

No. 677,453.

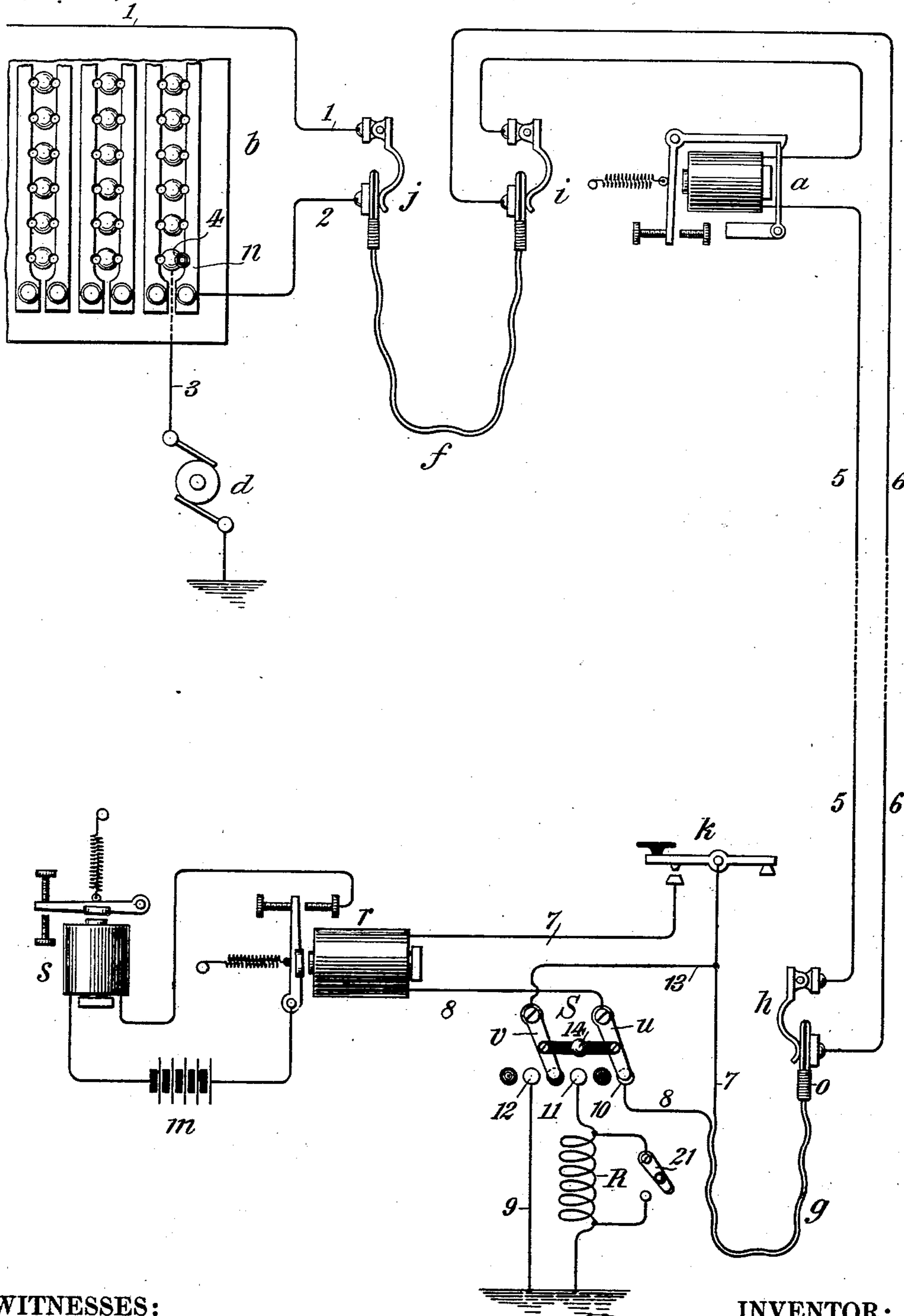
Patented July 2, 1901.

F. W. JONES.

TELEGRAPH SWITCHING APPARATUS.

(Application filed Mar. '16, 1901.)

(No Model.)



WITNESSES:

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UNITED STATES PATENT OFFICE.

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TELEGRAPH SWITCHING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 677,453, dated July 2, 1901.

Application filed March 16, 1901. Serial No. 51,476. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS W. JONES, a citizen of the United States, residing in the city of New York, in the county and State of New York, have made certain new and useful Improvements in Telegraph Switching Apparatus, of which the following is a specification.

My invention relates to the connection of a branch telegraph-office located on a loop with a main telegraph-wire at a main station or office.

The object of my invention is to provide for throwing out one side of a damaged loop and working a ground return-circuit in place thereof and to simplify the apparatus and decrease the cost of equipment.

The accompanying drawing illustrates my invention.

At the central station there is the well-known pin-switch *b*. The main line 1 enters the office, passing through the spring-jack *j*. The electrical connection 2 connects the spring-jack with a vertical strip *n* on the board *b*. The main-line generator *d* is connected by wire 3 to the button 4 and a pin connects the button and strip. There is a spring-jack *i* in the loop 5 6, extending to a substation. The jacks *i* and *j* have their respective contacts connected together by flexible double conducting-cord *f*, having suitable double contact-plugs for each jack. At the substation there is the spring-jack *h* in the loop 5 6, a relay *r* and key *k* being connected in circuit through wires 7 8, the flexible cord *g*, and the jack-plug *o*. There is a sounder *s* and local battery *m* in a local circuit operated by the relay *r*.

S is a switch having two movable and three fixed contacts. The movable contact *u* normally forms part of the conductor 8, and the movable contact *v* is connected to a tap-wire 13, the opposite end of which is connected to the conductor 7 between the instruments *k* *r* and the spring-jack *h*. The fixed contact 12 is connected to ground by wire 9. The fixed contact 11 is connected to ground through the resistance *R*, and this resistance is of such a size that the main line generator *d* when connected through the resistance *R* will not yield an excessive strength of current compared with that for which the instrument *r* is ad-

justed to operate. The fixed contact 10 of switch *S* is connected to one divided terminal of the conductor 8. The other terminal of the conductor 8 is connected to the movable contact *u*. The two contacts *u* and *v* are mechanically united by a bar of insulating material, fixed to which is a button 14, by means of which the two contacts are caused to move together in a well-known manner. It is to be noticed that the contact 12 is placed in such a position that the contact *v* will momentarily engage with it during the time that the contact *u* is passing from 10 to 11. When *v* and 12 are in contact, the loop 5 6 will be opened at 10 and a circuit will be made from generator *d* via 3, 4, 2, *j*, *f*, *i*, *a*, 5, *h*, 7, 13, *v*, 12, and 9. The annunciator *a* will be included in a circuit of very low resistance. The strength of current will be great and the drop will fall. The magnet of the annunciator *a* and its armature are constructed and adjusted so as not to respond to any less current strength. By this means the operator at the central station or main office is given notice that the substation desires his attention. The contact necessary to drop the annunciator *a* is but momentary, and the contact *u*, engaging the fixed contact 11, establishes a circuit from the generator *d* via 3, 4, *n*, 2, *j*, *f*, *i*, 5, *g*, 7, *k*, *r*, 8, *u*, 11, and *R* to ground return. This circuit, owing to the presence of the resistance *R*, relay *r*, magnet of *a*, and generator *d*, is substantially operated with the same strength of current that was present in the complete circuit. The substation and main station may then communicate and reestablish a complete working circuit by mutual understanding. We have so far assumed side 6 of the loop to be open or out of order. Suppose now the side 5 of the loop to be out of order or broken. The substation then reverses the connection of the pin *o* in the jack *h* and moves his switch *S* to its extreme left-hand position. A new circuit is thus formed, completely cutting off the central or main office generator *d* and including the elements *R*, 11, *u*, 8, *r*, 7, *k*, 7, *o*, 6, *f*, *j* to main line 1 and generator at distant station. The substation can thus communicate with the distant station, and this facility for communicating over either side of a damaged loop and over one side without the co-

operation of the main office is due to the presence of the means for reversing the connection of the instruments at the substation with respect to the loop 5 6.

5 The switch 21 is a two-point switch connected to opposite sides of resistance R to cut said resistance out of circuit when a circuit is made up excluding the generator *d* at the main office—as, for instance, when the
10 side 5 of the loop is open and the plug *o* has been reversed, as described.

What I claim, and desire to secure by Letters Patent, is—

1. The combination of a main telegraph-
15 line, a main station, a loop connected into said line at the main station, extending to a substation, an electromagnet in said circuit at the main station, telegraph instruments included in said loop at the substation, a switch
20 at the substation having three fixed contacts connected to a divided terminal of the loop, a grounded artificial resistance, and a ground, respectively, and two movable contacts connected to the other divided terminal of the
25 loop and to a tap-wire 13 connected to the opposite side of the loop at a point between the instruments and main line.

2. The combination of a main telegraph-
30 line, a main station, a substation-loop connected into said line at the main station, a

magnet adjusted to respond to an abnormal current strength in said loop at the main station, telegraph instruments included in said loop at the substation, a switch at the substation having two separable contact-points 35 included in one side of said loop and a contact connected to a grounded resistance whereby the loop may be divided and the artificial resistance substituted for one side thereof without affecting the magnet at the 40 main station.

3. The combination of a main telegraph-
line, a main station, a substation-loop connected into said line at the main station, a
magnet adjusted to respond to an abnormal 45 current strength in one side of said loop at the main station, telegraph instruments in said loop at the substation, means for reversing the connection of said instruments with respect to the loop at the substation, 50 and a switch at said station having two separable contact-points included in one side of said loop with a ground-contact whereby the loop may be divided, either side thereof grounded, and the substation instruments 55 included in such grounded circuit.

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Witnesses:

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