

No. 719,235.

PATENTED JAN. 27, 1903.

S. LAKE.
VENTILATION OF SUBMARINE BOATS.

APPLICATION FILED MAR. 4, 1902.

NO MODEL.

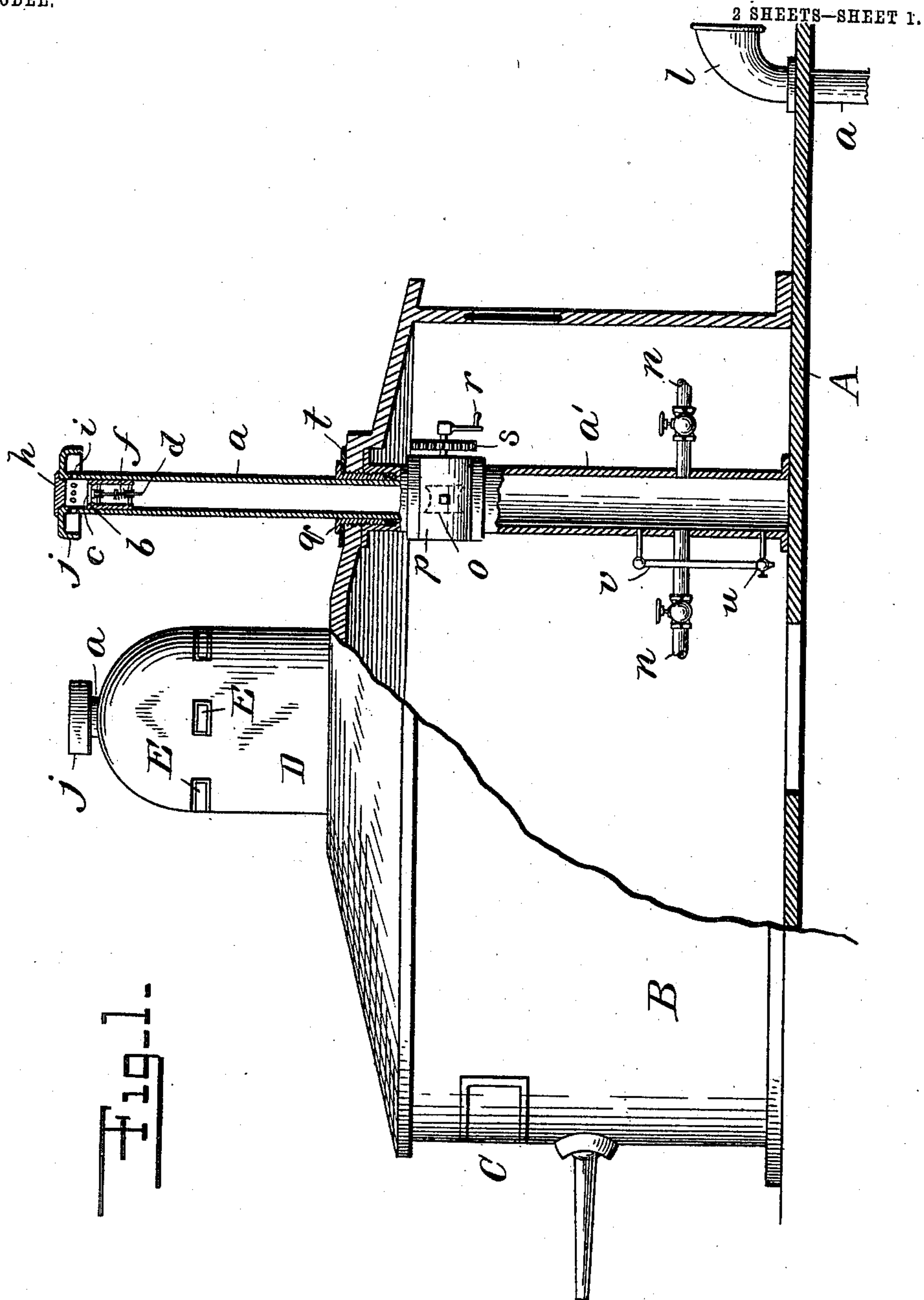


Fig. 1.

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INVENTOR

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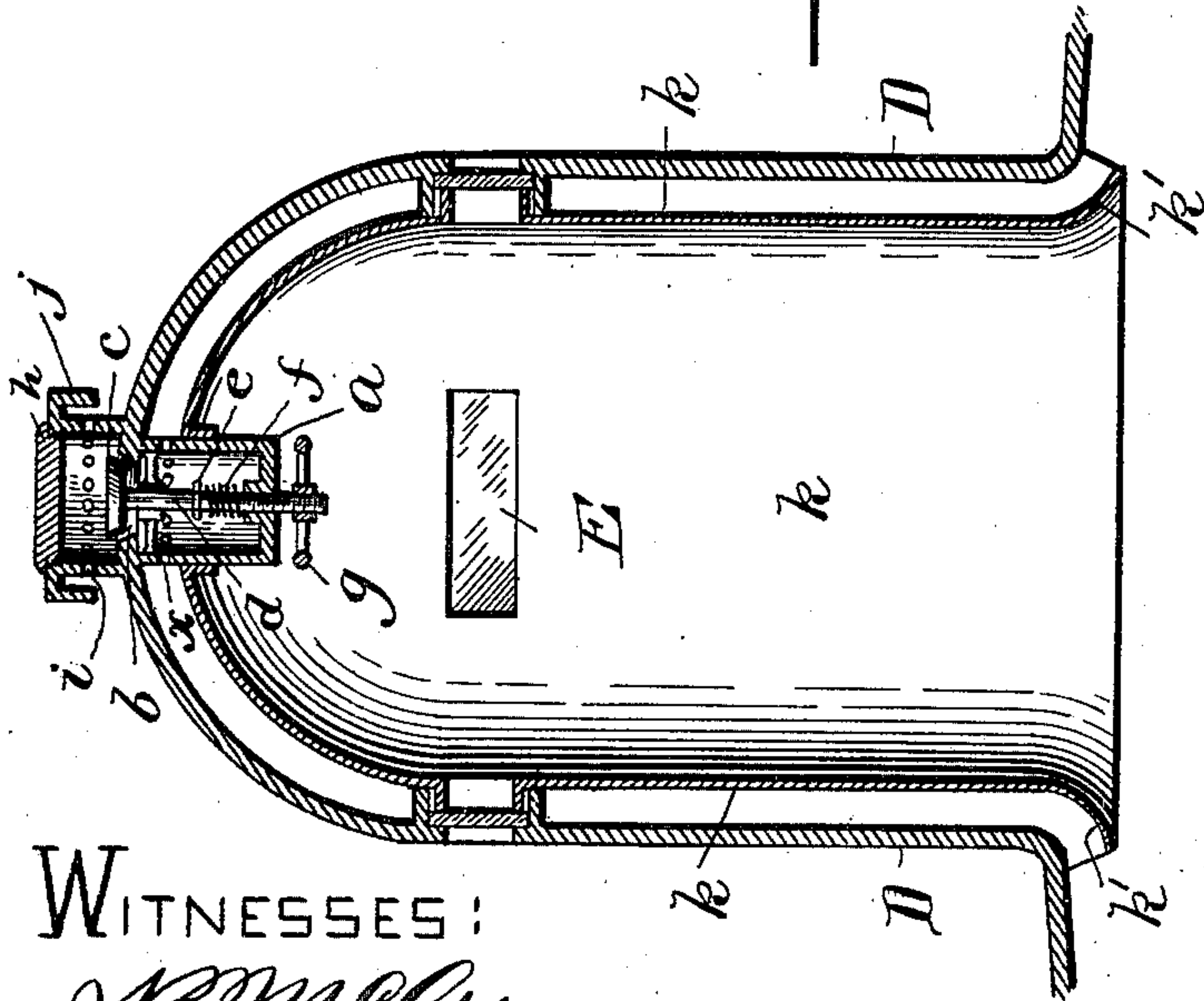
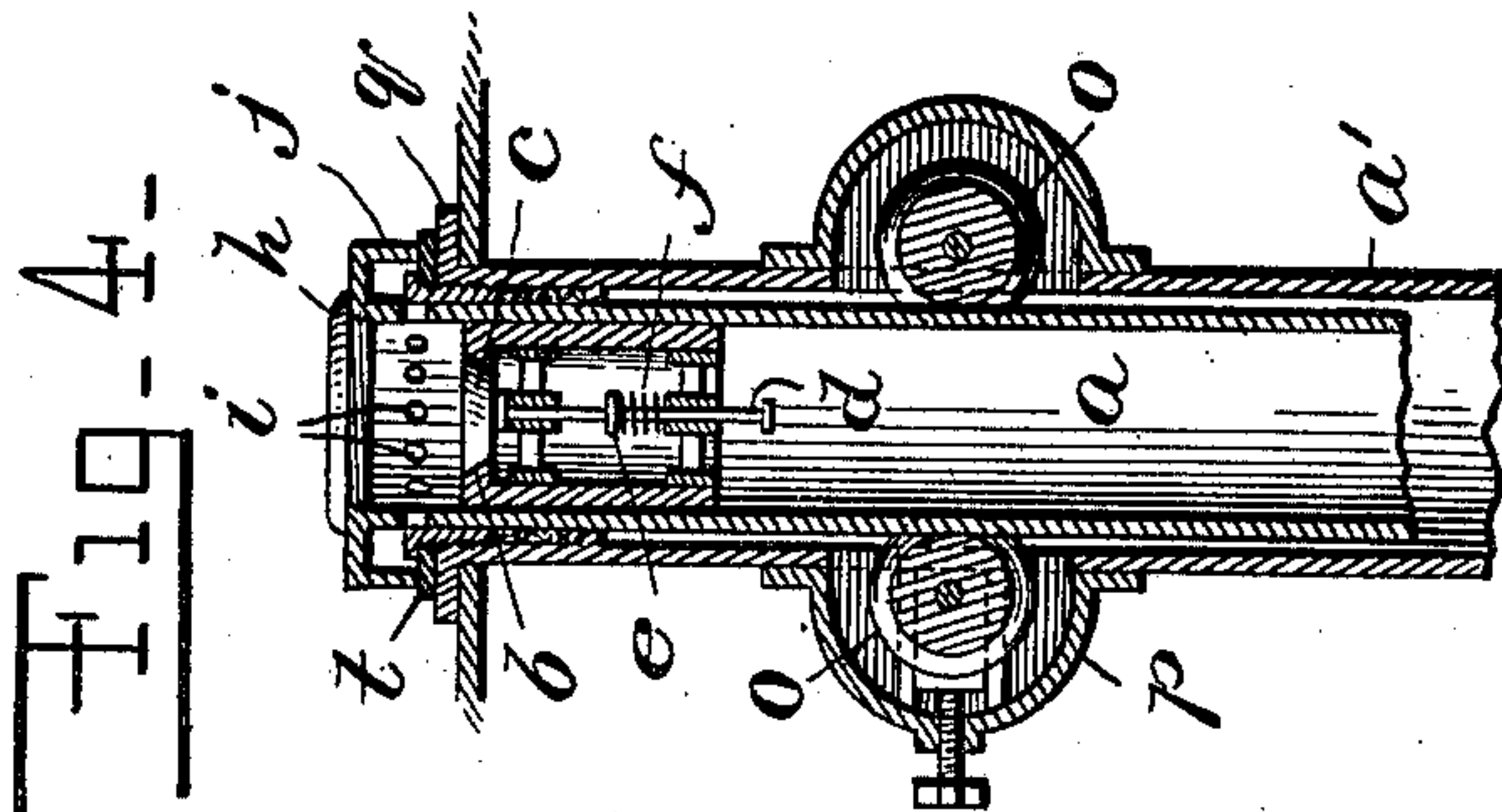
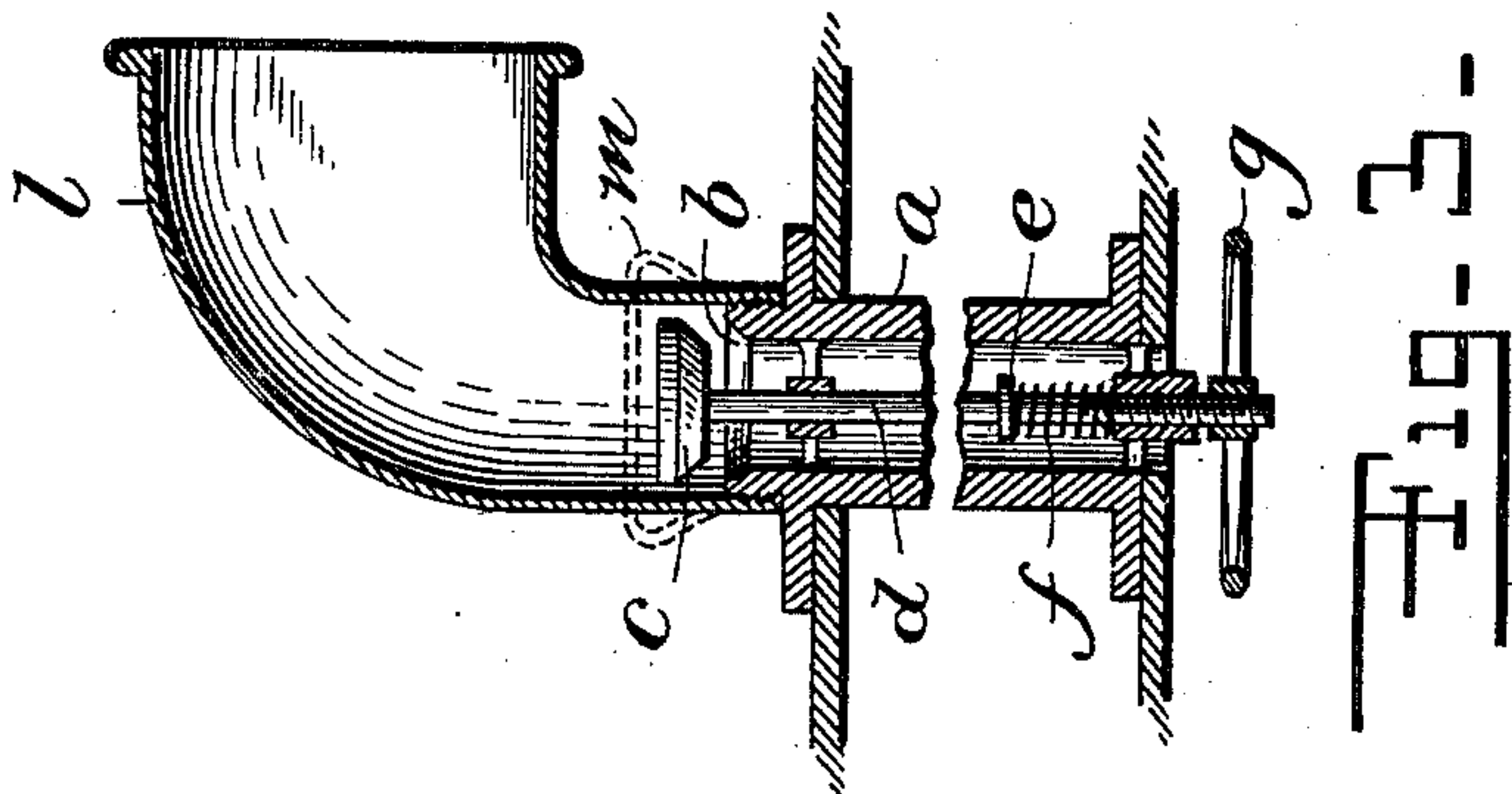
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2 SHEETS—SHEET 2.



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INVENTOR

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UNITED STATES PATENT OFFICE.

SIMON LAKE, OF BRIDGEPORT, CONNECTICUT.

VENTILATION OF SUBMARINE BOATS.

SPECIFICATION forming part of Letters Patent No. 719,235, dated January 27, 1903.

Application filed March 4, 1902. Serial No. 96,634. (No model.)

To all whom it may concern:

Be it known that I, SIMON LAKE, a citizen of the United States, residing at Bridgeport, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Ventilation of Submarine Boats, of which the following is a specification.

This invention has for its object to provide means whereby a submarine boat may while running in semisubmerged or nearly totally submerged condition maintain a free circulation of atmospheric air while continuing to utilize its surface motive power. This is a desideratum, especially in submarine torpedo-boats, for two reasons—first, because the motive power usually supplied from storage batteries employed for driving an electric motor when the boat is totally submerged is necessarily of limited quantity by reason of the small storage plant for which space is available in such class of boats, because of which it is very desirable that the resort to electrical propulsion should be deferred as long as possible, and, second, because it is desirable to reserve the air-supply carried by the usual air-receivers until actual necessity requires its use.

The invention consists, primarily, in the provision of a ventilating tube or passage in direct communication with the interior of the boat and opening outwardly at some considerable distance above the same, so as to be unaffected by the ordinary wash of the water over the deck or that portion thereof adjacent to said tube or passage in moderately rough weather, combined with an outwardly-opening check-valve within said tube or passage, a chamber permanently open in the upper portion only, being formed above and surrounding the mouth of said tube or passage to retain any water entering the same for the purpose of holding the valve closed when pressed to its seat by the weight of the water. It also includes certain other features to be hereinafter described.

Although the gasoline-engine commonly employed in such craft serves to induce a circulation of air by drawing the air which it requires in its operation from the interior of the boat, which air is replaced by that entering through the ventilating tube or passage

provided therefor, it is evident that the ventilation of the boat may be effected by the use of a pump or blower or by any other suitable device for the purposes of the present invention or that the improvement may be utilized in the charging of the compressed-air receivers or in any other operation requiring the admission or discharge of air or gases, respectively, into or from the interior of the boat.

The invention will be understood by reference to the drawings annexed, in which—

Figure 1 is a side elevation, partly in section, of a portion of the hull and the superposed conning tower or turret of a submarine boat provided with several forms of my improvement; and Figs. 2, 3, and 4 are sectional elevations, upon an enlarged scale, of the inspection dome or chamber of the conning-tower with its air-inlet valve, the valved ventilating-tube projecting above the hull, and the upper portion of the valved engine exhaust-tube, respectively.

The hull A is provided with the conning-tower B, having the usual dead-lights C and superposed inspection-dome D, with its dead-lights E and air-inlet tube *a*, having the conical valve-seat *b* and valve *c*, of which the stem *d* is provided with a collar *e*, between which and the lower closed end of the tube *a* is interposed the spiral spring *f*, maintaining the valve normally raised above its seat to admit a current of atmospheric air, but the lower end portion of which stem is externally threaded and carries a hand-wheel *g*, of which the hub is internally threaded and fitted to said valve-stem *d*. It will be seen that by screwing the hand-wheel upwardly upon the supporting valve-stem its threaded hub will come into engagement with the bottom of the tube *a*, which forms a stop-shoulder for the same and enables it to draw the valve-stem and valve downwardly positively in opposition to the spring *f* during the continued turning of the hand-wheel until the valve is firmly closed upon its seat. The rotation of the hand-wheel in the reverse direction obviously causes the release of the valve and permits it to rise and remain normally open under the action of the spring *f*.

The outer end of the tube or passage *a* is closed by a plug or cap *h*, adjacent to which

are the lateral apertures or orifices *i*, disposed slightly above the valve-seat *b*, so that a species of chamber or pocket is formed in the tube above the valve, and in front of which apertures is disposed the overhanging annular flange or shield *j*, depending from the externally-flanged upper end of the tube *a* and designed to prevent the entrance therein of water merely splashed upon the top of said ventilating device. It is evident, however, that in case of the sudden submergence of the outer end of the tube *a* and the entrance of water through the holes *i* the weight of the water will close the valve *c* in opposition to the spring *f*, the valve thereafter remaining closed under the weight of the superposed water until it is manually opened under more favorable external conditions.

While the lower end of the tube *a* might be made open with merely a spider therein for supporting the lower bearing and thrust-shoulder for the valve-stem and its hand-wheel, similar to that adjacent to the valve-seat *b*, such expedient is objectionable for the reason that the inrush of air through such tube directed upon the head of the lookout or steersman is found to be quite injurious to his physical health, and I therefore provide the tube *a* with the lateral apertures *x* beneath the valve-seat *b* and opening into a conduit formed between the inner wall of the inspection-dome *D* and the inner sheet-metal shield or deflector *k*, of which the lower end *k'* is turned outwardly to distribute the inflowing air through the conning-tower, so as to avoid the production of the objectionable draft referred to. While the form of shield or deflector herein shown is considered preferable, it is evident that its particular form and precise location are not material, being capable of considerable variation without substantially changing the effectiveness of this part of the improvement.

When the air-inlet of my improvement is employed in lieu of the usual ventilator rising from the deck, the upper portion of the tube *a* may be replaced, as indicated in Fig. 3, by the ordinary swinging hood or cowl *l*, of which the upright portion forms the chamber or pocket above the valve for retaining any water entering the same, and the lateral portion also serves in lieu of the depending shield *j* to prevent the entrance of water into the tube *a*, excepting under conditions of actual submergence, as before explained. When the boat is to be regularly submerged, the hood or cowl may be replaced by the cap *m*. (Shown only in dotted lines in said figure.)

While the discharge or exhaust tube or pipe for the spent gases from the usual gasoline-engines commonly employed for the surface navigation of this class of vessels requires certain modifications of the air-inlet devices above described to adapt it for similar automatic operation when performing their normal function, it is evident that the required changes are slight, as will be seen by refer-

ence to Figs. 1 and 4, in which the ventilating-tube serving as the discharge or exhaust pipe is made telescopic and formed with an upper portion *a*, provided with the valve-seat *b* and outwardly-opening valve *c*, whose stem *d* is provided with the collar *e*, having the counterbalance-spring *f* intermediate the latter and the lower spider for guiding the valve-stem and permitting the valve to remain normally closed, or nearly so. Said tube *a* is also provided with the plug or cap *h*, lateral apertures *i*, and overhanging shield *j*. The lower stationary portion *a'* is connected with the valved exhaust-pipes *n* from the gasoline-engines near the bottom and is provided with a pair of friction-rolls *o*, housed within a suitable casing *p* and adapted to bear upon the movable upper portion *a*, entering the same through a stuffing-box *q*, to raise and lower the same when operated by means of the crank *r* through a pair of connecting-gears *s*. The valved upper end of the movable section *a* is thus adapted to be adjusted by means of the crank *r* to any height above the adjacent portion of the boat, limited substantially by that of the air-inlet upon the inspection-dome, according to the condition of submergence of the boat, and may be drawn down so as to seat the edge of the overhanging flange or shield *j* upon the packing *t* when the boat is to be totally submerged, under which condition the check-valve *c* is obviously rendered wholly inoperative. In case a small amount of water should be admitted by accident by the valve *c* while the tube *a* is in operative position this may be drawn off into a suitable receptacle by means of the petcock *u* in the pipe *v*, connected with the lower end of the stationary section *a'* of the ventilating-pipe.

From the foregoing description it will be seen that my present improvement is adapted to ventilating tubes or passages of submarine boats, whether employed as inlets or outlets for air or gases, and that the same is susceptible of embodiment in various forms, for which reason it will be understood that the invention is not limited to the specific constructions herein shown and described.

Having thus set forth the nature of the invention, what I claim herein is—

1. In a submarine boat, the combination with a ventilating tube or passage communicating with the interior of the latter and opening outwardly above the same, of an outwardly-opening, spring-pressed check-valve in said tube or passage located below its outer end, a chamber permanently open in its upper portion being formed above the seat of said valve and adapted to retain water entering the same, whereby the weight of the water serves to press said valve to its seat and to automatically hold it closed.

2. In a submarine boat, the combination with a ventilating tube or passage leading upwardly and outwardly from the interior thereof through the deck or upper wall of the

same, of a valve-seat within said tube or pas-
sage, a valve fitted to said seat and provided
with a stem pressed normally upward by a
spring to retain the valve in open position
5 and having the inner portion thereof thread-
ed, guides fitted to said valve-stem for main-
taining said valve in axial relation to said
seat, and a hand-wheel with threaded hub
applied to the threaded portion of said valve-
10 stem and adapted to seat said valve in oppo-
sition to its spring.

3. In a submarine boat, the combination
with a ventilating tube or passage communi-
cating with its interior and opening outwardly
15 above the same, of an outwardly-opening
check-valve therein, and a deflector or baffle-
plate for directing the inflowing air trans-
versely of said tube or passage along the ad-
jacent inner wall of said boat.

4. A submarine boat provided with a con- 20
ning-tower or projecting portion rising above
its deck, a ventilating tube or passage con-
nected with the interior of said conning-tower
or projecting portion and provided with an
outwardly-opening check-valve, and a shield 25
or deflector leading from the inner mouth or
orifice of said tube or passage and down-
wardly into that portion of the boat beneath
said conning-tower or projecting portion.

In testimony whereof I have signed my 30
name to this specification, in the presence of
two subscribing witnesses, this 26th day of
February, 1902.

SIMON LAKE.

Witnesses:

L. B. MILLER,
HENRY J. MILLER.