Dec. 5, 1933. C. O. McDOWELL 1,937,707

FLEXIBLE BAILER FOR WELLS

Filed Nov. 23, 1932

FIG 1

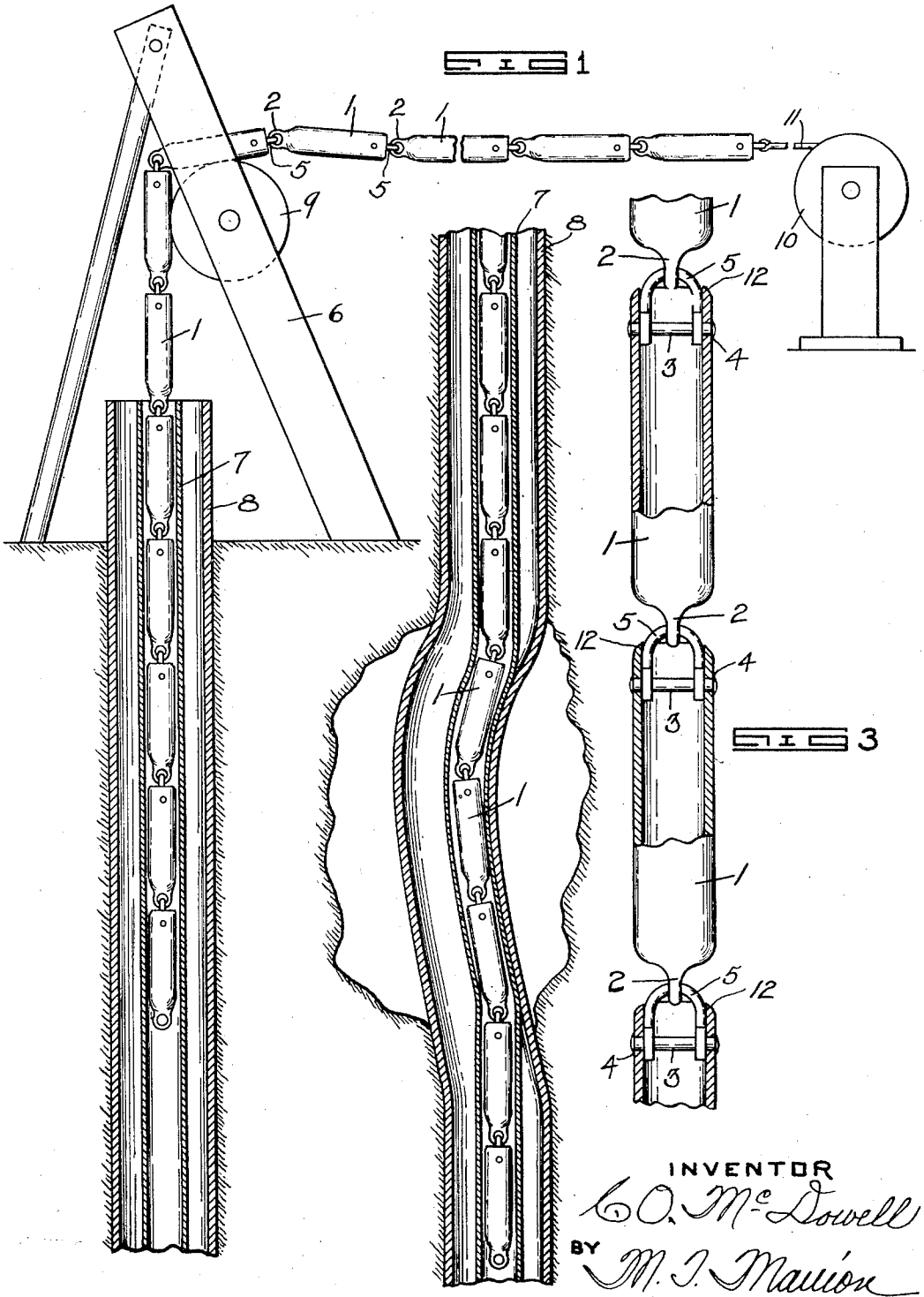


FIG 3

FIG 2

INVENTOR

C. O. McDowell

BY M. J. Marion

ATTORNEY

Patented Dec. 5, 1933 1,937,707

UNITED STATES PATENT OFFICE

1,937,707

FLEXIBLE BAILER FOR WELLS

Charles O. McDowell, Fairmont, W. Va., assignor of one-half to Chas. Phillips Tool Co., Mannington, W. Va., a corporation of West Virginia

Application November 23, 1932
Serial No. 643,987

2 Claims. (Cl. 166—1)

This invention relates broadly to bailers for wells, and more specifically to a bailer for removing foreign liquids, such as water, which have accumulated adjacent the bottom of oil and gas wells, particularly the latter.

The primary object of the invention is to provide a bailer of the character mentioned which shall possess great flexibility throughout its entire length, thereby enabling the same to be readily lowered and elevated in the well past any bend or bends existing in the well tubing.

A further object of the invention is to provide such a bailer which consists in joining or coupling together in alined parallel relation a plurality of liquid lifting buckets, the number of joined buckets forming the bailer being optional with the user and the number of said coupled buckets determining the lifting capacity of said bailer.

A still further object of the invention is to provide a device of the character mentioned which will require but simple and inexpensive mechanism to operate the same in a well to perform the function for which it is intended.

With these and other objects in view, the invention resides in the features of construction, arrangement of parts, and combinations of elements, which will hereinafter be fully described, reference being had to the accompanying drawing, in which—

Figure 1 is a side view illustrating the application of my bailer in association with a drilled well;

Figure 2 is a sectional view in side elevation of bent sections of well tubing and casing in a drilled well with the bailer shown in position in the tubing; and

Figure 3 is an enlarged side elevation of a plurality of coupled buckets, portions of the buckets being depicted in fragmentary section, to disclose interior construction.

It is now the general practice in the art to remove accumulated water from a well with a device known as a dart valve bailer, a device of hollow cylindrical form in cross section and having a length approximating twenty-five feet. The use of such dart valve bailers is rendered objectionable for several reasons, among which may be mentioned the fact that the valve located in the bottom of the bailers, and which controls the ingress of water interiorly of the bailer, frequently leak, resulting in loss of water from the bailer during the time it is being raised to the surface from the well. Furthermore, bailers of this type are rigid throughout their entire length, rendering it exceedingly difficult, if not impossible in some cases, to lower the bailer into a well past a bend or buckle in the well tubing, as often occurs. Moreover, the lifting frames, or "poles" as they are termed in the art, used in association with the bailers for raising and lowering the same into and out of the well must be of considerable height to correspond with the length of the bailer. These poles, of substantially tripod-form must be located directly over the drilled well and are so located but temporarily, being moved from one well to another as required. The moving of these poles from well to well is attended with considerable inconvenience due to their great length and weight.

My invention, now about to be described in detail, is designed to obviate these objectionable features and other objections which are not herein enumerated.

In carrying out the present invention, a plurality of flexibly coupled lifting buckets 1 are provided. Each of these buckets comprises a comparatively short tubular container having a closed bottom end and an open upper end. An eye 2 is formed exteriorly of the bottom of each bucket and depends downwardly therefrom, which eye may be either formed integral with said bucket or suitably attached to said bucket, as by welding.

A pin 3 is disposed transversely through the bucket adjacent its open end and has its opposite ends received in diametrically opposite apertures 4 provided in the side wall of the bucket. Said pin is permanently held in position by means of spot welding or by peining the opposite ends.

Carried by the pin 3 is a clevis 5, the perforated extremities of the inverted U being received by said pin. As is obvious, adjacent lifting buckets are flexibly coupled by interengaging the inverted U-shaped clevis 5 of one bucket with the eye 2 of another bucket, as is clearly shown in Fig. 3, the clevis serving as a carrying bail.

In use, a tripod-like supporting frame, or pole, 6 is suitably positioned on the surface directly over the drilled well in which is located the usual tubing 7 and casing 8. A rotatable sheave or pulley wheel 9 is carried by the pole 6, while an appropriately supported rotatable drum 10 or winch is located in substantial horizontal alinement with the sheave 9 and spaced therefrom at a predetermined distance. A length of rope or cable 11 is wound about the

drum, the free end of said cable being fastened to the clevis 5 of the uppermost bucket 1.

When it is desired to lower the bailer into the well to perform its bailing function, the drum 10 is rotated in a counter-clockwise direction thereby lowering the coupled buckets by gravity into the tubing 7 about the sheave 9 in an obvious manner, the buckets being supported in the well tubing by the attached cable 11. When said coupled buckets have been lowered to a depth sufficient to immerse the same in the accumulated water at the bottom of the well, the hollow buckets will, of course, become filled with a portion of said water. After the lapse of sufficient time to permit filling of said buckets, the drum 10 is rotated in a clockwise direction thereby elevating the cable and thereby suspended buckets. In its upward vertical travel outward from the well tubing, the cable and buckets will travel about the periphery of the sheave 9 and the direction of travel will thereafter be changed from a vertical direction parallel with the well tubing to a right angle direction or parallel with the surface. During the change in the direction of path of travel from the vertical to the horizontal path the buckets will be emptied of their contents in a manner which is readily manifest. It will be understood that the drum 10 is spaced away from the supporting frame a distance exceeding slightly the over-all length of the coupled buckets, resulting in the cable only being wound on the drum.

The peripheral edge portion of the side wall defining the open end of each bucket is preferably beveled or rounded, as designated at 12, in order to lessen the possibility of the bailer becoming snagged in its upward travel on inwardly directed projections which may exist interiorly of said tubing. The closed or bottom end of each bucket is also made of substantially convex form devoid of angled corners in order to eliminate chance of the bailer becoming snagged during its downward travel through the well tubing.

It will be noted that the clevis-eye method of coupling the individual buckets provides a practical universal joint. This coupling, combined with the fact that each coupled bucket is made of comparatively short length makes it possible for the bailer to be lowered and raised past bends, buckles and like obstructions which may be present in the tubing as a result of a cave-in of earth or other reasons known in the art. As will be appreciated following a study of Fig. 2 of the drawing, the bailer when coming in contact with such a bend or buckle readily shapes itself to conform to the curvature of the existing bend as it passes the latter. Moreover, the construction described permits the bailer to conveniently pass over the sheave 9.

It will also be apparent that the number of lifting buckets coupled to form the bailer may be varied at will to govern the lifting capacity thereof. Additionally, the replacement of a damaged or defective bucket may be easily effected simply by removal of the damaged bucket and the introduction of a new bucket.

Furthermore, changing the direction of travel of the bailer in a right angled horizontal direction shortly following its upward exist from the well renders unnecessary the provision of a supporting frame or pole of any great height, as is necessary with the rigid and elongated dart valve type bailer.

What is claimed is—

1. In a device of the type set forth, a supporting frame formed to be disposed over a well, a rotatable sheave, means to connect the sheave to the frame so that its periphery is disposed at substantially the center of the tubing of the well casing, a bailer composed of flexibly coupled lifting buckets having closed bottoms and open tops, a winding drum, and a cable connecting the outer-most bucket with said winding drum, said winding drum being located at a distance from the frame exceeding the over-all length of the coupled buckets whereby only the cable will engage the winding drum when the lower-most bucket passes the sheave, the winding drum being located at such distance above the surface of the ground whereby when each bucket as it is disengaged from the sheave is tilted downwardly to empty its contents.

2. In a device of the type set forth, a supporting frame formed to be disposed over a well, a rotatable sheave carried by the frame, a bailer composed of flexibly coupled lifting buckets having closed bottoms and open tops, a winding drum, and a cable connecting the outer-most bucket with said winding drum, said winding drum being located at a distance from the frame exceeding the over-all length of the coupled buckets whereby only the cable will engage the winding drum when the lower-most bucket passes the sheave, the winding drum being located at such distance above the surface of the ground whereby when each bucket as it is disengaged from the sheave is tilted downwardly to empty its contents.

CHARLES O. McDOWELL.