

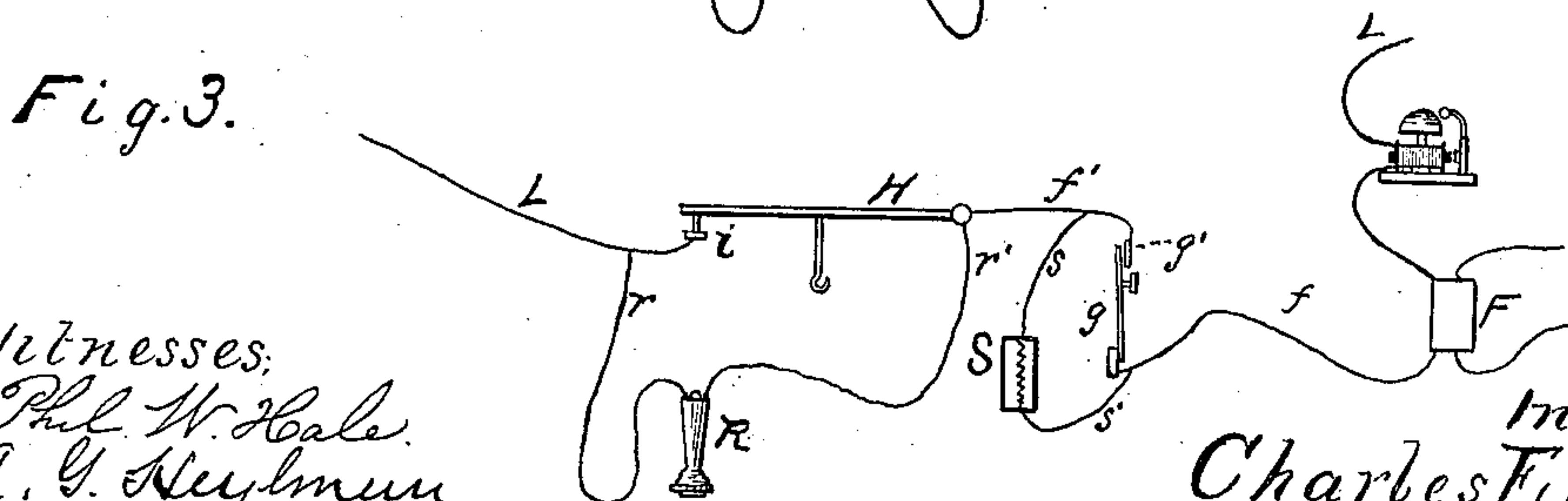
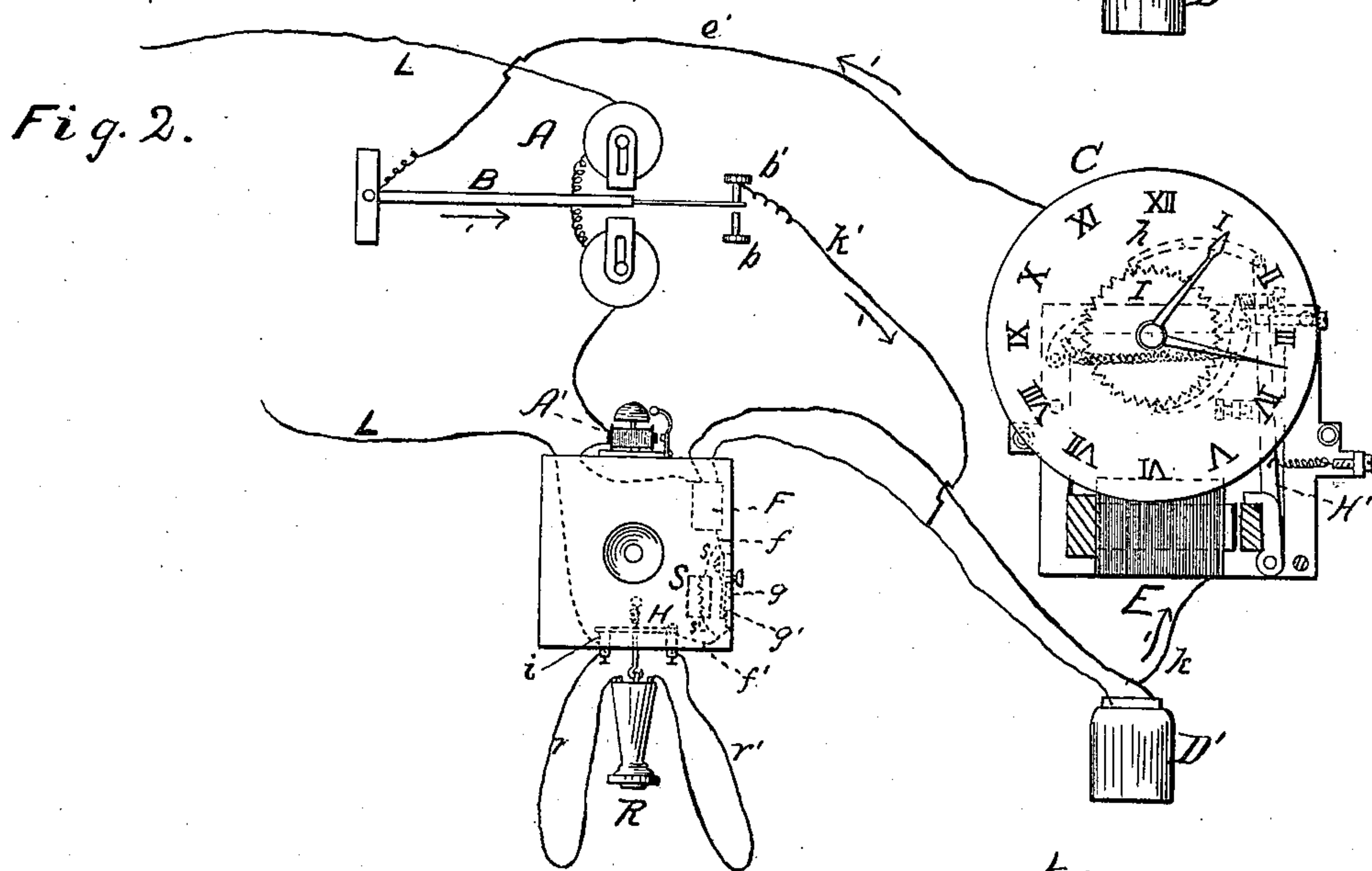
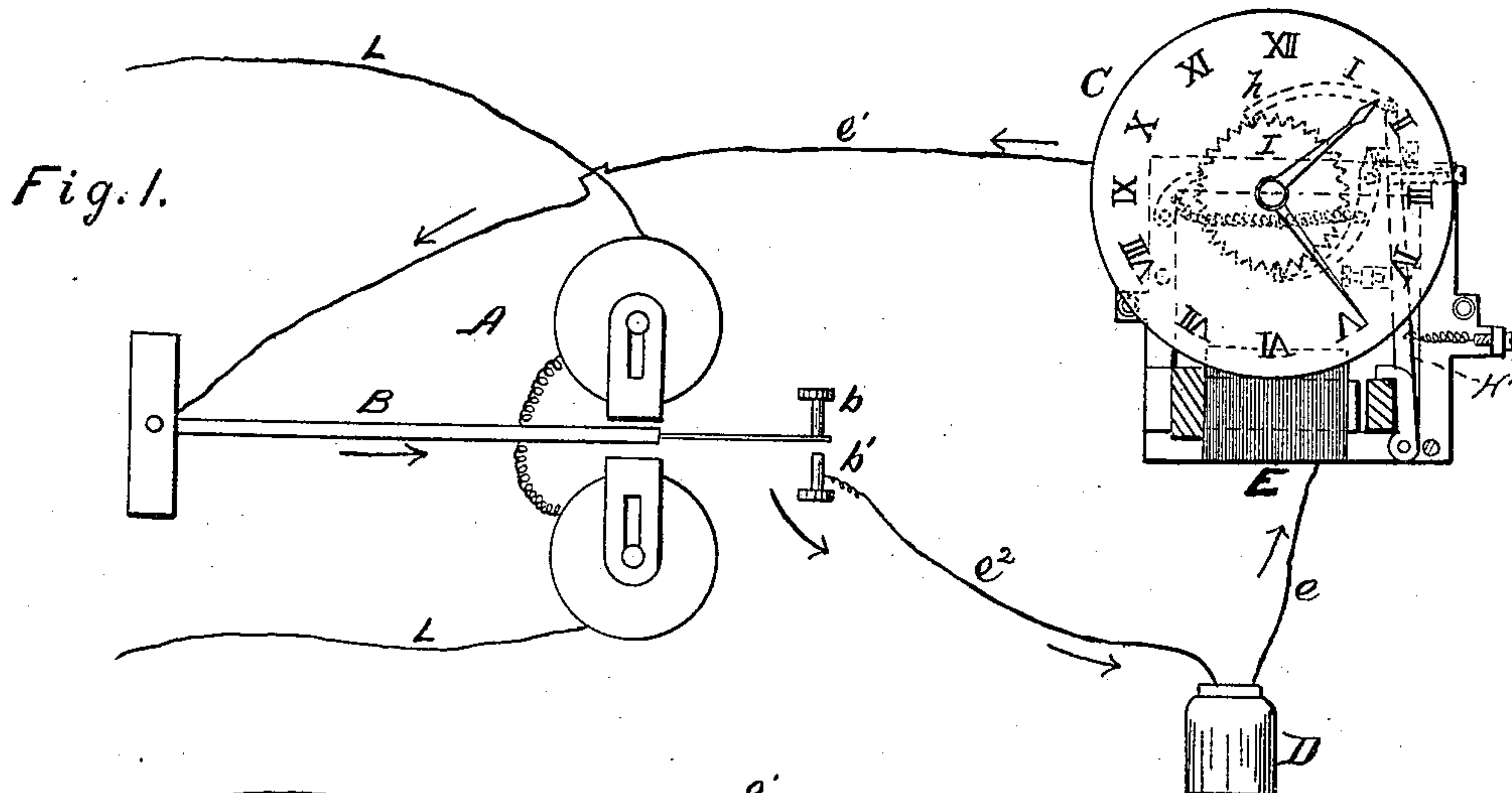
(No Model.)

C. E. BUELL.

COMBINED TELEPHONE AND ELECTRIC CLOCK SYSTEM.

No. 251,519.

Patented Dec. 27, 1881.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## COMBINED TELEPHONE AND ELECTRIC-CLOCK SYSTEM.

SPECIFICATION forming part of Letters Patent No. 251,519, dated December 27, 1881.

Application filed September 19, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. BUELL, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Combined Telephonic and Electric-Clock Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to the utilization of a single main-line wire for telephonic communication, and at the same time for controlling one or more electric clocks; and it consists in a novel arrangement of a local circuit including an electric-clock, in connection with a relay included in the main line, the clock being operated by the regular intermittent action of the relay closing and breaking the local circuit, as will be hereinafter more particularly described.

In the accompanying drawings, Figure 1 is a diagram illustrating an electric-clock station arranged according to my invention, in connection with the main line, which may be used for a telephone-circuit. Fig. 2 is a diagram illustrating the construction of a combined telephone and electric-clock station according to my invention. Fig. 3 is a detail diagram, illustrating devices for sending signals over the line.

Referring to Fig. 1, the letter L indicates the main line, in which is included polarized relay A, polarized armature B of which plays between the stops *b* and *b'*.

D is a local battery, from one pole of which a wire, *e*, leads to one of the terminals of an electro-magnet, E, which forms a part of the mechanism of the clock C, and from the other terminal of the coil of said magnet a wire, *e'*, leads to and is connected with the pivoted end of the polarized armature B. A wire, *e''*, leads from the battery D to the lower stop, *b'*, which limits the play of the armature B. The main line is connected to the main battery, and at a suitable point in the main line is arranged a controlling-clock, provided with means for reversing the current on the main line at regular inter-

vals; or if the controlling-clock be arranged at a terminal station it may make and break the main circuit at regular intervals. The reversals of the current on the main line cause the armature B to alternately make contact with the lower stop, *b'*, and the upper insulated stop, *b*. When the armature strikes the lower stop, *b'*, the local circuit is closed, and the current of the local flows, as indicated by the arrows, over wire *e*, coils of magnet E, wire *e'*, armature B, metallic stop *b'*, and wire *e''*, back to the battery. The magnet E, being charged, attracts its armature, which is carried by a lever, H', said lever having pivoted to its upper end a pawl, *h*, which takes into the teeth of a star-wheel, I, fixed upon an arbor of the clock, which is so geared with the clock-train that every forward movement of said star-wheel causes relative progressive movements of the hour and minute hands of the clock.

I have not shown the clock-train in detail, as it may be constructed in any suitable known manner.

It is obvious that the movement of the hands of the clock C will be isochronous with the reversals of the currents on the main line by the controlling-clock and the consequent closing of the local circuit. While the reversals of the current on the main line are going on, or even while regular makes and breaks of the main circuit take place at a terminal station, the main line may be used for telephonic communication, as the magneto-electric pulsations or undulations will not interfere with or be interfered with by the impulses flowing on the line at the same time from the main battery, provided the main circuit is kept intact between the stations in telephonic communication.

In the combined telephone and electric-clock station illustrated in Fig. 2 the main-line circuit L, after passing through coils of the polarized magnet A, connects with the coil of the bell-magnet A', and from thence connects with one terminal of the secondary coil of the induction-coil F of the transmitter, from the other terminal of which a wire, *f*, leads to a push-button circuit-breaker, *g*, from the stationary contact *g'* of which a wire, *f'*, leads to the telephone supporting-arm H. This arm, when depressed by the weight of the telephone, makes contact with metallic stop *i*, to which a main-



line terminal is connected. To this metallic stop *i* is connected one of the wires, *r*, leading from the receiving-telephone R, the other wire, *r'*, leading from which is connected with the pivoted end of the metallic telephone-supporting lever. When this lever is down it short-circuits the receiving-telephone; but when it rises from the stop *i* the telephone branch is included directly in the main circuit. A derived circuit (indicated by *s* and *s'*) has its terminals connected with the wires *f* and *f'* on opposite sides of the circuit-breaker *g*, and this derived circuit includes a resistance, *S*. It will be seen, then, that, although the circuit-breaker may break the line between the junctions thereof of the derived circuit, the main-line circuit, as a whole, remains unbroken when the circuit-closer is opened; but the opening of the circuit-closer, by including the resistance *S* directly in the main line, causes a variation in the tension of the currents flowing over the main line, and this variation of tension may be caused to operate signals constructed for such operation in a well-known manner.

The letter *D'* designates the local battery, the circuit of which includes the primary coil of the induction-coil *F* and the tension-varying contacts of the transmitting apparatus in the usual manner, which need not, therefore, be illustrated in detail here. From the wire leading from one pole of the local battery a wire, *k*, leads to one terminal of the coil of the clock-magnet, from the other terminal of which magnet the wire *e'* leads to the pivoted end of the armature *B* of the polarized magnet, and from the upper metallic stop, *b'*, of said armature a wire, *k'*, leads to the other wire leading from the local battery. When the armature *B* is in contact with the upper stop, *b'*, it will be seen that the clock-magnet is in a circuit derived from the circuit of the local battery and indicated by the arrows No. 1. The main-line current is reversed at regular intervals by a controlling-clock, as described in reference to

Fig. 1, and whenever the armature *B* makes contact with the stop *b*, the derived circuit including the clock is closed, and the clock-magnet actuates the mechanism thereof for propelling its hands isochronously with the operation of the controlling-clock.

It will be seen that the derived clock-circuit is included in and forms a part of the local circuit, but can be opened and closed without interrupting the continuity of the local circuit through the primary coil of the induction-coil *F* of the transmitting apparatus.

The main circuit, as before explained, remains unbroken after it leaves a central or terminal station, the calling signals being given by the push-button circuit-breaker *g*, which does not really break the main circuit, but includes therein the resistance *S*, when operated as before explained, and as clearly illustrated in Fig. 3.

Having now described my invention and explained the operation thereof, what I claim is—

1. In a combined telephonic and electric-clock station apparatus, the combination, with the main line, of a relay included therein, a local-battery circuit including the primary coil of an induction transmitting apparatus connected with the main line, and a derived circuit emanating from the local circuit including an electric clock and arranged to be broken and closed by the relay, substantially as described.

2. The combination, with a main electric circuit and a combined telephone and electric-clock station apparatus, substantially as described, of devices, substantially as described, for signaling to a remote station without interrupting the continuity of the main circuit.

In testimony whereof I affix my signature in presence of two witnesses.

CHAS. E. BUELL.

Witnesses:

JAMES G. SMITH,  
GEO. F. RILEY.