No. 751,071. PATENTED FEB. 2, 1904.

E. L. GRAUEL.

SIGNALING APPARATUS.

APPLICATION FILED MAR. 19, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

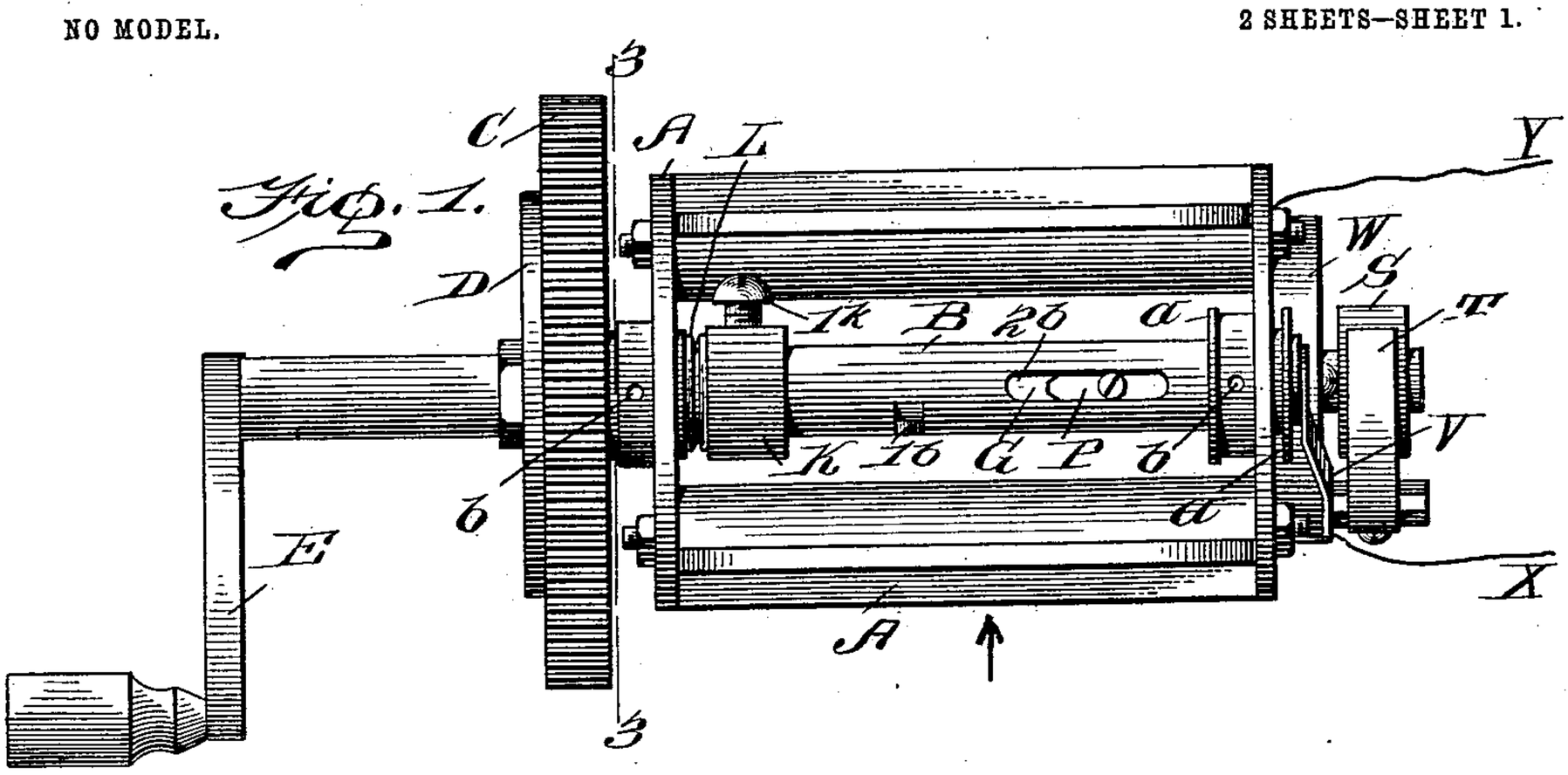


Fig. 2.

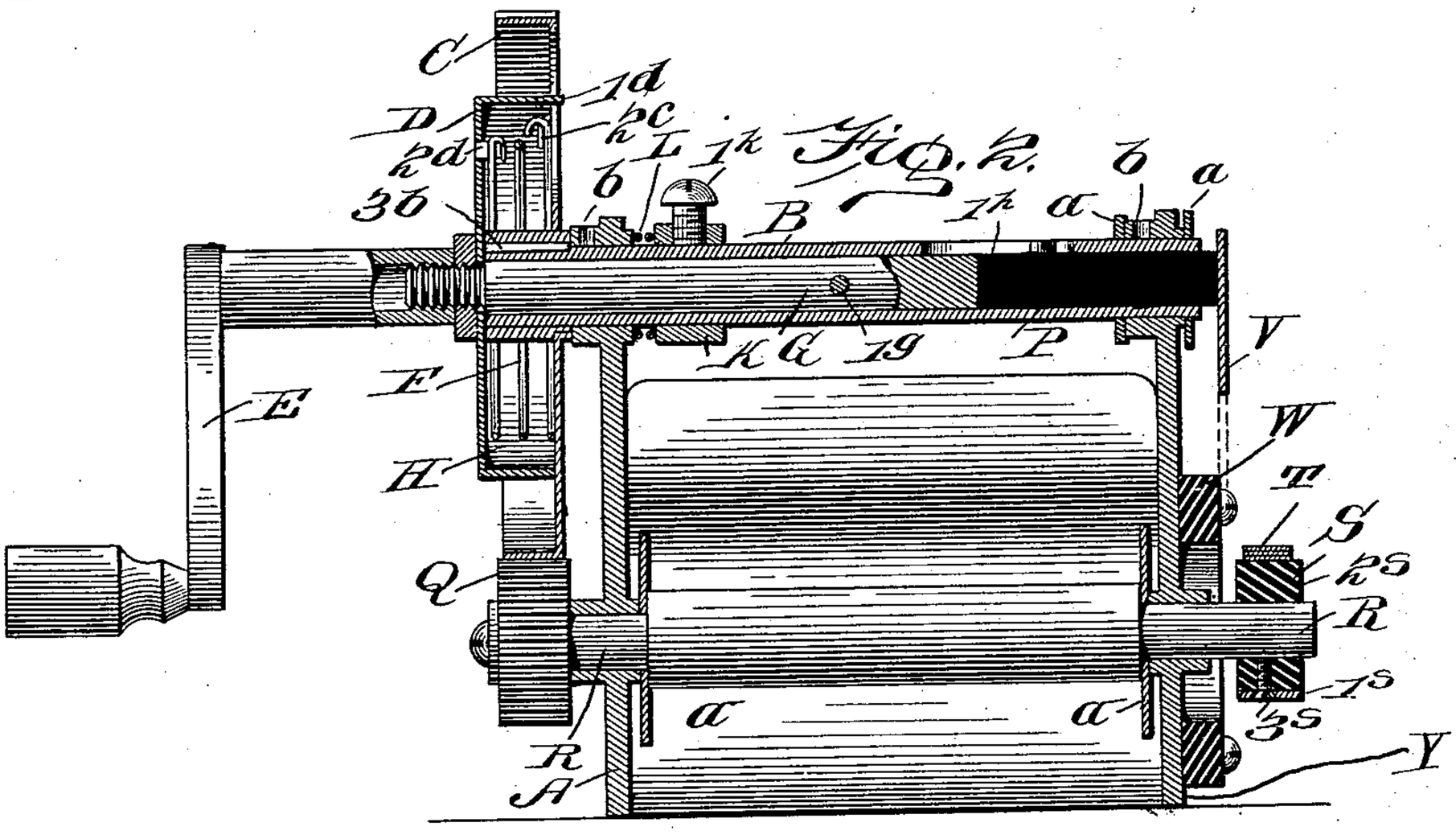
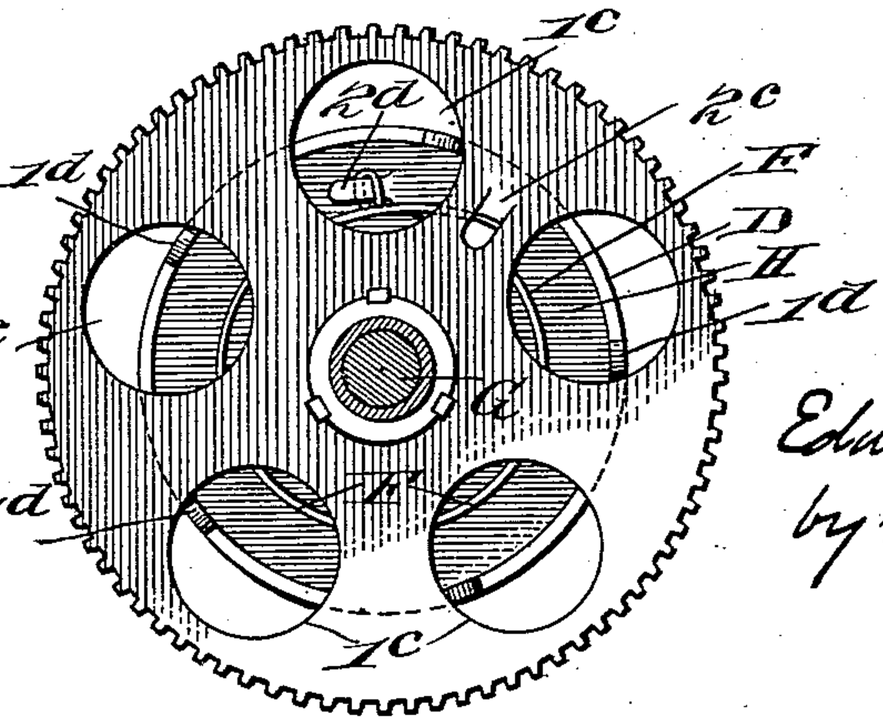


Fig. 3.



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APPLICATION FILED MAR. 19, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

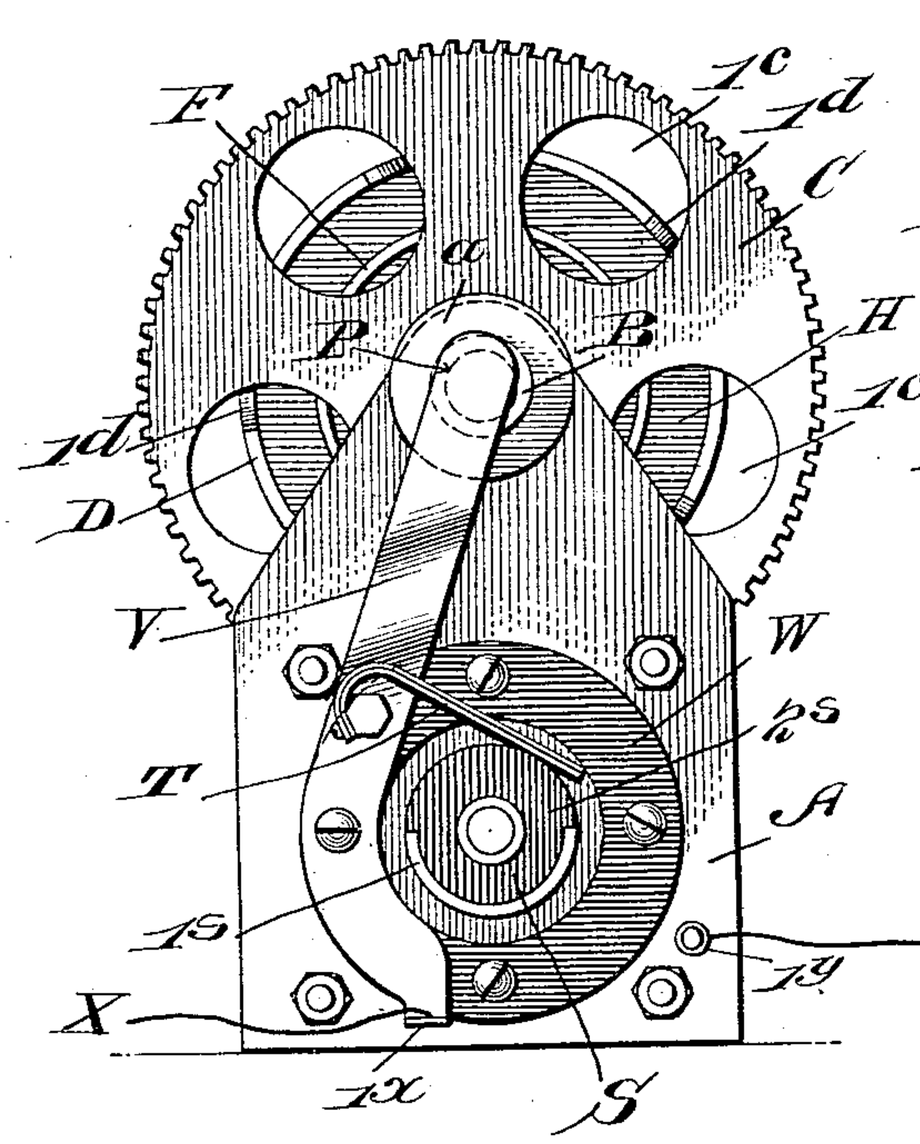

Fig. 5.

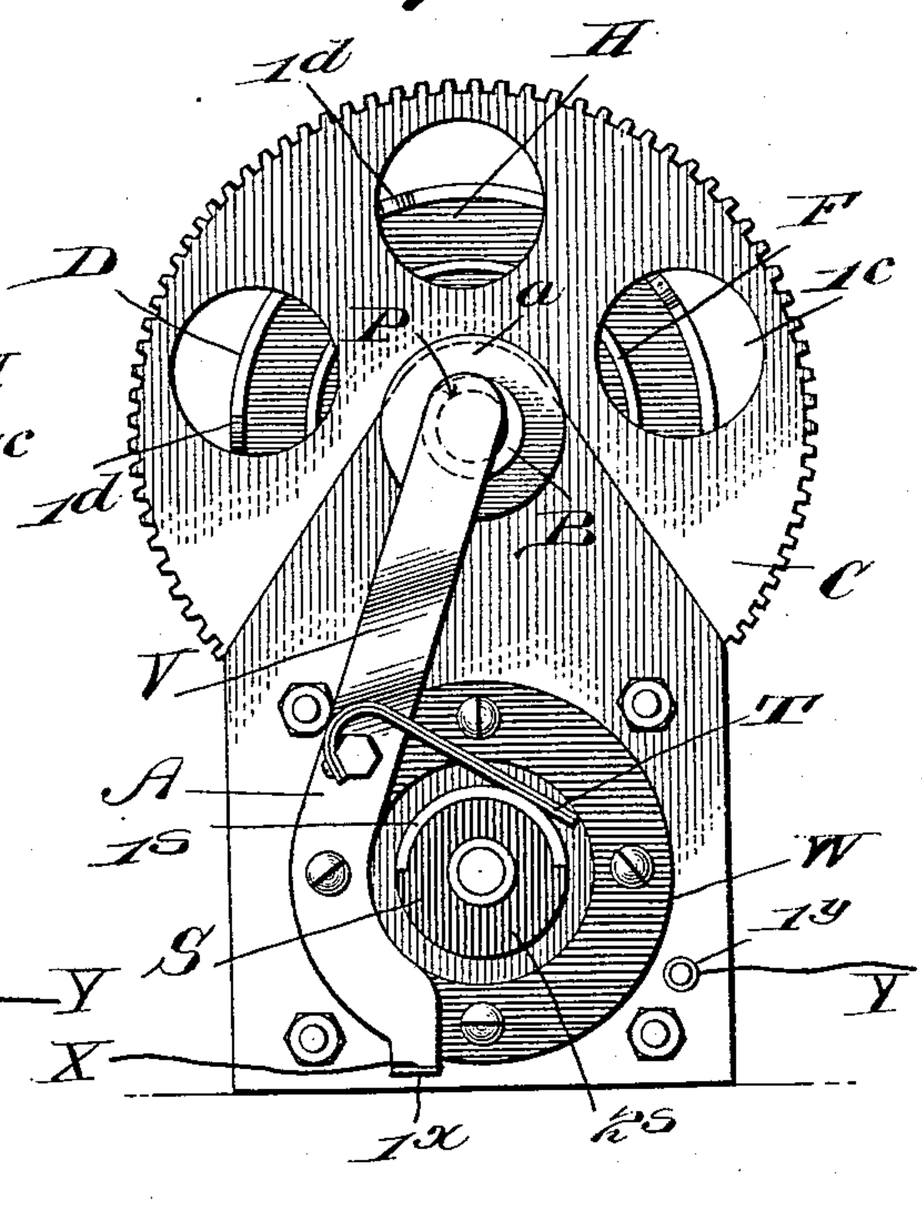

Fig. 6.

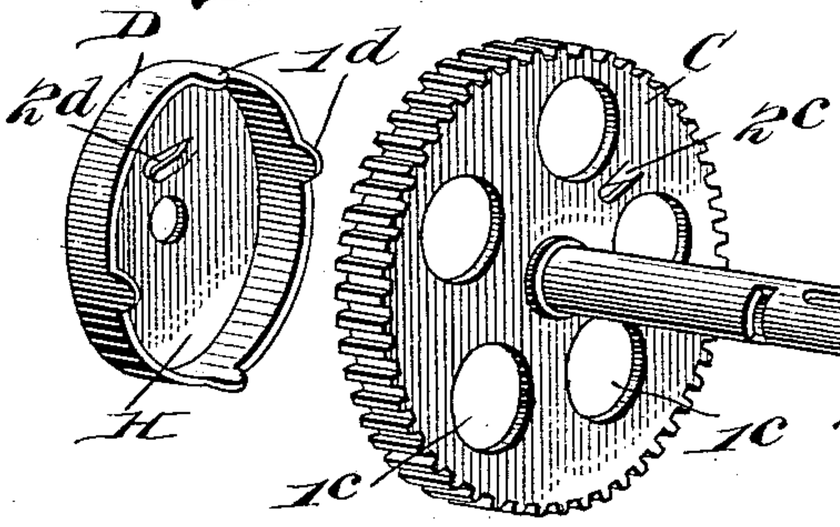

Fig. 7.

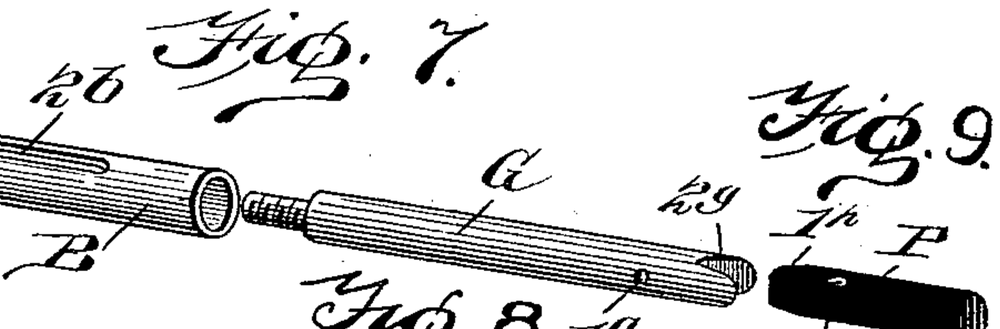

Fig. 9.

Fig. 8.

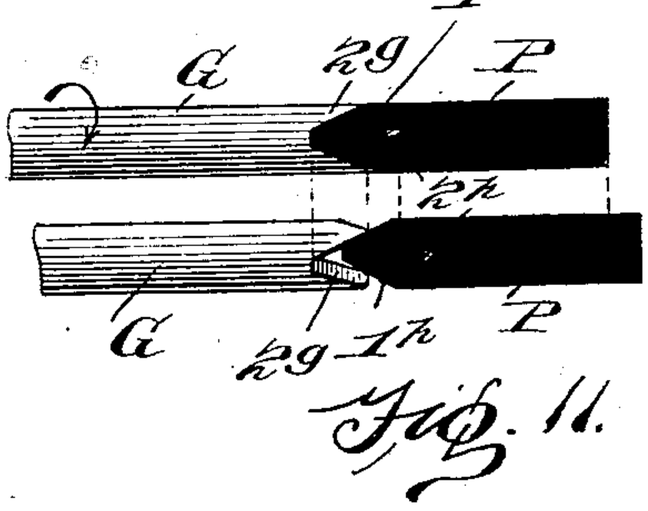

Fig. 10.

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Fig. 11.

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No. 751,071. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

EDWIN L. GRAUEL, OF ROCHESTER, NEW YORK, ASSIGNOR TO NATIONAL TELEGRAPHONE COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW JERSEY.

SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 751,071, dated February 2, 1904.

Application filed March 19, 1903. Serial No. 148,563. (No model.)

To all whom it may concern:

Be it known that I, EDWIN L. GRAUEL, a citizen of the United States, residing at Rochester, in the county of Monroe, State of New York, have invented certain new and useful Improvements in Make-and-Break Signaling Apparatus; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of the apparatus, the parts being in the relative positions they occupy when the mechanism is not in operation. Fig. 2 is a vertical central section taken through the upper or driving axle of the device and looking in the direction of the arrow, Fig. 1, the upper interior axle and the lower axle and its pinion being in side elevation. Fig. 3 is a section on the line 3 3, Fig. 1, looking toward the operating crank or handle. Fig. 4 is an end elevation of the device, the electric brush being in contact with the dead or insulated segment of the commutator. Fig. 5 is a view similar to Fig. 4, the electric brush being on the live or metal segment of the commutator. Fig. 6 is a perspective view of the driving-clutch, the spring omitted. Fig. 7 is a perspective view of the upper hollow axle with driving-gear attached. Fig. 8 is a perspective view of the plug-projecting axle. Fig. 9 is a perspective view of the spring-contact projecting insulated plug. Figs. 6, 7, 8, and 9 are positioned to show the relative arrangement of the parts thus illustrated. Fig. 10 is a plan view of the insulated plug and a portion of the plug-projecting axle in the potion they occupy when the spring-contact contacts with the hollow axle and the circuit is completed through the frame of the machine. Fig. 11 is a plan view of the insulated plug and a portion of the plug-projecting axle, showing the position they occupy when the contact between the spring-contact and hollow axle is broken and the circuit through the frame is open.

Like symbols refer to like parts wherever they occur.

My invention relates to the construction of make-and-break signaling apparatus for calling upon the relays of telegraph-lines when it is desired to annunciate a rapid, steady, and extended signal which shall be unmistakable in its character, such device being permanently in series with the line-wire and adapted when actuated to make and break the circuit of such line-wire and to automatically close such circuit when the apparatus is not in operation.

To this end the main feature of my invention embraces in combination a spring-contact member, a spring-contact projecting core or insulated plug adapted to be projected longitudinally by the rotation of a driving-axle, a brush mounted upon said spring-contact member, and a commutator having insulated and uninsulated sections or segments rotatable simultaneously with the driving-axle whereby when the mechanism is operated a regular and well-defined intermittent signal will be announced upon the relays of the line-wire with with which the device is in series.

There are other minor features of invention, all as will hereinafter more fully appear.

I will now proceed to describe my invention more fully, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A is a metallic frame, in the upper portion of which is journaled a hollow axle B, said axle having a transverse peripheral slot 1^b and a longitudinal peripheral slot 2^b. Secured to the hollow axle B by a spline 3^b or in other suitable manner is a driving gear-wheel C, said gear-wheel C having openings 1^c, into which project lugs or stops 1^d, which are integral with the driving clutch-cap D and which when the crank E is rotated engage the walls of the openings 1^c to positively drive the gear-wheel C and the pinion meshing therewith. Within the pocket H, between the members D and C, is a spring F, said spring being secured at one end to the driving gear-wheel C, as at 2^c, and at the other end to the clutch-cap D, as at 2^d, said spring being adapted to be put under strain by the relative movement of the clutch-cap D and gear-wheel C, which occurs at the initial movement

of the crank E, the relative movements of the parts D and C causing a corresponding relative rotation of the hollow axle B and its interior core-projecting axle G, which latter revolves with the crank E and clutch-cap D.

Secured to the hollow axle B by a set-screw 1^k or in other suitable manner is a collar K, against which and the inner side of the side frame A bears a spring L, said spring by its frictional bearing between the frame and the collar K creating sufficient resistance to allow the spring F to be put under strain. The core or plug projecting axle G is provided with a dowel or guide-lug 1^g, which projects into the peripheral slot 1^b of the axle B, and said slot prevents any longitudinal motion of the axle G. The end of the axle G which terminates within the hollow axle B is provided with a double-inclined groove 2^g, into which fits the correspondingly reversely inclined end 1^p of the insulated core or plug P, said plug P being also provided with a dowel or guide-lug 2^p, which projects into the longitudinal peripheral slot 2^b of the hollow axle B and which permits the relative longitudinal movement of said plug P and hollow axle B.

Meshing with driving gear-wheel C is a pinion Q, which is secured to the axle R, said axle R being journaled in the frame A and having at its opposite end the commutator S, which latter is composed of alternate segments 1^s 2^s, the former being metallic and connected to the axle R by the screw 3^s and the latter being of insulating material.

T is an electric brush which is mounted upon the spring-contact member V and which bears upon the periphery of the commutator S; but said brush may be mounted in any other manner, provided it be insulated from the frame A and electrically connected with the spring-contact member V.

Mounted upon the frame A and insulated therefrom by an insulating member W is a spring-contact member V, which when the mechanism is not in operation contacts the outer end of the hollow axle B, thus electrically connecting said spring-contact member V with the frame A, (see Fig. 1,) but which when the mechanism is in operation is forced out of contact with the end of said axle B by the projection of the insulated core or plug P, thus opening the circuit through the spring-contact member V and frame A.

X and Y are portions of the line-wire of the circuit the energy of which it is desired to influence by the operation of the device, said wires X and Y being respectively connected to the spring-contact member V, as at 1^x and to the frame A, as at 1^y.

For the purpose of lubricating the bearings of hollow axle B oil-ports *b b* are provided, and dust-guards *a a* for the several journals may be also provided, if desired.

The construction of the device being substantially as herein pointed out, its operation will be as follows: When the device is not in operation, it will readily be seen that the circuit from X to Y is always closed through spring-contact member V, hollow axle B, and thence through frame A, in which said hollow axle B is journaled to the binding-post 1^y, and thence to Y. Upon actuating the operating-crank or handle E of the device the clutch-cap D and interior core or insulated-plug projecting axle first rotate relative to the driving gear-wheel C and hollow axle B, the latter members being held against rotating by the frictional contact of the spring L upon the collar K and frame A, and this relative rotation of the parts before mentioned continues, thus putting the spring F under strain until the lugs or stops 1^d of the clutch-cap D engage the walls of the openings 1^c of the driving gear-wheel C, when clutch-cap D, gear-wheel C, and axles B and G revolve in unison. The relative rotation of the parts above referred to causes the incline 2^g of the plug or core projecting axle G to act upon the reversely-inclined end 1^p of the insulated core or plug P, thus projecting said core or plug longitudinally of the hollow axle B, in which direction relative to said axle B it may only move on account of the dowel or guide-pin 2^p and longitudinal peripheral slot 2^b, with the result that the spring-contact member V is unseated from the end of the hollow axle B and the circuit which was normally closed through such spring-contact member, thence through the hollow axle B, and frame A is broken at this point and remains open during the continued operation of the device and until power ceases to be applied to the operating-crank E, when the energy stored in the spring F by the initial relative rotation of the clutch-cap D, gear-wheel C, and their respective axles G and B causes a relative rotation of the same parts, but in a reverse direction, thus permitting the spring-contact member V to return the insulated core or plug P to its inoperative position and thereby automatically close the circuit through such spring-contact member V, hollow axle B, and frame A. The insulated core or plug P having been projected as above described and the spring-cap D and driving gear-wheel C being driven in unison by the continued application of power to the operative crank or handle E, it will be seen that the commutator S is caused to revolve through the agency of pinion Q, which meshes with driving gear-wheel C and axle R, whereby the insulated and uninsulated segments of the commutator S are alternately brought into contact with the brush T, and the circuit from X to Y is either open, as when the brush is upon the insulated or dead segment 2^s, or closed, as when the brush is upon the uninsulated or live segment 1^s, in which latter case the circuit is closed from X to Y through the lower portion of the spring-contact member V, brush T, uninsulated com-

mutator-segment 1^s, screw 3^s, commutator-axle R, and frame A to binding-post 1^y, and thence to Y. A well-defined, rapid, and extended signal may thus be announced upon any instruments in the circuit with which this device is placed in series which would be influenced by intermittently interrupting the energy of such circuit.

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

1. In a mechanism of the character indicated, the combination with a frame, of a hollow axle journaled therein, a spring-contact member arranged to engage said hollow axle when the latter is at rest, and means for insulating said spring-contact member and hollow axle from each other when the mechanism is in operation, substantially as and for the purposes specified.

2. In a mechanism of the character indicated, the combination with a frame, of a hollow axle journaled therein, a core-projecting axle within said hollow axle, an insulated core contacting said core-projecting axle and located within said hollow axle, and means for causing a relative rotation of the hollow axle and core-projecting axle whereby the insulated core is projected longitudinally with respect to said hollow axle, substantially as and for the purposes specified.

3. In a mechanism of the character indicated, the combination with a frame, of a hollow axle journaled therein, a core-projecting axle within said hollow axle said core-projecting axle having a double-inclined groove in one end, an insulated core having a reversely-inclined end contacting the double-inclined end of the core-projecting axle said insulated core located within said hollow axle, and means for causing a relative rotation of the insulated core and the core-projecting axle whereby the inclined end of said core-projecting axle acts upon the reversely-inclined end of the insulated core to cause a relative longitudinal movement of said core and the hollow axle, substantially as and for the purposes specified.

4. In a mechanism of the character indicated, the combination with a frame, of a hollow axle journaled therein, an insulated core within said hollow axle, a core-projecting axle also within said hollow axle, a gear-wheel secured to said hollow axle, a clutch-cap secured to said core-projecting axle, and means for causing a relative rotation of said hollow axle and its gear-wheel and the core-projecting axle and its clutch-cap whereby the said insulated core is projected longitudinally with respect to said hollow axle, substantially as and for the purposes specified.

5. In a mechanism of the character indicated, the combination with a frame, of a hollow axle journaled therein said hollow axle having a gear-wheel secured to one end, of a core-projecting axle located within said hollow axle said core-projecting axle having a clutch-cap secured to one end, means for causing a relative rotation of the hollow axle and core-projecting axle, and a spring secured to the gear-wheel and to the clutch-cap whereby said hollow axle and said core-projecting axle are relatively rotated in reverse direction, substantially as and for the purposes specified.

6. In a mechanism of the character indicated, the combination with a frame, of a hollow axle journaled therein said hollow axle having a longitudinal peripheral slot and a transverse peripheral slot, an insulated core located within said hollow axle and provided with a guide-lug which engages the longitudinal peripheral slot of said hollow axle, a core-projecting axle located within said hollow axle and having a guide-lug which engages the transverse peripheral slot of said hollow axle, and means for causing a relative rotation of said hollow axle and said core-projecting axle whereby said insulated core is projected longitudinally of said hollow axle, substantially as and for the purposes specified.

7. In a mechanism of the character indicated, the combination with a frame, of an axle journaled therein, a spring-contact member insulated from said frame and arranged to engage said axle when the latter is at rest, a commutator-brush mounted on said spring-contact member and contacting a commutator, a commutator having alternate segments insulated and uninsulated with respect to said frame, and means for insulating said spring-contact member and axle from each other and simultaneously rotating said commutator in contact with said brush, substantially as and for the purposes specified.

8. In a mechanism of the character indicated, the combination with a frame, of a spring-contact member arranged to close the circuit through said frame when the mechanism is not in operation and to be insulated from said frame when the mechanism is in operation, of a commutator-brush electrically connected to said spring-contact member and insulated from said frame said brush contacting the periphery of commutator, a commutator having segments alternately insulated and uninsulated with respect to said frame, and means for rotating said commutator when the spring-contact member is insulated from said frame, substantially as and for the purposes specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 13th day of March, 1903.

EDWIN L. GRAUEL.

Witnesses:
G. E. MILLIGAN,
GERALD E. MERCHANT.