No. 650,210. **Patented May 22, 1900.**

**W. J. WILSON.**

**MARINE TORCH.**

(Application filed Feb. 7, 1899.)

(No Model.)

Fig. 1.

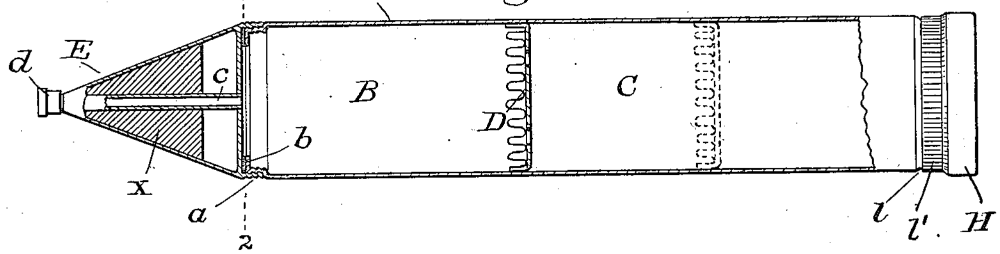



Fig. 2.

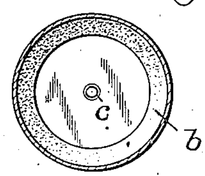



Fig. 3.

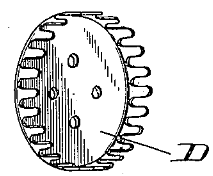



Fig. 4.

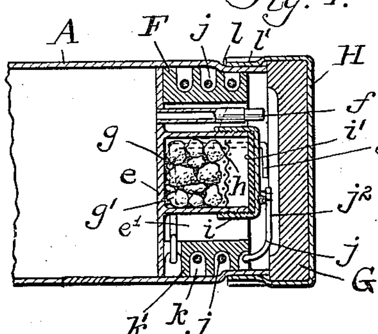
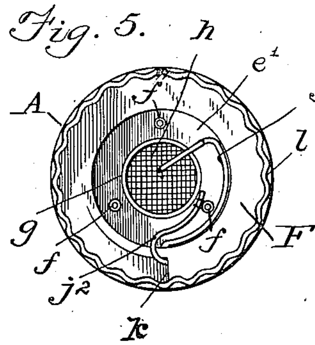



Fig. 5.



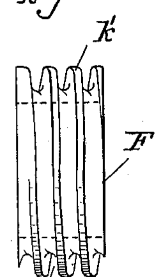




Fig. 6.

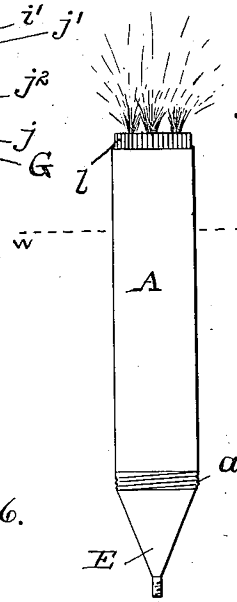



Fig. 7.

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# UNITED STATES PATENT OFFICE.

WILLIAM J. WILSON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AMERICAN ILLUMINATING SHELL COMPANY OF BALTIMORE CITY, OF MARYLAND.

## MARINE TORCH.

SPECIFICATION forming part of Letters Patent No. 650,210, dated May 22, 1900.

Application filed February 7, 1899. Serial No. 704,788. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. WILSON, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Illuminating-Projectiles, of which the following is a specification.

This invention consists in a torch adapted to float and to ignite when thrown into water either by hand or from a gun. The torch comprises a casing for inclosing illuminating material and an igniting device which is preferably adapted to spontaneously ignite the illuminant in the presence of water. In its preferred form the casing will be charged with carbid of calcium and provided with one or more perforations through which the water may pass to the carbid and effect the generation of acetylene gas when the shell is wholly or partially submerged. Preferably the shell is provided with an air or gas chamber to cause it to float and with suitable gas-burners above said chamber. The carbid is located in the lower or submerged portion of the shell and the water enters under its own pressure.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of a projectile embodying the invention, the two ends being represented in side view. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a perspective view of the movable partition. Fig. 4 is a sectional view of the burner end of the projectile with buffer-block, cap, and all parts in the position they occupy when the article is in condition for storage. Fig. 5 is a plan or end view of the burner end of the projectile as seen when the cap, buffer-block, and screw-cap of the potassium-chamber are removed. Fig. 6 is a side view of the block that secures the time-fuse; and Fig. 7 is a side view of the projectile on a smaller scale in the vertical position it takes when floating in the water, the line $w$ indicating the surface of the water.

The body A of the shell or projectile is preferably made of metal and cylindrical in form. It contains a chamber B for the storage of carbid of calcium and an air-tight or gas-tight chamber C, separated from the carbid-chamber by a movable partition D, which is held in place by frictional contact with the inner wall of the shell. The forward end E of the projectile is cone-shaped and, as shown, is connected with the cylindrical body A by a screw-joint $a$, a gasket $b$ being provided to make the joint air-tight. A suitable inlet or passage $c$ for water extends from the point to and through the head of the cone part into the carbid-chamber. When the projectile is not in use, this inlet is closed air-tight by a screw-cap $d$ on the point. This cone end is weighted by means of lead or other metal $x$ to insure that when fired the projectile will make an accurate flight and also to cause it to float upright, as shown in Fig. 7. Near the other end of the projectile the gas-chamber C is closed by a partition $e$, and on the exterior of the partition a chamber $e'$ is formed, wherein are located the burners $f$, which open through the partition $e$. A chamber $g$, also on the exterior, contains metallic potassium in the form of balls or lumps $g'$ and coal-oil to preserve the potassium from oxidation. The potassium is confined in the chamber by a wire-gauze diaphragm $h$, and the coal-oil is confined by a screw-cap $i$, which has inside a packing of cork or other suitable elastic stopper material $i'$ to seal it tightly.

A time-fuse $j$, consisting of a lead tube charged with powder, has one end $j'$ free and in position to be bent into the potassium-chamber when the screw-cap $i$ has been removed and the other end $j^2$ secured to one of the burners $f$, adjacent its gas-aperture. The fuse-tube $j$ must be of sufficient length to give the requisite time for lighting after firing—say half a minute or a minute—and this requires that it be disposed in the exterior chamber by coiling. The coils of the fuse must not be in contact with each other, and to thus keep them separate a ring-shaped block F is employed. This block has an exterior spiral groove $k$, in which the coils of the fuse fit. It will be seen that the threads $k'$ of the block F fit closely in contact with the inner wall of the shell-chamber, and thus the coils are kept perfectly separated. The fuse extends from its end $j'$ adjacent the potassium-chamber to the lowermost one of the spiral grooves, or that groove nearest the partition $e$, and then winds around the block F until its end $j^2$ comes out adjacent to a burner. When the projectile is floating in the water, its point E is downward, and this position insures that the fuse in the coils will burn from the lowermost coil upward.

The ring-shaped block F is confined in its shell-chamber by simply crimping or contracting the circular wall of the cylinder at its end, as at $l$.

A buffer-block G is employed when firing to loosely cover the end of the burner-chamber. This block merely separates the end of the projectile from the charge of powder employed in the gun, and the block drops off or separates from the projectile while the latter is making its flight through the air. In order to protect the fuse and potassium and to seal the burner end of the projectile air-tight while the projectile is in storage and also to temporarily confine the buffer-block G in position, a cap H is employed to cover the entire butt-end of the projectile. This cap is seen in Figs. 1 and 4, and its rim-flange is crimped, as at $l'$, on the contracted part $l$ of the cylinder-wall and may be secured by a soft solder. This cap H at the butt-end and the screw-cap $d$ at the point keep the projectile air-tight and water-tight until it is desired to use it. When the projectile is stored for keeping, the carbid, the potassium, and the fuse will all be maintained in good condition for an indefinite period of time, and thus the efficiency of the projectile is assured.

The operation of the invention is as follows: When it is desired to use one of the projectiles, the cap H on the butt-end must be removed. The buffer-block G is lifted, and the screw-cap $i$, that seals the potassium-chamber, is also removed. The coal-oil is then poured out and the free end $j'$ of the fuse-tube bent over into the potassium-chamber. The screw-cap $d$ on the point is also removed. As already stated, the potassium will now be prevented from escaping by the wire-gauze diaphragm $h$. The buffer-block G should then be reseated loosely and the projectile put in the gun. When the gun has been fired, the projectile will at first plunge under water, and the potassium confined in the chamber $g$ becoming wet will spontaneously ignite the end $j'$ of the fuse. The projectile will float and assume an upright position in the water, the burner end uppermost and projecting above the water-line, which will be approximately at $w$. (See Fig. 7.) The water will enter the inlet $c$ in the lower end and will act on the carbid of calcium in the chamber B, and acetylene gas will begin to generate. The gas will fill chamber C and then pass through the burners, and the fuse end $j^2$ will ignite the gas of one burner. The fire will then communicate to the gas escaping from the other burners. As the carbid is gradually exhausted it swells or expands in bulk, and the partition D will thereby be moved upward or toward the burners. Thus the partition while the projectile is in storage will confine the carbid closely and prevent it from rattling, and yet will yield when the carbid expands by the action of water.

An ordinary shell may contain sufficient carbid to produce a light from one to five hours.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A marine torch, comprising, in combination, a casing having an internal space or chamber for illuminating material, an exterior burner in communication with said internal chamber, a chemical-igniter, and a fuse extending from the igniter to the burner.

2. A marine torch comprising, in combination, a chamber charged with carbid of calcium, a water-inlet to said chamber, a gas-burner communicating with the carbid-chamber, a chamber containing a chemical-igniter, and a fuse communicating from the igniter to the burner.

3. A marine torch comprising, in combination, a chamber charged with carbid of calcium, a water-inlet to said carbid-chamber, a gas-burner communicating with the upper end of the carbid-chamber, and an air-tight chamber adjacent the gas-burner containing metallic potassium and coal-oil to preserve the said potassium from oxidation.

4. A marine torch comprising, in combination, a chamber charged with carbid of calcium, a water-inlet to said chamber, a gas-burner, a chamber containing metallic potassium, a block provided with a spiral groove, and a tube-fuse coiled in the spiral groove of said block and communicating from the potassium-chamber to the gas-burner.

5. A marine torch comprising, in combination, a shell forming a carbid-chamber, a water-inlet to said chamber, a gas-burner, metallic potassium confined adjacent the burners with a preservative for the potassium, and a fuse communicating from the potassium to the burner.

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

WILLIAM J. WILSON.

Witnesses:
ALBERT P. STROBEL,
CHARLES B. MANN, Jr.