(No Model.) 3 Sheets—Sheet 1.

I. KITSÉE.

TELEGRAPHY.

No. 550,510. Patented Nov. 26, 1895.

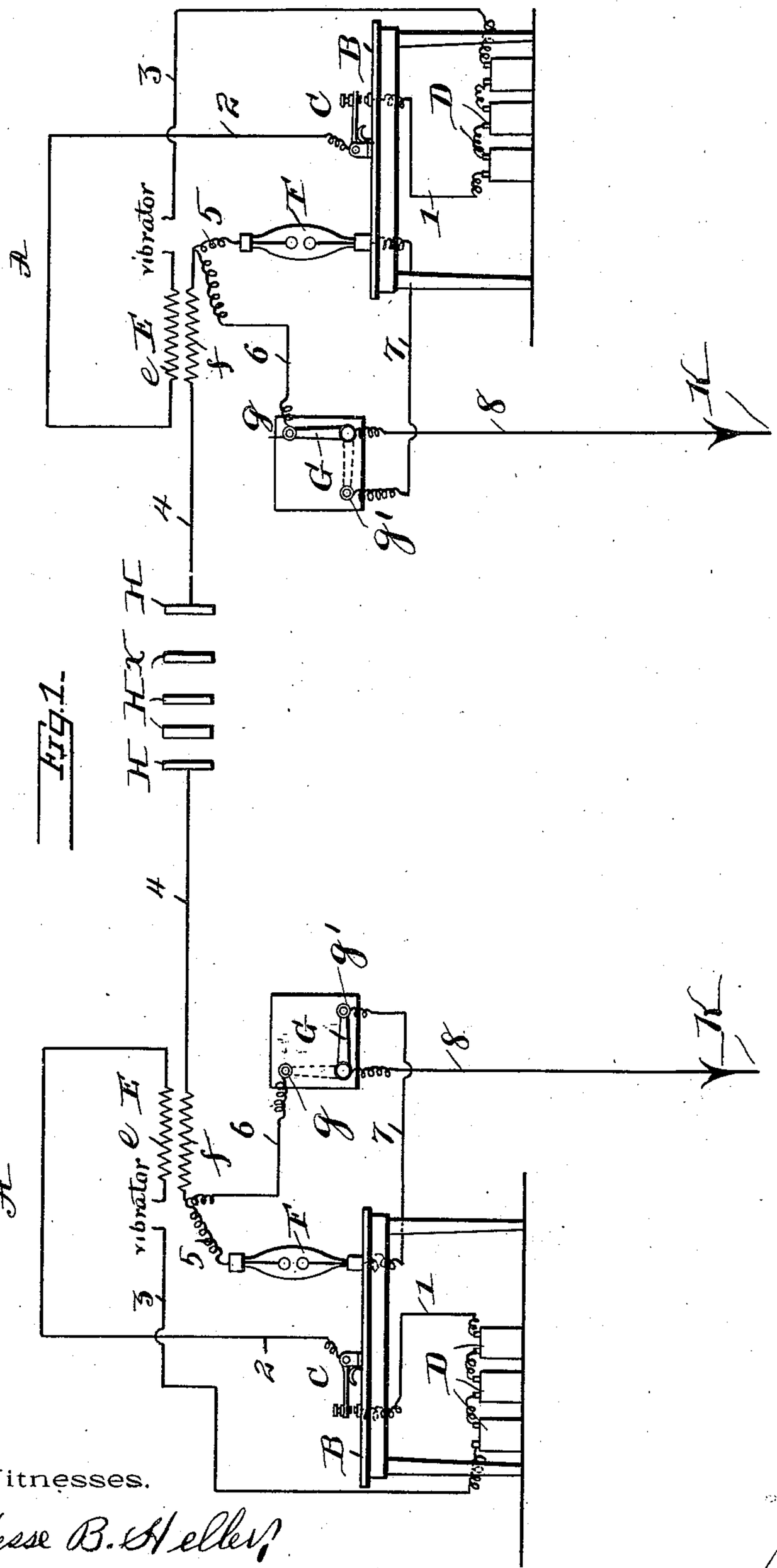

Fig. 1.

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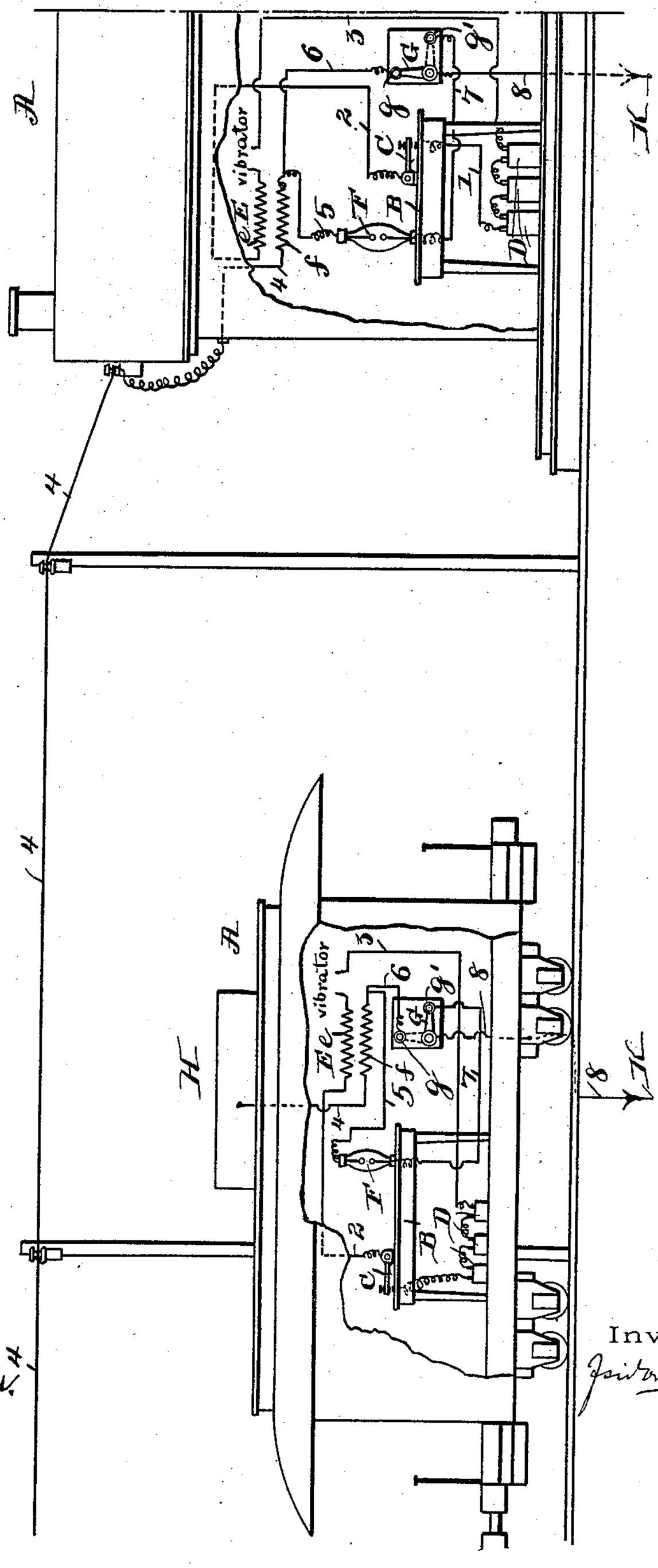
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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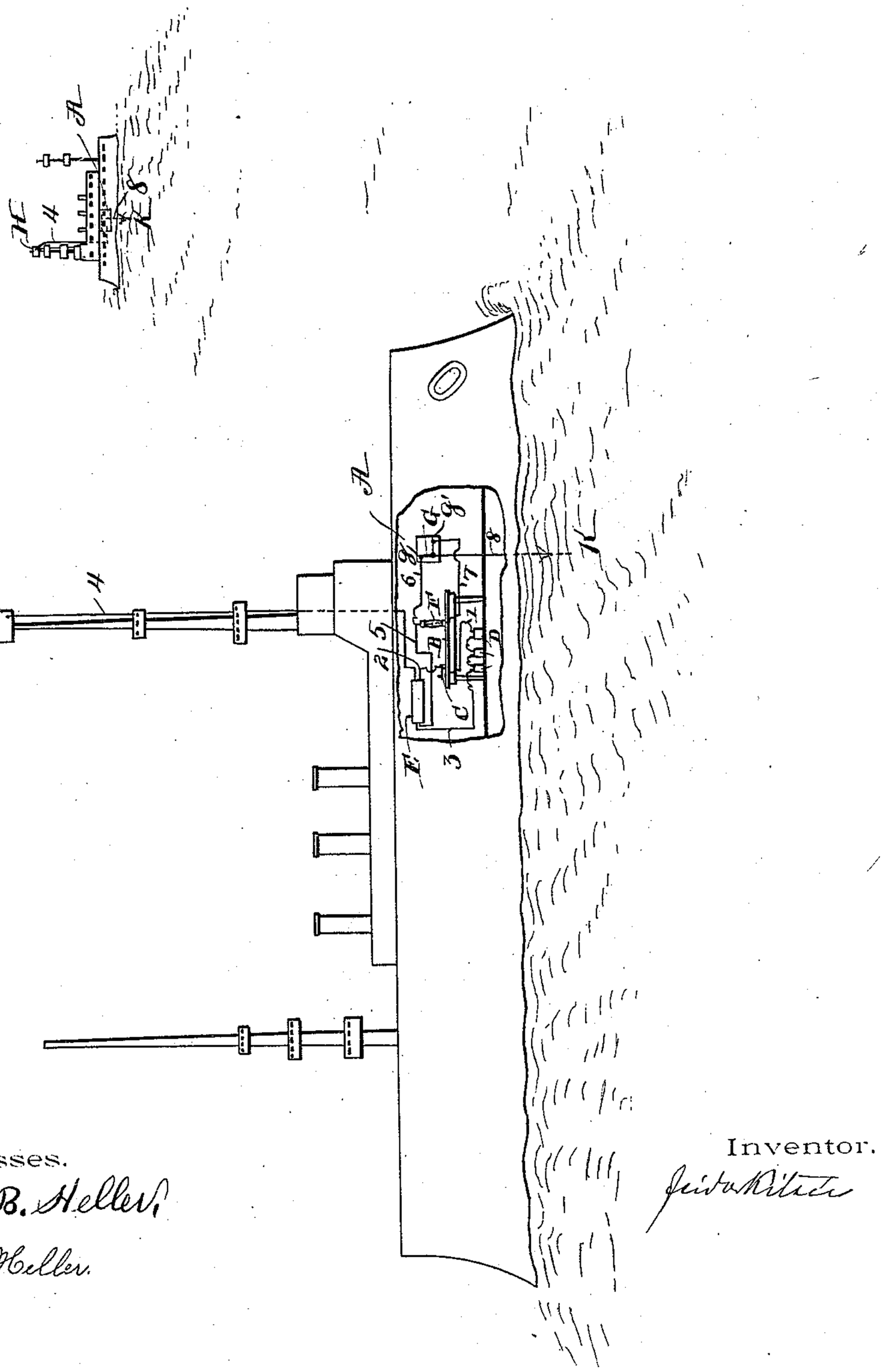

Witnesses.
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SPECIFICATION forming part of Letters Patent No. 550,510, dated November 26, 1895.

Application filed May 25, 1895. Serial No. 550,677. (No model.)

To all whom it may concern:

Be it known that I, ISIDOR KITSEE, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Telegraphic Communications, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to telegraphic communications, and has for its object the sending and receiving of telegraphic messages or signals by electricity without the aid of a continuous metallic circuit between sending and receiving stations.

To this end the invention consists in the special features hereinafter described, and particularly pointed out in the claims which follow this specification.

Referring to the drawings, Figure 1 represents in a diagrammatic view my improved system of telegraphic communication between two stationary points. Fig. 2 represents in a diagrammatic view the same system as carried out between one stationary point and one moving object. Fig. 3 represents in a similar view the same system as carried out between two movable objects.

A and A are two telegraph-stations, each being provided with similar sending and receiving devices.

B is the table on which the devices are mounted; C, the key for sending the messages; D, the batteries connected with one pole through wire 1 to the lower part of the key, the upper part of which is, through wire 2, connected to the primary *e* of the inductorium E, which in turn is connected through the vibrator and wire 3 with the opposite pole of the battery D. The manipulation of the key is in principle the same as in the common Morse system; but here the similarity ends. In ordinary telegraphy only one impulse is sent, no matter how short or long the closing period of the key is. In the sender, as illustrated, the longer or shorter closing-time of the key is equal to the production, and therefore sending, of a greater or lesser number of recurring or alternating impulses, as will later on be more fully explained.

The secondary of the inductorium E is connected on one end, through wire 5, with the vacuum-tube F and through wire 6 with one of the contact-points *g* of the switch G. The other end of the vacuum-tube is connected through wire 7 with the other contact-point *g'* of the same switch G. The switch itself is permanently connected at K through wire 8 with the ground.

The arrangement and mode of working is, as stated above, not essentially different from existing telegraph systems. The dissimilarity commences when the result of the working is taken into consideration. In existing systems the key is connected directly with the source of straight current and with the outgoing line-wire, and the closing of the key results in the uninterrupted flow of a straight current. Its effect at the receiving-station is equal to the effect of one electrical impulse, lasting in its chemical or magnetic action as long as the flow of the current, and therefore as the closing-time, of the key; but the interposition of the inductorium changes the effect. The key, no longer directly connected to the line-wire, but forming with the primary of the inductorium and the batteries a separate and local circuit, effects directly only the flow of the current in the wire forming the primary of the inductorium. Each closing of the key, supposing the vibrator to be a permanent connection, would therefore induce in the secondary of said inductorium only one impulse; but the vibrator being in action at the same time that the key is closed it follows that the induced impulses in the secondary wires correspond in number with the number of vibrations of the vibrator, each closing, as well as each opening, producing its own induced impulse. The longer, therefore, the key stays depressed the greater the number of induced impulses generated and sent over the outgoing line-wire. It is therefore in reality not only one impulse which is sent by each depression of the key, but a number of impulses. This is the first fundamental difference from existing telegraphic systems working on the Morse principle.

The second fundamental difference is found in the mode of receiving.

The induced impulses created in the secondary wires of the inductorium are of intensely-high electromotive force. They, as is well known, will, in a vacuum-tube, produce

the peculiar glow with which all versed in the art are well acquainted. The closing of the key in sending a current through the intervention of the vibrator through the primary wires generates the necessary induced impulses to create the glow referred to; but to the naked eye this action seems one continuous glow, and the greater or lesser number of induced impulses translated, as they are, in the vacuum-tube into the continuous glowing, effect only the glow-time. In other words, the longer the key stays depressed at the sending-station the longer will be the glow-time at the receiving-station, and the shorter the time of the closing of the key the shorter will be the glow-time. We therefore have in reality the Morse system with its dots and dashes, represented by the shorter or longer closing-time of the key at the sending and by the shorter or longer glow-time of the vacuum-tube at the receiving station. This method of sending and receiving may be adapted to ordinary telegraph-lines with unbroken metallic connections between sender and receiver. It may and undoubtedly has some advantage in submarine cabling, but it is of the highest value and even a necessity where the telegraphing or signaling has to be done without a continuous metallic circuit between the two stations.

In all figures the wires emanating from the stations, stationary or movable, with the exception of the stationary line in Fig. 2, have their extreme ends connected to the conducting-plate H. In Fig. 1, illustrating the system as carried on between two stationary points, additional plates $H^{\times}$ are placed. These plates are supported by non-conducting uprights and have to be well insulated. The office of these additional plates is to concentrate the electric impulses between the end plates if the same are at too great a distance from each other, but can be dispensed with if the distance of the end plates can be overcome by the direct impulses generated at the sending-station.

The end plates of a stationary system should be supported as high up in the air as possible and in direct line. In cities they should be elevated above the intervening buildings.

In Fig. 2 my invention is illustrated as applied to a car on a steam-road. The continuous wire of existing telegraphic circuits may be used as the wire illustrated in this figure and numbered 4 4 4. The plate H on the car should face the wire, and should be, as all end plates have to be, of the largest dimension practice can allow. The system as applied to moving cars is such that telegraphic communications can easily be established and maintained, and the messages received will be read by the operator in the car with as much ease as if the noise and jolting incident to the travel did not exist.

Fig. 3 illustrates the invention as applied to two vessels at sea. The two plates H are fastened to the upper part of the masts. The return-circuit is established through the water. The equipment with this system will be of great advantage not only to vessels of commerce, but telegraphing and signaling between men-of-war in time of action can be quicker and safer accomplished with this than with the ordinary flag system.

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

1. A system of telegraphic communications, consisting of sending and receiving stations, the sending station being connected with a source of rapidly recurring or alternating currents of electricity, the receiving station being connected with a vacuum or Geissler-tube, as and for the purpose specified.

2. In electric communications without a continuous metallic circuit a vehicle moving along the road of travel, a metallic conductor placed along said road of travel, said vehicle being provided with a source of rapidly recurring or alternating impulses and a sending key, and also with a vacuum-tube or similar device as a receiver, the stationary station connected with said metallic conductor being provided with similar sending and receiving devices as said moving car.

3. In telegraphy two or more stations, each being equipped with a sending device consisting of a source of rapidly recurring or alternating electric impulses and a sending key, and a receiving instrument consisting of a vacuum tube or device similar in its action.

In testimony that I claim the foregoing as my invention I hereunto sign my name this 16th day of May, A. D. 1895.

ISIDOR KITSEE.

In presence of—

JAMES S. PHILLIPS,

A. J. LEVINGTON.