

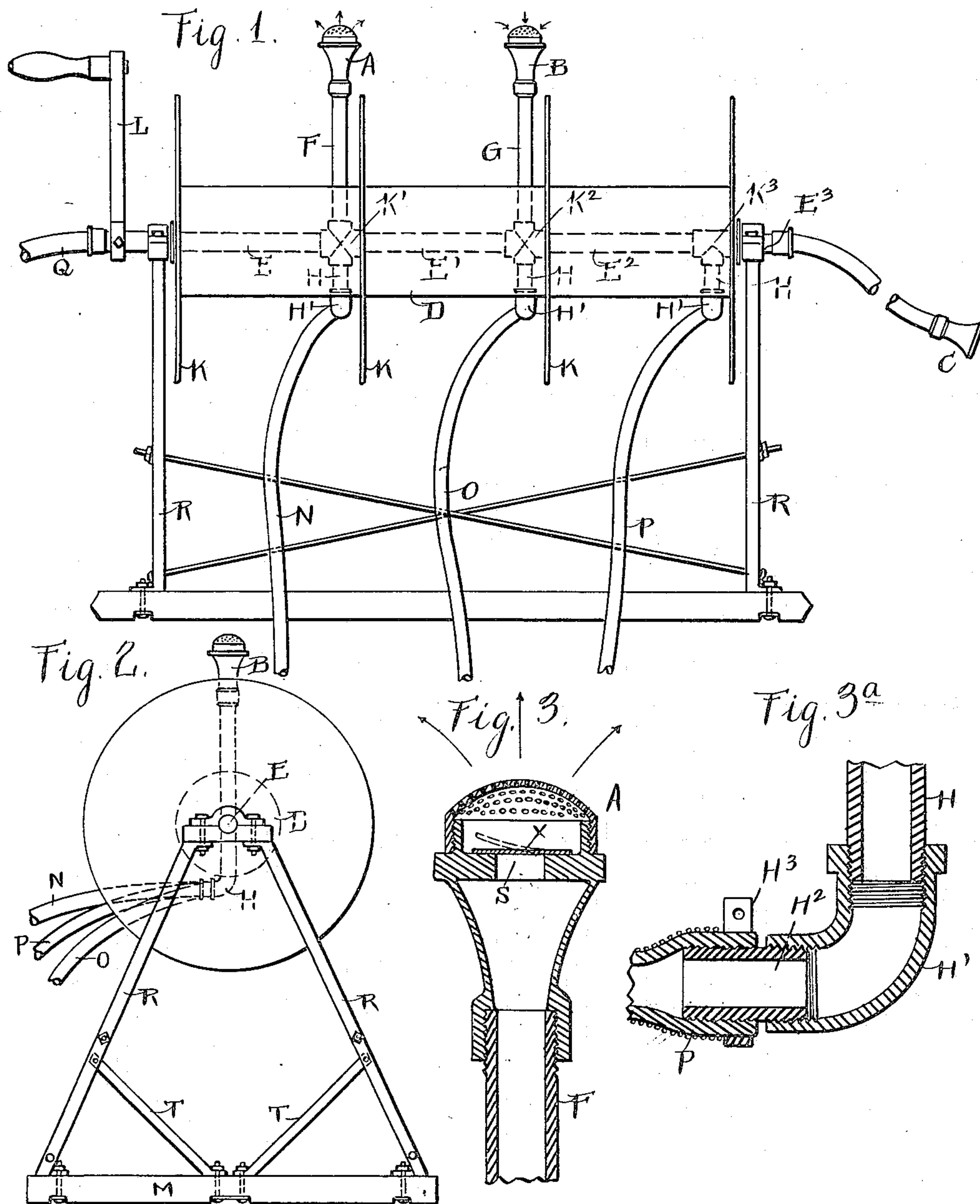
(No Model.)

2 Sheets—Sheet 1.

J. B. POLLARD.
DIVING OUTFIT.

No. 587,604.

Patented Aug. 3, 1897.



Witnesses.

G. Mantua
Phillips

Inventor.

James B. Pollard
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

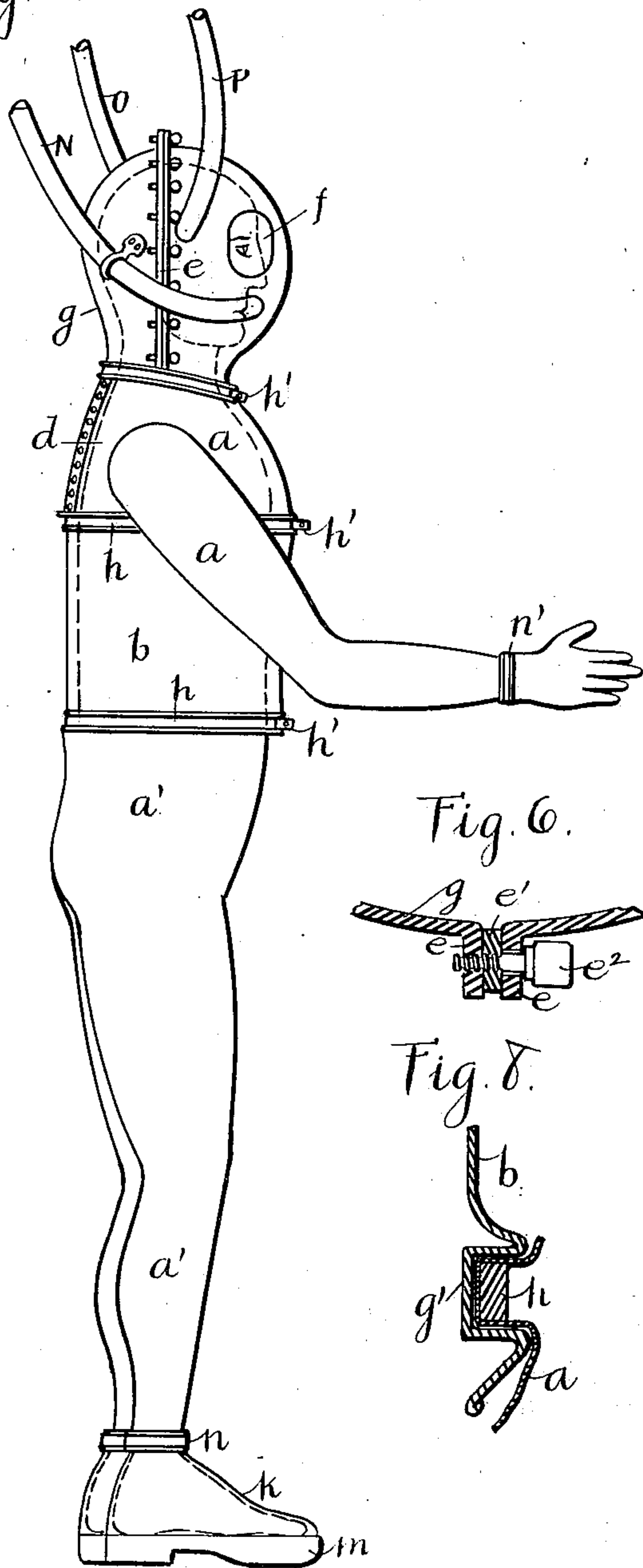


Fig. 5.

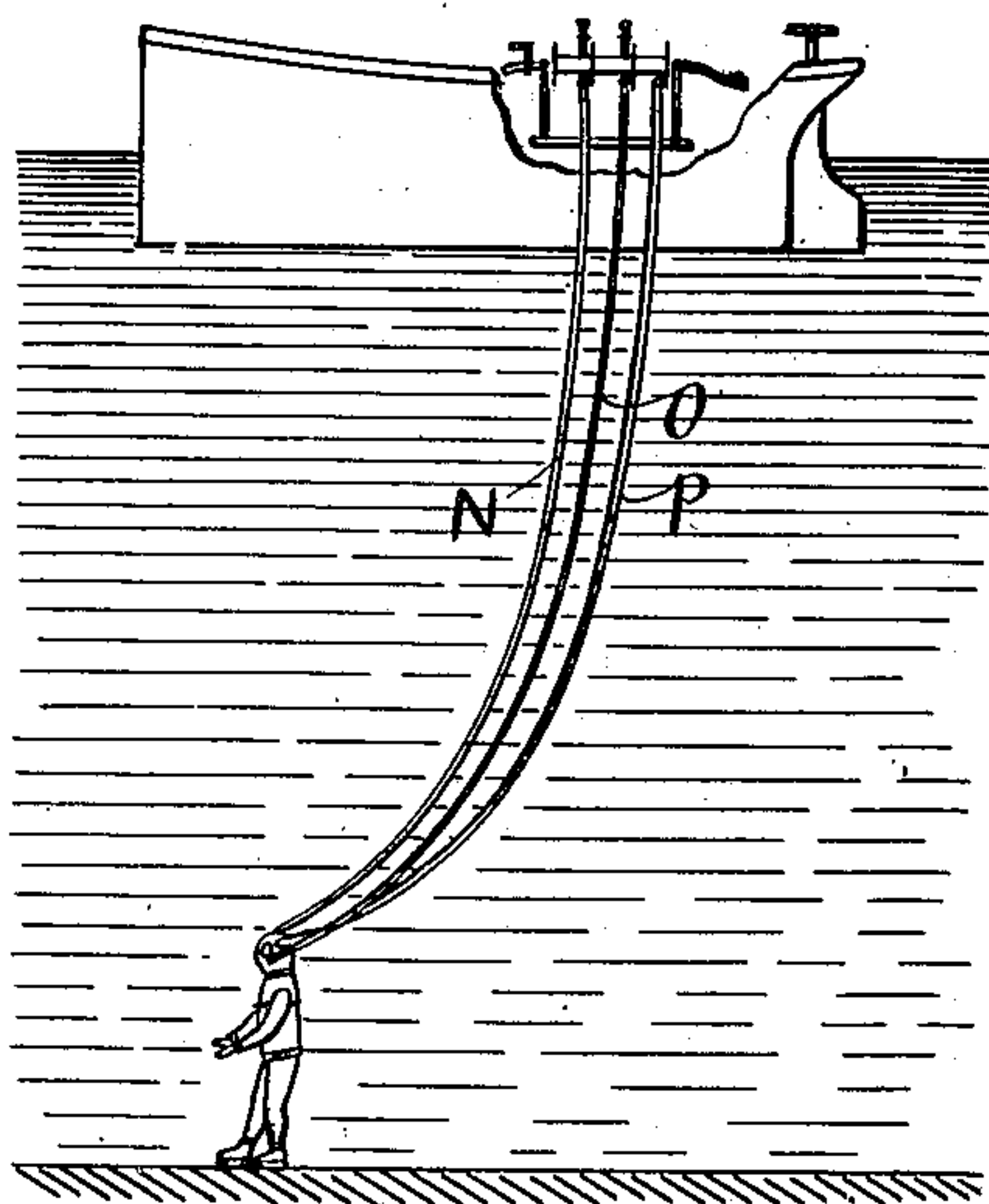


Fig. 6.

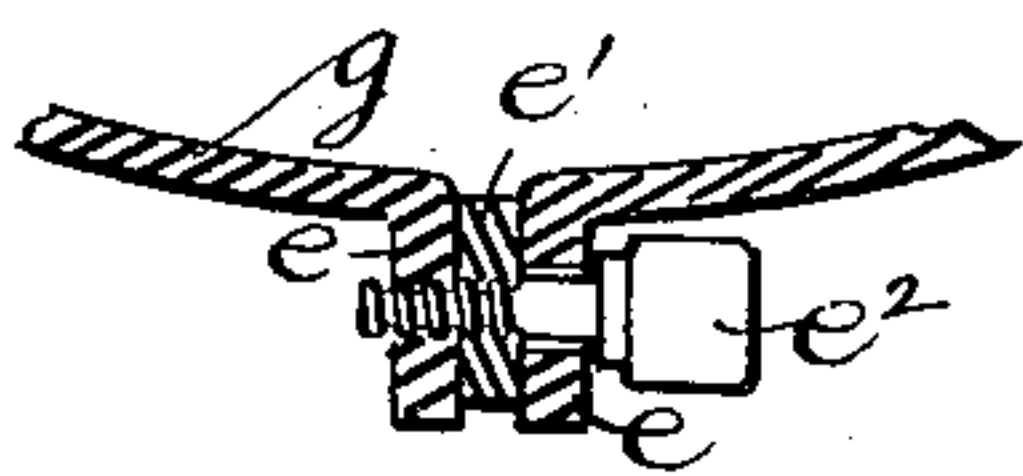


Fig. 7.

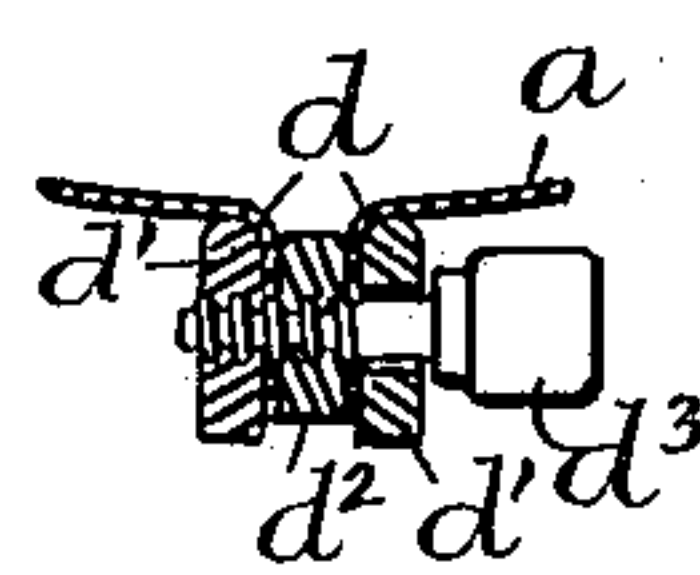
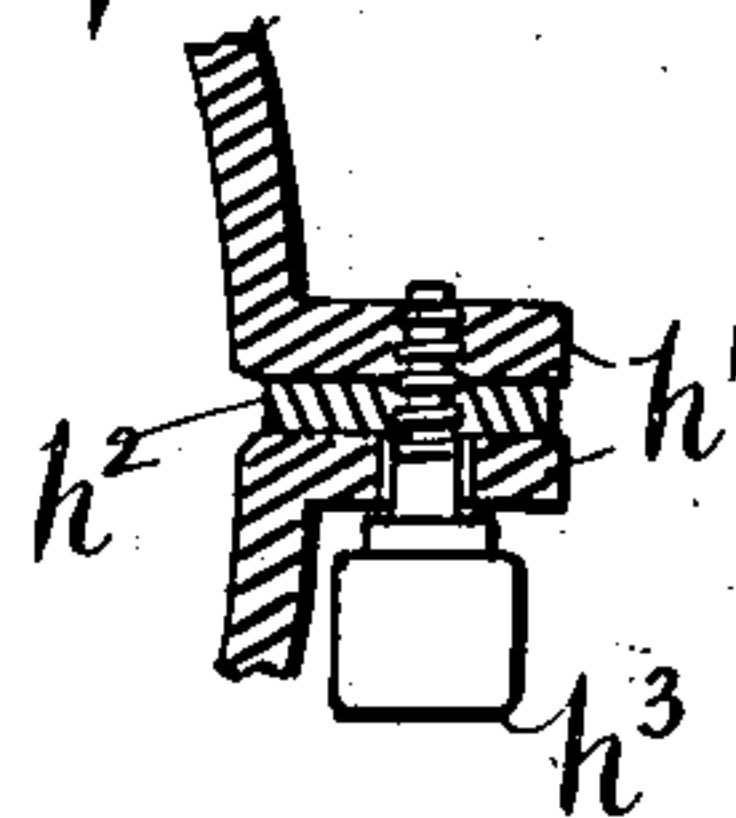


Fig. 8.



Fig. 9.



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UNITED STATES PATENT OFFICE.

JAMES BAKER POLLARD, OF ROANOKE, VIRGINIA.

DIVING OUTFIT.

SPECIFICATION forming part of Letters Patent No. 587,604, dated August 3, 1897.

Application filed October 8, 1896. Serial No. 608,283. (No model.)

To all whom it may concern:

Be it known that I, JAMES BAKER POLLARD, a citizen of the United States, and a resident of Roanoke, in the county of Roanoke and State of Virginia, have invented certain new and useful Improvements in Diving Outfits; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form part of this specification.

Figure 1 of the drawings is a representation of a side elevation of reel apparatus. Fig. 2 is an end view of same. Fig. 3 is a sectional detail view of head or nozzle A. Fig. 3^a illustrates manner of connecting pipes N O P with reel. Fig. 4 is a side view of diver with armor, &c., applied. Fig. 5 is a sectional view showing ship and diver and the application of the invention. Fig. 6 is a sectional view of helmet-joint. Fig. 7 is a sectional view of shoulder-section joint. Fig. 8 illustrates the joint between the different sections. Fig. 9 shows the manner of drawing the band *h* together.

This invention is designed to provide a diving outfit of improved character and possessing certain advantages of construction and operation, as will hereinafter appear; and with this object in view the invention consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

The invention relates to the armor which closes or incases the diver and also to the means at the surface by which he is supplied with fresh air and is also enabled to communicate with the assistants above and control their operations, together with the necessary connections.

The armor will first be described. This armor is made in sections, as indicated in Fig. 4 of the accompanying drawings, there being a helmet portion *g*, a shoulder-section *a*, a trunk portion *b*, a limb portion *a'*, and shoes *k*. The helmet portion is made in sections which meet over the top of the head from shoulder to shoulder, and is preferably of cop-

per. The joint between the two sections is made by forming opposing flanges *e* (see Fig. 6) at their meeting edges, between which is placed a packing-strip *e'* of rubber or other suitable waterproof material, the whole being drawn together by means of binding-screws *e*².

The helmet is contracted at its lower portion and made to come well down on the neck to meet the shoulder-section *a*. The two sections are placed upon the head and are then united, the neck-opening not being sufficiently large to permit the head to be inserted therethrough. In this manner I am enabled to use a much smaller helmet, it being desirable to make all parts of the armor fit as closely as possible in order that there shall be as little air-space as possible inside.

f designates one of the glass-covered openings in the front or face portion of the helmet.

The shoulder-section *a* is of rubber and is made to fit the arms and shoulders closely. It is made to open at the back, the two edges being turned outwardly, as indicated at *d*, Fig. 7, between the joint strips or plates *d'*. A packing-strip *d*² is placed between the edge portions or flanges *d*, and the whole is drawn together by the screws *d*³. The joint between this shoulder-section and the helmet is made in the manner indicated in Fig. 8, the neck of the helmet being bent or depressed to form a groove *g'*, which runs entirely around it. The upper edge portion of the shoulder-section is carried into this groove and firmly secured by means of a circular band *h*, which is seated in the groove and upon the rubber. The two end portions of the band are bent outwardly, as indicated at *h'*, and are drawn together by a screw *h*³, a packing *h*² being interposed. (See Fig. 9.)

The trunk-section *b* is of metal, preferably copper, and is made in one piece, being slipped on over the feet. It is made to extend from the upper line of the hips up under the arms and is closely fitted. It is, however, sufficiently large to permit the natural expansion of the chest and stomach in respiration. The joint between the lower edge of the shoulder-section and this trunk-section is made in the same manner as the joint between the helmet and shoulder sections, and a similar joint is

made between the trunk and the limb portion a' . For the purpose of these joints both the upper and lower portions of the trunk-section are formed with one of the surrounding grooves or depressions g' , such as above described, and shown in detail in Fig. 8. The portion a' is of rubber and is made to fit the limbs and hips closely.

The shoes k have weighted soles, as indicated at m . n are bands which hold the upper edges of the shoes and the lower portions of the legs closely around the ankles. n' are similar bands at the wrists.

The trunk-section b should be of sufficient rigidity to protect the ribs, chest, and stomach of the diver from pressure in deep-sea work.

O is the fresh-air-supply pipe or hose, which enters the helmet at one side, and N is the exhaust-pipe, which is supported by a ring i on the helmet and enters the latter at a point near the mouth.

P is a pipe which forms a speaking-tube.

The opposite ends of the three pipes are connected to a reel at the surface, which is constructed as follows: The letters R, M, and T designate a suitable frame in which is journaled a shaft having the four sections E E' E² E³. D is a wooden cylinder which is firmly secured on said shaft, and K are disks or heads thereon which divide the reel into separate portions, one portion for each of the pipes N O P. On the shaft E E' E² E³ are two four-way couplings K' K² and a three-way or T coupling K³. Secured in one arm of each of these couplings is a short pipe-section H, which extends through the cylinder D and screws into an elbow. (See Fig. 3^a.) Screwed into the opposite end of the said elbow is a nipple-section H², which has an externally-threaded portion which seats the upper end of one of the pipes N O P. H³ is a clamp which holds the pipe on said threaded portion. The pipe N is in this manner connected with the coupling K', the pipe O with the coupling K², and the pipe P with the coupling K³.

Secured in the opposite arms of the respective couplings K' K² and extending out through the cylinder D are pipes F and G, which terminate, respectively, in the perforated heads A and B. Each of these heads is provided with a valve-seat s for a valve X. The valve X in the head A is made to open outwardly, as shown in Fig. 3. The valve in the head B is similar, except that it is seated on the lower side of the seat and is designed to open inwardly.

L is an operating-crank on an end of the reel-shaft. The section E of said shaft is hollow and communicates with the coupling K' at its inner end, its outer end being fitted to receive a pipe Q from a suction fan or pump. The section E' is solid or else plugged to cut off all communication between the couplings K' K². The section E² is also solid or plugged to cut off communication between the couplings K² K³. The end section E³ is hollow,

its inner end being connected to and communicating with the coupling K³, while its outer end is fitted to receive the mouth and ear piece C of a speaking-tube.

In shallow water the diver breathes directly in and out through the pipes O and N and the valved heads A and B, but for deep and long-time diving work a small suction-fan is attached at Q. The action of this fan closes the valve in the head A and draws out the impure air from the helmet and a supply of fresh air in through the pipe O.

It will be noted that the several pipes may be wound to a greater or less extent upon the reel without interfering with the action through the air-pipes or the speaking-tube and that the diver by means of said tube can direct and control the actions of his assistants at the surface.

It will also be noted that with the outfit above described there is no air pumped into the suit to become heated by the body and then breathed and that the diver is not encumbered by tanks of compressed air or with a suit puffed up full of air. He has therefore much greater freedom of movement and much lighter weights are required to sink him. The diver is in no danger of becoming overheated and suffocated, as he can readily communicate with his assistants, and he has at all times a sufficient supply of fresh air. His ribs and chest are also protected from the pressure in deep water.

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

1. The herein-described diving suit or armor, comprising a divided metallic head-section, a flexible waterproof shoulder-section divided at the back, a metallic, undivided trunk-section, and flexible waterproof limb portion, said waterproof sections being close fitting, and joined to the metallic sections in a waterproof manner, substantially as specified.

2. The herein-described diving suit or armor, consisting of the divided metallic helmet, the flexible shoulder-section removably joined to the neck portion of the helmet in a water-tight manner, and arranged to open at the back, means whereby the edges of the said section are united in a water-tight manner, the undivided metallic trunk-section removably joined to the shoulder-section, the flexible limb portion removably joined to the trunk-section, the weighted shoes, and the ankle and wrist clasps, substantially as specified.

3. In a diving outfit, the reel-shaft having the several sections and partially hollow, the couplings thereon, the speaking-tube attachment at one end of the said shaft, the suction connection at the opposite end, the valve air induct and educt pipes connected to the said couplings, the flexible air-pipes N and O connected to the said induct and educt pipes

through the said couplings, the pipe N being also connected with the suction attachment through the hollow shaft, and the flexible speaking-tube connected to the speaking-tube attachment through one of said couplings and a hollow portion of the shaft, substantially as specified.

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

JAMES BAKER POLLARD.

Witnesses:

T. F. MCKEAN,
JOHN J. GARRY.