F. W. WALTERS.

DIVING DRESS.

APPLICATION FILED MAY 3, 1916.

1,226,148. Patented May 15, 1917.

FIG. 1

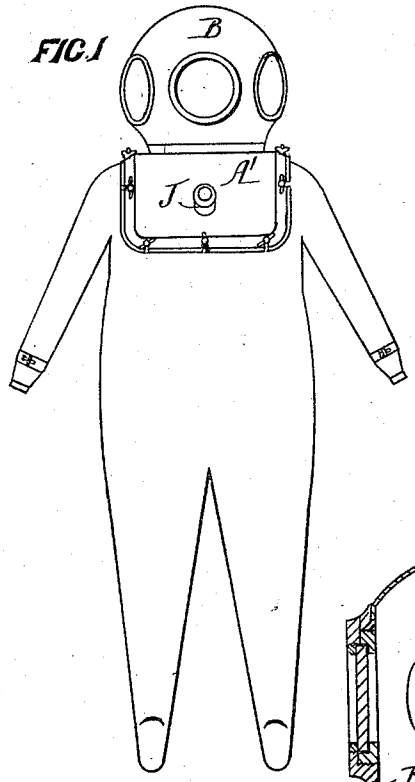

FIG. 2

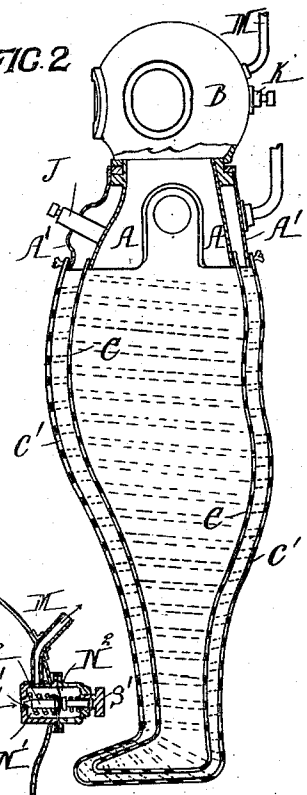

FIG. 3

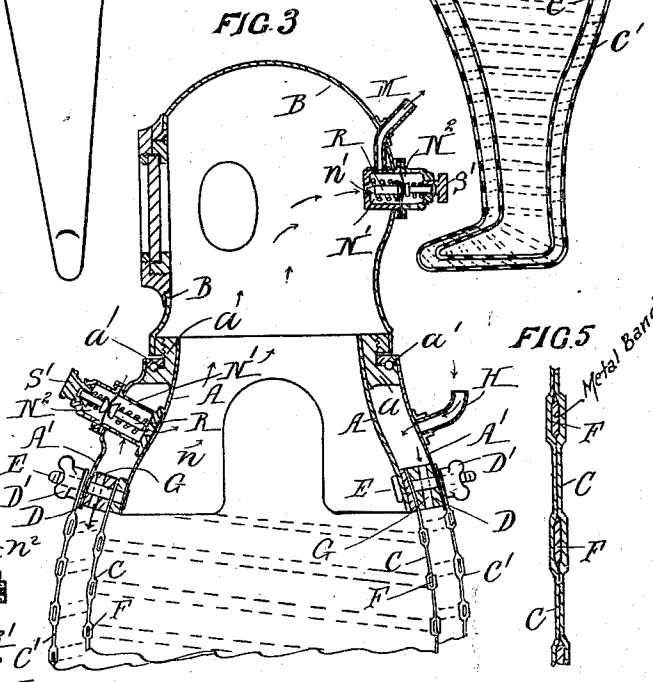

FIG. 4

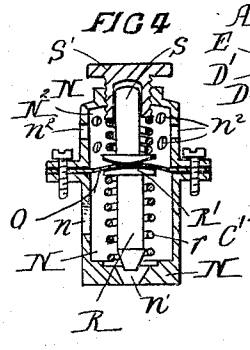

FIG. 5

INVENTOR:
F. W. WALTERS
BY: H. Van Oldenmuel
ATTORNEY.

UNITED STATES PATENT OFFICE.

FRANK WILLIAM WALTERS, OF AUCKLAND, NEW ZEALAND.

DIVING-DRESS.

1,226,148. Specification of Letters Patent. Patented May 15, 1917.

Application filed May 3, 1916. Serial No. 95,061.

To all whom it may concern:

Be it known that I, FRANK WILLIAM WALTERS, subject of the King of Great Britain, residing at Auckland, in the Dominion of New Zealand, have invented a new and useful Improved Diving-Dress; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention has been designed in order to provide an improved construction of diving dress by which greater resistance to the water pressure will be obtained, thereby enabling the diver to work at greater depths than is possible with the ordinary dress.

The invention consists broadly in the construction of the dress with an inner and outer lining each of which is stayed or reinforced with metal bands or rings encircling it throughout, and which two linings are so disposed that an air space is provided between them, which when the dress is used, is kept filled with compressed air from the air pumps employed and the degree of compression of which is varied automatically with the variations in outside pressure. This method of construction provides a strong resistance to the water's pressure.

The air pressure between the two linings of the dress is governed automatically by valves of special construction arranged to admit air from the outer to the inner lining and to release it through the helmet into a pipe by which it is conveyed to above the water level. Each of these two valves is constructed to open to a more or less extent as the pressure of the surrounding water diminishes or increases with the variation in depth and thus to provide for a greater compression of the air within the envelop formed by the two linings as the depth of water increases. This serves to support the pressure of the water so that the diver may work freely.

In fully describing the invention, reference will be made to the accompanying sheet of drawings in which:—

Figure 1 is a front elevation, and

Fig. 2 a sectional side elevation of the complete dress.

Fig. 3 is a sectional side elevation, on an enlarged scale, of the helmet, the corselet and the upper end of the dress body.

Fig. 4 is a detail longitudinal section of the air valve employed with the dress.

Fig. 5 is a detail view showing the manner of constructing the dress linings.

In carrying out the invention, the corselet is formed double with an inner member A and an outer member A′ each shaped in the usual form and the two being of such relative sizes as to provide a clear space between them. The two are fastened together at their upper ends in the manner shown in Fig. 3, that is by a collar flange *a* secured around the outside of the inner corselet member A that passes up through a collar *a′* around the inner edge of the outer corselet member A′ and which has a ledge that engages beneath such collar *a′*. The upper end of the collar *a* is screw threaded on its outer surface and the helmet B screws down over this and thereby locks the whole firmly together.

In like manner the body portion, the arms and the legs are made double, the inner and outer linings thus formed being secured respectively to the inner and outer corselet members. The arms are attached thereto in any of the usual methods while the top edges of the body portion are attached in the manner shown in Fig. 3. The inner lining C is made to overlap the lower end of the inner corselet member A and the outer lining C′ to overlap the outer corselet member A′. A distance block D is arranged between, and bolts E pass out from the inside through the overlapping edges and such distance block, and have wing nuts D′ screwed upon their outer ends so as to fasten the whole together. This method of fastening allows for the dress being placed upon and removed from the diver at will.

Each lining of the dress is reinforced by means of metal bands F encircling it and these bands may be separate or may be formed by winding helically around the body and limb portions of the linings. An approved manner of forming each lining is shown in Fig. 5, the lining being made up of two layers of suitable waterproof and air proof fabric fastened together with the metal bands F secured between them. Any other approved manner of making or reinforcing the dress may be adopted without departing from the invention herein.

Air passages G (Fig. 3) are made in the distance blocks D so that the space between the two members of the corselet is placed in full communication with that between

the linings of the dress. An air pipe H is arranged to enter the back of the outer corselet member and such air pipe is connected with the usual air supply tube used in diving operations so that the air will enter the space between the corselet members and pass from it throughout the spaces between the linings of the body and limbs of the dress.

The air passes from the space between the corselets into the inside of the inner corselet member through a valve J of special form and then up into the helmet from which it passes through another valve K also of special form, into a tube M that connects with a second air pipe that is carried to above the water level.

Each of these valves J and K is of the special form shown in Fig. 4 and is adapted to automatically govern the amount of its opening with the variations in depth at which the diver is working, for the special purpose beforementioned. The valve consists of a casing N having two chambers, an inner chamber N′ and an outer chamber N^2 divided from one another by a flexible water tight diaphragm O. The outer chamber N^2 is arranged to project outward beyond the front of the corselet or outside the helmet as the case may be, and is made with apertures n^2 in its wall through which the surrounding water has free access to this chamber so that its pressure may act upon the diaphragm O. The inner chamber N′ in the case of the corselet valves has an opening n' at its inner end that opens into the space within the inner member of the corselet and an opening n on its side that opens into the space between the two corselet members. In the case of the helmet valve, the end opening n' opens into the helmet while the side opening n is connected to the tube M that passes out through the helmet and has the second air pipe already referred to attached thereon.

The opening n' in each case is formed as a valve seat and a valve is placed within the inner chamber having a stem R adapted to fit into and close the opening or to more or less close it. The stem is provided with a head R′ that engages the diaphragm O and a spring r surrounds the stem and bears respectively outward against the inner end of the chamber and the valve head so as to normally press the valve back to leave the opening n' uncovered. The normal amount of opening is adjusted by means of a spring controlled plunger S fitted in the outer chamber and bearing upon the outer surface of the diaphragm. The tension of this spring is regulated by means of a nut S′ screwing through the end of the chamber and providing a bearing in which the end of the plunger fits and slides.

The air supply will thus enter through the air supply pipe into the space between the corselet members so as to inflate the spaces between the dress body and limbs and it will then pass through the opening n' of the corselet valve and through the opening n' thereof into the inside of the dress and up through the helmet to supply the diver with air. It then passes out through the opening n' of the helmet valve into the inner chamber thereof and from through the side opening n and the pipe M to above the water line.

The pressure of the surrounding water by having free access to the outer chamber of each valve will exert a pressure on the diaphragm O thereof, which will vary with the variations in the pressure at different depths. This pressure will act in opposition to the spring r of the valve R so that as the pressure increases, such valve will be forced in to close the opening n' and thereby serve to give a greater storage and compression of air within the suit. Such compression is thus automatically varied to withstand the varying pressure of the water upon the dress and thus to prevent its collapse upon the diver under great pressure.

I claim:—

1. A diving dress having an inner and an outer lining, an air supply inlet opening into the space between such linings, a spring controlled valve opening from such space into the inside of the dress, a spring controlled valve opening from the helmet and an air pipe leading from such latter valve, each of such valves being constructed to automatically vary the respective openings with the variations in the pressure around the dress, substantially as specified.

2. A diving dress having a double walled corselet and double walled body and limbs arranged with spaces between the respective walls in communication with each other, an air supply inlet leading into the space between the double walls of the corselet, an opening from such space to within the dress, a spring valve controlling such opening and constructed to automatically vary the amount of such opening with the variations in pressure around the dress, a helmet upon the dress, an outlet air valve in such helmet also constructed to automatically vary the area of the outlet with the variations in pressure around the dress and an air escape pipe leading from such valve, substantially as specified.

3. In diving dresses, the combination with a double walled dress having an air supply inlet leading into the space between the walls, of a valve adapted to control the passage of air from such space to the inside of the dress, such valve consisting of an inner and an outer chamber having a flexible diaphragm division between them the inside chamber communicating through openings

respectively with such space and the inside of the dress, a stem valve mounted inside such chamber adapted to close the opening into the inside of the dress, a spring surrounding the stem and forcing it normally outward to open said opening and against the flexible diaphragm, a spring controlled plunger mounted in the outer chamber of the valve and bearing inward against the diaphragm and having means for adjusting its tension, and openings in the outer chamber communicating with the outside of the dress, substantially as specified.

4. In diving dresses, the combination with a double walled dress having an air supply pipe leading into the space between the walls and an air valve controlling the passage of air from such space to within the dress, of a helmet fitted on such dress having an air outlet valve mounted therein consisting of a chamber within the helmet and a chamber on the outside thereof separated from one another by a flexible diaphragm, an opening in the inner end of the inside chamber a stem valve mounted in such chamber and adapted to close such opening, a spring surrounding the stem and forcing it normally outward to open said opening and against the flexible diaphragm, an opening in the side of the inner chamber, a pipe leading from such opening to outside the helmet, a spring controlled plunger mounted in the outer chamber and bearing inward against the flexible diaphragm, means for adjusting the tension thereof, and openings in the wall of such outer chamber, substantially as and for the purposes specified.

5. In diving dresses, forming the body and limbs of the dress with double walls of flexible material each strengthened or reinforced by bands of metal encircling them at intervals apart and secured within or upon the material, having provision for the inlet of an air supply into the space between the walls and for the passage of the air from such space through a spring controlled valve into the inside of the dress, a helmet upon the dress and a spring controlled air outlet upon such helmet, substantially as and for the purposes specified.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

FRANK WILLIAM WALTERS.

Witnesses:
E. BROOKE SMITH,
E. F. COURTNEY.