Jan. 15, 1929. 1,698,857

G. SCHMIDT ET AL

SOUNDING ARRANGEMENT

Filed May 18, 1923

Fig. 1.

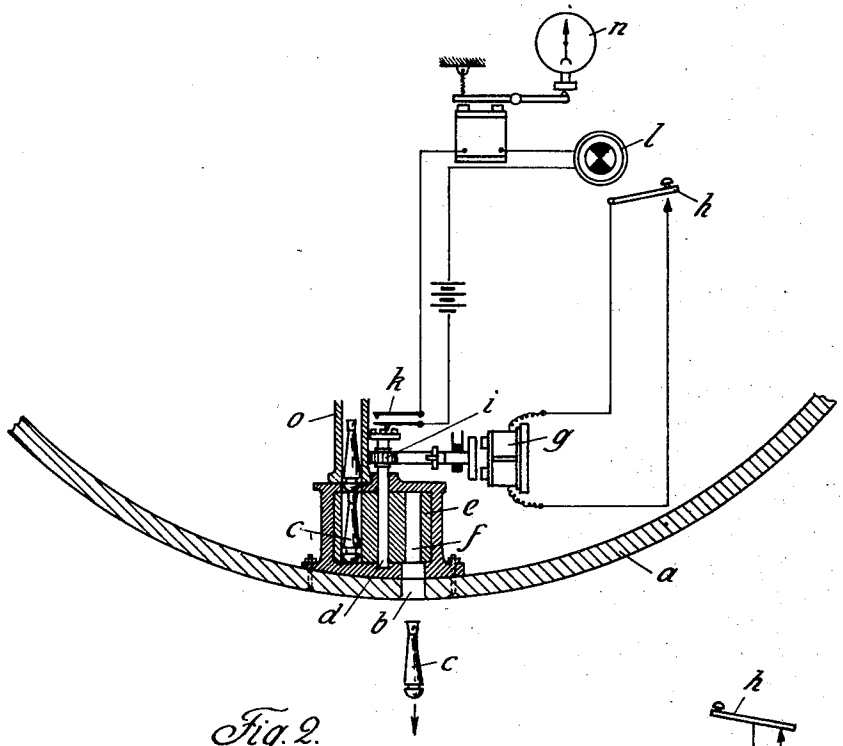


Fig. 2.

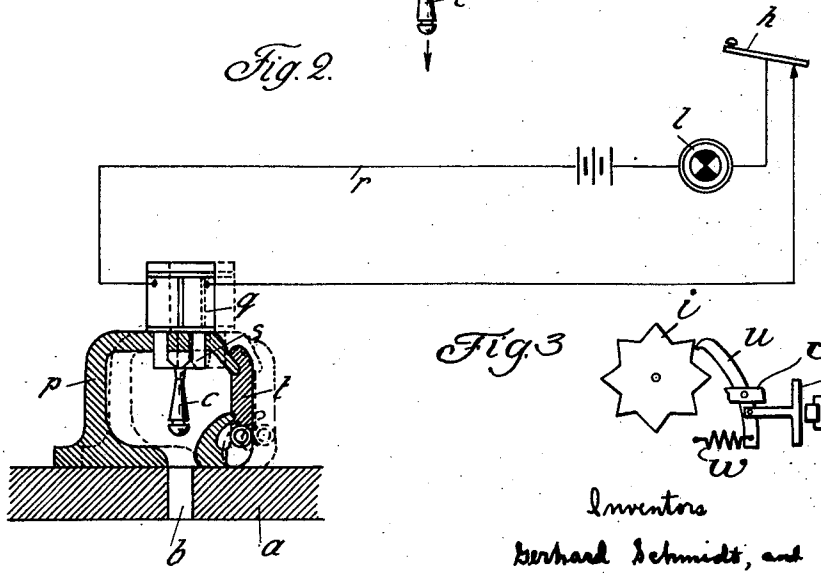


Fig. 3

Inventors

Gerhard Schmidt, and

Bernhard Settegast

by Knight Bros

Attorneys

Patented Jan. 15, 1929. 1,698,857

UNITED STATES PATENT OFFICE.

GERHARD SCHMIDT AND BERNHARD SETTEGAST, OF KIEL, GERMANY, ASSIGNORS TO SIGNAL GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, OF KIEL, GERMANY, A FIRM.

SOUNDING ARRANGEMENT.

Application filed May 18, 1923, Serial No. 639,788, and in Germany May 23, 1922.

This invention relates to arrangements for measuring the depth of water and more particularly to such arrangements on ships, especially on submarine vessels.

In the present invention the measurement is effected by means of a sounding lead which differs from the ordinary sounding lead in that it is free and not attached to a line. This free sounding lead descends at a constant rate of speed to the bottom of the ocean, the striking of which causes an explosive charge within the sounding lead to explode and give out a sound. The time interval from the beginning of the descent to the moment of explosion gives a measurement of the distance which can be determined readily due to the fact that the rate of descent is constant and known. Since this sounding lead differs from the usual sounding lead in that it is free and not attached to a line it will be called, hereafter in this specification, a free sounding lead.

A feature of the invention consists in discharging the free sounding lead, such for instance, as shown in the United States Patent No. 1,514,264 to Settegast et al., from the interior of the ship through a sluice or lock so as to enable the sounding operation to be carried out independently of whether the submarine is above or below the surface of the water.

Sluice arrangements for similar purposes are known and their general constructional features do not form the subject of this invention. An important feature of the invention is, however, that the free sounding lead or free sounding leads are discharged from the ship beneath the surface of the water through an opening in the ship's wall and that the time between the unshipping of the free sounding lead (which produces a sound signal when it strikes the sea bottom) and the arrival of the sound signal is measured.

Another feature of the invention is that the ejection or unshipping of the free sounding lead through the lock is controlled from a distance, as from the chart room or commander's bridge, this control being electromagnetic.

In order to enable the proper unshipping of the free sounding lead to be checked from the distant control station devices are provided by which the proper discharge of the free sounding lead is signalled back to the control station.

Another feature of the invention consists in arranging a plurality of free sounding leads in a magazine by which the free sounding leads may be successively moved into their discharge position like the cartridges of firearms.

The invention is illustrated by way of example in the drawing in which—

Fig. 1 is a diagrammatic representation of a complete sounding installation.

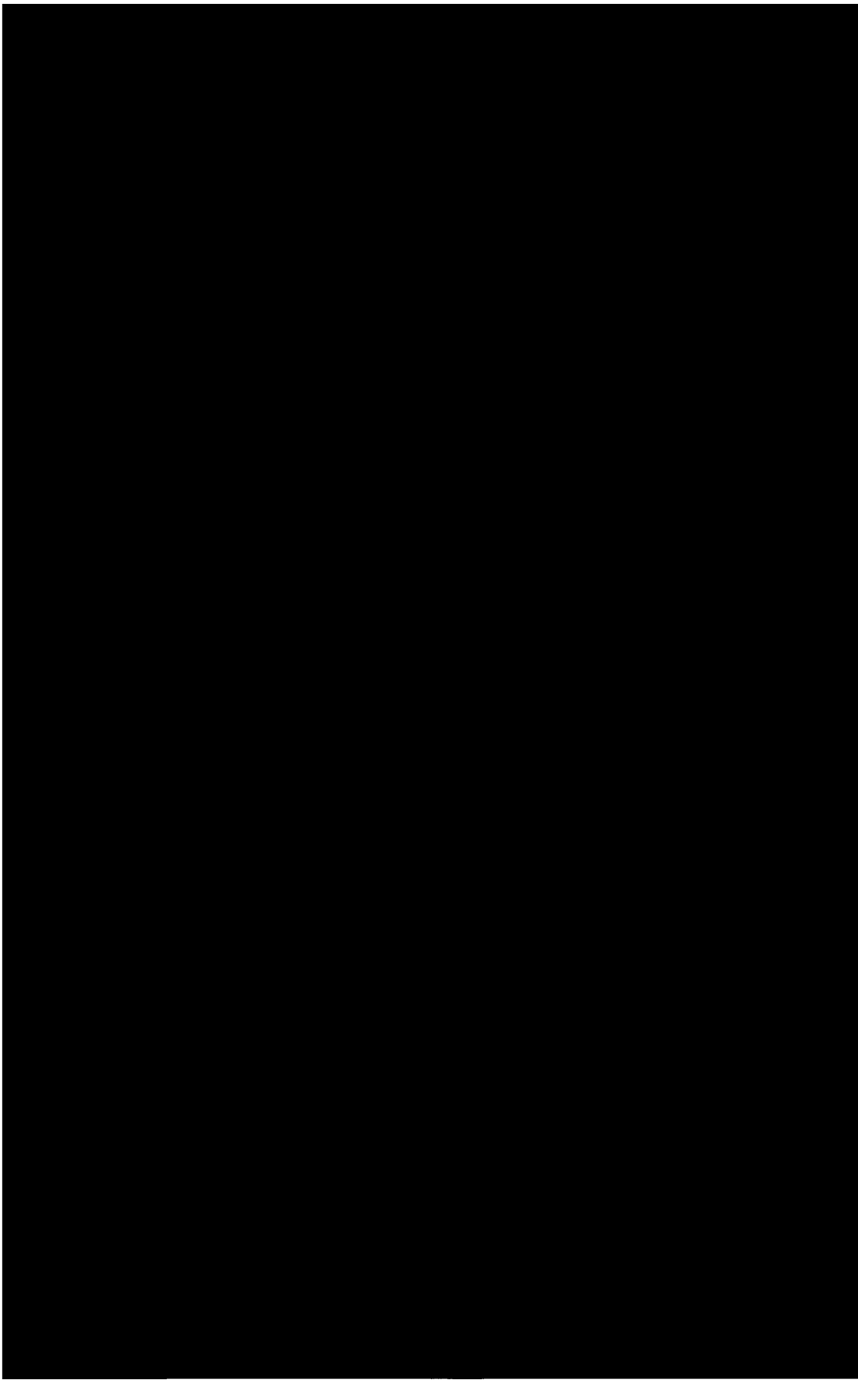
Fig. 2 shows a modified device for discharging a free sounding lead and

Figure 3 shows a detail of the device.

In the drawing *a* is a ship's wall with an opening *b* at the bottom through which the free sounding leads *c* are discharged. A plummet sluice or water lock in the form of a rotatable drum *e* is provided in the interior of the ship above the opening or port *b*. The drum or magazine *e* has a number of free sounding lead chambers *f* and is rotated b a revolving mechanism so that the chambers *f* are caused to register in succession with the discharge port *b* leading out from the lock. The drum may be rotated by means of a stepping magnet *g* which oscillates the stepping pawl of a ratchet wheel and is controlled with the aid of a key *h*. This is shown in detail in Figure 3, where the ratchet wheel *i* is rotated by the stepping pawl *u* which is pivoted at *v* and adapted to be attracted to the magnet *g* by means of the armature *x* attached to it. A spring *w* is supplied for returning the pawl to normal position. The movements of the ratchet wheel *i* produce corresponding movements of the drum or magazine *e*. The positions of the chambers *f* above the discharge opening *b* are signalled back by means of a contact device *k* and an indicating device *l* to the control station where the free sounding lead discharge key is placed.

A device *m*, which acts on a stop clock *n*, when a free sounding lead is discharged is preferably connected in the operating circuit of the indicator so that the time of discharge of a free sounding lead is indicated automatically.

Arranged in a position opposite to the port *b* of the lock is a magazine consisting of a tube or shaft *o* adapted to receive a considerable number of free sounding leads so that when-



whereby said sounding lead advanced to said opening is free to fall in the open water.

5. In a system for depth measurement adapted to be used upon a submarine when either above or below the surface of the water, a watertight casing attached to the skin of the vessel, having an opening therein directly aligned with a similar opening in the skin of the vessel, a barrel having compartments extending longitudinally therethrough and a shaft through the center of said barrel for rotating the same, a plurality of free sounding leads and means for feeding the same through the top of said casing into said compartments as said barrel is rotated, a ratchet wheel mounted on said shaft above said casing, means for driving said wheel in successive steps to advance successively said compartments to align with said opening whereby said sounding lead advanced to said opening is free to fall in the open water, a depth indicator and means operated by the movement of said ratchet wheel for commencing the operation of said depth indicator at the instant the sounding lead is free.

6. In a system for depth measurement adapted to be used upon a submarine when either above or below the surface of the water, a watertight casing attached to the skin of the vessel, having an opening therein directly aligned with a similar opening in the skin of the vessel, a barrel having compartments extending longitudinally therethrough and rotatable about a shaft through the center of said barrel, a ratchet wheel mounted on said shaft above the casing and a stepping magnet including an armature and a pawl adapted to engage said ratchet wheel to advance successive compartments to align with said opening, sounding leads and means for feeding said sounding leads into said compartments.

7. In a system for depth measurement adapted to be used upon a submarine when either above or below the surface of the water, a watertight casing attached to the skin of the vessel, having an opening therein directly aligned with a similar opening in the skin of the vessel, a barrel having compartments extending longitudinally therethrough and rotatable about a shaft through the center of said barrel, a ratchet wheel mounted on said shaft above the casing and a stepping magnet including an armature and a pawl adapted to engage said ratchet wheel to advance successive compartments to align with said opening, sounding leads and means for feeding said sounding leads into said compartments, a depth indicator and means operated by the movement of said ratchet wheel for commencing the operation of said depth indicator at the instant the sounding lead is free.

8. In a system for depth measurement adapted to be used upon a submarine when either above or below the surface of the water, a watertight casing attached to the skin of the vessel, having an opening therein directly aligned with a similar opening in the skin of the vessel, a barrel having compartments extending longitudinally therethrough and rotatable about a shaft through the center of said barrel, a ratchet wheel mounted on said shaft above the casing and a stepping magnet including an armature and a pawl adapted to engage said ratchet wheel to advance successive compartments to align with said opening, sounding leads and means for feeding said sounding leads into said compartment, a depth indicator, a starting magnet for starting said indicator including an electrical circuit having a battery and a pair of contacts in series with said magnet and means mounted on said shaft for closing said contacts and thereby energizing said magnet when said sounding lead is free.

In testimony whereof we affix our signatures.

GERHARD SCHMIDT.
BERNHARD SETTEGAST.