R. O. KING.

METHOD AND APPARATUS FOR WRECKING BODIES SUNK IN WATER.

APPLICATION FILED FEB. 18, 1909.

975,534. Patented Nov. 15, 1910.

4 SHEETS—SHEET 1.

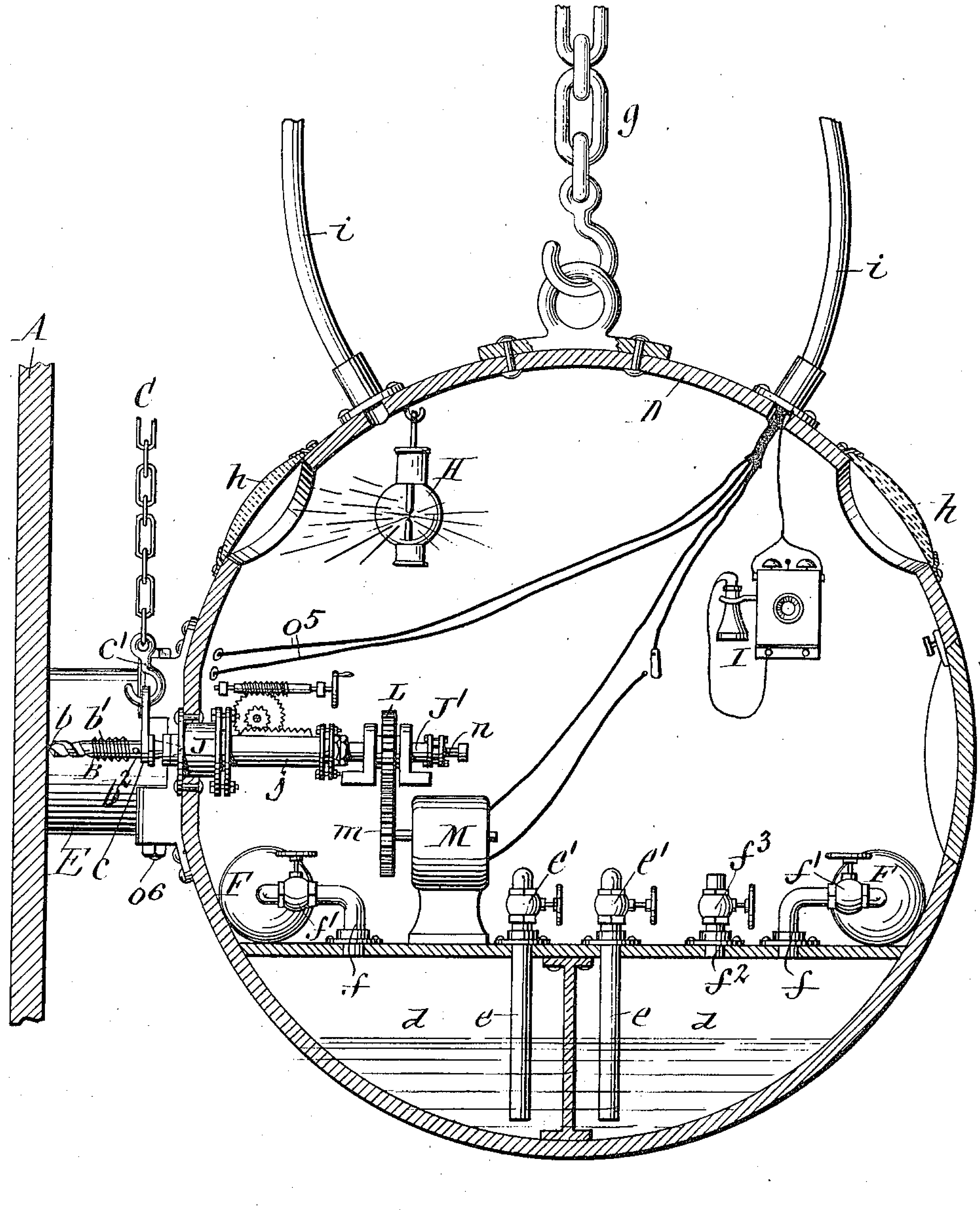

FIG. I.

Witnesses

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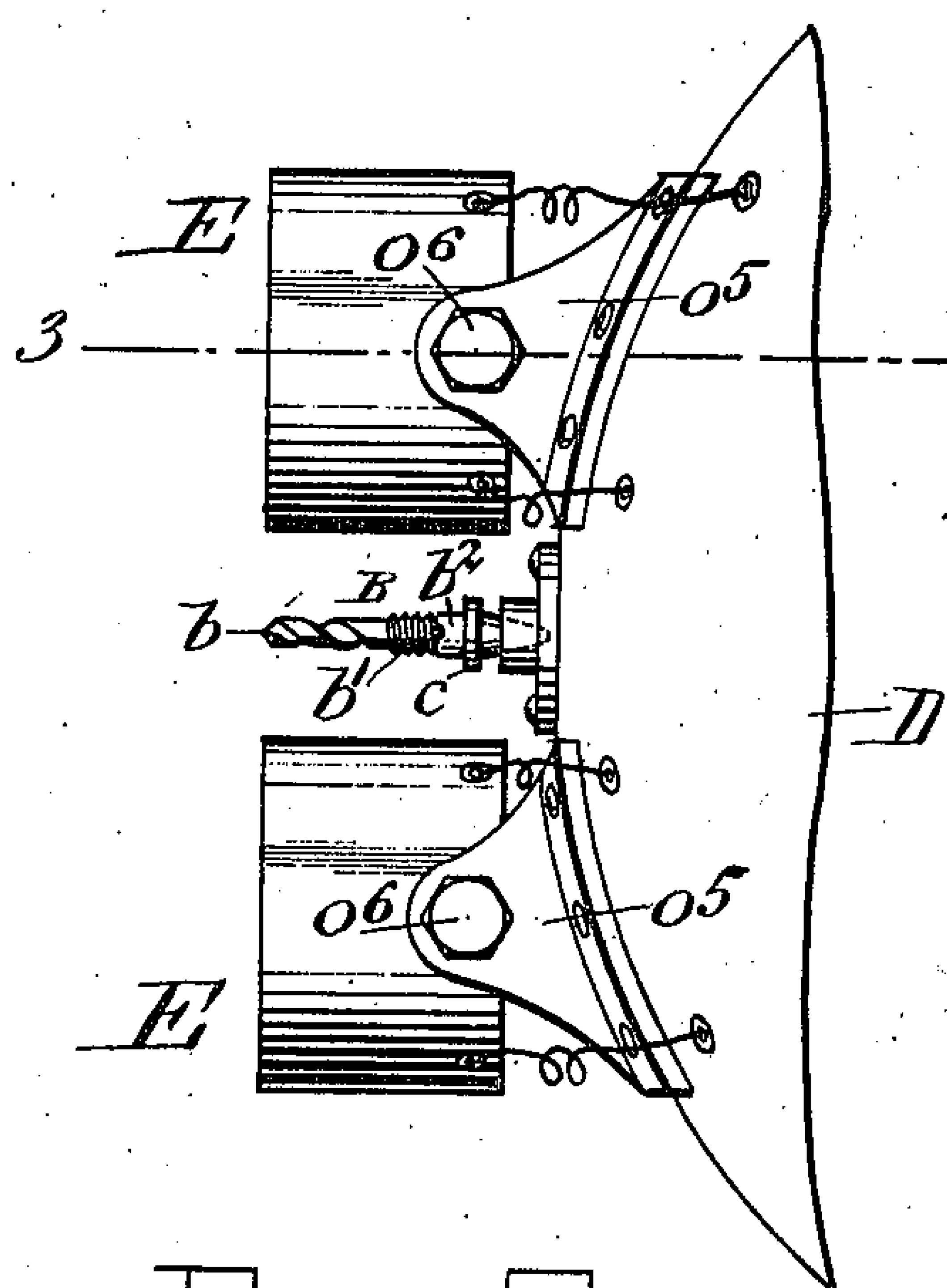

FIG. 2.

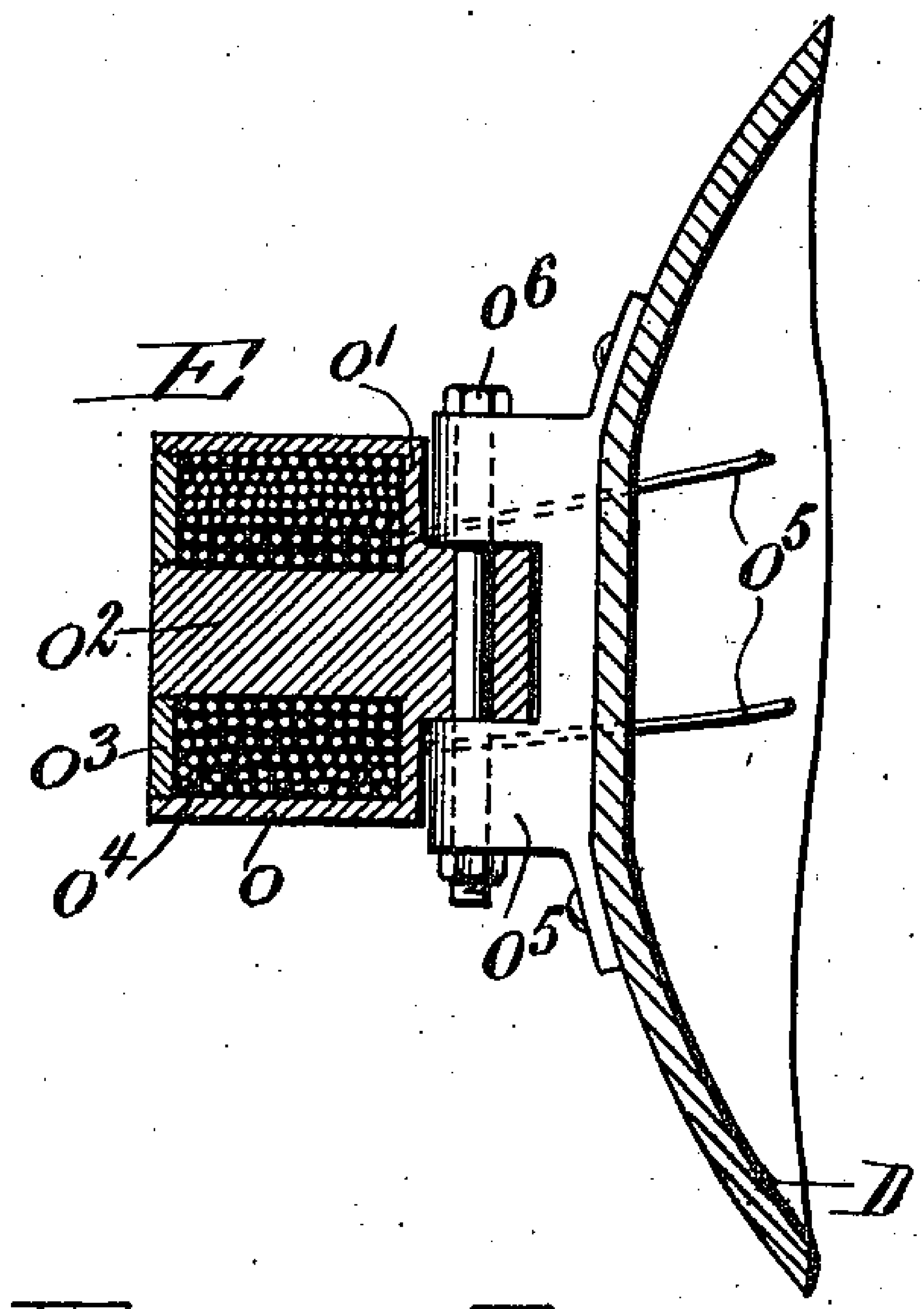

FIG. 3.

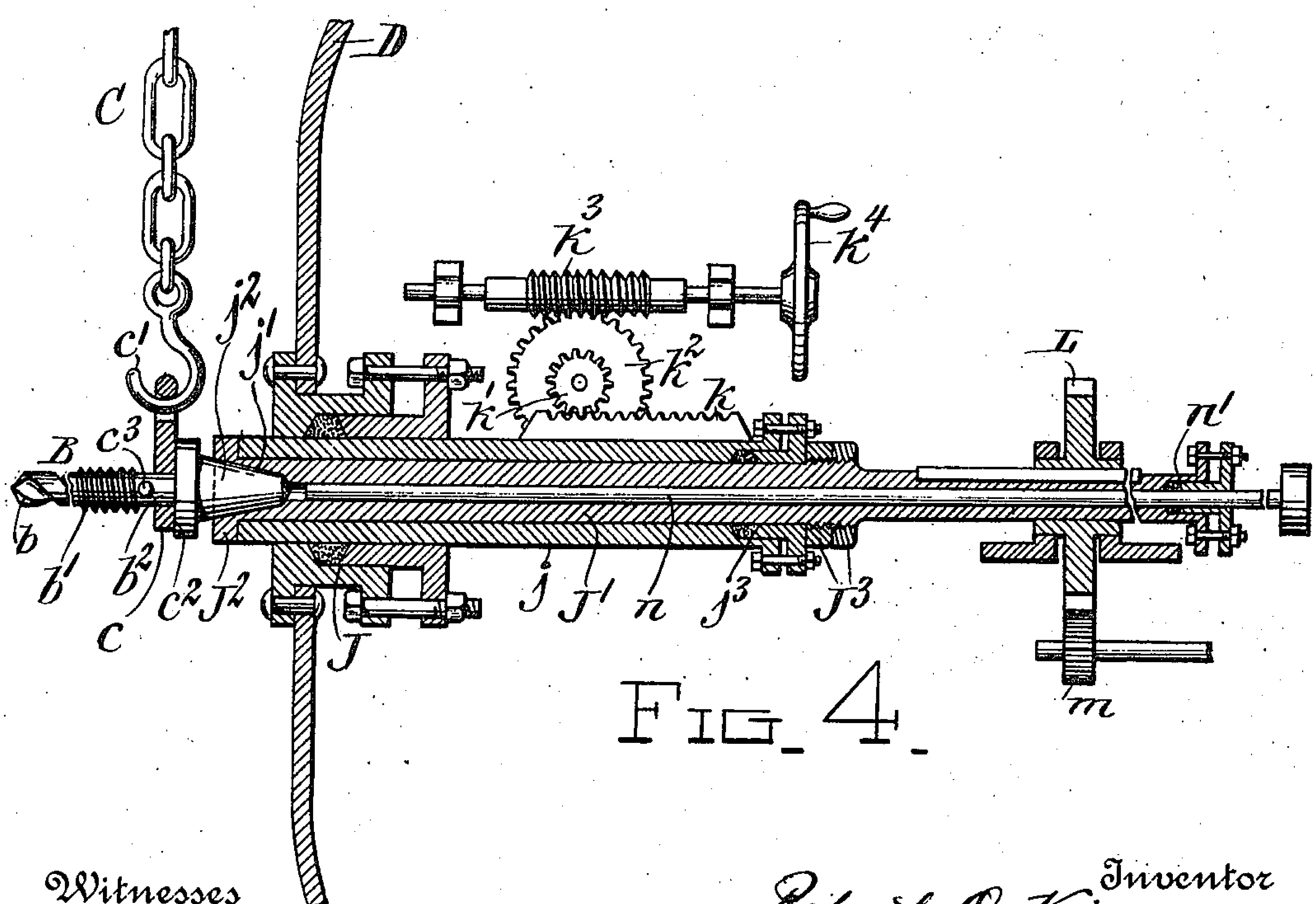

FIG. 4.

Witnesses

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4 SHEETS—SHEET 3.

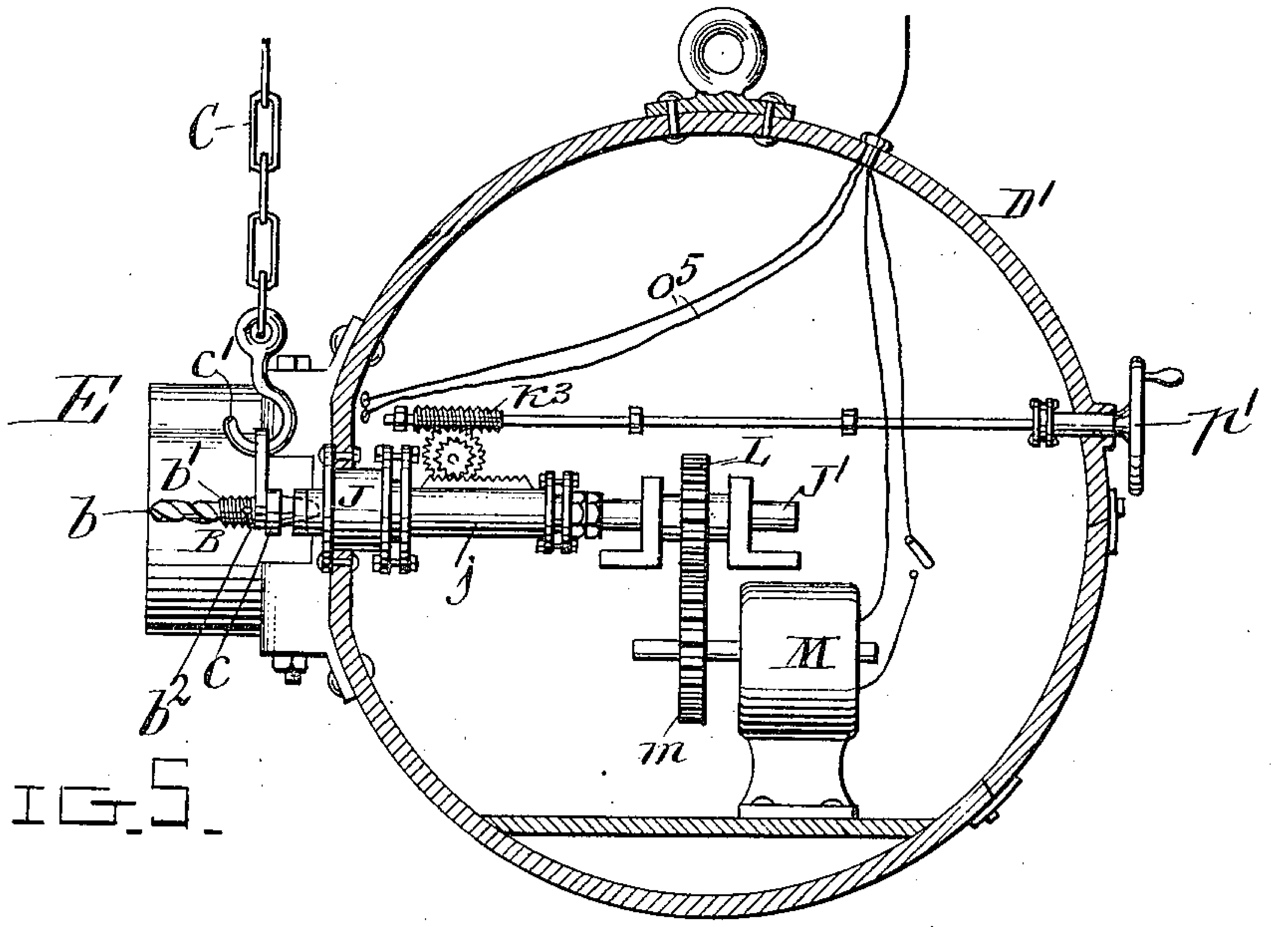

FIG. 5.

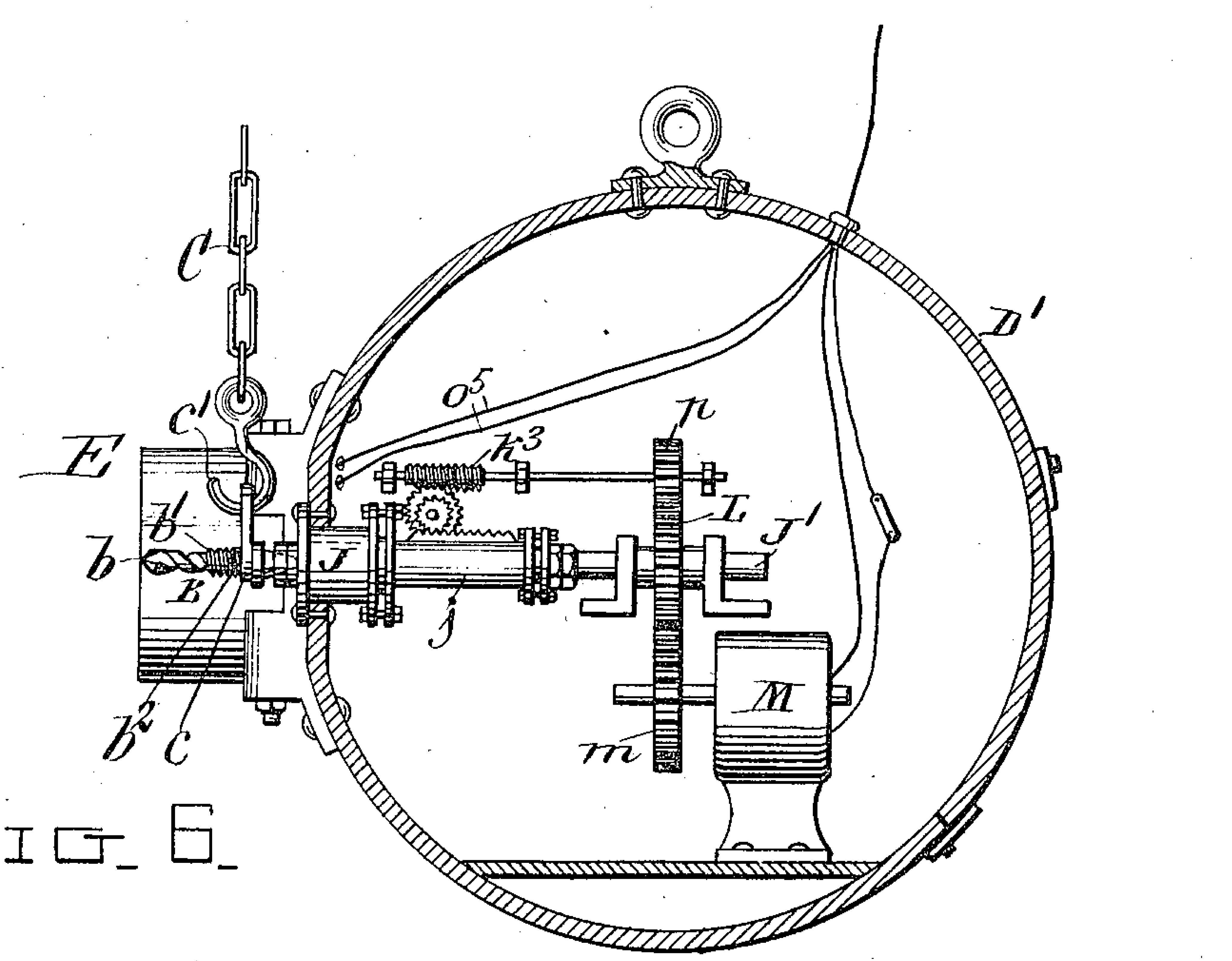

FIG. 6.

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4 SHEETS—SHEET 4.

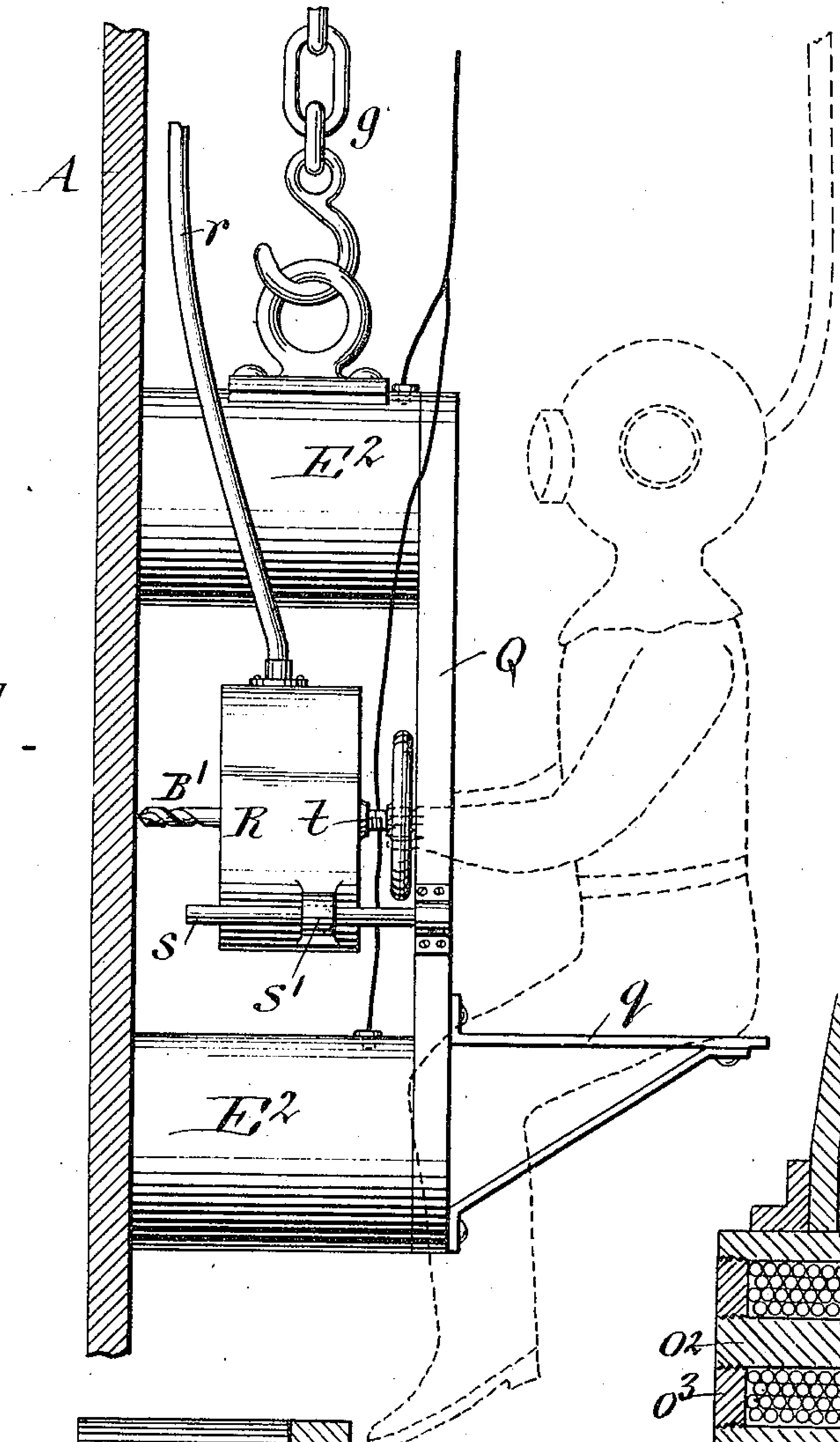

FIG. 7.

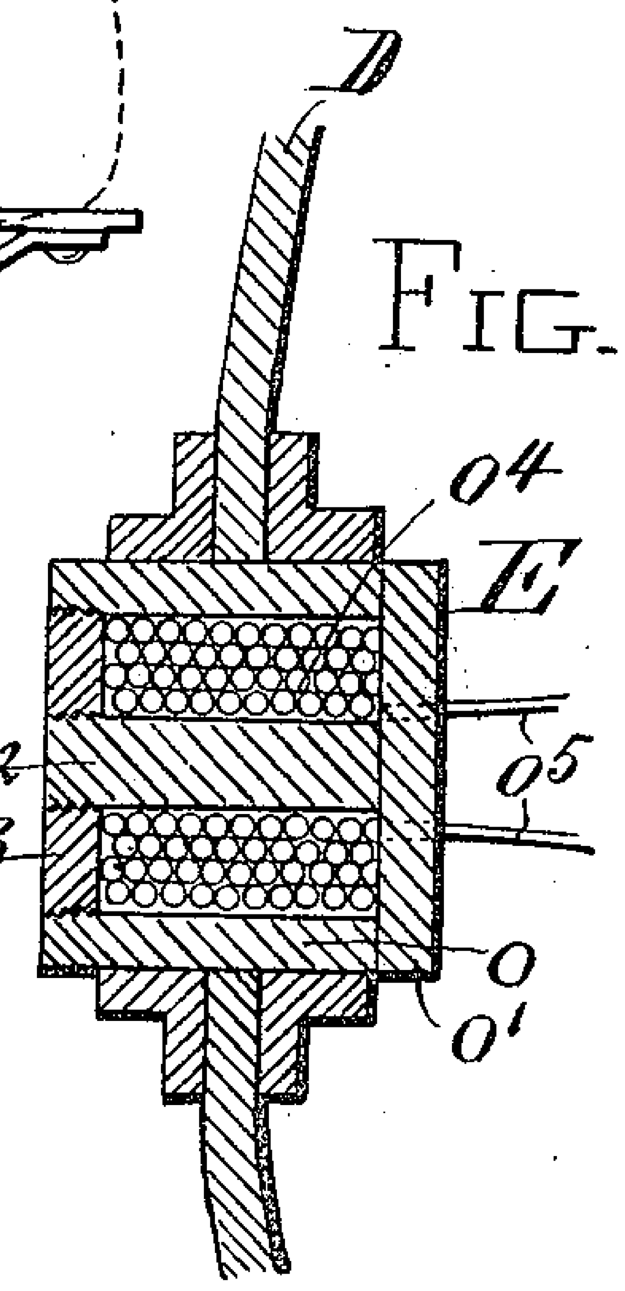

FIG. 9.

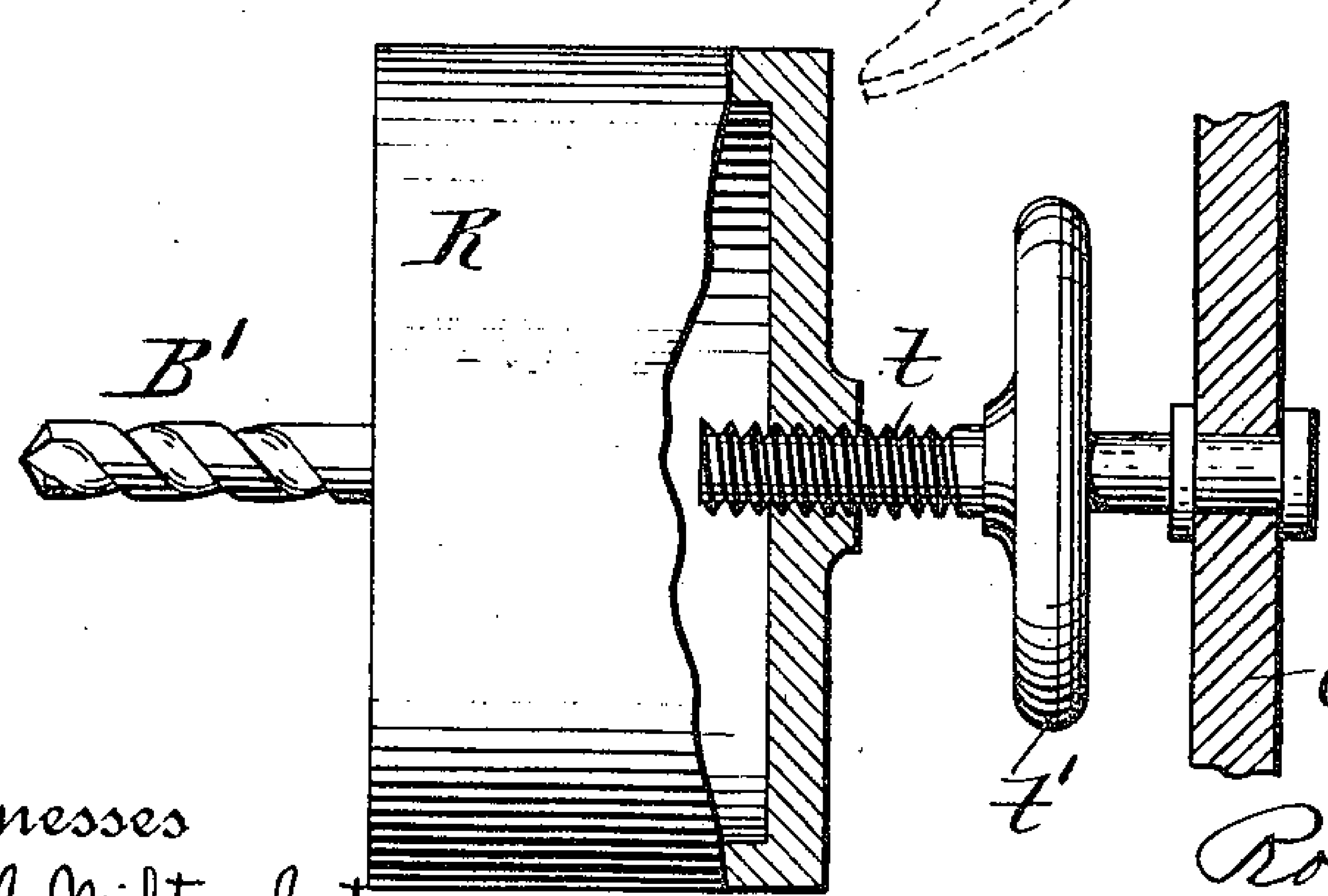

FIG. 8.

Witnesses
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UNITED STATES PATENT OFFICE.

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METHOD AND APPARATUS FOR WRECKING BODIES SUNK IN WATER.

975,534. Specification of Letters Patent. **Patented Nov. 15, 1910.**

Application filed February 18, 1909. Serial No. 478,638.

To all whom it may concern:

Be it known that I, ROBERT OWEN KING, a citizen of Canada, residing at Buffalo, in the county of Erie and State of New York, have invented a new and useful Improvement in Methods and Apparatus for Wrecking Bodies Sunk in Water, of which the following is a specification.

This invention relates to a method and apparatus which is more particularly designed for lifting iron or steel vessels which have been sunk in water but the same is also useful for lifting other kinds of vessels or submerged articles or bodies from under water.

The object of this invention is to provide a method and apparatus whereby vessels or other bodies may be raised from any depth of water with ease and certainty and at comparatively small cost.

In one of the methods heretofore in use for raising a vessel from a depth of water lifting cables were attached to the vessel and to these cables a sufficient force was applied to overcome the immersed weight of the vessel. The greatest difficulty in this method is the proper attaching of these lifting cables to the sunken vessel. When the sunken vessel is at a depth not greater than that at which divers can work the cables can be attached to projections on the vessel, or secured into port holes, or passed beneath the vessel or in other ways which suggest themselves. When the vessel is at a depth greater than that at which divers can work, ordinary methods fail and the vessel is considered lost.

My invention consists in providing means for attaching lifting cables to a vessel sunk to any depth and can also be used to advantage for attaching lifting cables to vessels near the surface.

In the accompanying drawings consisting of 4 sheets: Figure 1 is a vertical section of an apparatus which embodies my invention and which is more particularly designed for attaching lifting cables to ships or other bodies which are sunk too deep in the water to be reached by divers. Fig. 2 is a fragmentary top plan view of the same showing the gripping or holding magnets and part of the drilling mechanism. Fig. 3 is a fragmentary vertical section taken in line 3—3, Fig. 2. Fig. 4 is a fragmentary vertical longitudinal section, on an enlarged scale, of the drilling and cable attaching mechanism. Fig. 5 is a vertical section showing an apparatus embodying my invention which may be used for attaching lifting cables to vessels or bodies sunk in comparatively shallow water and in which the feeding of the drilling apparatus is effected by the diver. Fig. 6 is a similar view of an apparatus of this character in which the feeding of the drilling mechanism is effected automatically and the apparatus is only adjusted by the diver to the part of the ship to which a lifting cable is to be attached. Fig. 7 is a side elevation showing a modified construction of an apparatus embodying my invention. Fig. 8 is a fragmentary sectional view, on an enlarged scale, of the pneumatic motor for operating the drill and the drill adjusting means shown in Fig. 7. Fig. 9 shows a modification in the manner of supporting the magnet on the shell of the drilling apparatus.

Similar letters of reference indicate corresponding parts throughout the several views.

In general my improved method consists in the use of magnetism to hold a drilling machine against the shell or hull A of a submerged iron or steel vessel, and while the drilling machine is so held it is operated by power such as electricity or compressed air supplied from the surface. The drilling machine is provided with a special bit or auger B which has a drilling point b suitable for penetrating metal and also a thread cutter or tap b^1 in rear of the bit which is formed so that after the drilling operation is completed further rotation causes the bit to thread itself into the drilled hole. The drilling machine is arranged so that after the bit has been threaded into the shell of the vessel, it can be detached from the machine and left in place. Before the operation of drilling is begun or before the drilling machine is taken below the surface of the water, a lifting cable C is attached to the rear shank b^2 of the bit by means of a loose swivel, hanger or ring c which receives the hook c^1 of the lifting cable and which is applied to the shank between a shoulder c^2 and a cross pin c^3 thereon, so that after the bit has been drilled and threaded into the shell of the vessel, the lifting cable is securely attached to the vessel by the bit. The bit by this means is free to turn in the swivel or ring but is held against axial movement therein. This operation is repeated until as many cables as desired are attached to the vessel. For cases where the depth of water is too great for divers to work, this drilling machine is built into the side of a small vessel or diving bell D which is large enough to provide working space for one or more operatives, as shown in Fig. 1. This bell is strongly enough built so that it will safely stand the pressure at the depth at which it is desired to operate.

The diving bells heretofore in use were open to the water surrounding the same so that the air within the bell was influenced by the pressure of the water surrounding the bell. The small vessel or diving bell in the present case differs from the former bell in that it is water tight and completely closed excepting as to the air supply tube or tubes leading from the same to the atmosphere above the surface of the water. The air in the improved diving bell is therefore uninfluenced by the pressure of the surrounding water and is always at approximately atmospheric pressure, so that the operatives within the bell suffer no discomfort or inconvenience at any depth of water. This bell is provided with ballast tanks d, d to which water can be admitted through pipes e, e containing valves e^1, e^1 or driven out by compressed air conducted from reservoirs F into the ballast tanks by pipes f containing valves f^1. When the air is expelled from the ballast tanks by the admission of water into the same for sinking the bell, the air thus expelled is preferably delivered into the compartment for the operator in the upper part of the bell by a pipe f^2 containing a valve f^3. These tanks and equipment are constructed and arranged in the manner usual on submarine boats. By means of the ballast tanks the buoyancy of the bell can be adjusted, so that when submerged its weight on its supporting chain or cable g will be only a few pounds. In this condition it is suspended from a working boat on the surface of the water and lowered to the depth of the sunken vessel to which the lifting cable is to be attached. The bell is provided with suitable heavy glass windows h, so that the position of the sunken vessel can be seen by the operators inside of the bell. Powerful light from electric or other lamps H can also be directed through these windows. By means of a telephone system I extending to the surface of the water the working or surface boat can be directed, so that its movements will bring the bell into proximity of the sunken vessel. The bell is also provided with powerful electro-magnets E, so that when it is brought against the side of the sunken vessel it can be held there firmly. When the magnets are energized and have become attached to the side of the sunken vessel, the chain g may be slackened off, so that the motion of the surface boat will not interfere with the position of the bell. As the weight of the bell has been adjusted, so that it has a few pounds only of negative buoyancy it will be understood that the magnets E will not have to hold up very much weight.

The drilling machine may be variously constructed, that shown in Figs. 1 and 4 being constructed as follows: J represents a stuffing box which is fastened in the side of the bell and j is a supporting sleeve which slides through this box and in which the drill spindle J^1 is journaled. The latter is free to turn in the supporting sleeve but is held against axial movement in the same by a shoulder or head J^2 at the outer end of the spindle engaging with the outer end of the sleeve, and adjusting screw nuts J^3 arranged on the inner part of the spindle and engaging with the inner end of the sleeve, as shown in Fig. 4. At its outer end the drill spindle is provided with a conical seat or socket j^1 which receives the conical inner end or taper part j^2 of the shank of the bit and tap, as shown in Fig. 4. The sleeve j can be moved backward and forward by means of a rack k arranged lengthwise on the sleeve, a pinion k^1 meshing with the rack, a worm wheel k^2 connected with the pinion and a worm k^3 meshing with the worm wheel and provided with a hand wheel k^4 inside of the bell for operating the same. Any suitable means may be provided so that the sleeve j cannot rotate. The spindle J^1 can be rotated in the sleeve by a gear wheel L journaled on a stationary bearing and splined on the sleeve and an electric motor M having a pinion m meshing with the gear wheel L. A stuffing box j^3 is provided at the inner end of the sleeve around the drill spindle. After the bit is securely tapped into the shell of the sunken vessel, the spindle is backed off leaving the bell free to be raised to the surface. The detachment of the bit from the drill spindle is preferably facilitated by a push rod n slidable lengthwise in the spindle and adapted to be pushed by hand so that its front end strikes against the rear end of the shank of the bit and knocks the same out of its seat in the spindle. A stuffing box n^1 is provided at the inner end of the spindle around the push rod, as shown in Fig. 4.

The several stuffing boxes referred to permit the supporting sleeve to slide through the body of the bell, the drill spindle to rotate in the sleeve and the push rod to slide in the spindle without permitting water to enter the bell through the several joints between these parts. After another bit has been connected with a lifting cable and placed in the drill spindle, the bell is again lowered in position adjacent to the sunken vessel for attaching the bit and cable thereto.

An electromagnet is preferably placed on each side of the drilling device, as shown in Fig. 2. There are several forms of electro-magnets which could be used, that shown in the drawings being known as an iron clad magnet and consisting of an outer shell o, a back o^1, a central core o^2 of iron, a front head o^3 of brass or non-magnetic material and an insulated coil o^4 surrounding the core between the shell and heads and having its terminals connected with electric supply wires o^5. The magnetic circuit is completed when the face of the magnet comes in contact with the shell of the sunken vessel and thereby causes the magnet to adhere firmly to the same and hold the drilling apparatus in place while the drilling operation is going on. These magnets may be built into the shell of the small vessel, as shown in Fig. 9, or they may be hung outside of the bell, and in that case would be pivotally supported on a bracket o^5 on the outer side of the body of the bell by means of a pivot pin o^6 passing vertically through corresponding ears on the shell of the magnet and the bracket, as shown in Figs. 2 and 3. By this means the magnets are permitted to adapt themselves to the curvature of the hull of the sunken vessel and enable the magnets to obtain fair bearing and strong hold on the same.

The bell being held in position, the drilling machine is started and the bit drilled and tapped into the side of the sunken vessel. When the operation is completed the bell is hauled to the surface and a new bit put in the spindle ready for the next cable to be attached. The bell is provided with one or more air hose i which reach to the surface and through which air is pumped to supply the operatives. Throughout the operation the air in the bell remains at atmospheric pressure. The wires for supplying electricity to the motor, the magnet electric light, telephone, etc. may be brought down through the air hose, as shown in Fig. 1.

For cases in which the depth of water is not too great for work by divers the drilling machine is inclosed in an air tight shell or bell D^1 and the magnets E are mounted on the outside of its shell and suitably protected, as shown in Figs. 5 and 6, or the main part of the magnets may be inside the shell and the poles or legs only project through the shell, as shown in Fig. 9. When it is desired to attach a lifting cable to a vessel, the special bit is inserted in the spindle of the drilling machine, the lifting cable being attached to the bit. The whole is then lowered until it rests against the part of the sunken vessel to which the lifting cable is to be attached, then the magnet is energized by a current of electricity, causing it to adhere to the sunken vessel and hold the drilling machine firmly. The placing of the apparatus in the position required can be facilitated by divers. After the drilling machine has been properly located and held in position by the electro-magnets the motor driving the drill is started and the drill is fed forward. This feeding of the drill may be effected automatically by means of a pinion p on the worm shaft meshing with the gear wheel L on the drill spindle shaft, as shown in Fig. 6, or the drill may be fed into the work by the diver by means of a hand wheel p^1 arranged on the outside of the shell of the apparatus and connected with the worm shaft, as shown in Fig. 5. After the bit has been drilled and tapped into the shell of the sunken vessel it is left with its accompanying cable in position and the drilling machine detached and taken to the surface where another bit with its accompanying cable is put in place in the spindle of the drilling machine preparatory to attaching the same to the sunken vessel.

In the organization of my invention shown in Figs. 7 and 8, a scaffold Q is employed which is provided with electro-magnets E^2 for attaching the same to the hull of a sunken vessel and a seat q for supporting the diver who controls the drilling apparatus. The motor R of the drilling apparatus in this case is preferably of the type which is driven by compressed air supplied to the same from above the surface of the water by a hose r, inasmuch as no trouble from insulation defects would occur as in the use of an electric motor for this purpose. The motor frame or housing in this case may be guided on the scaffold to permit of advancing an ordinary bit B^1 toward the work by means of one or more horizontal guide rods s on the scaffold which receive perforated lugs s^1 on the motor housing, and the motor may be advanced as the drilling operation progresses by means of a feed screw t journaled at its rear end on the scaffold and engaging its threaded front end with a threaded opening in the motor housing while its intermediate part is provided with a hand wheel t^1 to be turned by the diver, as shown in Figs. 7 and 8, the arrangement shown in the last mentioned figures would be preferable for drilling and tapping a number of holes in the shell of a ship which is not sunk too deep to be reached by divers. It would not be necessary to use the bits which are left in place, inasmuch as the diver is able to reach the holes, thus permitting plugs with cables attached to be afterward screwed into these holes when wanted. By the use of this last mentioned device a large number of holes could be drilled in the hull of the sunken vessel in a short time and the diver after completing each hole could insert the plug with the lifting cable attached and then pass on to the next hole without coming to the surface.

I claim as my invention:

1. An apparatus for wrecking bodies sunk in water, comprising a support, an electro-magnet pivoted on said support and adapted

to attach itself to said body, and a drilling device mounted on said support.

2. An apparatus for wrecking bodies sunk in water, comprising a support, a drilling device mounted on said support, and electromagnets pivotally mounted on said support on opposite sides of the drilling device and adapted to attach themselves to said body.

3. An apparatus for wrecking bodies sunk in water, comprising a support, a drilling device mounted on said support, and electromagnets pivoted on said support on horizontally opposite sides of said drilling device so as to be capable of turning horizontally and adapting themselves to the side of the body to which they are to be attached.

4. An apparatus for wrecking bodies sunk in water, comprising an inclosing shell having an opening in its side, a supporting sleeve slidable through said opening, a drill spindle journaled in said sleeve and provided at its outer end with a socket adapted to receive a bit, and a push rod slidable lengthwise in the spindle and adapted to disengage said bit from said socket.

Witness my hand this 13th day of February, 1909.

ROBERT OWEN KING.

Witnesses:
THEO. L. POPP,
ANNA HEIGIS.