(No Model.)

J. MOHS.

LEAD FOR ELECTRICAL SOUNDING.

No. 596,172. Patented Dec. 28, 1897.

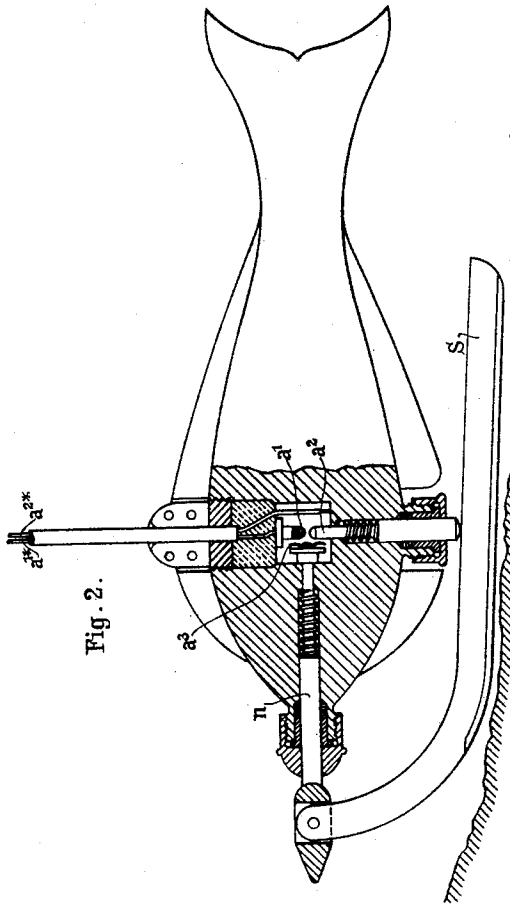


Fig. 2.

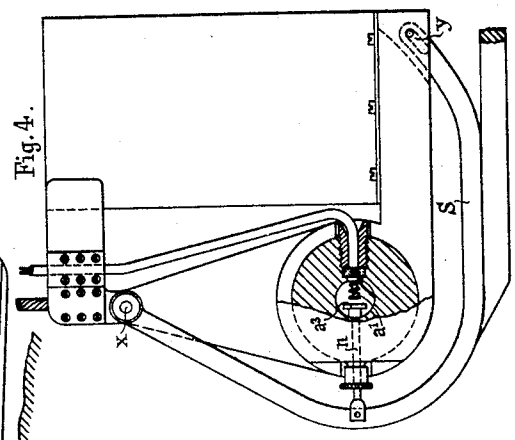


Fig. 4.

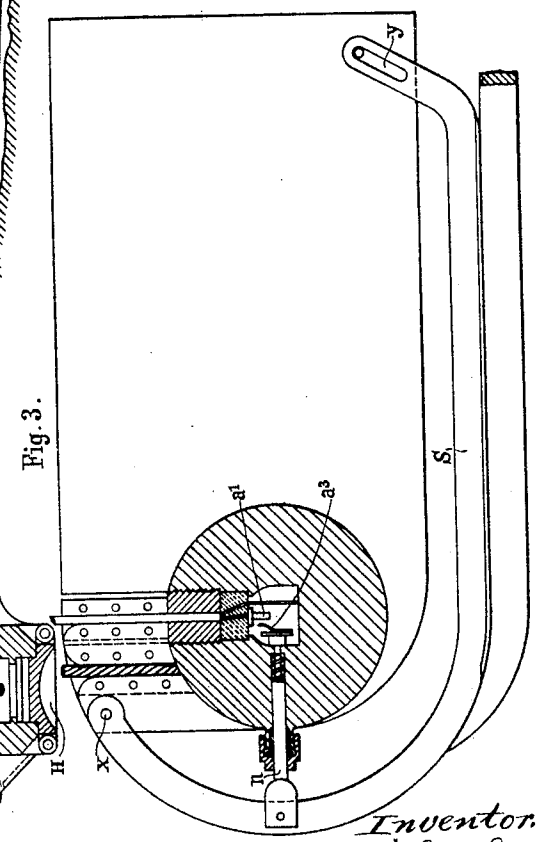


Fig. 3.

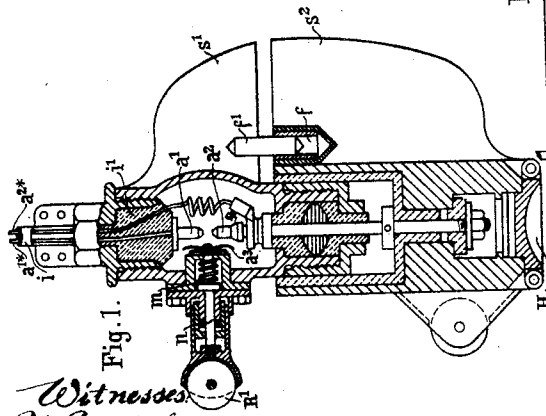


Fig. 1.

Witnesses:
H. Mitchell
F. H. Schott

Inventor.
Julius Mohs
by Masterson
Attorney.

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UNITED STATES PATENT OFFICE.

JULIUS MOHS, OF BRANDENBURG, GERMANY, ASSIGNOR OF ONE-HALF TO THE BERLINER KUNSTDRUCK UND VERLAGS-ANSTALT, VORMALS A. & C. KAUFMANN, OF BERLIN, GERMANY.

LEAD FOR ELECTRICAL SOUNDING.

SPECIFICATION forming part of Letters Patent No. 596,172, dated December 28, 1897.

Application filed September 3, 1896. Serial No. 604,804. (No model.) Patented in Germany February 23, 1895, No. 86,628, and in France December 17, 1895, No. 252,545.

To all whom it may concern:

Be it known that I, JULIUS MOHS, a subject of the Duke of Anhalt, residing at Brandenburg-on-the-Havel, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Leads for Electrical Soundings, (patented in Germany February 23, 1895, No. 86,628, and in France December 17, 1895, No. 252,545,) of which the following is a specification.

My invention relates to improvements in sounding leads or plumbs such as are employed for determining depths of water by sounding, locating sunken vessels, reefs, or shoals, and for other similar maritime purposes.

The principal object of my invention is to provide a lead which either by a lateral impact or by a vertical impact will actuate suitable signaling, registering, or winding mechanism on the vessel, whereby the fact that the lead has come into contact with an object or with the bottom is announced, the depth of the lead below the surface is indicated, and the winding mechanism is started to raise the lead. This feature of causing the operation of the aforesaid mechanism on the vessel by either a lateral or a downward impact of the lead is of great importance in some uses to which the lead may be put. For instance, where the lead is suspended at a certain depth from a vessel in motion the lead will at once signal its contact with any sunken object in its path—such, for example, as a reef or a sunken vessel—and if the lead is being carried through deep water at a considerable distance above the marine floor the contact of the lead with any water-logged derelict floating below the surface and in the path of the lead will be announced.

My invention consists in the features, details of construction, and combinations of parts, which will first be described in connection with the accompanying drawings and then pointed out in the claim.

In the drawings, Figure 1 is a vertical sectional view of one form of lead embodying my invention. Figs. 2, 3, and 4 are side elevations, partly in section, of three other forms of leads embodying my invention.

Referring to Fig. 1 of the drawings, which shows a lead in the form of a plummet, it will be observed that said lead is made in two principal parts A' A^2, capable of movement toward each other, each of said parts being provided with a contact device a' a^2, which devices are arranged to come into contact with each other when the lower end of the lead is arrested by striking the marine floor in sounding, the two parts A' and A^2 being held apart by the action of gravity, which tends to pull the lower part from the upper one, the latter being suspended from the sounding-line, while the lower one is held from dropping away altogether from the upper part by suitable connecting mechanism which permits a limited amount of movement of the two parts toward and from each other. The said lead is also provided with a laterally-arranged circuit-closing device, which when it strikes against any object or obstruction in its path closes a circuit and announces that fact by operating suitable signal mechanism on the vessel. To keep the lead in such a position that the laterally-arranged circuit-closing device will always project forward, the lead is provided at the side opposite said laterally-arranged circuit-closing device with a fixed rudder or fin, which is also composed of two parts movable toward and from each other, a guide-pin being fixed in one part of said rudder and arranged to move in a socket in the other part of the rudder, whereby the two principal parts A' and A^2 of the lead are prevented from rotating with relation to each other about their common axis. The specific construction illustrated in the said Fig. 1 and which I consider the preferable manner of carrying out this modification embodying my invention is as follows:

The lower part A^2 of the lead comprises a cylinder a^4, having a rearward-extending lower fin or rudder portion s^2. The cylinder has an upper and a lower cavity connected by a central opening, the upper cavity being somewhat larger in diameter than the lower one and arranged to contain a hollow cylinder a^5, of gun-metal, bronze, or similar material, provided with a hub or nave a^6, extending into the central opening, as clearly shown

in the drawings. Within the hollow cylinder a^5 is located the cylindrical lower end of the upper portion A′ of the lead, said lower end being formed both as a piston movable in said hollow cylinder a^5 and as a stuffing-box, through which passes a guide-rod a^7. The said guide-rod also passes through the hub a^6 and the central opening and terminates within the lower cavity of the part A^2, where it is provided with a nut a^8, threaded onto the guide-rod a^7 and bearing against a collar a^9. Above the hub a^6 and within the hollow cylinder a^5 a collar a^{10} is fixed to the guide-rod a^7, whereby by tightening the nut a^8 the hollow cylinder is held securely in position, the guide-rod itself is fixed rigidly to the lower part A^2 of the lead, and the collar a^9 is clamped with sufficient force to seat itself tightly over the central opening and thereby prevent the entrance of water through said central opening into the lower end of the hollow cylinder.

The lower cylindrical end of the upper portion of the lead comprises two glands a^{11} a^{12}, through which the guide-rod a^7 passes, a packing a^{13} between the glands, and a sleeve a^{14}, having inward-extending flanges a^{15}, engaging the lower gland a^{11}, said sleeve being provided with internal screw-threads engaging corresponding threads on a downward-extending cylindrical portion a^{16}, formed integral with the upper portion of the lead and arranged to contain the glands and packing. By screwing the said sleeve a^{14} into the portion a^{16} the glands are forced toward each other and the packing a^{13} compressed around the rod a^7 to a sufficient extent in order to preclude all possibility of water reaching the contact-points in case by any means it should succeed in entering the lower end of the hollow cylinder. The sleeve a^{14} is intended to fit so snugly in the hollow cylinder a^5 as to prevent the entrance of water between the two from above, and yet at the same time to permit the vertical movement of the lower end of the upper portion A′ within said hollow cylinder a^5.

The lower end of the lower portion A^2 has a bottom plate H, whose lower surface is concave and adapted to receive a coating of tallow for catching loose portions of the marine floor as samples, which when the lead is drawn up indicate the formation of bottom struck by the lead. This bottom plate H is made removable for the purpose of allowing access to the nut a^8 when assembling or taking apart the device.

Just above the bottom plate H is placed a disk a^{17}, preferably of rubber or wood, pressed tightly into place against an inner annular flange a^{18}, formed integral with the part a^4, whereby the chances of water entering the lower end of the hollow cylinder are reduced to a minimum.

The upper end of the guide-rod a^7 terminates in a chamber formed in the upper portion of the lead and is provided with a collar a^{19}, fixed on the rod and serving as a stop to limit the separation of the upper and lower parts of the lead. Above this collar is secured a clamping-ring a^{20}, provided with a binding-socket a^{21}, into which the end of one of the conductors $a^{2\times}$ is inserted and held by a screw, as will be clear from the drawings. Above the clamping-ring a^{20} and in electrical communication therewith through the guide-rod a^7 is placed a contact-point a^2, fixed as a cap onto the upper end of the guide-rod a^7.

Into the upper end of the chamber in said upper portion A′ is threaded a bushing a^{22}, which contains an insulating-plug i', through which pass two conductors $a'^{\times}$ $a^{2\times}$, the latter continuing through the chamber to the binding-socket a^{21}, as previously described, while the other terminates at an upper contact-point a', extending just below the said plug i'. The two conductors $a'^{\times}$ and $a^{2\times}$ pass through and form part of a cable i, which is secured to the bushing a^{22} and leads to the vessel from which the lead is suspended.

At the rear of the chambered upper portion of the lead is placed the upper portion s' of the fin or rudder, which carries a pin or stud f', arranged to slide within a bushing f, located in a socket in the upper edge of the lower portion s^2 of said fin or rudder, said pin or stud f' serving to hold the two portions of the fin in their proper relative positions.

On that side of the lead opposite the fin, and which is therefore the forward side, is placed a laterally-arranged circuit-closing device connected to the upper portion of the lead. This circuit-closing device is constructed as follows: Through an opening into the chamber of the upper portion of the lead projects a hollow plug b, having a flange at its outer end and an opening through its bottom. Through this opening passes a stem n, provided with a collar n', fixed on the stem and movable snugly within the hollow plug b. Between this collar and the bottom of the plug is placed a spring m, surrounding the stem and serving to hold said stem outward or forward in a yielding manner. The stem is provided inside the chamber with a cap or disk n^2, on which is fixed a contact-spring a^3, whose ends are arranged to be forced into contact with the two terminals or contact-points a' a^2, thereby forming an electric bridge and closing the electric circuit through the conductors $a'^{\times}$ and $a^{2\times}$ and causing the operation of the alarm mechanism on the vessel.

To the forward side of the flanged edge of the hollow plug b is secured a stuffing-box device b', through which the stem n passes, said stem carrying at its outer end a head R, in which is journaled a roller R′, the head having an inward-extending sleeve movable between the stuffing-box device and an annular rib b^2, made integral with the stuffing-box device. This sleeve serves to protect the stuffing-box from injury.

At the front side of the lower portion of the

lead is placed a roller R^2, journaled in lugs R^3, secured to the said lower portion.

In Fig. 2 I have shown a lead constructed in the form approximately of a fish, having a body A, fins B and C, and a tail D. In this arrangement the lower contact-point a^2 is carried on the end of a plunger s, which extends downward through the body, as shown, its lower end projecting beyond the bottom of said body. A stuffing-box s' is provided around said plunger s, which is held normally outward or downward by a spring s^2, as will be fully understood from the drawings. The forward end of the body is provided with a similar plunger n, normally held outward by a spring n' and packed by stuffing-box n^2, said plunger carrying at its inner end a contact-spring a^3, identical in arrangement and operation with that shown in Fig. 1 and previously described. To the outer end of the plunger n and in a vertical slot or recess in the same is pivoted the front end of a curved runner or shoe S, which is capable of swinging in a vertical plane about its pivotal point and is so bent as to extend backward beneath the body of the lead and to contact with the lower outer end of the plunger s when striking the marine floor, whereby the lower plunger s is forced inward and closes the electric circuit in an obvious manner. When the front end of the shoe S or the point of the plunger n strikes against an object or resistance of any kind, said plunger n is forced inward and can thereby also close the electric circuit on account of its contact-spring a^3 being brought against both contact-points a' and a^2.

In Figs. 3 and 4 I have shown constructions in which disk-formed leads are employed, these disks C having tails or fins G' and shoes S, which are pivoted above the disks and extend downward past the forward ends of the leads and then rearward beneath the bottoms of said leads, the shoes being connected to the rear end of the fins by slot-and-pin connections or other suitable connections, permitting a limited amount of angular movement of the shoes about their pivots. In the device shown in Fig. 3 the shoe S is connected to a plunger n, which carries a contact-spring a^3, arranged to be forced against the contact-point a', said plunger n being in circuit with one of the conductors $a^{2\times}$ through the metal of the disk to which the said conductor is attached. The vertical lower plunger is omitted in this construction as also in that form shown in Fig. 4, being rendered unnecessary by the fact that the shoe S is pivoted above the plunger n in each construction and will when forced toward the disk, either by an obstruction met at the front end or by coming to rest on the marine floor, drive the plunger n inward and thereby close the electric circuit. In Fig. 4 the stationary terminal a' is made in the form of a spiral spring, while the movable terminal a^3 is a plate arranged to contact with said opposite spring-terminal a'.

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

In a sounding-lead, the combination, with a body, of a pair of contact devices, a shoe pivotally connected to the front end of the body and extending beneath the said body, and means operated by the movement of the shoe for closing a circuit through the contact devices, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JULIUS MOHS.

Witnesses:
W. HAUPT,
HENRY HASPER.