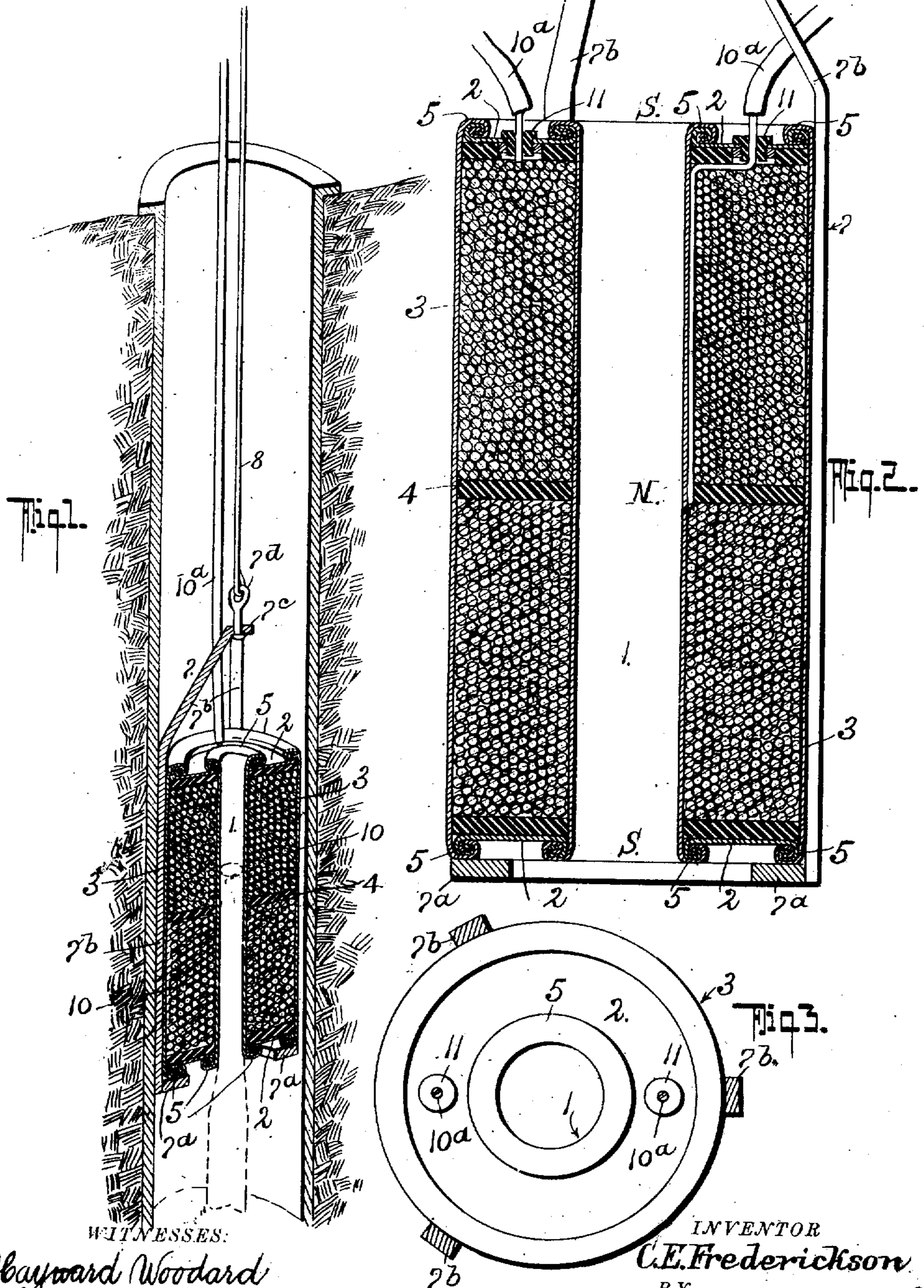


C. E. FREDERICKSON.  
LIFTING MAGNET.  
APPLICATION FILED JUNE 11, 1910.

974,047.

Patented Oct. 25, 1910.

2 SHEETS—SHEET 1.



WITNESSES:  
Hayward Woodard  
Charles H. Wagner

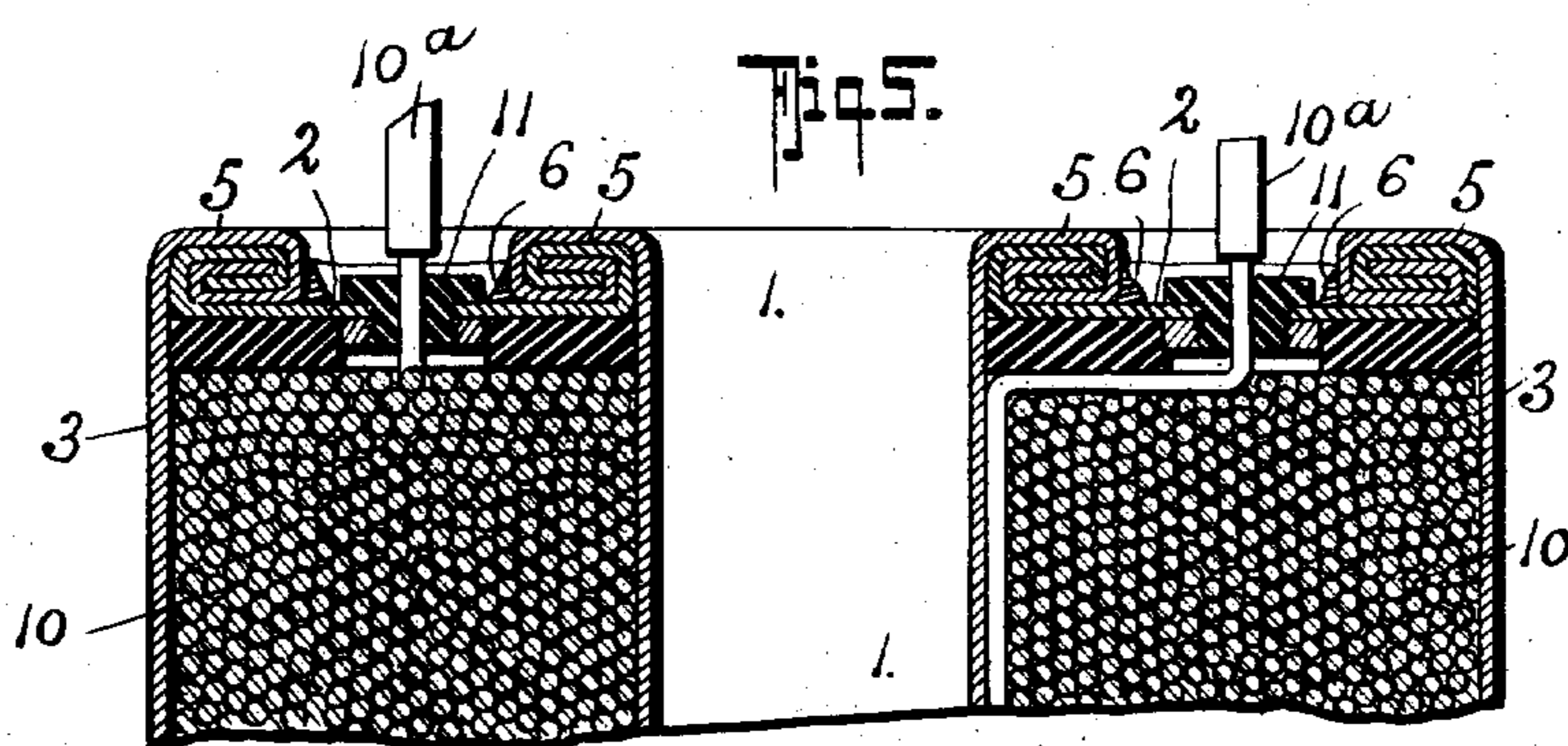
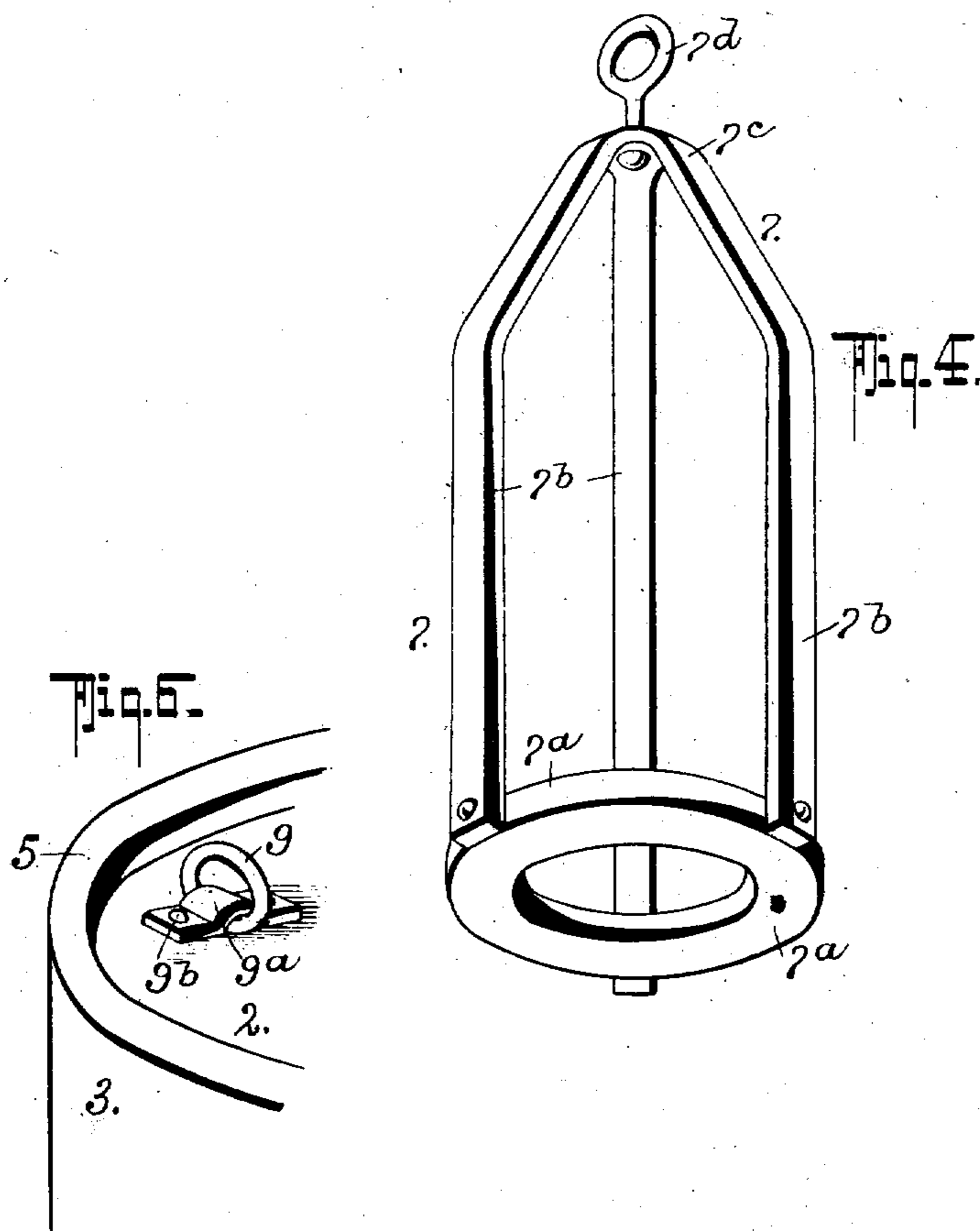
INVENTOR  
C. E. Frederickson  
BY  
Fred G. Dietrich  
ATTORNEYS

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Fred G. Dietrich & Co.  
ATTORNEYS

# UNITED STATES PATENT OFFICE.

CLAYTON E. FREDERICKSON, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF TWENTY-FIVE PER CENT. TO GORDON S. CHAMBERLIN AND THIRTY-SEVEN AND ONE-HALF PER CENT. TO EARL D. McCADDAM, BOTH OF SAN FRANCISCO, CALIFORNIA

## LIFTING-MAGNET.

974,047.

Specification of Letters Patent.

Patented Oct. 25, 1910.

Application filed June 11, 1910. Serial No. 566,368.

*To all whom it may concern:*

Be it known that I, CLAYTON E. FREDERICKSON, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Lifting-Magnets, of which the following is a specification.

My invention is an improved lifting magnet especially designed for use in lifting underreamer lugs, slips, drill rods, and other tools or devices that may be loose in oil, or other bored wells.

In its general make-up, my invention resides in providing a magnet of the consequent polar solenoidal type, or tri-polar type, inclosed in a water-tight case, preferably of non-magnetic material, such as copper or the like.

The invention also includes a suitable saddle or cage in which the magnet may be held, and by means of which the magnet may be lowered to the work and drawn up from the same.

In its more subordinate nature, the invention also includes those novel details of construction, combination and arrangement of parts all of which will be first described, and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:

Figure 1, is a sectional perspective view showing the use of my invention for removing broken drill rods, or other tools, from oil wells and the like. Fig. 2, is an enlarged central, vertical, longitudinal section of the device. Fig. 3, is an end view of the same. Fig. 4, is a perspective view of the cage in which the magnet may be held for lowering it into and withdrawing it from the well. Fig. 5, is an enlarged detail section of the upper end of the magnet, showing how the lifting cable may be secured directly to the casing head. Fig. 6, is a detail enlarged sectional view showing the manner of seaming the joints of the magnet casing.

Referring now to the accompanying drawings, in which like letters and numerals of reference indicate like parts in all of the figures, it will be noticed I take a copper, or other suitable tube 1, preferably of non-magnetic material, as the core tube on which

the magnet coils 10 are wound, so as to produce like poles S—S at the ends of the magnet and a consequent opposite pole N in the center, the two coils 10 being separated by insulation 4, as indicated. Over the coils 10 a second, preferably non-magnetic tube 3 (copper, or other suitable material) is placed, and the tubes 1 and 3 are joined at their ends by head or ring plates 2—2 which are secured to the tubes 1 and 3 by double seamed joints 5 and subsequently soldered or welded together, as at 6, to effect a tight and strong joint. Thus it will be seen that the magnet coils 10 are housed in a water-tight casing. The leading-in wires 10<sup>a</sup> of the coils 10 pass through water-tight insulation bushings 11 on one of the heads 2. In order to sustain the lifting magnet thus constructed, I prefer to provide a suitable cage 7 whereby the lifting strain will be taken off of the case of the magnet as much as possible. The casing 7 has a base ring 7<sup>a</sup> having upwardly projected arms 7<sup>b</sup> that terminate at 7<sup>c</sup> and join with a swivel ring 7<sup>d</sup> to which the lifting cable 8 is attached. In lieu of the cage, however, I may secure rings 9 by straps 9<sup>a</sup> and rivets 9<sup>b</sup>, or otherwise, to the end heads 2, to which the cable or rope may be secured.

In using my invention as a drill rod grab or for removing other tools from oil wells or the like, the magnet is lowered into the well over the tool, as indicated in Fig. 1 of the drawings. The shank of the tool enters the inner tube 1 of the magnet and acts as a core for the magnet upon energizing the coils thereof thereby causing the "core" to travel with the magnet as it is raised out of the well. By this means the tool, or other article, picked up will be kept from engaging the casing of the well and jamming therein. If the article to be lifted out of the well is of less length than the magnet it will practically enter the tube and be concealed therein as the magnet is lifted up out of the well. Other uses as well as the many advantages of the invention will be readily apparent to those skilled in the art and it is not thought necessary to enter into a further detailed discussion thereof in this specification.

It is, of course, understood that slight

changes in the details of construction, combination and arrangement of parts may be made without departing from the spirit of the invention; or the scope of the appended claims.

What I claim is:

1. A lifting magnet that includes a core tube, a pair of coils wound to present a consequent pole intermediate the ends of the magnet, an outer tube and end closure rings to form a housing for said coils.

2. A lifting magnet that includes a core tube, a pair of coils, an outer tube and end closure rings to form a housing for said coils.

3. A lifting magnet that includes a core tube, a pair of coils wound to present a consequent pole intermediate the ends of the magnet, an outer tube, end closure rings to form a housing for said coils, and means for securing said rings to said tube to effect water-tight joints.

4. A lifting magnet that includes a core tube, a pair of coils, an outer tube, end closure rings to form a housing for said coils, and means for securing said rings to said tube to effect water-tight joints.

5. A lifting magnet that includes a core tube, a pair of coils wound to present a consequent pole intermediate the ends of the magnet, an outer tube, end closure rings to form a housing for said coils, said tubes and said heads being seamed together and secured to effect water-tight joints.

6. A lifting magnet that includes a core tube, a pair of coils, an outer tube, end closure rings to form a housing for said coils, said tubes and said heads being seamed together and secured to effect water-tight joints.

7. A lifting magnet that includes a core tube, a pair of coils wound to present a consequent pole intermediate the ends of the magnet, an outer tube, end closure rings to form a housing for said coils, a cage for

holding said magnet and a cable secured to said cage for suspending the same.

8. A lifting magnet that includes a core tube, a pair of coils, an outer tube, end closure rings to form a housing for said coils, a cage for holding said magnet, and a cable secured to said cage for suspending the same.

9. A lifting magnet that includes a core tube, a pair of coils wound to present a consequent pole intermediate the ends of the magnet, an outer tube, end closure rings to form a housing for said coils, means for securing said rings to said tube to effect water-tight joints, a cage for holding said magnet, and a cable secured to said cage for suspending the same.

10. A lifting magnet that includes a core tube, a pair of coils, an outer tube, end closure rings to form a housing for said coils, means for securing said rings to said tube to effect water-tight joints, a cage for holding said magnet, and a cable secured to said cage for suspending the same.

11. A lifting magnet that includes a core tube, a pair of coils wound to present a consequent pole intermediate the ends of the magnet, an outer tube, end closure rings to form a housing for said coils, said tubes and said heads being seamed together and secured to effect water-tight joints, a cage for holding said magnet, and a cable secured to said cage for suspending the same.

12. A lifting magnet that includes a core tube, a pair of coils, an outer tube, end closure rings to form a housing for said coils, said tubes and said heads being seamed together and secured to effect water-tight joints, a cage for holding said magnet, and a cable secured to said cage for suspending the same.

CLAYTON E. FREDERICKSON.

Witnesses:

GEORGE S. CHAMBERLIN,  
EARL D. MCCADDAM.