

(No Model.)

5 Sheets—Sheet 1.

J. R. HAYDON.  
SUBMARINE BOAT.

No. 493,266.

Patented Mar. 14, 1893.

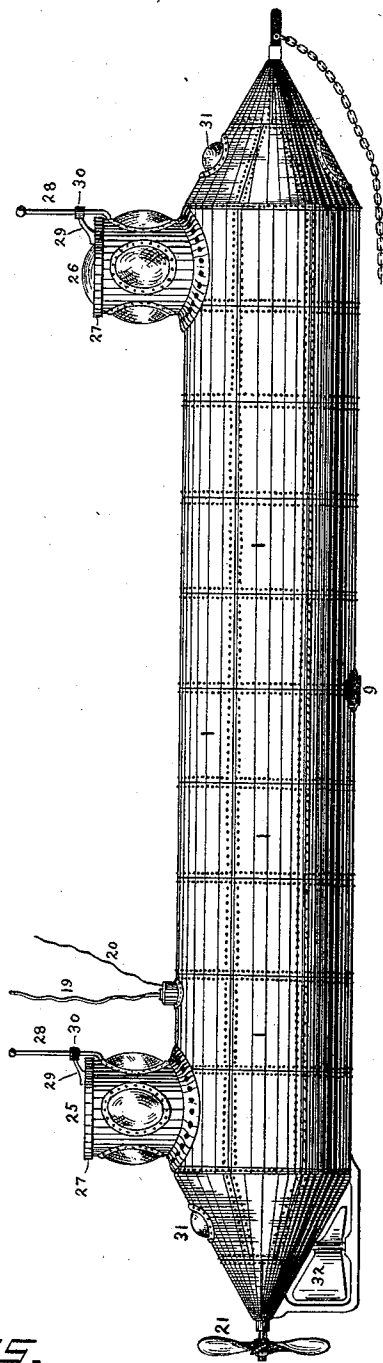


FIG. 1

Witnesses.  
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Inventor.  
J. R. Haydon  
By W. H. Burdick  
Atty.

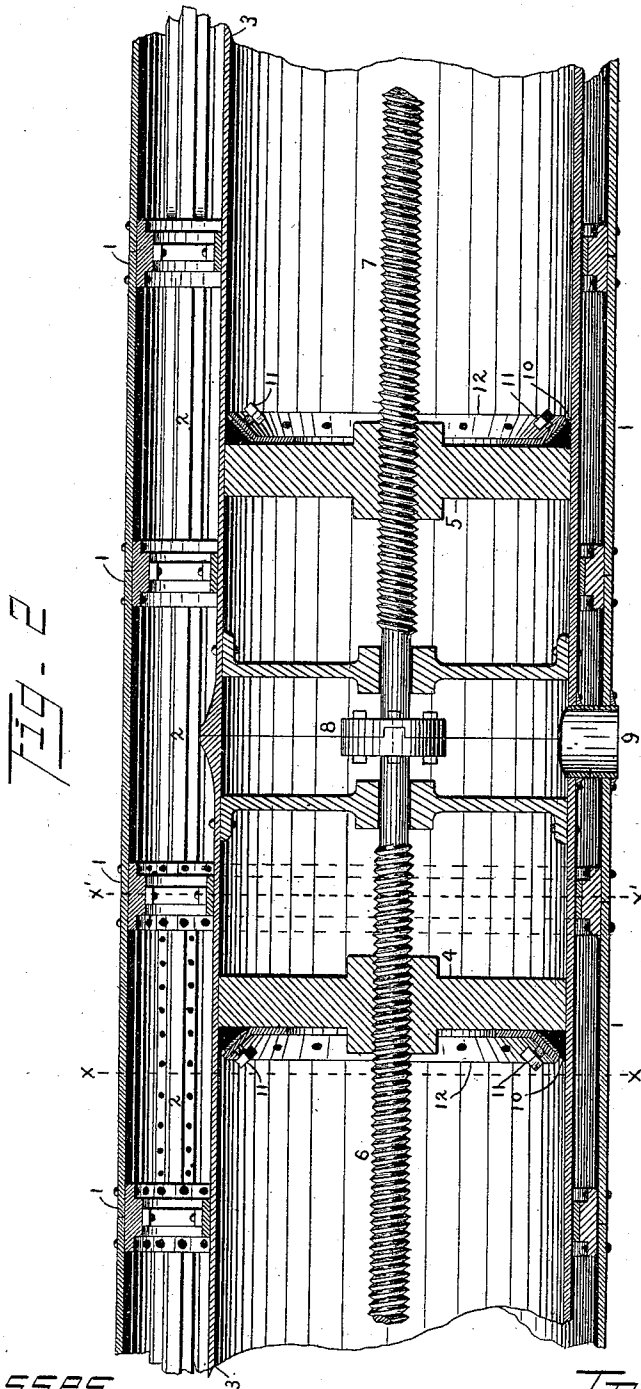
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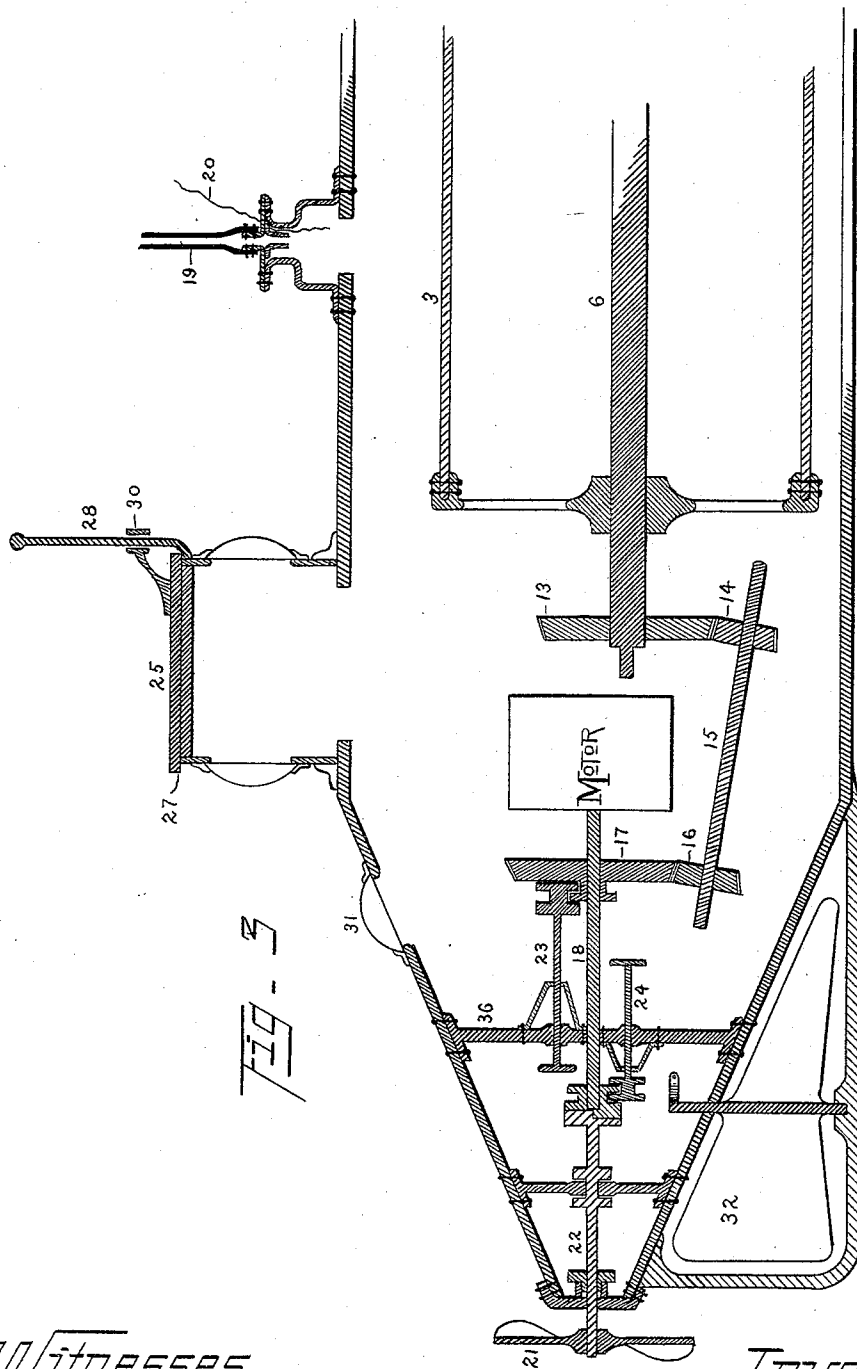
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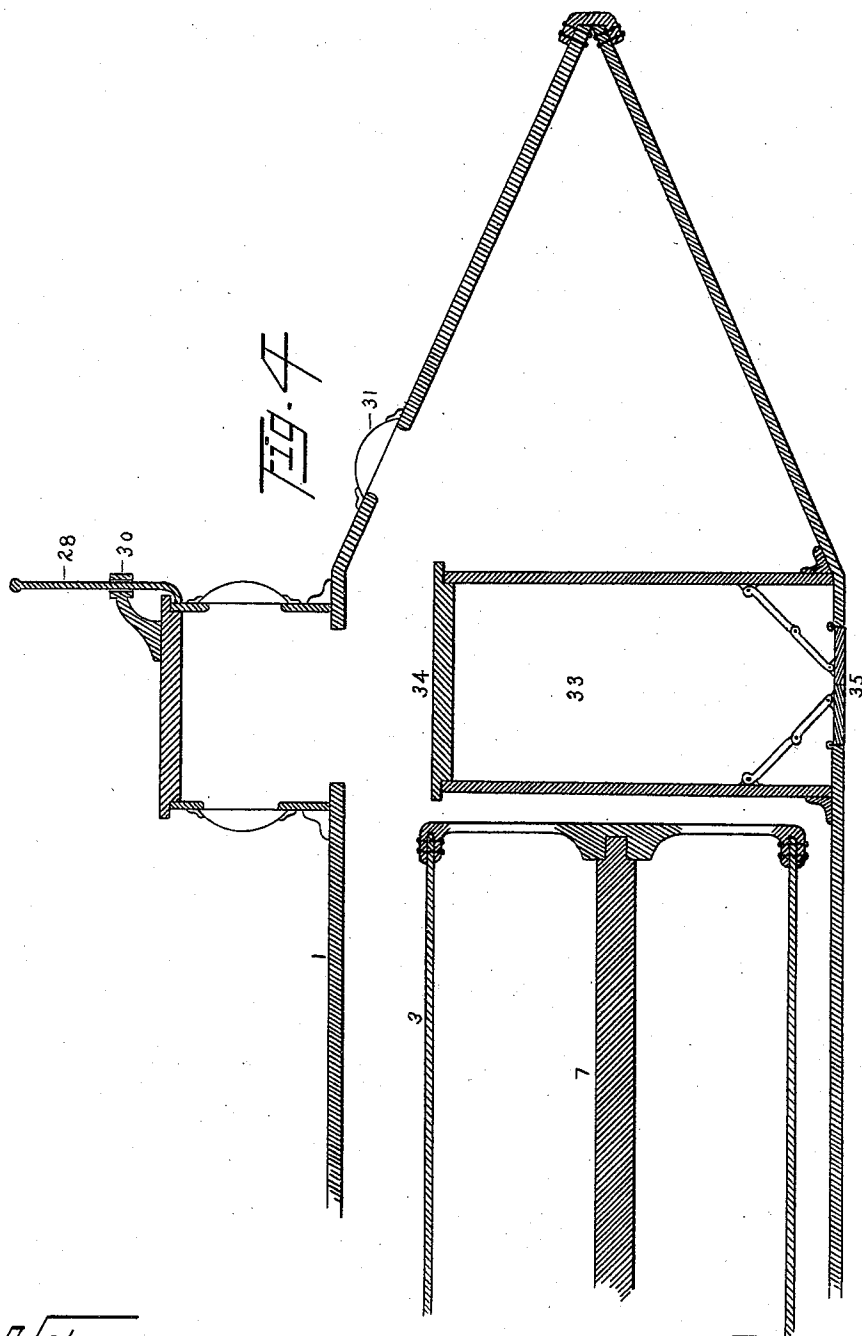
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5 Sheets—Sheet 4.

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5 Sheets—Sheet 5.

J. R. HAYDON.  
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Fig. 6

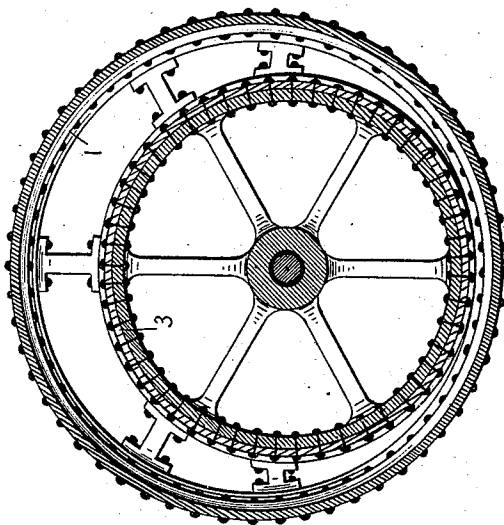
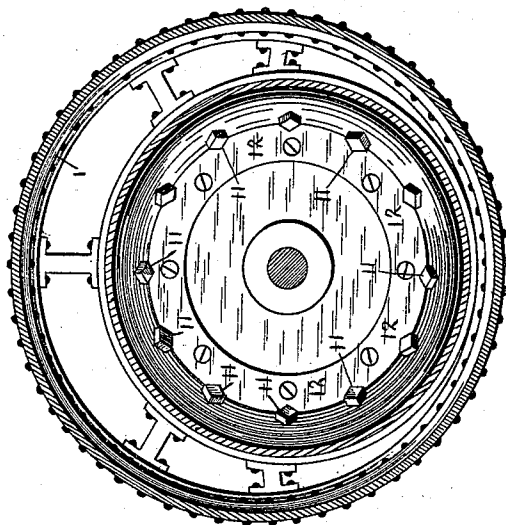


Fig. 5



Witnesses.

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# UNITED STATES PATENT OFFICE.

JAMES R. HAYDON, OF CLEVELAND, OHIO.

## SUBMARINE BOAT.

SPECIFICATION forming part of Letters Patent No. 493,266, dated March 14, 1893.

Application filed February 6, 1892. Serial No. 420,493. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES R. HAYDON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Submarine Boat, of which the following is a full, clear, and complete description.

The nature of my invention relates to a submarine boat constructed of steel plates or their equivalent, and substantially of the form hereinafter described, the mechanism in said boat being such that it may be raised or lowered any distance at the will of the operator, air and power being supplied from a tender above as hereinafter fully shown.

That the invention may be fully seen and understood by others, reference will be had to the following specification and annexed drawings forming part thereof.

Figure 1 is an elevation of my improved submarine boat. Fig. 2 is an enlarged vertical longitudinal section of the middle portion of the boat. Fig. 3 is an enlarged, skeleton, vertical, longitudinal section of the rear end. Fig. 4 is an enlarged, skeleton, vertical longitudinal view of the forward end of said boat. Fig. 5 is a cross section on line  $x, x$ , Fig. 2, and Fig. 6 is a cross section on line  $x', x'$ , Fig. 2.

Like figures of reference designate like parts in the drawings and specification.

My improved submarine boat is constructed of sheets of steel of sufficient thickness, riveted to the frame work of the boat, which consists of steel bands 1, 1, 1, Figs. 2, 3, 4, 5 and 6, and the girths 2, Fig. 2.

The ends of the boat, both rear and forward, are conical in form as shown in Fig. 1. The middle portion is in the form of a cylinder.

Within the middle or cylindrical portion of the boat is a second cylinder 3, Figs. 2, 3, 4, 5 and 6. The inner cylinder 3 as well as the outer, (which will hereinafter be called casing, to avoid prolixity) does not have the same center, the center of the inner cylinder being lower than that of the outside casing thus making more weight in the bottom of the boat and preventing it from rolling over, which owing to its shape would be the natural tendency were it not thus avoided. Within the cylinder 3 are two pistons 4 and 5 Fig. 2. The piston 4 has a right hand female thread therein, while the piston 5 has a left hand female

thread therein. A rod 6, Figs. 2 and 3 with a right hand thread thereon is threaded into the piston 4, the outer terminal extending out of the rear of the cylinder 3, and a rod 7 Figs. 2 and 4 with a left hand thread thereon is threaded into the piston 5, the outer terminal having its bearing at the forward end of the cylinder 3, as shown in Fig. 4. These two screw rods are rigidly bolted together at their point of contact in the middle of the cylinder 3 (shown at 8 Fig. 2).

There is an opening 9, Fig. 2, from the exterior of the boat to the interior of the cylinder 3. The pistons 4 and 5 are made tight within the cylinder by means of rubber packing 10, held in close contact by the set screws 11, in the plate 12, said plate being rigidly attached to the piston. The rear terminal of the screw rod 6, has a gear wheel 13 Fig. 3, keyed thereon. The gear 13 is in mesh with the pinion 14 on the shaft 15, on the opposite end of which is the pinion 16. The pinion 16 is in mesh with the gear wheel 17 on the power shaft 18, which is connected with the motor. The double screw rod 6 and 7 is operated by this gear mechanism. It will readily be seen from Fig. 2, that if the screw rod is turned to the right it will cause the two pistons 4 and 5 to recede from the middle of the cylinder 3 thereby permitting a volume of water to enter the opening 9, equal to the space between the two pistons 4 and 5, thereby sinking the boat, when a sufficient amount of water has been admitted. If the screw rod be turned to the left, the pistons 4 and 5 will approach each other and force the water out of the opening 9, and cause the boat to rise.

Air is supplied to the boat through the tube 19 Figs. 1 and 3, and the electric current through a wire 20, from a tug or tender above.

The boat is propelled by a screw 21, Figs. 1 and 3 on the shaft 22, which is readily connected and disconnected from the motor shaft 18 by means of the screws 23 and 24, Fig. 3.

There is an arrangement of pipes under the cylinder 3 for compressed air, which is forced into said pipes through the tube 19 from the tender above. This may be done by any known means as the ordinary air compressor or pump and suitable valves.

Two lookouts 25 and 26 Figs. 1, 3, and 4 are arranged on the boat. These are also used

for the entrance to the boat when above water level. The doors 27 to the lookouts are operated as follows. The rods 28 extend up from the side of the lookout, an arm 29 is attached  
 5 to the top of the door and has an eye 30 in the end thereof. The rod 28 passes through the eye 30, so when the door is raised up, the weight of said door will cause the eye 30 to bind on the rod 28, and consequently hold the door at  
 10 any desired height. I do not however wish it understood that I confine myself to this form of door as any suitable form of door that can be made to fit air tight, can be used.

I place two thick lenses 31, at the rear and  
 15 forward ends of the boat for the purpose of throwing out light provided by electricity.

The boat may be guided by an ordinary rudder 32, operated by a chain or cable running forward to a wheel.

20 In the forward part of the boat is arranged a chamber 33, Fig. 4 with an air tight cover. This chamber is for the purpose of allowing a person sufficiently protected with any kind of diving clothes or apparatus to get out of  
 25 the boat when under water. The diver enters the chamber 33 and the cover 34 is secured down air tight, he then opens the lower doors 35, and is able to get out. The water enters the chamber but does not enter the body of  
 30 the boat owing to the air tight cover 34. This chamber is intended also to be used in case of any break or accident to the machinery when under water.

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

1. In a submarine boat a cylinder 3 within an air tight casing with conical ends, said casing having an opening 9. therein in open  
 40 communication with the middle of the cylinder 3. in combination with two pistons 4 and 5. arranged within said cylinder 3 and operated by the right and left screw rod 6 and 7. conjointly with the gear system and motor, whereby a volume of water may be admitted  
 45 or forced out of the cylinder 3, as desired for

sinking or raising the boat, substantially in the manner as and for the purpose set forth.

2. In a submarine boat in combination, an air tight casing conical at each end and having lookouts 25 and 26 on top thereof, an interior cylinder 3, with opening 9. therein, the  
 50 right and left screw piston rod 6 and 7 and pistons 4 and 5 operating conjointly with the motor and gear system substantially in the manner as and for the purpose specified. 55

3. In a sub-marine boat an air tight casing, a cylinder of less size than the casing located on the bottom thereof, pistons located within the cylinder, a passageway extending from the cylinder between the pistons to the outside of the casing, and means carried within  
 60 the casing for operating the pistons to admit water to or expel it from the cylinder, substantially as described.

4. In a sub-marine vessel a cylindrical casing conical at both ends, a cylinder located in said casing with a passageway leading to the outside, means for admitting water to or expelling it from the cylinder, a propelling device carried by the casing, a motor located in  
 70 the casing, and means for connecting the motor with the propelling device or with the water forcing means as desired, substantially as described.

5. In a submarine boat, with an exterior air tight casing and an interior cylinder, the right and left screw rod 6. 7. operating the two pistons, in conjoint operation with the gear system and motor whereby said pistons are caused to recede or approach each other for  
 80 the purpose of filling or emptying the cylinder of water and sinking or raising the boat substantially in the manner specified.

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

JAMES R. HAYDON.

Witnesses:

WALTER A. BIDDLE,  
 L. F. GRISWOLD.