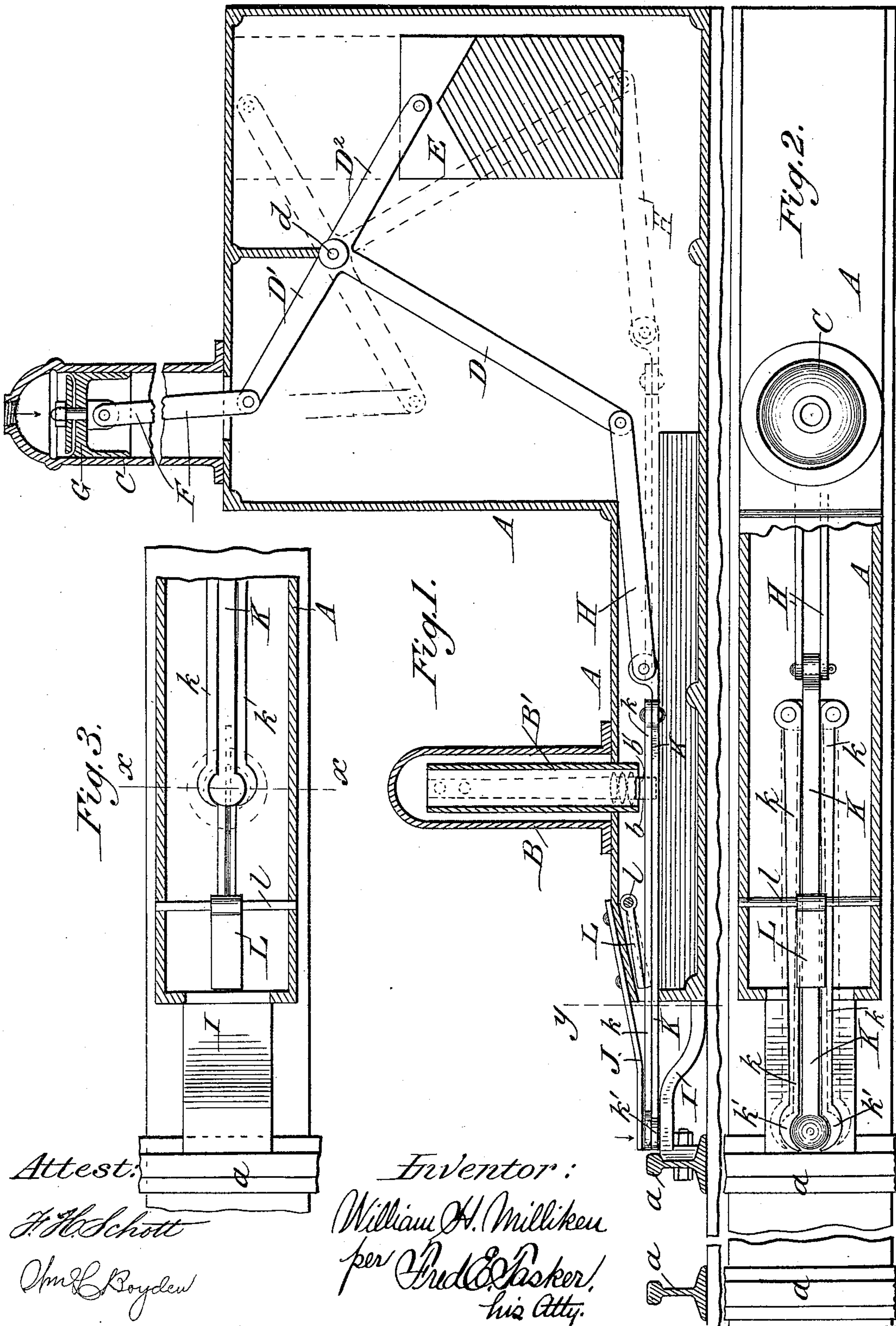


W. H. MILLIKEN.  
TORPEDO SIGNAL.

No. 482,019.

Patented Sept. 6, 1892.



Attest:  
H. H. Schott  
Chas. L. Boyden

Inventor:  
William H. Milliken  
per Fred C. Parker,  
his Atty.

(No Model.)

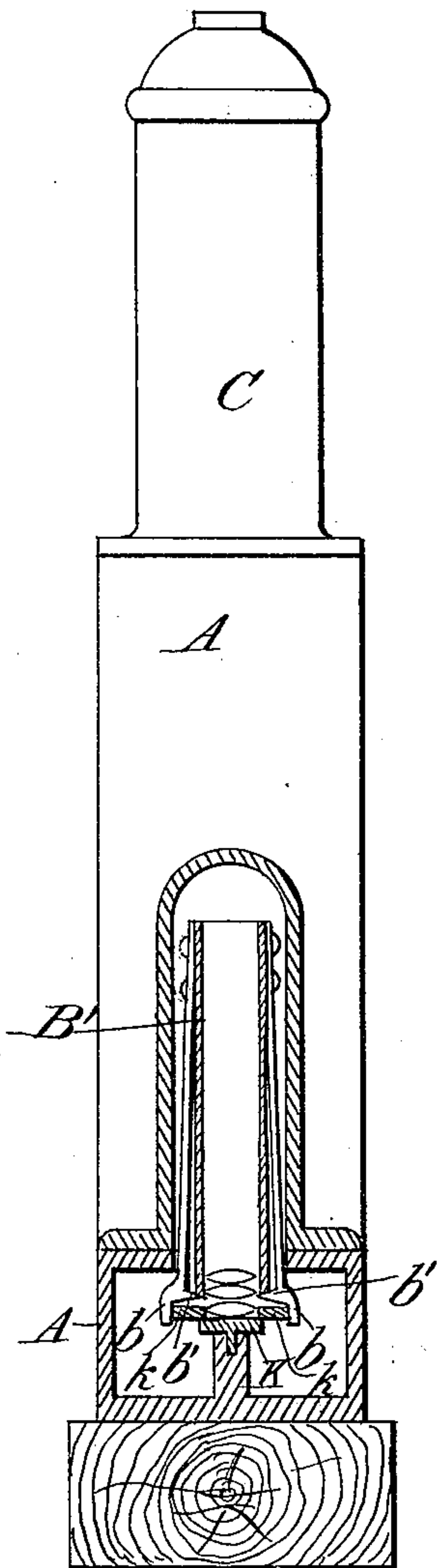
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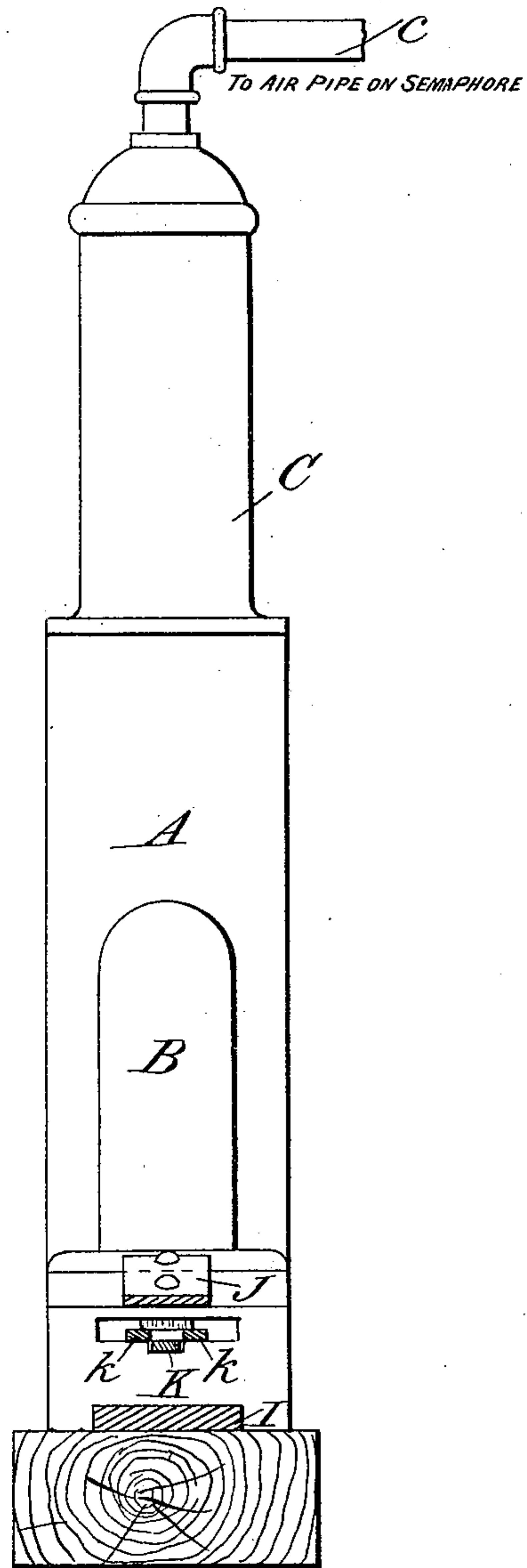
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*Fig. 4.*



*Fig. 5.*



*Attest:*

*W. Schott*  
*Amel Boyden*

*Inventor*

*William H. Milliken*  
*per Fred E. Parker,*  
*his Atty.*



# UNITED STATES PATENT OFFICE.

WILLIAM H. MILLIKEN, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO  
J. CHESTER LYMAN, OF SAME PLACE.

## TORPEDO-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 482,019, dated September 6, 1892.

Application filed September 12, 1891. Serial No. 405,505. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. MILLIKEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Torpedo-Signals; 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.

This invention relates to an improvement in detonating signals for use on railways, the object being to combine a torpedo-signal with a pneumatic semaphoric signal in such a manner that when the arm of the semaphore is placed in the danger position a torpedo may be simultaneously placed by automatic means in position to be exploded by the passing train, and thus a higher degree of safety may be attained or insured by the use of the signaling means which I have devised, because, should the arm of the semaphore be obscured by clouds or fog, as is often the case and has often been the cause of serious accidents, then the torpedo-signal will be of service in sounding an alarm which will call the attention of the passing train to its dangerous position.

The invention consists, therefore, essentially, in the construction, arrangement, and combination of the several parts, substantially as will be hereinafter described and claimed.

In the annexed drawings, illustrating my invention, Figure 1 is a vertical section of my improved mechanism for automatically placing torpedoes in position to be exploded by a train passing over the railway. Fig. 2 is a sectional plan view of the same. Fig. 3 is a detail sectional plan view of a portion of the torpedo-placing mechanism. Fig. 4 is an end elevation in partial section through the torpedo-magazine on line *xx* of Fig. 3. Fig. 5 is a similar end elevation in partial section on the line *y* of Fig. 1.

Similar letters of reference designate corresponding parts throughout all the different figures of the drawings.

Although my invention is especially designed for combination and use with a compressed-air semaphore, and although in the

example of the invention described herein, and illustrated in the drawings herewith, I have contemplated the actuation of the mechanism of the torpedo signal by means of compressed air received from the semaphore apparatus, yet I do not intend to be restricted to the particular use of my invention with a pneumatic semaphore, but reserve the liberty of combining it with any other kind of a semaphore or signal or of using it independently of any, and also of actuating its mechanism by any desired or preferred means or power.

A designates the casing which contains the mechanical parts of my improved signaling mechanism. This casing may be of any suitable size and shape and made of any suitable material. I preferably make it of a convenient form and size to be located alongside the track of a railway in convenient proximity to the semaphore with which it is to be combined and by which it is to be operated and yet at such a distance as may be required to signal an approaching train before it reaches the point of danger.

*a a* represent the parallel rails of a railway-track along which passes the train which explodes the torpedoes placed in position by means of the mechanism which I am now to describe. On the upper portion of the casing A is a cylinder C, containing piston G, which is designed to be moved downward by the pressure of air entering at the upper end of cylinder C through a pipe *c*, which connects with the air-pipe leading to the semaphore apparatus. Inside the casing A is a T-shaped lever having a long arm D, at one end of which is a cross-arm that provides two arms D' and D<sup>2</sup>, which are both at right angles to arm D, said T-shaped lever being pivoted at the point *d*, where the three arms D, D', and D<sup>2</sup> unite. The arm D' is pivotally connected to the air-piston G by means of a link F, pivoted to them both. The end of the arm D<sup>2</sup> carries a heavy weight E, pivoted thereto. The lower end of the arm D, which end lies near the bottom of the casing A, is pivoted to a link H, which in turn is pivoted to the end of a sliding elongated bed-plate K, which is arranged to reciprocate horizontally and the opposite end of which is designed to carry a torpedo in the manner which I shall presently



describe. The sliding plate K is provided with two parallel longitudinal spring-arms  $k$   $k$ , which are riveted or otherwise firmly bolted at their rear ends to the extreme rear part of plate K, and said spring-arms  $k$  have their forward ends curved or crescent-shaped at  $k'$ . Thus it will be seen that the plate K is provided on its upper side with these two spring-arms  $k$ , the free ends of which are adapted to separate from each other at certain times more than their normal distance apart—that is, these arms are adapted to occupy either the position shown in full lines in Fig. 2 or that shown in dotted lines in the same figure, and the crescent-shaped ends of these arms are adapted to hold a torpedo between them at certain times. The sliding plate K is arranged to be reciprocated, so that at one time it may occupy the position shown in full lines in the same figure. In its reciprocations it passes out through a slot in the end casing A and then returns to a position entirely within said casing. When it is in its projected position, its outer end rests upon an anvil-plate I, which may be of any suitable and convenient form, it being bolted securely to the rail  $a$ , so that the end of plate K when it rests thereon may be closely contiguous to the face of rail  $a$ .

J denotes a projecting cover, which is bolted or otherwise firmly secured to the top of casing A at a point near the slot through which the plate K reciprocates, and said swage occupies a position above the anvil I at a short distance therefrom, which distance is only sufficient to permit the torpedo-carrier to lie neatly in position therein.

Within the casing A, near the end thereof, is journaled a horizontal pin or shaft  $l$ , which supports a latch or pawl L, the free end of which rests upon the top of the torpedo-carrier and is adapted to occupy either the position shown in dotted lines in Fig. 1, where it is between the spring-arms  $k$   $k$ , holding them apart, or to occupy the position shown in full lines in Figs. 1 and 2, where it rests upon the upper faces of the arms  $k$   $k$ , which are in their normal closed position.

In connection with the casing A is arranged a torpedo-magazine consisting simply of a vertical cylindrical tube  $B'$ , the lower end of which projects down through the casing A into proximity to the torpedo-carrier, which slides directly beneath it.

B denotes a cover for the torpedo-magazine, which may be secured in position by any desirable locking device and which is readily removable to permit torpedoes to be placed into the upper open end of the cylinder  $B'$ . This cylinder  $B'$  is furthermore provided with two vertical flat spring-arms  $b$ , which have near their lower ends oppositely-located inwardly-projecting points  $b'$ . (See Fig. 4.) These points lie directly below the lower peripheral edge of the magazine  $B'$  and normally engage the lowermost of the series of torpedoes beneath said magazine, thereby

supporting said torpedoes. By disengaging these two arms simultaneously from contact with the torpedoes the column descends and the lowermost one passes out of the magazine onto the top of the torpedo-carrier. This carrier slides between the bottom ends of the springs  $b$   $b$ , and when the enlarged or crescent-shaped ends  $k'$  of the arms  $k$   $k$  pass between the lower ends of the springs  $b$   $b$  the result is to separate the two spring-arms  $b$   $b$  and disengage them from the torpedo column.

When the arm of the semaphore with which my contrivance is combined is set in the safety position, compressed air will enter the cylinder C, depress the piston G, actuate the T-shaped lever, and throw the torpedo-carrier back into the position shown in dotted lines in Fig. 1. As said carrier passes back into this position the outer end thereof will stop directly beneath the torpedo-magazine and the crescent-shaped ends  $k'$  of the arms  $k$  will, as I have already explained, thrust the springs  $b$   $b$  farther apart, thereby disengaging the point  $b'$  from the torpedo column and permitting the lowermost torpedo to drop into position on the top face of plate K between the crescent ends  $k'$ , as clearly represented in Fig. 4. The parts will continue to occupy this position until something happens to disturb the semaphore-arm and change it from the position of safety to the position of danger, and then the air-pressure on the piston G being released the weight E, which is attached to the arm  $D^2$ , will act under the force of gravity and will vibrate the T-shaped lever upon its pivot, and the result will be to slide the torpedo-carrier forward until the upper end thereof occupies a position closely adjacent to the face of the rail, as shown in Fig. 1, where the torpedo is in position to be exploded by a passing train. If, therefore, for any reason the semaphore-arm should be obscured, and thus not seen, the explosion of the torpedo would give the necessary danger-alarm. When the torpedo explodes, the force of the explosion forces the spring-arms  $k$   $k$  farther apart, and thus permits the pawl or latch L, which has heretofore been resting upon the upper edges of said arms to drop down between them into the position shown in dotted lines in Fig. 1, and when the latch is in this position it will continue to act to hold the arms apart in the position in which they have been forced by the explosion of the torpedo. Then when the torpedo-carrier again reciprocates backward the depending latch L will act as a scraper along the upper face of the plate K, so as to dislodge any fragments of the torpedo-shell which may be still remaining thereon. When the carrier has reciprocated far enough inwardly to have the end thereof pass the latch L, the spring-arms  $k$   $k$  will assume their normal position somewhat closer together, and, as will be obvious, the next time an outward reciprocation of the carrier takes place the latch L will ride upon the upper edges of the



arms  $k k$  and be in readiness to drop between said arms after the explosion has taken place. It will also be noted that when the torpedo-carrier begins its outward reciprocation the crescent-shaped ends  $k'$  will no longer act to holds the spring  $b b$  far apart, and therefore just as soon as said crescent-shaped ends cease to be in contact with the springs  $b b$  said springs will drop back into the position where the pointed ends  $b'$  serve to sustain the torpedo column.

Numerous changes in the many details of the mechanical parts and in their specific arrangement for the purpose in view may doubtless be made without departing from the spirit of my invention, which I have made, broadly, on the line indicated in the foregoing description, and I deem that I have the privilege of rearranging and reconstructing the several parts within wide limits, provided I do not depart from the essential mechanical combinations which constitute the invention, as hereinafter claimed.

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

1. In a torpedo-signal, the combination of the torpedo-carrier, a magazine for the torpedoes, a device for individually removing the torpedoes therefrom and placing them upon the carrier, an anvil adjacent to the track on which the outer end of the carrier is adapted to rest, an air-piston having a suitable connection with a pneumatic power-supply, and a leverage connection between said piston and torpedo-carrier, substantially as described.

2. In a torpedo-signal, the combination, with the torpedo-carrier consisting of a horizontal plate and a pair of longitudinal spring-arms thereon and means for actuating said carrier, of a torpedo-magazine, spring devices thereon having oppositely-projecting points and operating to remove the torpedoes individually therefrom and place them upon the aforesaid carrier, an anvil adjacent to the track, and a projecting cover above it, between which and the anvil the torpedo-carrying end of the carrier is adapted to rest in operative position.

3. In a torpedo-signal, the combination of a main casing, a carrier consisting of a horizontal plate and a pair of longitudinal spring-arms thereon, a vertical torpedo-magazine above the carrier, a spring device or devices for automatically placing the torpedoes individually upon the carrier, and suitable leverage connections for actuating the carrier, substantially as described.

4. The herein-described combined torpedo-signal and semaphore-signal, consisting, essentially, in the combination, with a pneumatic supply of a semaphore, of an air-piston and a torpedo-carrier operated by said piston so that when the semaphore-arm indicates "danger" the torpedo may simultaneously be placed in exploding position adjacent to the track.

5. In a torpedo-signal, the combination of

the carrier consisting of a longitudinal plate and two parallel longitudinal spring-arms thereon, an air-piston within an air-cylinder, and leverage connections between said piston and torpedo-carrier, substantially as described.

6. In a torpedo-signal, a carrier consisting of longitudinal plate  $K$  and crescent-ended parallel spring-arms  $k k$ , an anvil  $I$  adjacent to the track, a cover  $J$  above said anvil, a torpedo-magazine located vertically above the carrier, and suitable devices for operating the carrier, substantially as described.

7. In a torpedo-signal, the combination of a horizontally-reciprocating carrier consisting of a longitudinal plate  $K$  and spring-arms  $k k$  thereon, the anvil  $I$  adjacent to the track, the cover  $J$  above said anvil, the cylindrical torpedo-magazine  $B'$ , located vertically above the carrier, and the devices for reciprocating the carriage, substantially as described.

8. In a torpedo-signal, the combination of a torpedo-carrier consisting, essentially, of a longitudinal plate  $K$  and parallel longitudinal spring-arms  $k k$ , secured thereon and having the forward crescent ends  $k'$ , the anvil  $I$  near the back, cover  $J$  above said anvil, cylindrical torpedo-magazine  $B'$ , located above the carrier, and the springs  $b$ , secured to the sides of said magazine and provided with oppositely-projecting points  $b'$ , that engage the torpedo-column, substantially as described.

9. In a torpedo-signal, the combination of the carrier provided with the parallel crescent-ended spring-arms, the cylindrical torpedo-magazine arranged vertically above the carrier, provided with engaging-springs which automatically permit the torpedoes to be deposited singly at the proper time upon the carrier, and a scraper-pawl pivoted above the carrier and having its end adapted to drop between the carrier-arms and sweep the surface of the carrier, all substantially as described.

10. The combination of the main casing  $A$ , an air-cylinder thereon containing an air-piston, a horizontally-reciprocating torpedo-carrier operating within the lower portion of the casing and having its forward end adapted to move contiguous to the face of the track, a torpedo-magazine above said carrier, and a T-shaped lever pivoted within the casing, said lever being provided with a weight and being connected with the aforesaid piston and also with the carrier, substantially as described.

11. In a torpedo-signal, the combination of the air-cylinder to which the air-pipe of the semaphore is connected, said cylinder containing a piston, a horizontally-reciprocating torpedo-carrier consisting of a longitudinal plate provided with parallel spring-arms  $k$ , having enlarged ends  $k'$ , the anvil  $I$ , cover  $J$  thereabove, torpedo-magazine  $B'$ , having cover  $B$  and provided with the springs  $b$ , and the leverage mechanism between the air-piston and the torpedo-carrier, consisting, essentially, of the T-shaped weight-provided lever and the links  $F$  and  $H$ , substantially as described.



12. In a torpedo-signal, the combination of the torpedo-carrier consisting of a horizontal longitudinal plate K and the parallel spring-arms *k k*, secured thereon and having crescent-shaped forward ends *k'*, the anvil I adjacent to the track, cover J above it, the cylindrical torpedo-magazine B', containing the vertical column of torpedoes and provided with the springs *b b*, having oppositely-projecting points *b'*, that engage the lower end of the torpedo column, and the pivotal pawl or latch L, adapted to drop at certain times between the spring-arms *k k* and sweep the surface of the plate K, substantially as described.

13. In a torpedo-signal, the combination, with the torpedo-carrier consisting of a plate provided with a pair of longitudinal spring-arms, of a depending pawl supported above the carrier and adapted to clear the upper surface thereof of the fragments of an exploded torpedo.

14. In a torpedo-signal, the combination of a torpedo-carrier, a magazine for torpedoes, a horizontally-reciprocating torpedo-carrier consisting of a plate and a pair of longitudinal spring-arms thereon, an anvil adjacent to

the track, and a protecting-cover above the anvil, said cover being for the purpose of protecting and covering the torpedo which may be below it and preventing any interference therewith, substantially as described.

15. In a torpedo-signal, the combination of the main casing to inclose the mechanical parts, a reciprocating torpedo-carrier consisting of a horizontal plate provided with longitudinal spring-arms, a torpedo-magazine above the carrier, which deposits its torpedoes individually thereon, a pivoted depending pawl, the end of which is in contact with the upper face of the carrier for the purpose of clearing it of the fragments of an exploded torpedo, an anvil located adjacent to the track, and a protecting-cover above the same for protecting the torpedoes which may be located beneath it, and thus prevent interference therewith, substantially as described.

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

WILLIAM H. MILLIKEN.

Witnesses:

TIMOTHY DWIGHT, Jr.,

FRANK B. NEWTON.