

April 4, 1939.

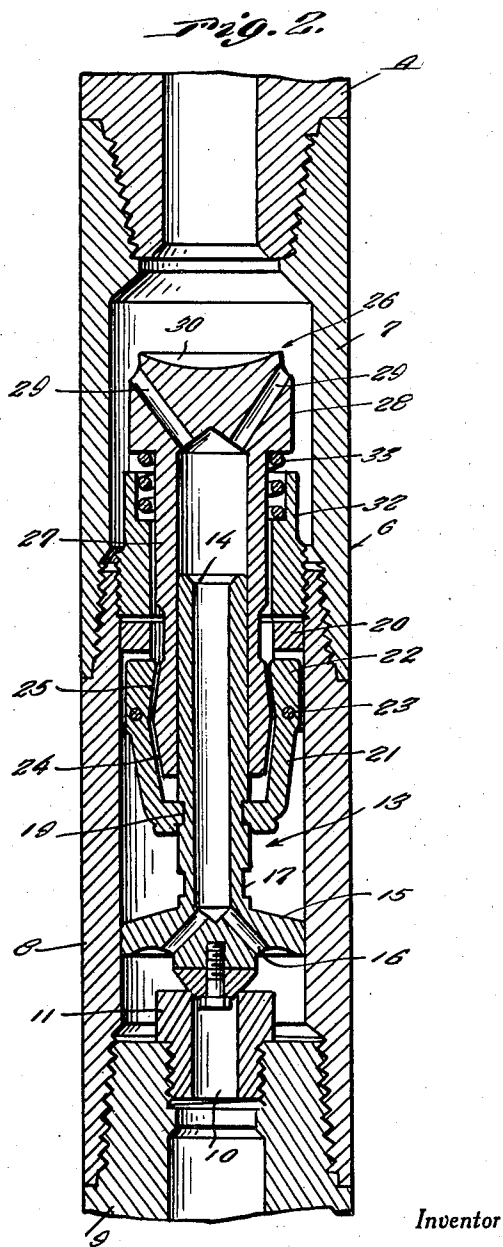
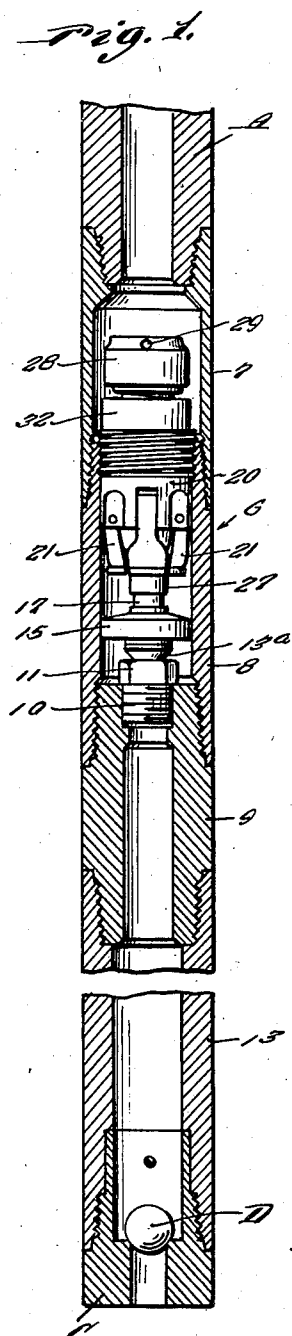
H. DRIPPS

2,152,794

OIL WELL SAMPLE TAKING MEANS

Filed Feb. 8, 1938

2 Sheets-Sheet 1



Inventor

Harold Driggs

By *Clarence A. O'Brien*
Hyman Berman

Attorneys

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Fig. 3.

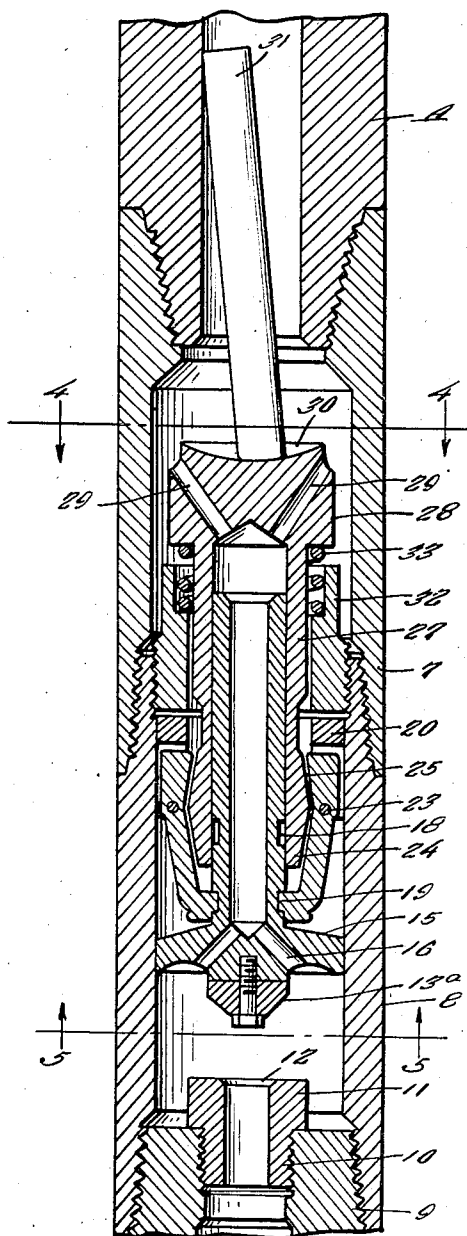


Fig. 4.

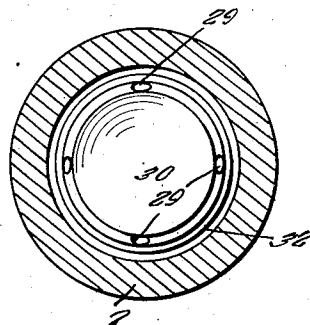
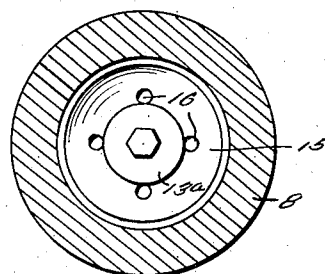


Fig. 5.



Inventor

Harold Driggs

By *Clarence A. O'Brien*
Hyman Berman

Attorneys

UNITED STATES PATENT OFFICE

2,152,794

OIL WELL SAMPLE TAKING MEANS

Harold Dripps, Lake Charles, La.

Application February 8, 1938, Serial No. 189,462

3 Claims. (Cl. 166—19)

This invention relates to an especially constructed manually utilized remote controlled valve structure usable in connection with a drill pipe or tubing, whereby to provide the trade with practicable and reliable means to trap and readily bring to the surface sample fluid and, as the case may be, to facilitate scientific testing and to promote unhampered well drilling.

The foregoing is not intended to convey the impression that I consider core taking and sample trapping structures broadly new in any sense of the word. In fact, it is intended to definitely and specifically disclose the fundamental novelty, this being the special valve construction, the latter being such as to permit the action of a hand dropped weight to develop a blow or impact sufficient to trip and open the valve for adequate collection of the well fluid for periodical testing and inspection work.

The preferred embodiment of the invention is exemplified in the form of a valve casing, seat and impact controlled valve mechanism, the latter being characterized by spring returned trip means controlling the function of detents or retaining slips alternately holding the valve elements in closed and open positions respectively.

Other features and advantages will become more readily apparent from the following description and accompanying illustrative drawings.

In the drawings:

Figure 1 is a view, partly in section and partly in elevation, showing the preferred embodiment of the invention and bringing out to advantage the valve means and casing construction, this being embodied in or attached to the well drilling tubing.

Figure 2 is an enlarged central vertical sectional or longitudinal view bringing out to advantage the valve structure and showing the valve closed and locked in closed position.

Figure 3 is a view similar to Figure 2 showing the valve locked in open position after having been tripped by the drop-weight.

Figures 4 and 5 are transverse views on the lines 4—4 and 5—5 respectively of Figure 3.

Reference being had to the general assembly depicted in Figure 1 it will be observed that the drill pipe or tubing is indicated at A, the lower or bottom section thereof B having an adapter fitting C for a fluid controlled ball check valve D. The improved valve structure, as a unit, interposed between the parts A and B is differentiated by the numeral 6. The pipe sections 7, 8 and 9 are threaded together and provide the valve cas-

ing structure, this being interposed between and connected with the parts A and B. The part 9 serves to accommodate the lower tubing section B and also serves to accommodate the neck portion 10 of the nut 11 forming the valve seat means 12. The valve element per se, which cooperates with this seat, is denoted by the numeral 13. The part 13 comprises a tubular stem 14 having a disk-like head 15, said head being provided with passages 16 radially communicating with the bore in the tubular stem. Surrounding the valve stem at longitudinally spaced points are annular keeper grooves or channels 17 and 18 respectively, and these are adapted to accommodate the keeper lugs or detents 19 on the so-called slips. The slips are in effect trip and retaining latches operating alternately as shown in Figures 2 and 3 respectively. It will be observed that these slips are mounted in a supporting case or equivalent adapter collar 20. Each latch or slip comprises a lower portion 21, an upper portion 22, these parts being pivoted in the collar 20 as indicated at the point 23. The respective parts 21 and 22 function as cams and these cooperate with complementary or companion cam surfaces 24 and 25 on the reciprocatory remote controlled trip sleeve 26. This sleeve unit 26 comprises the sleeve 27 proper and this is in effect a socket for slidable reception of the tubular stem of the valve element 13. The sleeve has an enlarged shoulder forming head 28 on one end, and said head is provided with ports or passages 29 for allowing the trappings to pass therethrough up into the drill pipe. The top of the head is provided with a cavity or depression 30 which accommodates the drop-weight 31, which in practice, is dropped down through the drill tube A from the ground or surface.

The sleeve unit 26 slides or works in a special annular fitting 32 threaded in the upper part 8 of the valve casing. This fitting is provided with a socket to accommodate a coiled spring 33 and the spring rests against the shoulder forming head 28 to normally lift and maintain the trip or sleeve unit 26 in the elevated position shown in the drawings.

In operation, before the drill tubing A is lowered into the well casing (not shown) for the purpose of taking samples at different depths the successively operable valves D and 6 are attached to the lower end thereof. Naturally, as the device descends into the well, the check valve D opens and initially traps certain of the well fluids and accumulations sought after. Before lowering the structure into the well, how-

ever, it is necessary to close the valve tip 13a against the complementary valve seat 12. Then the structure assumes the relationship shown in Figures 1 and 2 of the drawings. The valve is maintained closed by the retention latches or slips having the aforementioned lugs 19. That is to say, the lugs 19 then fit into the keeper channel or groove 18 to hold the valve closed. Whenever it is desired to take a sample at any particular depth or level this is accomplished by dropping a heavy piece of pipe or other weight 31 down through the drill tubing as brought out in Figure 3 of the drawings. The weight strikes a blow against the head 28 and hammers the unit 26 down, so to speak, against the tension of the return spring 33. As the trip unit 26 thus descends under the effect of this weighted blow, the cam surface 24 comes into engagement with coacting cam elements 21 releasing the detents 19. The incoming fluid under pressure thus unseats the valve unit 13 causing it to rise into the companion trip unit 26. As the unit 26 is returned under the tension of the spring 33 the cams 25 and 22 come into play to drop the detents 19 into the lower keeper channel 17. Consequently, the valve means 13 is now locked in open position as shown in Figure 3 of the drawings.

After the sample is thus trapped, the structure is withdrawn from the well, and the necessary scientific tests are made. This operation is, of course, repeated at different depths and each time the sample taking device is reinserted into the well it is necessary to again set the valve means 13 to its closed position shown in Figure 2 of the drawings.

The structure herein shown and described has been found to be sufficient for adequate attachment to a drill pipe or tubing permitting taking of samples of different materials for testing and is believed to be ingenious in that it is remote controlled under the action of a drop-weight, the valve structure being constructed along prescribed lines to definitely function to provide the desired closed and open activities according to the dictates of the user.

It is thought that the description taken in connection with the drawings will enable a clear understanding of the invention to be had. Therefore, a more lengthy description is thought unnecessary.

While the preferred embodiment of the invention has been shown and described, it is to be understood that minor changes coming within the field of invention claimed may be resorted to if desired.

I claim:

1. In a valve structure of the class described, a relatively stationary valve seat, a valve unit cooperable therewith, said valve unit including a tubular stem, a sleeve slidably fitted over said stem, said sleeve being provided with an apertured head, said sleeve and head constituting a remote controlled weight tripped actuator device, and spring return means for said sleeve, said sleeve being provided with successively operable cam surfaces, and pivoted cam surfaced latches surrounding said cam surfaces, said latches including detents, said sleeve being provided with keeper channels for reception of said detents.

2. In a valve construction of the class described, a casing, a valve seat in said casing, a relatively movable valve unit including a tubular stem and a valve head cooperable with said seat, said stem being provided with longitudinally spaced annular keeper channels, a mounting surrounding said sleeve, pivoted latches on said mounting including detent lugs selectively engageable with said channels, a guide fitting, a sleeve slidable in said guide fitting, said sleeve being provided with a head, spring means interposed between the guide fitting and head, the aforementioned stem being slidable in said sleeve in the manner and for the purposes described.

3. In a valve construction of the class described, a casing, a relatively fixed valve seat in said casing, a plurality of circumferentially spaced detent equipped latches pivotally mounted in said casing, a valve cooperable with said seat and having an upstanding stem rising therefrom and projecting upwardly between and beyond the detents on said latches, a spring elevated member having a weight lowered head and means telescopically receiving said valve stem, said means having portions for tripping and releasing the latches, and said stem having longitudinally spaced progressively usable keeper seats for the detents.

HAROLD DRIPPS.