

No. 711,893.

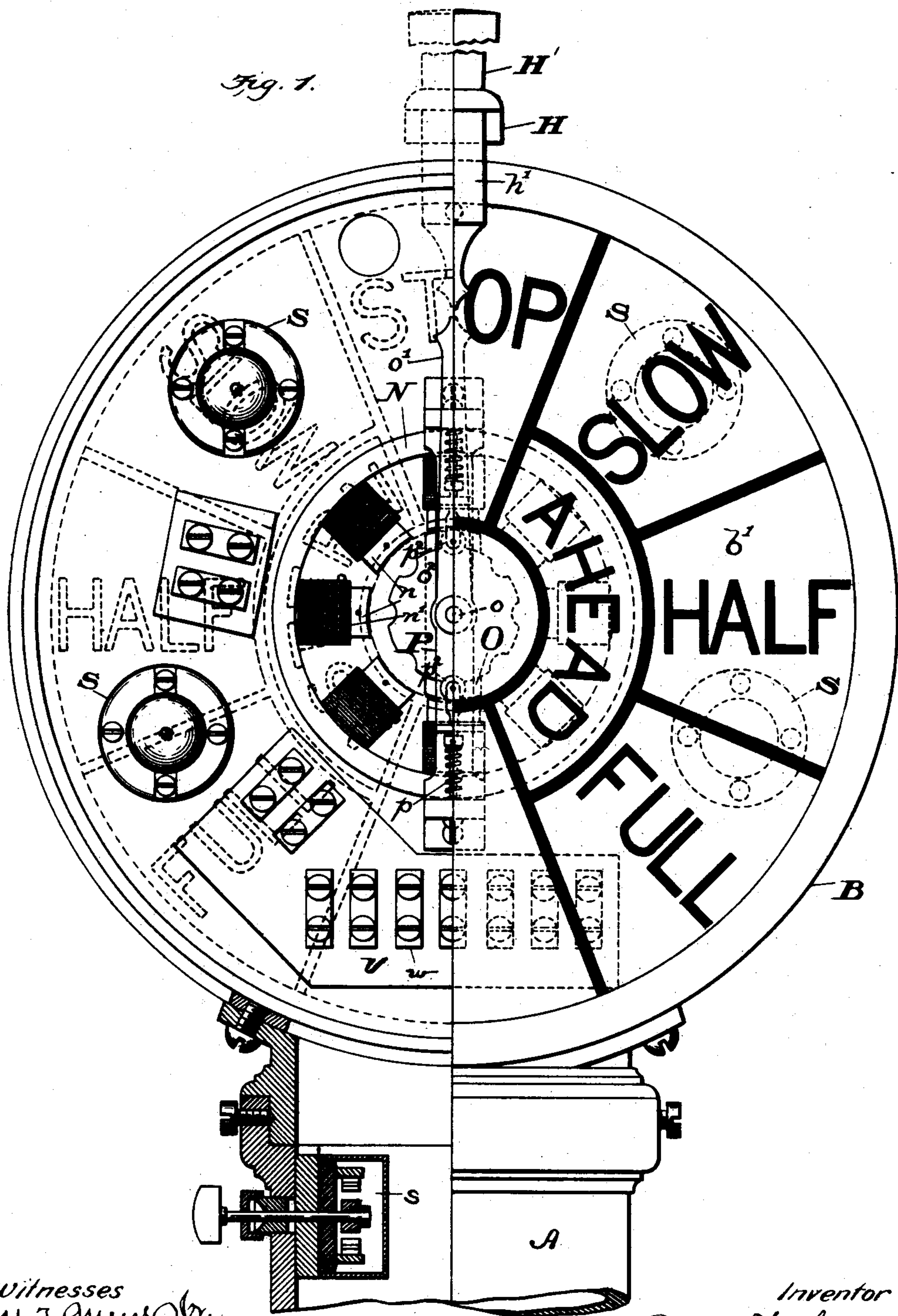
Patented Oct. 21, 1902.

A. F. HAUSS.
ELECTRIC SIGNALING APPARATUS.

(Application filed Jan. 30, 1902.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses
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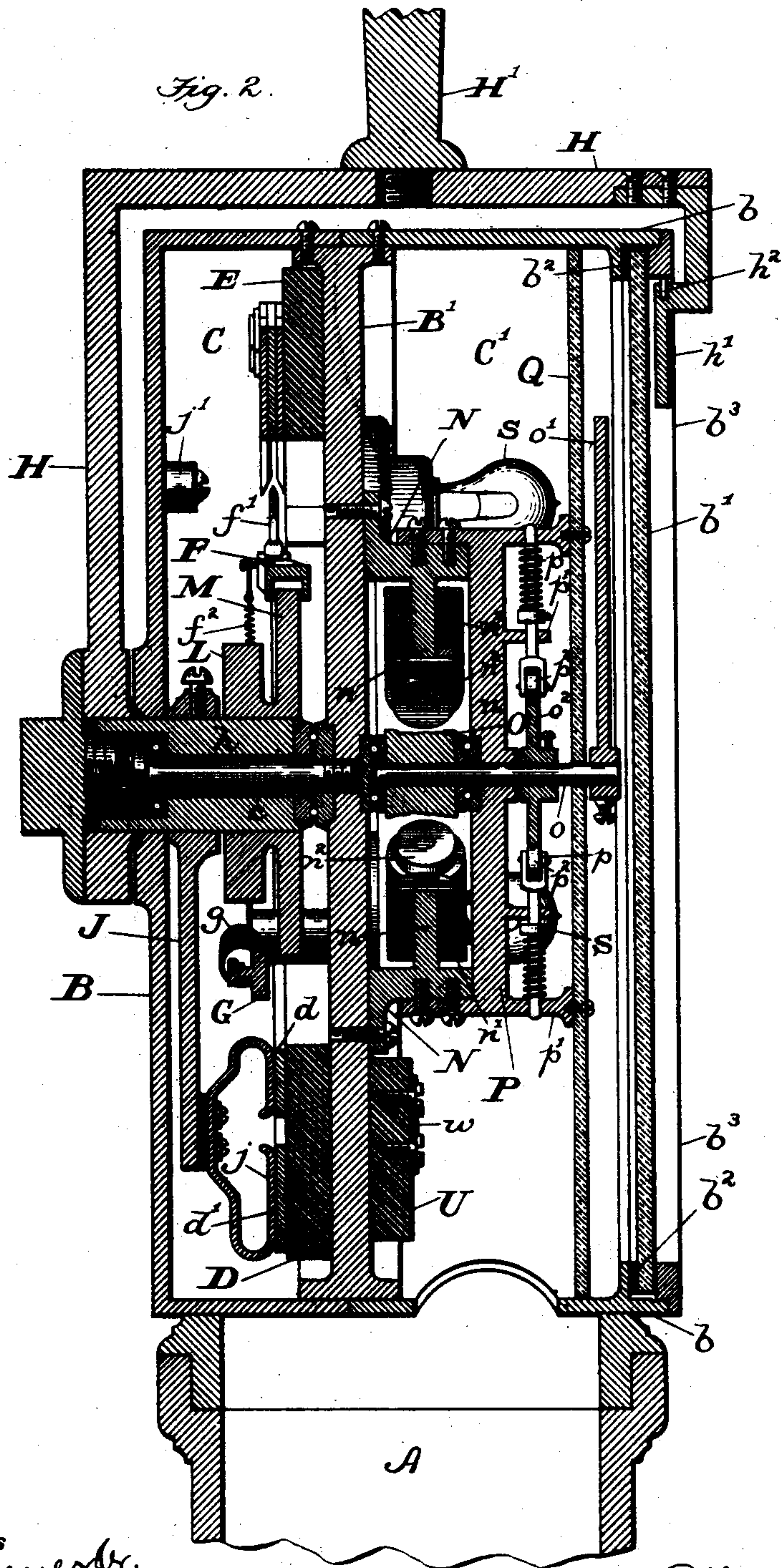
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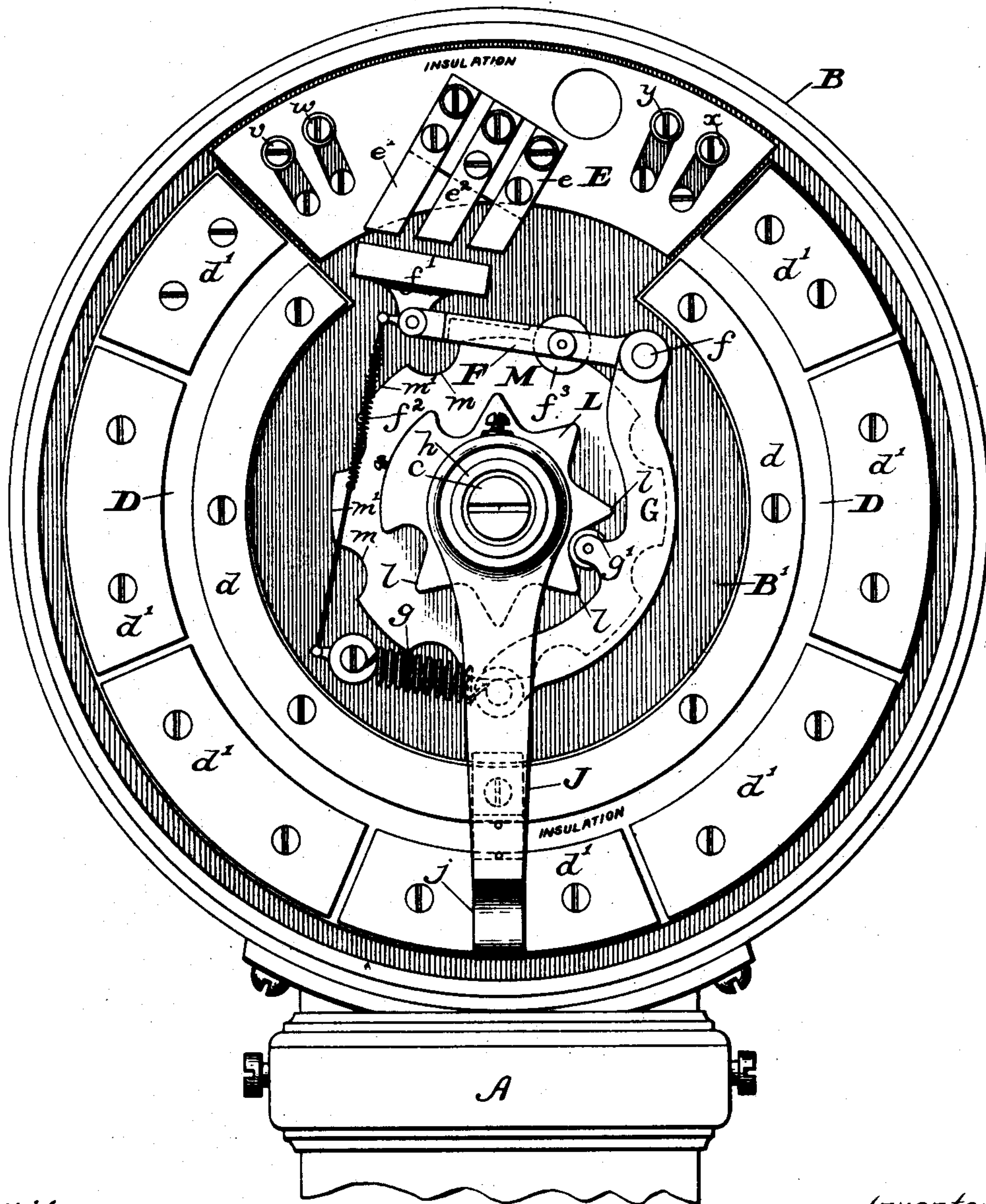
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Fig. 3.



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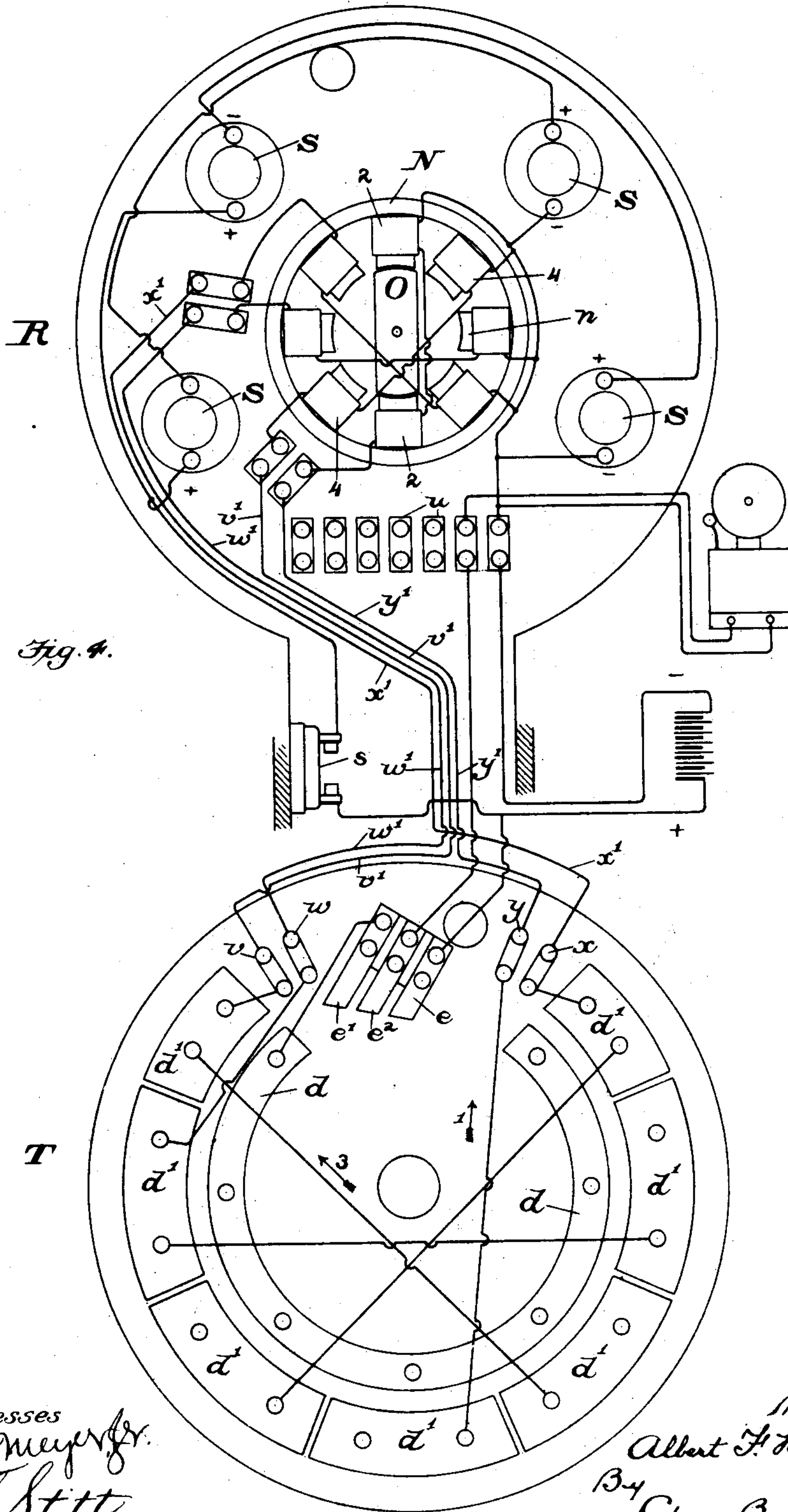


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TO CHARLES F. HAUSS, OF BALTIMORE, MARYLAND.

ELECTRIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 711,893, dated October 21, 1902.

Application filed January 30, 1902. Serial No. 91,843. (No model.)

To all whom it may concern:

Be it known that I, ALBERT F. HAUSS, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Electric Signaling Apparatus, of which the following is a specification.

This invention relates to electric signaling apparatus of that class designed to transmit orders or signals from one remote point to another and to receive at the point of transmission a confirmation of the signal or order to indicate that it has been understood and properly carried into effect.

One of the objects of the invention is to provide an electric signaling apparatus of this character with an improved circuit closing and opening device so arranged with respect to the transmitting mechanism that the battery-circuit will be closed when a signal is being transmitted, but will be open or broken just so soon as the signal has been transmitted, whereby when a signal has been given the electric current will not continue to flow through the apparatus, thereby avoiding wasting the current and also avoiding any accidental changing of the signal caused by the cross-circuiting of the wires or from any other cause.

A further object of the invention is to provide locking devices adapted to prevent the controller and the pointers of both the transmitting and receiving mechanisms from stopping on the border-line between any two signals, which would render the signal ambiguous and cause confusion.

A further object of the invention is to provide an improved system or arrangement of armature-attracting poles for the receiving mechanism, whereby each set of poles may serve to record two different signals, and a further object of the invention is to provide an improved system or arrangement of electric lamps for lighting the dial-plate of the apparatus in which said lamps are connected in circuit in diagonally opposite pairs, so that if one pair should burn out the light from the remaining pair or pairs will be evenly distributed.

With these and other objects in view the invention consists in certain mechanical and

electrical features of construction and arrangements of the parts hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a front elevation of an instrument for transmitting and receiving orders or signals, the said instrument being an embodiment of the invention in the form for telegraphing between a ship's bridge, pilot-house, or conning-tower and the engine-room, or vice versa. Fig. 2 is a vertical transverse section thereof. Fig. 3 is a rear elevation thereof with the back of the casing removed to better illustrate the construction, and Fig. 4 is a diagrammatic view illustrating one system of wiring between the transmitter of one instrument and the receiver of another.

The inventive idea has in this instance been embodied in an electric signaling apparatus particularly designed for use in transmitting orders from one station to another—as, for instance, from the pilot-house, bridge, or conning-tower of a ship to the engine-room, and vice versa—but it is to be understood that the invention is not limited to such use, but is of broader application and can be used wherever it is desired to transmit orders or signals from one point to another and to receive confirmatory indications that the orders or signals have been understood and properly carried into effect.

In order that the apparatus may be compact, the instruments embody in the same casing both the transmitting and receiving mechanisms for each point or station in the system, and as the said mechanisms at each station are like those at the other stations it is deemed only necessary to illustrate and describe in detail a single instrument; but it is to be borne in mind that in a system comprising, say, two instruments the transmitting mechanism of one instrument is connected to the receiving mechanism of the other and that the receiving mechanism of the one instrument is connected to and actuated from the transmitting mechanism of said other instrument.

The instrument here selected is the one for the pilot-house, bridge, or conning-tower of a ship and is mounted on a standard or ped-

estal A. The casing B of the instrument is composed of metal or other suitable moisture-proof material and is divided by a foundation plate or partition B' into a rear compartment C, intended to contain the transmitting mechanism, and a front compartment C', intended to contain the receiving mechanism, and the front of the casing is provided with a rabbet-rim b , in which is set a transparent dial-plate b' , pressed securely against a rubber washer b^2 by a screw-ring b^3 in order to keep out moisture and containing on its surface, as illustrated in Fig. 1, the words "Stop," "Slow," "Half," and so on, indicating the various signals to be communicated to and received from the engineer.

Rigidly secured to that face of the partition B which forms one wall of the compartment C for the transmitting mechanism are two part-circular insulating-blocks D E, one of which covers nearly the whole circle of the partition, except a space at the top which is occupied by the other block. On the lower and larger block D is secured the part-circular common battery contact-plate d , around which are grouped a part-circular series of independent armature-circuit contact-plates d' , spaced from each other and the common battery-plate and equal in number to the signals or orders which it is desired to transmit. On the upper and smaller insulating-block E are secured the two positive supply-circuit or battery terminals $e e'$, the bell-circuit terminals e^2 , and binding-posts $v w x y$.

Pivotally mounted on a stud f on the partition B' within the circle of the contact-plates is a switch-arm F, carrying at its free end a battery-circuit closing and opening knife-blade f' , insulated from the switch-arm and adapted to make and break contact with the said terminals $e e' e^2$, and to the extremity of said switch-arm is secured a compression-spring f^2 , tending to draw the switch-arm F, with its blade f' , away from or out of contact with the terminals, and said switch-arm is provided between its ends with a roller f^3 for a purpose presently described. A detent-arm G is also pivoted at one end on the stud f , with its free end secured to a compression-spring g , and a roller g' is secured to said detent-arm, as shown in Fig. 3.

A shaft c is secured centrally across the transmitting-mechanism compartment C, and around said shaft is mounted to rotate on suitable ball-bearings a spindle h , one of whose ends projects slightly outside of the rear wall of the casing B, and an actuating-lever H is secured to the projecting end of said spindle and extends around the casing to the front thereof, as illustrated in Fig. 2, where it is provided with an inwardly-extending pointer h' , adapted to be moved over the outer surface of the dial-plate b' to register with any of the signal-indicating words thereon. The said lever H is also provided with a handle H', by which it can be readily ma-

nipulated, and the pointer has an antifric-tion-roller h^2 .

Rigidly secured on the spindle h within the compartment C for the transmitting mechanism is an armature-circuit controller J, which in this instance extends in an opposite direction to the actuating-lever H, and said controller carries at its free end a spring bridge-contact j , insulated therefrom and adapted, as the controller J is moved, to slide over the surfaces of the common battery contact-plate d and armature-circuit contact-plates d' , whereby to electrically connect any one of said last-named plates with the common battery contact-plate, so as to transmit the different signals.

In order to render it impossible for the controller J to remain at rest half-way between any two armature-circuit contact-plates d' , which would result in confusion, a sharply fluted or peaked detent-wheel L is rigidly secured on said rotary spindle h , with its periphery in alinement with the roller g' of the detent-arm G, and the spring g of said arm tends to draw the latter toward said detent-wheel, whereby as the controller J sweeps around the said roller g' will ride over the peaks l of said wheel and compel the controller to move far enough to register with but a single armature-circuit contact-plate d' at a time. The construction and resultant operation of this detent device are plainly indicated in Fig. 3.

As hereinbefore stated, it is one of the objects of this invention to provide means whereby the battery-circuit is opened or broken just so soon as a signal has been correctly transmitted. This means comprises the switch-arm F, with its blade f' normally retracted from the battery and bell terminals, in combination with a circuit-closer in the form of a notched cam-wheel M, whose periphery is in alinement with the roller f^3 of the switch-arm F and is provided with a series of recesses m and cam-surfaces m' , adapted, as said wheel revolves, to alternately receive and to press against said roller to break and make the contact between the knife-blade and terminals. This notched cam-wheel is so arranged on the rotary spindle h that during the movement of the controller from one contact-plate to the next the roller f^3 will be rolling on one of the cam-surfaces m' and the circuit will be closed, but when said controller has completely passed from one contact-plate to the next and has passed to the middle of said next plate the said roller will then immediately enter one of the recesses m and the circuit will at once be broken and remain broken until the controller J and cam-wheel M are again moved. A stop-pin j' is secured to the inner side of the casing-back, as shown in Fig. 2, in order to limit the movement of the controller.

Bolted or otherwise rigidly secured to that side of the partition B' which constitutes one

wall of the receiving-mechanism compartment C' is a pole-carrying ring or frame N, provided with a series of radially-grouped poles n , arranged and electrically connected, as shown in Fig. 4, in diametrically opposite pairs, and each pole is wrapped with a helix n' , which is surmounted by a cap-ring n^2 , in order to obtain a large amount of active surface at the end of each pole.

The armature O, which is intended to be attracted by any pair of poles n , is mounted at its center on a shaft o , which is journaled on ball-bearings within the circle of the poles and extends through a cross-bridge P, secured to the ring N, as shown in Fig. 2. At its outer end said shaft carries a pointer o' , which is moved by the rotation of said shaft over the inner surface of the transparent dial-plate b' whenever the armature is attracted by the energization of any pair of poles n , and the said shaft also carries a notched wheel o^2 , adapted for engagement on diametrically opposite sides by spring-pressed fingers p , movable in lugs p' , projecting from said cross-bridge P, and said fingers carrying rollers p^2 at their opposing ends to take into the notches of said wheel, whereby to prevent the accidental movement of the armature and its indicator.

A translucent plate Q of celluloid, frosted glass, or the like is secured to the cross-bridge P back of the dial-plate b' and the two pointers, and incandescent electric lamps S are mounted on the partition back of said translucent plate, whereby to light up the latter and shed an even light on the dial-plate. Within the transmitting-mechanism compartment C' and preferably underneath the said mechanism is secured an insulating-block U, to which are secured binding-posts w for the wires leading from the receiving mechanism back to the battery and also for the positive and negative wires of a bell-circuit hereinafter described; but in the present instance, as only one transmitting mechanism and one receiving mechanism are described and as the system also includes a bell-circuit, only two of said binding-posts are shown in use.

The mechanical features of the invention having been thus described, I shall now describe one system of connecting by wires the transmitting mechanism of one instrument with the receiving mechanism of the other, together with the system by which the incandescent lamps and signal-bell are included in the main circuit, at the same time setting forth the operation of the apparatus. For this description special reference is to be had to Fig. 4, which is a diagrammatic view and in which, for convenience, the transmitting portion of one instrument is designated by the letter T and the receiving portion of the other instrument is designated by the letter R. Commencing at the battery it will be seen that the positive feed-wire leading therefrom enters the transmitter T at the binding-post of

the terminal e . Then the continuity of said wire is interrupted and it commences again at the binding-post of the complementary terminal e' , which it connects with the adjacent end of the common battery contact-plate d . The armature-circuit contact-plates d' , adapted for the transmission of the signals "Slow," "Half," and "Full" of the "Ahead" position, are cross-connected or paired by wires with the diametrically opposite contact-plates adapted for the transmission of the signals "Full," "Half," and "Slow," respectively, of the "Astern" position; but the lowermost contact-plate d' , which is adapted for the transmission of the signal "Stop," has no diametrically opposite contact-plate, and is therefore not so connected. One plate of each pair is connected to binding-posts v w x , respectively, which are connected by wires v' w' x' , respectively, to one pair of armature-attracting poles in the receiver. The contact-plate adapted to transmit the signal "Stop" is connected by wire to a binding-post y , which in turn is connected by wire y' to the remaining pair of armature-attracting poles. The negative battery-wire leads from the other pole of each pair back to the battery. Now with this system of wiring the operation is as follows: If it is desired to transmit the signal "Stop," the controller is brought into contact with the lowermost contact-plate d' , and the current will then flow from the common battery contact-plate d to said contact-plate d' , and thence in the direction of the arrow 1 through wire y' to energize the pair of poles in the receiver designated 2, which will result in the attraction of the armature and bring the receiver-pointer at the other end of the line to the "Stop" position, or, again, if it is desired to transmit the signal "Slow-ahead," the controller is brought into contact with the next contact-plate to the right of the lowermost plate in Fig. 3, and then the current will flow in the direction of the arrow 3 through wire v' and energize the pair of poles in the receiver designated 4, which will result in bringing the armature and receiver-pointer at the other end of the line to the "Slow-ahead" position. In this connection it is to be especially noted that by arranging the armature-attracting poles in a radial group and cross-connecting them in diametrically opposite pairs each pair is capable of receiving two signals—for instance, "Slow-ahead" and "Full-astern." In order to clearly understand this double function, so to speak, it is simply necessary to remember, first, that the armature which actuates the receiver-pointer has two opposite ends, both of which are energized, and that it can be rotated so as to completely reverse its position end for end; and, second, that in passing from the "Ahead" position to the "Astern" position, or vice versa, the said armature must always be energized at one time in its passage by the current from the lowermost or "Stop" contact-

plate, at which time it (the armature) is in vertical position and from whence it passes step by step to one side or other of the vertical, according to which side of the instrument the controller passes. As also shown in Fig. 4, the circuit for the incandescent lamps *S* is introduced from the main battery-line, and it is to be noted that said lamps are electrically connected in diametrically opposite pairs, so that if one pair should burn out and not the other the remaining pair will more evenly distribute the light than would be the case if the said lamps were connected in tandem. A switch device *s* opens and closes the lamp-circuit. The current for the signal-bell (shown in Fig. 4) comprises a wire leading from the middle terminal *e*² to one of its binding-posts and a wire leading from its other binding-post to the negative battery-wire, and it is to be observed that with this arrangement the bell-circuit is so related to the main battery-circuit that it will be closed only when a visible signal is about to be transmitted.

While the accompanying drawings illustrate one form of the invention, it is to be understood that various changes may be made in the features of mechanical construction and system of wiring without departing from the scope of the invention as defined in the appended claims.

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

1. In an electrical signaling apparatus, the combination of transmitting mechanism; receiving mechanism; a supply-circuit provided with terminals; a switch-arm adapted to make and break contact with said terminals; and means which will automatically move said switch-arm into contact with said terminals while the transmitting mechanism is shifting from one signal to another, and which will also automatically move said switch-arm out of such contact as soon as the signal has been given.

2. In an electrical signaling apparatus, the combination of transmitting mechanism; receiving mechanism; supply-circuit terminals; a switch-arm adapted to make and break contact with said terminals; and mechanical means, actuated by the transmitting mechanism, for automatically breaking the contact between said switch-arm and terminals so soon as a signal has been given.

3. In an electrical signaling apparatus, the combination of mechanism to transmit visible signals; mechanism to receive the same; audible signaling mechanism adapted to call attention when a visible signal has been given; supply-circuit terminals for all of said mechanisms; a switch-arm adapted to make substantially simultaneous contact with said terminals while the signals are being given; and means for automatically breaking the

contact between said terminals and switch-arm after the signals have been given.

4. In an electrical signaling apparatus, the combination of mechanism adapted to transmit visible signals; mechanism to receive the same; audible signaling mechanism adapted to call attention when a visible signal has been given; a supply-circuit for all of said mechanisms; and means for automatically closing said circuit while the signals are being given, which means will also automatically open said circuit after the signals have been given.

5. In an electrical signaling apparatus, the combination of supply-circuit terminals; a pivoted switch-arm adapted to make and break contact with said terminals; means tending to draw said switch-arm out of contact with said terminals; and signal-transmitting mechanism arranged to move said switch-arm into contact with said terminals.

6. In an electrical signaling apparatus, supply-circuit terminals; a pivoted switch-arm, *F*, carrying at one end a switch-blade adapted to be moved into and out of contact with said terminals, and also carrying a roller, *f*³; a spring secured to the said end of said switch-arm and tending to draw said blade out of contact with said terminals; a revoluble controller adapted to transmit signals; and a wheel, *M*, provided on its periphery with a series of cam-surfaces, *m'*, and recesses, *m*, adapted to alternately receive and press against said roller, *f*³, to break and make contact between the said switch-blade and terminals, as set forth.

7. In an electrical signaling apparatus, the combination of supply-circuit terminals; a battery contact-plate connected to one of said terminals; separate contact-plates adapted to be connected one at a time to said battery contact-plate; a revoluble controller adapted to connect any one of said separate contact-plates with said battery contact-plate; a switch-arm adapted to make and break contact with said terminals and normally held out of contact therewith; a roller on said switch-arm; and a cam-wheel movable with said controller and adapted to act against said roller whereby to move said switch-arm into contact with said terminals.

8. In an electrical signaling apparatus, a transmitting mechanism provided with a series of contact-plates for different signals; a controller arranged for contact with said plates and movable from one to another; a detent-wheel movable with said controller; and a detent-arm spring-pressed into engagement with said wheel, as and for the purpose set forth.

9. An electrical signaling apparatus, comprising a transmitting mechanism; a receiving mechanism provided with radial poles connected to said transmitting mechanism; a rotary armature adapted to be attracted by

said poles; a notched wheel on the shaft or axis of said rotary armature; and a finger spring-pressed into engagement with said wheel whereby to prevent the accidental rotation of said armature.

10. An electrical signaling apparatus, comprising a transmitting mechanism; and a receiving mechanism including a magnetic ring provided with a series of inwardly-extending radial poles connected to said transmitting mechanism, and a rotary armature adapted to be attracted by said poles.

11. An electrical signaling apparatus, comprising a transmitting mechanism; and a receiving mechanism, including a magnetic ring provided with a series of radially-grouped poles connected in diametrically opposite pairs and adapted to be energized by said transmitting mechanism, and a rotary armature adapted to be attracted by any pair of said poles and being capable of turning end for end, as and for the purpose set forth.

12. An electrical signaling apparatus, comprising a transmitting mechanism provided with contact-plates arranged in electrically-connected pairs; a receiving mechanism provided with energizable poles also arranged in pairs and a pole of each pair being connected with one contact-plate of each pair; and an armature adapted to record the different signals and arranged to be attracted by the said poles.

13. An electrical signaling apparatus, comprising a transmitting mechanism provided with contact-plates arranged in diametrically opposite pairs; a receiving mechanism provided with energizable poles also arranged in diametrically opposite pairs and a pole of each pair being connected with one contact-plate of each pair; and a rotary armature adapted to record the different signals and

provided with two ends arranged to be attracted by the said pair of poles.

14. An electrical signaling apparatus, comprising transmitting mechanism; receiving mechanism; a casing therefor provided with a transparent dial-plate; and electric lamps adapted to light up said dial-plate and connected in diagonally opposite pairs, as and for the purpose set forth.

15. An electrical signaling apparatus, comprising a supply-circuit; a transmitting mechanism; a receiving mechanism provided with radial poles adapted to be energized by said transmitting mechanism; an armature adapted to be attracted by any of said poles to indicate a signal; means for automatically de-energizing said poles to release said armature from electrical circuit therewith; and a locking device for holding said armature against movement after the poles have been deenergized.

16. An electrical signaling apparatus, comprising a supply-circuit; a transmitting mechanism; a receiving mechanism provided with radially-grouped poles adapted to be energized by said transmitting mechanism; an armature adapted to be attracted by any of said poles to indicate a signal; means for automatically opening the supply-circuit, whereby the poles are deenergized after a signal has been given, so that said armature will then be released; and a locking device for holding said armature against movement after the poles have been deenergized.

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

ALBERT F. HAUSS.

Witnesses:

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