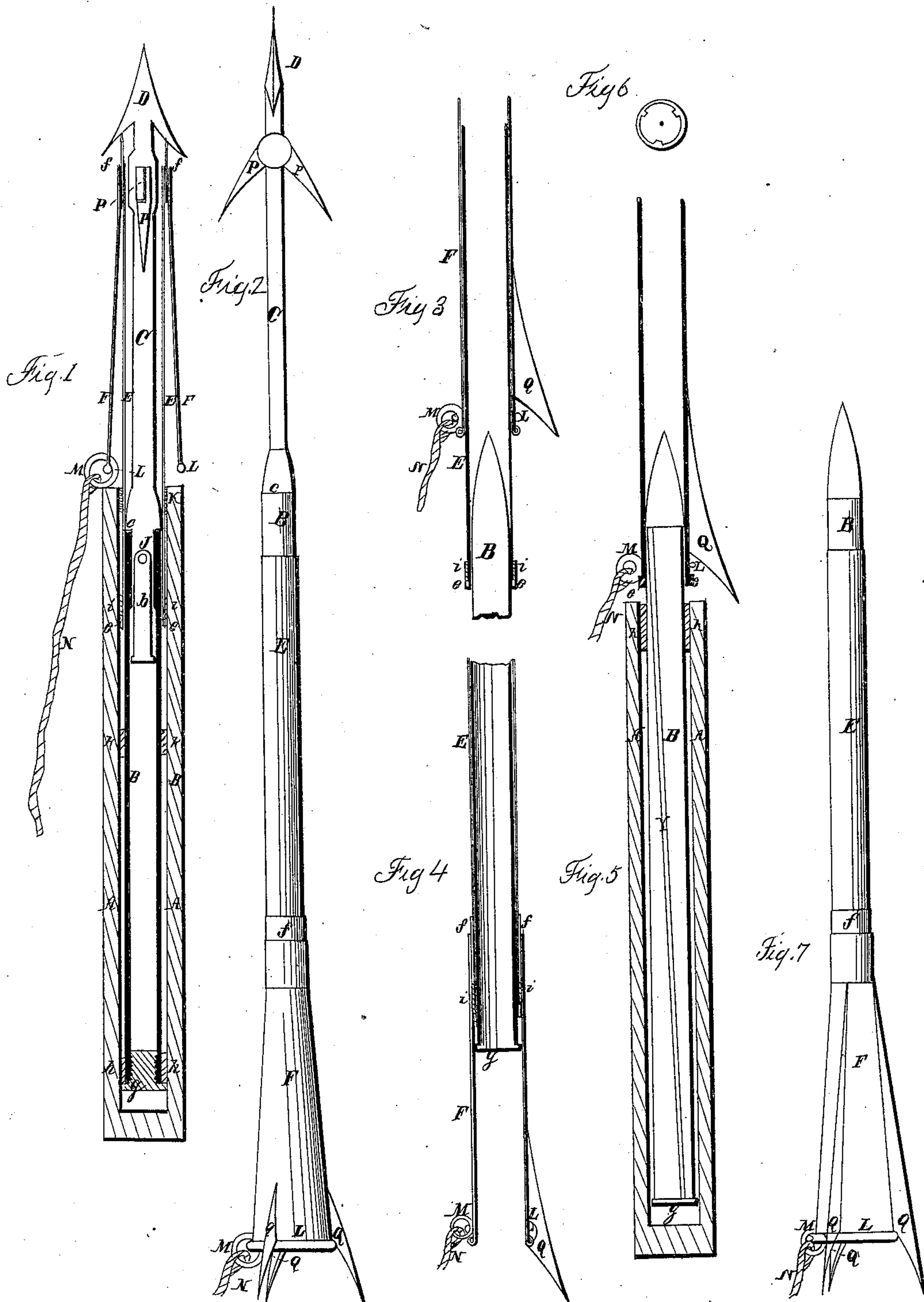


N. SCHOLFIELD.

Bomb Lance.

No. 21,278.

Patented Aug. 24, -1858.



UNITED STATES PATENT OFFICE.

NATHAN SCHOLFIELD, OF NORWICH, CONNECTICUT.

IMPROVEMENT IN HARPOON-LANCES.

Specification forming part of Letters Patent No. **21,278**, dated August 24, 1858.

To all whom it may concern:

Be it known that I, NATHAN SCHOLFIELD, of Norwich, New London county, and State of Connecticut, have invented a new and useful Improvement in Harpoon-Lances and other Projectiles to be fired from a Gun; and I do hereby declare that the following is a clear and exact description thereof, reference being had to the accompanying drawings, making part of this specification.

My invention consists in a peculiar method of applying a line to a harpoon-lance to be fired from a gun, and giving flexibility to the shank when fastened to a whale by a sliding socket-joint or other similar means, and also applying suitable devices to govern and preserve the proper direction of harpoon-lances and other projectiles.

Figure 1 is a sectional view of a harpoon-lance with a gun from which it is to be discharged. Fig. 2 is a surface view of the harpoon after the discharge.

A A, Fig. 1, is the gun. B C is the harpoon-lance. This consists of a piece of wrought-iron pipe, B, of nearly the length of the gun, and of a size a little smaller than the bore, except a flange, *g*, of the breech-screw at the rear end, which should nearly fill the bore, and also a rod, C, with a barbed lance-point, D, connected to the former by a sliding socket-joint, J.

At a little distance from the lance-point D is a set of expanding spurs, P, so hung on a socket or joint that they will be closed down on the stock by any resistance forward, their points being so inclined that a like resistance from the opposite direction would cause them to open or expand, as shown in position in Fig. 2. They should be set so as to act in a plane perpendicular to that of the lance-head D, and their tendency to expand may be increased by springs acting thereon.

E is a cylindric case of tin, a little shorter than the shell or pipe B, and having a collar or enlargement, *e*, on the exterior, at its rear end, which may just be crowded into the gun, and also on the shell. Around and on this case is placed another case, F, which is slightly conical, expanding toward the rear end. This is made to clasp the former case by means of an internal ring or collar of the same material,

to which it is connected, and may slide from the front to the rear thereon.

A spring or yielding cushion, *h*, of soft metal, india-rubber, leather, yarn, or any suitable material, should be made to encircle the shell B forward of the rear flange or enlargement *g*, and a similar cushion, *i*, should also be applied on the rear end of the case F just forward of the rear collar.

The rear end of the conical case is attached firmly to a strong wire or ring, L. Locking in with this is another ring, M, to which a line, N, is attached. Spurs Q may be applied to the rear end of this case, to hold the whale when penetrating the flesh far enough to do so.

When this lance is discharged from a gun the expanding gas from the ignited powder, acting directly on the rear end thereof, first thrusts the body of the lance forward with a rapidly accelerating velocity, and by contact of surfaces the cases E and F acquire incipient motion before the rear flange with its spring or cushion *h* reaches a contact with the rear end, *e*, of the case, and when this is reached the case E is compelled to move forward with the same velocity as that of the body. The cushion or spring *h* tends to counteract or prevent the effect of a violent concussion between the rear flange and the collar *e* of the case, which might otherwise occur; and while the shell B is passing forward within the inner case, E, this case is in like manner passing forward within the outer case, F, until the internal collar, *f*, thereof reaches a contact with the cushion *i* at the rear of the inner case, which can only occur when the shell is completely out of the gun, and its condition is, in such case, as shown at Fig. 2, while the lance is in its rapid flight through the air.

The inner case, E, should be made to fit as tightly on the body B as is consistent with its proper action, as with this means it will acquire motion along with the body, and will not be struck so hard by the rear flange as when it is fitted loosely thereon. The anterior collar *f* of the outer case should, for the same reason, fit close on the case E.

It will also be of service to wind some yarn or twine around the body, as at *k*, between the rear end of the case E and cushion *h*, and also on the inner case, just within the muzzle of the

gun. The latter will tend to hold the case more steadily in its place, and they will each tend to impart motion in some degree to the respective cases acting thereon.

Should the lance penetrate wholly within a whale, as it would do if fired point blank at a short distance, the spurs on the rear of the case would serve to hold the whale; but if it should penetrate but a short distance therein, or not beyond the joint J, the line being at L, much lateral strain would be thrown thereon, tending to bend or break the shank, or, by its rigidity, to tear the flesh while the whale is passing rapidly through the water.

To obviate this the shank C is connected to the cylindric shell B by a sliding socket-joint, J. This consists of a sliding bar, *b*, fitted to work accurately within the cavity at the end of the shell B. This cavity being contracted in some degree for a little distance, when compared with that toward the rear, a flange or enlargement is made on the rear end of the bar *b*, so that it cannot be drawn out through the contracted space.

The rod or shank C is made to correspond in size at the joint with the bar *b*, so that it may slide with it into the cavity, till the shoulder *c* reaches a contact with the end of the shell, by which means the shank is held rigidly in line with the axis of the shell, and in this condition the joint cannot act; but when drawn out, so that the joint is wholly without the cavity, it will then turn freely and flexibly on its pivot, and in such case, if the lance is fixed in a whale, there will be no rigidity of action thereon tending to tear the flesh and to loose its hold.

The shock in striking a whale, the agitation consequent on its action thereon, and the hauling the line, will generally be sufficient to draw out the shank and relieve the joint; but to make it more sure the shell should contain a small quantity of powder when discharged, so that its explosion may force the bar *b* forward sufficiently to allow the joint to act.

The quantity of powder should be so small as not to cause an explosion of the shell, and can be fired in the usual manner, by means of a fuse in the rear to take fire on the discharge of the gun. The fuse should be of a sufficient length to allow proper time for the lance to reach the whale before the explosion.

Instead of the bar *b* and joint J, a chain may be used to connect the rod or shank C to the inside of the shell, the shank being inserted therein when fired, and disengaged, in the manner before described, when fixed in a whale; or, if preferred in any case, the shank may be screwed rigidly within the shell.

The line N and conical case projecting in the rear will generally be sufficient for guiding the direction of the lance; but if desired other devices, such as guiding wings or feathers, may be attached to the case. The spurs Q may, if necessary, be expanded into wings for that purpose. This case, instead of being conical, may be cylindrical, and without an

internal ring or collar, *f*, as shown at Fig. 3, and having a flange or enlargement at its rear end, to hold the ring or device for connecting the line; but in this form it would not slide back so far as to extend in the rear of the end of the shell, if made of a proper size to clasp the inner case, E; but if of a sufficient size to pass over the rear collar, *e*, of this case, and with an internal ring or contraction, *f*, as shown at Fig. 4, it would still slide so as to extend in the rear, as in the former conical case.

If the cylindric body of the lance reaches forward of the muzzle of the gun, as at Fig. 5, the inner case, E, may be dispensed with, and the case F, to which the line is attached, may be placed directly thereon; but with this arrangement a ring or collar, *n*, must be placed on the anterior part of the body and within the gun, to hold it in a central position therein while passing out, and when this collar comes in contact with the rear end of the case F, which it may do before being overtaken by the flange *g*, its progress will be checked by the inertia of the case, and it will be forced therewith to a contact with this flange; and if this collar is composed of india-rubber, lead, or other yielding substance, it will serve as a cushion to neutralize the effects of the concussion of the case on the rear flange, or, even if composed of a less yielding material, it will serve this purpose in some degree.

If the surface of the cylindric body of this or any other projectile is grooved spirally in lines *y* slightly diagonal to its axis, while the collar *n* has internal projections or ridges corresponding thereto, as shown in transverse section at Fig. 6, and if this collar is made to fit somewhat tightly in the bore of the gun, the projectile in its discharge will, by passing through this collar, which will be more tardy in its action than itself, acquire a rotary motion, the axis of which is the line of projection, which will serve more effectually to keep it in its proper course.

The lance head and shank D C, Figs. 1 and 2, may be dispensed with, as at Fig. 7, and the harpoon may consist only of a cylindrical body or shaft, with the case F, Fig. 5, or the cases E and F, Figs. 1, 2, 3, and 4, the holding-spurs Q thereon serving mainly to fasten the lance; but folding spurs may, if necessary, be also applied to the forward part of this lance, and since the efficiency of this form would depend mainly on its total immersion in the body of the whale, the spurs on the case F should be lengthened forward into sharp lance-edges, as shown at Fig. 7, so as to cut the flesh and penetrate therein more easily.

The sliding cases E and F, with their connections, may also be applied advantageously to bomb-lances and other cylindrical projectiles whose lengths are nearly as great as that of the gun from which they are to be thrown, or where their lengths are as great or greater than the gun, and any kind of guiding wings or feathers may be applied to the surface of these cases; but in general, where the case ex-

tends in the rear of the projectile, as at Figs. 2, 4, and 7, no other guides are necessary.

The spurs Q, instead of being attached on the rear end of the case F or E, as shown in the drawings, may be placed forward on the same case, or additional spurs may be thus placed thereon; and by omitting the spurs in the rear a portion of the line N may be coiled around that part of the case in the rear of the forward spurs, and so be projected and pass off with the same velocity as the lance in its discharge, by which action the lance will not be affected in so great degree by the retarding action of the line, which otherwise must be put in motion from a state of rest by the momentum of the lance in its course, and this retarding action is found, practically, to be very great, and prevents the harpoon from being fired with much accuracy but a very short distance; but by coiling a portion of the line on the case, to receive the initiatory velocity from the gun with the lance, its range is much greater.

The use of a sliding case or a collar carrying guiding-wings on the surface of a cylindric projectile I am aware is already secured to me by my patent of March 10, 1857; therefore I do not in this claim their application, but only the peculiar manner of that application to the projectile. Neither do I claim the use of cushions, packing, or springs on the projectile or cases to neutralize the rigid effects of concussion of the cases on the rear flange of the projectile, for this feature is embraced in the patent granted to me on the 8th of December, 1857.

Neither do I claim the construction of a harpoon-lance, with a joint in its stem, shaft, or shank, nor the attachment thereto of a holding-line, by means of a ring placed on its forward part outside the bore of the gun, and sliding so as to take a position in the rear when discharged, for this has been previously practiced.

What I claim as my invention, and for which I solicit Letters Patent, is—

1. The several modes herein described of applying the sliding and extension cases E and F, either with or without spurs Q, on the anterior part of a cylindric projectile, so as to extend either wholly or partially without the bore of the gun before its discharge, and while the projectile is in its proper position therein.

2. Attaching the ring or collar holding the line of a harpoon-lance to be fired from a gun to the rear end of a sliding case, F, with or without spurs Q, and on which a portion of the said line may be coiled, if desired, preparatory to being projected, substantially as described.

3. Connecting a lance-head and shank of a harpoon-lance to be fired from a gun to a cylindrical shell, by a sliding socket-joint, J, so that when forced in or in place the joint shall remain rigid and inactive, but when drawn or forced out it shall be susceptible of flexibility by turning on its pivot.

NATHAN SCHOLFIELD.

Witnesses:

JOHN BARNES,
A. S. PRENTICE.