Nov. 11, 1924. 1,515,066

C. OCHS

PRESSURE GUN FOR FISHING TOOLS

Filed Jan. 7, 1924

Fig. 1.

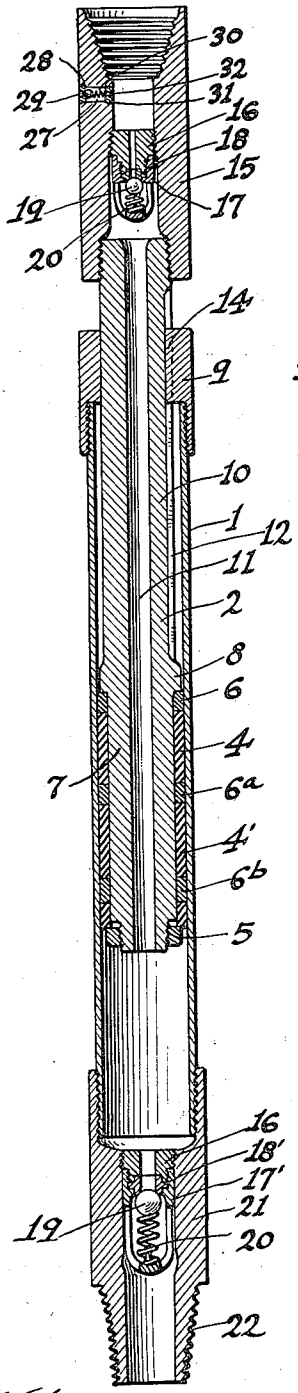



Fig. 2.

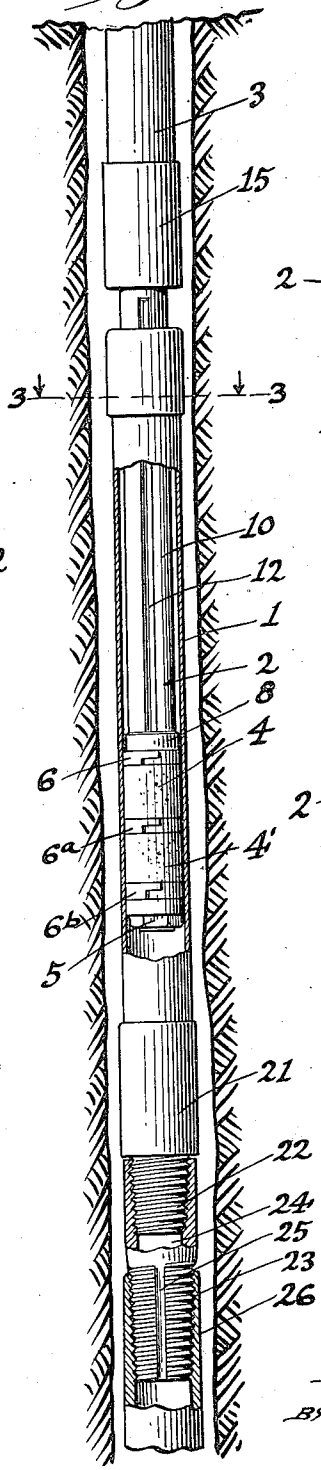



Fig. 3.

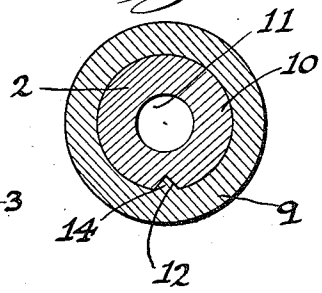
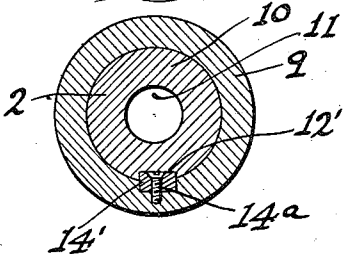



Fig. 4.




Witness:

Inventor:
Clarence Ochs.
By Hazard and Miller
Attorneys.

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# UNITED STATES PATENT OFFICE.

CLARENCE OCHS, OF LONG BEACH, CALIFORNIA.

## PRESSURE GUN FOR FISHING TOOLS.

Application filed January 7, 1924. Serial No. 684,915.

*To all whom it may concern:*

Be it known that I, CLARENCE OCHS, a citizen of the United States, residing at Long Beach, in the county of Los Angeles and State of California, have invented new and useful Improvements in Pressure Guns for Fishing Tools, of which the following is a specification.

My present invention being referred to as a pressure gun for fishing tools, it may be understood to be an object of this invention to provide novel and effective methods and means for the establishment of circulation through a "fish" caught in the bottom of a well and not freely removable therefrom.

It being well known that the establishment of circulation through a fish at the bottom of a well may contribute materially to the loosening and withdrawal of the same, to permit further drilling or other desired operations, it is an object of this invention to provide means whereby the weight of a string of drill pipe, or the like, may be utilized in what I may term a hydraulic gun or pressure gun, which may be secured at the lower end of such a string of pipe, the lower end of said gun being preferably connected, or adapted for connection with, a threading tool, such as a tap or die, which may be of a usual or any preferred design capable of cutting an interior or exterior thread upon the upper end of a fish,—the said threading tool being adapted to remain in engagement with the fish so caught and to serve in the ultimate elevation and withdrawal thereof.

It is an object of this invention to provide a pressure gun comprising a piston and a cylinder capable of relative reciprocation but incapable of relative rotation, one of the mentioned elements being provided with means for connection directly or indirectly with a string of pipe and the other being provided with means for direct or indirect connection with a fish; and in a preferred embodiment of my invention, the said piston and cylinder elements may be respectively provided with valves opening only in an inward or downward direction, adapting the same to force a circulating fluid, such as an ordinary "slush," downwardly or laterally into the said gun and out through the lower end of a fish.

Other objects of my invention including certain details in the construction of pistons and plungers and in the construction of valved "subs" and connecting elements will appear from the following description of advantageous embodiments thereof, taken in connection with the appended claims and the accompanying drawings in which—

Fig. 1 is a vertical, longitudinal section through a pressure gun embodying my invention.

Fig. 2 is an elevational view, with parts broken away or sectioned, this view being taken on a somewhat smaller scale in order to show the relationship of the novel parts of my pressure gun with a pipe line and a threading tool and fish to be removed thereby.

Fig. 3 is a horizontal section substantially on the line 3—3 of Fig. 2.

Fig. 4 is a similar section showing an alternative construction hereinafter referred to.

Referring to details of that specific embodiment of my invention chosen for purposes of illustration, it being a primary object of this invention to provided a device which can be carried upon the lower end of a string of drill pipe, or the like, when fishing, for the purpose of creating an enormous downward fluid pressure, so as to break or restore circulation through and around a drill bit, this device may comprise a long and heavy barrel or cylinder 1, and a heavy plunger 2, adapted to work within said barrel, this plunger being shown as connected at its upper end, directly or indirectly with a string of drill pipe or the like, 3.

Near the lower end of the plunger 2, and carried upon the same, are shown a series of rubber or other suitable packing sleeves 4, 4′, the outer surfaces of which packing sleeves, or their equivalent, should conform to inner walls of the cylinder 1.

The mentioned sleeves are shown as adjustable by compression such as that of lock nut 5, at the lower end of said plunger, and spacers or expansion rings 6, $6^a$ and $6^b$, when employed, may slide relatively to the central body 7 of said plunger, although the last or uppermost spacer 8 may engage a stop such as the shoulder or collar 8 thereon.

The upward and downward stroke of a plunger of the character referred to may be

limited by means such as a heavy bushing or head 9, shown as having a threaded engagement with the upper end of the cylinder 1, the inner horizontal face of said head being adapted to transmit upwardly any strain received from, for example, the shoulder or collar 8 upon the plunger 2.

The main shank 10 of the piston or plunger 2 is shown as provided with circulation channel 11 running longitudinally therethrough, and this shank is preferably non-circular in cross-sectional outline, the outer surface of the shank shown being rounded, although provided with a longitudinal V-shaped channel or channels 12 (or with a substantially rectangular channel 12′, in the embodiment illustrated in Fig. 4) interfitting with a corresponding feather or key or projection 14 (or 14′, Fig. 4) upon the bushing or head 9 (the feather or key 14′, of the embodiment shown in Fig. 4, being shown as retained by a machine screw 14ª.)

By an arrangement such as has been referred to, it will be obvious that means are provided permitting a relative reciprocation of the plunger 2 within the barrel or cylinder 1, although precluding a relative rotation of the mentioned parts. It will be obvious that either the cylinder 1 or the plunger 2, may, within the scope of my invention, be connected with an operating string of pipe capable of either a rotary or reciprocatory movement; and that, in any event, a suitable fit between the inside surface of the cylinder 1 and the plunger 2 or the packing thereon, as well as a suitable valve arrangement, is necessary to the production of a powerful downward pressure upon fluid which may be confined beneath said plunger, in a manner suitable to the dislodgement of a fish with which the lower end of my pressure gun may be directly or indirectly connected.

To compel water or "slush" or any liquid mixture below or within the plunger 2 to move downward under pressure applied thereby, I may provide any suitable means and for the purpose here referred to, I have shown, as screwed upon the top end of the plunger shank 10, a special tool joint box or "sub" 15, inside of which may be carried an ordinary ball and socket valve comprising an apertured and threaded plug 16 carrying a cage 17, shown as retaining not only a seat 18 and a ball 19 but also a coil spring 20 confined therein.

The cylinder 1 may be threaded at its lower end within a special tool joint or fitting 21, shown as terminating in a pin 22 and as also provided with a ball and socket valve permitting only a downward movement of fluid therethrough, the general construction and relationships of the ball and socket valve here referred to being optionally substantially the same as that described above, the corresponding parts of the present valve being designated by corresponding numerals 16′ to 20′ inclusive.

The pin 20 may be connected with any suitable fishing or other tool such as a thread-cutting and thread-engaging die or tap, tap 23 being shown as provided with a central circulating passage 24 and with longitudinal clearance channels 25 and as engaging a fish 26.

A device of the general character described may be operated within a well hole simply by hoisting and lowering the entire drill or operating pipe from a derrick floor. When the drill pipe is hoisted, the plunger will obviously be raised to the top of the cylinder, all parts being put under an upward tension and supported in such a relative position as will cause the fluid which may be in the drill pipe above the plunger, or which may come through an inwardly opening lateral check valve in the "sub" or bolt 15, to enter and fill the cylinder. The valve last referred to may comprise a threaded seat or socket 28, a ball 29 and a spring 30, shown as retained by an apertured plug 31, seated, as by threading, adjacent the circulating passage 32 extending longitudinally of the "sub" or box 15.

When the string of pipe is lowered after elevation in the manner described, the upper ball and seat or other valve being automatically closed under the operation of fluid pressure (optionally supplemented by the action of the spring 20, or its equivalent) the entire weight, or any desired fraction of the weight of the drill pipe, which weight may amount to many thousands of pounds, may be brought to bear upon the fluid within the cylinder 1 and transmitted therefrom through a die or tap or other tool therebelow into a fish, to facilitate the loosening and withdrawal of the same.

Usual or special tool threads may be provided in the box 15 and upon the pin 22; and the cylinder of my device, when constructed and operated as described, will be understood normally to remain stationary during the reciprocation of a plunger therein, because of the fact that it is screwed or otherwise rigidly secured to a die or tap or other fishing tool, which in turn is screwed into or upon or otherwise rigidly connected with a fish; but the mentioned splined connection between the piston shank 10 and the cylinder 1 or its head 9, or equivalent means, may be relied upon not only to permit the mentioned relative reciprocation of the parts referred to but to prevent a relative rotation thereof, thereby permitting a transmission, to a die or tap or other fishing tool, of a rotary motion suitable to its engagement or disengagement, or permitting other well drilling operations.

The reciprocation of the plunger 2 of my

novel pressure gun, which bears some structural resemblance but no functional resemblance to an ordinary pump, fluid being moved only in a downwardly direction therethrough, may be repeated as often as necessary, and the described operations may be used in conjunction with any other operations of a usual or preferred type in the dislodgement of fishes by steps comprising a restoration of circulation therethrough, or otherwise in the forcing of a circulation through well drilling tools.

Although I have herein described one complete embodiment of my invention, suggesting alternative details of construction, it will be understood that various features of my novel pressure gun might be independently employed, and also that various additional modifications might be made therein, without the slightest departure from the spirit and scope of my invention as the same is indicated above and in the following claims.

What I claim is:

1. In a fishing equipment for use in drilled wells, a hydraulic or pressure gun comprising a plunger rigidly connected with a vertically movable string of pipe.

2. In a fishing equipment for use in drilled wells, a hydraulic or pressure gun comprising a piston cylinder rigidly connected with a threading tool.

3. In a fishing equipment for use in drilled wells, a hydraulic or pressure gun comprising a piston cylinder rigidly connected with a threading tool, said cylinder being provided with a piston connected with a string of pipe.

4. In a fishing equipment for use in drilled wells, a hydraulic or pressure gun comprising a piston cylinder rigidly connected with a threading tool, said cylinder being provided with a piston connected with a string of pipe by means preventing a relative rotation while permitting a relative reciprocation.

5. In a fishing equipment, means comprising a piston and a cylinder cooperating therewith, secured in proximity to the lower end of a string of pipe for the utilizing of the weight of said string to force liquid downward through tools.

6. In a fishing equipment, means comprising a piston and a cylinder cooperating therewith, secured in proximity to the lower end of a string of pipe for the utilizing of the weight of said string to force liquid downward through tools, comprising threading tools, and through a fish connected therewith.

7. In a fishing equipment, means comprising a piston and a cylinder cooperating therewith, secured in proximity to the lower end of a string of pipe for the utilizing of the weight of said string to force liquid downward through tools, said cylinder being provided with means for attachment to a fish.

8. In a fishing equipment, means comprising a piston and a cylinder cooperating therewith, being provided with means for attachment to a fish and said piston being provided with means for attachment to a string of pipe.

9. In a fishing equipment, means comprising a piston and a cylinder cooperating therewith, secured in proximity to the lower end of a string of pipe for the utilizing of the weight of said string to force liquid downward through tools, said piston and said cylinder being provided with co-operating means to prevent relative rotation while permitting a relative reciprocation thereof.

10. In the recovery of a fish by steps comprising a circulation, the method which comprises interposing a pressure gun between the lower end of an operating string of pipe and the upper end of a fish, and employing the weight of said string to produce circulating pressure within said gun.

11. In a fishing equipment, a valved "sub" or box adapted to be interposed between the lower end of a string of pipe and the plunger or cylinder of a pressure gun.

12. In fishing equipment, a valved "sub" or box adapted to be interposed between the lower end of a string of pipe and the plunger or cylinder of a pressure gun, said "sub" or box being provided with both a downwardly opening valve and an inwardly opening valve.

In testimony whereof I have signed my name to this specification.

CLARENCE OCHS.