

E. A. JEFFREYS.  
SUBMARINE MINE AND THE LIKE.

APPLICATION FILED MAY 23, 1905.

2 SHEETS—SHEET 1.

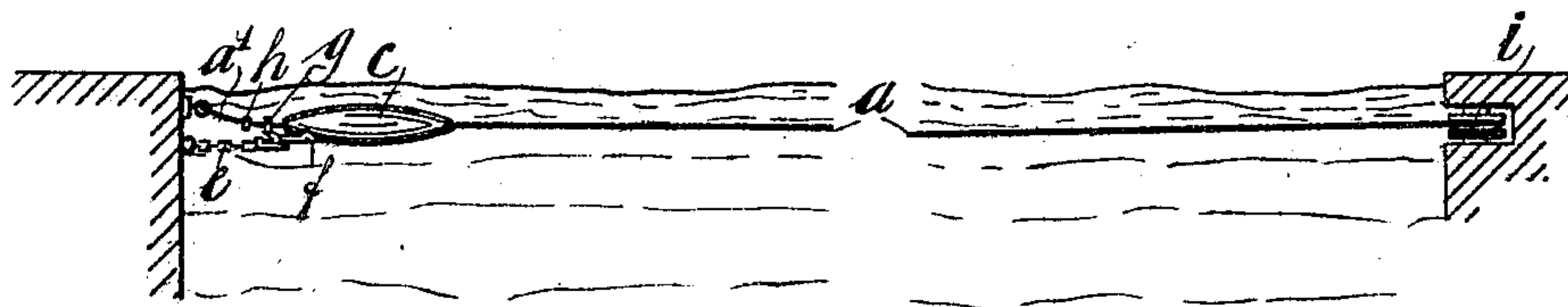


Fig. 1

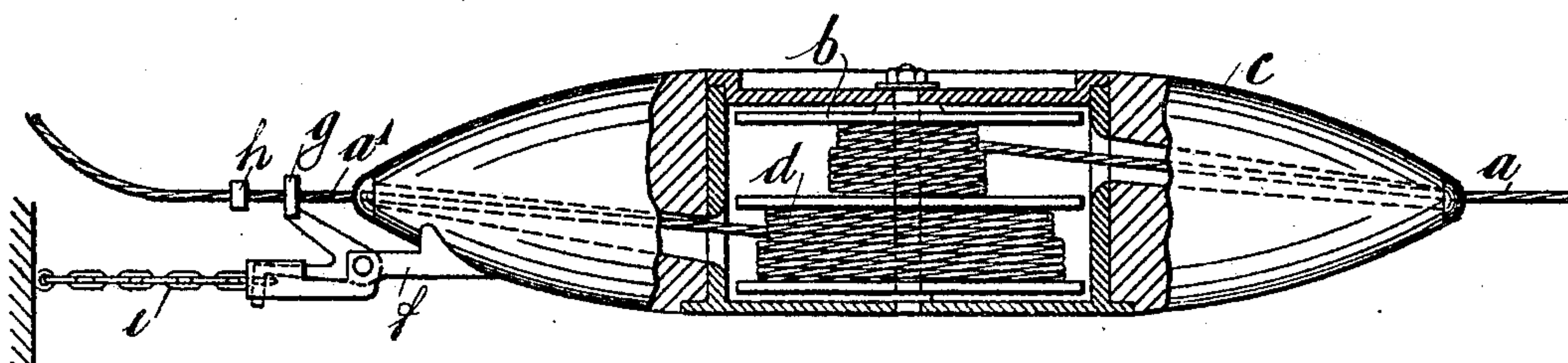


Fig. 2

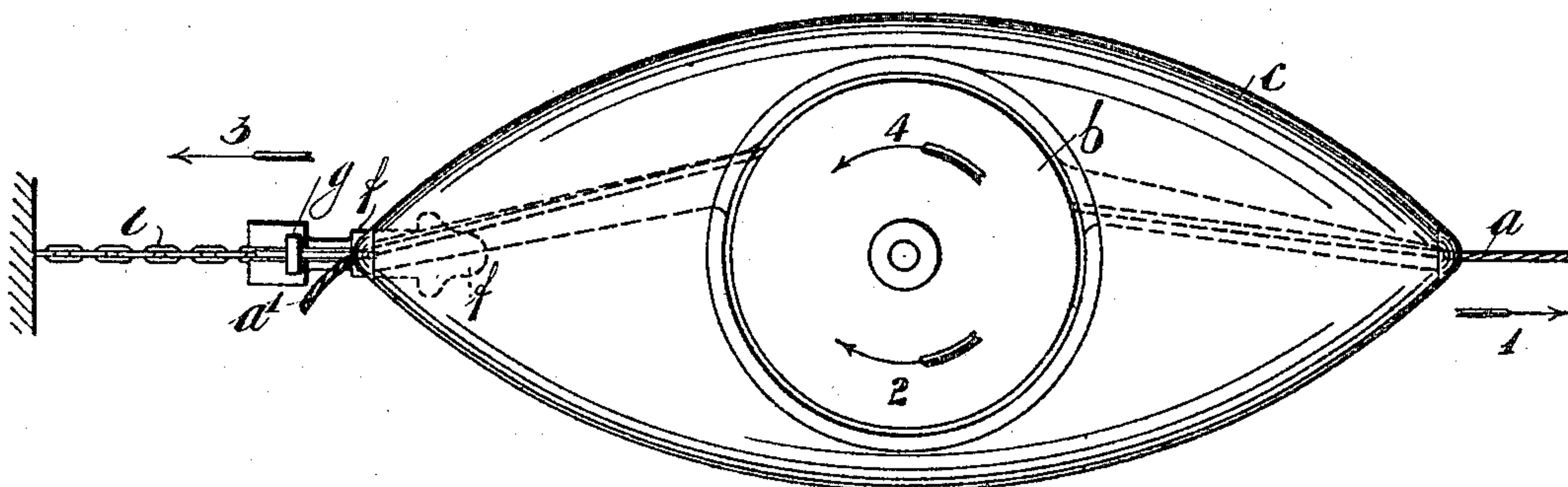


Fig. 3

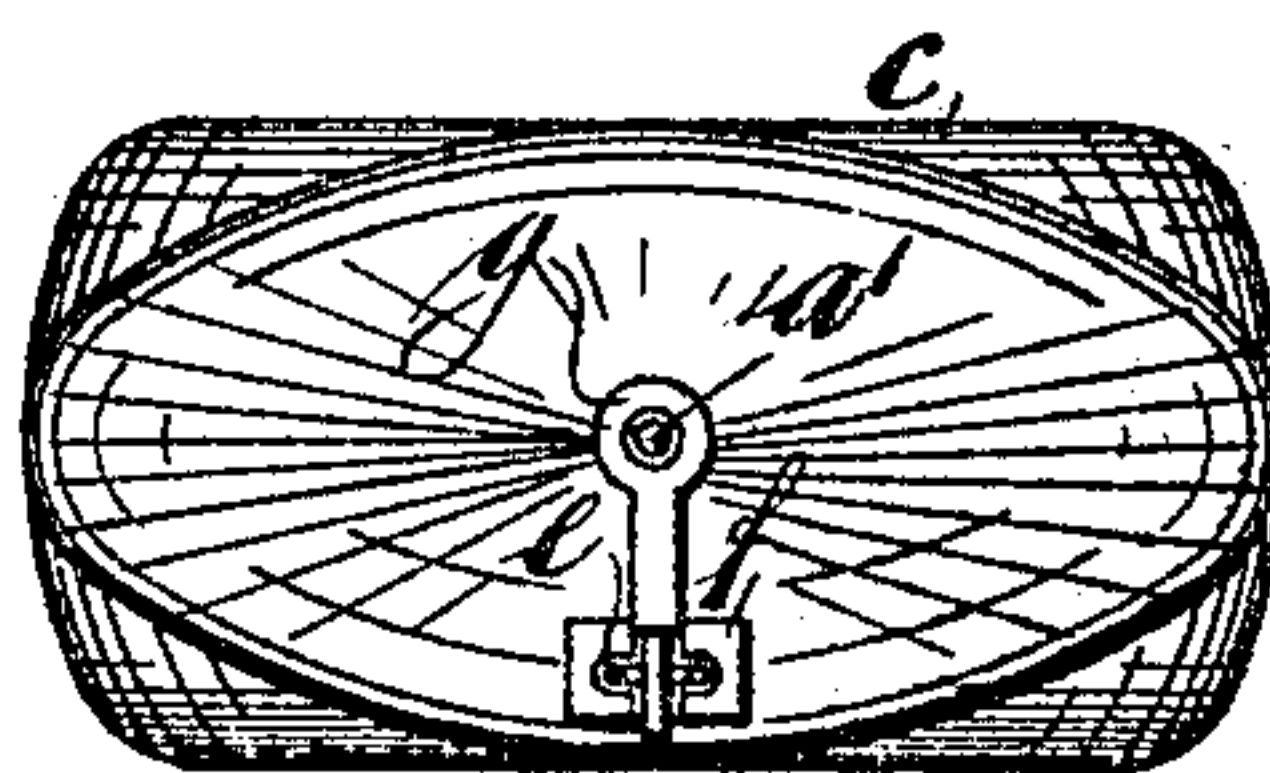


Fig. 4

Witnesses  
A. M. Kuehne  
John A. Percival.

Inventor  
Edward A. Jeffreys

BY *Richard R.*  
ATT'Y

No. 806,258.

PATENTED DEC. 5, 1905.

E. A. JEFFREYS.  
SUBMARINE MINE AND THE LIKE.

APPLICATION FILED MAY 23, 1905.

2 SHEETS—SHEET 2.

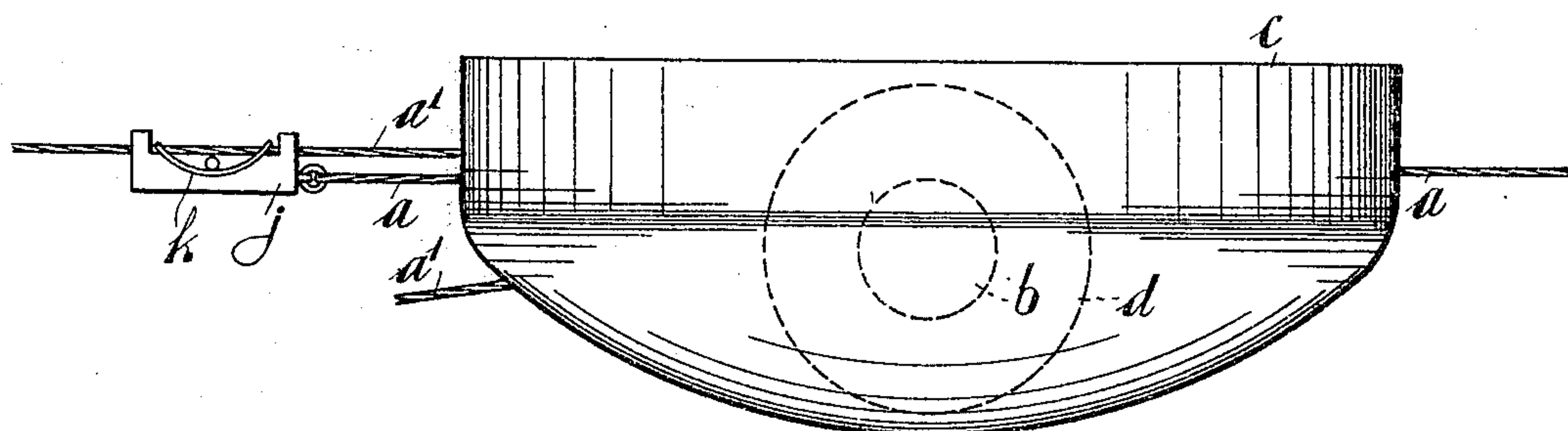


Fig. 5

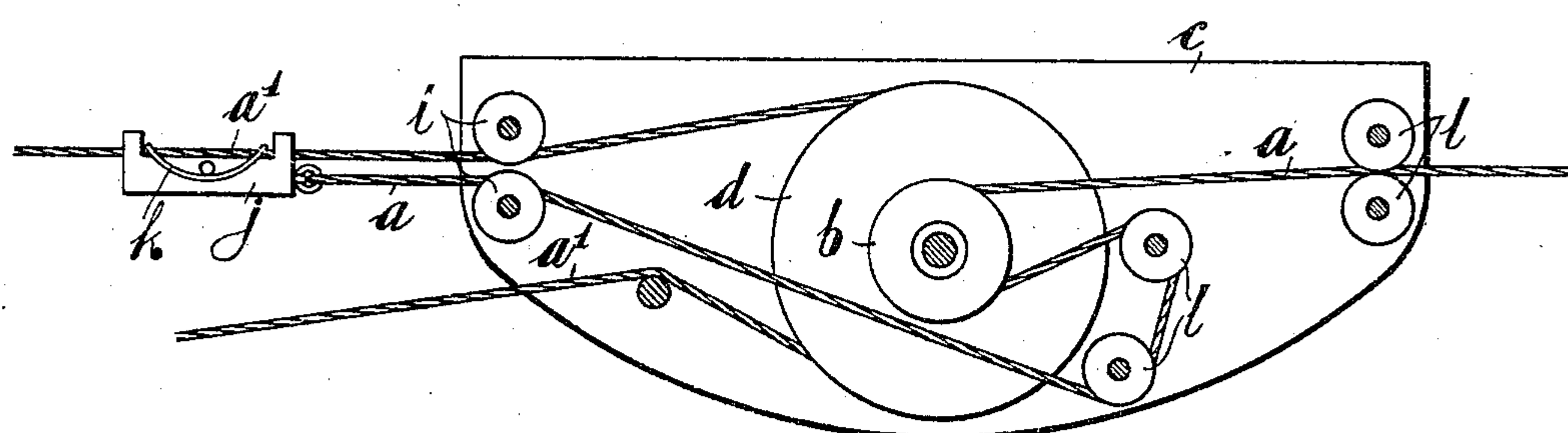


Fig. 6

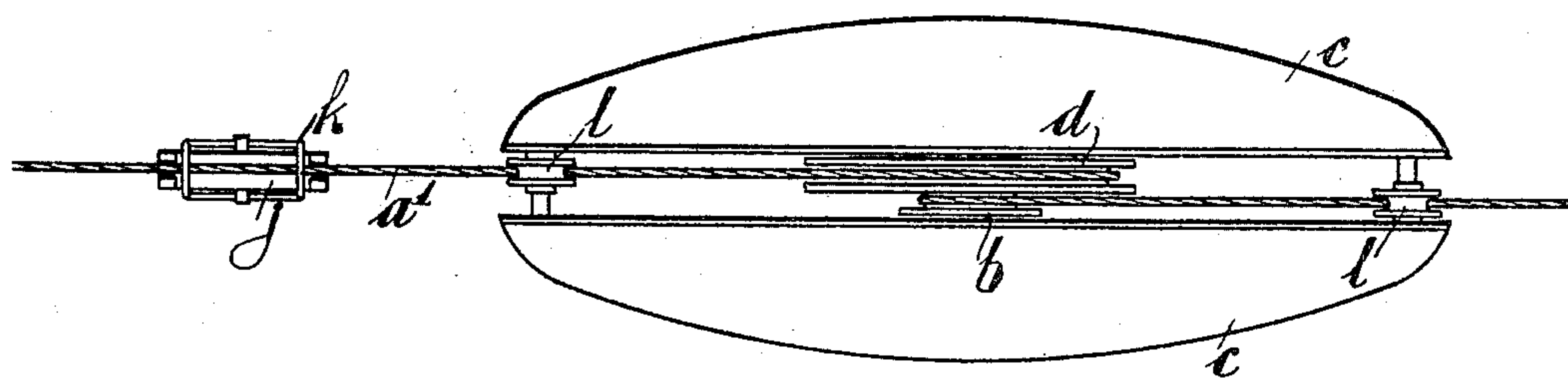


Fig. 7

Witnesses  
J. M. Kuehne  
John A. Percival

Inventor  
Edward A. Jeffreys  
By *Richard R. [Signature]*



# UNITED STATES PATENT OFFICE.

EDWARD AUGUSTUS JEFFREYS, OF LEAMINGTON, ENGLAND.

## SUBMARINE MINE AND THE LIKE.

No. 806,258.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed May 23, 1905. Serial No. 261,891.

*To all whom it may concern:*

Be it known that I, EDWARD AUGUSTUS JEFFREYS, a citizen of Great Britain, residing at Hazlewood, St. Mary's Road, Leamington, in the county of Warwick, England, have invented new and useful Improvements Relating to Submarine Mines and the Like, of which the following is a specification.

This invention relates to submarine mining and the like, and has for its primary object to provide simple and reliable means for advancing mines or like weapons into contact with the moving war-ships or other vessels of an enemy.

My invention comprises the combination, with the mine or the like floating object, of a submerged rope or ropes or other flexible lines and differential drums, reels, wheels, or coiling devices therefor, the whole being arranged so that a moving vessel on meeting and pushing forward the rope will automatically rotate the differential coiling-drums, and thereby cause the mine or like weapon or floating object to roll or advance along or in the direction of the rope until it strikes the vessel.

Referring to the two accompanying sheets of explanatory drawings, Figure 1 is a sectional elevation representing the manner of protecting by my automatic mines a harbor and other navigable waterway. Figs. 2, 3, and 4 illustrate one of the mines to a larger scale in sectional elevation, plan, and end view, respectively. Fig. 5 is an elevation, Fig. 6 a sectional elevation, and Fig. 7 a plan showing a modified form and arrangement of the mine.

The same reference characters in the different views indicate the same or similar parts.

In the application of the invention illustrated by Figs. 1 to 4 a rope or line, as *a*, is placed across the waterway to be protected just below the surface of the water. The said rope is secured to the smaller drum or reel *b* of a pair of the same which are formed or connected together and mounted upon or within the mine-casing *c*. Another rope, as *a'*, (or another portion of the same rope,) is coiled on the larger drum or reel *d*. The outer ends of the ropes may be suitably anchored on opposite shores or banks or be attached to submerged buoys or floats anchored at any desired distance apart. Normally the mine remains in the water at the position at which it is placed, such position being pref-

erably adjacent to the moored or anchored end of the rope *a'*, which is coiled round the larger drum *d*. In the example shown by Figs. 1 to 4 the mine is retained at its normal position by a mooring-chain, as *e*, which is detachably connected to a bracket, as *f*, on the mine by the lever-coupling piece *g*. When a moving vessel abuts upon the rope *a*, it imposes a tension thereon, as represented by the arrow 1. The first effect of such tension is to slightly rotate the united reels *b* and *d* in the direction indicated by the arrow 2. The fixed collar *h* on the rope *a'* is thereby pulled against and so moves the lever *g* about its pivot as to release the mooring-chain *e* from the mine. The tension 1 on the rope then sets up a reaction (indicated by the arrow 3) due to the resistance of the anchorage of the rope *a'*, and as such tension 1 and reaction 3 act at unequal distances from the center of the reels, due to the variation in their diameters a rotation of the drums or reels is set up in the direction of the arrow 4, causing an unwinding of the rope *a'* from the larger and a winding of the rope *a* at a less rate onto the smaller reel. Simultaneously with and due to the differential winding and unwinding and the continued tension on the rope *a* the complete mine will advance along such rope in the direction of the arrow 1 until it strikes the vessel. The automatically-detachable mooring-chain *e* prevents the aforesaid translatory movement of the mine by the mere action of the waves. Any other suitable retaining or retarding device which will automatically yield or become detached under the tension imposed by a vessel may be employed for the same purpose.

The explosive charge and the detonating device with means for firing the same when the mine strikes the vessel are provided and arranged in any suitable manner.

A mine may be detachably moored at each end of the rope *a*. When there is a mine at one end only, the end of the rope remote from the mine is moored to a rotatable barrel or drum, such as *i*, Fig. 1, or is arranged in an equivalent manner to enable the rope to yield or lengthen sufficiently to adjust itself with the movement of the vessel which strikes it. The barrel or drum *i* is held against rotation by a brake or other ordinary device under the mere action of the waves upon the rope. With a mine at each end of the rope no such provision is necessary, as there is of course an unwinding from each end or on each side of the vessel, due to the differential reels or



their equivalents on the respective mines. The vessel thus sets two mines in action, automatically drawing both toward itself.

In the modified form of mine illustrated by Figs. 5 and 6 the aforesaid drums or reels are replaced by differential wheels or pulleys *b* and *d*, round which the tension-ropes take only a single turn or rather less than one turn, but which set up rotation of the wheels, as in the former case, when a tension is imposed on the ropes by a vessel moving against the same. The rope *a'*, which passes round the larger pulley *d*, is moored at one end, while the opposite end is wound onto a drum or barrel, which may be on shore or be mounted within the mine-casing. The rope *a*, which passes round the smaller wheel *b*, has one end of it secured to a grip-piece, such as *j*, provided with a spring-clamp, as *k*, whereby it is held to the rope *a'* in order to maintain a sufficient initial tension on the rope *a* as to insure that it shall not slip on the pulley *b* when the operative tension is imposed by a vessel moving against the rope as aforesaid. Suitable guide-pulleys, as *l*, or equivalent means are provided to maintain the ropes in position with respect to the differential wheels or pulleys *b* and *d*.

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

1. In submarine mining and the like, the combination with the mine or explosive weapon of a rope or line and means causing the said mine or explosive weapon to move along the said rope or line when tension is imposed on the latter.

2. In submarine mining and the like, the combination with the mine or explosive weapon of a rope or line and means consisting in part of differential rope winding and unwinding devices whereby the said mine or explosive weapon is caused to move along the said rope or line when a tension is imposed on the latter.

3. In submarine mining and the like, the combination with a float of wheels of different diameters rotatably mounted on the said float, and ropes or lines which simultaneously wind upon and unwind from the respective wheels when the latter rotate together under the influence of a tension on the ropes.

4. In submarine mining and the like, the combination with the mine or explosive weapon of wheels of differential diameters carried on the said mine, a rope or line pass-

ing round the smaller wheel and having one end anchored or held at a distance from such wheel, and a rope passing round the larger wheel and having one end anchored or held in a direction opposite to that of the anchorage of the first-named rope.

5. In submarine mining and the like, the combination with the mine or explosive weapon of wheels of differential diameters carried on the said mine, a rope or line passing round the smaller wheel and having one end anchored or held at a distance from such wheel, a rope passing round the larger wheel and having one end anchored or held in a direction opposite to that of the anchorage of the first-named rope, and a detachable mooring device adjacent the anchorage of the last-named rope.

6. In submarine mining and the like, the combination with the mine or explosive weapon of wheels of differential diameters carried on the said mine, a rope or line passing round the smaller wheel and having one end anchored or held at a distance from such wheel, a rope passing round the larger wheel and having one end anchored or held in a direction opposite to that of the anchorage of the first-named rope, a mooring-chain adjacent the anchorage of the last-named rope, and a lever-coupling piece mounted on the mine and detachably engaging the said mooring-chain.

7. In submarine mining and the like, the combination with the mine or explosive weapon of wheels of differential diameters carried on the said mine, ropes or lines respectively passing round the said wheels, a fixed anchorage for one end of the rope passing round the larger wheel and a yielding anchorage for one end of the rope passing round the smaller wheel.

8. In submarine mining and the like, the combination with the mine or explosive weapon of wheels of differential diameters carried on the said mine, ropes or lines respectively passing round the said wheels, and a tension device substantially as described for the rope or line passing round the smaller wheel.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD AUGUSTUS JEFFREYS.

Witnesses:

EDWARD MARKS,  
JOHN MORGAN.