No. 655,144. Patented July 31, 1900.

O. P. & R. H. YURGAE.

ELECTRIC SIGNAL REGISTERING SYSTEM.

(Application filed May 14, 1900.)

(No Model.) 3 Sheets—Sheet 1.

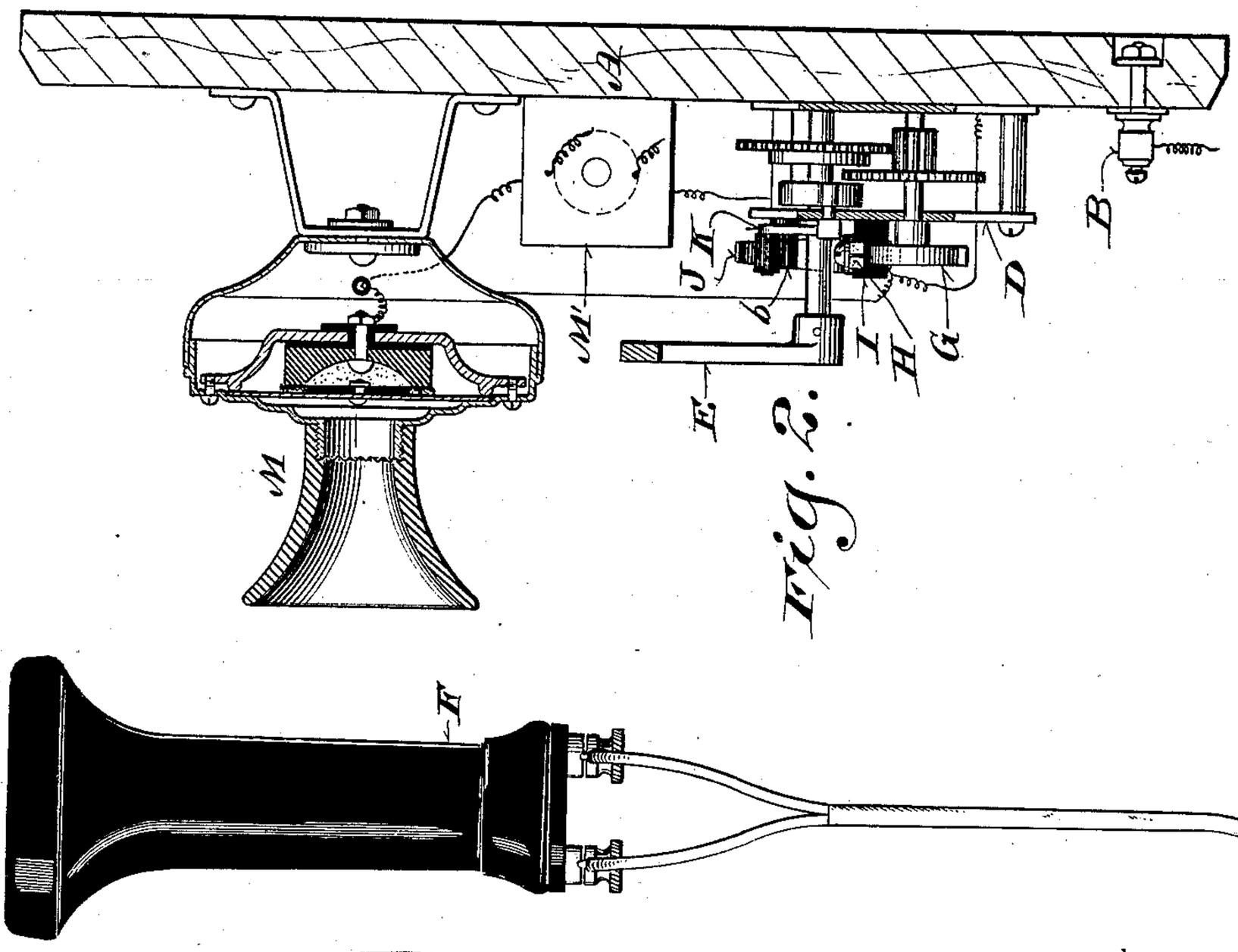

Fig. 2.

Fig. 1.

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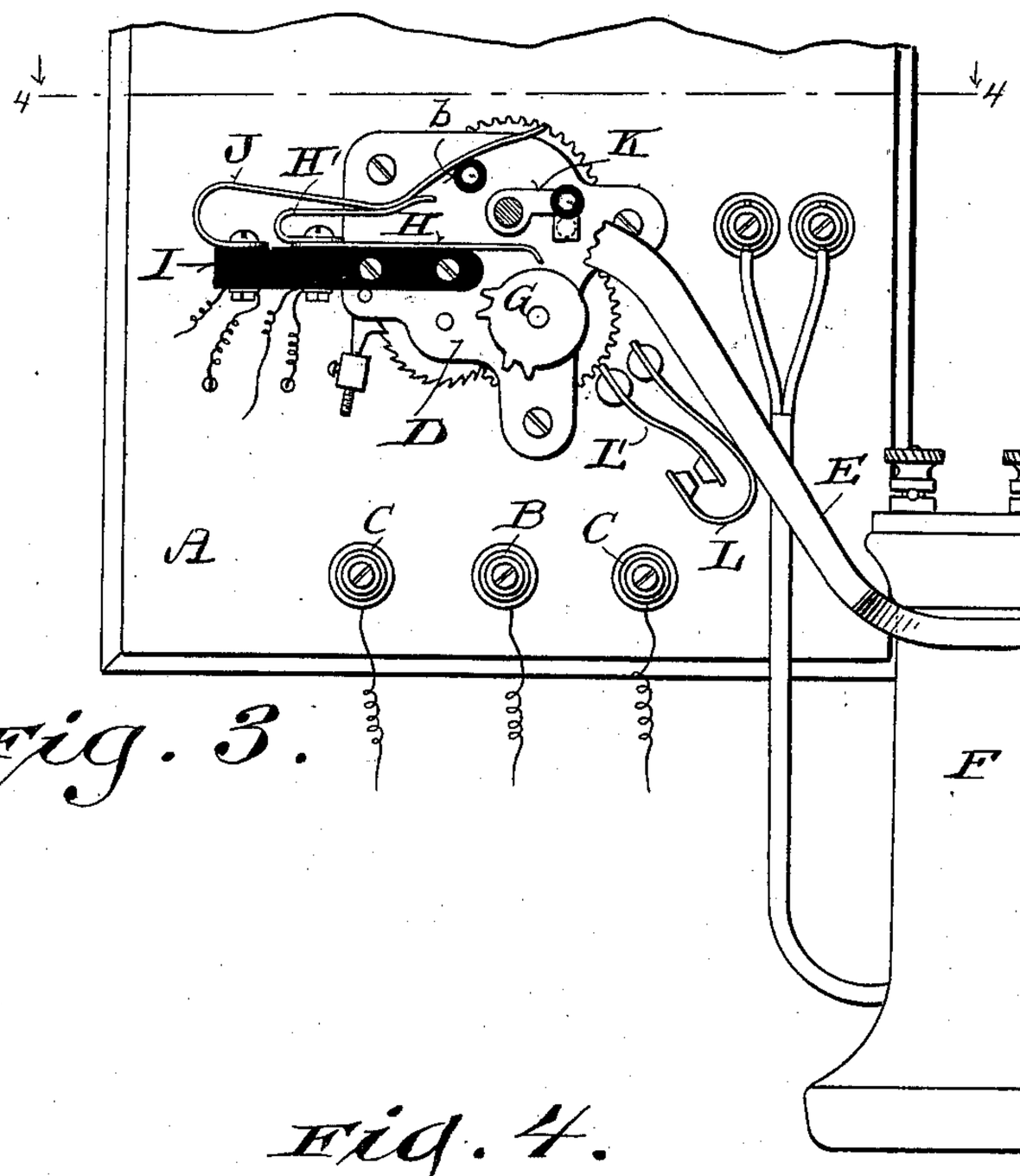
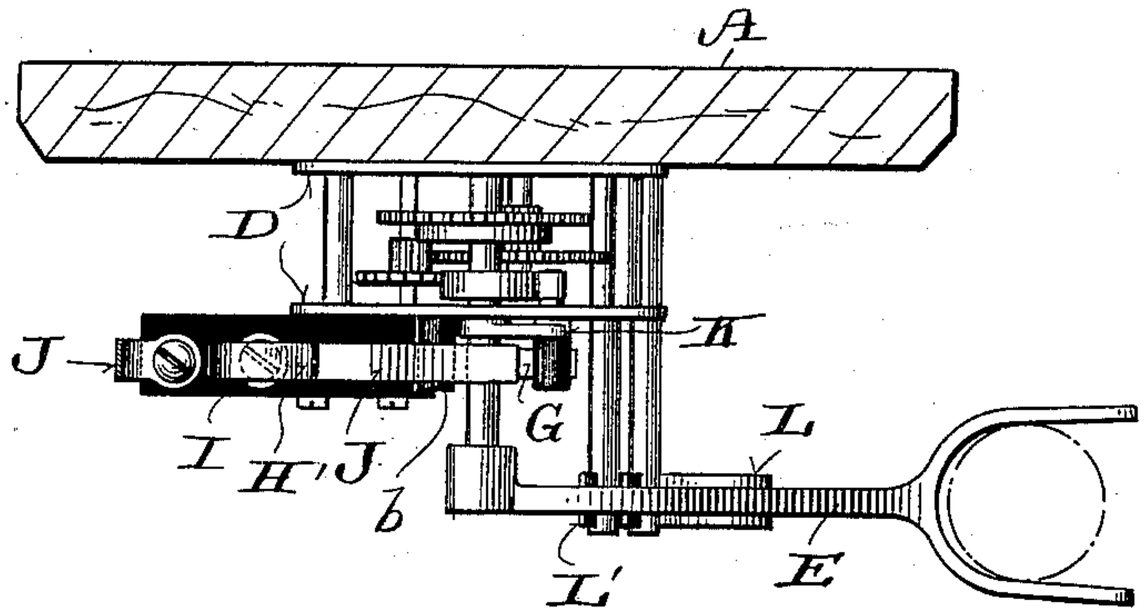


Fig. 3.

Fig. 4.



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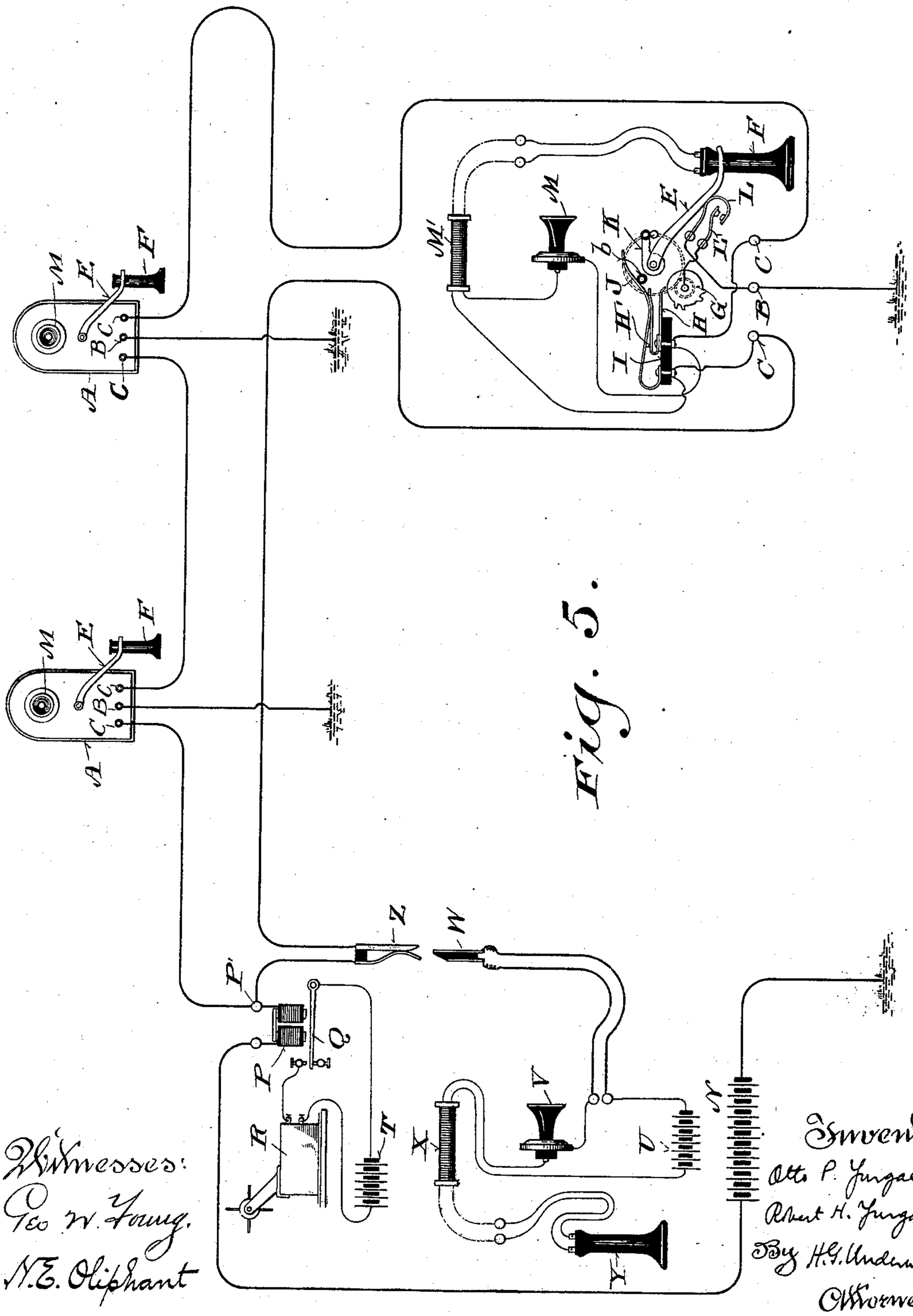

Fig. 5.

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UNITED STATES PATENT OFFICE.

REISSUED

OTTO P. YURGAE AND ROBERT H. YURGAE, OF MILWAUKEE, WISCONSIN, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO THE YURGAE SIGNALPHONE MANUFACTURING COMPANY, OF SAME PLACE.

ELECTRIC-SIGNAL-REGISTERING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 655,144, dated July 31, 1900.

Application filed May 14, 1900. Serial No. 16,563. (No model.)

To all whom it may concern:

Be it known that we, OTTO P. YURGAE and ROBERT H. YURGAE, citizens of the United States, and residents of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Electric-Signal-Registering Systems; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention has for its object to economically combine electric-signal-registering systems with means for electric-telephone communication between call and main stations of such systems, said invention consisting in what is hereinafter particularly set forth with reference to the accompanying drawings and subsequently claimed.

Figure 1 of the drawings represents a front elevation of combined signal and telephone apparatus embodied in a call-station instrument that constitutes part of our invention, the telephone-receiver being off hook; Fig. 2, a sectional view indicated by line 2 2 in the preceding figure; Fig. 3, a front elevation of a portion of the aforesaid apparatus, partly broken, said telephone-receiver being hung on the main-shaft crank of a spring-motor such as is commonly employed in messenger-call boxes of district-telegraph companies; Fig. 4, a plan view, partly in horizontal section, on the plane indicated by line 4 4 in the third figure of the series; and Fig. 5, a diagram illustrating the practical working of our invention.

Referring by letter to the drawings, A indicates the back of an instrument such as we propose to employ at each call-station of an electric-signal-registering system, and in practice a removable housing will be utilized to cover mechanism mounted on said back, the latter being provided with a ground-wire binding-post B and other binding-posts C C for a line-wire with which the several call-station instruments are connected in series. Mounted on back A is the frame D of a spring-motor, to which reference is had in the description of Fig. 3, and in accordance with our invention main-shaft crank E of this well-known type of motor is made to serve as a hanger for an electric-telephone receiver F, that in accordance with our invention constitutes part of the apparatus at each call-station on the line. When the receiver F is hung on motor-crank E, the latter is swung down to contract the motor-spring; but if said receiver be detached from said arm expansion of said spring takes place to drive the motor-gear, and thereby rotate the number-wheel G, fast on a counter-shaft of the gear-train, throw of the aforesaid arm in either direction being limited by any suitable means. When the number-wheel has rotation, its teeth contact with an opposing spring-metal plate H, constituting a conductor supported on insulation I, attached to the motor-frame. Another spring-metal plate or conductor H′ is shown surmounting the one H, for the most part parallel thereto; but in practice it may be a recurved continuation of same, these conductors being electrically connected with one of the line-wire binding-posts C of the instruments. Supported on insulation I and electrically connected with the other of the line-wire binding-posts C of the instrument is a spring-conductor J, that contacts with conductor H′ and an insulating-stud *b* of the motor-frame when crank E is depressed to full limit. Fast on the main shaft of the motor we show an insulated lifter K for the conductor J; but it is practical to have this lifter on the aforesaid crank, its function being to break connection of the opposing conductors when said crank has upward throw incidental to removal therefrom of the telephone-receiver for which it constitutes a hanger.

In post connection with the instrument back A we show spring-contacts L L′, one of which is wired to binding-post B and the other to the motor-frame, whereby when these contacts are in touch the number-wheel G is grounded. The motor-crank E being swung down by weight of telephone-receiver thereon, it bears against contact L to separate same from contact L′, and thus the ground is taken off the number-wheel; but it is apparent that grounding of said wheel takes place the in-

stant said crank-arm is permitted to ascend. While we have provided means for taking the ground off the number-wheel when the call-station telephone-receiver is hung up, it is practical to have the ground constant on said wheel. An electric-telephone transmitter M and an induction-coil M′ are included in the call-station instrument, the conductors H and J being put in circuit with said transmitter and primary of the coil, the secondary of said coil being put in circuit with the telephone-receiver F aforesaid. One terminal of a battery N at main station of the line is grounded, and the other terminal of the battery is wired to the electromagnet P of a relay, from which said line goes out through a post P′, through the several call-station instruments, and returns to said post, the armature Q of the relay, a register R, and a battery T being in local circuit. An electric-telephone apparatus at main station is in circuit with a battery U, having sufficient strength to overcome resistance of the line-circuit, the terminals of this battery, the transmitter V of the telephone apparatus, and opposite conductor-plates of a split plug W being in circuit with the primary of the induction-coil X of said telephone apparatus, the receiver Y of this apparatus being put in circuit with the secondary of said coil.

In connection with the line at main station is a spring-jack Z for engagement of the split plug W when it is desirable to connect the telephone at said station with said line.

To signal main station from any call-station on the line, telephone-receiver F at the call-station is removed from its hanger, and incidental to automatic ascent of this hanger the then rotating number-wheel is grounded, whereby it is apparent that the number of the call-station will be automatically registered at said main station owing to intermittent contact of the teeth of said wheel with conductor H, whose practical continuation H′ is for the time being in contact with conductor J of the circuit. When a call comes in, the main-station operator connects split plug W with spring-jack Z to utilize current from battery U and complete a metallic talking-circuit with the call-station, the lifter K at said call-station having operated in the meantime to lift conductor J, so that the telephone apparatus of this station may be effective. The caller can now converse with the main-station operator to impart or receive instruction or information, and the conversation being finished receiver F of calling-station telephone is again hung on the motor-crank to thereby effect an automatic cutting out of said telephone and the taking away of ground from the number-wheel of the signal-circuit.

From the foregoing it will be understood that all current necessary for the signaling and talking circuits is furnished directly from main station of the line, and under ordinary circumstances none of the call-stations on said line can have telephone communication with the main station without first registering the call-station number, nor does establishing of the talking-circuit between one call-station and main station interfere with sending in of signal from any others of the call-stations on the line, and should it happen that while one caller has the line other callers cut in the operator at main station will take the messages in order of registration of the calls. Should the line furnishing current for talking-circuit become broken, short-circuited, or otherwise inoperative, there will be no interference with the signaling of a call-station to main station, as either the out or in of the line and the ground will constitute a signal-circuit. In case the signal-circuit becomes improperly grounded, so as to prevent registration of a call, and the talking-circuit remain unimpaired communication between call and main stations may be had on the latter circuit, provided main-station operator becomes aware of the trouble and connects main-station telephone with the line.

It is obvious that one main-station-telephone apparatus may serve for connection with the talking-circuit of any of several independent call-station lines, each of the latter being provided with its own spring-jack for engagement of the split plug constituting part of said apparatus.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a main-station battery and electric-signal-register apparatus, call-station instruments in series on a line in circuit with said battery and apparatus, each instrument comprising a number-wheel, a spring-motor for same, separable conductors intercepting the line and arranged to have one thereof in yielding opposition to teeth of said wheel, a crank on a motor-shaft movable in one direction to contract the motor-spring, a device movable with the crank to separate said conductors coincident with expansion of said spring, and an electric-telephone apparatus in circuit with the aforesaid conductors, the motor-crank serving as a hanger for the receiver element of this apparatus; means for ground-circuiting the number-wheel with the aforesaid battery, a main-station electric-telephone apparatus, a battery for same, and means for putting this telephone apparatus in and out of circuit with the line of call-stations.

2. The combination of a grounded main-station battery and electric-signal-register apparatus, call-station instruments in series on a line in circuit with said battery and apparatus, each instrument comprising a number-wheel, a spring-motor for same, separable conductors intercepting the line and arranged to have one thereof in yielding opposition to teeth of said wheel, a crank on a motor-shaft movable in one direction to contract the motor-spring, a device movable with the

crank to separate said conductors coincident with expansion of said spring, electric-telephone apparatus in circuit with the aforesaid conductors, the motor-crank serving as a hanger for the receiver element of this apparatus, and separable contacts respectively in electric connection with ground and the aforesaid number-wheel, their arrangement being such that separation takes place incidental to descent of said crank; a main-station electric-telephone apparatus, a battery for same, and means for putting this telephone apparatus in and out of circuit with the line of call-stations.

In testimony that we claim the foregoing we have hereunto set our hands, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

OTTO P. YURGAE.
ROBERT H. YURGAE.

Witnesses:
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B. C. ROLOFF.