

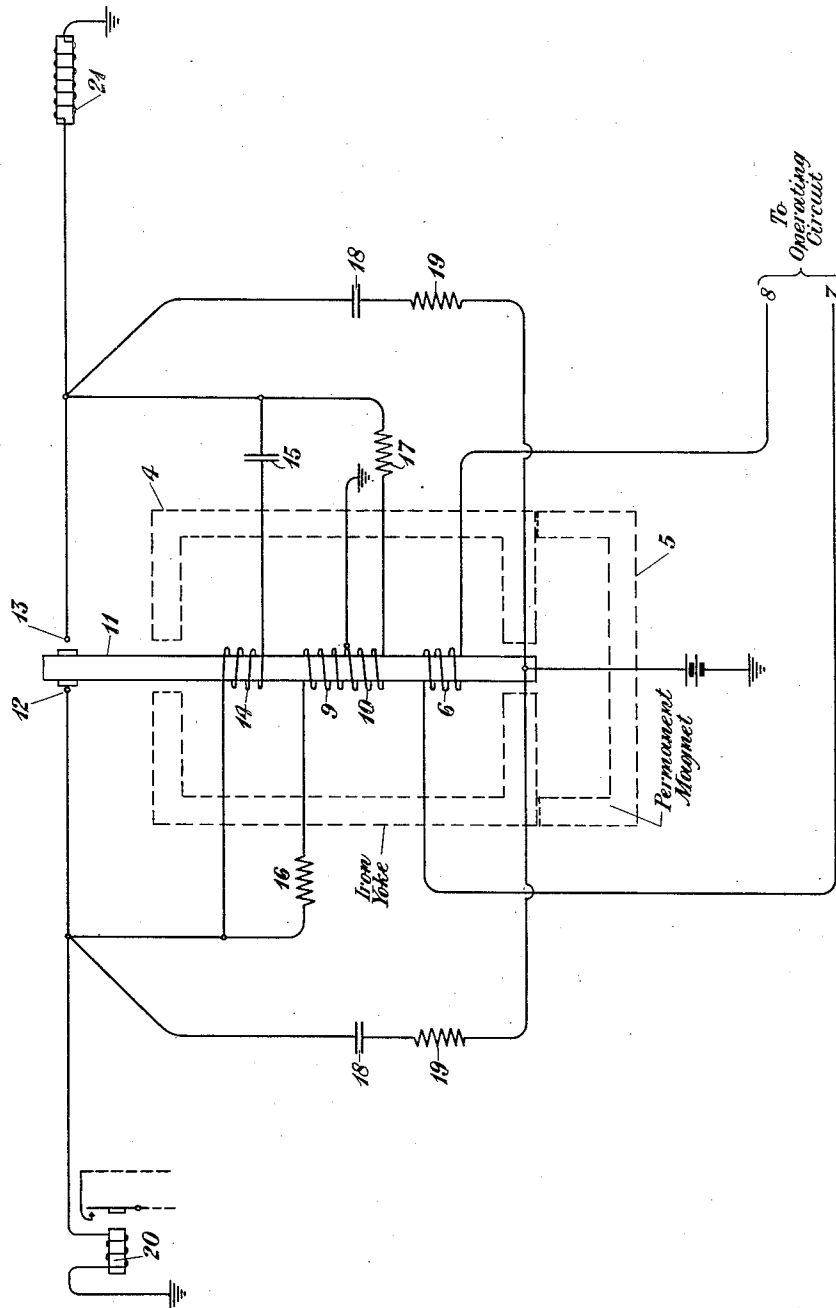
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D. E. BRANSON

RELAY AND CIRCUITS THEREFOR

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RELAY AND CIRCUITS THEREFOR.

Application filed June 21, 1924. Serial No. 721,487.

To all whom it may concern:

Be it known that I, DAVID E. BRANSON, residing at Bloomfield, in the county of Essex and State of New Jersey, have invented certain Improvements in Relays and Circuits Therefor, of which the following is a specification.

This invention relates to relays of the vibrating armature type, and more particularly to accelerating arrangements therefor.

An object of the invention is to provide a circuit arrangement for polar relays when only a single local battery is available.

Another object of the invention consists in the use of such arrangement in connection with local and other circuits to provide for the opening and closing thereof or to provide continuous interruptions therein.

These objects and further objects of the invention will be apparent from the following description, when considered in connection with the accompanying drawing, in which a preferred embodiment thereof is diagrammatically represented.

Referring to the drawing, the numeral 4 designates the yoke of a polar relay which has associated with it a permanent magnet 5. The armature of the relay, in this instance, is shown as being provided with a plurality of windings. The operating winding 6 for the relay is connected to conductors 7 and 8, extending to an operating circuit in which is included a source of current that may flow through the winding 6 in either direction. The opposing windings 9 and 10 are bridged across the contacts of the relay, and are grounded at their center point in such a way that steady current flowing through these windings, as will presently appear, tends to move the armature 11 away from either the contact 12 or the contact 13, against which it may be resting, to the opposite contact. The armature 11 may be clamped at one end, and its opposite end may extend through the air gap provided between the pole pieces of the yoke 4. In this position the extended end of the armature may swing between the contacts 12 and 13. The accelerating winding 14, which is in series with the condenser 15, is also connected to the contacts 12 and 13, in such a way that a surge of current, upon the closing of a contact or at the time the armature 11 is in the air between the contacts, will supplement the influence of the operating

winding and produce an effect on said armature to hold or accelerate its movement in the direction in which it is being vibrated. In the present arrangement, the opposing windings 9 and 10 should be adjusted by means of resistances 16 and 17, respectively so that their effect will not take control of the operation of the relay, but will serve to neutralize the effect of the accelerating winding 14.

A condenser 18, in series with a resistance 19, is associated with each of the contacts 12 and 13 of the armature 11 to protect said contacts from arcing, and also serve to prevent interference between the local relay circuits, in which relay 20 and retardation coil 21 are respectively included, and the vibrating circuit.

The local circuit including retardation coil 21 is provided in case it is desired to eliminate relay bias. This circuit is similar to the local circuit, in which relay 20 is included, and is connected to ground from the contact 13 so that the local circuits extending from each of the contacts of armature 11 to ground will be entirely symmetrical.

If it is permissible to operate the polar relay with a slight bias for the armature 11, this may be brought about by connecting only one contact of the armature to ground through the moderate resistance presented by the relay 20, included in the local circuit connected to that contact, so that the opposite contact of the armature will have no corresponding local circuit and retardation coil connected thereto.

Incoming current from the operating circuit over the conductors 7 and 8 flows through the operating winding 6, and causes the armature 11 to rest on either contact 12 or 13, depending upon direction of the current flow.

In the operation of the relay, the closure of the armature on either contact 12 or 13 will cause a surge of current from the local battery over the contact against which the armature may be positioned, and will hold the armature momentarily against the make contact by means of accelerating winding 14. With the armature 11 of the polar relay positioned against the contact 12, as indicated in the drawing, a circuit is closed from local battery connected to the armature, through said contact, resistance 16, opposing winding 9 to ground. In case the

armature 11 is positioned against contact 13, a circuit will be closed from battery, through make contact 13, resistance 17, opposing winding 10, to ground. The closure of either of these circuits tends to neutralize the effect of the accelerating winding 14 and to move the armature from the contact at which it is positioned toward the opposite contact.

10 The circuit comprising the opposing windings 9, 10, and 14, including the re-
resistance 16 and 17, is so arranged that the relay may be made to operate in accord-
15 ance with current incoming over the con-
ductors 7 and 8 and flowing through the op-
erating winding 6.

The winding 6 may be omitted, if neces-
sary, and in such case the relay will be op-
erated by the opposing windings 9, 10 and
20 the accelerating winding 14, and will func-
tion similarly to that previously outlined.

Each time the armature 11 in vibrating
rests against contact 12, a circuit is momen-
tarily established from the local battery,
25 through said armature and contact 12, wind-
ing of relay 20 to ground. The closure of
this circuit causes the operation of relay 20,
which in turn completes a circuit over its
make contact to operate such circuits and
30 apparatus as it may be desired to control.

While the arrangements of this invention
have been illustrated as embodied in a cer-
tain specific form which has been deemed
desirable, it will be understood that they are
35 capable of embodiment in many and widely
varied forms without departing from the
spirit of the invention as defined in the ap-
pended claims. For instance, it will be ob-
vious that the arrangement is suitable for
40 use in connection with the receiving relays
of telegraph circuits in the cases where the
relay repeats by opening and closing the
circuit. It is also adapted to provide a
source of continuous interruptions of a di-
45 rect current circuit for operating a tele-
phone subscriber's signal or for use in va-
rious testing and measuring circuits.

What is claimed is:

1. A vibrating relay system including a
50 polar relay having an armature, a pair of
contacts between which said armature is
adapted to swing, an operating winding
associated with said armature to bias it to-
ward either of said contacts, a winding as-
55 sociated with said armature and bridged
across said contacts to supplement the in-
fluence of said operating winding, a source
of current connected with said armature,
and an opposing winding connected with
60 each contact for completing a circuit from
said source of current to neutralize the ef-
fect of the bridged winding on said arma-
ture.

2. A vibrating relay system including a
65 polar relay having an armature, a pair of

contacts between which said armature is
adapted to swing, an operating winding as-
sociated with said armature to bias it to-
ward either of said contacts, a winding as-
70 sociated with said armature and bridged
across said contacts to supplement the in-
fluence of said operating winding, a single
source of current connected with said arma-
ture, and a pair of windings associated with
the armature and bridged across said con-
75 tacts, each of said windings being adapted
to complete a circuit from said source of
current through the contact with which it
is connected and said armature to neutralize
the effect of the bridged winding on the ar-
80 mature.

3. A vibrating system including a polar
relay having an armature, a pair of contacts
between which said armature is adapted to
swing, an operating winding associated with
85 said armature to bias it toward either of
said contacts, an accelerating winding
bridged across said contacts to supplement
the influence of said operating winding, a
single source of current connected with said
90 armature, and an opposing winding con-
nected with each contact member for com-
pleting a circuit from said source of current
to neutralize the effect of the operating and
accelerating windings on said armature
95 when it is positioned at either of said con-
tacts, and a local circuit controlled by said
armature through one of its contacts.

4. A vibrating relay system including a
polar relay having an armature, a pair of
100 contacts between which said armature is
adapted to swing, an operating winding as-
sociated with said armature to bias it to-
ward either of said contacts, a winding
bridged across said contacts to supplement
105 the influence of said operating winding, a
single source of current connected with said
armature, a pair of opposing windings as-
sociated with the armature and bridged
across said contacts, each of said windings
110 being adapted to complete a circuit from
said source of current through the contact
with which it is connected to neutralize the
effect of the bridged winding, and a resist-
115 ance associated with each of the opposing
windings whereby proper relation is ob-
tained between the effects of the opposing
windings and the bridged winding.

5. A vibrating system including a polar
relay having an armature, a pair of con-
120 tacts between which said armature is
adapted to swing, an operating winding as-
sociated with said armature to bias it to-
ward either of said contacts, an accelerat-
ing winding bridged across said contacts to
125 supplement the influence of said operating
winding, a single source of current con-
nected with said armature, and an oppos-
ing winding connected with each contact
member for completing a circuit from said
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source of current to neutralize the effect of the operating and accelerating windings on said armature, when it is positioned at one contact and tend to move the armature to the opposite contact when the operating current is reduced to approximately zero.

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6. A vibrating relay system including a polar relay having an armature, a pair of contacts between which said armature is adapted to swing, a single source of current connected with said armature, an operating winding associated with said armature to bias it toward either of said contacts, a winding bridged across said contacts and connected therethrough with said source of current, said bridged winding being adapted to supplement the influence of said operating winding, and a pair of windings associated with the armature and bridged across said contacts, each of said windings

being adapted to complete a circuit from said source of current through the contact with which it is connected to neutralize the effect of the bridged winding and operating winding, a condenser connected with said bridged winding for effecting therethrough, a change in current during the movement of said armature, said change in current taking place in advance of current changes through said opposing windings to accelerate the movement of said armature, and a resistance associated with each of the opposing windings whereby proper relation is obtained between the effects of the opposing windings and the bridged winding.

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In testimony whereof, I have signed my name to this specification this 20th day of June 1924.

DAVID E. BRANSON.