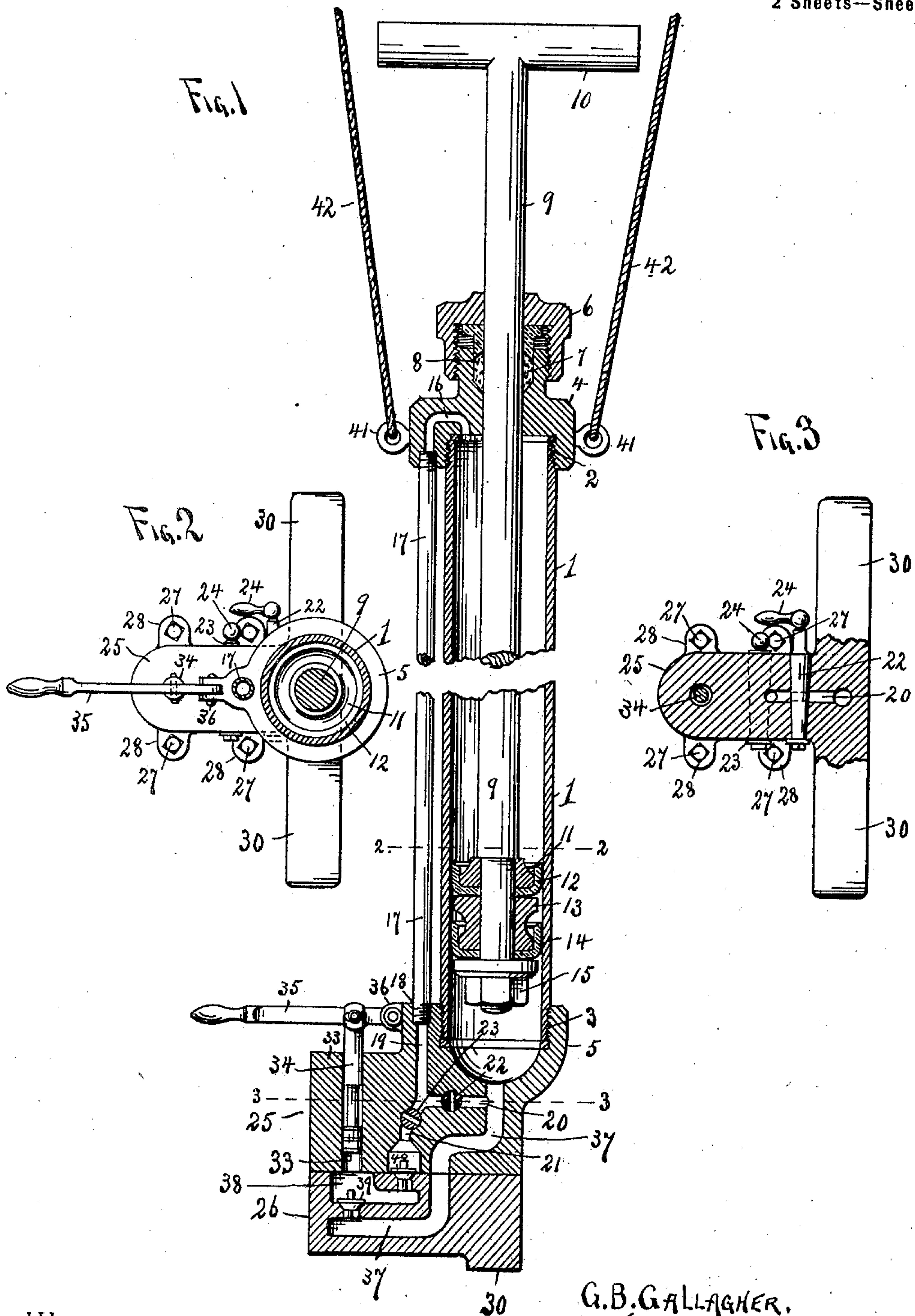
**Patented Aug. 5, 1902.**

G. B. GALLAGHER & C. J. MACOMBER.  
FLUID PRESSURE APPARATUS FOR WELL DRILLING TOOLS.

(Application filed July 17, 1901.)

(No Model.)

**2 Sheets—Sheet 1.**



Witnesses  
C. H. Woodward.  
R. M. Elliott.

30 G.B. GALLAGHER,  
C.J. MACOMBER, Inventors,  
by *Chas. Snow & Co.*  
Attorneys

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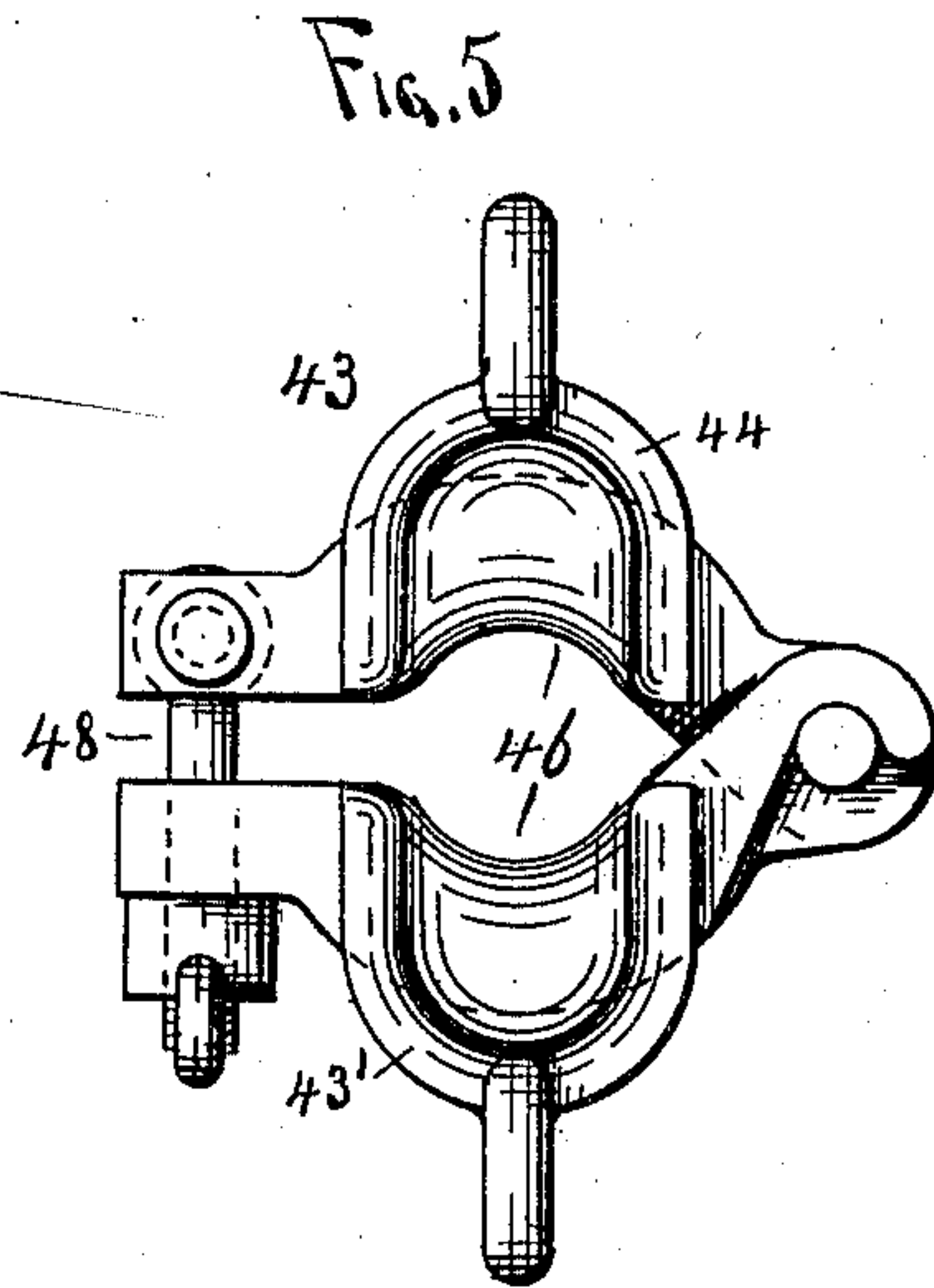
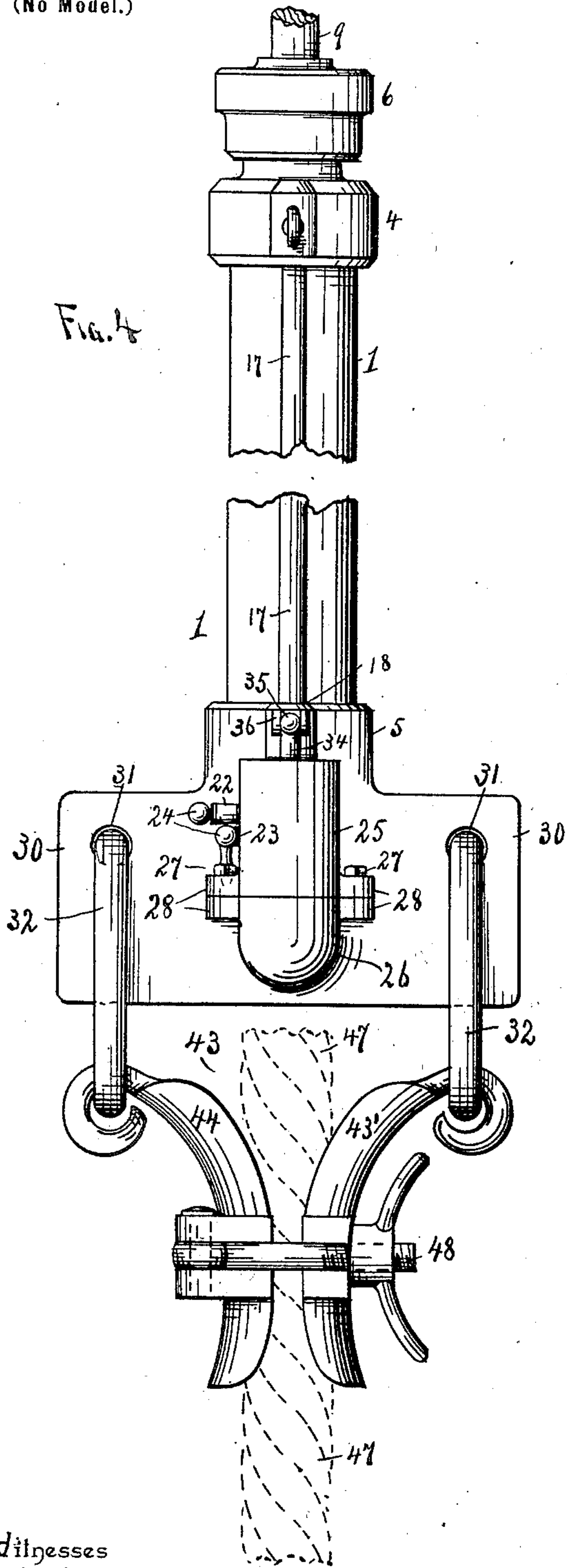
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G. H. Woodward  
R. M. Elliott.

G. B. GALLAGHER,  
C. J. MACOMBER, Inventors,  
by *Chas. Snow & Co.* Attorneys



# UNITED STATES PATENT OFFICE.

GEORGE BYRON GALLAGHER AND CHARLES JOHN MACOMBER, OF ST. MARYS, OHIO.

## FLUID-PRESSURE APPARATUS FOR WELL-DRILLING TOOLS.

SPECIFICATION forming part of Letters Patent No. 706,173, dated August 5, 1902.

Application filed July 17, 1901. Serial No. 68,654. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE BYRON GALLAGHER and CHARLES JOHN MACOMBER, citizens of the United States, residing at St. Marys, in the county of Auglaize and State of Ohio, have invented a new and useful Fluid-Pressure Support for Well-Drilling Tools, of which the following is a specification.

This invention relates generally to well-drills, and specifically to a fluid-pressure support for well-drilling tools.

The object of the invention is to present a simply-constructed, thoroughly-efficient, and readily-operable apparatus of the character specified which in use will be at all times under perfect control of the operator either to effect raising or lowering of the drill and in which the parts of the apparatus will be so constructed and assembled as to be readily separable for purposes of cleansing or repair, a further object had in view by the mechanism employed being to dispense with all complicated and delicate instrumentalities, thereby insuring effective service with a minimum of danger of breakage or derangement in use.

With these and further objects in view, as will appear as the nature of the invention is better understood, the invention consists in the novel construction and combination of parts of a hydraulic attachment for well-drilling tools, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like numerals of reference indicate corresponding parts, we have illustrated a form of embodiment of our invention capable of carrying the salient features thereof into effect, it being understood that various changes in the form and proportion of the parts may be resorted to without departing from the scope of the invention, and in these drawings—

Figure 1 is a view in sectional elevation, exhibiting the relation existing between the various parts of the device. Fig. 2 is a view in horizontal section, taken on the line 2 2 of Fig. 1. Fig. 3 is a similar view taken on the line 3 3 of Fig. 1. Fig. 4 is a view in elevation, exhibiting the device with a rope-clamp associated therewith. Fig. 5 is a view in plan,

exhibiting the general construction of the rope-clamp shown in Fig. 4.

Referring to the drawings and to Fig. 1 thereof, we have exhibited a hydraulic attachment for well-drilling tools embodying the essential features of our invention. In this view, 1 designates a cylinder for containing the fluid to act as a buffer, the fluid to be either water or oil, as may be preferred. The cylinder is provided at its extremities with threaded portions 2 and 3, respectively, the portion 2 being engaged by the upper cylinder-head 4 and portion 3 by the lower cylinder-head 5, this latter cylinder-head also constituting a casing for housing the valves controlling the passage of fluid to the respective ends of the cylinder and also as a pump-casing. The cylinder-head 4 has its upper portion threaded to be engaged by a nut 6, a portion of the head 4 being chambered out, as at 7, to receive suitable packing material 8, which material, in conjunction with the nut 6, constitutes a packing-box. The nut 6 and cylinder-head 4 are each provided with a central opening in which works a piston-rod 9, carrying at its upper end a cross-bar 10 to engage with the walking-beam of an engine, and as this will be readily understood detailed illustration showing this connection is deemed unnecessary. The lower portion of the piston-rod is reduced, and on the reduced portion is fitted a piston-head 11, seated in a cup 12, of leather or the like, and bearing against the cup 12 is a follower 13, also seated in a cup 14, of leather, a nut 15, screwed onto the lower end of the piston-rod, serving to force the follower against the piston-rod, and thereby cause the cups to impinge the inner surface of the cylinder to present an effective juncture between the two to prevent passage past the cups of the fluid contained in the cylinder. The cylinder-head 4 is provided with a port 16, in this instance of inverted-U shape and terminating on the under side of the head, and communicating with this port is a pipe 17, constituting a by-pass, the lower end of the by-pass having threaded engagement with the upper portion of the cylinder-head 5, as at 18. Communicating with the lower end of the by-pass is a port 19, which extends downward within the cylinder-head for some



distance and then forks into two branches 20 and 21, respectively, each of these branches being provided with a transverse tapered valve-seat to be engaged by valves 22 and 23, respectively, the valves being extended outward to one side of the cylinder-head, as shown in Fig. 3, and provided with suitable handles 24, by which they may be turned. The valve 22 controls the passage of fluid from one end of the cylinder to the other through the by-pass 17 and will hereinafter be designated as the "by-pass cut-off" valve, and the valve 23 controls the passage of fluid from the lower portion of the cylinder through the pump to the upper portion of the cylinder and will hereinafter be designated the "pump cut-off" valve. The lower cylinder-head 5 is constructed of two sections 25 and 26, the section 25 by preference being integral with the cylinder-head and the section 26 detachable therefrom and held assembled therewith by bolts 27, passing through aligned ears 28 on the two sections. The general contour of the valve and pump containing portion of the lower cylinder-head is clearly shown in Figs. 2 and 3 and in elevation in Figs. 1 and 4 and is exhibited as a projection extending at right angles to the length of the cylinder, and while this manner of constructing the lower cylinder-head has been found advantageous in use and is one that will generally be preferred it is to be understood that the invention is not to be limited to this precise manner of arrangement. The cylinder-head 5 is constructed with side extensions 30, provided with openings 31, through which pass links 32 for supporting the rope-clamp, as will presently appear.

The front portion of the lower cylinder-head is provided with a vertical chamber 33, into which fits a plunger-rod 34, constituting one member of the pump, the rod being operated by a lever 35, having a pivotal connection with the rod and with an offset or projection 36 of the cylinder-head. Within the upper and lower sections of the lower cylinder-head there is formed a duct or port 37, extending from beneath the lower end of the cylinder to beneath the chamber in which the plunger-rod of the pump works, and beneath and communicating with the chamber 33 is a chamber 38, this chamber being placed in communication with the duct 37 through the medium of an upward-opening gravity-valve 39. To one side of the valve 39 and above the same there is arranged a second valve 40, this valve controlling the passage-way between the branch 21 of the port 19 and the chamber 38, the branch 20 of the port 19 opening into the duct 37, as clearly shown in Fig. 1.

The upper cylinder-head is provided with eyes 41, to which are connected ropes 42, these ropes to be employed for the purpose of lifting the cylinder when the operation of drilling a section of the well equal to the stroke of the cylinder has been completed.

The rope-clamp 43, to which reference has been made, comprises, generally stated, two members 43' and 44, having their upper extremities formed into hooks 45 to engage with the links 32. The opposed faces of the members 43 and 44 are concaved, as shown at 46, to conform to the contour of the rope 47, (indicated by dotted lines in Fig. 4,) a clamp-bolt (designated generally 48) being employed for effecting a rigid union between the members 43' and 44 and the rope. The general description of the rope-clamp herein given will be sufficient to render it easily understood as to the manner of its operation, no specific description being given, as this clamp forms no part of the present invention.

The operation of the device is as follows: The cylinder being in its lowest position—that is, with the piston-head close to the upper cylinder-head—the valve 22 is opened and the cylinder is lifted, the oil or fluid in the cylinder under the piston-head being forced through the branch 20, through the valve 22, into the port 19, and thence up through the by-pass 17 into the upper end of the cylinder. When the cylinder has been lifted to the limit of its height, the valve 22 is closed. The rope 47 is then securely clamped in the rope-clamp and the engine started. As the device is reciprocated by reason of the connection between the upper end of the piston and the walking-beam the drill gradually sinks, and the operator will from time to time open the valve 22 to permit the drill to drop as requisite. If at any time during the operation of drilling the operator desires to lift the drill a short distance, the valve 23 will be opened, and by operating the pump the fluid will be drawn down through the duct 37 into the chamber 38, thence to the branch 21, and upward through the by-pass 17 to the upper end of the cylinder. When the drill has reached the desired limit of its upper adjustment, the operator again closes the valve 23.

It will be seen from the foregoing description that while the parts of this device are comparatively few in number they are disposed and cooperate in such manner as to produce the most effective results in operation. As above pointed out, there are no delicate or intricate parts that are liable to become damaged in use, the only parts that really would be liable to wear being the valves 39 and 40, and by reason of the manner in which the lower section of the valve-casing is associated with the upper section the parts of the casing may readily be disassociated when it is desired to remove the valves for the purpose of grinding or retrueing.

It is to be understood that air may in some instances be employed as a buffer in lieu of a liquid, so that the generic term "fluid" used in the specification is to be understood as meaning either an aeriform fluid or a liquid.

What is claimed is—

1. A device of the character specified, com-



prising a fluid-containing cylinder, a piston mounted therein and operating to support the same by fluid contained between the piston and one end of the cylinder, valves for positively controlling passage of fluid from the upper to the under side of the piston to allow the cylinder to descend, a by-pass connecting the ends of the cylinder and a force-pump for withdrawing fluid from the under side of the piston and forcing it against the upper side thereof to raise the cylinder.

2. A device of the character specified comprising a fluid-containing cylinder having its ends closed by heads, a piston mounted within the cylinder and having a rod projecting through the upper head to be connected with suitable actuating mechanism, a force-pump carried by the lower head and coacting with a chamber arranged therein, a gravity-valve-controlled duct connecting the lower end of the cylinder and the chamber, a second chamber communicating with the first chamber through a gravity-valve-controlled duct, a by-pass connecting the cylinder-heads, branch ducts connecting the lower end of the cylinder and the said second chamber with the by-pass, and manually-operable valves arranged in the branch ducts and operating, respectively, to open or close communication between the lower end of the cylinder and the by-pass and between the said second chamber and the by-pass.

3. An apparatus of the character specified, comprising a cylinder to contain a fluid, a pis-

ton-carrying rod to work in the cylinder, a by-pass to establish direct communication between the ends of the cylinder, a duct to establish indirect communication between one end of the cylinder and the by-pass, a pump in communication with the duct for drawing fluid from the lower portion of the cylinder and forcing it through the by-pass to the top of the cylinder, and valves for controlling the passage through the by-pass and the duct.

4. An apparatus of the character specified, comprising a fluid-containing cylinder, heads secured thereto, a piston-carrying rod to work in the cylinder, the latter to be supported by the contained fluid, a by-pass pipe arranged exteriorly of and connecting the two cylinder-heads, valve-controlled chambers arranged in the lower cylinder-head, pumping means in coöperative relation with the chambers, a duct connecting the lower end of the cylinder with the chambers, a port having branches communicating, respectively, with the duct and one of the chambers and the by-pass and valves for controlling passage through the said branches.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

GEORGE BYRON GALLAGHER.  
CHARLES JOHN MACOMBER.

Witnesses:

HOBART SCOTT,  
CHARLES H. KELLY.