

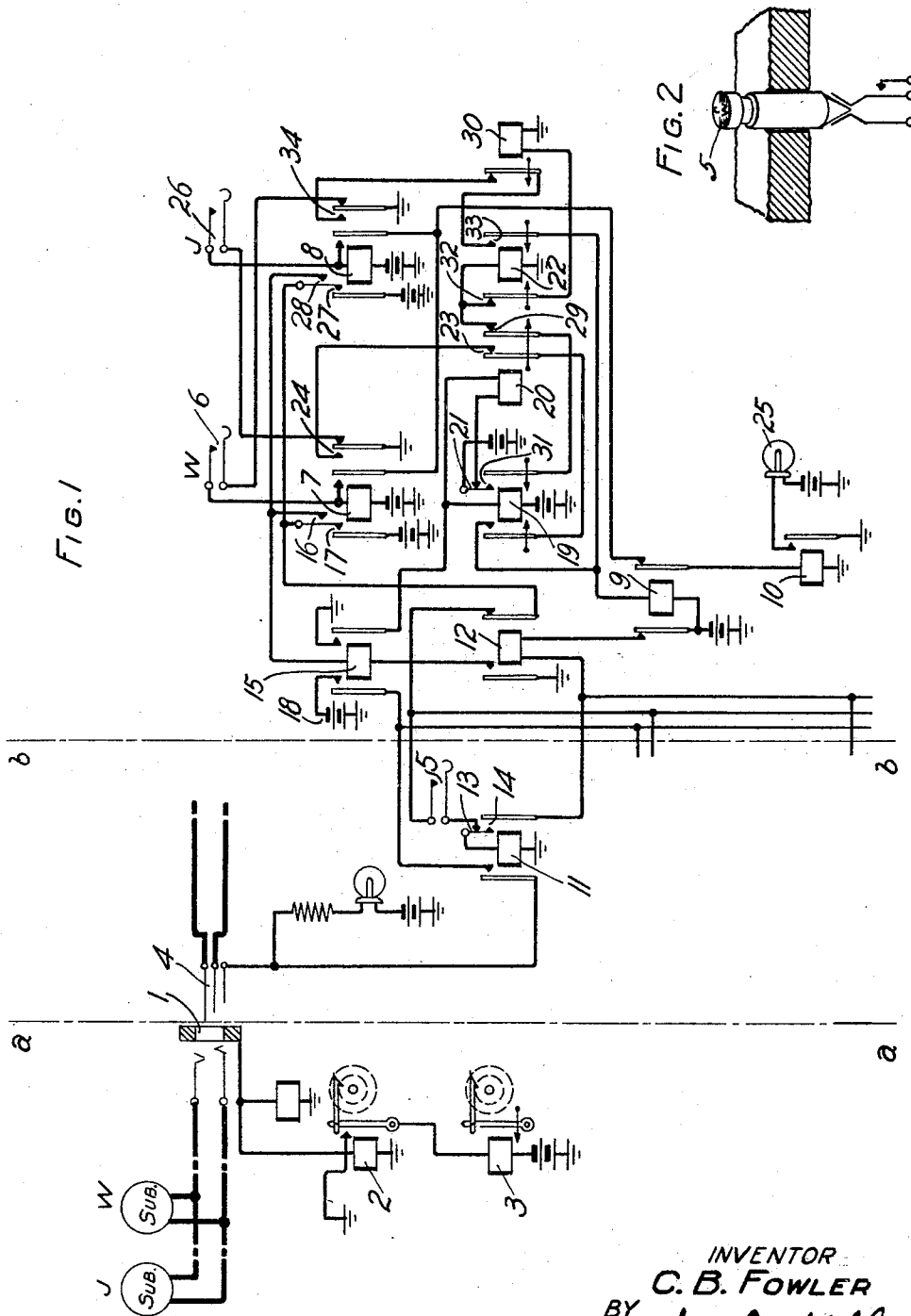
April 7, 1931.

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1,799,223

PARTY LINE MESSAGE REGISTER SYSTEM

Filed Jan. 14, 1930



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PARTY-LINE MESSAGE-REGISTER SYSTEM

Application filed January 14, 1930. Serial No. 420,662.

This invention relates to metering of telephone calls and more particularly to the selective registration of calls originating with any one of a number of subscribers' stations connected to a single line.

An object of the invention is to effect such selective registration in an improved manner and at minimum expense.

In accordance with the invention each station of a two-party line has a corresponding meter at the exchange, one of which is connected in the usual manner in the sleeve circuit of the line and the other is controlled over a front contact of the first meter.

The first meter, which is directly connected with the sleeve circuit, is adapted to operate in response to an impulse of metering current of the order of one-fourth second duration, but the second meter, which is controlled by the first meter, is sluggish and does not respond unless its energizing circuit is held closed for substantially twice that period, i. e. one-half second.

A common circuit for supplying metering current is associated with the cord circuits of the operator's position at which the line is answered, and arranged to supply a metering impulse of either one-fourth or one-half second depending upon the actuation of one or the other of a pair of common keys. When the operator is ready to register a call she also operates the usual message register key individual to the answering end of the cord in use, whereupon the common circuit functions to supply a current impulse to the sleeve circuit of the cord and calling line of the duration determined by the sitting of the common keys.

If a short ($\frac{1}{4}$ sec.) impulse is transmitted the first meter operates but does not hold up long enough to permit the second meter to become fully energized. If a longer ($\frac{1}{2}$ sec.) impulse is transmitted, both meters operate.

The second meter reads direct, i. e. it registers the number of calls charged to its respective station without interpolation whereas the first meter, which operates both on short and long impulses, must have its reading reduced by subtracting the reading of

the second meter from it in order to obtain the number of calls chargeable to the station to which it corresponds.

The invention will be understood from the following description when read in connection with the accompanying drawing, Fig. 1 of which represents a circuit for practicing the invention and Fig. 2 shows the structural details of the charge key and marking therefor to enable the operator to temporarily record the party designation of the calling subscriber.

In Fig. 1 of the drawing a two-party subscriber's line is shown at the left which terminates before the operator in the usual switch board jack 1, to the sleeve terminal of which is connected, in the usual manner, a message register 2 for one of the subscribers, which we will assume to be the so-called W party. This message register is so arranged that when its armature is attracted a circuit is completed through the winding of the J register 3. The J register 3 differs from the W register 2 in that it is sluggish in its operation so that whereas the W register 2 operates in a normal interval of time, of the order of $\frac{1}{4}$ second, after the metering potential is applied thereto, the J register will only attract its armature in case the registering current is applied for substantially twice that interval or $\frac{1}{2}$ second.

Between the vertical broken lines $a-a$, $b-b$ is shown the answering end of one of the operator's cord circuits and at the right of the line $b-b$ is shown positional equipment common to the operator's position, whose function will be explained later.

A description of the operation of the circuit for practicing the invention will now be given.

Let it first be assumed that the W subscriber calls in the usual manner and is answered by the operator inserting the answering plug 4 of one of her cord circuits in the jack 1. Due to the fact that jack 1, or the line lamp associated therewith, has some characteristic or appropriate marking to indicate the so-called "class" of the line the operator is immediately apprised of the fact that the calling line is a party line and that it is equipped

with a message register or call meter for each party on the line and she, therefore, requests the subscriber's letter designation before completing the desired connection.

5 This we have already assumed to be W.

As soon as the operator obtains this information she records it in some simple manner so that when the called subscriber finally hangs up his receiver she will know which
10 party on the calling line to charge for the call. This information may be recorded in several ways which will suggest themselves to anyone, such as noting the subscriber's letter on a slip of paper or placing a distinctively colored clip on the shell of the plug
15 which is inserted in the calling line, but a preferred and more simple method is shown in Fig. 2 and consists in painting half of the top of each message register key 5 some distinctive color such as black and also painting
20 or otherwise indicating the party letters on the key top, one letter on each half, for example, J on the natural or red half and W on the black half. Due to the fact that the plungers of message register keys generally
25 used are free to revolve, the operator merely has to turn the top of the key associated with the cord circuit used, so that the half bearing the letter of the calling subscriber is toward
30 her.

As soon as this operation has been completed the operator will then proceed to complete the connection to the called line and ring the desired subscriber in the usual manner.
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When the operator is apprised of the completion of the conversation by the lighting of the usual supervisory lamps she glances at the top of the message register key 5 previously referred to, and, noting that the W or black portion of the key is toward her, momentarily presses the common key 6 associated with her position whose function is to prepare a circuit for operating the W register 2 associated with the line on which the call originated. Relay 7 thereupon operates in a circuit which can be traced from battery, winding of relay 7, contacts of key 6,
40 and outer right hand normal contacts of relay 8 to ground. Relay 7 in operating completes a holding circuit for itself over its inner right hand front contacts, right hand normal contacts of relay 9 and winding of pilot relay 10 to ground. Relay 10 operates
45 in the above locking circuit for relay 7 and closes an obvious circuit for lighting pilot lamp 25, which indicates to the operator that a metering combination has been set up and that she should not attempt to register another call until the lamp has been extinguished. Relay 7 also prepares at its outer
50 left hand contacts 17 a circuit for operating relay 11, which is normally open at the contacts of message register key 5.

55 Following or simultaneous with the operation of key 6 the operator depresses the message register or charge key 5 in the usual manner for the purpose of causing the operation of the calling subscriber's meter, whereupon relay 11 operates in the previously mentioned circuit, which may be traced
60 from battery, contacts 17 of relay 7, right hand contacts of relay 12, contacts of key 5, contacts 13 and winding of relay 11 to ground. Relay 11 in operating locks up over its contacts 14 in series with relay 12 to battery over the left hand contacts of relay 9. Relay 12 operates in this locking circuit and closes at its left hand contacts an energizing circuit for relay 15, which receives battery over contacts 16 and 17 of relay 7. Relay 15 in operating closes its left hand contacts and applies metering potential from the battery 18 over the left hand contacts of relay 11 to the sleeve of the plug 4 and jack 1 to energize the message register 2. Relay 15 also closes its right hand contacts, thereby completing an obvious energizing circuit for the slow-operate relay 19 and slow-to-release relay 20, the circuit for which latter relay is completed to battery over contacts 21 of relay 19. Relay 20 operates immediately and opens its contacts 23 and 29. Relay 19 in operating opens its contacts 21, thereby releasing relay 20 which is, therefore, only energized momentarily or during the time it takes relay 19 to operate. Relay 19 in operating closes its left hand contacts, thereby preparing an energizing circuit for relay 9 which however is not completed until slow release relay 20 closes its contacts 23. This circuit may then be traced from battery, winding of relay 9, left hand contacts of relay 19 contacts 23 of relay 20 and contacts 24 of relay 7 to ground. The operation of relay 9 opens its left hand contacts, thereby releasing relays 12 and 11. Relay 11 in releasing opens the before traced sleeve circuit, thereby disconnecting metering potential from the meter 2. Relay 12 in releasing opens the energizing circuit for relay 15, which removes battery from its left hand contacts and opens the previously traced energizing circuit for relay 19, which also releases. The operation of relay 9 also opens at its outer right contacts the holding circuit previously traced for relays 7 and 10. Relay 10 in releasing extinguishes the pilot lamp 25. The release of relays 7 and 19 open the circuit for relay 9 which releases. Due to the slow operating characteristics of relay 19 and the slow release characteristics of relay 20 battery 18 is connected to the subscriber's meter 2 for approximately $\frac{1}{4}$ second.

When meter 2 operated it closed an obvious energizing circuit for meter 3, but due to the slow-operate characteristics of that device the $\frac{1}{4}$ second metering impulse above mentioned is not of sufficiently long duration to cause its operation.

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We will now assume that subscriber J calls and, therefore, the operator will turn the top of the message register key 5 so the red or J half is toward her.

When the conversation is completed and the subscribers hang up, the operator, noting that it was the J party who initiated the call, momentarily depresses the common key 26, thereupon completing an obvious circuit for operating relay 8. Relay 8 in operating closes a holding circuit for itself, including its inner right hand contacts, the right hand back contacts of relay 9 and the winding of pilot relay 10 to ground. Pilot relay 10 operates and closes a circuit to light pilot lamp 25. The operator then depresses message register key 5, which closes a circuit to operate relay 11, which can be traced from battery, contacts 27 of relay 8, right hand contacts of relay 12, contacts of key 5, contacts 13 and the winding of relay 11 to ground. Relay 11 in operating locks itself up over its contacts 14 in series with relay 12 and the left hand contacts of relay 9 to battery. Relay 12 operates in this locking circuit and completes an energizing circuit for relay 15, which can be traced from battery, contacts 27 and 28 of relay 8, winding of relay 15 and left hand contacts of relay 12 to ground. Relay 15 in operating connects, at its left hand contacts, the metering battery 18 to the sleeve of the cord and line, over the left hand contacts of relay 11, to operate meter 2 as before described. Meter 2 in operating completes an obvious energizing circuit for slow-to-operate meter 3. Relay 15 in operating also closes its right hand contacts, thereby completing an obvious energizing circuit for the slow operate relay 19 and for slow release relay 20 the circuit for which latter relay is completed to battery over contacts 21 of relay 19. Relay 20 operates immediately in this circuit and opens its contacts 23 and 29. After a definite time interval relay 19, which is slow to operate, closes its contacts 31 and opens its contacts 21, thereby deenergizing slow-to-release relay 20. After a predetermined time interval relay 20 closes its contacts 23 and 29, thereby completing an energizing circuit for relays 30 and 22 in a circuit which may be traced from battery, contacts 31 of relay 19, contacts 29 of relay 20, winding of relay 22 and contacts 32 of relay 22 and winding of relay 30. Slow-to-release relay 30 operates immediately in this circuit, followed after a predetermined time interval by relay 22, the operation of which opens its contacts 32, thereby deenergizing relay 30, which is slow to release. After a definite time, however, this relay releases, thereby completing at its left hand contacts an energizing circuit for relay 9, which can be traced from battery, winding of relay 9, contacts 33 of relay 22, normal contacts of relay 30 and contacts 34 of relay 8 to ground. Relay 9

in operating opens the holding circuit for relays 11 and 12, which cause disconnection of the metering battery from the line and the restoration of the other relays to normal.

It will be noted that due to the sequential operation and release of relays 20, 19, 30 and 22, the metering battery is maintained connected to the line substantially twice as long as when key 6 was operated, consequently slow-to-operate meter 3 has time to attract its armature and operate the meter mechanism.

As previously mentioned it will be noted that the message register device 2 operates every time the battery 18 is connected to the line but that the register 3 only operates in response to an impulse of the order of $\frac{1}{2}$ second which is applied only when the key 26 is operated. It will, therefore, be obvious that the reading of register device 2 represents the sum of the calls registered for both the W and J parties but that the reading of register 3 represents only the calls charged to the J party. To obtain the number of calls charged to the W party it will, therefore, be necessary to subtract from the reading of the W register 2 the reading of the J register 3.

What is claimed is:

1. In a party line metering system, a line, a plurality of stations connected to said line, an exchange, a meter for each of said stations associated with said line, said meters having different time characteristics, and means at said exchange for applying current impulses of different lengths to said line to selectively operate a certain one of said meters.

2. In a party line metering system, a line, a pair of stations connected thereto, an exchange, a meter for each station associated with said line one of said meters being controlled by the operation of the other and having a slower operating characteristic, and means at said exchange for applying current impulses of different duration to said line to operate one or both of said meters.

3. In a party line metering system, a line, a pair of stations connected thereto, an exchange, a meter for each station associated with said line, one of said meters being controlled by the operation of the other, and having a slower operating characteristic, and means common to a plurality of cord circuits at said exchange for applying current impulses of different duration to said line to operate one or both of said meters.

4. In a party line metering system an operator's position, a line terminating thereat, a plurality of cord circuits thereat adapted to be connected to said line to answer a call thereover, a pair of subscribers' stations connected to said line, an individual call meter for each station associated with said line one of said meters having a slower operating characteristic than the other, a source of

metering potential and means common to said plurality of cord circuits and comprising a plurality of slow acting relays for selectively connecting said source to said line for different durations of time to operate one or both of said meters.

In witness whereof, I hereunto subscribe my name this 11th day of January, 1930.

CLARENCE B. FOWLER.

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