

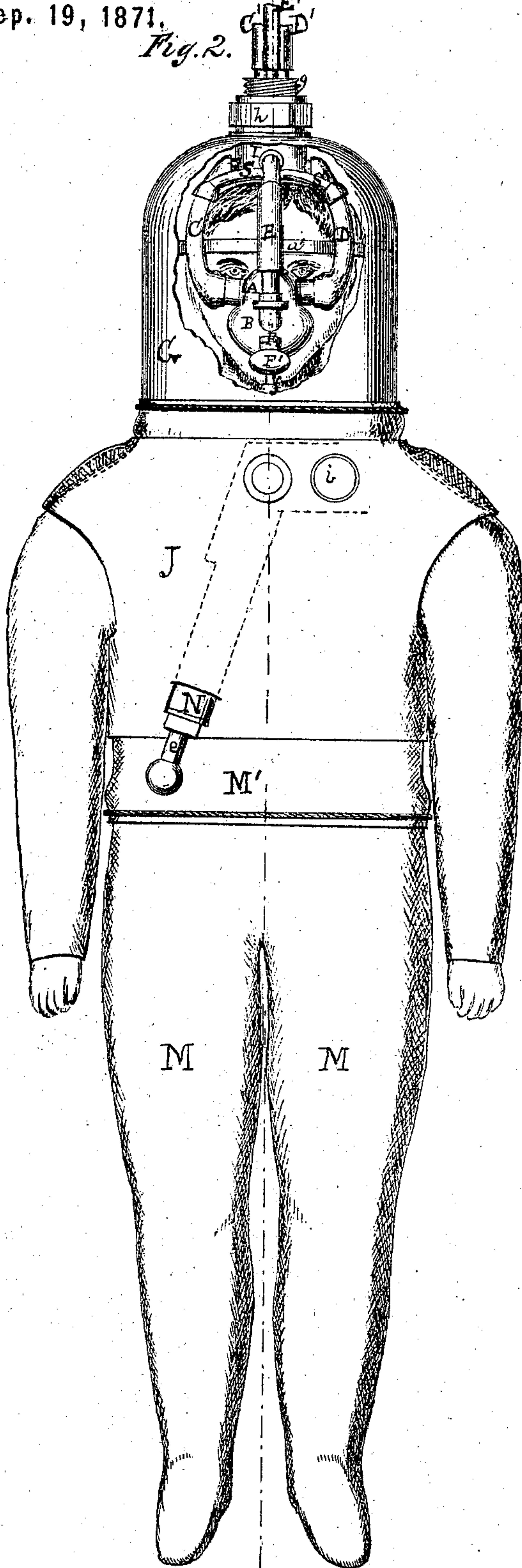
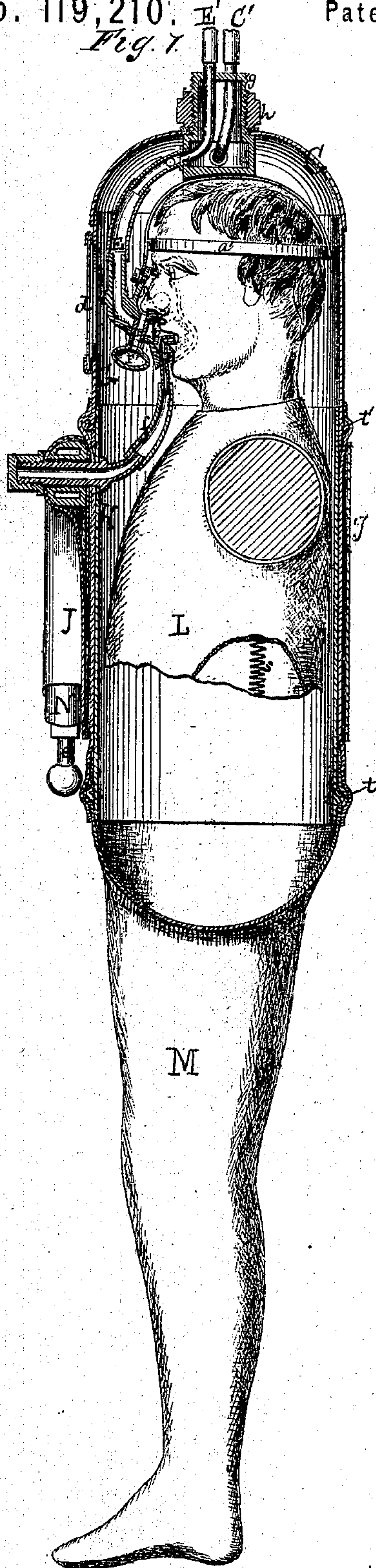
Imp<sup>ts</sup> in Diving Apparatus & Armors.

No. 119,210. E' C'

Patented Sep. 19, 1871.

Fig. 1.

Fig. 2.



Witnesses:  
M. M. Livingston  
J. L. Beecher

Inventor:  
Charles Wilson

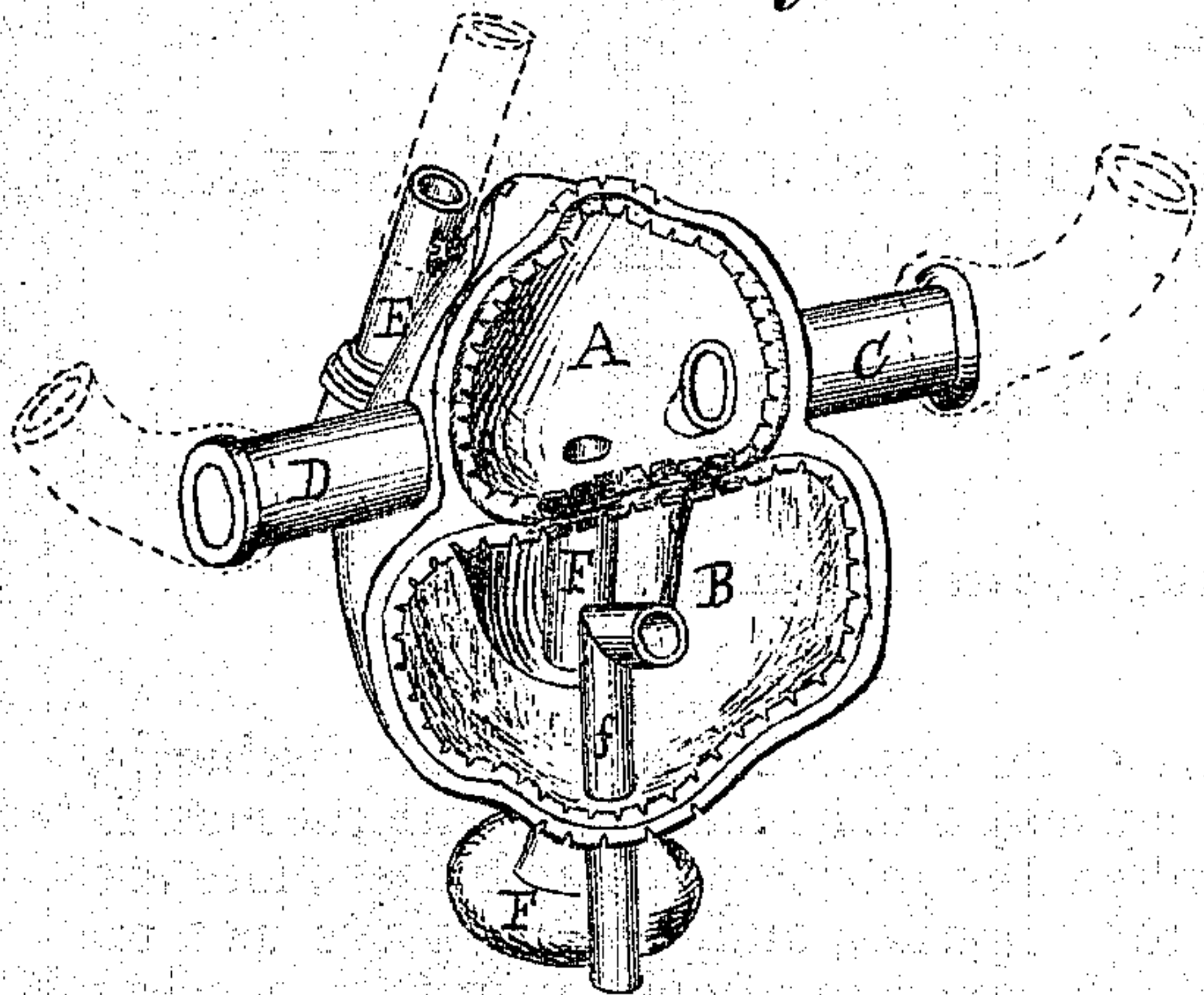


*Charles Wilson.*  
*Imp<sup>ts</sup> in Diving Apparatus & Armor.*  
 No. 119,210.

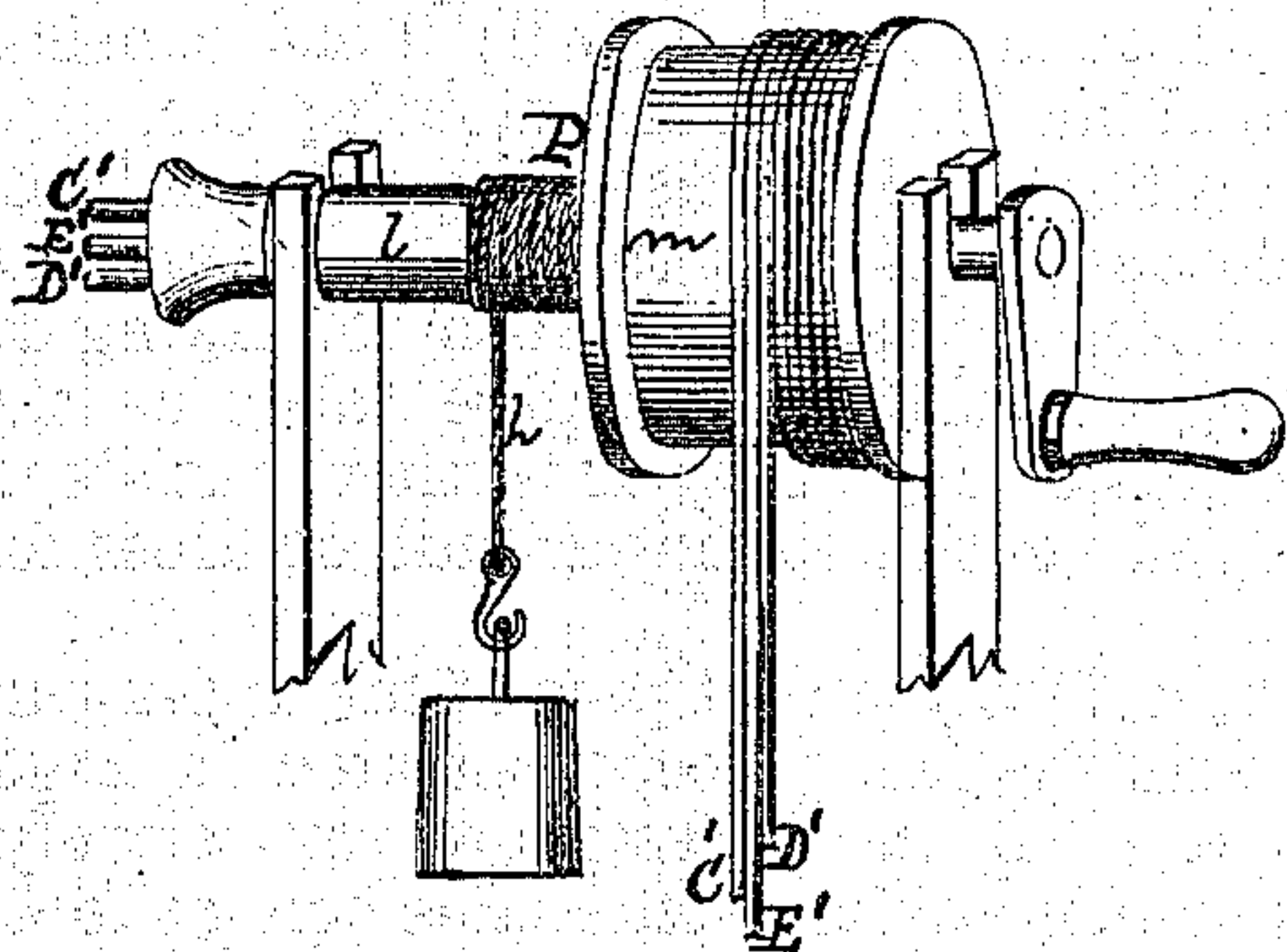
2 Sheets.  
 Sheet II.

Patented Sep. 19, 1871.

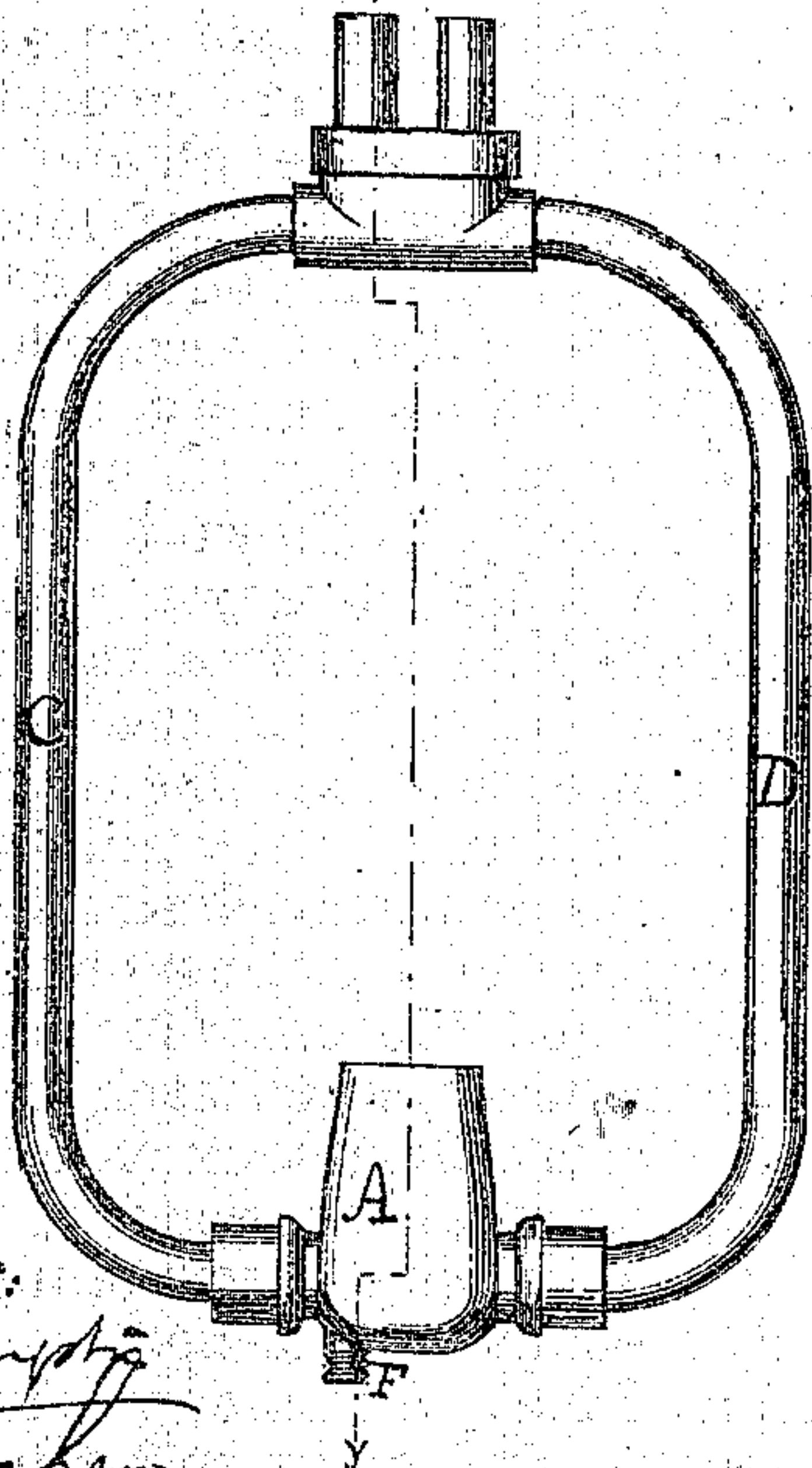
*Fig. 3.*



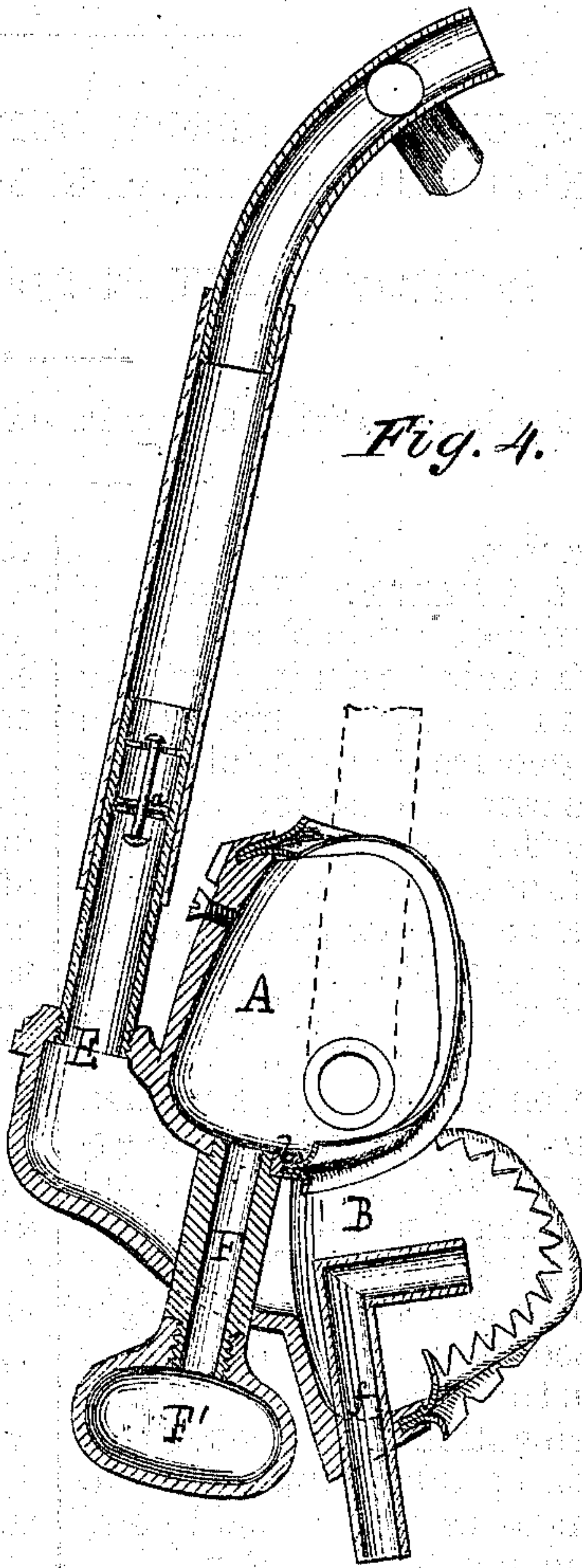
*Fig. 7.*



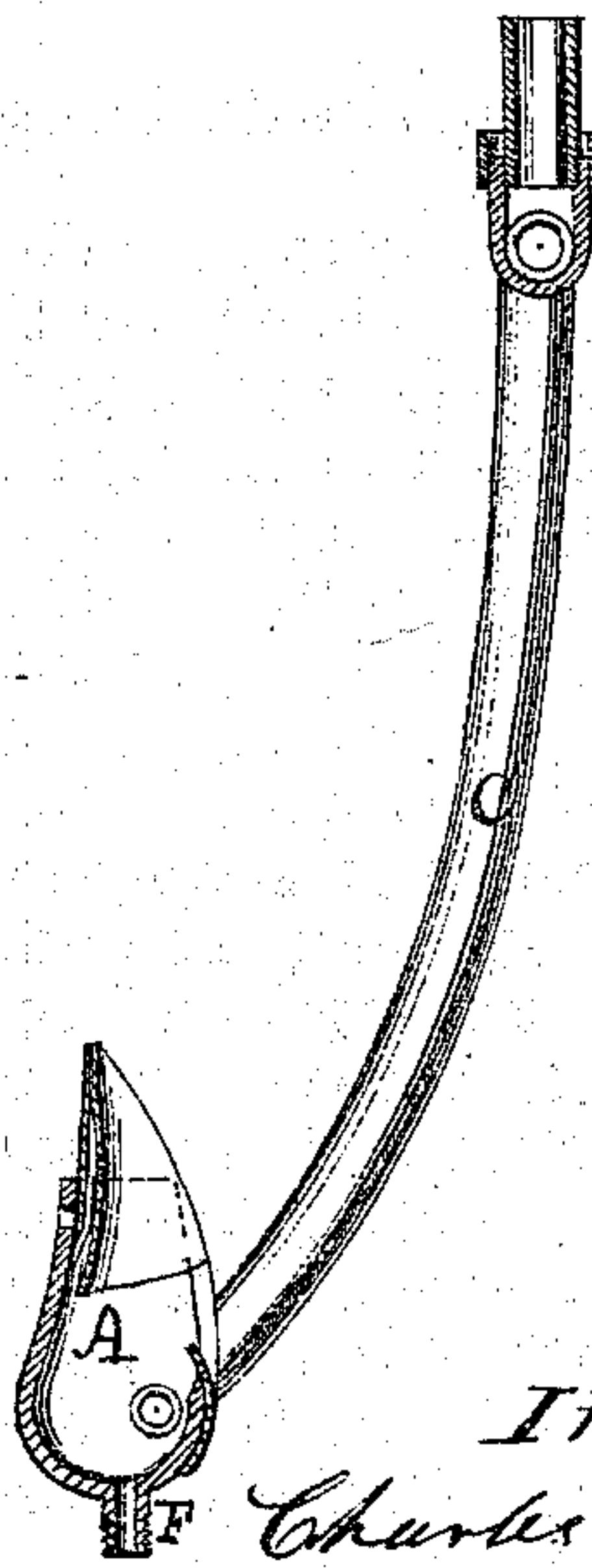
*Fig. 5.*



*Fig. 4.*



*Fig. 6.*



*Witnesses:*  
*M. M. Livingston*  
*T. B. Beecher*

*Inventor:*

*Charles Wilson*



# UNITED STATES PATENT OFFICE.

CHARLES WILSON, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR OF ONE-HALF  
HIS RIGHT TO CHARLES F. MUDGE, OF SAME PLACE.

## IMPROVEMENT IN DIVING APPARATUS.

Specification forming part of Letters Patent No. 119,210, dated September 19, 1871.

*To all whom it may concern:*

Be it known that I, CHARLES WILSON, of Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Diving Apparatus and Armor; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a vertical central longitudinal section of my improved diving apparatus and armor taken on the plane of the line *x x*, Fig. 2, and illustrated as applied to the person of a diver. Fig. 2 is a front elevation of the same, a portion of the head-dress having been broken out to expose the apparatus for conveying air and sound to and from the diver. Fig. 3 is a detached perspective view of the said apparatus for conveying air and sound, drawn on a somewhat larger scale than in the preceding figures. Fig. 4 is a vertical central section through the said apparatus. Fig. 5 is a front elevation of the nose-piece alone, with the breathing-tubes applied to it. Fig. 6 is a vertical central section of said nose-piece taken on the line *y y*, Fig. 5. Fig. 7 is a perspective view of the reel mechanism for taking up and letting out the flexible tubes for conveying air and sound.

Similar letters of reference indicate corresponding parts in the several figures.

The object of my invention is to provide a diving apparatus and armor complete in all the details requisite and desirable for subaquatic explorations in very deep or comparatively shallow waters—a thoroughly efficient apparatus, all the parts of which shall be completely under the control of the diver—one which will enable him unrestrained, and with great facility, to change his position from place to place under water, and to raise and lower himself, and supply himself with fresh air in just the quantity he desires at all times. My invention consists in a face-piece so constructed as to surround the nose and mouth and inclose them respectively in separate and distinct chambers, one of which chambers is provided with inhaling and the other with an exhaling-tube of such length as to open above the surface of the body of water in which the diver may be; it further consists in the combination with the nose-piece, whether connected to the mouth-piece or separate therefrom, of a cup or

receptacle for receiving any nasal discharge, which cup may also be connected with the mouth-piece when the mouth-piece and nose-piece are connected together, and, further, serve as a receptacle for expectorations; it further consists in the combination of an air-pump with an air-tight bag or receiver in such manner that the diver shall have the regulating of the quantity of air in the air-bag completely under his control, and be thereby enabled to change his position as to distance from the surface of the body of water in which he may be, at will; it also consists in the combination, with the mouth-piece, of a speaking-tube; it also consists in the combination, with the face-piece of the apparatus and the flexible tubes, of a reel mechanism for taking up and letting out the said flexible tubes as the diver ascends or descends; it further consists in an improved ventilated under suit or dress for the diver.

I will first describe that part of the apparatus which I term the face-piece, illustrated in Figs. 1, 2, 3, and 4. A and B designate, respectively, the mouth and nose-pieces, the same being shown in said figures as combined in one piece, the two compartments being separated by a partition, *b*, in such manner as to practically cut off communication between the said compartments. The said face-piece A B may be made of sheet-copper or other light material, and air-tight joints, at the points where the edges meet the face, may be insured by securing India rubber around such edges of the said face-piece, which rubber will be caused to press against the face when the said face-piece is confined by a strap passing around the head, as shown in Figs. 1 and 3. C D (see Fig. 2) designate two pipes or breathing-tubes leading upward from the nose-piece, preferably from points near the lower end of the nose, one on each side. One of these tubes may be provided with an outwardly-closing and the other with an inwardly-closing valve, for the obvious purpose of adapting one for an inhaling-tube solely and the other for an exhaling-tube solely, and hence, when each of these tubes is provided with a flexible extension-tube reaching above the surface of the water in which the diver may be, the liability of reinhaling the foul air is entirely precluded. The bottom of the nose-compartment B may be further provided with a tube, E, opening into it and terminating in a cup, E',



which cup may be screwed upon the end of the tube, or be otherwise secured thereto to admit of its removal. This device would serve as a receptacle for any nasal discharges; and an opening or tube leading from the mouth compartment B would serve to conduct expectorations to the same cup or receptacle F'. From the forward part of the mouth-compartment B a pipe or tube, E, extends upward. I have shown this tube as provided with an upwardly opening valve, *a*, (See Fig. 4,) so that this tube will serve as an exhalation-tube, to carry away the foul air expelled from the mouth instead of the nose. And it will be observed that if there were no valves at all in the tubes C, D, and E, the inhalation could be through either the nose or the mouth, and the exhalation the reverse; and it is evident that the valves can be arranged in various ways for insuring a fresh supply of air to the lungs at all times. The tube E, when valveless, may be used as a speaking-tube as well as an inhalation or exhalation-tube; but when provided with a valve it will serve as a speaking-tube either for the diver or for those above the water, accordingly as the valve is arranged. When said tube E is provided with a valve which constitutes it an exhalation-tube, it becomes also a speaking-tube, through which the diver can speak to those above the water; but when it is valveless or provided with a downwardly-opening valve, I find it advantageous to employ special ear-tubes S S, which tubes are let into said tube E at opposite sides and curved so that their ends will be sufficiently near to the ears of the diver. These ear-tubes S S are designed for use when the diver is invested with the head-dress shown in Figs. 1 and 2; and these tubes S S serve also, when the passage through the tube E is unobstructed by valves, to carry off any disagreeable odors or air from the interior of the head-dress and armor. Of course, in cases where the duties required of the tubes do not interfere with the design of supplying fresh air to the diver, said tubes C D E may be let into each other above the diver's head, or carried up separately, if desired. In Figs. 5 and 6 I have represented the nose-piece separate from the mouth-piece, and I have designated the parts by the same letters as the application of the cup or receptacle F' to a nose-piece separate from a mouth-piece, the said cup being constructed to screw upon a tube, F, projecting downwardly from the said nose-piece, lettered A C D, and arranged in proper position to receive nasal discharges, so frequently occurring with a diver under water, thus removing a great obstacle to his breathing freely. The face-piece is to be secured in proper position by a band, *a'*, passing around the head—say as shown in Fig. 1, or in any other suitable manner.

I will now describe the diving-dress or armor: H is a metallic case, which I term a metallic vest, made, preferably, of sheet-copper. I prefer to use two curved plates of a suitable length to protect the body of the driver—say long enough to extend from the neck down to just below the hips. These pieces are provided with arm-holes, and, when put upon the diver, the

edges are designed to overlap each other down the back and front, when said edges may be fastened together so as to prevent their crowding past each other by reason of the pressure of the water. It is evident that a continuous sheet may be used, or a sheet united at two edges only instead of two separate pieces. G designates the head-dress. This is also made of sheet metal, preferably sheet-copper. It consists in an inclosing-case sufficiently large to give the head ample room within it. Its front is provided with a window, *d*, and the said case is sufficiently long to extend down over the metallic vest H, and I preferably construct it with a slotted lower edge and bend the separated parts outward so as to overlap the upper edge of the metallic vest H, in which position it is held by catches or in any suitable manner. The head-dress G is provided with an opening at its top, through which passes the screw-shank *g* of a block, I, which I term the crown-piece. Into this crown-piece are let the several tubes for conveying air and sound, either or both, hereinbefore described. Communication between the said tubes and their flexible extensions C' D' E' is established through this crown-piece. This crown-piece, it will be observed, is secured, above the head of the diver, to the head-dress, by a nut, *h*, screwing on the shank *g*, and, of course, the joint between the said shank and opening in the head-dress is made liquid-tight by packing or washers, or otherwise. The tubes C D E connecting the mouth-piece with the crown-piece are preferably made of elastic tubing so as to permit of the head being freely turned or moved within the head-dress.

In clothing the diver I find it desirable to first provide a suit, L, made of some suitable soft woolen fabric of a considerable thickness, or of two thicknesses, through which runs—from the feet up, say to the top, so as to extend or open in the head-dress—a series of spiral springs, *s*. (See Fig. 1.) I thereby provide a means of ventilation, by allowing air from the head-dress to pass or circulate through this woolen dress. This suit L is designed to be worn by the diver in place of ordinary pants and vest. I also provide pants M and jacket M', made of India rubber or other water-proof material not dissimilar to a like dress usually employed by divers. To secure water-tight joints I preferably form on the metallic vest H a rib, *t*, and on the head-dress G another rib, *t'*, the pants M overlapping the vest M', and secured above the rib *t*, and the vest secured above the rib *t'* by being tightly drawn around the same and secured by a cord or otherwise.

J designates an air-bag or receiver, which I employ to assist the diver in raising and lowering himself while in the water by increasing or decreasing the quantity of air in the bag J. This air-bag J is designed to be worn around the body like a vest, the two edges, in the present instance, being united or tied together at the back of the diver, and provided with arm-holes, through which the arms are thrust when the diver puts it upon him. This air-bag is, of course, to be



made air-tight, and it is designed to assist the diver, as before stated, in changing his position in the water by counterbalancing his weight by the buoyancy of the air in the bag. It may be partially filled by the diver forcing air into it with his mouth through a pipe, *f*, (see Figs. 1 and 4,) one end of which pipe is accessible to the diver's mouth, within the head-dress *G*, and the other passes into the said bag. To facilitate the filling of the bag with air, which is to be drawn from out of the head-dress, I provide an air-pump, *N*, (see Figs. 1 and 2,) located principally within the air-bag, but so arranged that the piston-stem *e* will project outside the bag, so as to be accessible for operation by the hand of the diver. The connection of the pipe *f* with the pump is preferably in such manner that the said pipe *f* can be used as a filling-tube for the mouth or as an induction-tube to the pump, which is so obvious an arrangement as to need no particular description here. The bag is provided with a vent, the opening-and-closing plug or valve *i* being so arranged as to be operated by the hand from the outside. This vent provides an escape for the air from the bag. It is obvious that the diver, by regulating the quantity of air in this air-bag, is enabled to change his position in the water relatively to distance from the surface. To enable the diver to take up or let out the flexible tubes which extend above the surface of the water, I provide a simple form of reel, *P*. (Refer to Fig. 7.) The shaft *l* of the reel, which is mounted in suitable bearings, is provided with a drum, *m*, which may be made hollow, so that air may circulate through it, the ends of the flexible tubes being let into this drum, so that on revolving said drum the said tubes will be wound upon or unwound from it without contracting their usual diameter or in any degree impairing their efficiency. And I will here remark that the ends of the tubes are preferably carried through the drum and its shaft and out of one end of the shaft, where each one will be most convenient of access, as will be clearly understood by reference to said figure. A cord or rope, *h*, is attached to the shaft *l* or a pulley thereon, and arranged to wind in an opposite direction from the flexible tubes upon the drum *m*. This cord *h* may be provided with a weight of a ca-

capacity to balance the weight of the diver, though not in a manner to interfere with his descent into the water, but which will revolve the drum to wind up the tubes, or which may be sufficient to assist the diver in ascending when he increases his buoyancy by forcing air into the air-bag *J*. But, if desired, the cord *h* may be long enough to extend down to the diver, and hence he could, by drawing upon the said rope *h*, ascend to the surface of the water without assistance from others.

From the foregoing description it is manifest that I provide a diving-armor and apparatus complete in all necessary and requisite parts, and particularly for deep-sea diving.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The face-piece *A B*, consisting of two separate compartments—one for the nose and one for the mouth—in combination with two or more pipes for conveying air or sound, or both, to or from above the surface of the water in which the diver may be using the apparatus, substantially as herein specified.
2. The combination of the receptacle *F'* with the nose-piece *A*, substantially as and for the purpose herein specified.
3. The combination, with the head-armor *G* and pipe *f*, of the air-bag or jacket *J*, substantially as herein specified.
4. The combination, with the air-bag or jacket *J*, of an air-pump, *N*, substantially as and for the purposes herein specified.
5. The combination, with the water-proof clothing *M M'*, of the suit *L*, ventilated in the manner substantially as herein specified.
6. The combination, with the face-piece *A B* and flexible pipes, of the reel mechanism *P*, substantially as and for the purpose herein specified.
7. The shaft *l* of the reel *P*, provided with internal longitudinal bores which admit of the carrying through it of the tubes *C' D' E'*, so as to bring their ends in an accessible position, as and for the purposes herein specified.

CHARLES WILSON.

Witnesses:

E. B. KUNKELMAN,  
HARMON JUDD.

(7.)