

(No Model.)

2 Sheets—Sheet 1.

V. F. LÄSSOE.

PILOT SHELL AND CENTERING RING FOR SUBMARINE PROJECTILES.

No. 425,616.

Patented Apr. 15, 1890.

The "pilot" shell C directs, any pilot preferably without exploding the main (bursting) charge.

Fig. 1.

Witnesses:

O. Lundgren
O. H. Hayward

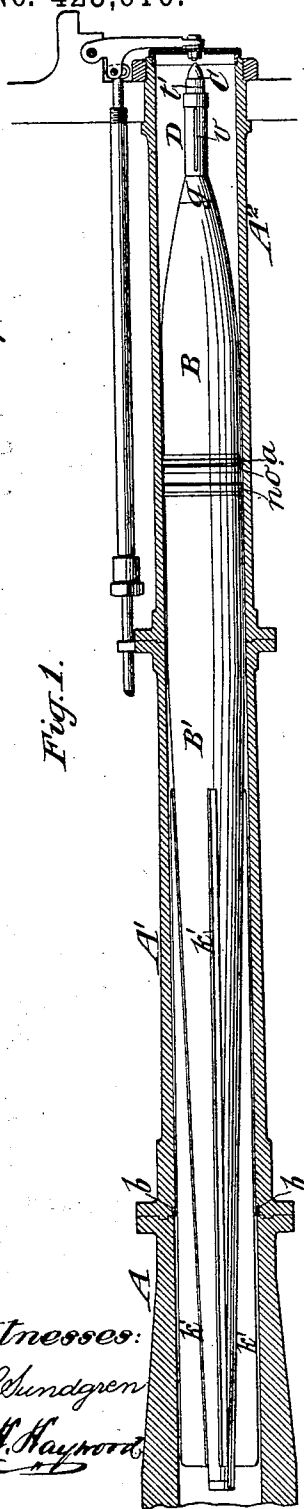


Fig. 3.

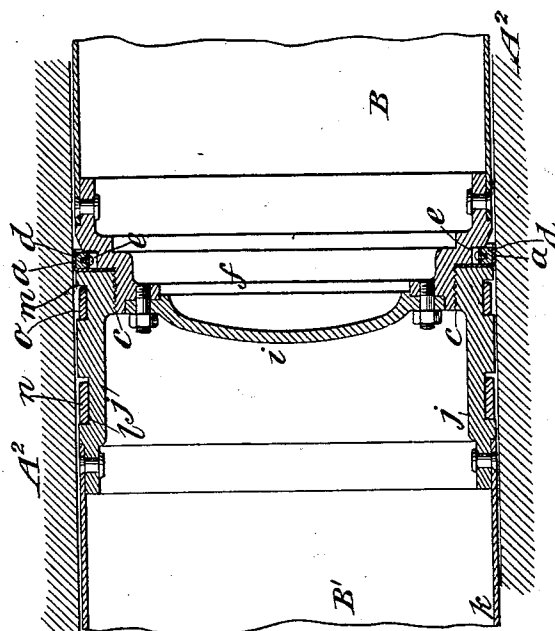
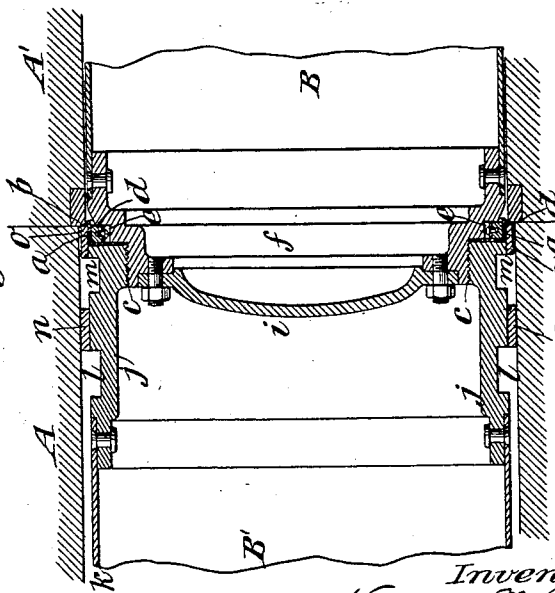


Fig. 2.



Inventor:
Valdemar F. Læssøe
By attorney
Mont Griswold

(No Model.)

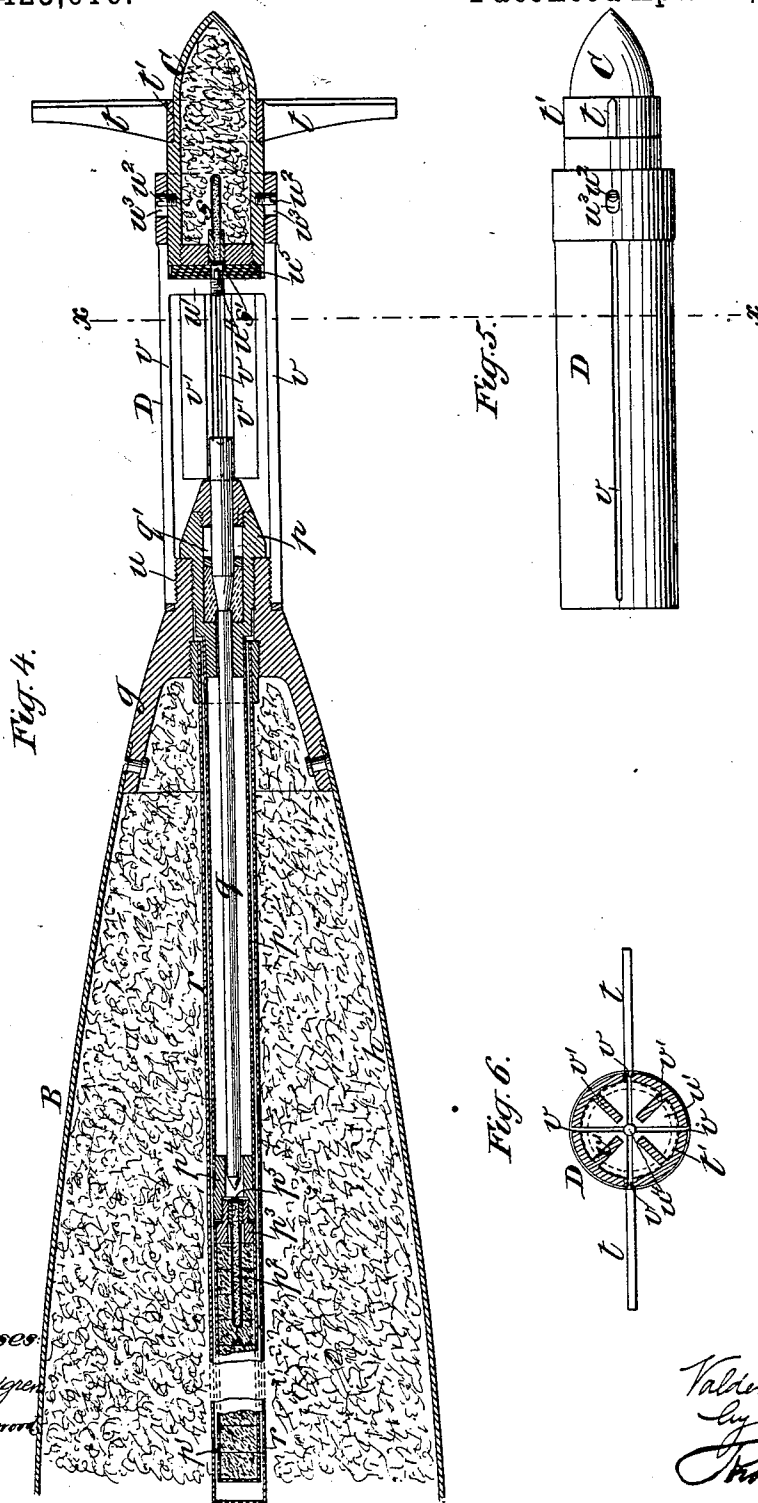
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UNITED STATES PATENT OFFICE.

VALDEMAR F. LÄSSOE, OF BROOKLYN, NEW YORK.

PILOT-SHELL AND CENTERING-RING FOR SUBMARINE PROJECTILES.

SPECIFICATION forming part of Letters Patent No. 425,616, dated April 15, 1890.

Application filed August 27, 1889. Serial No. 322,080. (No model.)

To all whom it may concern:

Be it known that I, VALDEMAR F. LÄSSOE, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Projectiles for Submarine Guns, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates especially to that class of explosive projectiles which are projected from guns placed below the sea-level in the vessel's hold for the purpose of destroying or injuring the side or bottom of an opposing vessel.

Certain features of my improvement are only intended for projectiles to be used against vessels protected by wire netting or its equivalent, and their object is twofold—namely, to prevent the premature explosion of the projectile by its firing-pin striking the wire netting, and, second, to so destroy or break the wire netting that the projectile may pass through or by it.

Other features of my invention are applicable to submarine projectiles without any such provision for destroying or breaking the netting, their object being to make the projectile so fit the gun from which it is to be discharged as to exclude the water from all parts of the bore of the said gun, except the part between the muzzle thereof and the projectile, and thereby to render it unnecessary that the gun should be provided with any frangible or secondary valve or any other valve than that employed at the muzzle to close it when there is a projectile in the gun, or at such other times as the muzzle requires to be closed independently of the projectile.

The invention will now be described with reference to the accompanying drawings, and its novelty will afterward be pointed out in the claims.

Figure 1 represents a longitudinal section of a submarine gun, a part of the bow of a vessel in which it is applied, and an outside longitudinal view of a projectile with my improvements contained in said gun. Figs. 2 and 3 represent a longitudinal section, portions of the walls of a gun, and of a projectile, illustrating certain features of my invention, as will be hereinafter explained. Fig. 4 is a longitudinal central sectional view of the

front part of an explosive projectile and of the device thereto attached and constituting part of my invention for destroying the netting or equivalent protection with which an opposing vessel may be surrounded. Fig. 5 represents an external longitudinal view, taken at right angles to Fig. 4, of the device above-mentioned as attached to the projectile. Fig. 6 represents a transverse section in the line *xx* of Figs. 4 and 5.

Similar letters of reference designate corresponding parts in all the figures.

The explosive projectile represented is, for convenience of construction and of loading with an explosive charge, constructed of two principal sections B and B', the section B constituting the head and containing the explosive charge, and the section B' constituting the tail or steadying portion. Between these two sections is applied an expanding packing *a*, which constitutes one feature of my invention, the two sections being screwed together at *c c*, as shown in Figs. 2 and 3, and the packing *a* being clamped between them. This expanding packing *a* is represented as a cup-packing of leather, which has its cup-cavity, the interior of which constitutes the surfaces which are to receive the pressure to produce its expansion presented toward the front of the projectile. This packing is represented as an ordinary cup-ring, such as is commonly used for pumps and other hydraulic apparatus, having placed within its cup-cavity an automatically-expanding metal ring *d*, for the purpose of assisting its expansion. This ring *d* may be of any suitable construction substantially like that of an ordinary automatically-expanding piston-ring. A groove *e* is provided in the rear portion of the front section B of the projectile for the reception of this ring *d*. The cup-cavity of this packing being presented in the forward direction or toward the front of the projectile will be expanded by any pressure in front of it, as by the pressure of the water in front of the projectile when the latter is in a gun which is arranged on board of the vessel below water-line when the muzzle of the said gun is open. It may be here observed that this cup ring or packing is applied in a manner precisely the reverse of that which has commonly been applied to projectiles,

such packing-rings having been applied in such manner as to be expanded by pressure from behind and not by pressure in a forward direction, as is the case with my packing.

The forward section B of the projectile is represented as consisting of three pieces—namely, a ring *f*, of cast metal, a head *g*, of cast metal, and a shell *h*, of copper or other suitable metal riveted to the said ring *f* and head *g*. The space included within this shell *h* is the chamber for the explosive charge of wet gun-cotton or other suitable material. This chamber is loaded through an opening in the ring and the said opening is closed by a flanged plate *i*, which is bolted to an internal flange around the ring *f*.

The rear section or tail portion of the projectile B' is represented as composed of a front ring *j*, of cast metal, and a long taper tube *k*, of steel or other material, provided with flanges or wings *k'*; but this particular construction of the projectile is not material to my invention, it being, however, necessary that the junction of the front and rear sections here represented as composed of the cast rings *f* and *j* should be made substantial enough to sustain the expanding packing and to contain two circumferential grooves *l* *m*, for receiving two automatically-contractile metal rings *n* *o*, the purpose of which is to adapt the projectile for use, as hereinafter explained, in a submarine gun in which the rear portion is of larger bore than the portion in front of it and in which a shoulder is presented in front of said larger portion of the bore.

The gun represented is of the construction hereinbefore mentioned, A designating the rear section of the larger bore, and A' A² the forward section of smaller bore, and *b* the shoulder formed in front of the said larger bore. The exterior of the projectile is of a size to fit snugly, but loosely, in the smaller bore, but in front of the shoulder *b*.

When an expanding packing such as has been hereinbefore explained is applied to a projectile for such a gun, it is necessary that the packing should, while the projectile is being inserted into the gun and until the entrance of the packing into the smaller bore in front of the shoulder *b*, be contracted to prevent it from coming in contact with the said shoulder, and it is for this purpose that the automatically-contractile ring *o*, hereinbefore mentioned, is applied outside of the said packing, as shown in Fig. 2, before entering the projectile in the breech of the gun. This ring *o* may be a simple hoop of steel cut across one portion of its circumference and it must be strong enough to overcome the expansive force inherent in the ring *o*. The said ring *o* must also be capable of contracting itself entirely within the groove *m*, as shown in Fig. 3, when it comes opposite the said groove. When the said ring *o* encircles the packing *a*, the exterior of the said

ring is small enough to pass freely through the larger portion of the bore of the gun behind the shoulder *b*; but when, in pushing forward the projectile into the gun, the said ring strikes the shoulder *b* it is arrested, and as the projectile moves forward the packing passes out of it and is left free to expand within the smaller portion of the bore forward of said portion, and the groove *m* being brought opposite the said ring the latter is contracted into the said groove, as shown in Fig. 3, where it does not in any way interfere with the necessary operations of the projectile.

The automatically-contractile ring *n*, hereinbefore mentioned, the purpose of which is to center the projectile in the larger portion of the bore of the gun behind the shoulder *b*, is capable by its contractile force of attaching itself to the exterior of the body of the projectile, as shown in Fig. 2, and when so contracted its exterior fits snugly, but easily, to the larger portion of the bore of the gun behind the shoulder *b*, and serves to center the projectile in that portion of the bore, and the said force is also sufficient to cause it to contract itself entirely into the groove *l*, as shown in Fig. 3, when brought opposite to the said groove. When in pushing the projectile forward into the gun the said ring *n* comes in contact with the shoulder *b* the said ring is arrested, and as the projectile is pushed farther forward the groove *l* comes opposite the said ring, which then contracts itself into the said groove, where it forms no impediment to the projectile moving forward into the smaller portion of the bore in front of the said shoulder.

The concussion firing apparatus shown in Fig. 4 of the drawings constitutes no part of the present invention, and therefore will only be briefly described. The said apparatus is all attached to a nozzle *p*, which is screwed into the head *g* of the projectile, and which has attached to it a tube *p'*, which extends some distance back through the center of the chamber formed within the shell *h*, for containing the explosive charge. This tube is made in two sections, the joint of which consists of two metal sockets *p³ p⁴*, of which *p⁴* is formed on the front section and *p³* is formed on the rear section of the tube, the said two sockets *p³ p⁴* being screwed together. The fuse *p²*, with the fulminate *p⁵* at its front end, is secured in the rear socket *p³*, and the detonator, which may consist of dry gun-cotton, is contained in the rear section of the said tube. The firing-pin *q* works in a central guide formed in the socket *p⁴*, and through a stuffing-box *q'* in the nozzle *g*. Washers are inserted between the sockets *p³ p⁴*, and these may be varied in number to adjust the distance between the fulminate and the point of the firing-pin. The firing-pin may be held forward out of contact with the fulminate by any known or suitable means. It is represented as formed with a conical part, which

is surrounded within the nozzle p with a cylinder of soft composition metal, as lead and tin. When the head of the firing-pin strikes a vessel or object at which the projectile is impelled this soft metal is driven forward on the cone of the firing-pin until the fulminate p^5 strikes the point of the said pin.

In order to provide for inserting the tube p p' into the chamber of the projectile after the latter has been loaded with explosive, there is a tube r of larger caliber and of a length not less than p' screwed into the head g of the projectile.

In Figs. 1, 4, 5, and 6 there is represented what I call a "pilot-shell" C, the purpose of which is to destroy or break the wire netting or other protection which may be applied around an opposing vessel. This shell C, which is of small size compared with the main explosive projectile, may be of cast-iron of cylindro-conoidal or other convenient form, and may be charged with any suitable explosive material. It is represented (see Fig. 4) as fitted in its rear end with a fuse s , at the rear of which is a fulminate s' , and as furnished near its front end with lateral projections t , the purpose of which is to cause its arrest against any netting or other protection hereinbefore referred to. These projections may be of any suitable character that will prevent the shell from passing through the meshes or interstices of any such netting or other protection. The said projections are represented as consisting of wings t , provided on a ring t' , which is tightly placed over the front of the shell C, against a shoulder provided thereon.

The explosive strength of the charge of the pilot-shell and the distance of the said shell from the forward end of the main projectile B B' must be so proportioned that the explosion of the said charge will not cause the main charge in the projectile B B' to detonate by sympathy, and for this purpose the pilot-shell is attached to the front of the main shell by a socket D of considerable length. This socket is represented as of substantially cylindrical form, having a screw-thread u within its rear end by which to attach it to a corresponding screw-thread on the exterior of the head g of the main projectile, and at some distance from its front end there is a bridge u' across it, and its interior in front of this bridge is of a form to receive a portion of the pilot-shell C within it. The said shell C is secured in this part of the socket by screws w^2 , which pass through short longitudinal slots w^3 in the socket and screw into the shell. These screws and slots permit a certain amount of longitudinal movement of the shell within the socket.

In the bridge u' there is firmly secured a firing-pin u^4 , which is opposite the fulminate s' when the shell is in the socket.

Between the rear end of the shell C and the bridge u' there is an elastic cushion w^5 , which may be composed of india-rubber or other

elastic material, which keeps the shell at such distance from the bridge that the fulminate s' is out of contact with the firing-pin u^4 until the pilot-shell strikes or meets with any obstacle during its forward movement with the projectile B B'. When the pilot-shell is arrested by its lateral projections or wings coming in contact with the netting or other protection, the continued forward movement of the main projectile and the socket D, permitted by the screws w^2 and slots w^3 , causes the firing-pin u^4 to strike the fulminate s' and produce the explosion of the pilot-shell, which thus destroys the surrounding or adjacent portion of the netting or other protection, and leaves the way clear for the main projectile B B'.

It is desirable that when the pilot-shell C explodes, the socket D should be thrown out of the way before the firing-pin q of the main projectile reaches the side of the vessel or object at which the projectile is thrown, and for this purpose I make the said socket frangible by the explosion of the pilot-shell. I may adopt any suitable construction by which this frangibility may be secured. In the example represented the socket is made of cast-iron with a number of longitudinal slits v , which extend almost to its rear end, leaving only enough metal behind them to screw onto the head of the main projectile, and between these slits I provide it with internal ribs v' . By this construction the socket is caused to break into four parts by the explosion of the pilot-shell and detached from the head of the main projectile.

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

1. The combination, with a projectile having in it a groove l for the reception of a ring, of an automatically-contractile centering-ring n , placed on the body of the projectile, forward of the said groove, substantially as and for the purpose herein set forth.

2. The combination, with a submarine projectile having a circumferential groove, of an expanding packing secured to said projectile in front of said groove, and an automatically-contractile ring for surrounding the said packing to prevent the expansion thereof, the said groove being of such depth and in such position that it may receive the said ring within it when the latter is off the packing, substantially as and for the purpose herein set forth.

3. The combination, with an explosive projectile for a submarine gun, of an explosive shell and a firing-pin attached to the front end of said projectile, said shell consisting of a case having lateral external projections and containing a cavity for explosive material and a receptacle for a fulminate to be ignited by the forward movement of the firing-pin moving with the projectile after the stoppage or retardation of the said shell by any obstacle met by said projections, substantially as and for the purpose herein set forth.

4. The combination, with an explosive pro-

jectile, of a socket attached to the front of
said projectile, a firing-pin secured in said
socket, an explosive shell fitted to said socket
and capable of a movement back and forth
5 therein, an elastic cushion provided in said
socket behind the said shell, substantially as
described, for the purpose of keeping a ful-
minate priming in said shell out of contact
with said firing-pin until an obstacle is pre-
10 sented to the said shell in the firing of the
projectile, as herein set forth.

5. The combination, with an explosive pro-

jectile for a submarine gun and an explosive
shell in front thereof, of a socket attached to
the nose of the projectile and having in it a 15
bridge to hold a firing-pin for firing the said
shell, the said socket being split through said
bridge and that part which is attached to the
projectile, substantially as and for the pur-
pose herein set forth.

VALDEMAR F. LÄSSOE.

Witnesses:

FREDK. HAYNES,
K. E. PEMBLETON.