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R. K. HONAMAN

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ELECTRICAL DISCHARGE REGISTERING SYSTEM

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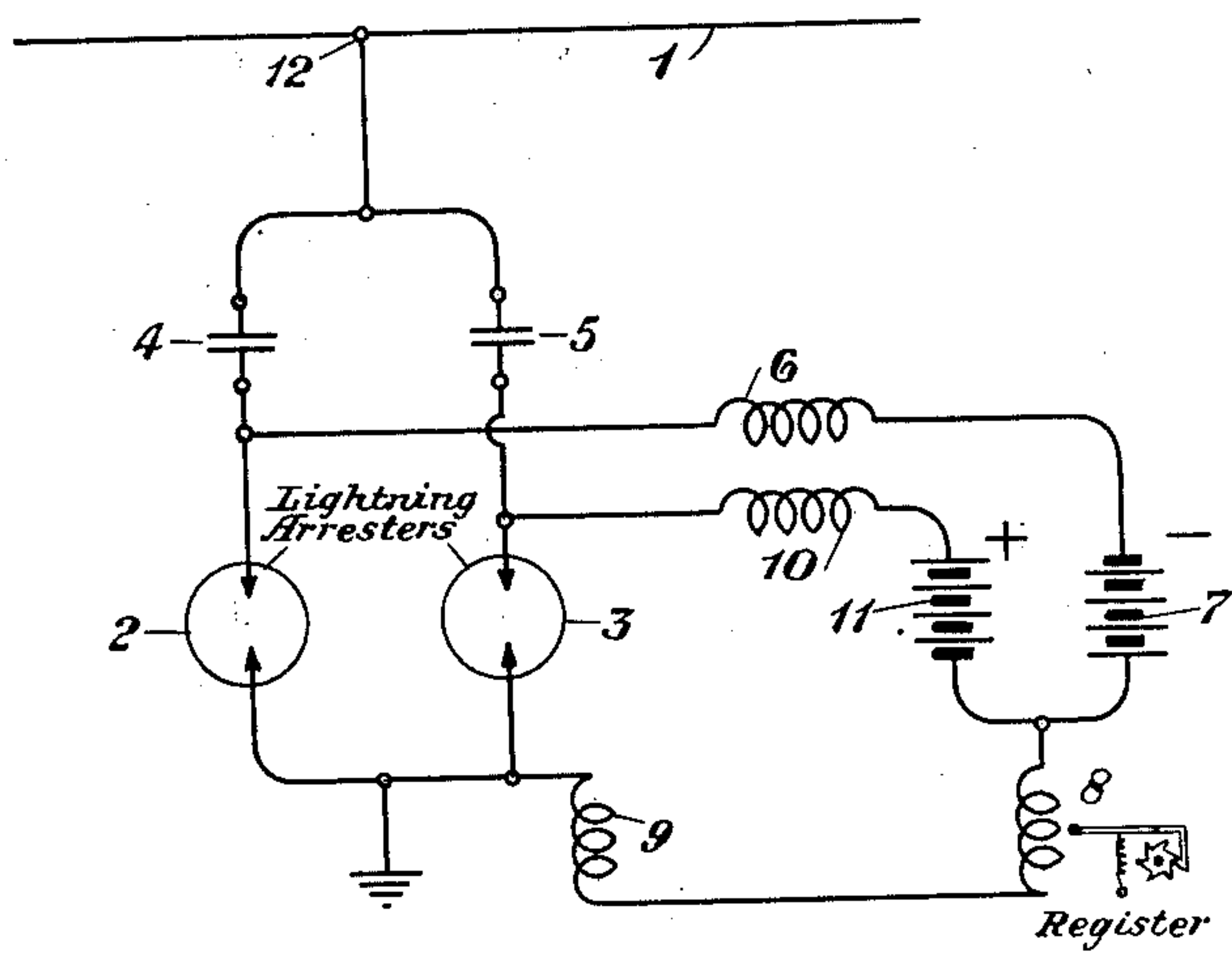


Fig. 1

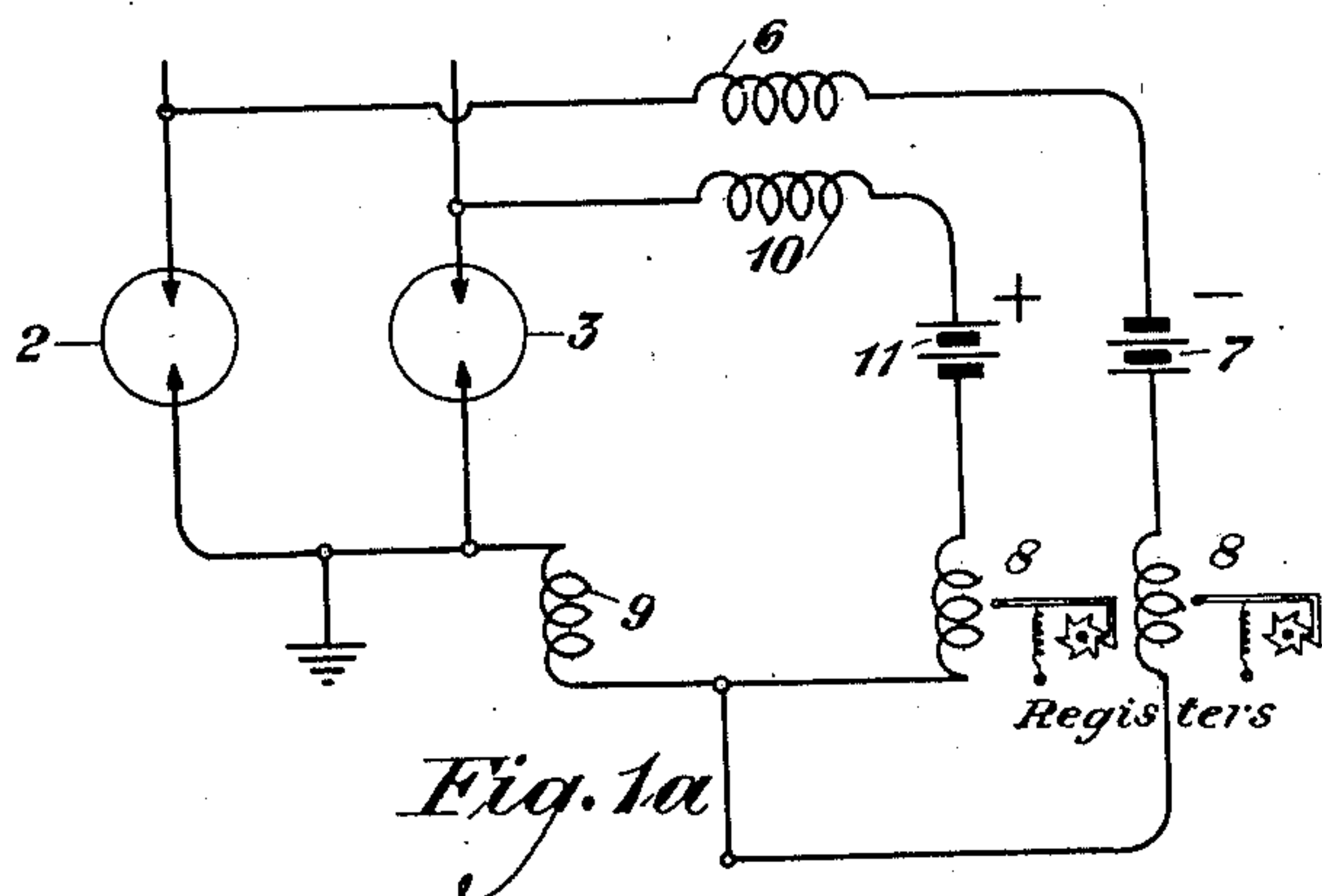


Fig. 1a

INVENTOR
R. K. Honaman
BY *g. f. o. k.*
ATTORNEY

UNITED STATES PATENT OFFICE

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ELECTRICAL DISCHARGE REGISTERING
SYSTEM

Richard K. Honaman, Bloomfield, N. J., assignor
to American Telephone and Telegraph Com-
pany, a corporation of New York

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1 Claim. (Cl. 177—311)

This invention relates to electrical discharge registering systems, and particularly to a system for registering the number of times a lightning surge is impressed on a transmission line.

5 In the operation of transmission lines, such, for example, as power, telephone or telegraph circuits, it is frequently desirable to know the number of times a lightning surge is impressed upon the line. Such information is of value not
10 only to those responsible for the operation of the transmission line, but also to those who are concerned with the natural electrical phenomenon in a given territory as, for example, employees of the Forestry Service.

15 The object of this invention is to provide a simple and effective means for registering the number of occurrences of lightning surges upon a transmission line, which affords an indication of the frequency of lightning discharges in the
20 territory through which the line passes.

This invention will be clearly understood from the following description when read in connection with the attached drawing, of which Figure 1 shows schematically a simple form of embodiment of the invention and Fig. 1a shows in frag-
25 mentary form a modification of Fig. 1.

In Fig. 1, 1 represents a transmission line which has connected with it a plurality of lightning arresters 2 and 3, preferably of the vacuum
30 type although other types of arresters may also be used. The path to ground from the line 1 is made up of two branches, each containing one of the lightning arresters and also one of the condensers 4 and 5 in series therewith. Effec-
35 tively connected across the arrester 2 is a circuit including the inductance 6, the source of direct current 7, a registering device 8 and an inductance 9. In like manner, there is effectively
40 connected across the arrester 3 a circuit including the inductance 10, a source of direct current 11, the registering device 8 and an inductance 9. It will be seen that the device 8 and the inductance 9 are common to both of the
45 circuits just mentioned; and it will also be seen that the sources of current 7 and 11 are so connected to their respective lightning arresters that the correspondingly positioned terminals of the
several arresters are of opposite polarity.

When lightning impresses a surge potential
50 between line 1 and ground of sufficient magnitude at the point where the arresters are connected to the transmission line, these arresters will break down. If the surge is positive with respect to ground, current from source 11 will

flow through arrester 3 and inductance 9 and the registering device 8, causing the operation of said registering device. Under these conditions current will not flow through arrester 2 because the potential will be such as to oppose the current
5 from source 7. If the lightning surge is such that point 12 is negative with respect to ground, then current from source 7 will flow through arrester 2, inductance 9 and registering device 8, causing the operation of said registering device, but no
10 current will flow from source 11. Thus, operation of the registering device will be secured on surges of either polarity. The device 8 may be a message register such as is employed upon tele-
15 phone circuits or it may be some other form of registering device known in the art. The condensers 4 and 5 serve to prevent direct current of the sources 7 and 11 from flowing to the line
1 and to prevent short-circuiting sources 7 and 11; and the inductances 6, 10 and 9 are choke
20 coils to prevent the lightning discharges from passing through the circuits containing the sources 7 and 11 and the registering device 8.

Fig. 1a is a modification of Fig. 1, consisting in the insertion of additional registering device for
25 the purpose of obtaining registrations separately of surges of positive or negative polarity. By applying the same reasoning outlined above in connection with Fig. 1, it will be seen that separate
operations of the registering device 8 will be ob-
30 tained for each polarity of the lightning surge.

While the invention has been disclosed in a schematic form only, it is to be understood that it is capable of embodiment in other forms without departing from the spirit and scope of the
35 appended claims.

What is claimed is:

In a system for registering the occurrence of lightning discharges from a transmission line, the combination with two vacuum lightning ar-
40 resters connected to a conductor of the said line, of sources of potential of opposite polarity each effectively connected across the gap of one of the arresters, the said sources being so connected as to polarize the said arresters in opposite
45 senses, and being sufficiently low in voltage as to be unable to maintain the discharge through the said arresters, inductance coils each connected between the line side of an arrester and its source of potential, and a registering device connected
50 between said sources and said arresters to register the occurrence of lightning discharges through the said arresters.

RICHARD K. HONAMAN.