

A. NEUBERT.  
DIVING GEAR OR THE LIKE.  
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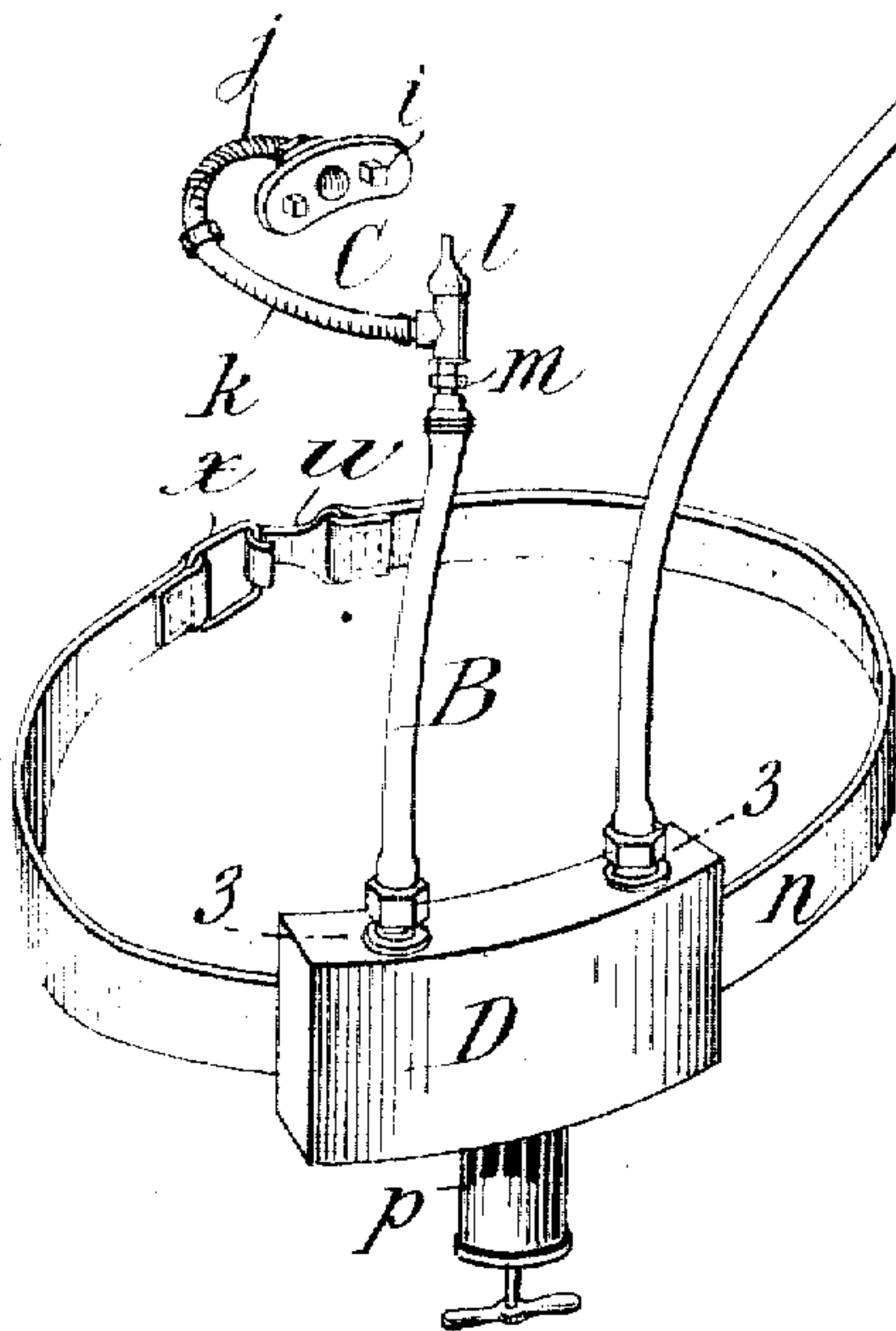
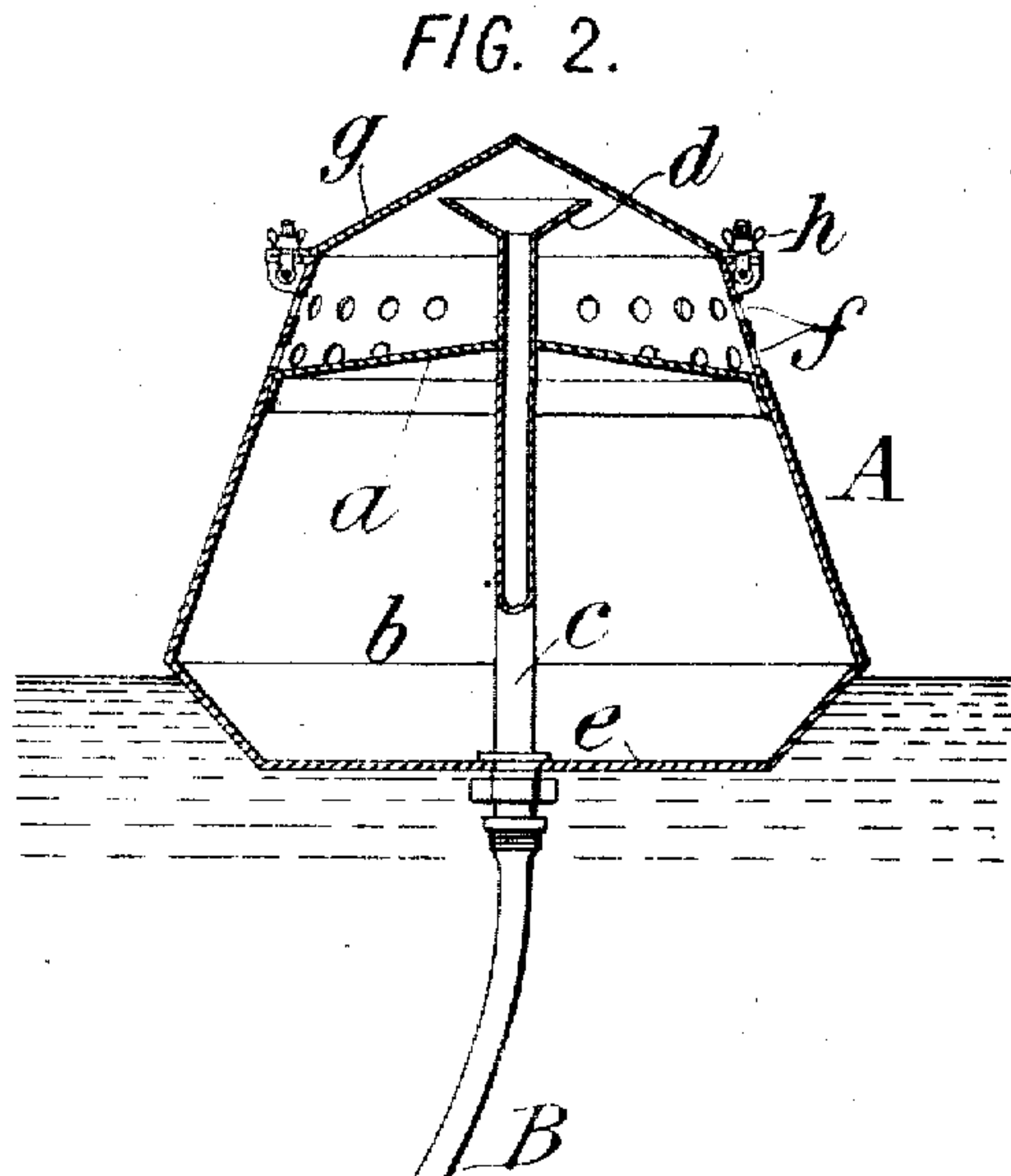
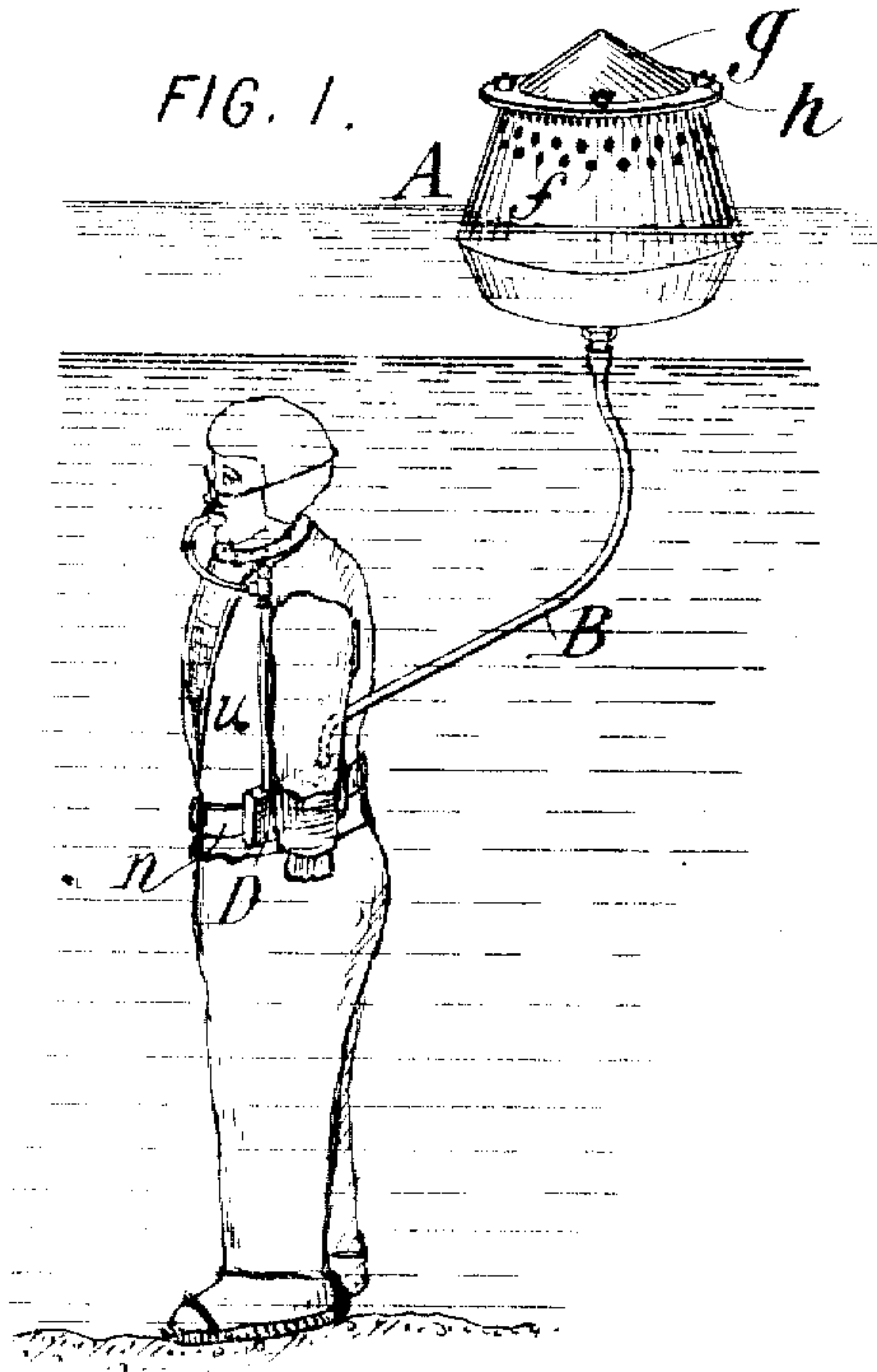


FIG. 4.

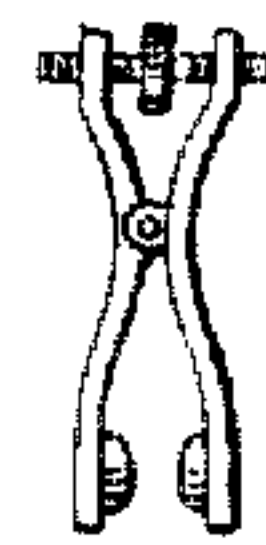
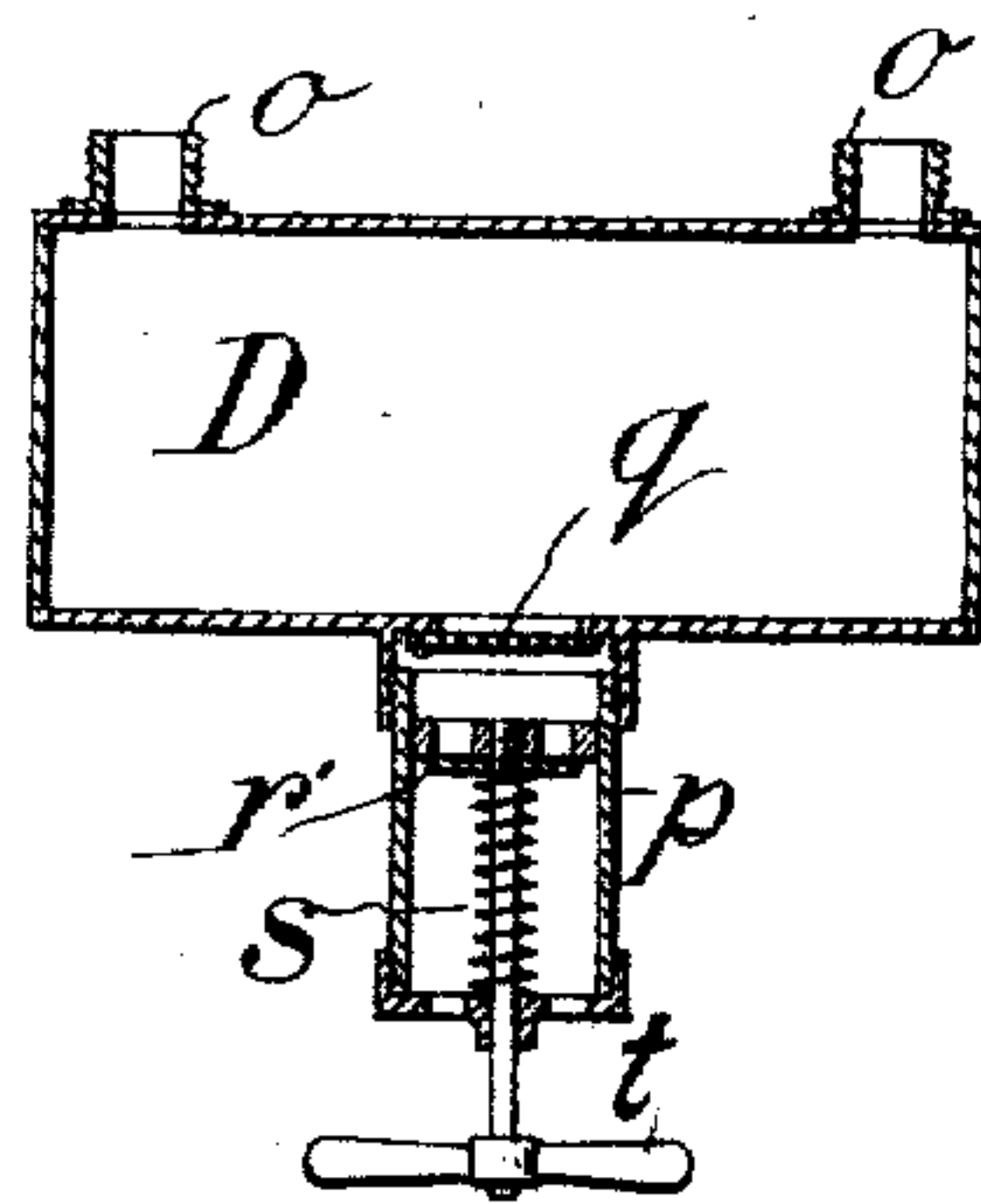


FIG. 3.



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# UNITED STATES PATENT OFFICE.

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## DIVING-GEAR OR THE LIKE.

No. 908,690.

Specification of Letters Patent

Patented Jan. 5, 1909.

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*To all whom it may concern:*

Be it known that I, ALOIS NEUBERT, born a subject of the Emperor of Austria-Hungary, and having taken out first papers of citizenship in the United States of America, and a resident of Astoria, in the county of Queens, city and State of New York, have invented certain new and useful Improvements in Diving-Gear or the Like, of which the following is a specification.

This invention is directed particularly to diving apparatus for use in comparatively shallow water, although it is susceptible of other applications.

It is found in practice that the ordinary diving dress is not suited for use in water of less depth than about six feet, the weight of the dress being insufficiently counteracted by the low water pressure so that it is burdensome to the operator. The cumbersome nature of the usual diving dress also impairs the facility of movement, and materially interferes with the work.

By my invention I aim to provide a light diving gear which is especially adapted for shallow diving and which permits the diver to work unimpeded for practically an indefinite time beneath the surface.

To this end my invention in its preferred form comprises a suitable floating body which is designed to support the intake end of a flexible air tube, the opposite end of which is designed to be held to the mouth of the diver. Preferably a single tube is used, means being provided for releasing the exhaled air from the apparatus at a point close to the mouth of the user, a suitable valve mechanism being provided to prevent the foul air from rising into the air tube.

An important feature of my invention is the provision of means for maintaining the apparatus free from moisture or water so that there is no danger of suffocation from this cause.

My invention also includes other features of importance which are hereinafter referred to.

In the drawings wherein I have illustrated one embodiment of my invention, Figure 1 is a perspective view illustrating the use of the apparatus, Fig. 2 is a similar view on a larger scale, the float being shown in section. Fig. 3 is a section taken approximately on the line 3, 3, in Fig. 2 and illustrating the water trap, Fig. 4 is a plan of the nose-clip used in connection with the invention.

Referring to the drawings, let A designate a suitable float which is adapted to support the end of an air pipe B at the surface of the water so that such air pipe is in constant communication with the atmosphere. The float A is preferably constructed of sheet metal, of such form that it tends to maintain an upright position in the water. As shown it is formed with a broad base portion, and tapers upwardly, its top being of much smaller dimensions than its bottom. It is provided at its interior with a plate *a* which divides the float into two chambers, the lower of which is water tight, and serves to secure the desired buoyancy for the float. The air pipe B enters the bottom of the float A and is continued upwardly through the lower chamber *b* to a point somewhat above the top of the body of the float.

Within the float the pipe B is preferably formed of a metallic tube *c*, the walls of which are soldered or otherwise secured to the bottom wall *e* and plate *a* so as to make a leak-tight joint at each point. At the top of the tube *c* is preferably provided a flaring or funnel shaped mouth *d* which serves to deflect any water which may tend to splash into the tube from below. Any means may be provided for admitting the air to the tube *c*, but as shown, I prefer to provide a series of holes *f* in the upper part of the float A, such holes being arranged considerably below the mouth *d* of the tube *c* so that water passing into the upper chamber of the float may drain out at once before it reaches the top of the tube *c*. To protect the latter from the entrance of water as much as possible a cone shaped cover *g* is provided, the walls of which extend quite closely to the mouth *d* of the tube. The cover *g* is fastened to the body of the float by means of thumb screws *h* or any other suitable devices.

The apparatus is provided with a mouth piece C, which is designed to be placed between the lips and the gums and teeth of the diver, suitable projections *i*, *i* being provided to be held between the teeth so as to maintain the mouth piece in place. Preferably some means are employed for preventing the diver from breathing through his nostrils, a suitable device of this character being illustrated in Fig. 4, and consisting of a clip designed to be placed upon the nose to close the nostrils and secured



to the head by an elastic band or otherwise, such clip being shown as operated by a screw; obviously any other means, such as a spring may be provided. The mouth piece C is preferably mounted at the end of a short metal tube *j* which is curved as shown, and which is connected with a length of flexible tubing *k*, one end of which is connected with and forms a continuation of the tube B. The curved piece *j* is designed to hold the flexible tube *k* away from the face of the diver so that it does not obstruct his vision, and the tube *k* is adapted to permit movements of the diver's head without danger of displacing the mouth-piece.

An important feature of my invention comprises a means for permitting the exhaled air to be at once passed out of the apparatus so that it does not to any appreciable extent mix with the pure air being drawn through the air tube. To this end I provide a valve *l* which, as shown, is of the ordinary "beer valve" type, and is located as near as convenient to the mouth-piece C. As shown, it is arranged at the end of the tube *k*, so that there is formed a comparatively short passage between the mouth-piece and the valve through which the exhaled air passes before it is exhausted. Such valve may, if desired, be located still nearer to the mouth-piece, but I have found in practice that the arrangement just described operates in a satisfactory manner. The valve should be so arranged that neither it nor the air bubbles expelled from it interferes with the vision of the diver. In order to prevent the exhaled air from passing backward into the tube B, I preferably locate a check valve *m* between the tube B and the tube *k*, which permits the passage of the air towards the mouth-piece, but prevents a flow in the opposite direction. Such valve is preferably made of cork, vegetable marrow, hollow papier-mâché, or other light material.

Another important feature of my invention is the provision of means for ridding the apparatus of moisture or liquid so that there is no danger of such liquid reaching the mouth-piece C. I have found in practice, notwithstanding any precautions which may be taken to prevent it, that some moisture will accumulate in the apparatus due partly to the condensation of moisture in the inhaled or exhaled air in the cool tube, and partly to the fact that some liquid will pass into the tube B through its mouth *d*. To avoid any possibility of such moisture being inhaled by the diver, I provide a trap D which is located at some point in the length of the tube B, and preferably at a point close to the mouth-piece C. As shown, such trap is arranged close to the valve *m*, and is adapted to be carried by the diver, means such as a belt *n* being provided to attach the trap to the body of the diver. Such trap

may be of any suitable construction, but is shown as comprising a tank shaped to fit the body of the user, and connected with the tube B by suitable nipples *o* arranged at the top of the tank, to which the sections of the tube are attached. By this means any moisture which passes into the tube B through its mouth *d* will at once drain into the tank and accumulate in the bottom thereof, without reaching the mouth-piece C. Any moisture which is condensed in the tube *k* will find its way past the valve *m* when the latter is lifted, and pass by gravity downwardly through the short section of the tube B into the trap.

My invention also provides a means by which accumulated moisture in the trap may be discharged by the diver while he is submerged, such means preferably comprising a pump *p* secured to the under side of the trap. The pump is provided on its inlet side with a light flap valve *q* and with a piston *r* having a valve *r'*, a suitable spring *s* being provided to normally maintain the piston in its upper position. The piston rod extends to the exterior and is provided at its lower end with a suitable handle *t*. As the piston is moved downwardly the valve *q* opens and permits the water to flow into the cylinder above the piston, and as the latter is moved upwardly the valve *q* closes and the valve *r'* opens, so that the water passes beneath the piston.

By the use of this device the diver may, at desired intervals, force out the accumulated liquid from the trap and thus maintain the entire apparatus in a water-free and safe condition.

While the apparatus may, of course, be used in connection with any suitable dress, I prefer in ordinary shallow diving to fasten the various parts which are carried by the diver to a sleeveless and preferably weighted garment, such as *u*, Fig. 1. Such garment has fastened to it a belt such as *n* which in this case forms the sole means for holding the garment to the person, such belt being provided with a quickly releasable catch of ordinary construction such as the hook *w* and eye *x*, Fig. 2. By this means the diver may quickly divest himself of the entire apparatus in case this should be necessary.

While I have described in detail the preferred construction of my invention, it will be understood that many changes may be made therein without departing from the invention. For instance, the construction and proportions of the float, trap, valve, etc., may be materially changed, so long as these parts retain the functions described. Or instead of the particular form of mouth-piece shown, any means may be adopted for connecting the air tube to the mouth or nostrils of the operator, such means being intended to be covered by the term mouth-piece as used herein. Nor is



my invention limited to apparatus for use in diving. It may be employed in whole or in part in rooms or other places containing poisonous gases, smoke, etc., and it is also susceptible of use in laying foundations where the excavations are flooded, and is generally adapted for employment wherever it is desired to supply atmospheric air to an operator working under conditions where a natural supply of air is unobtainable.

What I claim is:—

1. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and a trap connected with such tube and adapted to receive moisture therefrom, such trap comprising an enlarged chamber into which such tube leads, whereby the moisture cannot follow the tube to the operator.

2. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and a trap connected with such tube and adapted to receive moisture therefrom, said tube being interrupted at such trap so as to prevent moisture from following the tube to the operator.

3. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and a trap connected with such tube and adapted to receive moisture therefrom, such trap being arranged at a point materially below the mouth of the operator, so that the air is compelled to pass upwardly from such trap.

4. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and means for discharging moisture from said tube while submerged.

5. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and a trap connected with such tube and adapted to receive moisture therefrom, said trap being provided with means for discharging the water therefrom while submerged.

6. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and a trap connected with such tube and adapted to receive moisture therefrom, said trap being provided with a pump for discharging the water therefrom while submerged.

7. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and a trap connected with such tube and adapted to receive moisture therefrom, said trap being adapted to be carried directly by the operator, so that the tube is relieved of its weight.

8. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and a trap connected with such tube and adapted to re-

ceive moisture therefrom, said trap being adapted to be carried directly by the operator, and means for fastening said trap to the operator's person.

9. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and a trap connected with such tube and adapted to receive moisture therefrom, and means for discharging the moisture from said trap without permitting ingress of water while submerged, said means being arranged within reach of the operator so as to be operable by him when desired.

10. In a diving apparatus or the like, the combination of an air tube through which the air is led to the operator, and means for discharging the exhaled air outside such tube at a point near the operator, such means being arranged so that the discharging air does not obstruct the vision of the operator.

11. In a diving apparatus or the like, the combination of an air tube through which air is led to the operator, said tube being adapted to be connected to the operator at his waist and to lead upwardly therefrom, a mouth-piece connected with said tube, and a rigid pipe *j* leading from said mouth-piece and connected to said tube and adapted to hold such tube out of the line of vision of the operator.

12. In a diving apparatus or the like, the combination of an air tube through which air is led to the operator, said tube being adapted to be connected to the operator at his waist and to lead upwardly therefrom, a mouth-piece connected with said tube, a rigid pipe *j* leading from said mouth-piece and connected to said tube and adapted to hold such tube out of the line of vision of the operator, and a flexible tube *k* between the air tube and the tube *j* adapted to permit movements of the head of the operator.

13. In a diving apparatus or the like, the combination of an air tube through which air is led to the operator, said air tube having an upwardly extending portion, a tube *k* joined thereto at an angle, and a mouth-piece connected with the opposite end of said tube *k*.

14. In a diving apparatus or the like, the combination of an air tube, a trap connected with said air tube, means for attaching said trap to the body of the operator, a mouth-piece, and a valve through which the exhaled air is discharged, said valve being arranged between said mouth-piece and said trap.

15. In a diving apparatus or the like, the combination of an air tube, a trap connected with said tube, means for attaching said trap to the body of the operator, a mouth piece, a valve through which the exhaled air is discharged, said valve being arranged between



said mouth-piece and said trap, and a check valve arranged between said exhaust valve and the trap.

16. In a diving apparatus or the like, the combination of a float, a mouth-piece or the like, a single tube connected to said mouth-piece and adapted to lead air to the operator, and means for discharging the exhaled air.

17. In a diving apparatus or the like, the combination of a float, a mouth-piece or the like, a single tube connected to said mouth-piece and adapted to lead air to the operator, means for discharging the exhaled air, and means for preventing the return passage of air through said air tube.

18. In a diving apparatus or the like, the combination of a float, an air tube having one end supported by said float, a mouth-piece or the like, and a trap adapted to collect the water entering said tube.

19. In a diving apparatus or the like, the combination of a float having a water-tight chamber, an air tube extending through said chamber, the side walls of said chamber extending upwardly around the end of said tube, and being perforated to admit air to said tube, and an imperforate cover for said chamber, fitting said side walls.

20. In a diving apparatus or the like, the combination of a float, having a water tight chamber, an air tube extending centrally through said chamber and having its end arranged above the latter, said float having a

perforated wall extending above said chamber adapted to admit air to said tube.

21. In a diving apparatus or the like, the combination of a mouth-piece or the like, an air tube connected to said mouth-piece and adapted to lead air to the operator, and means operable while the operator is submerged for discharging the moisture which collects in such tube.

22. In a diving apparatus or the like, the combination of a long single tube one end of which is in communication with an air supply, and the other end is adapted for connection with the mouth of the operator, and a means close to the operator and remote from the other end of the tube for discharging the exhaled air.

23. In a diving apparatus or the like, the combination of an air tube, a garment or like device worn by the operator for supporting such tube, and means for fastening such garment to the operator's person, such means being adapted to be quickly released so that the operator may be freed from the apparatus.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

ALOIS NEUBERT.

Witnesses:

HENRY P. KRAFT,  
ALBERT G. SEARLES.