

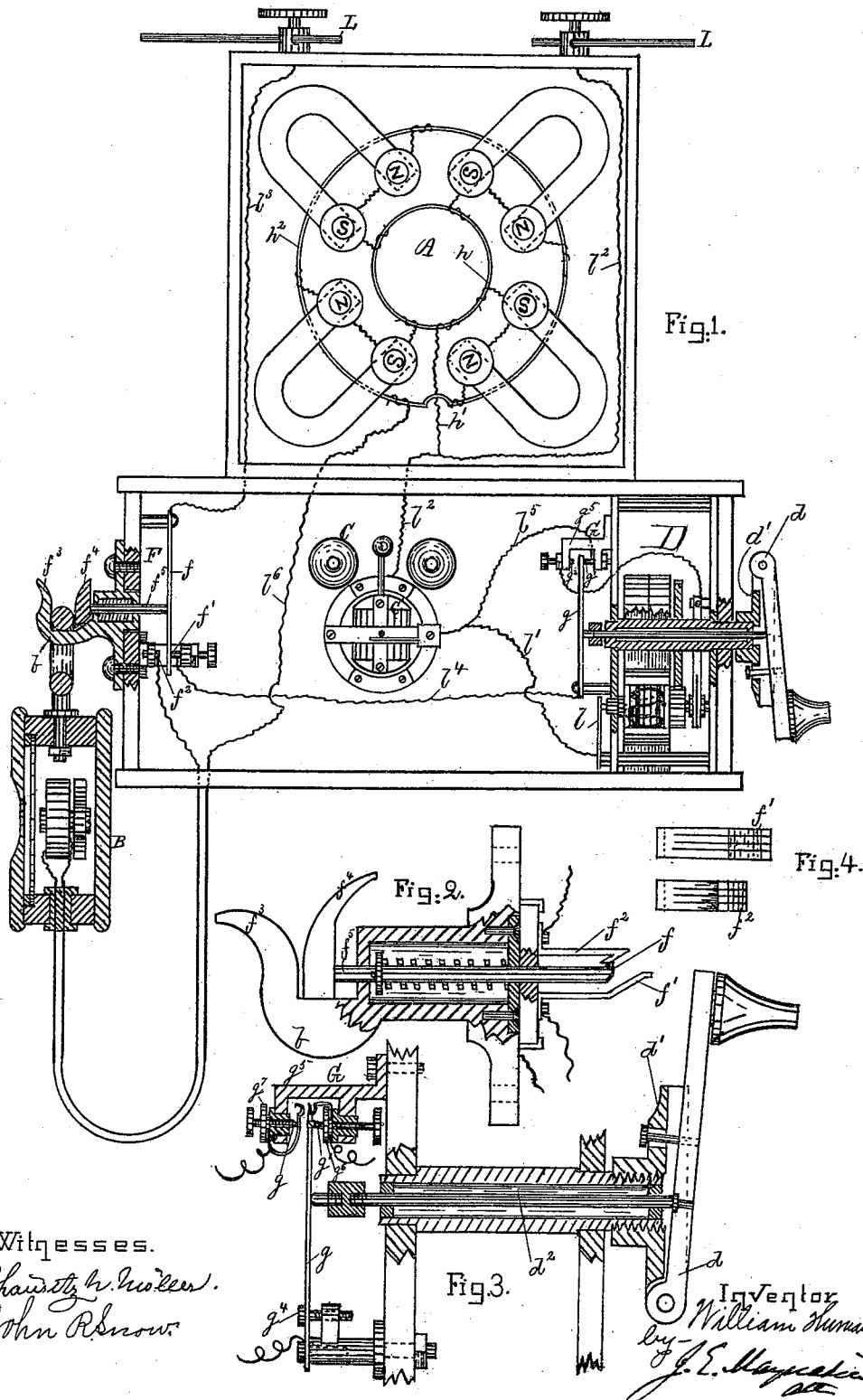
(No Model.)

2 Sheets—Sheet 1.

W. HUMANS.  
MAGNETO TELEPHONE SWITCH.

No. 492,019.

Patented Feb. 21, 1893.



Witnesses.

*Charles H. Walker.*  
*John R. Brown.*

Fig. 3.

Inventor

*William Humans*

by *J. E. Maynard*

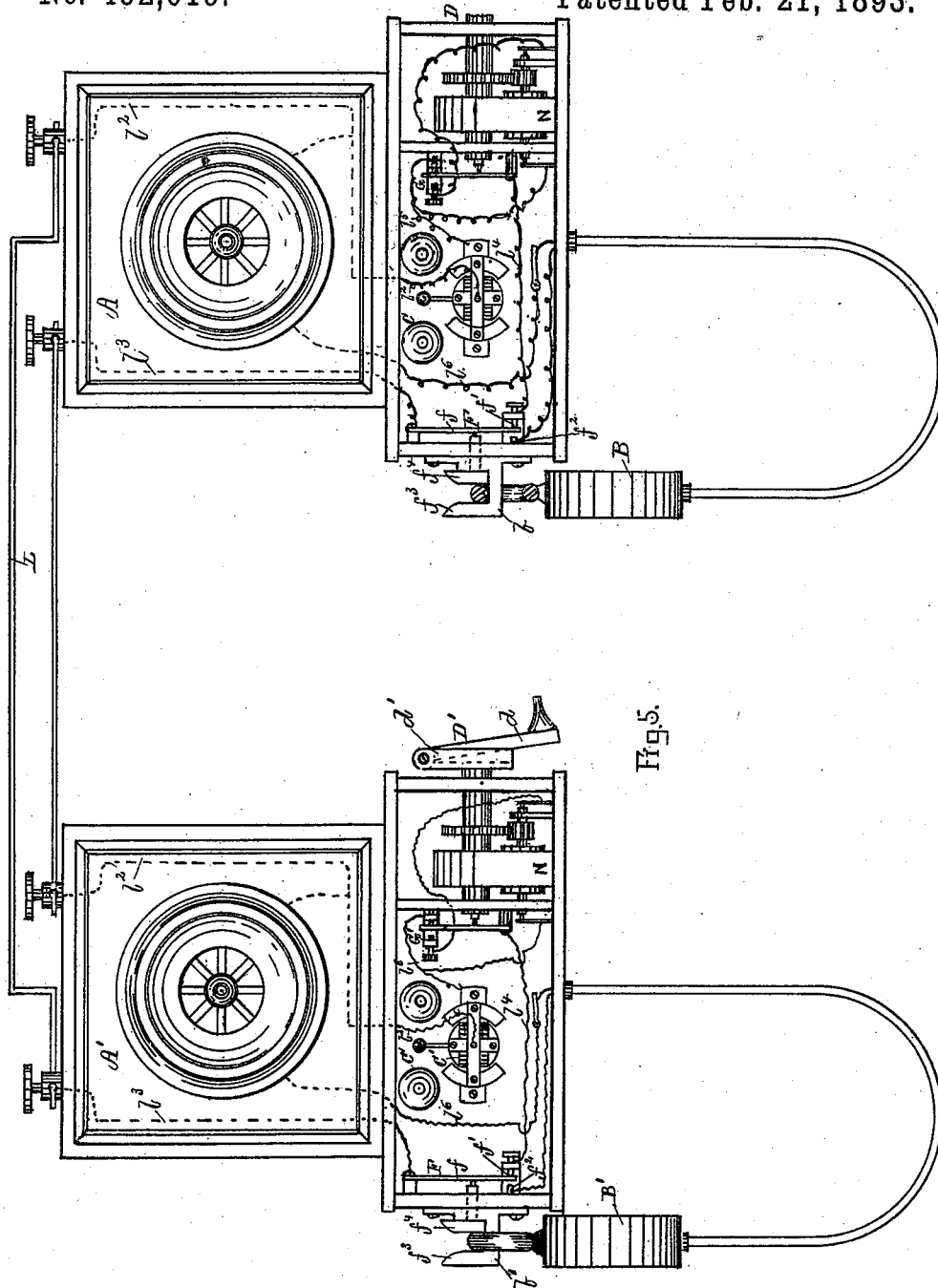
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*Henry H. Luoker.*  
*John R. Brown.*

Inventor.  
*William Humans*  
by *J. E. Harpster*  
*att'y*

# UNITED STATES PATENT OFFICE.

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JERSEY.

## MAGNETO-TELEPHONE SWITCH.

SPECIFICATION forming part of Letters Patent No. 492,019, dated February 21, 1893.

Application filed July 23, 1885. Serial No. 172,441. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HUMANS, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented a new and useful Magneto-Telephone System, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a sectional view of an instrument embodying my invention: Figs. 2, 3 and 4 are details of Fig. 1 on a larger scale and with slight modifications; and Fig. 5 illustrates my invention as applied to two stations at opposite ends of a line.

In the several figures the same letters refer to the same parts.

My invention relates to the arrangement at each station of a telephone line of a transmitter, a receiving telephone, an electro-magnetic call-bell or other electro-magnetic signaling apparatus, a magneto generator, a switch operating automatically on the use of the generator, a switch operating automatically on the use of the telephone and electric connections whereby when the line is not in use the magnets of the call-bell or other electro-magnetic signaling apparatus are maintained in the circuit and the telephone and the armature coils of the magneto generator are disconnected from the circuit, on the use of the generator its armature coils are connected to the line through the electro-magnet of the call-bell, or other electro-magnetic signaling apparatus, and on the use of the telephone the armature coils of the magneto generator and the magnet of the call-bell, or other electro-magnetic signaling apparatus, are disconnected from the line.

Referring to the drawings, A, A' represent the magneto telephone transmitters, B, B' the magneto telephone receivers, C, C' the call-bells, D, D' the magneto generators. These transmitters, receivers, and call-bells are of any suitable construction, and the magneto generator is of well known form with the exception that the shaft of the armature is geared to a hollow shaft which is rotated by a handle  $d$  hinged at one end to a plate  $d'$  secured to the hollow shaft. Supported in this shaft is a rod  $d^2$  having an endwise mo-

tion and the handle  $d$  bears against one end of this rod.

In case of a system between two or more places, such as a factory and its office, there is at each place an instrument such as is shown in Fig. 1 adapted for both calling and receiving calls as illustrated in Fig. 5. The instrument is composed of the pair of magneto telephones, that is, a transmitter A and a receiver B, the call-bell C, or a like signaling instrument, as for example an annunciator, the magneto generator D and the automatic switches F and G, the former controlled by the telephone and the latter by the magneto generator.

The switches have a moving electrode between two contact points, or electrodes connected as follows: The electrode  $f$  of the telephone switch F is connected to the line L on one side by the wire  $l^2$  and when the telephone is on its support and not in use bears against contact point or electrode  $f'$ , and when the telephone has been removed from its support comes in contact with contact point  $f^2$ . The moving electrode  $g$  of the generator switch G is connected by the wire  $l^1$  with the contact point  $f'$  and when the generator is not in use, bears against the contact point  $g'$ , but when the generator is used comes in contact with the contact point  $g^2$ . The contact  $f^2$  is electrically connected to one of the terminals of the telephone B and the other terminal of the telephone is connected by the wire  $l^3$  to the magneto transmitter A and from the magneto transmitter connection is made by the wire  $h'$  with the wire  $l^2$  which is connected to the other side of the line from that which is connected to the wire  $l^3$  or to the ground.

In Fig. 5 a metallic circuit is shown but it is obvious that the ground may form a part of the circuit as is usual and that either the wire  $l^2$  or the wire  $l^3$  may be connected to the ground. The wire  $l^2$  is also connected to one of the terminals of the call-bell, or other signaling apparatus, while the other terminal of the bell is connected by the wire  $l^5$  to the contact point  $g'$  and also by the wire  $l'$ , and spring  $l$ , to one of the terminals of the magneto generator. The other terminal of the generator is connected to the contact point  $g^2$ .

It will thus be seen that when the line is not in use and the switches  $f$  and  $g$  are on their respective contact points,  $f'$  and  $g'$ , the magnets of the call-bells, or other signaling apparatus, at each station are in circuit and ready to receive signals while the telephones and the magneto generator at each station are disconnected from the circuit.

When the hinged crank of the generator at any station on the line is grasped for the purpose of operating this generator the rod  $d^2$  is pushed in against electrode  $g$  breaking contact with  $g'$  and making contact with  $g^2$ ; and thus one terminal of the generator is connected by  $g'$ ,  $g$  and  $l^4$  electrodes  $f'$ ,  $f$ , and wire  $l^3$  to the line or ground on one side, and the circuit is completed through the line or ground on the other side, wire  $l^2$ , call-bell or other signaling apparatus to the other terminal of the generator. When the telephone at any station is removed from its support electrode  $f$  breaks contact with  $f'$  and makes contact with  $f^2$ , thus disconnecting the generator and call-bell at that station from the line circuit and establishing this circuit through the telephone and transmitter by the wire  $l^3$ , spring  $f$  and wires  $l^6$ ,  $h'$  and  $l^2$  to line L. The call-bell at each of the other stations on the line remains in circuit unless the telephone at that station is removed from its support.

Electrode  $g$  is moved by the endwise motion of the rod  $d^2$  by mechanism automatically operated by removing the telephone from its support and by replacing it thereon. The device which I use consists of two jaws  $f^3$  and  $f^4$ , one, the former,  $f^3$ , attached to a bracket  $b$  fixed to the outside of the case the other,  $f^4$ , attached to a sliding horizontal rod  $f^5$  passing through the walls of the case. A coiled spring as shown in Fig. 2 acts to force jaw  $f^4$  close to jaw  $f^3$  but this action may be accomplished by the electrode  $f$  when made in the form of a leaf spring.

The telephone is supported on the bracket  $b$  by placing a ring or hook attached to the telephone between the jaw  $f^3$  and  $f^4$  thus forcing them apart so that the electrode  $f$  is brought against the contact point  $f'$ . When the telephone is removed from its support the jaws come together and the electrode leaves the contact point  $f'$  and makes contact with the contact point  $f^2$ . While I have shown the jaw  $f^4$  mounted on a slide  $f^5$  it will be obvious that it may be mounted in any way that will make it to move toward and from the jaw  $f^3$ .

I am aware that it is not new to support a telephone between jaws, one of which slides and operates a switch, and I do not claim the device.

Referring to the switch G. The rod  $d^2$  sliding in the hollow shaft rotated by the handle D is best made in two pieces, insulated from one another, as shown in Fig. 3, but when the ends of the armature coil of the generator are insulated from the frame then the rod may of course be a single piece of metal. The crank

$d$  and its shoe  $d'$  are described in my application Serial No. 172,436, but are there shown as moving the armature shaft endwise, while in my present invention the crank receives the rod  $d^2$  and this rod controls the electrode  $g$ . A spiral spring may of course be used with rod  $d^2$  but when electrode  $g$  is a leaf spring, as shown, it will serve also as a spring to throw back rod  $d^2$ . The tension of the spring  $g$  is regulated by the screw  $g^4$  as shown in Fig. 3. Each pair of electrodes, or contact points,  $g'$ ,  $g^2$ ,  $f'$ ,  $f^2$ , is attached respectively to a single post or bracket as shown at  $g^5$  in Fig. 3, and check nuts, shown at  $g^6$  and  $g^7$ , Fig. 3, are provided by means of which the circuit wires are conveniently connected to the electrodes.

In Fig. 3 the electrodes are in the form of springs which can be accurately adjusted by means of the set-screws, and the nuts  $g^6$  and  $g^7$  serve not only as check nuts but also as binders to hold the springs and wires in place. These springs are not essential but are highly desirable. If the bracket be made of metal the screws will of course be insulated as shown in Fig. 3.

I am aware of Gray's patent, No. 309,617, dated December 23, 1884, which shows a telephone and its switch, a generator and its switch and a call-bell; but those parts are combined in a manner wholly different from my combination; and while I disclaim all that is shown in Gray's patent,

What I do claim as my invention is—

1. In combination a magneto generator; a magneto-telephone; a signaling apparatus; a switch automatically controlled by the generator and consisting of one moving electrode between two fixed electrodes; a second switch automatically controlling the magneto telephone, and consisting of one moving electrode between two fixed electrodes; a conductor connecting the moving electrode of the generator switch with that fixed electrode of the telephone switch which is normally in contact with the moving electrode of that switch; a conductor connecting that fixed electrode of the generator switch which is normally in contact with the moving electrode of that switch, with one terminal of the signaling apparatus; a conductor connecting the other fixed electrode of the generator switch with one terminal of the generator; a conductor connecting the other terminal of the generator with that terminal of the signaling apparatus connected with the generator switch; a conductor connecting that fixed electrode of the telephone switch normally out of contact with its moving electrode, with the telephone and through it to line; a conductor connecting the moving electrode of the telephone switch to line; and a conductor connecting the other terminal of the signaling apparatus to line; all substantially as described.

2. In a telephone system the combination substantially as and for the purposes set forth, of magneto telephones electro-magnetic sig-

naling apparatus; magneto generators; moving electrodes  $f$  and  $g$  between fixed electrodes  $f'$ ,  $f^2$  and  $g'$ ,  $g^2$  respectively; means for maintaining electrodes  $f$  in contact with electrodes  $f'$  when the telephone is upon its support, and electrodes  $g$  in contact with electrodes  $g'$  when the magneto generator is not operating; means whereby the act of removing any telephone from its support causes its electrode  $f$  to leave its electrode  $f'$  and make contact with its electrode  $f^2$ , and the operation of any generator causes its electrode  $g$  to leave its electrode  $g'$  and make contact with its electrode  $g^2$ ; electrical connections between one terminal of each telephone and the line on one side; electrical connections between the electrodes  $f$  and the line on the other side; electrical connections between the other terminals of the telephones and electrodes  $f^2$ ; electrical connections between electrodes  $f^2$  and  $g$ ; an electrical connection between one terminal of each signaling

apparatus and the line; an electrical connection between the other terminal of each signaling apparatus and its electrode  $g'$  and also between this terminal and one terminal of the proper magneto generator; and an electrical connection between each electrode  $g^2$  and the other terminal of its magneto generator.

3. In a magneto generator, a hollow shaft geared to the armature shaft and provided with a hinged handle to rotate the hollow shaft, in combination with a rod movable endwise through the hollow shaft, and electrodes controlled by the rod, whereby the operation of the handle to set the generator in motion moves the rod endwise and connects the armature to line all substantially as and for the purpose set forth.

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Witnesses:

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