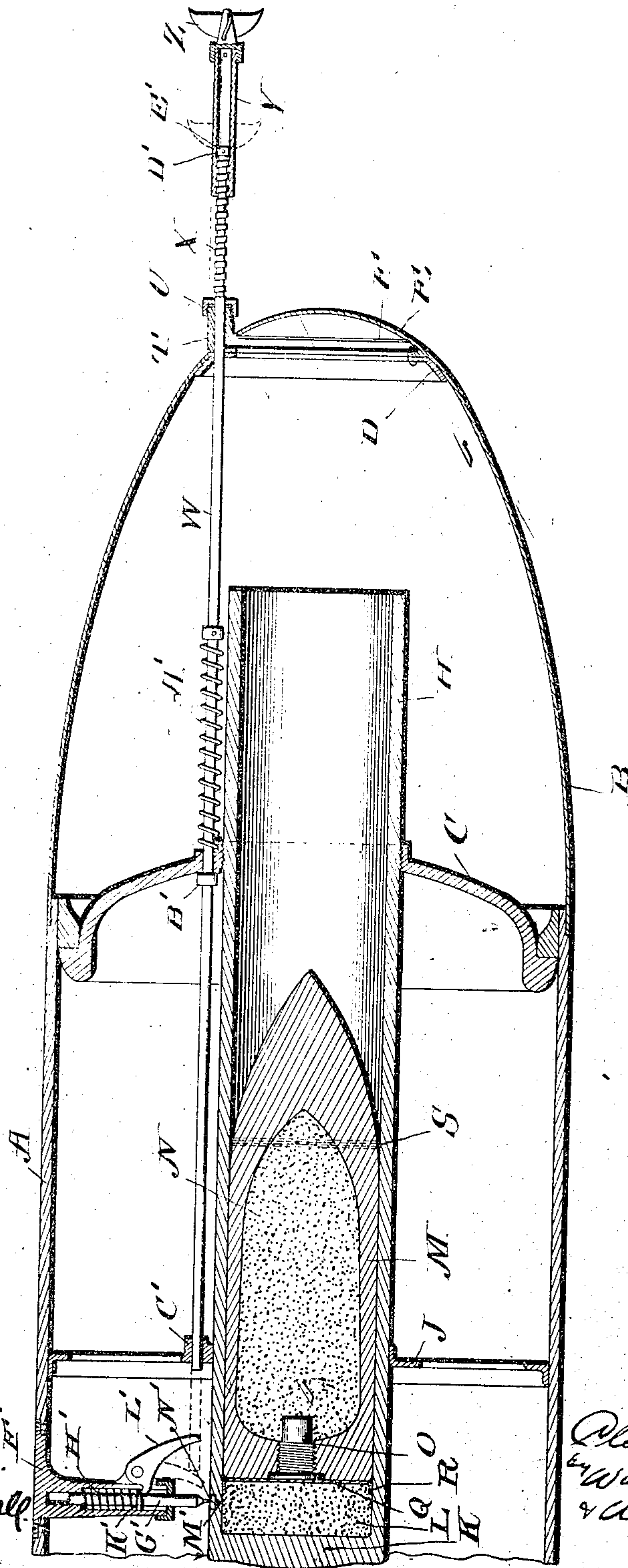


TORPEDO.

APPLICATION FILED OCT. 21, 1907.

964,148.

Patented July 12, 1910.



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# UNITED STATES PATENT OFFICE.

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## TORPEDO.

964,148.

Specification of Letters Patent.

Patented July 12, 1910.

Application filed October 21, 1907. Serial No. 398,497.

*To all whom it may concern:*

Be it known that I, CLELAND DAVIS, lieutenant-commander U. S. Navy, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Torpedoes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to torpedoes, and particularly to that class of torpedoes that are propelled, or projected, through the water under the surface thereof, and are adapted to strike the vessel or other object attacked below the water line, and where armor plating is not so thick, as it usually is above the water line.

The object of my invention is to create greater disabling effects on the vessel or other object attacked, than is now possible with the present torpedoes in general use, and especially if the ship is provided with armor or other protecting devices below the water line.

As is well known, the effect of modern torpedoes on vessels provided with a considerable protection of thin, or more or less thick armor plating below the water line, is to simply blow a hole therethrough. This hole, when there is no armor protection, may be very large, and does injury to the vessel largely by the admission of water thereto. If, however, there is a thin armor protection the hole blown through the sides of such ship, will be much smaller and it might, or might not, be sufficiently large to disable the vessel. And again, if the armor is made sufficiently thick the hole will be either too small to cause much damage or it will not be made at all. In fact it is well known, that if sufficient armor protection is provided, and if the torpedo does not get a fair chance, the explosion thereof will only cause a greater or less bulging in of the sides of the vessel or other object attacked.

The object of my present invention, more specifically stated, is to send high explosives into the vitals of the ship and thus enable, or insure her destruction, under all conditions.

To this end my invention consists in providing an ordinary torpedo shell

with a simple form of gun from which an ordinary projectile, carrying an explosive charge, may be fired and providing said gun with a simple, and a certain means of insuring the firing thereof, at the moment of impact of the torpedo against the object attacked. By this means, I am enabled to pierce the under water body of the ship, or any protection that may have been provided against torpedoes upon the ship that is being attacked. After the said ship, or its protection is pierced, the shell, of course, may be caused to explode within the vessel thereby disabling her machinery, or causing her destruction by exploding her boilers, or magazines.

My present invention is an improvement upon a similar invention made the subject of my prior application No. 383,814, filed July 15, 1907.

Referring to the accompanying drawings forming a part of this specification, the figure illustrates a sectional view of the war head end of a standard torpedo shell.

A, designates the shell or air flask of a standard torpedo, and B, the war head.

C, represents the ordinary disk closing the air flask, and D, a flanged ring in the end of the war head.

E, represents a cap secured to the war head as usual, and F, represents a line of weakness in said cap, formed by weakening the metal all around the same, or in any suitable manner so as to enable it to be easily crushed in upon striking the vessel or target attacked, but at the same time leaving the cap sufficiently strong to resist the pressure of the water while the torpedo is being propelled therethrough. Said line of weakness F, also enables the cap to be readily blown out upon the explosion of the charge within the gun, and thereby to provide a vent for the accumulated gases within the war head.

H, represents a barrel of a gun, which is preferably smooth bore, but of course may be rifled if desired, and which is screwed into the disk C, as shown, by means of a wrench, or other tools, suitably engaging the end or muzzle thereof. Said barrel is also suitably supported at its rear by means of a spider or perforated diaphragm J, as shown, and is preferably closed at its rear end by means of a plug K, which is preferably integral with said barrel, but, of course, which



may be suitably attached thereto in any other desired manner.

L, represents a charge of powder located in the bottom of the bore of said barrel H, and M, a shell provided with a suitable explosive charge N, and a suitable fuse O. Attached to the base of the shell M, I may provide any suitable gas check, to prevent the escape of gas between the body of said projectile and the inner walls of the barrel H; and I prefer one of the expansible cup shaped type. I have shown, as an example, a cup shaped disk Q, provided with the expansible flange R, adapted to be forced outwardly against the bore when the charge L, is exploded, and thereby prevent an undue escape of the gases past the shell, before it leaves the gun. It is also very desirable that the shell should not leave the barrel before the full gas pressure has been developed in the breech of the gun, and to this end I may provide any suitable retarding device for the shell which will hold the same in position, or offer a considerable resistance to the passage of the shell out of the bore, while the powder pressure is being developed. To these ends I find that a few turns of soft copper wire S, placed on the outside of the shell, as shown, are sufficient to accomplish the purpose, in that they exert a jamming action against the bore of the gun, and are yet so soft that the powder pressure is enabled to force the shell out of the bore with a high velocity after the full pressure has been developed.

It is essential, in my invention, that the shell shall have a sufficient velocity, before it strikes the ship, to penetrate the sides thereof, and also any armor protection that may be placed on the same. To these ends, it is very desirable that the shell shall have as long a travel as is possible, before striking the vessel or other target, that the gases generated from the powder charge shall not be confined in front of said shell and thereby lessen its velocity, and that the shell shall only be fired when the torpedo's nose is either in contact with the vessel, or is in close proximity thereto. Of course, it is also desirable, in order to attain this essential velocity, that water shall be kept out of the torpedo, and out of the gun barrel containing the shell, before the latter is fired. To accomplish these most desirable and essential conditions, I prefer that the gun barrel H, be either stopped short of the ring D, of the war head, as shown, or that it be provided with large perforations at its outer end, in order to permit any gases that escape past the shell to freely expand, and thereby not oppose the passage of the shell. I also find that by providing a special weakening means, as the line F, on the cap E, that the said cap may be readily blown out by a comparatively small pressure, and thereby furnish a ready escape for said gases while the

water, at the same time, is kept out of the torpedo. I also find that I may very materially lengthen the war head, without materially disturbing the ballistics of the torpedo; and especially may I do this if I suitably distribute the weight of my barrel H, charge and projectile. By thus lengthening the war head, I very materially increase the distance through which my shell may be propelled before striking the vessel, and thereby very materially increase the time during which the shell may increase its velocity up to the desired degree, which is necessary to enable it to penetrate the vessel.

Since when the projectile is fired the nose of the torpedo is either in contact with the vessel attacked, or else is very close to the same, the nose of the projectile itself, when fired from the gun, will contact with said vessel before the base of said projectile leaves the torpedo. In other words, the projectile will extend some distance within the war head of the torpedo when it begins to penetrate the side of the vessel; it has therefore attained at this instant its maximum velocity. Evidently, since when in this position it has attained its maximum velocity, there would be no need for its base to be further surrounded by the gun barrel. Therefore I am enabled to stop the gun barrel short of the nose of the torpedo, as shown in the drawings, and thereby save the weight that such cut off portion of the barrel would possess, and to add said weight to the charge and projectile. This I consider an important feature of my invention, for that it is very desirable to make both the projectile and charge as large as possible, in order that they may have a maximum destructive effect.

In order to fire my shell at the proper moment, and in order to insure against its being fired accidentally or at any other time than the proper moment, I provide the following means: T, represents a suitable perforated lug, or projection attached to, or integral with the cap E. This lug is provided with a suitable stuffing box U, as shown, and through this lug and stuffing box pass the firing rod W, provided with a screw thread X, over which fits the screw threaded sleeve Y, provided at its outer end with the propeller Z. Said rod W, reciprocates under the control of the spring A', which rests against the disk C, as shown, and is provided with the collar B' on the inside of said disk. Said rod W, passes through said disk C, as well as through a bearing C' in the spider or perforated diaphragm J. When the sleeve Y, is screwed down to the extremity of the screw thread X, as shown in dotted lines, the collar B' is jammed against the inner surface of the disk C, and the sleeve Y, is jammed against the outer sur-



face of the stuffing box U, and the said rod is firmly locked so that it cannot be moved in any direction. When, however, the torpedo is projected or propelled through the water, the said propeller Z, will cause the said sleeve Y, to turn in such a direction as to advance along the screw thread X, and to occupy the position, shown in full lines, when the shoulder D', on the interior of said sleeve rests against the ring E', on the outer end of said screw thread X, in which position the propeller and spring A', will tend to urge the rod W, forward, and the collar B', will prevent this further movement.

Secured in the torpedo shell A, is the firing pin support F'. This firing pin support is suitably bored, as shown, and carries the firing pin G', provided with the spring H', and the collar K', against which the trigger L', takes, as shown. The barrel H, is provided with any suitable vent M', which receives a primer N', or other firing devices, and the hole is so arranged that when the collar K', takes against the trigger L', as shown, the spring H', is not under tension, and, therefore, it is not possible for the firing pin to be projected forward against the primer N', until the said trigger is tripped by the rod W, and the said spring tensioned. Nor is it possible, as above stated, for the rod W, to move backward against the said trigger L', until the sleeve Y, has been moved forward by the propeller Z, in the manner above described.

The operation of my device is as follows:—The torpedo is fired at the object or propelled in its direction, by the usual and well known means. Upon moving through the water, the propeller Z, sets the collar Y, in the position shown. The spring A', is of sufficient tension to prevent the pressure of the water against the propeller Z, from forcing the rod W, back against the trigger L', but upon impact of the said propeller Z, against the vessel or other object attacked, the said rod W, is forced back against the tension of said spring A', into contact with the trigger L', turns the same on its pivot, tensions the spring H', and then trips the firing pin, when the same, under the action of the spring, moves forward and explodes the primer.

The explosion of the primer ignites the charge L, which expands the flange R, and jams the retarder S, against the bore of the gun. Any powder gases that may escape beyond the shell escape into the war head, and finally blow out the cap E. In the meantime the torpedo nose is approaching the vessel, and the pressure behind the shell is developing to its maximum. During the brief interval of time between the explosion of the primer, and the departure of the projectile from the

gun, the projectile will have attained its necessary velocity, and the nose of the torpedo will have either contacted with the vessel, or else will have approached so close thereto, that the intervening layer of water will be of no consequence. In fact, the whole distance between the nose of the torpedo and the propeller Z, is not sufficient to prevent the shell from penetrating the vessel's side.

The fuse O, which may be of any suitable type is so set, as to cause the shell M, to explode after it passes through the ship's side.

Particular attention is called to the fact that in standard torpedoes, or in any other kind, where the ballistics are to be preserved and accuracy in flight is to be attained, that the length of the air flask is limited, and also that of the war head. Therefore, in such torpedoes, if the gun had to be placed entirely in the war head, its length and therefore the velocity of the projectile would be likewise limited; but if the gun is extended back into the air flask, the length of its bore may be greatly extended and the velocity of the projectile correspondingly increased, provided the center of gravity of the system is not materially disturbed. I have found by actual trial that in practice, the gun may be sufficiently extended into the air flask to enable the projectile to attain the required velocity, and all without materially disturbing the center of gravity of the system.

Having now described my invention what I claim is:—

1. In a torpedo, the combination with the shell thereof, of a gun barrel fixed to the same adapted to fire a projectile therefrom, means forming a fixed and rigid part of said shell adapted to exclude water from said barrel, and firing means extending beyond said torpedo adapted to contact with the object to be destroyed, substantially as described.

2. In a torpedo, the combination with the body thereof adapted to move through the water, of a gun carried by the same and adapted to fire a projectile therefrom, fixed and rigid means attached to said shell for excluding water from said gun, and firing means for said gun extending beyond the nose of said torpedo, substantially as described.

3. In a torpedo, the combination with the shell thereof adapted to be fired from a tube, of a gun barrel carried by said shell and adapted to fire a projectile therefrom, fixed and rigid means attached to said shell for excluding water from said gun barrel, and firing means extending beyond the nose of said torpedo, adapted to contact with the vessel to be destroyed, substantially as described.



4. In a torpedo, the combination with the shell thereof properly proportioned to enable the same to be fired with accuracy from a torpedo tube, of a gun carried by said shell adapted to fire a projectile therefrom, fixed and rigid means attached to said shell for excluding water from said gun, and firing means for said gun extending beyond said torpedo adapted to contact with the object attacked, substantially as described.

5. In a torpedo, the combination with the body thereof, of a gun carried thereby, a charge and projectile carried by the gun barrel, and terminating short of the nose of the torpedo a distance sufficient to enable the projectile to acquire a considerable velocity before leaving the gun, and means for exploding said charge and firing the projectile consisting of a rod extending beyond said nose, adapted to contact with the target attacked, and means operated by said rod for igniting said charge, substantially as described.

6. In a torpedo, the combination with the body thereof of standard make, of a gun carried thereby, a propelling charge, a projectile, a fuse therein, all carried by the said gun, and leaving a space between the point of said projectile and the nose of said torpedo, and means extending beyond said nose for firing said gun, whereby upon impact the said firing means will ignite the charge and the projectile will attain a considerable velocity before it leaves the gun, substantially as described.

7. In a torpedo, the combination with the body thereof, of a gun fixed in said body and provided with a propelling charge, a shell provided with a bursting charge, a fuse in said shell, means to exclude water from said gun, a rod W, provided with a propeller Z, and a sleeve Y, extending beyond said torpedo, and means adapted to be operated by said rod to fire said charge, substantially as described.

8. In a torpedo, the combination with the body thereof of standard make, of a gun fixed in said body and provided with a closed breech, a propelling charge, a projectile having a bursting charge, a fuse carried by said projectile, means to exclude water from the gun, having a line of weakness therein, a rod W, provided with a sleeve Y, a propeller carried by said sleeve, and firing means with which said rod is adapted to contact, substantially as described.

9. In a torpedo, the combination with a body thereof of a gun fixed in said body, means to fire said gun consisting of a rod projecting beyond the nose of said torpedo, a trigger with which said rod is adapted to contact, a firing pin controlled by said trigger, and a spring normally not under tension for controlling said firing pin, but adapted to be put under tension when said

trigger is swung on its pivot, substantially as described.

10. In a torpedo, the combination of a gun and a firing mechanism therefor, comprising a rod extending beyond the nose of said torpedo, a spring A', for controlling said rod, a trigger L', with which said rod is adapted to contact, a firing pin G', provided with a collar K', with which said trigger is adapted to contact, and a spring H', adapted to be put under tension when said trigger is operated, substantially as described.

11. In a torpedo, the combination of a gun and a firing mechanism therefor, comprising a rod W, provided with a screw threaded outer end, a bearing for the rod, a stuffing box through which said rod passes, a collar B' on said rod adapted to contact with said bearing, a sleeve Y, fitted to said screw threaded end of said rod, and adapted to contact with said stuffing box, and thereby hold said rod firmly locked, and a propeller on said sleeve, substantially as described.

12. In a torpedo, the combination of a gun and a firing mechanism therefor, comprising a rod W, a spring A', on said rod, a collar B' on said rod, a propeller Z on said sleeve, a trigger L', with which said rod is adapted to contact, a firing pin controlled by said trigger, and a spring for propelling said firing pin adapted to be tensioned when said trigger is operated, substantially as described.

13. In a torpedo, the combination with the body thereof, of standard make of a gun fixed in said body, and provided with a propelling charge, a projectile having a bursting charge, and a fuse, also in said gun, a cap E, provided with a line of weakness F, adapted to exclude water from said gun, and a firing mechanism for said gun comprising the rod W, provided with the spring A', the sleeve Y', and the collar B', said rod being screw threaded at its outer end, and said sleeve engaging said screw threads, and provided with the propeller Z, a trigger L', with which said rod is adapted to contact, a firing pin G', adapted to be operated by said trigger, and a spring H', controlling said firing pin and normally inert, and adapted to be tensioned when said trigger is operated, substantially as described.

14. In a torpedo, the combination with the shell thereof, of a gun barrel carried by said shell, of such a length as to leave a space between the nose of said torpedo and the muzzle of said barrel, and firing means also carried by said shell, substantially as described.

15. In a torpedo, the combination with the shell thereof, of a gun barrel carried by said shell, a projectile and charge in said barrel, the combined length of which is shorter than said barrel, and said barrel so



located as to leave a space between the nose of said torpedo and its muzzle, and means also carried by said shell for firing said charge, substantially as described.

5 16. In a torpedo, the combination of an air flask and a gun located partly within said flask, substantially as described.

17. In a torpedo the combination of an air flask, a war head, and a gun located partly  
10 within each, substantially as described.

18. In a torpedo, the combination of an air flask, a war head, a gun located within each, and firing means for said gun, substantially as described.

19. In a torpedo, the combination of an 15 air flask, a war head, a gun located partly within each, and terminating short of the nose of the torpedo and firing means for said gun, substantially as described.

20. A torpedo, having an air flask, pro- 20 vided with means for securing a gun partly within the same, substantially as described.

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

CLELAND DAVIS.

Witnesses:

GEO. B. PITTS,

A. W. NEALE, Jr.