Oct. 23, 1928. 1,689,079

Y. MURAKAMI

DIVING DRESS

Filed June 21, 1926 2 Sheets-Sheet 1

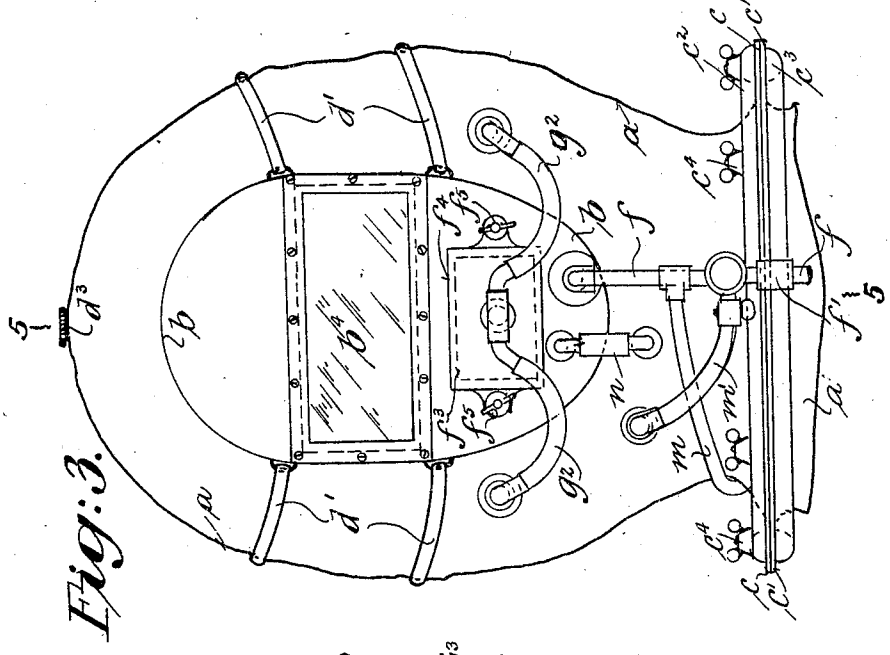


Fig. 3.

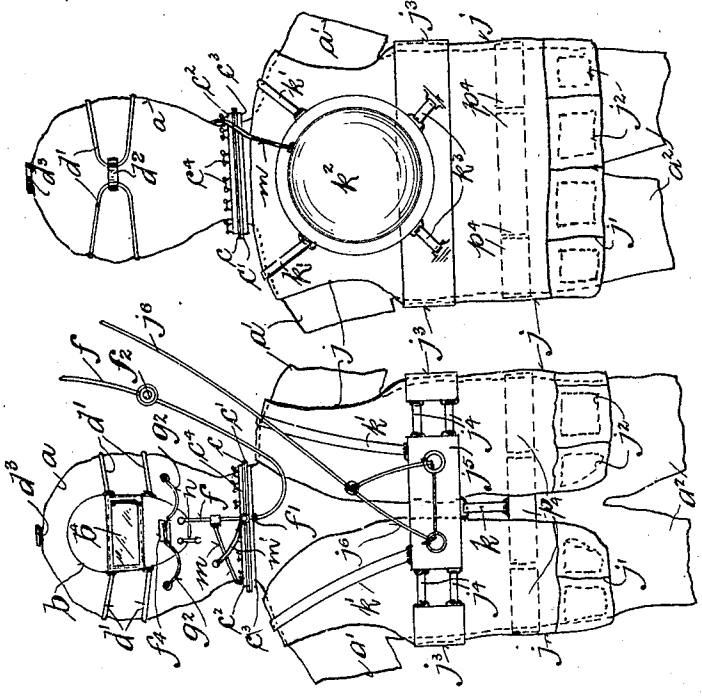


Fig. 2.

Fig. 1.

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Fig:3.

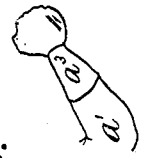


Fig:7.

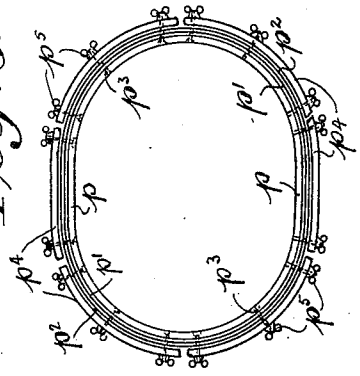


Fig:6.

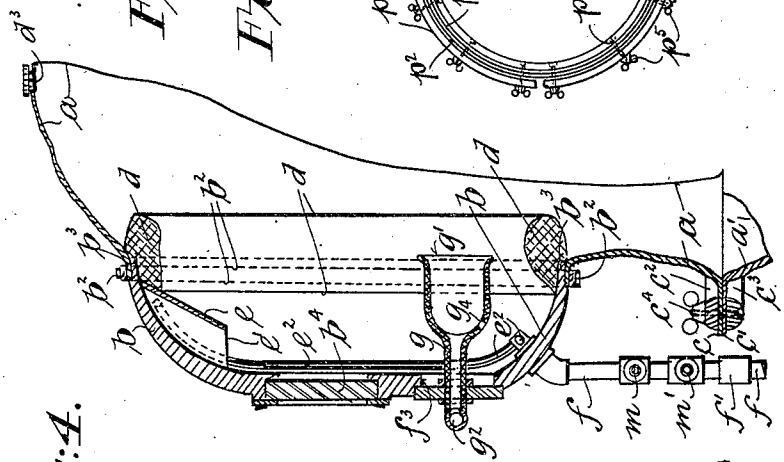
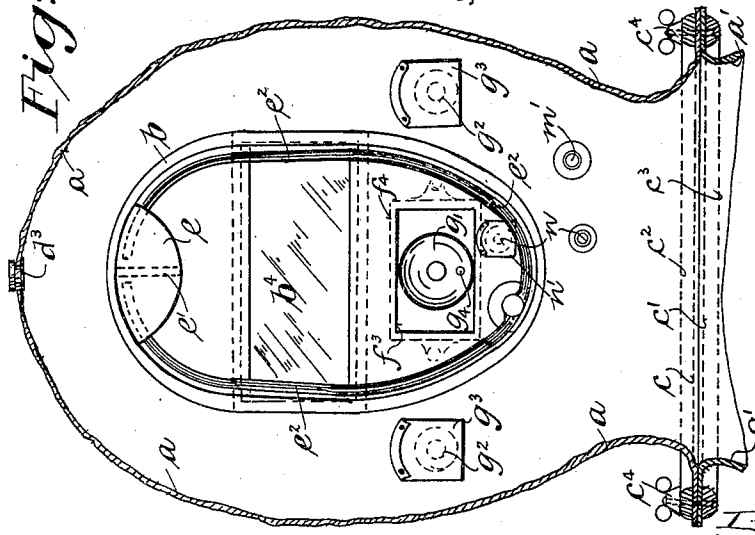


Fig:4.



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UNITED STATES PATENT OFFICE.

YASUKICHI MURAKAMI, OF BROOME, WESTERN AUSTRALIA, AUSTRALIA.

DIVING DRESS.

Application filed June 21, 1926, Serial No. 117,481, and in Australia May 3, 1926.

This invention relates to diving dresses for deep sea diving and its object is to provide an improved diving dress whereby the diver is enabled to work at greater depths and for longer periods of time with greater personal comfort and safety than is possible with existing diving dresses, and thus to do a greater amount of work during a given time interval and at a less expenditure of time, labor and money.

In diving dresses as heretofore made, air is always present within the dress and helmet during diving operations, which has required the supply of air in excess of that required for actual breathing purposes.

Also in existing diving dresses the air exhaled by the diver mixes with the fresh air pumped into the dress resulting in the inhaling by the diver of mixed and impure air. Further, such body of air within the dress has the tendency to raise the diver, thus necessitating the use of extra weights which render his movements difficult and laborious.

These difficulties and disadvantages are overcome by the use of my invention in which the major portion of the air supplied is inhaled for breathing purposes and is always pure, no air being present within the dress during diving operations. These latter results are accomplished by my invention which essentially consists in the employment of an improved diving dress whose helmet (except the mask portion) and upper and lower portions are made of an improved water-proof and flexible material. The mask portion is made of metal and fitted with a fixed window and is attached by a ring flange and screw studs to the flexible helmet, an opening in the latter being provided for the reception of the mask. The helmet and corselet are formed with flanges at their neck portions which are held between metal rings and secured by screw studs and wing nuts, while the corselet and leggings or trousers at their girth portions are held between metal bands and secured by screw studs and wing nuts, thus enabling the helmet to be removably attached to the corselet and latter to be removably attached to the trousers.

In a diving suit constructed according to this invention the diver inhales through his nose and exhales through his mouth by way of a mouth piece and tubes into the helmet from whence such exhaled air passes into the surrounding water through an exhaust valve in the top of the helmet.

The construction and use of the invention will now be described with the aid of the attached drawings wherein Fig. 1 is a broken front view of a dress embodying the invention, Fig. 2 is a rear view of same, Fig. 3 is an enlarged front view of the mask as fitted to the flexible and removable helmet. Fig. 4 is a rear view of same, the helmet being shown in section and the face member being removed for sake of clearness. Fig. 5 is a sectional view through line 5—5 of Fig. 3. Fig. 6 is a detail sectional plan of the waist band. Fig. 7 is a view showing the wrist band.

Referring to said drawings, the dress comprises a helmt as a, a corselet as a^1 and trousers portion a^2, all made of a flexible, air and waterproof material, the corselet having wrist portions a^3 (Figure 7) made of rubber or analogous material, to enable same to make a tight water seal for the related parts of the diver's body. The face portion of the helmet has a flanged spring b^3 for a metal mask b which is secured to the helmet by a metal ring surrounding said flanged opening and mask and screws b^2 passing through said ring and flange into the mask.

Said mask b is provided with a fixed window b^4 to provide visibility. The helmet a and the corselet a^1 at their neck portions are formed with flanges as c and c^1 respectively which are tightly held between upper and lower metal rings c^2 and c^3 and secured by studs or bolts and wing nuts c^4.

The mask b is fitted on its inner face edge with a sealing band d to surround the face of the diver and which insulates the diver's face from the interior of the dress as a whole, thus preventing the escape of air into the helmet and corselet.

The metal mask b is provided at each side with a rubber loop d^1, each of which passes around to the rear of the helmet and is secured to the other by a metal clip d^2, the object of said loops being to maintain the sealing band d tight against the diver's face. The helmet a at its top is provided with an exhaust valve d^3 of any approved type for the escape, when submerged, of any air which may have been present in the dress before descending and also to allow the escape of excess air which may be fed to the mask, b, which excess air is automatically released from the mask when the excess pressure tends to overcome the flexibility of the rubber seating member d and also the loops d^1.

At an upper position within the mask is secured a downwardly projecting plate e having a central vertical rib e^1 to deflect the incoming air against the window b^4 and thus prevent any sudden pressure air shock against the diver's face. The air is fed through tubes e^2 which are led around the inner edge of the mask b and terminate near the central rib e^1 of the plate e, as seen in Fig. 4.

The tubes e^2 at their lower ends communicate with the air supply pipe f which is fitted with a nonreturn or check valve f^1 of any approved type, said pipe being manually controlled by cock f^2. The mask b is formed with an opening f^3 closable by a door f^4, the latter being secured to the mask by studs and wing nuts f^5. Through the center of said door extends the stem g of a mouth piece g^1, the latter being of a cupped section and adapted to fit over the mouth of the diver. Said mouthpiece communicates with the companion pipes g^2 which lead the exhaled air into the interior of the helmet a, the exits of said pipes being controlled by flap valves g^3 on the interior of the helmet. This mouth piece g is formed with a small orifice g^4 through which the excess pure air from the mask escapes into the helmet through the pipes g^2 which convey the exhaled air.

In conjunction with the dress I employ a jacket j fitted with pockets j^1 to receive weights j^2, and around said jacket is placed a belt j^3 having adjustment straps j^4 and a breast plate j^5 to which the life line j^6 is secured as shown in Fig. 1. From said breast plate a security strap k extends downwardly and is connected to the waist hereafter referred to. To said plate j^5 is connected a pair of shoulder straps k^1 which at their opposite ends are secured to an air bag k^2 on the back of the jacket, and the bag k^2 is also attached by lower straps k^3 to the rear portion of the belt j^3. This air bag is fed by a by-pass pipe m from the air supply pipe f. Said bag provides means for equalizing the air pressure within the mask and facilitates ascension and also furnishes air to the mask for breathing purposes if the main air supply pipe f should become fouled or cut and the valve f^2 should be closed. From the air supply pipe f, a branch pipe m^1 leads to the interior of the helmet and dress for the inflation of same when the diver desires to ascend or float over rocks and the like when moving from one place to another, being assisted by the life line. A further purpose of inflating the dress and helmet is to supply air for breathing purposes in the event that the air supply pipe f becomes entangled, in which case the diver inflates the dress, closes the control cock f^2 and then severs said pipe f, thereabove, thus receiving his breathing air from said helmet and corselet through the pipe n whose exit is fitted with a flap valve and also from the air bag k^2 through the pipe m.

To removably connect the corselet and trousers portions as a^1 and a^2, I employ a metal waist band p (Figure 6) which is formed with outwardly projecting screw threaded studs p^3 which pass through eyelets formed in the girths p^1 and p^2, respectively, of said corselet and trousers portions, and also through eyelets formed in metal sectional clamp members p^4, secured by wing nuts p^5.

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

1. A helmet for a diver's suit, having a mask, a door removably carried by the mask, a mouthpiece carried by the door and in communication with the helmet, an escape valve in the helmet, and means for supplying fresh air to the mask, whereby the fresh air is inhaled through the nose of the wearer and exhaled through the mouth and mouthpiece to be exhausted into the helmet.

2. A helmet for divers' suits, having a mask, a door removably carried by the mask, a mouthpiece carried by the door and in communication with the helmet, an escape valve in the helmet, means for supplying fresh air to the mask, whereby the fresh air is inhaled through the nose of the wearer and exhaled through the mouth and mouthpiece to be exhausted into the helmet, said mask being provided with a face-engaging rim, and means connected to the mask and extending exteriorly of the helmet for holding the mask against the wearer's face.

3. A helmet for divers' suits, having a mask, a door removably carried by the mask, a mouthpiece carried by the door and in communication with the helmet, an escape valve in the helmet, a deflector plate mounted adjacent the forehead position of the mask, and two air feeding pipes leading from the exterior of the mask and terminating adjacent the deflector.

4. A helmet for divers' suits, having a mask, a door removably carried by the mask, a mouthpiece carried by the door and in communication with the helmet, an escape valve in the helmet, means for supplying fresh air to the mask, whereby the fresh air is inhaled through the nose of the wearer and exhaled through the mouth and mouthpiece to be exhausted into the helmet, said mask being provided with a face-engaging rim, means connected to the mask and extending exteriorly of the helmet for holding the mask against the wearer's face, a deflector plate mounted adjacent the forehead portion of the mask, and two air feeding pipes leading from the exterior of the mask and terminating adjacent the deflector.

5. A helmet for divers' suits, having a mask, an air-exhausting means provided with a mouthpiece carried by the mask, a deflector

plate having a central rib also carried by the mask near the upper inner portion thereof, and two air pipes terminating, respectively, upon opposite sides of the rib, whereby the air is deflected downwardly and outwardly away from the face of the wearer.

6. A helmet for divers' suits, having a mask, a face-engaging rim carried by the helmet, means encircling the mask from the mask for holding the mask firmly against the face of the wearer, a mouthpiece mounted in the mask and forming the exhaust, a deflector plate carried by the mask adjacent the forehead portion thereof, said deflector plate having a central rib, and two air supply pipes connected to the mask and terminating, respectively, upon opposite sides of the rib, whereby the air is deflected downwardly and outwardly away from the face of the wearer.

7. A helmet for divers' suits, having a mask, a door removably carried by the mask, a mouthpiece carried by the door, an escape valve in the helmet, means for supplying fresh air to the mask for inhalation through the nose of the wearer, means connecting the mouthpiece with the helmet for escape of exhaled air into the helmet, and an equalizer and auxiliary air supply in communication with the air supply and adapted to be placed in communication with the helmet and suit in case of an emergency.

8. A helmet for divers' suits, having a mask, an air supply pipe connected to the mask, a manually operated valve controlled pipe between said pipe and the helmet, an escape valve in the helmet, and a main valve controlled air supply pipe, said manually operated valve-controlled pipe serving, if the main valve should be closed or the supply pipe fouled, to supply air from the helmet to the mask as an emergency supply.

9. A helmet for divers' suits, having a mask, an air supply pipe outletting into the mask, a manually operated valve controlled pipe outletting from said air supply pipe into the helmet, an escape valve in the helmet, a main valve controlling the air supply pipe, said manually operated valve serving, should said main valve be closed or the supply pipe be fouled, to supply air from the helmet to the mask as an emergency supply, and an inflatable bag in communication with the air supply pipe and adapted to be connected to supply air to the helmet.

In testimony whereof I have hereunto set my hand.

YASUKICHI MURAKAMI.