(No Model.)

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TELEGRAPHY.

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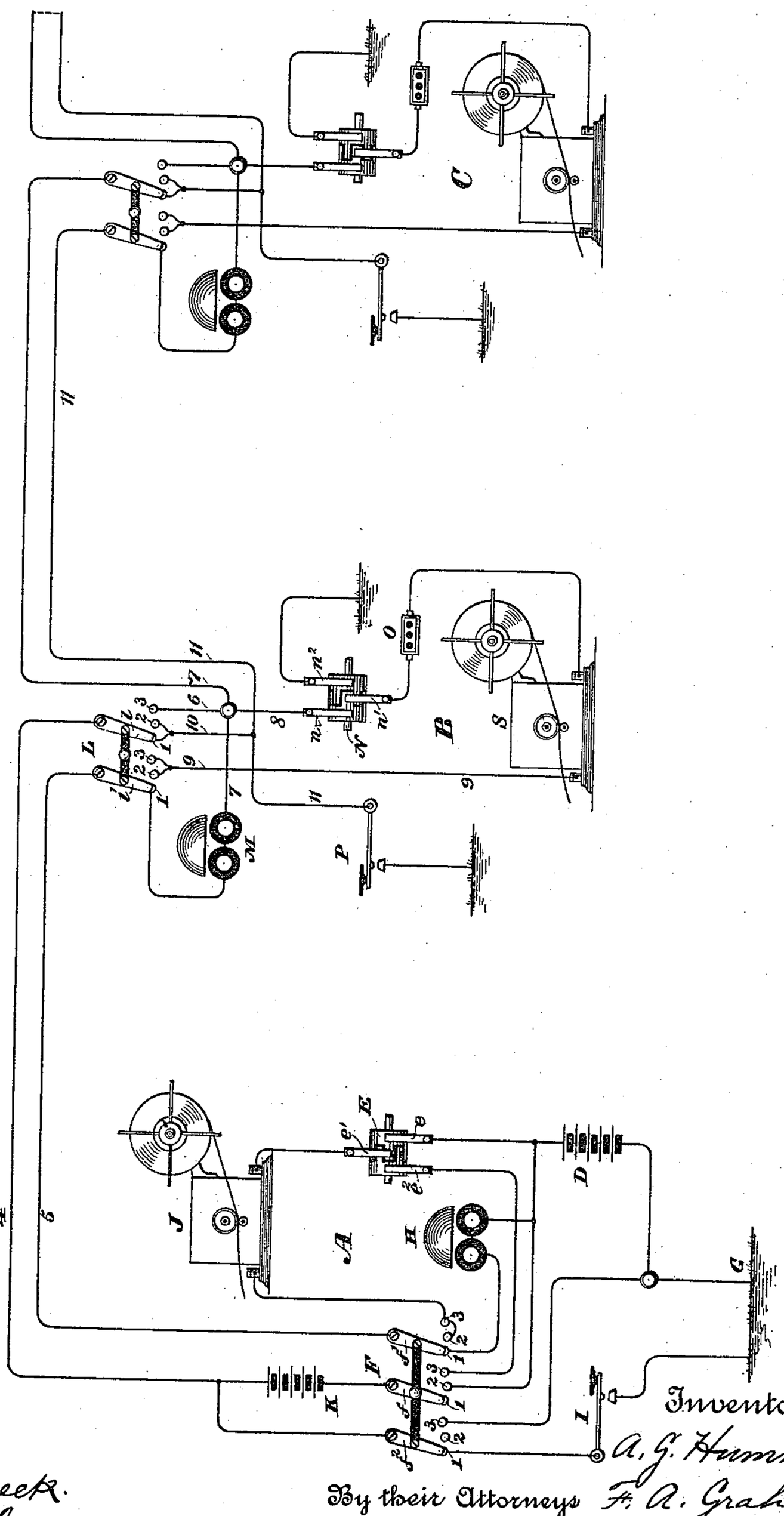

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UNITED STATES PATENT OFFICE.

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TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 442,808, dated December 16, 1890.

Application filed July 10, 1890. Serial No. 358,270. (No model.)

To all whom it may concern:

Be it known that we, ADOLPH G. HUMMEL, of the city, county, and State of New York, and FRANK A. GRAHAM, of Brooklyn, Kings county, State of New York, both citizens of the United States, have invented certain new and useful Improvements in Systems of Telegraphy, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, forming part of this specification.

The object of our invention is to provide a system of telegraphy especially adapted for rapid sending in the police or the railway service. In addition to this we wish, also, to secure accuracy in such work and to furnish means whereby any inaccurate work will be detected and the responsibility placed where it belongs. To this end we provide for the printing of all messages, whether general orders or of whatever character, at both the transmitting and the receiving station. The system can be employed not only for the service mentioned—that is, police and railway service—but wherever any institution or concern requires quick connection between its several branches.

We prefer to place our batteries at the central office, thus doing away with local batteries at the different stations. One of our batteries is permanently grounded at one pole, and the other has a metallic circuit, the two being common, so far as the line is concerned. The line is capable of being grounded through a switch at the central office and is designed to be so when the central-office apparatus is set for transmitting.

Our invention is illustrated in the accompanying drawing, which shows in diagram a central office and two sub-stations.

A is the central office, and B and C are the two sub-stations. At the central office is a battery D, which is permanently grounded at G. The opposite pole of the battery is connected to one brush *e* of the pole-changing transmitter E, and also to an anvil 2 of a nine-point switch F, which is provided with three anvils numbered 1, three numbered 2, and three numbered 3, corresponding to the three positions of the switch. The battery D is also joined through a bell H to one of the anvils of the same switch. From the central brush e' of the pole-changer the circuit passes to a "ticker" J, and thence to anvils 2 and 3 of the switch. Another of the anvils, numbered 3, is joined to the brush e^2 of the transmitter, and the third of that number is connected to ground G. The other anvils are dead-points except that numbered 1 at the left, which is connected to ground through a normally-open key I. The movable parts of the switch are connected up as follows: It being understood that there is a second battery K in the main circuit, but located at the central office, one pole of this battery is joined to the central arm *f* of the switch F, and from the other pole extends the main wire 4. The right-hand arm f' of the switch F connects with the other main wire 5, and the remaining arm f^2 is joined to the wire 4 beyond the battery K. Such is the apparatus and such are the connections at the central office.

At the sub-station B wires 4 and 5 lead, respectively, to the arms *l* and l' of the six-point switch L, the anvils or points of this switch, like those of the switch F at the central office, being numbered in two groups, 1, 2, and 3, depending on the three positions of the switch. Of the first group, point or anvil 1 is joined to 3 of group 2 through a bell M, the wire 6, which runs to 3, being a branch from the main wire 7, which runs from the said point 1 to the next sub-station, and thus makes a continuous connection between the said anvil 1 and one of the arms of the switch at the said sub-station C. Another branch 8 from the same main wire runs to a brush *n* on the sub-station pole-changing transmitter N. From points 2 and 3 of group 1 runs a common wire 9 through a ticker S, and through an adjustable resistance O to the central brush n' of the transmitter N. The brush n^2 of the same transmitter is connected to ground. The points 1 and 2 of the second group are joined by a wire 10 to the main wire 11, running to the switch at the next sub-station, the said main wire being grounded at sub-stations B through a normally-opened key P.

The circuits and apparatus at succeeding sub-stations are identical with those just de-

scribed. At the last station on the line the main wires which would otherwise pass onto another station are joined together.

The tickers are operated in the usual manner, the proper character being brought into position for printing by a suitable number of impulses caused by the pole-changing transmitter, while this in turn is of the usual kind, without any features of special novelty.

The drawing shows the switches and other parts in the proper position for calling. Suppose, now, that the central-office operator wishes to call a sub-station. In that case he simply operates the key I and closes a circuit through all the bells, as follows: From battery D to bell H, anvil 1, arm f', wire 5, arm l', anvil 1, bell M, wire 7, through station C and back by wires 11 and 10 to point 1, arm l, wire 4, and arm f^2, anvil 1, key I to ground, and from ground back to the other pole of the battery D. Thus the operator at the central office can call any station and receive an answer when a sub-station operator manipulates his key. In that case, assuming that the operator at station B answers with the key P, the circuit will proceed directly from wire 11 to ground and thence back to battery. The tickers are normally cut out. Having called and received an answer, the operator at central turns his switch to the transmitting-points 3, while the switch L at station B is turned to the receiving-points 2. Then the transmitter E is made to operate the ticker at B alternately over a ground-circuit from battery D and a metallic circuit from battery K. The ground-circuit is as follows: Ground on one side to battery, thence to and through transmitter E, ticker J, and point 3, arm f', wire 5, arm l', point 2, wire 9, ticker S, resistance O, transmitter N, line-wire 7, and so on through one or more stations back by wires 11 and 10 through switch L, wire 4, arm f^2, point 3 to ground. The metallic circuit goes from battery K to arm f, point 3, transmitter E, and ticker J, and from there by the same course as far as wire 4, whence it goes directly to the opposite pole of battery K. The local operator in transmitting an original message or a reply will turn his switch to the three points, and the central-office switch will be turned to the two points for receiving. This will cut out all the stations beyond that which is transmitting at the time. Thus the circuit of battery D will be ground, battery, transmitter E and ticker, switch F, wire 5, arm l', point 3, wire 9, ticker and resistance, brush n', transmitter N, brush n^2, and ground. The metallic circuit will start from battery K, pass through the switch to the transmitter, and thence by the same course to the local transmitter N. This last-named instrument being now in the position shown, the circuit proceeds by brush n and wires 8 and 6 to the switch L, and back by wire 4 to the opposite pole of the battery K.

If the transmitting-station happens to be the most distant station on the line, the message will be received on his own ticker and all the bells between him and the central office will tap until the message is fully in. The same will be true of the messages sent from the central office to the most distant station. The batteries D and K will be arranged with like poles opposed for obvious reasons.

Having now described our invention, we claim—

1. In a system of telegraphy, a central station and one or more local stations connected therewith by a main circuit, a bell at each station normally in the said circuit, a ticker or equivalent receiving apparatus at each of the stations, and a pole-changer or equivalent transmitter also at each station, and a switch at each station with a triple set of connections, one set being the normal one which throws the bells into circuit, another set capable of throwing in one pole of the transmitter and the ticker at the same station for receiving, and the third set capable of throwing in both transmitter-poles and the ticker for sending, and a key in the bell circuit at each station, whereby it is possible to call from either station, and whereby the message is recorded at both the sending and the receiving stations, as set forth.

2. In a system of telegraphy, a pole-changing transmitter and a ticker at one station, a main circuit running to suitable receiving and transmitting apparatus at one or more connected stations, and a two-arm switch, the said arms being adapted to co-operate in two positions with two sets of anvils or points, the first set being the terminals of a circuit including the ticker and one pole of the transmitter at its station, and the second set being the terminals of a circuit including the ticker and both transmitter-poles, as set forth.

3. In a system of telegraphy, a central station provided with two batteries having like poles opposed and one of the said batteries being permanently grounded, a pole-changing transmitter at the same station, a main circuit leading to suitable receiving apparatus at one or more sub-stations, the connections from the batteries through the transmitter and the said local receiving apparatus extending to ground beyond the receiving apparatus from one side or pole of the transmitter and through a metallic circuit from the battery which is not grounded on the other side or pole of the transmitter.

In testimony whereof we have hereunto set our hands, this 25th day of June, 1890, in the presence of two subscribing witnesses.

ADOLPH G. HUMMEL.
FRANK A. GRAHAM.

Witnesses:
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