(No Model.)

2 Sheets—Sheet 1.

S. H. JAMES.

SHOAL ALARM.

No. 493,826. Patented Mar. 21, 1893.

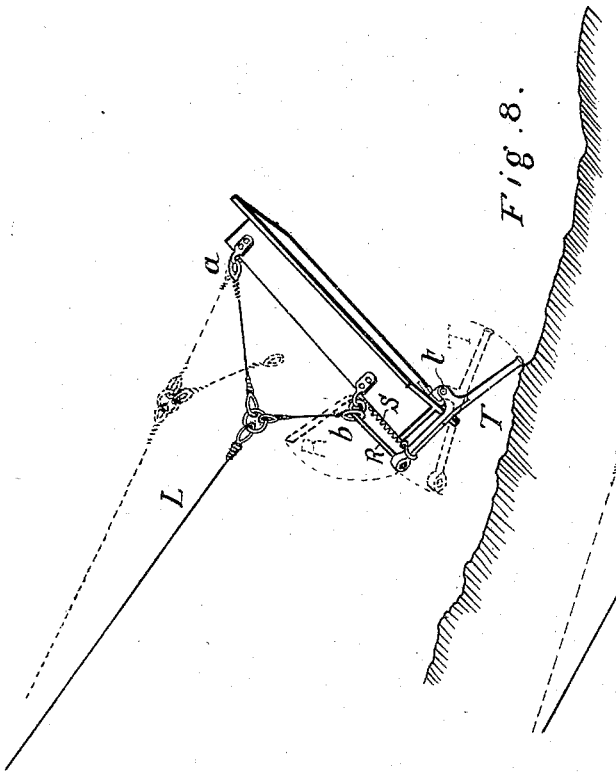


Fig. 8.

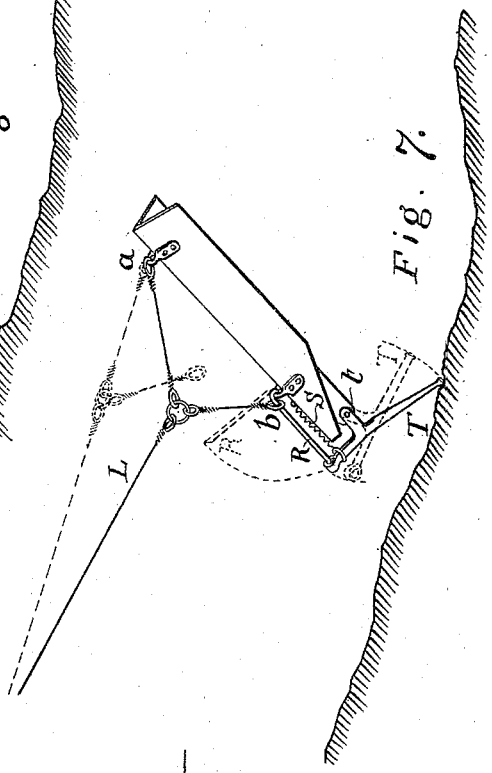


Fig. 7.

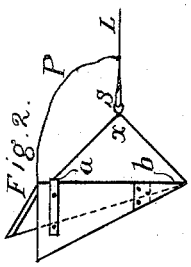
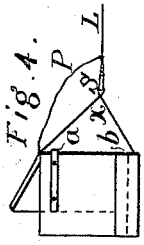


Fig. 2.



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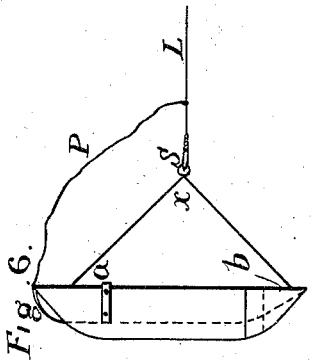

Fig. 6.

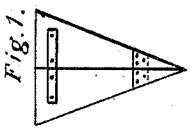

Fig. 1.

Fig. 3.

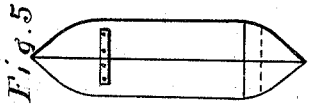

Fig. 5.

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E. K. Sturtevant

Inventor:
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By Richards & Co.
his Attorneys.

(No Model.) 2 Sheets—Sheet 2.

S. H. JAMES.

SHOAL ALARM.

No. 493,826. Patented Mar. 21, 1893.

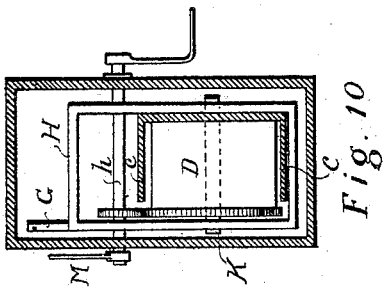


Fig. 10

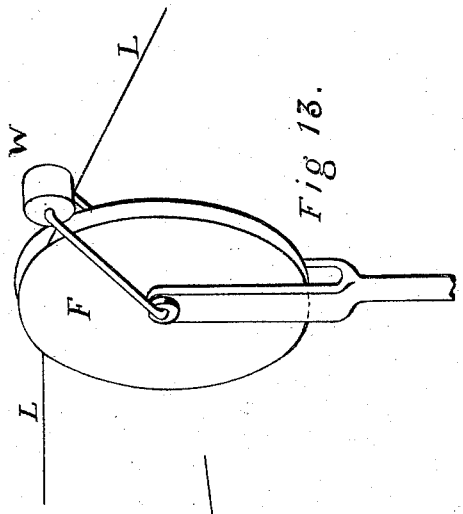


Fig 13.

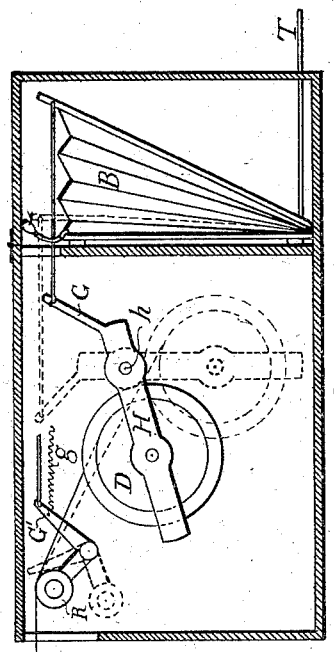


Fig. 9.

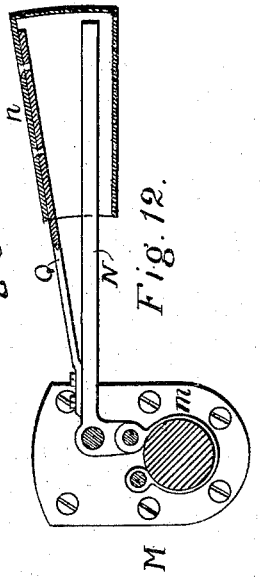


Fig. 12.

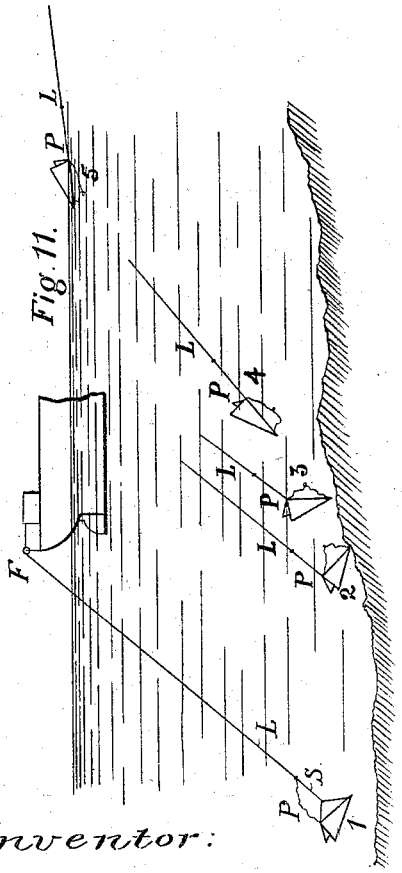
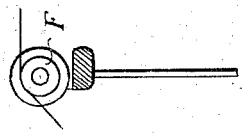


Fig. 11.



Witnesses:
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E. K. Stuntevant.

Inventor:
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By Richards & Co
his Attorneys.

UNITED STATES PATENT OFFICE.

SAMUEL HUBBARD JAMES, OF LONDON, ENGLAND.

SHOAL-ALARM.

SPECIFICATION forming part of Letters Patent No. 493,826, dated March 21, 1893.

Application filed March 17, 1891. Serial No. 385,418. (No model.) Patented in England April 25, 1888, No. 6,134.

To all whom it may concern:

Be it known that I, SAMUEL HUBBARD JAMES, a subject of the Queen of Great Britain and Ireland, residing at 3 Douglas Villas, Greyhound Lane, Streatham Common, London, in the county of Surrey, England, have invented an Improvement in Sounding Apparatus, (which has been patented to me in part in Great Britain under No. 6,134, dated as of the 25th April, 1888,) of which the following is a specification.

The object of this invention is to warn mariners of the existence or approach of shallow water by means of a sentry sounding apparatus, which may be constantly towed by a vessel, and will give the necessary warning without the necessity of stopping the vessel to make special soundings. And my invention consists essentially in the application for the purpose of this sentry sounder of the principle of an air kite reversed, thus forming a water kite or plow so adapted to the towing line that it shall sink when towed through water until it causes the tow line to take up a definite position to the surface of the water, instead of rising in the air as in the case of a kite thus forming a sentry sounder towed at a definite depth. The required certainty and steadiness of action are insured through making the top part lighter or more buoyant than the lower part (the greater the difference between the specific gravity of the top and bottom parts the better) so that one end shall always point downward. And in order that the depth of immersion shall be independent of the speed, I make the sounding kite or water plow approximately equal as a whole in density to that of the water, but in practice their density may be disregarded at speeds over four miles per hour. The form also of the sounding kite or water plow is with extended wings so that the sounder steadies itself in equilibrium against the water resistance of towing. The towing line is not of course a perfectly straight line being in reality a part of a very flat curve, but it is shown on the drawings and may be treated practically as a straight line, so far as the length is concerned. As the depth attained by such a kite sounder depends upon three factors, viz:—first the size or area of the kite itself; second:—the angle of the bridle or setting of the kite to the tow line; and, third,—the diameter of the tow line or wire used, it is convenient to adjust standard angles to standard sizes, for different apparatus or descriptions of work required. The proportion between the length run out and the vertical depth attained, would thus be most conveniently found by trials from each standard apparatus, and a counter upon the line winch would be graduated accordingly, to give the depth of the sentry sounder in proportion to the amount of line run out. I may fit also to the sounder a striking trigger, which when it strikes the ground, shall in part release the sounder from the bridle, and permit the sounder to be towed to the surface with a minimum resistance, as it is thus converted from a kite to a mere log of wood and metal. The relief of strain upon the towing line, so obtained, is caused to operate a suitable device for giving warning that the sounder has struck bottom, as hereinafter more fully described.

I may further apply a resonating drum or device placed upon the tow line, which by reason of the vibration of the said tow line, so long as the sounder is acting as a kite upon the tow line, will cause a continuous audible indication that the sounder is towing properly, and has not struck bottom. This resonator will cease to be audible after the sounder has struck, and is towed to the surface, since the towing resistance in this latter case is but a small fraction of the former strain.

Figures 1 and 2 show a front elevation and perspective of one form of my sounder. Figs. 3 and 4 show a plan and perspective of a modification thereof. Figs. 5 and 6 show a front and perspective of a further modification thereof. Fig. 7 is a perspective view of a sounder with striking trigger and disengaging gear attached. Fig. 8 is a further perspective view of a modified sounder with striking trigger and disengaging gear attached. Figs. 9 and 10 are a longitudinal and transverse section of a winch box. Fig. 11 is a general sectional elevation of a sounder at work before and after striking bottom. Fig. 12 is a detail of a spring brake lever for the line winch. Fig. 13 is a detail elevation of a fair-lead with resonator.

The sounder or water kite I employ may be

of any of the forms illustrated in Figs. 1 to 8, or of other convenient form, so long as such kite or plow presents spread wings on either side of a central axis, by which it is attached, by suitable bridles *a*, *b*, to the towing line L. These kites are preferably in the form of a pointed or double pointed wedge or arrow, but in all cases the bottom or lower part should be weighted, so that its specific gravity shall be greater than that of the upper portion, so that the sounder or kite shall have a quick self righting tendency, causing one end or part to be always downward. In order that the sounder as a whole may be approximately of the same density, or only a little greater or less than that of water, the upper portion should be conveniently buoyant thus either constructed of wood or with air chambers in metal to give buoyancy. I make these sounders as thin and light as possible, having regard to necessary strength for hard knocking about, sometimes weighting them with an iron shoe which answers the double purpose of strengthening, as well as weighting, and having an indentation or hollow on the under side to bring up specimens of the bottom. Where the sounder is provided with a striking bar, this bar will also serve the purpose of a weight for the bottom end of the sounder.

I do not limit myself to the particular forms of sounder or water kites herein shown, as even a long rod, hollow tube, or box, answers more or less efficiently, provided they are properly weighted and attached as kites or plows to the towing line.

The bridles *ax*, *bx*, meet at the apex of the triangle at *x*, between which point and the towing line L, I insert a rope, wire, or spring hook S, which is of somewhat less strength than the line wire L, and which will give way when a sudden jerk or strain (greater than that due to fluid pressure only) arises, so that when the kite, plow, or sounder, catches in rocks, or strikes the bottom (as shown in Fig. 11) the part S being weakest gives way, and releases the sounder. In order however that the sounder should not be lost, at or near the top I attach a slack rope, wire, or chain P (Figs. 2 to 6) so that when the sounder strikes the bottom and the loop or hook S gives way, the preserving slack rope, wire, or chain, being still attached to the towing line, drags the sounder away from its detaining obstacle, and the sounder then begins to rise (as at 3, 4, Fig. 11) until it floats upon the water (5 Fig. 11). By this action of the sounder the towing strain or tension on the towing line L, is reduced to a mere fraction of its towing strain, when towing the sounder as a kite or plow (at 1 Fig. 11). I utilize this reduction of towing strain to actuate an alarm as follows:—The towing line is led over a fair-lead F into a winch box (Figs. 9 and 10) in which R is a roller or wheel supported by a pivoted crank, one arm of which is controlled by a spring *g*, and over this roller the line wire is placed, the different tensions of the wire causing the roller to move upward or downward against the reaction of the spring, as the tension of the towing line decreases or increases, thus forming a dynamometer or indicator of reduction of strain, from which by means of the arm G′ any mechanism for working an alarm, or any electrical circuit for operating an electrical bell, may be operated or closed. In this case the towing wire may be led to a fixed winch drum. Or, the said roller may be fixed, and the winch drum D, over or around which the line wire is wound, may be carried in a swinging frame H, pivoted at *h*, and provided with an arm G. When the sounder or water kite is being towed in its normal condition in deep water, the strain on the line is sufficient to cause the swinging winch drum D to be raised into the position shown in full lines; but directly the sounder touches the bottom, and the bridle is detached, the strain on the towing line is immediately reduced to a small fraction of its normal strain, and the swinging winch drum falls back into the position shown in dotted lines, by its own gravity, or by the reaction of a spring if required. The winch drum itself may be thus made to act as a dynamometer and the arm G by means of a rod or other convenient device may operate a bellows B (the other flap being fixed) so that the lift of the winch under the towing strain, opens the bellows while the sounder is run out and so long as it is towing normally, until the bottom is struck; when the reduced tension of the towing line, and the return swing of the winch drum gradually close the said bellows, and eject the air to a whistle or whistles either at the winch box itself, in the captain's cabin, or at the bridge, or whenever required to give audible warning to the officer in charge. I do not however limit myself to this particular method of giving warning, for it is obvious that the motion of the frame H may be utilized, to turn on the tap of a steam boiler, or to close an electrical circuit actuating an electric bell, to release a clockwork alarm, or to fire off a gun, as may be desired.

In Fig. 10 is shown more clearly the swinging frame H upon an axle or pivot *h*, the gearing K and the case C encircling the winch drum, allowing sufficient clearance within this cover C for the drum to revolve, but not enough for the towing line to slip between the drum and its cover, thus preventing any fouling of the towing line. In practice I generally use a steel pianoforte wire for the towing line, and I make that part of the winch box, where the drum is situated, water-tight, keeping it filled with a mixture of lime and water or oil. And I provide a spring brake M (shown in detail in Fig. 12) for the winch drum or handle spindle, and further attach some common counting arrangement to show the revolutions of the winch drum, and consequently the length of line run out, together with the standard graduations for vertical

depth attained by the sounder, determined to suit the particular apparatus in use.

In Fig. 11, I show the fair lead and winch box placed at the stern of the vessel, with the water kite or sounder being towed normally at the rear of the vessel (No. 1,) and its subsequent action (Nos. 2, 3, 4 and 5) when released from the bridle by striking bottom. When required the winch box may be placed on the bridge and be entirely under charge of the officer of the watch, or on the forecastle thus avoiding the necessity of employing any one to attend to it, and if under special and exceptional circumstances, it should be required, soundings of moderate depth may be obtained even in front of the vessel by placing the fair lead F at the end of the bowsprit, instead of at the stern.

In Figs. 7 and 8 I show the sounder fitted with a striking trigger T at the lower and forward end of the sounder. The said trigger T is pivoted at *t* to the sounder and kept in position by a spring S. The pivoted catch R has been slipped through the thimble on one side *b* of the towing bridle, and the whole is then towed as a kite as shown in the drawings. When however the botton is struck by the trigger T the catch R and the bridle *b* are released, and the kite is changed into a mere log of wood and metal, which the tow line L hauls up by its upper end by the remaining portion of the bridle *a*, as shown in dotted lines.

In Fig. 12, I show a suitable brake for the axle of the drum winch or handle shaft, which consists of a strap *m* gripping the axle, by the action of a pivoted lever N. The lever handle is operated however by the case *n* which is attached to a spring Q which allows a play between the case and the lever handle. The pressure must therefore be applied gradually on the brake block, as the spring case prevents a sudden jerk, and yet at the same time when the spring case is brought down on to the lever, the full power may be put on. The object of this arrangement is to prevent as far as possible a novice suddenly jerking and putting a sudden shock or strain upon the tow line, as it is being paid out.

In Fig. 13, I show the fair lead with the tow line L passing over it, and the loose riding drum *w* of suitable hollow or solid material resting upon the line wire, beyond the fair-lead, to act as a resonator. While the kite sounder is towing as a kite, there is a heavy strain on the wire which cutting through the water causes vibration. The resonator, taking up the vibration, causes a continuous sound to be heard all the time that the kite is towing as a kite, but this ceases immediately the bottom is struck, as the strain is then materially reduced. The resonator may be mounted on arms pivoted at the center of the fair-lead, so that it can readily be lifted or turned over at the opposite side of the fair lead if not required. I do not limit myself to this special arrangement, for anything capable of acting as a resonator will answer;—such as a fiddle, a piece of tin plate, plank of wood, bunch of keys, or box of matches, placed on a wire will answer the purpose of a continuous audible alarm.

For surveying purposes, where it is required to find unknown shoals or rocks, I sometimes make the kite sounder specifically lighter than water, so that if by chance the kites are carried away by striking rugged rocks, the kite sounder will float, and thus mark the spot enabling the kite to be recovered for future use. This can be done by adding cork, or wood at the back of the ordinary kite sounder as described, or by the addition of any buoyant material; the accuracy of the sounding not being affected to any serious amount thereby at speeds above five knots per hour.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. A sentry kite sounder consisting of tapering wings extending approximately at right angles to each other, a bridle arranged centrally of the wings at the junction of the same and a towing line connected therewith, the said bridle forming a detachable connection between the tow line and the lower pointed end of the wings, substantially as described.

2. In combination a kite, a bridle, a towing line, a yielding pivoted bearing for the upper end of the towing line and an alarm operated by the action of the pivoted bearing, substantially as described.

3. In combination a kite, a bridle, a towing line, a winding drum, a fair lead F, and a pivoted drum *w* resting on the towing line, substantially as described.

4. In a sounding apparatus, a kite consisting of two wings extending on either side of a central axis at an angle to one another, and a bridle connected to the kite by one fixed and one detachable end, substantially as described.

SAMUEL HUBBARD JAMES.

Witnesses:
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CHARLES CARTER.