

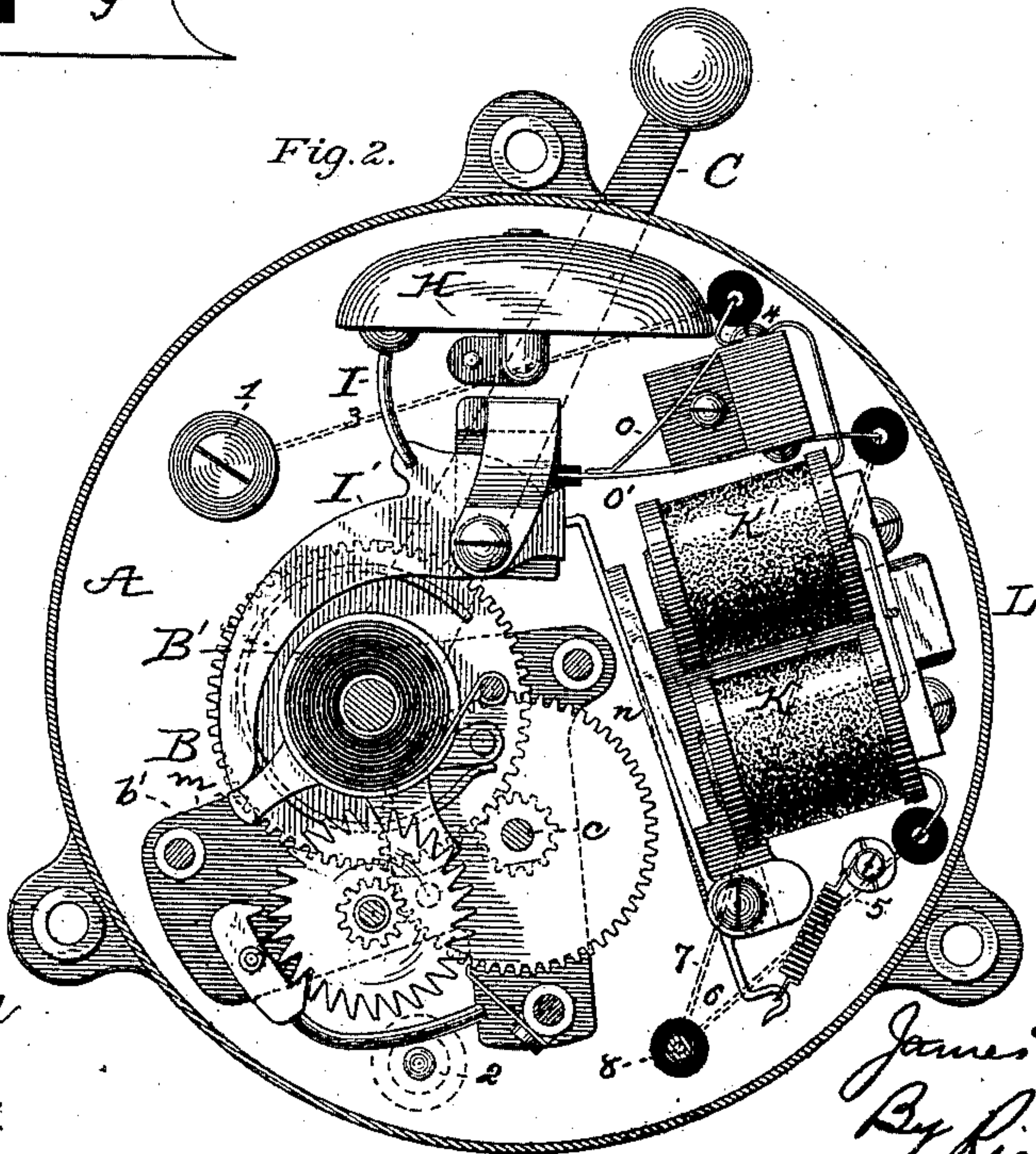
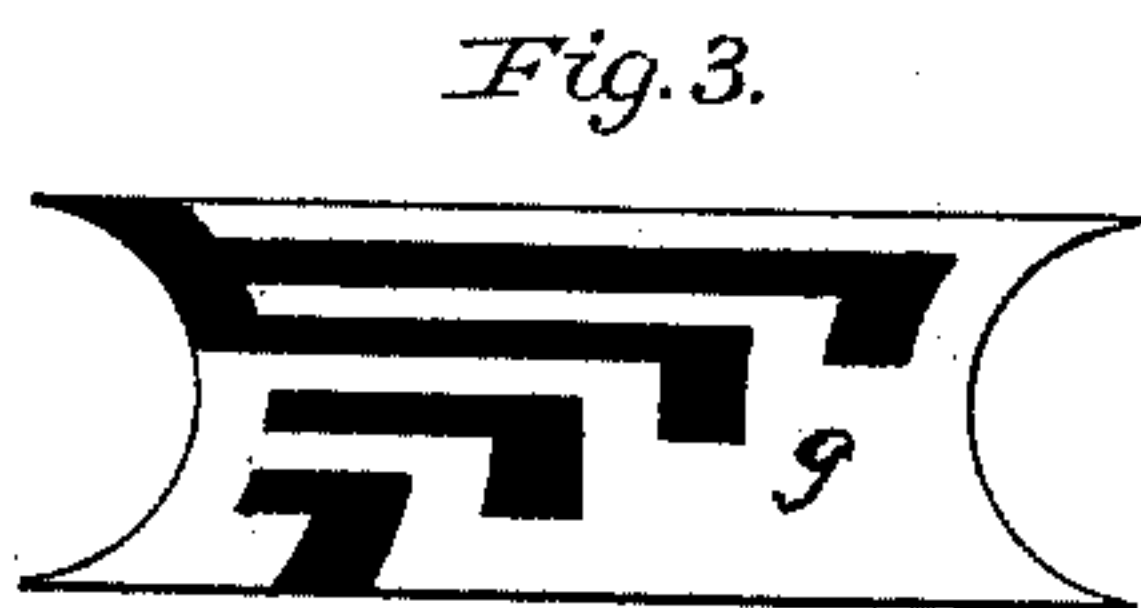
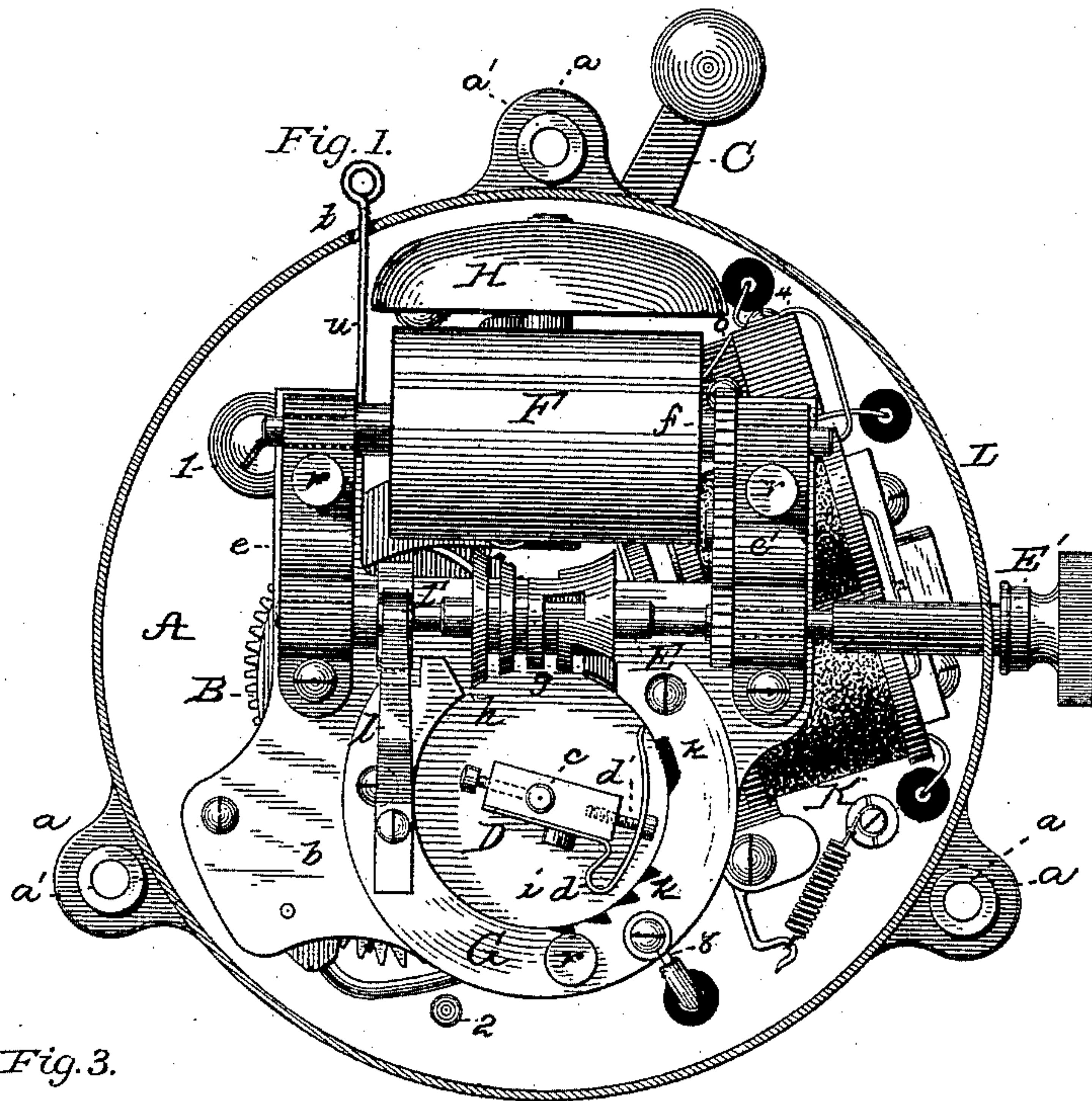
(No Model.)

2 Sheets—Sheet 1.

J. U. MACKENZIE.
ELECTRICAL SIGNALING APPARATUS.

No. 426,621.

Patented Apr. 29, 1890.



Attest:
E. C. Rowland
Attorney

Inventor:
James U. Mackenzie
By Rich. H. Dyer, Atty.

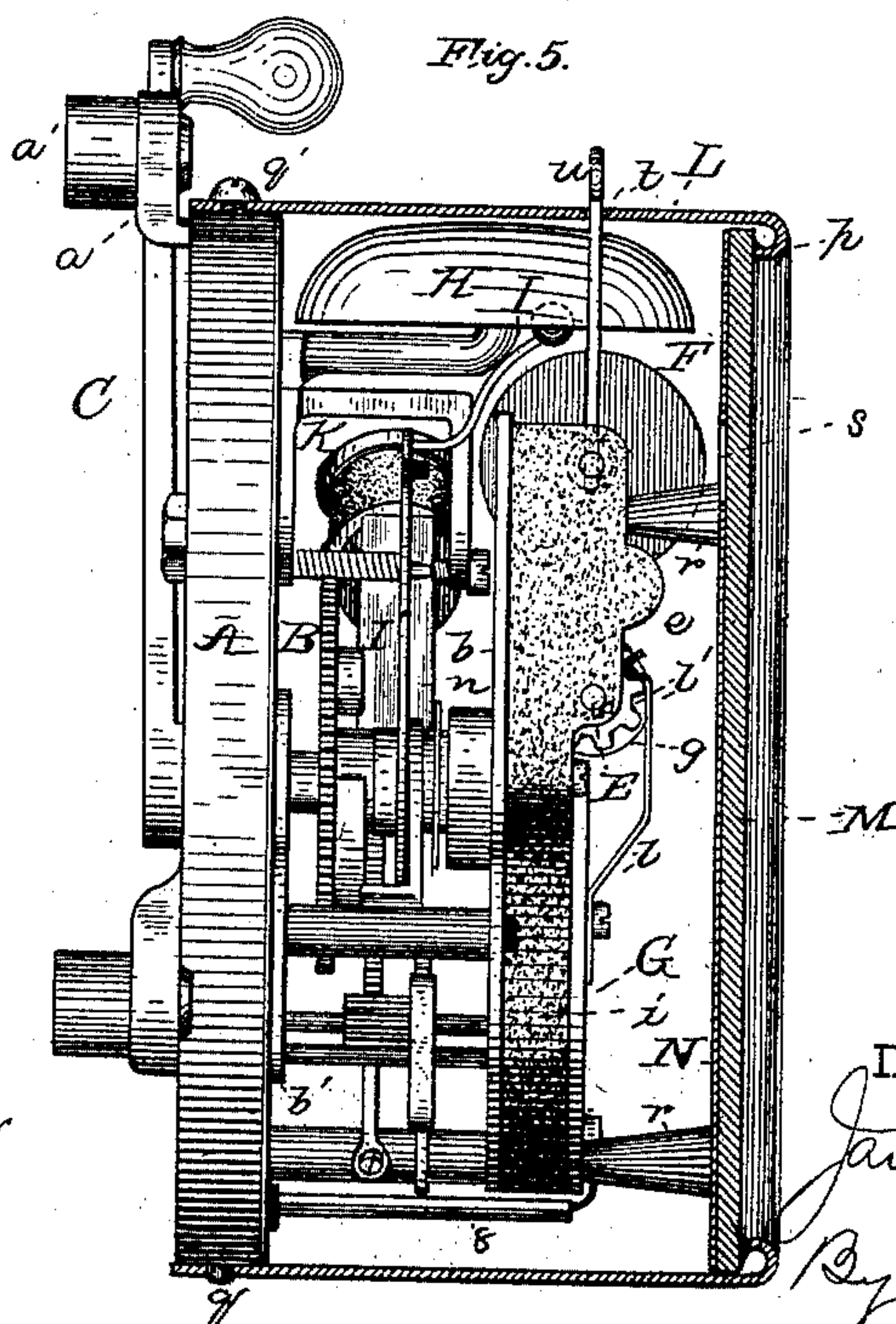
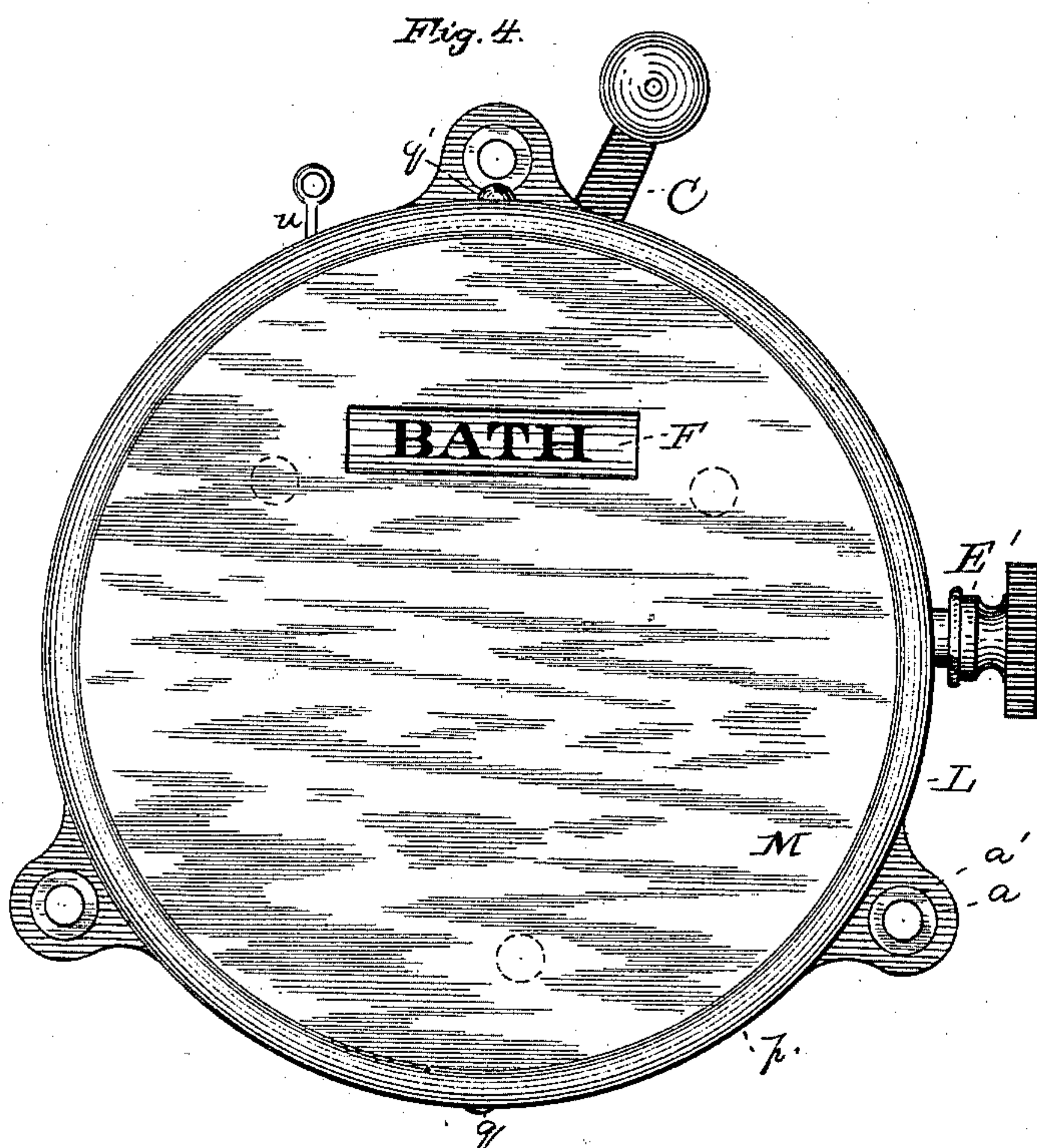
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ATTEST:

Wm. O. Rowland
Witness

INVENTOR:

James U. Mackenzie
By Rich. H. Dye
Att'y.

UNITED STATES PATENT OFFICE.

JAMES U. MACKENZIE, OF NEW YORK, N. Y., ASSIGNOR TO THE GAMEWELL
FIRE ALARM TELEGRAPH COMPANY, OF SAME PLACE.

ELECTRICAL SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 426,621, dated April 29, 1890.

Application filed October 9, 1883. Serial No. 108,521. (No model.) Patented in England April 11, 1883, No. 1,829.

To all whom it may concern:

Be it known that I, JAMES U. MACKENZIE, of New York city, in the county and State of New York, have invented a certain new and useful Improvement in Electrical Signaling Apparatus, (Case A,) (patented in Great Britain, No. 1,829, April 11, 1883,) of which the following is a specification.

The object I have in view is to produce a compact and reliable mechanism for transmitting signals electrically; and the invention consists in the means employed for producing variable and fixed signals, and for exhibiting the signal for which the box is set, in the peculiar construction of inclosing-case, and the means used for giving access to the mechanism without removing the base or back plate on which the works are mounted from position, and in further details of construction, all as will be fully hereinafter explained, and pointed out by the claims.

In the accompanying drawings, forming a part hereof, Figure 1 is a front elevation of a signal-box embodying my invention, the inclosing-case being in section to show the mechanism; Fig. 2, an elevation of the mechanism from the front, with parts removed; Fig. 3, a view of the contact-cylinder laid out flat to show the contacts; Fig. 4, a face view of the box; and Fig. 5, a side elevation of the mechanism, the case being in partial vertical section.

Like letters and figures denote corresponding parts in all the figures.

A is the metallic base or back plate of the box, which is preferably circular with a flanged edge, and has lugs *a*, provided with insulating-thimbles *a'*, through which screws pass for securing the box in position. Upon the circular back plate is mounted the frame of a spring mechanism B, said frame being composed of front and back plates *b b'* and connecting-posts. This spring mechanism has a spring B', which is put in under tension and is wound up by the pivoted operating-handle C to the same extent that it runs down at each operation, as will be well understood. The pivoted operating-handle is on the back of the back plate outside of the case of the box and projects beyond the box be-

tween two of the lugs *a*, which limit its movement.

A shaft *c* is given a complete revolution at each operation of the box, and this shaft projects through the front plate *b* of the frame *b b'* and carries on its end the contact-arm D, which is secured thereto in any suitable manner. This revolving contact-arm has on its end the contact-spring *d*, which is secured to the arm, then bent forward away from the arm, and then backward across the end of the arm, its free end being bent outwardly to form a contact-point, which acts upon the stationary contacts. A screw *d'* passes loosely through the spring and enters the end of the arm. The head of this screw catches upon the spring. It prevents all movement of the spring, except laterally toward and away from the stationary contacts, and by adjusting this screw the contact-spring can be properly adjusted to the stationary contacts.

Upon the front plate *b* are secured blocks *e e'* of hard rubber or other suitable insulating material, and in these blocks is journaled a contact-spindle E, and also the character-cylinder F, arranged parallel with the contact-spindle and connected therewith by cog-wheels *f*. The contact-spindle is provided with two or more series of contacts and spaces which form the variable signals of the box and are arranged on concave lines forming a series of concave signaling-surfaces. These contacts and spaces are shown as formed in a concave cylinder *g*, the face of the cylinder corresponding to the circular path described by the revolving contact-spring and the axis of the cylinder being at right angles to that of the contact-spring. The contacts and spaces are varied, so that at each adjustment of the spindle axially a different set of contacts and spaces will be brought into the path of the revolving contact-spring.

The contacts and spaces are shown as constructed for producing ten variable signals in connection with the break *h* at one end of the cylinder, as shown in Fig. 1; but it is evident that the number of variable signals upon one spindle could be greater or less than ten. The end of the contact-spindle is screw-threaded and receives a screw-threaded turn-

ing-key E' , projecting through the case to the outside of the box and having a milled head for turning. This key is turned hard upon the spindle, and by turning it the contact-spindle and character-cylinder can be revolved in either direction without loosening the hold of the key on the spindle. A curved block i of insulation is also secured to the front plate b of frame $b b'$, and upon this is secured the metallic segment G . This is cut with contacts and spaces k for producing a fixed signal, which may be the number or other designation of the box. The segment G surrounds the revolving contact-spring, except the space occupied by the contact-cylinder, which is located between the ends of the segment. The segment and contact-cylinder, with break h , complete the circular path described by the end of the revolving contact-spring. The segment G is connected electrically with the contact-spindle by a spring l , which has a curved end engaging with a wheel l' on the spindle. An additional spring bearing on the smooth surface of the contact-spindle may be used to make a better electrical connection; but this extra spring may be omitted. The spring l not only connects the segment and spindle electrically, but it controls and determines the movement of the spindle, the wheel l' having a notch for each of the spindle adjustments. The engaging-point of the spring and the teeth of the wheel are formed so that the contact-spindle can be turned in either direction.

The box is provided with an insulated binding-screw 1 and a binding-screw 2, not insulated from the back plate. The segment G is connected with the insulated screw 1 by connections which will be described farther on. The revolving contact-spring being connected with the base, it will be seen that the circuit will be broken when the point of the contact-spring drops into one of the spaces of the segment or contact-cylinder, and hence the signal transmitted will depend upon the arrangement of the spaces. The fixed signal will be transmitted at each operation of the box, and also one of the variable signals. The box shown is a closed-circuit box, the circuit being normally closed; but it is evident that the features of invention are equally well applicable to open-circuit boxes.

The character-cylinder has marked upon it the words, letters, numbers, or characters representing the signals for which the box can be set. These appear one at a time behind an opening in the front of the box. There is also mounted upon the back plate within the inclosing-case a bell H , sounded by a hammer I . This bell is operated by the throwing upon the line from the receiving-office of a stronger current than is used in transmitting the signal, to notify the sender that the signal has been received. The only point of novelty in connection with this bell is its location within the inclosing-case. The hammer I is mounted on a spring-lever I' , thrown

forward by an arm m , worked by the operating-handle of the box. The lever I' is locked forward by the armature-lever n of an electro-magnet K . Two shunt-controlling springs $o o'$ are forced together when the hammer is released, and spring apart when the hammer is locked back by the armature-lever n . The operation of these parts will be well understood. The magnet is cut out of circuit when the box is at rest. The setting of the box for operation sets back and locks the bell-hammer and throws the magnet into line. The retractile spring of the magnet-armature is put under such tension that the magnet does not move its armature when the signal-current is on the line. After the signal is received a stronger current is thrown upon the line, the magnet moves its armature, the bell-hammer is released, and the magnet is cut out of circuit.

The connections of the box are as follows: From the insulated screw 1 a wire 3 runs to a point 4, where the circuit divides, one part being through the magnet, and by wire 5 to point 6, and the other part through the springs $o o'$, and by wire 7 to point 6. At point 6 the two parts of the circuit join in a single wire 8, extending to segment G . The inclosing-case of the box is a spun-metal band L , having its outer edge p turned inwardly, as shown. This band is placed over the works, encircles the back plate, and is secured thereto by a stud q and screw q' . The face of the box is closed by a circular glass plate M , behind which is a card-board disk N . These parts are supported from the works by posts r , three or more of such posts being used. The card-board disk N has a slit s over the center of the character-cylinder, through which one word, number, letter, or other character can be seen. The glass plate and card-board disk are held firmly in position, the posts being made of proper length to assure this, or when the posts are short one or more extra card-board disks can be placed back of the first one to make a close fit of the parts.

The turning-key E' projecting through the band L , it will be impossible to remove the case to give access to the mechanism, even after unscrewing the back plate from position, unless some means is provided for locking the contact-spindle and character-cylinder, so that the turning-key can be turned back off of the spindle. This I do by making a hole t in the band L , opposite a hole in the shaft of the character-cylinder, and through the hole t , I introduce a wire u , entering the hole in the character-cylinder shaft and locking the character-cylinder and contact-spindle. This permits the removal of the turning-key E' , and then the band L can be removed from the back plate, giving access to the mechanism. The wire u is not left in the box, because it prevents adjustment of the contact-spindle.

The principal features of my signal-box applied to a box having two or more sets of ad-

justable contacts are shown and described and specifically claimed in an application of even date herewith, designated Case B, (since issued as Patent No. 304,209, dated August 26, 1884.)

What I claim is—

1. In electrical signaling apparatus, the combination, with a spindle having two or more series of contacts and spaces arranged longitudinally thereon and adapted to be adjusted axially to bring into position any one of the series of contacts and spaces, of a revolving contact-spring passing over the contacts and spaces of the spindle, substantially as set forth.

2. In electrical signaling apparatus, the combination, with an adjustable spindle having a series of concave signaling-surfaces, of a revolving contact-spring whose axis is arranged at right angles to the axis of the contact-spindle, substantially as set forth.

3. In electrical signaling apparatus, the combination, with an adjustable spindle having two or more series of contacts and spaces arranged longitudinally thereon, of a revolving contact-spring and means for indicating the signal for which the spindle is adjusted, substantially as set forth.

4. In electrical signaling apparatus, the combination, with a revolving contact-spindle, of a character-cylinder mounted upon a separate shaft parallel with the contact-spindle and turning with such contact-spindle, substantially as set forth.

5. In electrical signaling apparatus, the combination, with a revolving contact-spindle provided with a turning-key, of a character-cylinder and the connecting cog-wheels, substantially as set forth.

6. In electrical signaling apparatus, the combination, with a revolving shaft, of a contact-arm secured to said shaft, the double contact-spring, and the limiting and adjusting screw, substantially as set forth.

7. In electrical signaling apparatus, the combination, with a spindle having two or more series of contacts and spaces arranged longitudinally thereon and adapted to be adjusted axially to bring into position any one of the series of contacts and spaces for producing variable signals, of contacts and spaces for producing a fixed signal, substantially as set forth.

8. In electrical signaling apparatus, the combination of an adjustable contact-spindle having two or more series of contacts and spaces arranged longitudinally thereon, and a set of fixed contacts and spaces with a revolving contact-spring acting both upon the adjustable and the fixed contacts and spaces, substantially as set forth.

9. In electrical signaling apparatus, the

combination, with an adjustable contact-spindle having two or more series of contacts and spaces arranged longitudinally thereon for producing variable signals, contacts and spaces for producing a fixed signal, and means for indicating the variable signal for which the spindle is adjusted, substantially as set forth.

10. In electrical signaling apparatus, the combination of an adjustable contact-spindle, a set of fixed contacts and spaces, and a character-cylinder, substantially as set forth.

11. In electrical signaling apparatus, the combination of an adjustable contact-spindle, a set of fixed contacts and spaces, a revolving contact-spring, and a character-cylinder, substantially as set forth.

12. In electrical signaling apparatus, the combination of a back plate A, upon which the mechanism is mounted, an inclosing circular-spun band L, secured to said back plate and forming the sides of the case and having an inwardly-turned edge *p*, and a front plate held by such edge, substantially as set forth.

13. In electrical signaling apparatus, the combination of a back plate A, upon which the mechanism is mounted, an inclosing circular-spun band L, secured to said back plate and forming the sides of the case and having an inwardly-turned edge *p*, a front plate placed under said edge, and posts supported from the mechanism for holding the plate in position, substantially as set forth.

14. In electrical signaling apparatus, the combination of back plate A, carrying the mechanism, the inclosing circular-spun band L, having inwardly-turned edge *p* and forming the sides of the case, the glass plate M, card-board disk N, and posts *r*, substantially as set forth.

15. In electrical signaling apparatus, the combination, with the mechanism having adjustable contacts, the inclosing-case, a key for adjusting the contacts projecting through the case, and means for locking the adjustable contacts for permitting the removal of the turning-key, substantially as set forth.

16. In electrical signaling apparatus, the combination, with the mechanism having an adjustable contact-spindle, the inclosing-case, a turning-key screwing onto the end of the spindle and projecting through the case, and an opening in the case through which means can be inserted to lock the contact-spindle for permitting the removal of the turning-key, substantially as set forth.

This specification signed and witnessed this 24th day of September, 1883.

JAMES U. MACKENZIE.

Witnesses:

H. W. SEELY,

EDWARD H. PYATT.