

No. 869,714.

PATENTED OCT. 29, 1907.

J. L. JONES.
WIRELESS SIGNALING SYSTEM.
APPLICATION FILED AUG. 24, 1906.

2 SHEETS—SHEET 1.

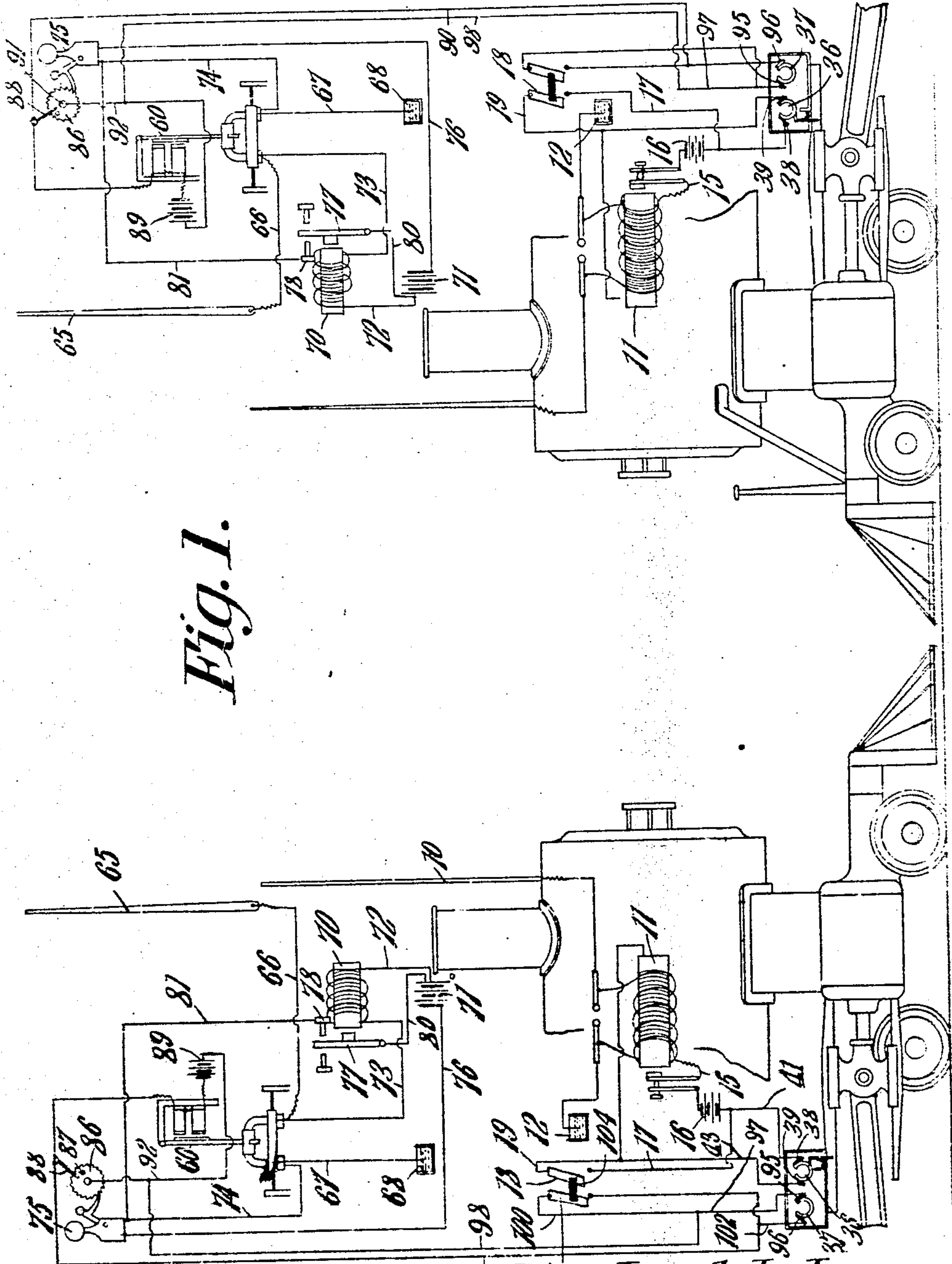


Fig. 1.

WITNESSES:

[Signature]
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By *Joseph L. Jones,*
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Chenoweth
ATTORNEYS

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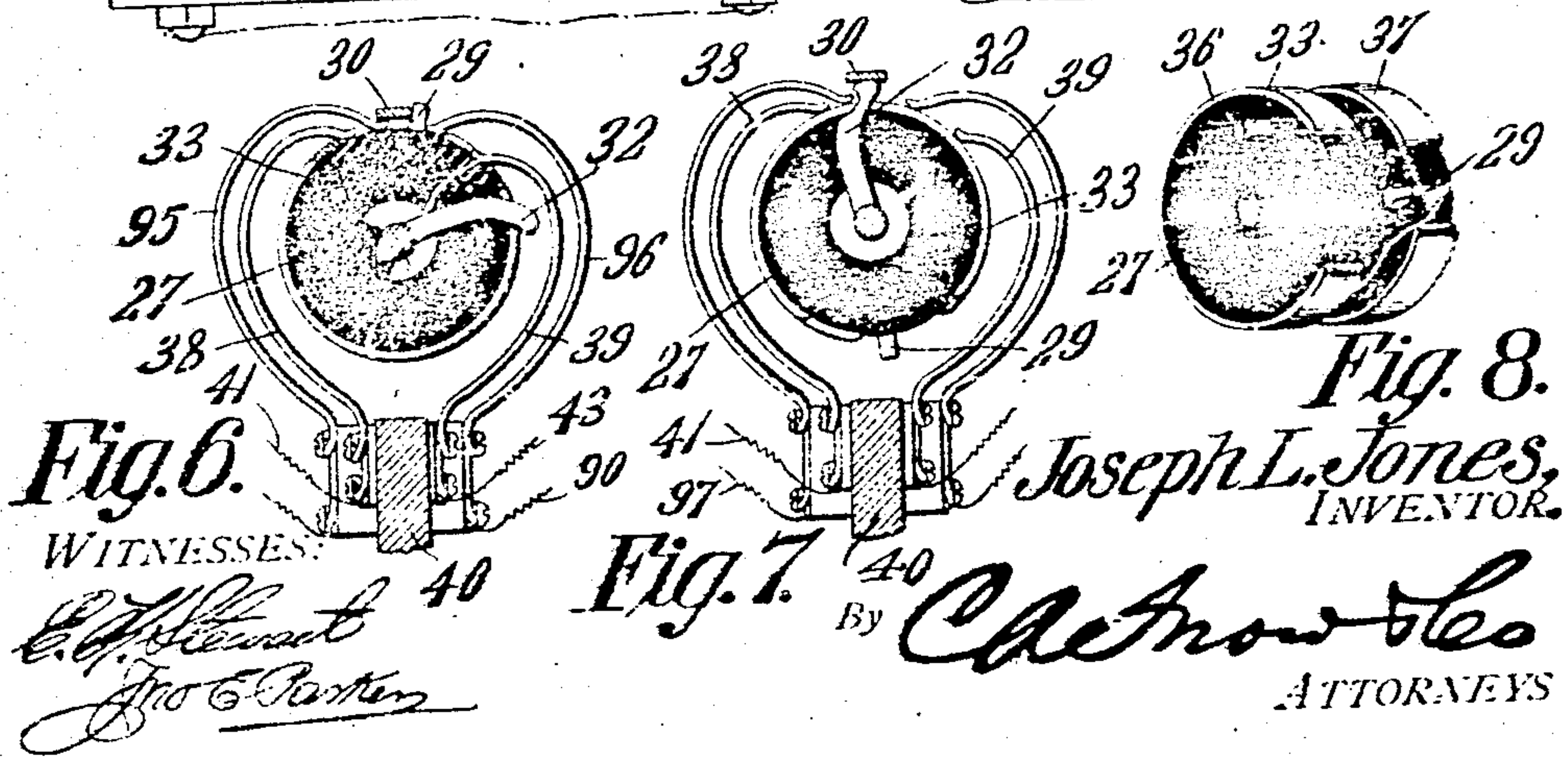
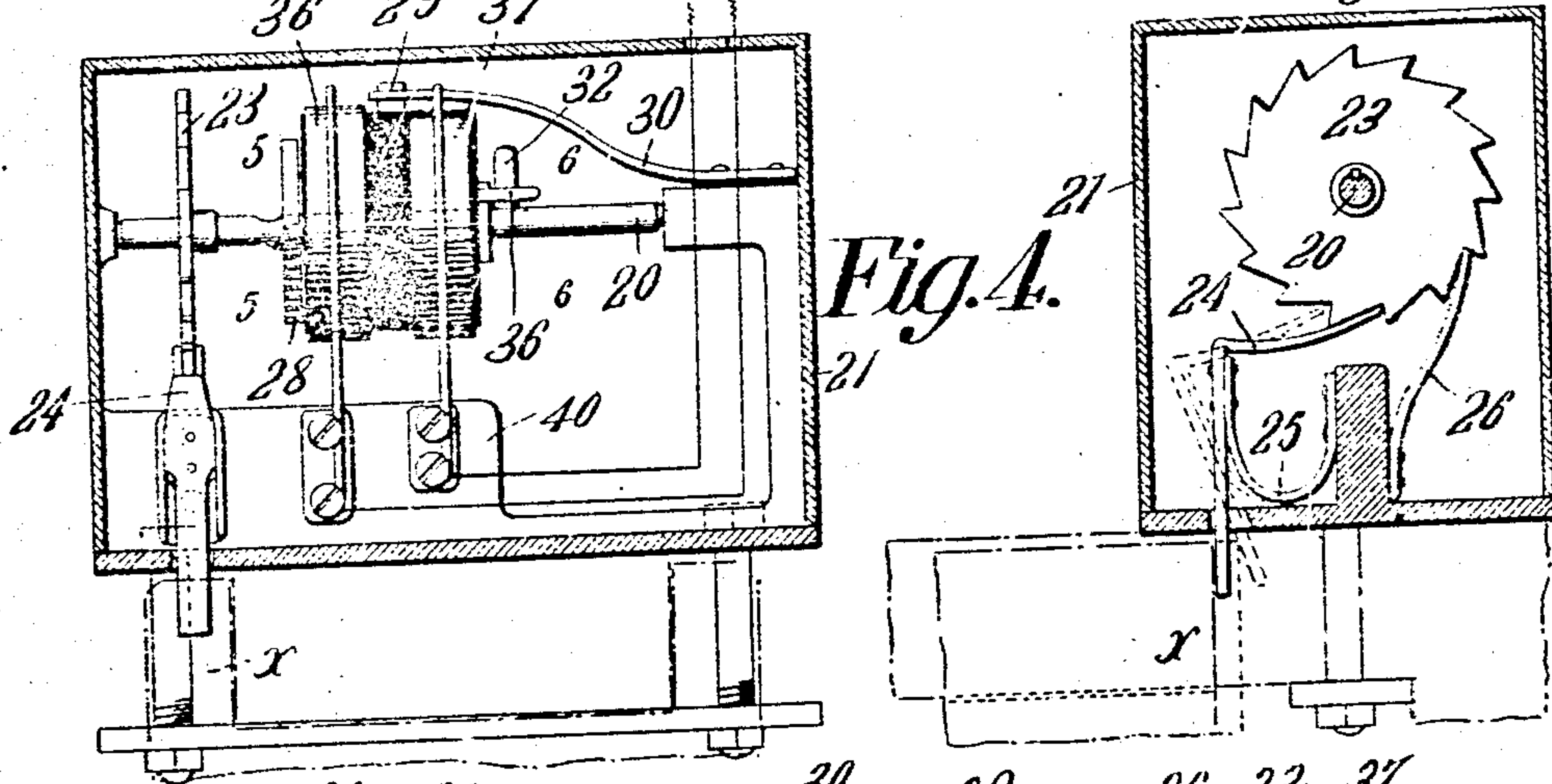
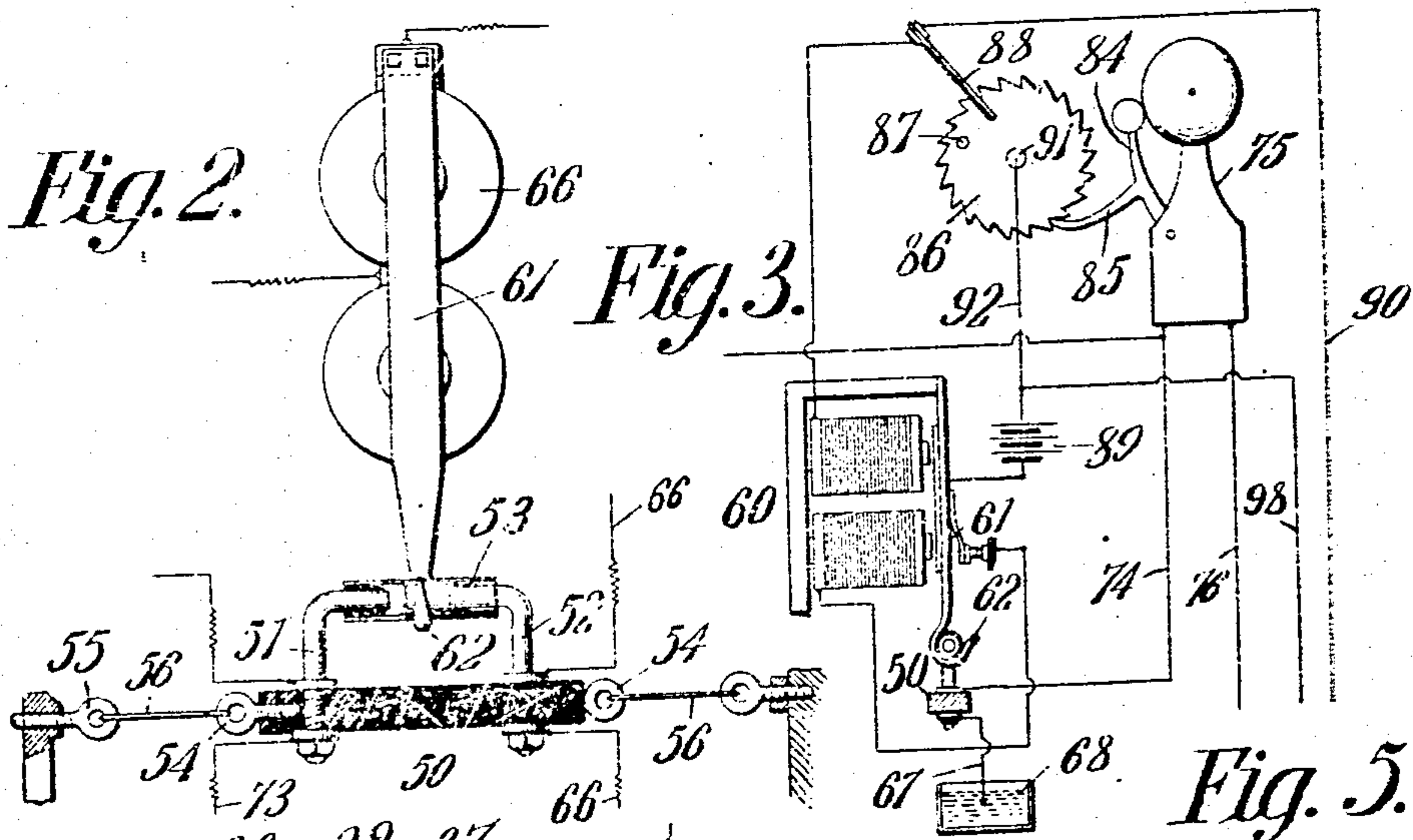


Fig. 6.
WITNESSES:
E. J. Stewart
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Fig. 7.

Fig. 8.
Joseph L. Jones,
INVENTOR.
By *Chas. H. Knowlton*
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UNITED STATES PATENT OFFICE.

JOSEPH L. JONES, OF KIZER, TENNESSEE.

WIRELESS SIGNALING SYSTEM.

No. 839,714.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed August 24, 1906. Serial No. 331,934.

To all whom it may concern:

Be it known that I, JOSEPH L. JONES, a citizen of the United States, residing at Kizer, in the county of Blount and State of Tennessee, have invented a new and useful
5 Wireless Signaling System, of which the following is a specification.

This invention relates to systems of intercommunication between moving railway trains, or between trains and stations, and has for its principal object to provide
10 a wireless system of communication in which provision is made for automatically signaling the approach of trains to each other or to stations.

A further object of the invention is to provide a system which may be operated either automatically or
15 manually for the sending of signals, or for the sending of readable messages.

A still further object of the invention is to provide a novel form of receiving mechanism so arranged that an alarm or other signal will be energized for a predetermined
20 mined period of time, and then will be automatically cut out.

A still further object of the invention is to provide a novel form of receiving mechanism including a relay and circuit controlling devices, which together with
25 the decoherer are placed under the control of an alarm mechanism.

A still further object of the invention is to provide a signal sending means operable at predetermined intervals by the movement of some portion of the engine or
30 train.

A still further object of the invention is to provide a circuit closing member that is under the control of the cross head or other movable member of the engine and serves to close the signaling circuit at regular periods as
35 the trains advance.

A still further object of the invention is to provide a novel form of circuit closing device.

A still further object of the invention is to provide an apparatus of this type in which provision is made for
40 preventing the reception of a signal at the station which is sending.

A still further object of the invention is to provide an apparatus of this class in which the decoherer is held from movement for a predetermined period of time and
45 then is allowed to operate in order to break the circuit.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangements of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in
50 the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from

the spirit or sacrificing any of the advantages of the invention. 55

In the accompanying drawings:—Figure 1 is a view in the nature of a diagram showing the application of the invention to two approaching trains. Fig. 2 is an elevation on a larger scale of the coherer and decoherer, parts being broken away in order to more clearly illustrate the invention. Fig. 3 is an elevation of the mechanism for timing the operation of the decoherer. Fig. 4 is a front elevation of the mechanism that is operated by the engine or train for the purpose of closing the signaling circuit. Fig. 5 is a transverse sectional view of the same on the line 5—5 of Fig. 4. Fig. 6 is a similar view on the line 6—6 of Fig. 4 showing the revoluble commutator or circuit closer in locked position. Fig. 7 is a similar view showing the same in release position and moving for the purpose of closing a circuit. Fig. 8 is a
60 detail perspective view of the commutator or circuit closer detached. 65

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings. 70

On each locomotive, and at each station along the line are sending and receiving devices, together with two aerial poles, one for sending and the other for receiving, these being generally in the form of metallic rods about one-fourth of an inch in diameter and as
80 high as the tunnels, bridges and the like will permit. 85

The sending apparatus includes a vertical pole or conductor 10 and a Ruhmkorff coil 11, one of the sparking poles being connected to the aerial conductor and the other to a ground 12 which in the present instance takes the form of a zinc box containing water. The primary of the coil is connected by a wire 15 to one pole of a source of energy 16, and the opposite pole of this source of energy is connected by a wire 17 to a contact immediately under a switch blade 18, the
90 switch blade being normally out of engagement with the contact. From the fixed end of the switch blade runs a wire 19 to the primary, the interrupter being arranged in the circuit as usual, and a condenser being employed if necessary. 95

The present apparatus is designed to send a signal automatically as the train advances, that is to say, the primary circuit of the induction coil will be closed every predetermined number of revolutions of the driving wheels, for instance fifteen revolutions, which
100 would mean from fifteen to twenty signals every mile, in accordance with the diameter of the driving wheels. For this purpose an automatic circuit closer is arranged adjacent to the cross head, and receives a step by step movement as the cross head reciprocates. This circuit
105 closer includes a revoluble shaft 20 that is mounted

in a suitable bearing inclosed in a casing 21, and secured to the shaft is a ratchet wheel 23 with which engages a pawl 24. The pawl is supported by a spring 25 and has one end projecting through an opening in the wall of the casing in position to be engaged by the cross head τ , indicated by dotted lines in Fig. 5, the cross head moving the pawl from the full line to the dotted line position, and the return movement being accomplished by the spring 25, so that the ratchet wheel will be advanced a single step at each complete reciprocatory movement of said cross head. When so advanced the ratchet wheel is held by a spring pawl 26.

Mounted loosely on the shaft is a circuit closing drum 27, preferably formed of insulating material and connected to the shaft by a spiral spring 28. This drum carries on its periphery a radially projecting pin 29 which is engaged by a locking spring 30 that tends to hold it from movement under stress of the spring. As the ratchet wheel is turned, the spring is wound up, and if the locking member 30 is released, the drum is allowed to make one complete rotative movement as the spring unwinds.

Mounted on the shaft is a radially projecting arm 32, having a cam-shaped outer end that engages under the locking member and raises such member 30 from engagement with the pin 29, whereupon the drum revolves rapidly under the action of the spring 28, until a stop pin 33 projecting from the end of the drum engages against the cam arm 32 and stops further movement of said drum, this occurring in advance of the arrival of the pin 29 at the initial position and the contact of the pin 33 with the arm 32 will move said arm from below the stop member 30, so that the latter will be in position to be engaged by the pin 29 and check the movement of the circuit closer when it has made a single complete revolution.

Mounted on the drum 27 are two bands 36 and 37, formed of good conducting material, the band 37 being a trifle longer than band 36 for a purpose hereinafter described. This band 36 is engaged by two spring contacts 38 and 39, that are carried by a portion 40 of the fixed frame, while the drum is rotating. When the drum is at rest they bear on the surface of the insulating material of which the drum is formed, and hence no circuit is closed between them. The contact 38 is connected by a wire 41 to that pole of the battery or other source of energy opposite the connection of said battery with the primary of the induction coil, while the contact 39 is connected by a wire 43 with the fixed end of the switch blade 18 so that if the revoluble drum is rotated, the circuit is closed in the same manner as it would be by a depression of the blade 18 of the key or switch, and the primary of the induction coil will be energized for the purpose of sending a signal; and it may here be remarked that the function of the switch is to enable the engineer or conductor to send a signal when the train is stopped, or to allow the engineer, conductor or station master to send a readable message as by the Morse or other alphabet.

The coherer, which is best shown in Fig. 2, comprises a strip 50 of insulating material, said strip carrying two rods 51 and 52 having their upper ends bent at a right angle and introduced within the opposite ends

of a tube 53 formed of glass or other suitable material, the ends of the rods being sealed within the tube by packings of any suitable material in order to make air tight joints. The interior of the tube between the two poles or bars is filled with metal filings of the ordinary character.

The opposite ends of the strip 50 are yieldably supported, so that the coherer as a whole is free to move from side to side. These supports may be in the form of eyelets 54 secured at the opposite ends of the strip, and auxiliary eyelets 55 that are fastened to the box or other inclosure, or any other suitable supporting means, the pairs of eyelets being connected by cords 56 formed of any suitable material which will allow free motion of the coherer.

The decoherer in the present instance comprises an electro-magnet 60, the frame of the magnet carrying an armature 61, and the armature lever being extended down and terminating in a hook 62 which surrounds the tube or outer portion of the coherer. The electro-magnet 60 and its armature are preferably mounted in much the same manner as the electro-magnet and clapper carrying armature of an ordinary electric bell, so that when the electro-magnet is energized and the current is made and broken therethrough in the usual manner, the armature will be vibrated and its hook, engaging some part of the coherer, will shake the latter rapidly to and fro for the purpose of loosening up the metal filings in the coherer tube. This is found in practice to be more effectual and certain in its operation than the ordinary tappers such as are usually employed in the decohering operations.

The aerial receiving rod 65 is connected by a wire 66 to one rod of the coherer, and the opposite rod is connected by a wire 67 to a ground 68 which in this case is preferably in the form of a zinc box containing water.

The receiving apparatus further includes a delicate relay 70, the coils of the relay being included in a circuit which may be traced from a battery 71 through a wire 72 to the relay coil, from thence through a wire 73 to the rod 51 of the coherer, the coherer, the wire 74, an electric bell 75, through the coils of the bell and back through a wire 76 to the battery 71. This latter energizes the relay core when the particles of metal in the coherer cling together when subjected to the action of the wave, and the armature 77 of the relay will be attracted against the stop 78, thereupon closing a circuit which may be traced from the battery 71 through a wire 80, the relay armature 77, stop 78, wire 81, the bell 75 and wire 76 back to the battery.

The bell will thereafter continue to ring so long as the primary of the Ruhmkorff coil is connected to the sending battery, and in order that it may be stopped after a certain number of taps, the clapper rod 84 of the bell is provided with a pawl 85 which engages a ratchet wheel 86 mounted at one side of the bell and carrying a circuit closing pin 87 which, when the ratchet wheel has moved to the extent of a complete revolution, is adapted to engage a spring contact 88. This contact 88 is arranged in a circuit which may be traced from a battery 89 to electro-magnet of the decoherer, wire 90, contact 88, pin 87, the ratchet wheel, the ratchet

wheel arbor 91, a wire 92 to battery 89, so that after a certain number of taps of the bell depending on the number of teeth of the ratchet wheel 86, the decoherer will be set into operation and the message will be 5 stopped.

In order to prevent the reception of an alarm by the bell of the sending station, the strip 37 of the drum 72 is utilized. It will be seen by reference to Figs. 6 and 7 that this strip is engaged by two contacts 95 and 96, 10 which normally rest in the space between the ends of the current conducting strip. When the drum is turning, however, these contacts will both be in engagement with the strip, and a circuit will be closed between them. The contact 95 is connected by a wire 15 97 to a wire 98 which leads to a wire 92 while the contact 96 is connected to the wire 90, so that as soon as the drum starts to rotate, the circuit of the decoherer will be closed with its battery and the decoherer will start into operation, shaking the coherer and preventing the reception of the signal. By making the strip 20 37 a trifle longer than the sending strip 36, the non-reception of a message is positively prevented.

In order that the decoherer of the sending station may be set into operation when a message is being 25 sent manually, the contact 95 is connected by a wire 100 to the fixed end of a switch blade 101, and the opposite contact 96 is connected by a wire 102 to a contact immediately under such switch blade 101 and normally out of engagement therewith. The two switch 30 blades are connected by a cross bar 104 formed of non-conducting material and carrying a suitable handle, so that both may be moved to closed position or to open position at the same time, so that whenever the switch is depressed for the purpose of energizing the 35 primary circuit of the Ruhmkorff coil, and sending a message, the decoherer will be placed in circuit with its battery and the coherer of the sending station will be prevented from responding to the message so sent.

The apparatus may be installed at low cost and all

of the parts may be placed within a suitable box or 40 casing in order to protect them from exposure.

I claim:—

1. In a wireless signaling system for railways, means carried by the locomotive for propagating electrical waves or oscillations, a coherer, an electrically operated signal 45 controlled by said coherer, a decoherer, an operating circuit for the latter, means on the locomotive and operated thereby for closing the decoherer circuit during the propagation of the electrical waves, and means controlled by the signal mechanism for closing the decoherer circuit 50 after the signal has ceased to operate.

2. In a wireless signaling system, a coherer, a circuit therefor, an electro-magnetically actuated member operated on the closing of the circuit through the coherer, a decoherer, a circuit therefor, and means operable after a pre- 55 determined number of movements of said member for closing the decoherer circuit.

3. In apparatus of the class described, a drum of insulating material, a pair of contact bands carried thereby, a shaft or arbor on which the drum is loosely mounted, a 60 spring connecting the shaft and drum, means for imparting a step by step movement to the shaft, a locking member for holding the drum from rotative movement, and a shaft carried arm arranged to engage and release said locking member. 65

4. In apparatus of the class described, a shaft, means for imparting step by step rotative movement thereto, a frame of insulating material mounted loosely on the shaft, a pair of circuit closing bands mounted on the drum, a pin 70 projecting from the periphery of the drum, a locking member engaging the pin, and an arm carried by the shaft and serving to move said locking member to release position.

5. In apparatus of the class described, a coherer, an alarm bell, a relay circuit closed by the coherer, a battery circuit under the control of the relay and connected to 75 the bell, a decoherer, an independent battery circuit therefor, and means under the control of the bell for closing the decoherer circuit.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two 80 witnesses.

JOSEPH L. JONES.

Witnesses:

JOHN A. MCCALL,
HUGH N. WALKER.