No. 52,522. PATENTED FEB. 13, 1866.

G. W. BOWLSBY.

OCEAN TELEGRAPH.

2 SHEETS—SHEET 1.

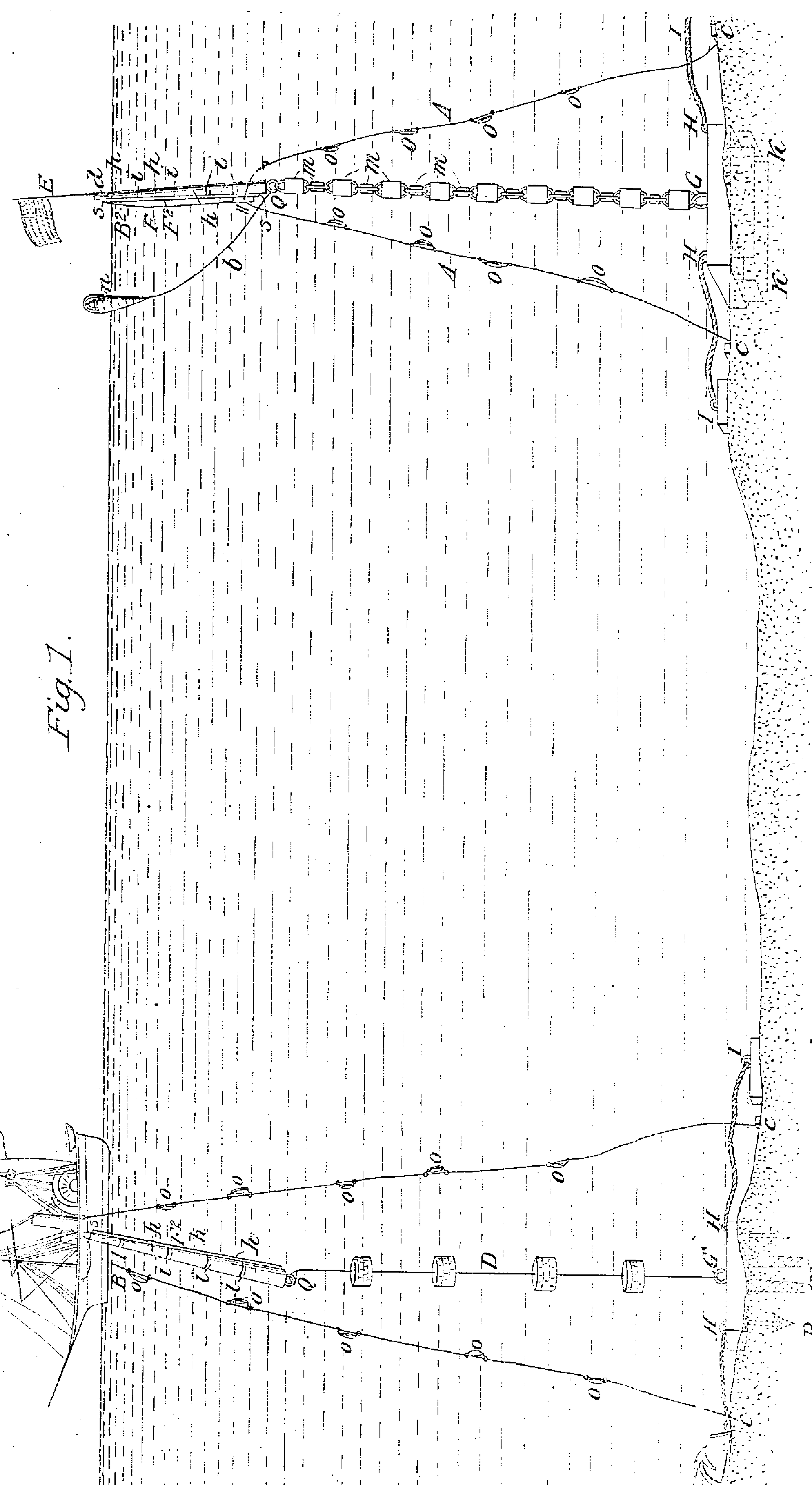

Fig. 1.

Witnesses:

Gustave Vinghy

Louis Frederick

Inventor:

George W. Bowlsby.

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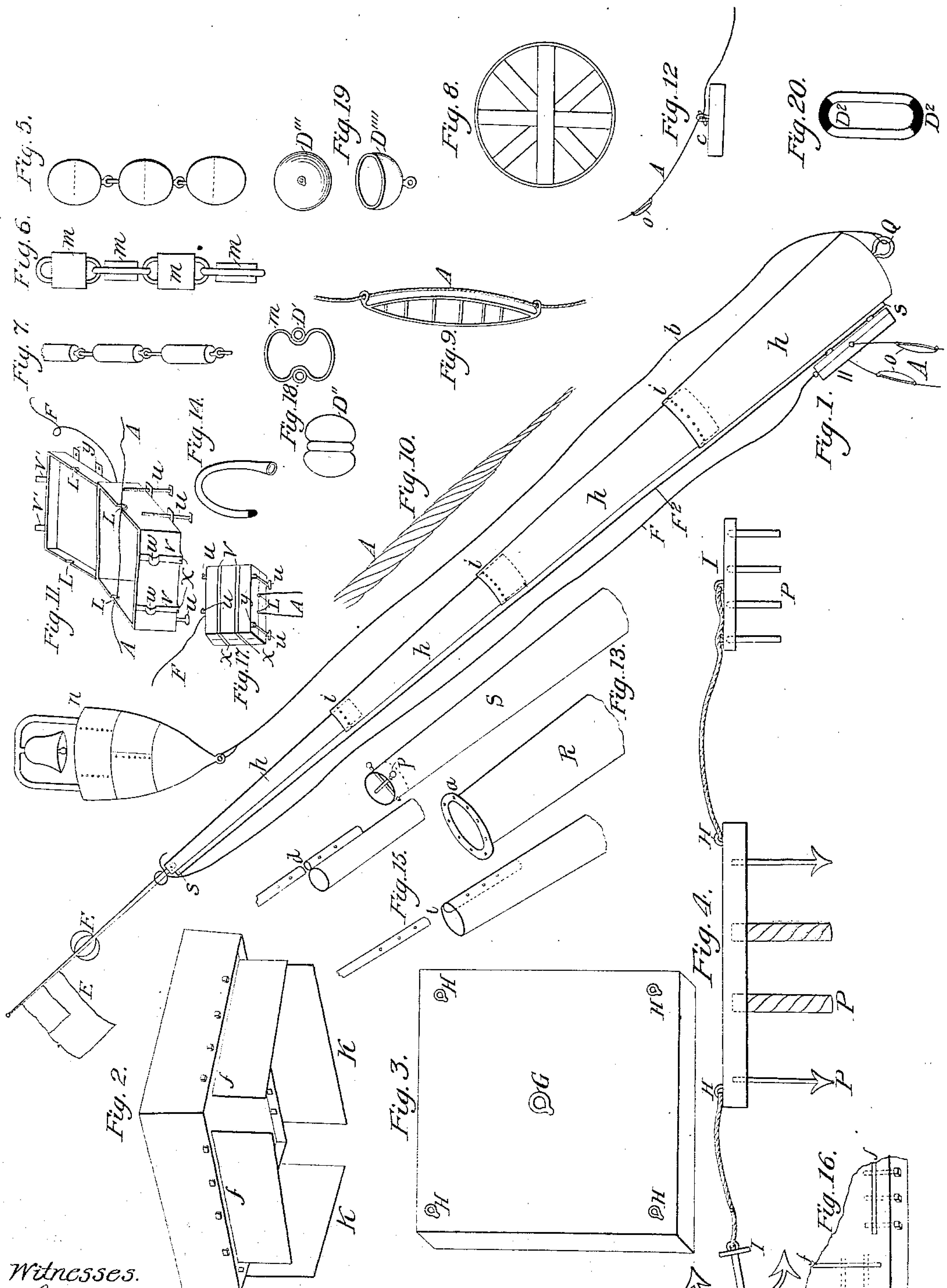
2 SHEETS—SHEET 2.



Witnesses.

Gustavus Virgh

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Inventor:

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UNITED STATES PATENT OFFICE.

GEO. W. BOWLSBY, OF MONROE, MICHIGAN.

IMPROVEMENT IN OCEAN-TELEGRAPHS.

Specification forming part of Letters Patent No. 52,522, dated February 13, 1866.

To all whom it may concern:

Be it known that I, GEORGE W. BOWLSBY, of Monroe, in the county of Monroe and State of Michigan, have invented a new and Improved Mode of Ocean-Telegraphing; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in a series of electric submarine telegraphic cables somewhat similar in manufacture to those now in use, or, in other words, an ocean electric telegraphic cable divided into sections of suitable length and connected by means of ships, which are moored to their places at sea by proper weights, anchors, and cables, and also by proper buoys, signals, &c., for finding such moorings or stations when abandoned temporarily by the vessel because of storms and various causes necessary in the working of the line, and also of proper devices for supporting the cables in the water between the surface and the bottom, and also of many other auxiliaries to the proper, convenient, and profitable working of the line and its dependencies, which will be described in this specification.

The different parts are the flying stations, consisting of ships or steamers and their tenders, the sections of electric cable, the fastening-cables and their buoys, the moorings with their auxiliaries, the signal-buoys and other signal-fixtures, the bell-buoys, the water-proof chest for packing the ends of the cables when the station is abandoned temporarily by the ship, and other minor devices for carrying them into effect.

In the accompanying drawings, Sheet No. 1 is a general view of the device in vertical elevation, showing the stations, one occupied by the steamer B′ or "flying-station," and the other temporarily abandoned with signals set, by which to direct the return of the flying station to its moorings B².

Sheet No. 2 shows the different parts in detail. Figure 1 shows the great "surface-buoy" with signals E E set, packing-box 11, and lanyard F in place, and the electric cable A passing through it, box-traveler F², and bell-buoy *n* attached. Figs. 2, 3, and 4 are different views of the great mooring and its auxiliaries K K I I P P. Figs. 5, 6, 7 are modifications of the mooring-cable chain-links. Figs. 8 and 9 of the electric and mooring cable buoys in section, showing the interior braces. Fig. 10 of the electric cable near and at ends of sections, showing enlargement between sea bottom and surface. Fig. 11 of packing-box and fixtures. Fig. 12 of electric-cable weights. Fig. 13 of the joinings of the compartments of the great surface-buoy. Fig. 14 of the hollow links in the mooring-cable before welding. Fig. 15 shows the flag-staff sockets. Fig. 16 shows the grooves in the moorings for the flanges. Fig. 17 the packing-box closed and modified. Figs. 18 and 19 are sections of mooring-cable buoys and links. Fig. 20 is a hollow mooring-cable link in section, (vertical,) with solid ends D².

Similar letters of reference refer to like parts.

A, Sheet 1, is the cable in sections, passing from one station to the other along the bottom of the sea, and passing to and from the surface of the water at intervals of twenty-five, fifty, one hundred, or five hundred miles, more or less, as proves most profitable in the different localities. It may be made of large size—say two or three inches, or even more, in diameter—as it will be laden on different vessels, and, being so short, will not overload the ship by its bulk. It may also have a large number of conducting-wires, even hundreds, because of its great size. These wires may also be made larger than those heretofore in use in ocean-cables for the same reason. The whole cable may also, if small, be enlarged at the ends to strengthen it, as shown in Fig. 10.

Buoys O, of just sufficient capacity and number to balance the weight of the cable from the bottom to the surface, are bent on at proper intervals along the wire, so that there need be no undue strain upon the great buoy, Fig. 1. The ends that reach the surface are passed into the ship B′, one on each side or both on one side, as most convenient, and communicate with the operating room and instruments, and the messages are repeated from one station to another, or past stations, according to the working strength of the currents on the wires for the time and other circumstances attending it. At the point where the electric cable leaves the bottom to go to the surface a small mooring, *c*, may be made fast to it to keep it from dragging about with the upward pressure of the buoys O and the swing of the ship to the different points of the compass in the wind.

The buoys, in very deep water, should be braced across thoroughly inside to prevent collapse of the walls by the immense pressure, and particularly at the joints to prevent leakage. This bracing is shown in Figs. 8 and 9.

The buoys are made in the common manner, of plates of iron joined into a water-proof air-chamber, and of the proper size and number for just sufficiently buoying up themselves and also the weight of the cable added.

At B′ and B² are the stations where the cables come to the surface and pass into the ship. They are surveyed and charted upon the map in a precise point of latitude and longitude, so that they can be readily found by the telegraph-ships and all the shipping of the world, and are occupied in the following manner: A mooring, Figs. 2, 3, 4, Sheet 2, is sunk to the bottom, of great weight, and, with its auxiliaries I P R, sufficient to hold a ship or steamer steadily in place on the surface in fair weather by means of a cable, D, which is self-supporting, and a long mast-like buoy, Fig. 1, at top, to which the telegraph-ship B′ is tied in fair weather, and in foul weather a signal, E, is set at the top of this, consisting of a tall flag-staff, with or without other signals, as flags, balls, and other well-known means of sighting objects at long distances, and the ship then abandons its moorings till a return of fair weather, when, by means of said signals, together with proper observations for latitude and longitude, it finds its station. These stations should be planted at convenient distances for all the objects of the line, and on the most frequented routes of travel between great marts of commerce, for the accommodation of shipping in transit, as well as for the termini of communication, and may branch off in divergent lines to various points, as found most profitable and convenient.

Fig. 1 is the great surface-buoy that supports the mooring-cable, and to which the ship is tied. It is a series of water-proof tanks, of considerable length and size, bolted or otherwise joined by flanges *a*, Fig. 13, or in any known manner, making, when put together, a spar-shaped buoy of great length, perhaps two or three, or even four, hundred feet, and of sufficient displacement in the water to elevate the signals a great distance in the air, and also to hold the packing-box, Fig. 11, below the agitated surface in quiet water while the ship is absent from the station, and also to compensate for any surplus weight in the appendages and for accumulations of deposits on the buoy and lines, and to provide for accidental leakage of itself or the buoys below. It has a ring, Q, at its foot for the great mooring-cable, a traveler, F^2, of iron rod or rope, its whole length, and proper staples or a socket, Fig. 15, or other means at top of fastening in place the signal-staff E. It is best to make it of different compartments, and then water-proof, for the following purposes: greater convenience in transporting it to its place of destination, of sinking it to its proper place in the sea, and of lifting it out of the sea for repairs, and also that, if it suddenly leaks and tends to fill, only one of the tanks will fill; otherwise it would sink and carry with it the whole fixtures of the station if the ship were absent at the time, and thus destroy the working of the two adjoining cables till relaid.

The compartments may be joined in various ways, among which are those shown in Fig. 1, and in R and O, Fig. 13. In Fig. 1 the joints are stepped into each other, and the flanges, as shown in S, Fig. 13, are bolted through and through with screw or key bolts, so that they can be separated when necessary. In R, Fig. 13, are flanges *a*, projected outward, and jamming up against each other, and through the flanges, which stand at right angles with the walls of the tanks, short bolts pass vertically, and are secured with screw-nuts or keys.

The traveler F^2 may be a rigid rod of iron the whole length of the buoy, and secured at a short distance from and parallel to it by elbow-joints *s s* at each end. The socket or staples, Fig. 15, or other fastenings for the signal-staff, may be made in any desirable and convenient manner. The bell-buoy *n* will be made as well known, and attached to the foot-ring Q of the great buoy by a rope-cable, *b*, and given a sufficient length to clear it from all danger of collision with the other buoy.

Figs. 2, 3, and 4 are views of the great moorings and their auxiliaries. They consist, first, of an immense mass of iron, having considerable breadth and width, but of little comparative thickness, and weighing from two or three tons to a hundred, more or less, with a strong ring, G, in the center of the top for the ship's cable D to enter, and other rings, H, at the corners to tie the auxiliary anchors or moorings I to. Other fixtures may be added to these, as broad thin flanges K, Fig. 2, bolted to the lower edges of the moorings and extending downward, which, by settling into the earth from the great weight of the mooring, take hold upon the additional weight of the mass of inclosed and surrounding mud and help to fix it firmly in place, which, with the superincumbent body of water lying upon the broad flat mass of iron, the great friction of the cables and their appendages in the immense depth of water, and the immobility of the water at such depth, will prevent the movement of the mooring, although it may be comparatively light.

Iron stakes P P P, either flat, square, plain, or barbed, or spiral like an auger, may be bedded into the under side of the moorings, having the same effect as the flanges K, or any other convenient device that will sink into and take hold of the mud upon the bottom of their own accord. (See the different forms at P P P, Fig. 4.)

Figs. 5, 6, and 7 are modifications of the great mooring-cable, made of water-proof air-cylinders stapled together, Fig. 7, or of rounded and grooved air-chambers m, inclosed in either solid or hollow links, Figs. 6 and 18, or of round chambers not inclosed, Fig. 5, and various other modifications of self-supporting chains, of iron tanks, or of buoys strung upon cable of rope or chain or wires, as seen at D, station B'. The buoys should be braced across internally in those that are strung on the cable at great depths, to prevent collapse by the pressure of the water externally. (See Figs. 8 and 9.)

If found necessary, the electric cables may be enlarged at the ends, as in Fig. 10, for increased strength.

Fig. 11 shows the box for packing the ends of the cable in when thrown overboard in a storm, and is an iron chest of suitable size and form, the joints being packed with rubber, as also the apertures L L where the ends of the cable enter. Inside of this the conducting-wires are properly joined to complete the electric circuit past that station to the next. The cable is laid in the rubber beds L L in the apertures, and the two halves of the chest are joined by powerful screw clamps and bolts u u and bands v v passing around the chest, or by lugs or flanges upon the edges of the seam or elsewhere. Upon one side of the box the bands have loops w w, which open out by hinges x x and pass around the traveler F^2, which fits loosely into the loops. The box is then closed, when the ends of the bands v' v', which project from the front edge of the cover, lock down onto the straps v v. The screw-bolts are then inserted in the lugs y y, and the box is lowered to the bottom of the great surface-buoy in still water by the lanyard F, and when the ship returns to its station the box and cable are lifted on board again by the lanyard F, the signals E are taken in aboard, and the line is again complete. A bell-buoy, n, is attached to the foot of the great buoy to assist in finding the station, especially at night and in fogs.

Small moorings may be set at the point where the electric cable leaves the ground to go to the surface, and tied to it to prevent its swinging around with the veering of the vessel or the upper end, and to overcome any extra buoyancy of the fixtures on the perpendicular ends of the cables. They are shown in Fig. 12.

Fig. 13 shows the joinings of the compartments of the great surface-buoy, and consist of open tubes P reaching beyond the air-chambers, which slip into each other and are bolted through from side to side. R shows flanges extending outward from the ends and jamming together and bolted vertically.

Fig. 14 shows the hollow links in the mooring-cable B^2 before fastening together by welding. It is a tube plugged at one end and welded down and drawn out a little smaller. The opposite end is stretched and passed over the smaller and then welded onto it.

Fig. 15 shows the flag-staff setting. In t the socket or cylinder for the reception of the staff is on the inside of the tube that is lifted into the air. In d it is on the outside.

Fig. 16 shows the grooves f in the under side of the moorings for the flanges K, with the bolts passing through them from the edges. They may also be packed with lead, instead of the bolts.

Fig. 17 shows the packing-box closed ready for throwing overboard, and also with the apertures L L both on one side, in which case the connection of the conducting-wires on the inside will be bent short to match them, and the cables will then both pass out at the under side of the box, directly downward, without any bend in the cable proper.

Figs. 18 and 19 are cross-sections of the mooring-cable. D''' is a top view of one of the air-chambers in Fig. 5. D'''' is a cross-section of the same in perspective, showing one half. D' is a cross-section of one of the hollow links in Fig. 6, with the inclosed chamber m having the corners rounded. D'' is a top view of the same.

Fig. 20 is a vertical section of hollow link, in which the ends D^2 are solid to increase the tortive strength, and also to prevent the wear through of the chafing-links into the air-chamber of the link.

Having described my invention, I will set forth some of its advantages over other ocean-telegraphs now in use, and also some of the uses to which it will necessarily be applied independent of electric telegraphing, and some of which are of as much or more importance than the communication with the opposite shores.

First, it makes it possible to telegraph by electric current across a wide and deep expanse of ocean, which, with a continuous cable, it is impossible to do by any known means practically, because principally of the waste of electric force from imperfect insulation; but there are other causes which operate to add to the difficulty, one of which is induction, even where the insulation is comparatively perfect, and which is increased by the immense pressure exerted by the overhanging body of water, and also by the high conducting powers of the medium through which the cable passes, consisting of salt-water, mud, and minerals, &c.—all good conductors—and to add to the resistance nearly all ocean-cables will have to be laid across the earth-currents, instead of along with them, thereby greatly increasing the resistance to the free passage of the artificial current. The earth, in its revolution on its axis, sends the electric fluid, by centrifugal force, to the circumference, and draws the supply from the center. On reaching the surface it moves in right lines to the nearest pole, where it enters at the magnetic pole—a point near the entire absence of rotary motion—and travels down the stationary line called the "axis," and returns again to the surface, and so on continually. These currents are of varying, but generally too great, intensity to permit the profitable working of long deep-sea lines, and impossible in the case of the great ocean stretches. These currents also attach the line with the advantage of great pressure. The overlying weight forces the ultimate atoms of water between the ultimate atoms of the insulator, and every little cell in the cable is soon filled with these minute stepping-stones, on which the natural currents leap across and through the artificial current, carrying along with them, little by little, the fluid from the wires, and thus step by step the force grows weaker, till it is finally all destroyed. This can be overcome only by powerful batteries exerted through short circuits, and by thicker insulation. The powerful batteries make the force of the current greater than the aggregate force of the counter-currents. The short circuits enable the signals to reach their destination before they are stopped by the induction, and the thicker insulation prevents the stepping-stones from reaching the wires in so great number, and therefore retards the leaping of the enemy across the path. From these reasons I am fully convinced that a continuous cable cannot be worked successfully across even the Atlantic, although laid upon the famous plateau.

But another advantage, and perhaps the greatest, is the benefit, direct and indirect, not only to commerce generally, but to shipping in transit. It will be a great inducement to all vessels to travel along the route, and thus add to each other's safety and convenience. Every ship owner and consignee may know just where his property is, and what condition it is in all the time, and when they may expect its arrival. Insurance will be greatly reduced, because the risk will be so much less. Salvages will be more frequent from all sorts of wreck. A mariner may work his foundered vessel to a near point of safety, instead of abandoning it for a raft, and thus save life and property both. The telegraph-stations may go to the relief of distressed vessels, whether on fire or foundered, or from any cause, and so may the crowd of sail along this ocean highway assist each other, like travelers along a frequented road. Before leaving its station the ship may notify the next stations each way of the direction, force, and other particulars of the coming storm, ice fields and bergs, &c.,, and thus notify all the shipping along the whole line to move out of its path and thus avoid it altogether. A supercargo may watch the market quotations all the way across the sea, and so prepare himself for his sales on arrival.

It will so increase the conveniences of commerce as to greatly increase the commerce itself, and the ocean will soon be a peopled continent alive with the rush of travel. Trading vessels will flock along the line and become tugs, salvors, mail-barges, lighters, &c., and become means of communication generally between the stations and passing ships. The routes will soon become immense mail-lines for the exchange of letters, sale of newspapers, carriage of parcels, &c. Express companies will be established, and most of the transit conveniences of the land will be created for the new order of things. Every passenger can have his daily papers, even from both shores, thus breaking up the monotony of a sea voyage; can communicate with his friends quickly and cheaply, (for hundreds of wires will soon be at work to supply the demand,) and more fully every day and hour by letter, and if he finds it necessary to return while yet at sea, can do so by waiting at a station the hourly arrivals of returning vessels. Pirates could not prey so readily upon weaker vessels because of so many enemies within hail.

Being in sections, it may be laid with safety, as fair weather only need be chosen. It can all be laid within a few hours, from one shore to the other, after the station-moorings are all set, as each vessel will have to steam but a short distance to connect with the others. The electric cable can be made of any desirable dimensions and any number of wires and any thickness of insulation, and if any of it fails only the defective piece need be laid aside, and that only temporarily, as, being so strong, it can be raised, instead of losing the whole line, as in long weak cables. Many such lines may be laid across the same ships when needed. Many intermediate stations may be posted along the route for separate lines, thus shortening the distance between the safety-beacons and cheapening the price of communication. Shipping would travel so closely along the route that all sunken rocks could be well known and guarded, and so avoided. Electric lights may be used on board the stations to signal passers and act as beacons and light up the surrounding fogs. The supply of electric fluid for all purposes may be generated by the engines of the stations. A passing ship may send a message at one station and receive a reply at another. The messages could be written rapidly, because of so little resistance, and therefore cheaply. The current being so strong, less mistakes would be made in writing.

What I claim, and desire to secure by Letters Patent, is—

1. The flying-telegraph stations B′, consisting of ships or steamers, when used for the purpose specified, and in combination with the permanent stations B^2 and the partially-submerged electric-cable sections.

2. The electric-cable sections, lying for the most part upon the bottom of the sea, and the ends coming to the surface of the water and supported by buoys, substantially as described.

3. The combination of moorings, Figs. 2, 3, and 4, Sheet 2, with buoys B′ and B^2, cables D D, and auxiliaries I I, P P, K K, H H, and G, Sheet 1, and made substantially in the manner described, and for the purpose specified.

4. The water-proof packing-chest, Figs. 11

and 17, with its appurtenances, for the joining of the ends of the cables, or any mechanical modification of the same for the same object, and substantially similar.

5. The combination of the great buoy, Fig. 1, with its traveler F^2, bell-buoy *n*, detachable signals E E, separate water-proof compartments *h*, joining flanges and fastenings *a p i*; but I do not claim any of them specially and separately.

6. The hollow-linked mooring-cable, Figs. 5, 6, 7, 14, 18, 19, 20, with the inclosed water-proof chamber *m*, for self-support in the water.

7. The flanged and staked moorings shown in Figs. 2, 3, and 4, for the purpose of adding to the weight of the mooring by taking hold of the earth by means of their own weight and gradually settling into the bottom, instead of taking hold by dragging, like an anchor, or by any other artificial means or force.

8. The interior bracing of the deep-water buoys, as shown in Figs. 8 and 9, for the purpose of overcoming the pressure of the water and the prevention of leakage.

9. The hollow-linked chain-cable, Figs. 6, 14, 20, when used without the inclosed air-chambers *m*, (shown in Fig. 6 and absent in Fig. 20.)

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Witnesses:

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