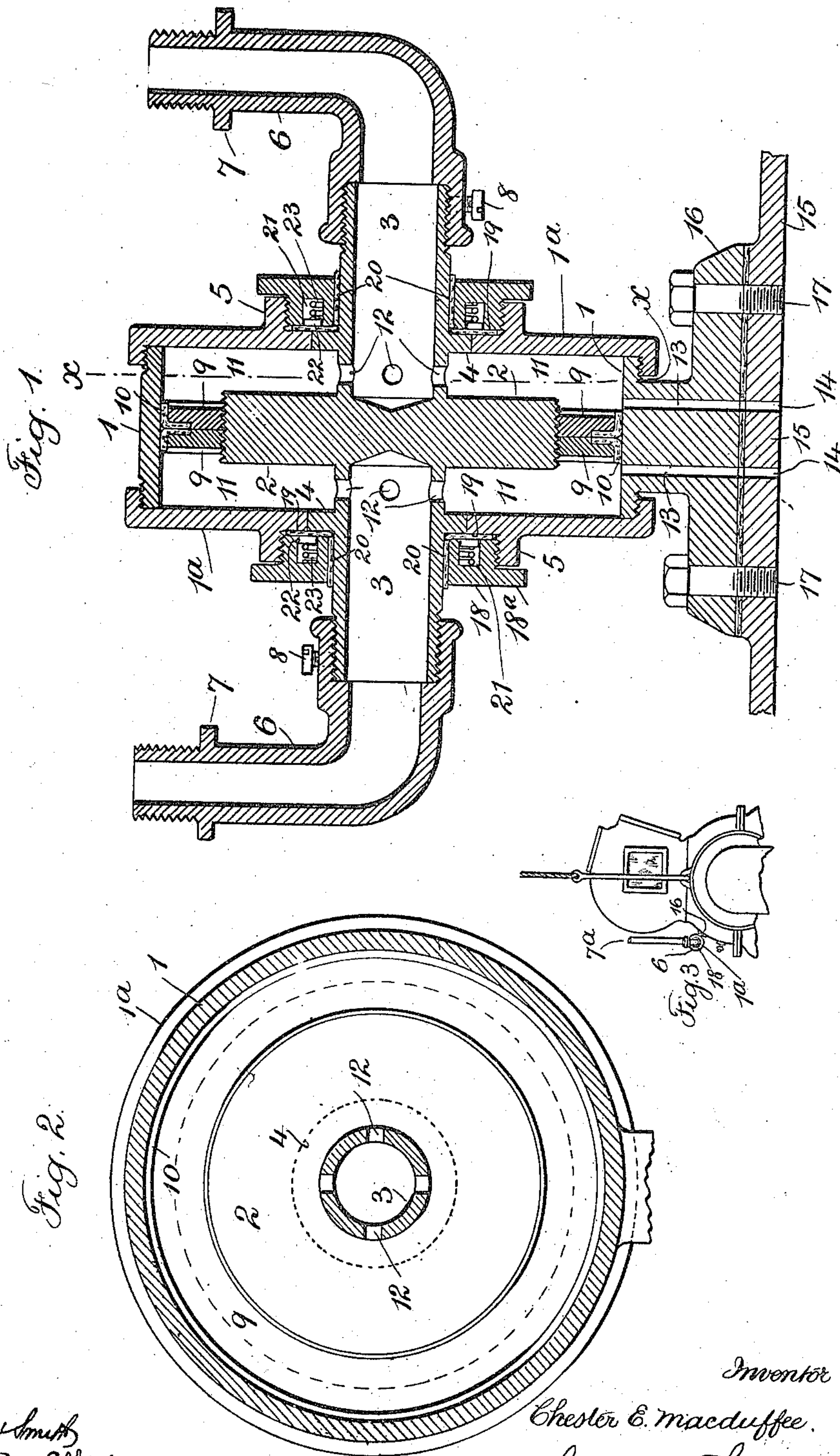


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ATTACHMENT FOR SUBMARINE ARMOR.
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989,531.

Patented Apr. 11, 1911.



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UNITED STATES PATENT OFFICE.

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ATTACHMENT FOR SUBMARINE ARMOR.

989,531.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHESTER E. MACDUFFEE, a citizen of the United States, residing at the borough of Manhattan, city, county, and State of New York, have invented a new and useful Attachment for Submarine Armor, of which the following is a specification.

My invention relates to a device adapted to be secured to the armor worn by submarine divers, and provided with swinging connections for the flexible tubes or hose through which air is supplied from above water to the diver and for the discharge of the exhaled or vitiated air from the armor, and the objects of my invention are (1) to allow a free movement of the hose or tube connections while the diver is descending or ascending, or while at work at the bottom among wreckage, so as to prevent twisting of the tubing or any undue strain upon the same or the connections, and (2) to provide an intervening air chamber between the armor and the air supply tube, from which air chamber a port of small diameter communicates with the interior of the armor so that a regulated and uniform supply of air will be conveyed to the diver.

In the accompanying drawings Figure 1 is a vertical section of my improved attachment. Fig. 2 is a section at the line x, x , of Fig. 1 and Fig. 3 is an elevation of the upper portion of a submarine armor illustrating where my attachment is connected to the same.

Similar reference numerals refer to like parts throughout the several views.

1 is a cylinder having flat heads 1^a screwed thereon at opposite sides, and a flanged base, there being oppositely disposed circular openings in each of the cylinder heads 1^a, which openings are central of the cylinder 1 and of corresponding diameter.

Within the cylinder 1 and arranged centrally therein is a wall or partition preferably comprising a circular disk 2 having integral tubular cylindrical projections 3 at its center at each side, which projections extend through the said openings in the heads 1^a at the respective sides of the cylinder and are provided with annular flanges 4 at such distance from the sides of the disk as to fit in and occupy the said openings in the cylinder

heads: the said flanges having a flat periphery and being of the same width as the metal composing the cylinder heads 1^a entirely fill such openings and are revoluble therein. On the outer surface of the cylinder heads 1^a at each side of the cylinder and surrounding said openings in the cylinder heads at a predetermined distance therefrom are circular projections 5 interiorly screw-threaded.

The outer ends of the tubular projections 3 are exteriorly screw-threaded, and upon the same are screwed tubular elbows 6 which are exteriorly screw-threaded at their free ends and provided with annular ribs or flanges 7 for the attachment of flexible tubing 7^a (see Fig. 3) for the supply and discharge of air. Set screws 8 are preferably employed to prevent the elbows 6 turning upon the screw-threads of the tubular projections 3, after they have been screwed to place.

The periphery of the disk 2 is provided with a screw thread and upon this is screwed the flat sided rings 9, which are of such dimension that their peripheries come closely adjacent to the interior circular surface of the cylinder 1, but not in contact therewith. These rings 9 are rabbeted on their meeting surfaces leaving an annular recess between them at the top, and within this recess is placed a suitable packing 10 which fills such recess and extends therefrom into the space between the peripheries of the rings 9, and the interior circular surface of the cylinder 1, entirely filling such space and sealing the air chamber 11 thus formed in the cylinder 1 at either side of the disk 2 one from the other.

The bore in the tubular member 3 extending at either side of the disk 2 terminates inwardly preferably somewhat conically and at a point slightly within said disk. Through these tubular projections 3 at a point between the annular flanges 4 thereon the disk 2, and consequently in that part within the air chambers 11 are bored spaced apart openings 12 in a circular range. Parts 13 extend through the base of the cylinder and communicate between the respective air chambers 11 and the interior of the armor 15 through openings 14 in the armor. Through the flanged portion 16 of the base of the cylinder are spaced apart bolt holes,

through which are passed the screw threaded bolts 17 which screw into screw threaded holes in the armor 15.

A circular packing gland 18 surrounds the tubular projections 3 at each side of the cylinder heads 1^a; there being intervening packing rings 20. These glands 18 each have an outer annular flange 18^a which extends over the circular projections 5 and below such flanges the exterior surface of the glands are screw threaded to mesh with the screw threads on the interior surfaces of said circular projections 5. There are packing rings 19 between the glands 18 and the cylinder heads 1^a. Each of the glands 18 has an annular recess 21 in its inner surface. Within each of these recesses 21 there is a presser ring 22 and helical spring 23, the springs bearing upon the presser rings and forcing them against the packing rings 19.

It will be readily seen that the liability of injury to the hose or flexible tubing while the diver is descending or ascending, or while attending to his duties at the bottom of the sea is obviated by the employment of my invention; and that the air required by the diver while down is supplied to him in uniform regulated quantity.

The air chambers 11 within the cylinder 1 on both sides of the disk 2 being alike as are also the joints and connections it is immaterial which side is used for the supply and which side for the exhaust, but it will be readily understood that the tube conveying air for the diver will be connected with a source of supply above water, while the tube conveying away the exhaled or vitiated air discharges into the atmosphere.

I claim as my invention:

1. The combination with an armor for submarine divers, of a stationary hollow body secured directly to said armor, passageways for air between the interior of said hollow body and the interior of said armor, and swinging connections secured to said hollow body through which air is supplied to the diver and vitiated air discharged from the armor.

2. The combination with an armor for submarine divers and hose for air, of a hollow body for connection with the armor having openings for air, series of revoluble devices within and projecting from said hollow body and adapted for connection with the hose and between and through which body and revoluble devices are passageways for air.

3. The combination with an armor for submarine divers and hose for air, of a stationary hollow body secured directly to the said armor, passageways for air between said hollow body and the interior of the armor, a revoluble partition member or wall midway within the hollow body dividing the same into two chambers, revoluble tubu-

lar members extending from the partition member in opposite directions through the said body to connections with the hose and the tubular members having openings into said chambers.

4. The combination with an armor for submarine divers, of a stationary hollow body secured directly to the armor and having tubular swinging connections for the admission and discharge of air and adapted for the attachment thereto of air supply and discharge tubes, air chambers within the stationary hollow body and intervening between said swinging connections and the armor, and air ports communicating from said air chambers with the interior of the armor.

5. The combination with an armor for submarine divers, of an attachment therefor having tubular swinging connections for the admission and discharge of air and adapted for the attachment thereto of air supply and discharge tubes, air chambers intervening between said swinging connections and the armor, means for preventing the leakage of water between said swinging connections and said air chambers, and ports communicating from said air chambers with the interior of the armor.

6. The combination with an armor for submarine divers, of an attachment therefor having tubular swinging connections for the admission and discharge of air and adapted for the attachment thereto of air supply and discharge tubes, air chambers intervening between said swinging connections and the armor, means for preventing the leakage of air between said air chambers, means for preventing the leakage of water between said swinging connections and said air chambers, and ports communicating from said air chambers with the interior of the armor.

7. The combination with an armor for submarine divers, of an attachment therefor, comprising in combination, a cylinder, a disk centrally arranged within said cylinder, air chambers within said cylinder one at each side of said disk, tubular cylindrical projections on either side of said disk having openings communicating with said air chambers, said tubular projections extending from said disk through openings in the cylinder heads and adapted at their outer ends for the attachment thereto of tubing, means for preventing the leakage of water between said projections and the cylinder heads, and ports communicating between said air chambers and the interior of the armor.

8. The combination with an armor for submarine divers, of an attachment therefor, comprising in combination, a cylinder, a disk centrally arranged within said cylinder and revoluble therein, air chambers within said cylinder one at each side of said disk, means for preventing the leakage of air be-

tween said air chambers, tubular cylindrical projections on either side of said disk, having openings communicating with said air chambers, said tubular projections extending from said disk through openings in the cylinder heads, revoluble therein and adapted at their outer ends for the attachment thereto of tubing, means for preventing the leakage of water between said projections and the cylinder heads, and ports communicating between said air chambers and the interior of the armor.

9. The combination with an armor for submarine divers, of an attachment therefor, comprising in combination, a cylinder, a disk centrally arranged within said cylinder and revoluble therein and having a screw thread on its periphery, air chambers within said cylinder one at each side of said disk, rings screwed upon the periphery of said disk and rabbeted on their meeting surfaces at the top forming an annular recess between them, a packing filling such recess and extending therefrom between the peripheries of said rings and the inner surface of the cylinder and filling such space, tubular cylindrical projections on either side of said disk having openings communicating with said air chambers, said tubular projections extending from said disk through openings in the cylinder heads, revoluble therein and adapted at their outer ends for the attachment thereto of tubing, means for preventing the leakage of water between said projections and the cylinder heads, and ports communicating between said air chambers and the interior of the armor.

10. The combination with an armor for submarine divers, of an attachment therefor comprising in combination, a cylinder having a head at each side thereof with a cen-

tral circular opening therein and a circular projection interiorly screw-threaded surrounding said opening at a predetermined distance therefrom on the outer surface of the cylinder heads, a disk centrally arranged in said cylinder and revoluble therein, having a screw-threaded periphery, air chambers within said cylinder one at each side of said disk, rings screwed upon the periphery of said disk and rabbeted on their meeting surfaces at the top forming an annular recess between them, a packing material within such recess and extending therefrom between the peripheries of said rings and the interior circular surface of said cylinder, tubular cylindrical projections on either side of said disk provided with openings communicating with said air chambers, said tubular projections extending from said disk through said openings in the cylinder heads, revoluble therein and adapted at their outer ends for the attachment thereto of tubing, glands exteriorly screw-threaded surrounding said tubular cylindrical projections and screwed into the said circular projections on the cylinder heads, said glands each having an annular recess in its inner surface, packing rings between said glands and said tubular projections, a packing within said annular recess in each gland, a presser ring bearing upon such packing, springs bearing upon such presser rings, and ports communicating between said air chambers and the interior of the armor.

Signed by me this first day of December 1910.

CHESTER E. MACDUFFEE.

Witnesses:

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