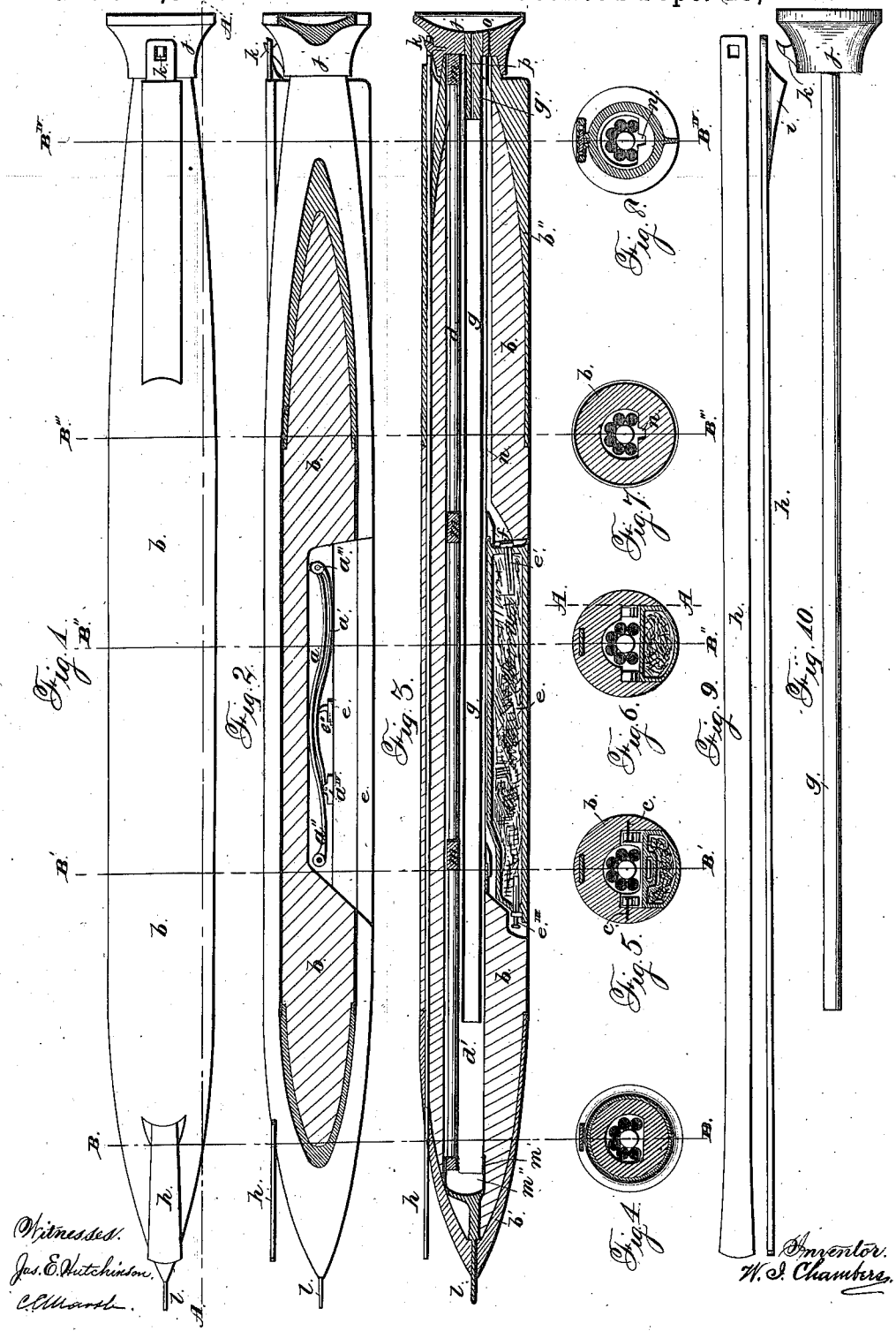
(No Model.) 2 Sheets—Sheet 1.

W. I. CHAMBERS.

MARINE TORPEDO.

No. 327,380. Patented Sept. 29, 1885.



Witnesses.
Jas. E. Hutchinson.
C. C. Wardle.

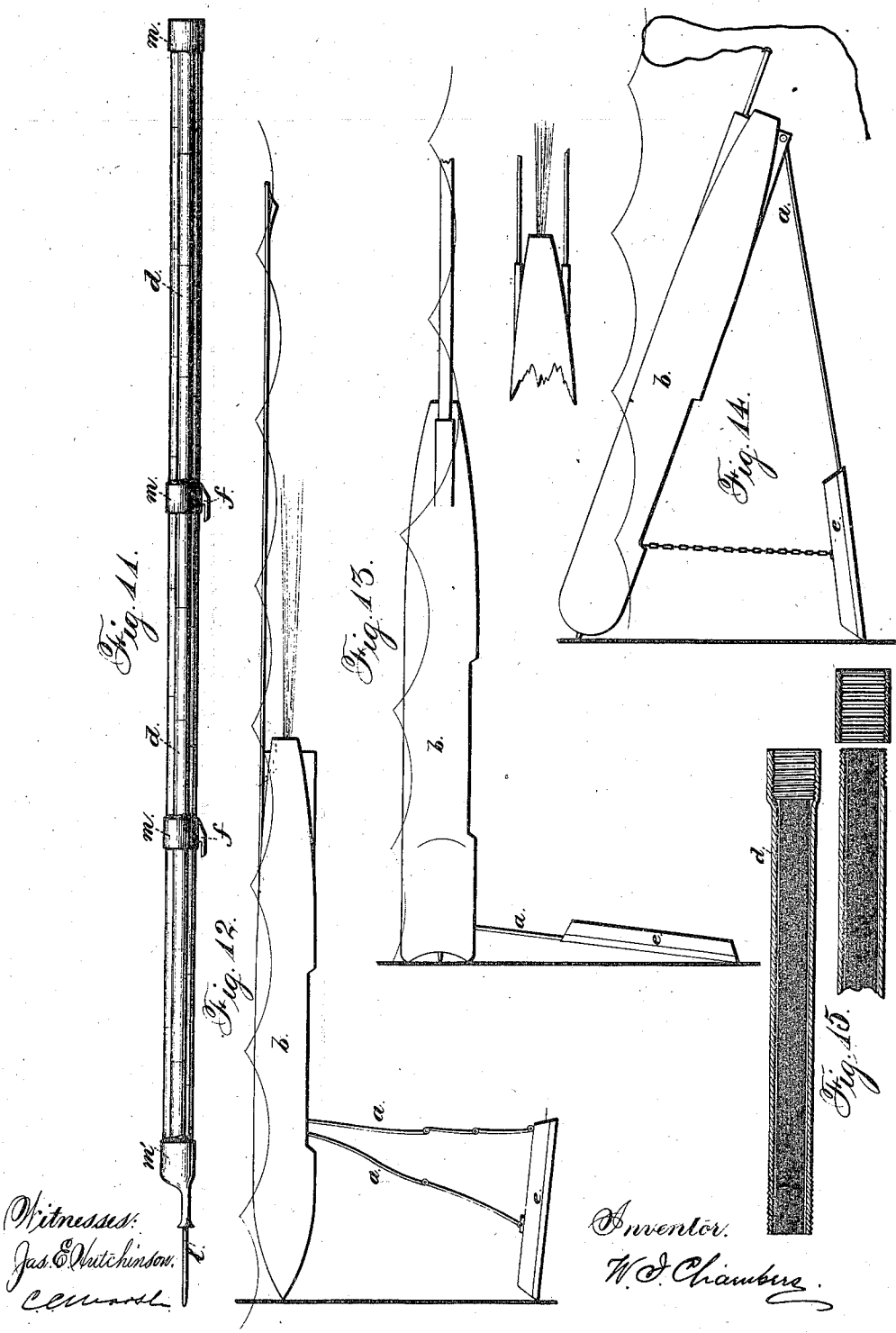
Inventor.
W. I. Chambers.

(No Model.) 2 Sheets—Sheet 2.

W. I. CHAMBERS.

MARINE TORPEDO.

No. 327,380. Patented Sept. 29, 1885.



UNITED STATES PATENT OFFICE.

WASHINGTON IRVING CHAMBERS, OF KINGSTON, NEW YORK.

MARINE TORPEDO.

SPECIFICATION forming part of Letters Patent No. 327,380, dated September 29, 1885.

Application filed January 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, WASHINGTON IRVING CHAMBERS, an ensign in the United States navy, residing at Kingston, in the county of Ulster and State of New York, have invented certain new and useful Improvements in Marine Torpedoes, of which the following, in connection with the accompanying drawings, herein referred to, and forming a part hereof, is a full and complete specification.

My invention relates to that class of torpedoes commonly known as "rocket-torpedoes;" and has for its object, first, to produce a projectile or float which shall carry the torpedo or magazine housed within it to the objective point to be there released and dropped a sufficient distance below the surface of the water and then exploded; second, to provide means for propelling this projectile or float upon or near the surface of the water after receiving its initial impulse; third, to provide means for steering or guiding the projectile; and, fourth, to provide a rocket projectile which shall be simple in construction, capable of being taken apart for convenience and safety in transportation, cheap, and effective in operation. These objects I attain by the construction, arrangement, and combination of parts, as hereinafter described.

In the accompanying drawings, Figure 1 is a plan view of the projectile or rocket arranged to be fired from a gun situated either above or below the surface of the water. Fig. 2 is a vertical longitudinal section on the line A A of Figs. 1 and 6. Fig. 3 is a vertical longitudinal section through the axis of the projectile. Figs. 4, 5, 6, 7, and 8 are cross-sections on the lines B B′ B″ B‴ B^{IV}, respectively. Fig. 9 represents in plan and side view a sliding bar to be arranged in the upper side of the projectile to form what I shall herein denominate the tail. Fig. 10 is an elevation of the sabot and its stem. Fig. 11 is a side view of a series of tubes which contain rocket composition, arranged around a central unfilled tube which, when all parts are assembled, receives the stem of the sabot. Figs. 12, 13, and 14 represent modifications, which will be hereinafter described; and Fig. 15 is a sectional detail showing the construction of the tubes containing the rocket composition.

In carrying out my invention I take a cylindrical body of wood, cork, or other buoyant material, *b*, of suitable diameter, to loosely fit the bore of the gun from which it is to be fired, and of a length of, say, from fifteen to twenty diameters. This body of wood is pointed at both ends, as shown in Fig. 3, and is bored out centrally from the rear nearly its entire length, as shown in Figs. 3 to 8, to receive the series of tubes shown in Fig. 11. It is also provided with a recess in its lower side, near or slightly in front of its longitudinal center, which recess extends into the central bore, and the purpose of which is to receive the magazine *e*, charged with dynamite, gun-cotton, gum-gelatine, or other suitable high explosive. The pointed ends of the body *b* are covered and protected by shells or cases *b′ b″* of cast-iron, bronze, or suitable alloy, and the cylindrical portion is covered with thin sheet metal—such, for instance, as common sheet-iron—the ends lapping over those of the end casings, as shown in Fig. 3.

In order that the tail, hereinafter described, shall be enabled to guide the projectile as desired, the center of gravity should fall below the longitudinal axis. This is accomplished by placing the magazine in the lower recess before mentioned.

Heretofore it has been customary in constructing rocket-torpedoes to pack the rocket composition in one mass within the body of the projectile and to ignite at and burn from the rear. According to my invention I separate it into several masses—six being shown in the drawings—by packing it into separate tubes, *d*, which are arranged longitudinally around a central tube, *d′*, as shown in Figs. 4 to 8, which central tube subserves a purpose to be hereinafter explained. The tubes *d d* are each composed of several short lengths screwed together, forming continuous tubes, and are bound together by rings or bands in any suitable number—three being shown in Fig. 11—and their front ends are secured within a head, *m′*, all opening into a chamber, *m″*, within said head. The head *m′* is provided with a point or projection, *l*, which projects through the point of the casing *b*, and which I denominate the "trigger." All the tubes, except the larger central tube, may be filled with rocket composition; or one or more of them may be left vacant to serve as an air-

space or air-cushion for regulating the even discharge of gases, as hereinafter described.

The tail of the projectile, which guides and steadies the latter in its flight, is illustrated in Fig. 9. It consists of a bar, *h*, made of wood or other suitable material, and of a length about the same as or greater than that of the body *b*. This bar is arranged in a suitable opening or channel in the body of the projectile, as shown in Fig. 3. The front end of the bar is broader than the main body thereof, and the channel in which it is arranged is narrower at its rear end, to prevent the bar from being entirely withdrawn rearward. Instead of the enlarged head and a narrowing channel, the bar may be provided with a slot of sufficient length, corresponding with the longitudinal movement which it is desirable to allow it, and a pin or bolt be passed partly through it into the body *b*.

To the under side, at the rear end of this bar, is attached a fin or blade, which serves as a rudder or guide to direct the movement of the projectile in water, and this fin or blade I make adjustable on the bar, so that it may be set at an angle in order to provide against the deflecting force of currents or tides.

The sabot *j*, which is affixed to the rear end of the projectile, is made to snugly fit the bore of the gun, and may be made expansible, to provide, as is usual, against the escape of gases from the firing-charge. Its rear face is preferably concaved, as shown in Fig. 3; it tapers toward the front, and its front face is recessed or chambered to fit over the rear end of the casing *b''*. A metal projection, *j'*, externally screw-threaded, is either cast or screwed into a central opening in the sabot, its front end extending through the chamber in the front face, and upon this projecting end is screwed a tube, *g*, which may be called the "stem" of the sabot. This stem, when the parts are in position for firing, lies within the tube *d'*, which it should snugly fit. The sabot *j* is provided with a projecting pin or hook, *k*, which engages in an opening in the rear end of the bar *h*, to connect the two together.

The magazine *e* may be made of any suitable metal, and of a shape to fit snugly into the opening in the bottom of the projectile. It is provided with flanges or loops to engage hooks *f f* on two of the bands *m m*, which surround the series of tubes *d d'*, the bands carrying said hooks being so disposed that the latter project into the magazine loops or flanges and hold it in place.

The series of tubes is capable of rearward movement within the body of the projectile, and this movement is effected when the point or trigger *l* strikes an object, whereby the hooks *f f* are disengaged from the magazine and the latter is allowed to drop out of its chamber before exploding, so as to be exploded at a distance below the surface of the water, which distance is regulated by the length of the connecting-bars by which it is hung to the body of the projectile. These connecting-bars are jointed spring-bars, joined to the body *b* and to the magazine *e*, and arranged to fold together, as shown in Fig. 2, where *a* represents one of the bars, which is hinged to the body *b* at *a''*, and *a'* represents the other bar, which is hinged to the torpedo at a^{IV} and to the first bar at *a'''*. The hinge or joint *a'''* has a bearing in the top of the magazine-chamber, and both bars are bent or sprung over a bearing, *e''*, on the top of the magazine. Thus, when the magazine is released from the hooks *f f* by the backward movement of the tubes *d d'*, the spring-bars force it out of its chamber, and, after it has dropped, support it until the explosion takes place.

The magazine is provided at its rear end with a time-fuse, *e'*, which is ignited through a channel, *n*, in the bottom of the central bore by the gases of the firing-charge, the gases entering said channel through a small opening, *o*, in the sabot *j*.

In addition to the time-fuse a percussion-fuse may be arranged in the front end of the magazine, as shown at e^{IV}, to be fired by striking against the side of a vessel or other objective point, when the magazine drops and swings forward.

The operation of the devices thus far described is as follows: The parts being adjusted as shown in Fig. 3, the projectile is placed in a gun to the caliber of which it is adapted. The gases generated by the burning of the firing-charge, at the same time that they drive the projectile from the gun, enter the openings *o* and *p* in the sabot *j* and ignite the time-fuse *e'* and the rocket composition contained in the tubes *d*, through the passages *n* and *d*, respectively. The gases from the rocket composition pass into the tube *d'* through the chamber *m''*. The backward pressure of these gases forces the tube or stem *g*, and the sabot to which it is attached, backward until the stem is entirely forced from the tube *d'*. This backward movement of the sabot and stem also draws back the bar *h*, by reason of the connection *k*. As soon as the stem *g* is entirely withdrawn from the tube *d'* it is free to disconnect itself from the bar or tail *h*, leaving the latter projecting from the rear end of the projectile to steady and guide the latter in its flight, as above stated. As soon as the stem *g* leaves the tube *d'* the gases from the rocket composition are free to escape therefrom and act against the water, as in other projectiles of this class.

Igniting and burning the rocket composition thus from the front end of a number of tubes, each made up of several short lengths of tubing screwed together, and discharging the gases through a long tube or passage extending to the rear end of the body of the projectile, I regard as an important feature, as it affords a body of gas under pressure which, as thus controlled, compensates for any unevenness or irregularity in the burning of the rocket composition, and produces a more even action of the gases against the water. In packing

even short lengths of tubes with rocket composition it will be difficult to secure entire uniformity or regularity of density throughout their length; but when packed under the same conditions and with the same pressures the density of the packed composition will be more or less uniform at corresponding points in the length of the several tubes. I so arrange the short lengths as to "break joints," as shown in Figs. 11 and 15, and by this means, together with the air-cushion before mentioned, arising from burning the composition at the front end, I secure comparative uniformity by burning from several tubes at the same time. These short lengths may be packed to different degrees of density or with different kinds of composition, so as to give the intensity of the burning composition from front to rear in the tubes a progressive action, ending in explosion of the tubes, if desirable, as the last lengths burn out. Dividing the several tubes into short lengths also facilitates packing the composition and transporting or storing the tubes, as it enables them to be easily handled and stowed away.

Fig. 12 shows the rocket after it has struck the object aimed at and before the explosion has taken place, the magazine and tail being disposed in the body, as above set forth, and released and fired by the means described.

Fig. 13 shows a rocket in the same position, provided with two tails—one at each side—the magazine being disposed as before and connected to the body by a spring-bar hinged near the front end of the body.

Fig. 14 shows a rocket provided with a short tail and a length of rope attached thereto, which trails behind after having been pulled out, as in the other cases. It also shows the magazine attached to the rear end of the projectile by a hinged spring-bar on which it may slide, its downward movement being limited by a chain or cord, which also operates either a friction or percussion fuse.

I do not claim herein the method of packing and forming the rocket-composition chamber; but

I claim for my invention—

1. In a rocket-torpedo, the combination of a body, *b*, provided with a longitudinal channel at or near its axis open at the rear end of the projectile, an opening or chamber in its lower part connected therewith, a magazine to contain an explosive charge arranged in said opening and provided with a time-fuse, and means for holding and releasing said magazine, as and for the purpose described.

2. A rocket-torpedo constructed substantially as described and having a detachable magazine arranged in a chamber at or near its longitudinal center, with a preponderance of weight, caused by this arrangement of the magazine, at one side of the axial center of the torpedo, whereby said magazine is made to serve as ballast to prevent rotation during the flight of the torpedo, as described.

3. In a rocket-torpedo, the combination of a body, *b*, provided with a chamber or recess to receive the magazine, a magazine arranged in said chamber, means for holding and releasing the magazine, and a spring or springs to force the magazine out of its chamber when released, substantially as described.

4. In a rocket-torpedo, the combination of a body, *b*, provided with a chamber or recess to receive the magazine, a magazine arranged in said recess or chamber, means for holding and releasing the magazine, and two or more spring-bars jointed to the magazine and to the body and arranged to fold and be sprung between the magazine and the body, whereby the magazine, when released, is forced from its chamber and supported in firing position, as described.

5. In a rocket-torpedo, the combination of a series of tubes, as *d*, for containing the rocket composition, arranged in the longitudinal axis of the projectile and closed at their rear ends, and an unpacked tube, *d'*, open at both ends, said tubes *d* and *d'* opening into a common chamber at their front ends, whereby the rocket composition is adapted to be burned from the front and the gases discharged at the rear, as described.

6. In a rocket-torpedo, the combination of a series of tubes, as *d*, for containing the rocket composition, an unpacked tube, *d'*, open at both ends, said tubes *d* and *d'* opening into a common chamber at their front ends, and a sabot, *j*, arranged upon the rear end of the projectile and having a stem which projects into the tube *d'*, as and for the purpose described.

7. In a rocket-torpedo, the combination of a series of tubes, *d*, packed with rocket composition, an unpacked tube, *d'*, open at both ends, said tubes *d* and *d'* opening into a common chamber at their front ends, a sabot, *j*, arranged on the rear end of the projectile and having a hollow stem which projects into the tube *d'*, and an opening, *p*, into the hollow stem, all as and for the purposes set forth.

8. In a rocket-torpedo, the combination of one or more sliding bars arranged in longitudinal channels in the body of the projectile and provided with a stop or shoulder to limit the backward movement, a tube, *d'*, in the longitudinal axis of the projectile through which the gases from the rocket composition are discharged, a sabot arranged on the rear end of the projectile and provided with a stem which projects into the tube *d'*, and a separable connection between the sliding bar or bars and the sabot, as and for the purpose described.

WASHINGTON IRVING CHAMBERS.

Witnesses:
GEO. M. LOCKWOOD,
WM. H. DE LACY.