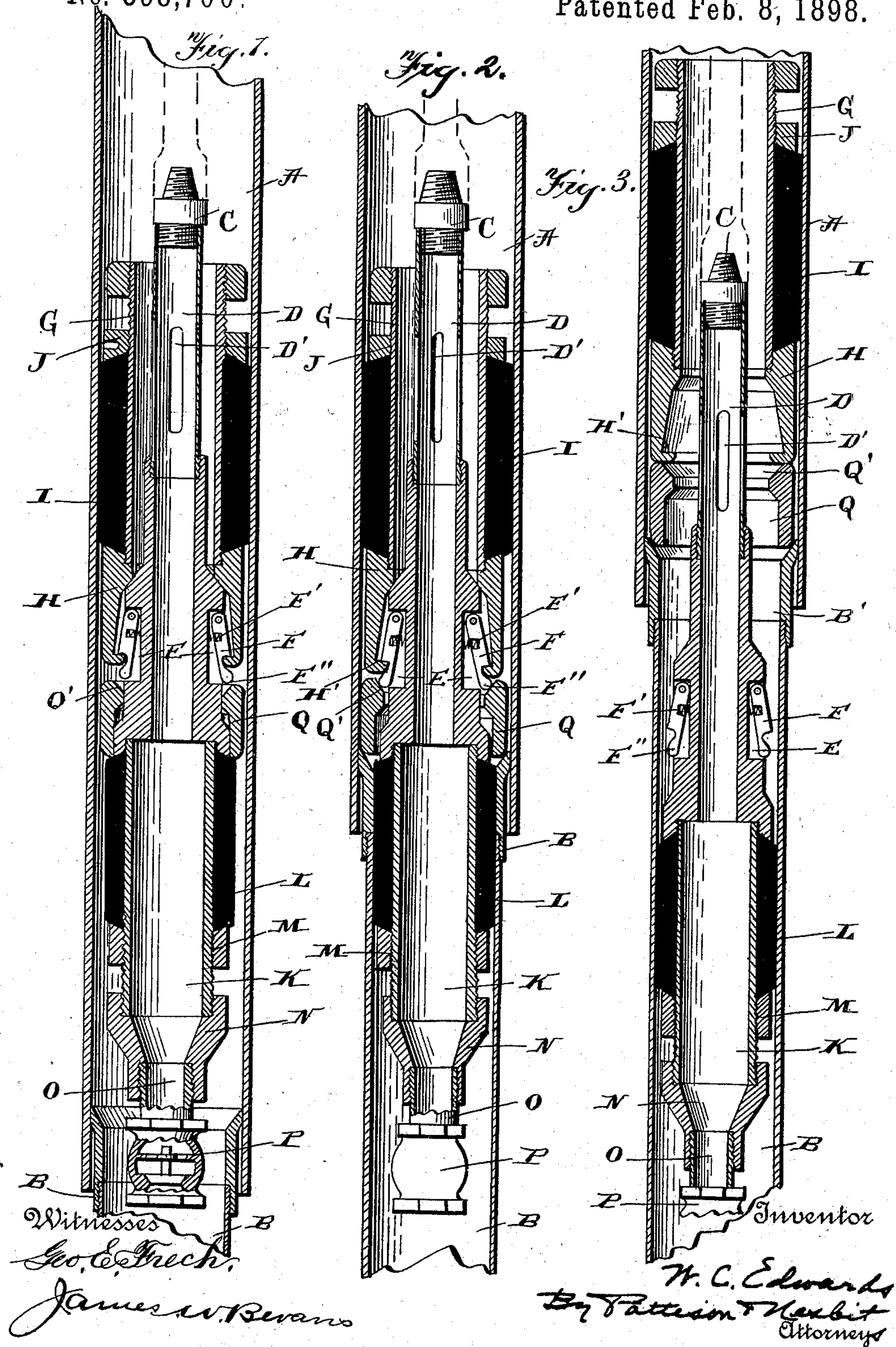


(No Model.)

W. C. EDWARDS.
DEVICE FOR CLEANING OIL WELLS.

No. 598,700.

Patented Feb. 8, 1898.



UNITED STATES PATENT OFFICE.

WILLIAM C. EDWARDS, OF MANNINGTON, WEST VIRGINIA.

DEVICE FOR CLEANING OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 598,700, dated February 8, 1898.

Application filed August 11, 1896. Renewed December 30, 1897. Serial No. 664,748. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. EDWARDS, of Mannington, in the county of Marion and State of West Virginia, have invented certain new and useful Improvements in Devices for Cleaning Oil-Wells; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

This invention relates to devices for cleaning oil-wells; and its primary object is to provide an apparatus of simple and improved form for loosening and elevating paraffin deposits in well-casings.

The invention contemplates the construction of such an improved device as will be adapted for cleaning wells from bottom to top in which two or more sizes of casing occur.

The invention also includes a swab of simple and improved form.

The invention consists in the novel features of construction hereinafter fully described and claimed, and illustrated by the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a well provided with two sizes of casings, the cleaning device being shown in the larger or upper casing-section. Fig. 2 is a similar view showing the cleaner at the junction of the two sizes of casings, the lower portion of the cleaning device shown as disconnecting automatically from the upper portion. Fig. 3 is still another vertical section showing the parts of the cleaning device separated and in operative position in the respective casing-sections.

In deep oil-wells it frequently occurs that the lower part or section of the casing is of smaller diameter than the upper part, and in some instances the casings may be graded into a greater number of sizes where wells are very deep.

For the purpose of illustrating the present invention a section of a well is shown provided with only two sizes of casings, A rep-

resenting the upper or larger section, and B the lower or smaller section. The bell-mouthed collar B' at the upper end of the casing B unites or splices the casing-sections, as shown. The cleaning device, which is adapted to remove paraffin deposits from both sections, consists of parts of a drilling-tool C, having the elongated hollow stem D, provided adjacent its upper end with outlet D'. The lower enlarged portion of the stem is formed with opposite vertical elongated depressions E, in the upper ends of which are pivoted depending catches F, and the lower operating ends of these catches are held normally sprung outward by springs F'. The lower extremities F'' of the catches are rounded outwardly slightly for the purpose presently to be explained.

Encircling hollow stem D is a tube G, and secured to its lower end is the depending collar H. The interior of the lower extremity of this collar is formed with annular shoulder H', which is adapted to be engaged by catches F automatically when the parts are in proper relative position, and by this means the tube G is held to the hollow stem D and caused to move in unison with the parts of the drilling-tool. Considerable of tube G is inclosed or incased by a packing material I, such as rubber, the lower end of the same abutting the upper end of collar H, while nut J, which is adapted to move on the outer screw-threaded surface of the upper end of tube G, serves to clamp the packing to place. By forcing nut J downward it will be seen that the packing material will be expanded, and thus it will be caused to fit as tightly as desired in the well-casing. Tube G, collar H, packing I, and ring J constitute the swab for the upper or larger casing-section A. Catches F serve to unite the upper swab with the operating-tool, so as to carry the same to the lower end of the larger casing-section. Otherwise, as the swab fits tightly within the casing, it would stick fast and the operating tool would simply move downward in the casing through it.

The swab or cleaning device for the lower

or smaller casing-section is secured permanently to operating-stem D, the same consisting of tube-section K, screwed into the lower end of the hollow stem, the tube being
 5 incased by the rubber or other packing L, which abuts the lower end of the stem, while nut M, movable on the screw-threaded exterior of the casing, clamps the packing in place and governs the expansion thereof, as described of the packing for the upper swab.
 10 At the lower end of tube K is coupling N, which unites thereto pipe-section O, in which is placed the upwardly-opening check-valve P.

A collar Q is loose upon but encircles the
 15 lower extremity of hollow stem D, said collar being of about the same diameter as collar H, so as to move freely through the larger portion of the well-casing. In operation the several parts are united and lowered in the
 20 well, their position being as shown in Fig. 1. When bell-mouthed collar B', however, is reached by the cleaning device, the lower swab portion is of sufficiently small diameter to pass freely therethrough, but collar Q is
 25 engaged thereby and stopped, as indicated in Fig. 2, and the continued downward movement of the device forces the lower end F'' of catches F downward against the inner beveled surface Q' of collar Q, thus forcing said
 30 catches inward and causing them to release their hold upon collar H of the upper swab. The upper swab is thus released from the tool and operating-stem at the lower portion of the larger casing-section, while the lower
 35 swab is free to descend as far as desired in the lower casing-section.

The packing material of the swab is sprung or bulged sufficiently by pressure of nuts J and M, respectively, to cause them to fit tightly the
 40 respective casing-sections, so as to disengage the paraffin deposits from the casing, and this deposit will be forced upward along with the oil through check-valve P and the hollow stem, through which it cannot return when the de-
 45 vice is moved upward, and thus the objectionable deposit is effectually removed, having first been thoroughly loosened by the swab.

Owing to the peculiar nature and arrangement of the swab-packing the same is adapted
 50 to yield to the uneven contour of the casing without being worn thereby. When an unevenness is passed, the swab simply expands and fills the casing completely, as before, without any perceptible injury thereto. Devices
 55 for this purpose now in general use are rigid transversely and not so constructed as to yield radially, as just described. On this account the devices just described are exceedingly objectionable, for it not infrequently
 60 occurs that by the time a swab of that class has been lowered in a well-casing it has become so worn and indented by the dents and obstructions in the casing as to have lost its usefulness in raising the liquid loaded with

the loosened paraffin, as well as having become worthless for even an effective repetition of the downward cleaning movement.

Where more than two sizes of casings are used in a well, the number of swabs or cleaning devices may be increased or multiplied by
 70 simply coupling them together in succession in the manner shown of the device here illustrated, the largest cleaner always being at the top of the series, and the devices grading downward in diameter to the lowermost section, which is secured to the hollow stem.
 75 In such case it will of course be necessary to increase the length of the hollow stem to accommodate the number of cleaning devices employed.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is--

1. An improved device for cleaning well-casings made up of casing-sections of different diameters, comprising a stem, a cleaner
 85 for the lower casing-section carried by the lower end of the stem, a cleaner for the upper casing-section through which the stem is adapted to pass freely, devices for securing
 90 the upper cleaner to the stem, and a releasing mechanism adapted to lodge at the upper end of the lower and smaller casing-section and when thus stopped being adapted to disengage the upper cleaning device from the hol-
 95 low stem, substantially as shown and described.

2. The combination of the longitudinally-hollow stem open at its upper end, the cleaner for the lower casing-section secured to the
 100 lower end of the stem, the upwardly-opening check-valve at the base of the said cleaner, the cleaner for the upper casing-section through which the stem is adapted to move freely,
 105 catches carried by the stem and normally projected outward so as to engage the upper cleaner and secure it to the stem, and the collar carried by the lower extremity of the stem immediately beneath the upper cleaner,
 110 whereby when the device is lowered in the well made up of casing-sections of different diameters, said collar when engaging the upper end of the lower section will be held from downward movement, and the continued downward movement of the device will
 115 cause the said catches to engage the collar and disengage their hold upon the upper cleaner, substantially as shown and described.

3. The combination of the stem, the lower cleaner carried thereby, the upper cleaner
 120 through which the stem is adapted to move freely, the collar H constituting the lower portion of the upper cleaner and provided with the internal shoulder H', catches G pivoted to the stem and held normally in an outwardly-sprung position and in engagement
 125 with the shoulder H', said catches depending beneath collar H and shoulder H', ring Q

carried by the lower portion of the stem and
beveled upon its inner surface, whereby when
the device is inserted in a well and the said
ring lodged upon the upper end of the lower
5 and smaller casing-section the continued
downward movement of the device will cause
the catches to be moved inward owing to
their engagement with the beveled surface of
the collar and thus be disengaged from the

upper cleaner, substantially as shown and de- 10
scribed.

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

WILLIAM C. EDWARDS.

Witnesses:

C. F. RIGBY,

G. L. McMULLEN.