

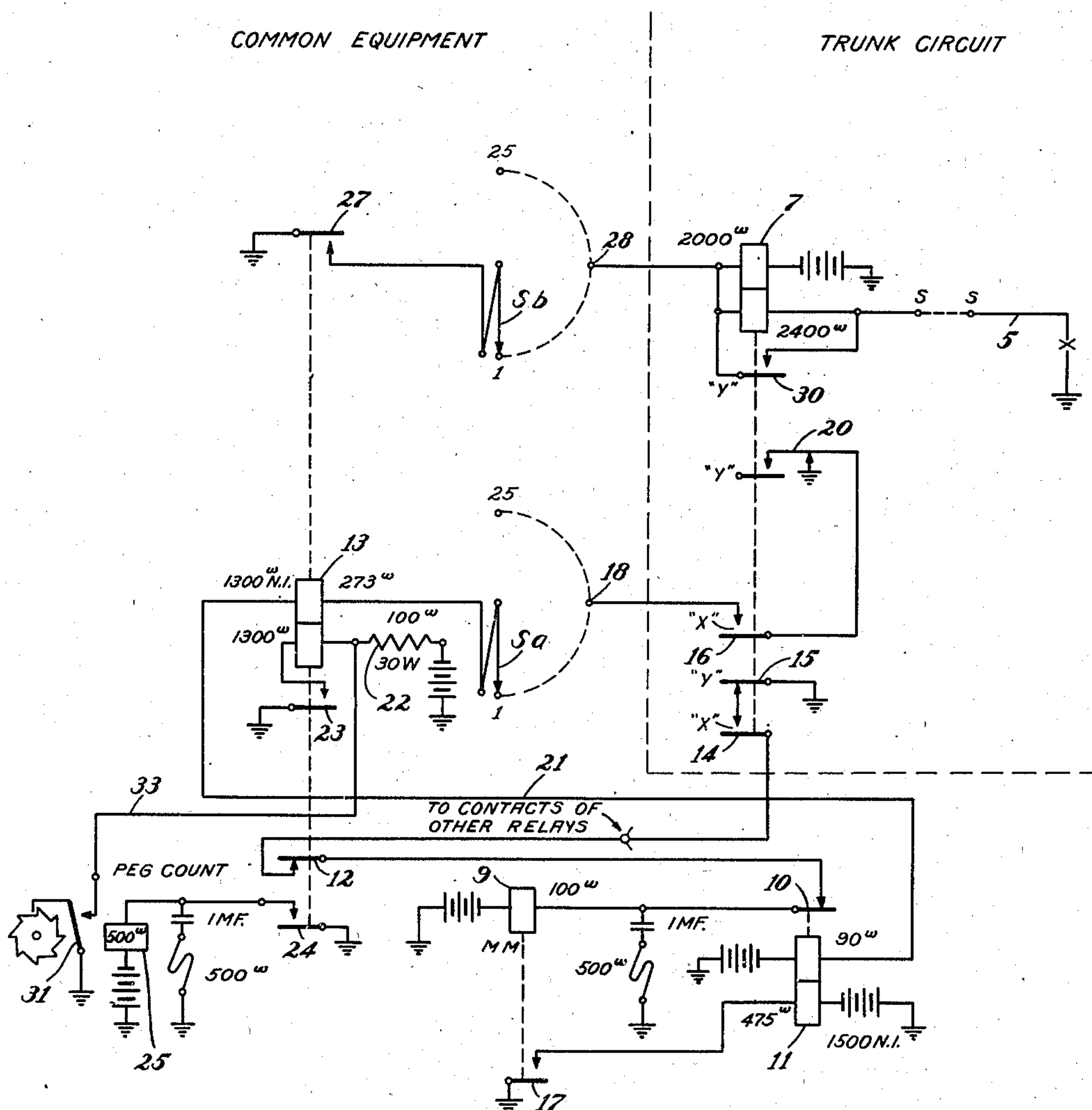
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PEG COUNT METERING ARRANGEMENT

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PEG COUNT METERING ARRANGEMENT

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This invention relates to a peg count circuit arrangement.

In telephone systems or similar electrical systems it is frequently desirable to know the number of times that a group of electrical units are used in a given period of time. For example, in a telephone system it is especially useful, in determining traffic conditions, to know the number of times that a group of trunks, links or like circuits are used in a given interval. In the past it has been the practice to provide a peg count meter in such determinations, for each trunk in the group of trunks under consideration. The provision of such a large number of peg count meters is not only expensive but the work involved in reading them and in obtaining a total of the several readings becomes an item of real importance.

In accordance with the present invention, a peg count circuit arrangement having a single meter therein, is used to register the individual calls on the several trunks of a group and to accumulate or totalize the calls thus registered.

The present metering arrangement is diagrammatically illustrated in the single figure of the drawing wherein the equipment indicated at the left of the broken line is common to the group of trunks or other circuits under observation. However, the portion of the diagram at the right of the broken line indicates the equipment individual to each trunk or circuit and comprises a so-called two-step relay which is connected to a terminal individual to its trunk or link.

In the arrangement, as herein disclosed, it is assumed that there are twenty-five trunks or links in the group to be observed. Each trunk is provided with a supervisory conductor individual thereto which is connected to a two-step relay also individual to the trunk. Each such relay is connected to a terminal in the terminal bank of a progressively movable switch. Since it is assumed that there are twenty-five trunks in the group, the switch is shown as being of the twenty-five point size. If there are more than twenty-five trunks in the group, a switch arrangement of large capacity must be provided.

With this brief description of the equipment, it is believed that the invention will best be understood by describing how a call on a trunk or link is counted by the common peg count arrangement. Let it be assumed that there is a call on a trunk of which only its supervisory conductor 5 is illustrated. Under this condition ground potential is connected to the supervisory conductor 5 and thence through the lower winding (2400

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ohms non-inductively wound) and the upper winding (2000 ohms) in series of a so-called two-step relay 7, to grounded battery. The relay 7 operates in this circuit but since it is of the two-step type, only its X contacts are operated, its Y contacts remaining unoperated at this time. This is effective to complete a circuit for the motor magnet 9 of a well-known rotary stepping switch, including the brushes Sa and Sb and their related terminal banks, although any other type of switching means can be substituted therefor. This circuit extends from grounded battery, winding of the motor magnet 9, armature 10 and back contact of the interrupter relay 11, armature 12 and back contact of the cut-off relay 13, armature and front contact 14 (now closed) to ground at the back contact and armature 15 (still unopened) of the two-step relay 7. When the magnet 9 operates, it completes at its armature 17 and front contact, a circuit from ground, through the lower winding of the interrupter relay 11, to grounded battery. Relay 11 operates and at its armature 10 interrupts the operating circuit of the motor magnet 9, thereby advancing the switch one step. Thus the motor magnet 9 and the interrupter relay 10 alternately operate, one interrupting the circuit of the other in a pulse assuring arrangement, until the switch brush Sa is advanced until it encounters the switch terminal 18 individual to the mentioned trunk. When terminal 18 is encountered, the cut-off relay 13 operates over a circuit from ground at the back contact and continuity spring 20, of relay 7 (now partially operated), contacts 16, through terminal 18, switch brush Sa, upper winding of the cut-off relay 13, conductor 21, and upper winding of the interrupter relay 11, to grounded battery. The energization of the upper winding of the interrupter relay 11 is effective to hold this relay in its operated position to hold open the circuit of the motor magnet 9 and thereby stop the finding operation of the switch instantaneously. This is necessary since the brushes Sa and Sb of the switch may advance at the rate of twenty-five to forty pulses per second in hunting for the switch terminal 18. The cut-off relay 13, on operating, locks itself operated from grounded battery, resistor 22, lower winding of this relay, its front contact and armature 23, to ground. Relay 13, on operating, further opens the operating circuit for the motor magnet 9, at the armature 12 and back contact. The cut-off relay 13, at its armature 24 and front contact, closes a circuit from ground and winding of the peg count meter 25, to grounded battery. The cut-off relay 13, at its armature 27 and front

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contact, also closes a circuit from ground, switch brush Sb, terminal 28, upper winding of relay 7, to grounded battery. This causes the relay 7 to be operated to its second step, that is, it becomes fully operated. When relay 7 is thus fully operated it actuates its Y contacts and maintains its X contacts operated. At its armature 30 and front contact, relay 7 closes a locking circuit for itself, from grounded battery, upper winding of relay 7 through the mentioned armature 30 and front contact, to ground over the supervisory conductor of the trunk under consideration. The relay 7 is thus locked operated as long as the mentioned trunk is in use. At the continuity spring 20 and back contact of relay 7 the circuit including the upper windings of relays 13 and 11 is interrupted and relay 11 is released. Thus, the ground potential is cleared from terminal 18, so that on any subsequent operation of the switch the continued use of the mentioned trunk will not result in a second metering of the call under consideration. Likewise, at the armature 15 and back contact of relay 7, the operating circuit of the motor magnet 9 is opened.

When the peg count meter is fully operated, it closes its armature 31. This is effective to close a shunt circuit from grounded battery resistor 22, conductor 33, front contact and armature 31, to ground. This circuit is effective to shunt the locking circuit of the cut-off relay 13 causing this relay to release. At the conclusion of the use of the mentioned trunk, ground potential is removed from its supervisory conductor, in the well known manner, to effect release of the relay 7. This restores both the X and Y contacts of relay 7 to their normal condition.

It will be understood that calls on any of the other trunks will be counted in like manner.

From the foregoing, it will be seen that the present invention provides a simple arrangement with a minimum amount of equipment, which quickly and reliably registers the number of times that the units of a group are used.

It will be understood that a part or all of the twenty-five trunks of the group may be taken for use simultaneously. The rotary stepping switch, common to the group, associates each of the trunks in use, in succession with the peg count meter to count that use. Thereafter, the relay individual to a given trunk functions to disconnect that trunk during the continued use thereof, from the rotary switch and the peg count meter. Thus, each use of a trunk is counted only once.

What I claim is:

1. In a peg count arrangement, a plurality of trunks, each trunk having an individual conductor and an individual relay, means responsive to the taking of a trunk for use for operating the relay individual to said trunk over the conductor thereof, a peg count meter common to said trunks, means including switching mechanism for associating said peg count meter with a single given trunk in use as indicated by the operation of the relay individual thereto, controlling means common to said trunks and responsive to the association of said peg count meter with said given trunk for operating said meter, said controlling means causing the relay individual to said given trunk to prevent said peg count meter from operating more than once on any given use of the trunk, and a locking circuit for said relay completed over the conductor of the given trunk as long as its related trunk continues in use.

2. In a peg count arrangement, a plurality of

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units such as trunks and the like, each unit being provided with a control conductor, a two-step relay individual to each unit and provided with primary and secondary groups of contacts, the primary group only of said contacts being operated in the first step of said relay and both groups of said contacts being operated in the second step of said relay, means responsive to the taking of a unit for use, for operating in its first step, the relay individual to said unit over the control conductor thereof, whereby its primary group of contacts is operated, a peg count meter common to said units, means including switching mechanism for associating said peg count meter with a given unit in use as indicated by the operation of the primary group of contacts of the relay of said given unit, governing means responsive to the association of said peg count meter with said given unit for operating said meter, said governing means being effective to operate said relay to its second step whereby its second group of contacts are closed, means including certain of said last-mentioned contacts for disconnecting the peg count meter from the unit in use, and a locking circuit for said relay completed through said secondary group of contacts and the control conductor associated therewith as long as its related unit continues in use.

3. In a peg count arrangement, a plurality of units such as trunks and the like, a two-step relay individual to each unit provided with primary and secondary groups of contacts, the primary group only of said contacts being operated by said relay in response to current of a given value and both groups of said contacts being operated by said relay in response to current of a different value, means responsive to the taking of a unit for use for supplying current of a given value to the relay individual to said unit whereby only the primary group of contacts thereof is operated, a peg count meter common to said units, means including switching mechanism for associating said peg count meter with a given unit in use as indicated by the operation of the primary group of contacts of the relay of said given unit, controlling means responsive to the association of said peg count meter with said given unit for operating said meter, said controlling means being effective to operate said relay to its second step whereby its second group of contacts are closed, means including certain of said last-mentioned contacts for disconnecting said peg count meter and said switching mechanism from the unit in use, and a locking circuit for said last mentioned relay completed through said secondary group of contacts as long as its related unit continues in use.

4. In a peg count arrangement, a plurality of trunks, each trunk having an individual conductor and an individual relay, means responsive to the taking of a trunk for use for operating the relay individual to said trunk over the conductor thereof, a peg count meter common to said trunks, hunting means including progressively movable switching mechanism for associating said peg count meter with said trunks in succession until a trunk in use is located as indicated by the operation of the relay individual thereto, controlling means common to said trunks and responsive to the association of said peg count meter with said given trunk for operating said meter, said controlling means causing the relay individual to said given trunk to prevent said peg count meter from being reassociated a second time

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with said given trunk during a given use thereof, and a locking circuit for said relay completed over said individual conductor as long as its related trunk continues in use, said controlling means responsive to the operation of the peg count meter, causing said hunting means to associate the peg count meter with a second trunk in use.

5. In a peg count arrangement, a plurality of units such as trunks and the like, a two-step relay individual to each unit provided with primary and secondary groups of contacts, the primary group only of said contacts being operated by said relay in response to current of a given value and both groups of said contacts being operated by said relay in response to current of a different value, means responsive to the taking of a unit for use for supplying current of a given value to the relay individual to said unit whereby only the primary group of contacts thereof is operated, a peg count meter common to said units, means including progressively movable switching mechanism for associating said peg count meter with a given unit in use as indicated by the operation of the primary group of contacts of the relay of said given unit, a circuit for operating said switching mechanism completed

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through actuated primary contacts and through unactuated secondary contacts of the relay of said given unit, controlling means responsive to the association of said peg count meter with said given unit for operating said meter, said controlling means being effective to apply current of said different value to the relay of said given unit to operate it to its second step whereby all of its contacts are closed, means including certain of said last-mentioned contacts for disconnecting said peg count meter and said switching mechanism from the unit in use, and a locking circuit for said last-mentioned relay completed through said secondary group of contacts as long as its related unit continues in use.

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