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N. H. SAUNDERS ET AL

2,315,020

GANG RELAY

Filed Jan. 15, 1941

Fig. 1.

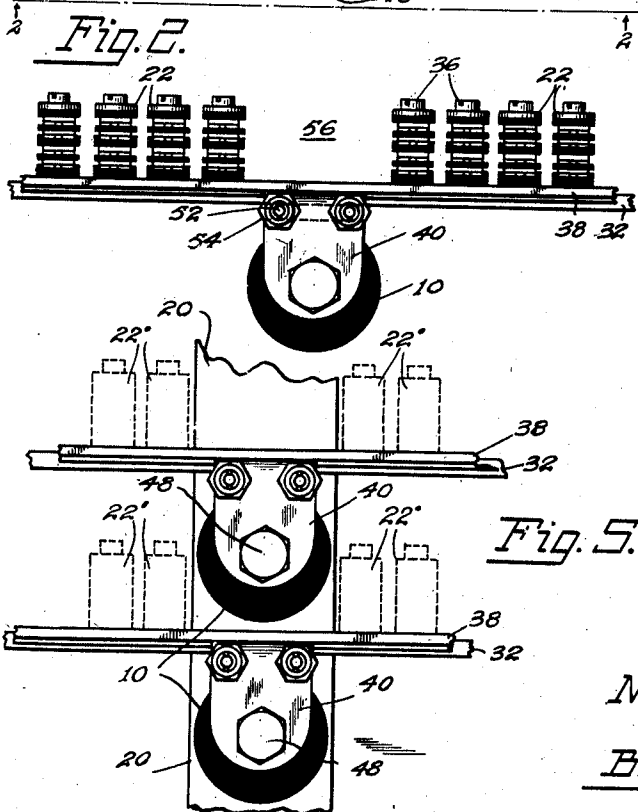
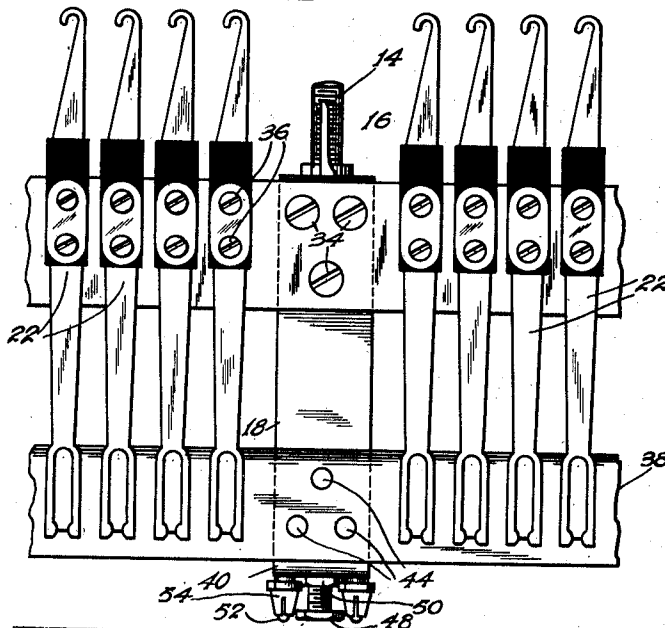


Fig. 3.

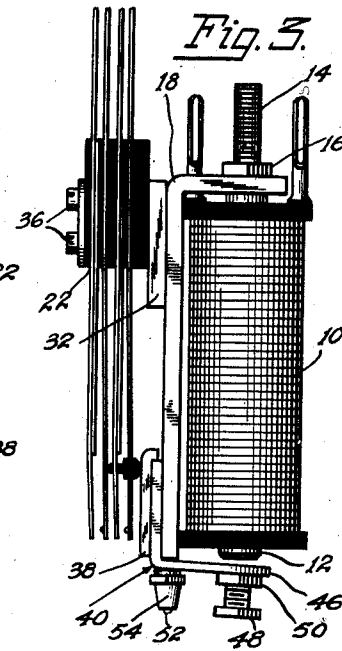


Fig. 4.

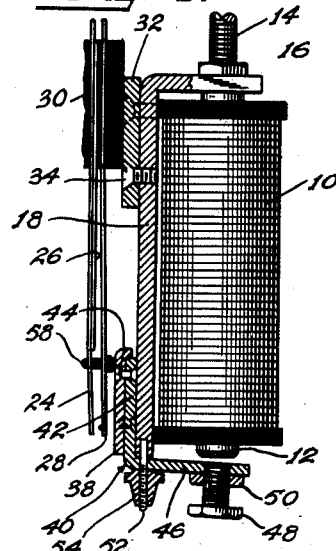
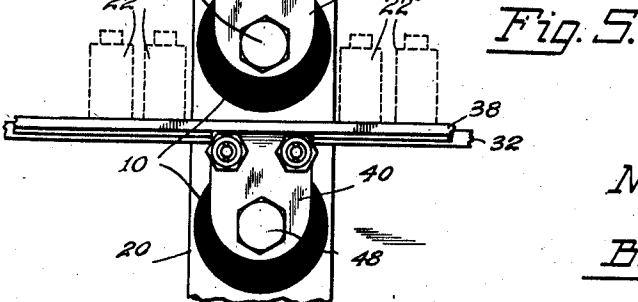


Fig. 5.



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UNITED STATES PATENT OFFICE

2,315,020

GANG RELAY

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board and Supply Company, Chicago, Ill., a
corporation of Illinois

Application January 15, 1941, Serial No. 374,428

4 Claims. (Cl. 200—98)

This invention relates to a useful improve-
ment in gang relays and more particularly to
the type which are used in telephone systems
for establishing connections in conversational
circuits between calling and called subscribers.

The object of this invention is to provide a
relay of this type which permits ready adjust-
ment, is cheap to manufacture, is compact, reli-
able in operation, which eliminates parts, and
which may be economically positioned in space
adjacent to other relays.

One of the features of this invention resides
in the organization of the relay so that it may
be nested with respect to other relays on a
switchboard so as to reduce the space required
for line finder, selector, connector or other
relays in automatic switchboards. Another fea-
ture resides in the arrangement of the parts
and of the springs so that ready adjustment
may be made. A further feature resides in the
simplified construction of the heel iron, and the
adjusting screw so that less critical limits may
be applied in manufacture, resulting in conse-
quent economies, and ultimately in simplified
structures.

Other features and advantages will appear
from the description of the invention taken in
connection with the figures of the accompanying
drawing.

In the drawing wherein like reference char-
acters indicate corresponding parts,

Fig. 1 is a top plan view of the relay with parts
broken away;

Fig. 2 is a front elevational view with parts
broken away as viewed on the line 2—2 of Fig. 1;

Fig. 3 is a side elevation of the relay of Fig. 1;

Fig. 4 is a sectional view through Fig. 1; and

Fig. 5 is a front elevational view of a partial
section of a relay bank nested together.

Referring now more particularly to the draw-
ing, the relay is shown in its preferred form as
comprising an operating magnet 10, having a
core 12 projecting at one end to form a pole
piece and extending at the other end into a
threaded boss 14, provided with means 16 for
securing the heel iron 18 to the operating mag-
net and for securing the relay structure to a sup-
porting framework 20 which may be arranged in
either a horizontal or vertical direction.

Spring contact elements are mounted on the
relay in the form of stacks 22 so as to provide
a multiplicity of circuit connections under the
control of the one relay magnet. The free con-
tact springs 24 rest against metal strips 26 of
somewhat ductile material which serve as a stop.

These springs are adjacent to the lever contact
springs 28 which are relatively movable with
respect to the free springs, and the entire group
of spring contacts in the stack are insulatably
mounted at 30 upon a mounting plate 32, which
latter is detachably secured through its central
section to the heel iron 18 by means of suitable
fastening means 34. In the preferred arrange-
ment, this connection is accomplished by coun-
ter-sunk machine screws. The mounting plate
is rigidly secured to the heel iron thereby pre-
serving the contact spring stacks in definite
positions at all times. Each stack is in turn fas-
tened upon the mounting plate by two screws 36.

An operating lever 38 is arranged to extend
across the width of the front of the relay so
as to provide an operating means for all of the
spring contacts in the various stacks. An arma-
ture 40 effects the operation of the actuating
lever 38. The armature is preferably angular
in section, having a portion 42 to which the
operating lever may be secured by appropriate
fastening means shown in the form of rivets 44.
The other leg 46 of the armature extends adja-
cent to the pole piece 12 and is arranged in
adjustable relation thereto by means of the
adjusting screw 48 which latter is of relatively
large diameter and may have a right hand
screw providing a means for close adjustment
of the extent of movement of the operating
lever. A lock nut 50 secures the screw in ad-
justed position so as to preclude variations of
adjustment when the device is in operation.

The armature and operating lever are piv-
otally supported upon the heel iron by means
of the threaded studs 52. These studs are spaced
laterally on the front edge of the heel iron there-
by retaining the operating lever and armature
in aligned relation to the other parts of the relay
at all times. Spring nuts 54 serve to hold the
parts in the position as described.

The stacks of spring contacts are positioned
on the mounting plate at either side of the cen-
ter thereof, as clearly seen in Figs. 1 and 2 there-
by providing a space 56 in which the coil of op-
erating magnet of the next adjacent relay may
nest. This arrangement of relays is seen in Fig.
5 providing a very compact relationship of the
relays when mounted upon a switchboard panel.

In Fig. 5, a series of contact spring stacks 22'
are positioned above each operating lever 38, and
an operating magnet 10 is positioned below each
operating lever. The stacks are on each side of
the magnet 10 of the next higher relay. The
operation of a lower magnet 10 effects the move-

ment of the operating lever 38, above it, and in turn operates the spring stacks 22', above it, (and to the side of the operating coil of the magnet next above it).

It will be readily seen that the arrangement described permits a very marked economy of space in connection with the height of a switch-board and permits of a more economical fabrication of the parts of the relay as groups. For example, the spring contacts and mounting plate may be fabricated as one assembly, with the armature and operating lever as another, and the operating magnet itself as a third.

The heel iron is greatly simplified over those heretofore commonly used. The armature and operating lever are also simplified. Special spring contacts are eliminated and simple bumper pins 58 of insulating material are arranged to extend the movement of the operating lever to all the lever contact springs in the stacks.

Although a preferred embodiment of the invention is shown and described, variations within the true spirit and scope of the same are to be determined by the appended claims.

Having thus described our invention, what we claim is new and desire to secure by United States Letters Patent is:

We claim:

1. A telephone relay bank comprising a plurality of relays arranged in a row, each relay including a bar extending transversely of the row of relays, a plurality of sets of contact springs mounted transversely of the row of relays in substantial alignment on said bar and an electromagnet and associated means for actuating said sets of contact springs, the sets of contact springs of each relay being arranged in two groups separated to provide a space therebetween and means for mounting said relays with the electromagnet of each preceding relay positioned in the space between the groups of contact springs of the next succeeding relay.

2. A telephone relay bank comprising a plu-

5 rality of relays arranged in a row, each relay including a plurality of sets of contact springs mounted in substantial alignment transversely of the row of relays and an electromagnet and associated means for actuating said sets of contact springs, the sets of contact springs of each relay being arranged in two groups separated to provide a space therebetween substantially centrally of the relay, and means for mounting said relays with the electromagnet of each preceding relay positioned in the space between the groups of contact springs of the next succeeding relay.

3. A telephone relay bank comprising a plurality of relays arranged in a row; each relay including a bar extending transversely of the row of relays, a plurality of sets of contact springs mounted on said bar in substantial alignment and an electromagnet and associated means for actuating said sets of contact springs; the sets of contact springs of each relay being arranged in two groups separated to provide a space therebetween substantially centrally of the relay, and means for mounting said relays with the electromagnet of each preceding relay positioned in the space between the groups of contact springs of the next succeeding relay.

4. A telephone relay bank comprising a plurality of relays arranged in a row; each relay including a bar extending transversely of the row of relays, a plurality of sets of contact springs mounted in substantial alignment on one side of said bar and an electromagnet and associated means for actuating said sets of contact springs mounted on the other side of said bar; the sets of contact springs of each relay being arranged in two groups separated to provide a space therebetween and means for mounting said relays with the electromagnet of each preceding relay positioned in the space between the groups of contact springs of the next succeeding relay.

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