

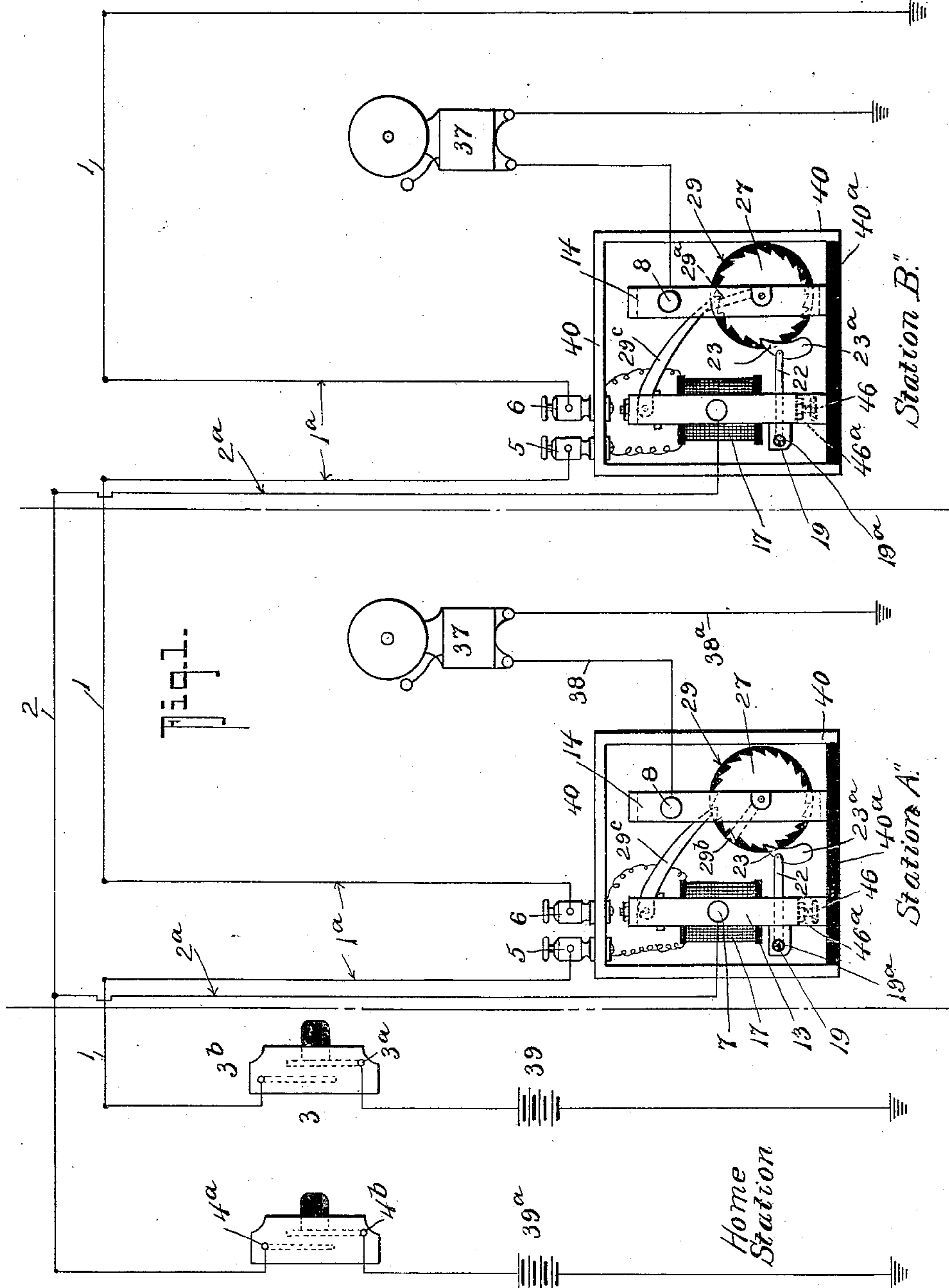
No. 870,328.

PATENTED NOV. 5, 1907.

J. F. WEBB, JR.  
ELECTRIC SIGNALING MECHANISM.

APPLICATION FILED MAY 31, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

*John J. Schrott*  
*H. Woodard*

INVENTOR

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BY

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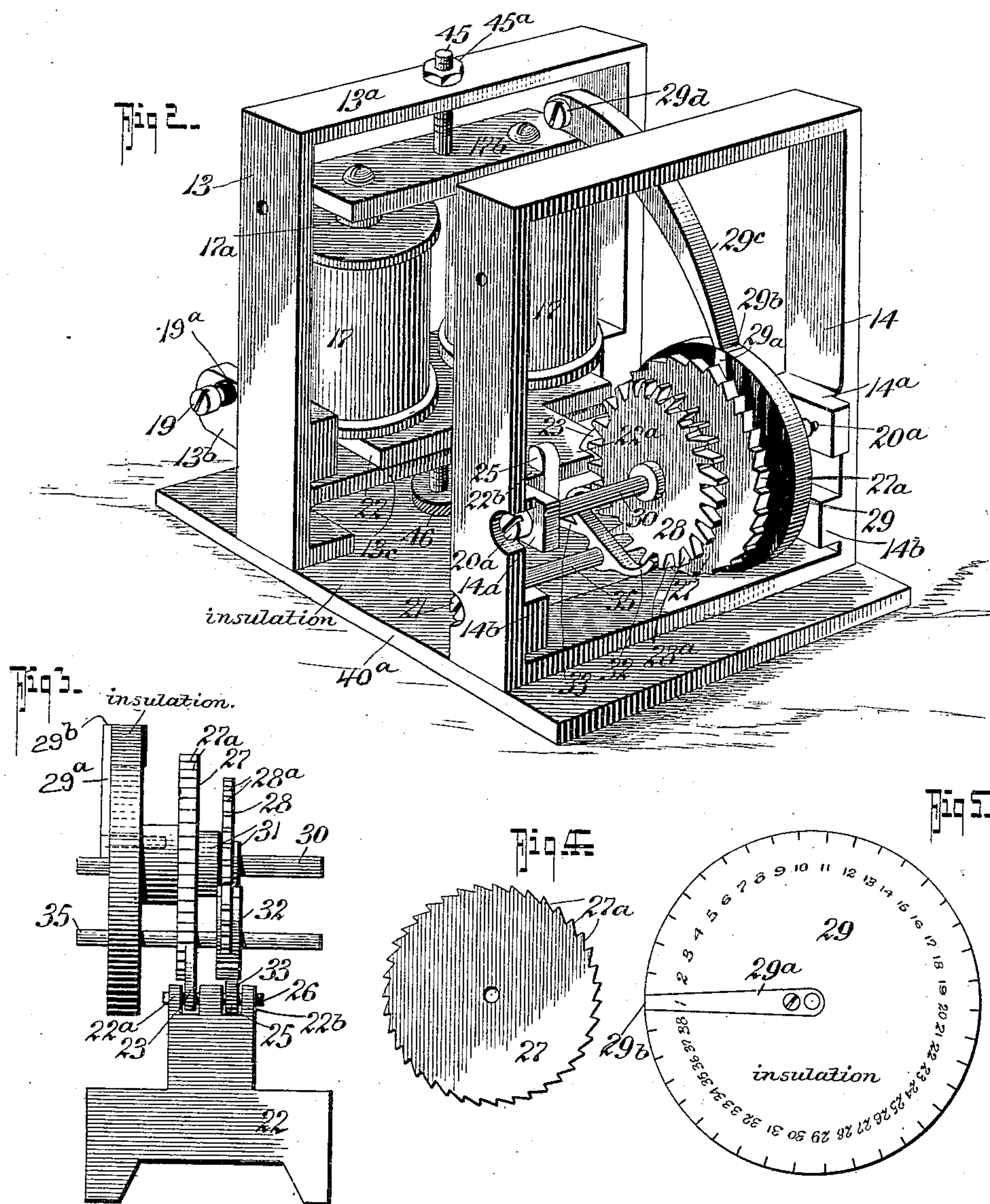
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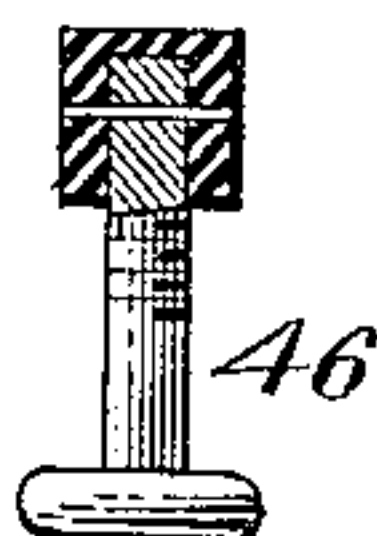
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

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## ELECTRIC SIGNALING MECHANISM.

No. 870,328.

Specification of Letters Patent.

Patented Nov. 5, 1907.

Application filed May 31, 1907. Serial No. 376,562.

*To all whom it may concern:*

Be it known that I, JEAN F. WEBB, Jr., residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Signaling Mechanism, of which the following is a specification.

My invention relates to certain new and useful improvements in electric signaling mechanisms of the type disclosed in my co-pending application, filed August 25, 1906, Serial No. 332,017, and allowed December 19, 1906, and my invention primarily has for its object to provide certain improvements on the selecting mechanism disclosed in my co-pending application aforesaid.

In its generic nature, the present invention embodies a step-by-step uni-directionally rotatable shaft upon which is an escapement wheel and a ratchet disk which coöperate with the escapement verge and pawl respectively, carried by the armature of the operating magnets, and a contact carrying wheel also mounted on the uni-directionally rotatable shaft to which one terminal of an electric circuit is connected, the contact wheel carrying a contact plate which is adapted to be engaged by a dog which is electrically connected to the other terminal of an electric circuit.

From practical experience, I have found that when the type of selecting mechanism disclosed in my co-pending application is used, owing to the fact that the electric current is compelled to go through so many joints, there is danger of the contact being not always perfect between the terminals of the electric circuit, and I therefore obviate this danger by the type of selecting mechanism disclosed in my present invention in which the electric circuit need only go through a minimum number of joined parts.

With other objects in view which will be readily apparent hereafter, the invention also embodies certain novel construction, arrangement and combination of parts all of which will be first described in detail, and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which,—

Figure 1, is a diagrammatic view illustrating the arrangement of a system in which my present apparatus is designed to be used, the "home" or central station and two substations being shown. Fig. 2, is a perspective view of my invention, showing the parts mounted upon their insulating base with the casing removed. Fig. 3, is a detail plan view of a portion of my invention. Fig. 4, is a detail view of the rotatable disk. Fig. 5, is a detail view of the circuit closer carrying wheel. Fig. 6 is a detail view of the screw 46, showing different forms of insulating tips therefor.

Referring now to the accompanying drawings, in which like numerals and letters of reference indicate

like parts in all of the figures, 1 designates the line wire of the selecting circuit and 2 represents the line wire of the signaling circuit, as clearly shown in Fig. 1, of the drawings.

Each station has its selecting mechanism in electrical connection with the line wire 2 of the signaling circuit by branch wires 2<sup>a</sup>, and the respective electro operative parts of the mechanism of each station (station A, station B) that are controlled by the wires 2<sup>a</sup>, are connected in parallel with one another. The selecting mechanism of each station has its selecting magnet 17 connected in series with the line wire 1, thus connecting all selecting magnets 17 on the line in series with the "home" station apparatus hereinbefore referred to.

Since the operative mechanism of all sub-stations is the same, a detail description of one of such operative mechanisms is thought will be sufficient.

Each sub-station mechanism comprises an insulating base 40<sup>a</sup> adapted to receive the housing 40 of any approved construction. Mounted on the base 40<sup>a</sup> is a rectangular frame 13, the frame 13, in practice, being preferably in the nature of a brass casting and forms what I shall hereinafter term the magnet supporting frame. The electro-magnets 17 have their cores 17<sup>a</sup> secured to a cross bar 17<sup>b</sup> which is in turn adjustably fastened to the upper bar 13<sup>a</sup> of the frame 13 by a bolt 45 and nuts 45<sup>a</sup>. Near the lower end the frame 13 is provided with a pair of laterally projecting lugs 13<sup>b</sup> which receive the insulating bushings 19<sup>a</sup> in which the fulcrum screws 19 are held. The fulcrum screws 19 serve to pivot the armature 22 to the frame 13. The armature is provided with bearing portions 22<sup>a</sup> and 22<sup>b</sup> that are adapted to receive the pawl 23 and pitman 25, the pawl and pitman being fulcrumed on a pin 26 in the armature 22 and the pawl 23 as well as the pitman 25 may be made of brass or other suitable metal or material. The movement of the armature 22 is limited and adjusted by a set screw 46 and check nuts 46<sup>a</sup> in the lower bar 13<sup>c</sup> of the frame 13, the screw 46 being capped with insulation or provided with an insulating pin, as shown in Fig. 6, to prevent electrical connection between the armature and the frame 13. The terminal wires of the magnets 17 connect with the binding posts 5 and 6 on the outside of the housing 40 to which the line wire 1 is electrically connected by leads 1<sup>a</sup>.

7 designates a binding post which screws into the frame 13 and is connected to the wire 2<sup>a</sup> of the signaling circuit.

A second supporting frame 14 of similar form to the frame 13 is provided, and this frame I shall hereinafter term the selecting mechanism supporting frame. The frame 14 has lateral lugs 14<sup>a</sup> to receive pivot screws 20<sup>a</sup> which pivotally support the axle 30 that carries the ratchet wheel 27 and the escapement wheel 28. The



axle 30 has an enlargement 31 to enable the wheels 27 and 28 to be readily secured thereto. The frame 14 is suitably mounted on the insulating base 40<sup>a</sup> in any approved manner, and the ratchet wheel 27 as well as the escapement wheel 28 may be made of brass, steel or any other suitable material. The ratchet wheel 27, in practice, is provided with a definite number of ratchet teeth 27<sup>a</sup> to cooperate with the pawl 23 which has a weighted portion 23<sup>a</sup> so that it will always be held in engagement with the wheel 27. Mounted upon the shaft 30 is a contact carrying wheel 29 which is provided with a contact plate 29<sup>a</sup> terminating in the peripheral portion 29<sup>b</sup> which cooperates with the dog 29<sup>c</sup> that is fulcrumed at 29<sup>d</sup> to the frame 13, thus making electrical contact between the frame 13 and the frame 14 through the medium of the dog and shaft 30. The relative position of the peripheral contacts 29<sup>b</sup> on the contact disks 29 of the different sub-station mechanisms, it should be stated, are arranged to correspond to the number of sub-stations so that only one sub-station will have its contact 29<sup>b</sup> in engagement with the dog 29<sup>c</sup> at a time. The escapement wheel 28 has teeth 28<sup>a</sup> to correspond in number with those on the ratchet disk 27, and the verges 32 of the escapement wheel 28 are mounted on a shaft 35 which is fulcrumed on set screws 21 that are held in lugs 14<sup>b</sup> which project laterally from the frame 14.

33 designates an actuating arm for the verges 32 and the arm 33 is fulcrumed to the pitman 25.

A binding post 8 is secured to the frame 14 and is electrically connected by a wire 38, which in turn may be grounded through a wire 38<sup>a</sup>.

The signal 37 may be any desired electrically controlled or operative mechanism, and for convenience of illustration, I have shown such signal as being an ordinary electric bell, although I desire it understood that I do not limit myself to such type of signal.

At the "home" station, I provide a normally open make and break circuit closer 4 whose contacts 4<sup>a</sup> and 4<sup>b</sup> are respectively connected to line wire 2, and to a source of electrical energy 39<sup>a</sup>. A second normally open make and break circuit closer 3 is provided which has one of its terminals 3<sup>b</sup> connected to the line wire 1 and the other terminal 3<sup>a</sup> connected to a source of electrical energy 39. Both sources of electrical energy 39 and 39<sup>a</sup> have their other terminals grounded.

The circuit closers 3 and 4 may be of any approved type and either automatic in their operation or otherwise, since the specific construction of such circuit closers form no part of my present invention, and for convenience of illustration, I have shown such circuit closers as being of the ordinary type of "push buttons".

So far as described the manner in which my invention operates will be best explained as follows,—The operator desiring to call a particular station from the "home" office, works the circuit closer 3 to close the circuit a definite number of times, depending upon the station to be called. When the circuit is closed by the circuit closer 3, the electrical circuit is made from ground through battery 39, make and break circuit closer 3, line wire 1, binding post 5, electro magnet 17 of station A, binding post 6 of station A, line wire 1 and from thence in a similar manner through all the stations on the line and grounded from line wire 1 at the final station. When it is desired to operate a sig-

nal at any particular station, the circuit just mentioned is closed and opened by the circuit closer 3, a sufficient number of times to bring the dog 29<sup>c</sup> of the respective station desired in contact with the circuit closing member 29<sup>a</sup>, at that particular station. Each closing of the circuit by the circuit closer 3 sends electrical impulses over the line wire 1 which energizes the magnets 17 of all stations, thus attracting their armatures 22 upwardly; each raising of the armature 22 rotates the ratchet wheel 27 one cog, by reason of the engagement of the pawls 23 in the teeth of the ratchet wheel 27. The ends of the armature 22 likewise oscillate the verges 32 of the escapement wheels 28, so that the escapement wheels and ratchet wheel 27 can only turn one cog at each raising of the armature. Each breaking of the circuit over the line wire 1, by the circuit closer 3 deenergizes the electro magnets 17, thus permitting the armatures 22 to drop by gravity, into their normal positions. The pawls 23 engage the succeeding lower cogs of the wheels 27 (the upper end of the portion making a contact against the face of cogs by reason of the gravity of the heavier lower portion) and the verges 32 engage the succeeding teeth of the wheel 28. When the wheels 27 have been rotated until the circuit closer 29<sup>a</sup> of the desired station is in contact with the dog 29<sup>c</sup> at the particular station where the signal is to be given (see station B, Fig. 1), the signal is operated by closing the circuit on the line wire 2, through the medium of the make and break circuit closer 4.

The signaling circuit includes a source of electrical energy 39<sup>a</sup> grounded at one side at the "home" station and when the circuit closer of the signaling circuit is closed, the current flows from the source of electrical energy 39<sup>a</sup> through the line wire 2 and lead 2<sup>a</sup> of the desired station into the supporting frame 13 of said station and frame, thence across the dog 29<sup>c</sup> to the contact 29<sup>a</sup> of the contact carrying wheel 29 and from thence through axle 30 and frame 14 to binding post 8, to signal 37. From signal 37 the current passes to ground lead 38<sup>a</sup>, thus the actuating of the controlling mechanism or circuit closer 4 at the "home" station will actuate the bell or other signaling devices 37 at the desired station.

In place of the ground return, a metallic connection may be used, if desired, as is well known in the art, and hence illustration thereof is thought to be unnecessary.

From the foregoing it will be seen that by reason of the direct contact between the dog 29<sup>c</sup> and the contact plate 29<sup>a</sup> which is electrically connected to the shaft 30, the current passes from the frame 13 to the frame 14, through a minimum number of movable parts, and hence the liability of an imperfect contact is proportionately decreased.

From the foregoing description taken in connection with the accompanying drawings, it is thought the complete construction, operation and advantages of my invention will be readily understood by those skilled in the art to which the invention appertains.

What I claim is,—

1. A step-by-step circuit controlling mechanism comprising in combination a magnet supporting frame, operating magnets carried thereby, an armature pivotally mounted in said frame, a wheel carrying frame, a uni-



directionally rotatable shaft mounted therein, a contact carrying disk mounted on said shaft, a ratchet wheel mounted on said shaft, a pawl carried by the armature for engaging with said ratchet wheel, an escapement wheel mounted on said shaft, an escapement verge pivotally supported on said wheel carrying frame, connections between the armature and the verge whereby the motion of the armature is imparted to the verge, and means for electrically connecting the magnet supporting frame to said contact disk at times, substantially as shown and described.

2. A step-by-step circuit controlling mechanism comprising in combination with a magnet supporting frame, operating magnets adjustable in said frame, an armature pivotally mounted in said frame, means for adjusting and limiting the movement of said armature, a wheel carrying frame, a rotatable shaft mounted in said wheel carrying frame, a ratchet disk mounted on said shaft, an escapement wheel also mounted on said shaft, a pawl carried by said armature for engaging said ratchet disk, a pivotally supported escapement verge, connections between the armature and the verge, a contact carrying disk mounted on said shaft and having a contact plate, and a dog pivoted on the magnet carrying frame and engaging said contact carrying wheel.

3. A step-by-step circuit controlling mechanism comprising in combination a suitable supporting frame, an electro magnet, an oscillating armature, a uni-directionally rotatable circuit closer carrier, a contact dog pivotally mounted on said supporting frame, adapted to engage said circuit closer carrier, a ratchet wheel rotatable with said circuit closer carrier, a pawl carried by said armature for engaging said ratchet wheel, an escapement wheel rotating synchronously with said carrier, and an

escapement verge cooperating therewith, and means for oscillating the verge by the movement of the armature.

4. A step-by-step circuit controlling device comprising in combination with a suitable supporting frame, an electro magnet, an oscillating armature therefor, a uni-directionally rotatable circuit closer having a contact portion, a ratchet disk rotating synchronously with said circuit closer, a pawl pivotally mounted on said armature for engaging said ratchet disk, a dog mounted on said supporting frame for engaging said circuit closer, an escapement wheel rotatable synchronously with said circuit closer, an escapement verge cooperating with said escapement wheel, and connections between the escapement verge and the armature for imparting the armature movement to the escapement verge to oscillate the same.

5. A step-by-step circuit controlling mechanism, comprising in combination with a suitable magnet supporting frame, an oscillating armature mounted therein and insulated therefrom, a second supporting frame, a uni-directionally rotatable circuit closer carrier rotatably mounted in said second frame, a contact pawl pivotally mounted on said first mentioned frame, and adapted to engage said circuit closer carrier, a ratchet wheel rotatable with said circuit closer carrier, a dog carried by the armature for engaging the ratchet wheel, an escapement wheel rotating synchronously with said carrier, an escapement verge cooperating therewith, and means for oscillating the verge by the movement of the armature, substantially as shown and described.

JEAN F. WEBB, JR.

Witnesses:

T. O. MYREN,  
F. H. QUAIL.