

P. J. HOWE.
ADJUSTABLE CONDENSER.
APPLICATION FILED FEB. 7, 1918.

1,350,279.

Patented Aug. 17, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

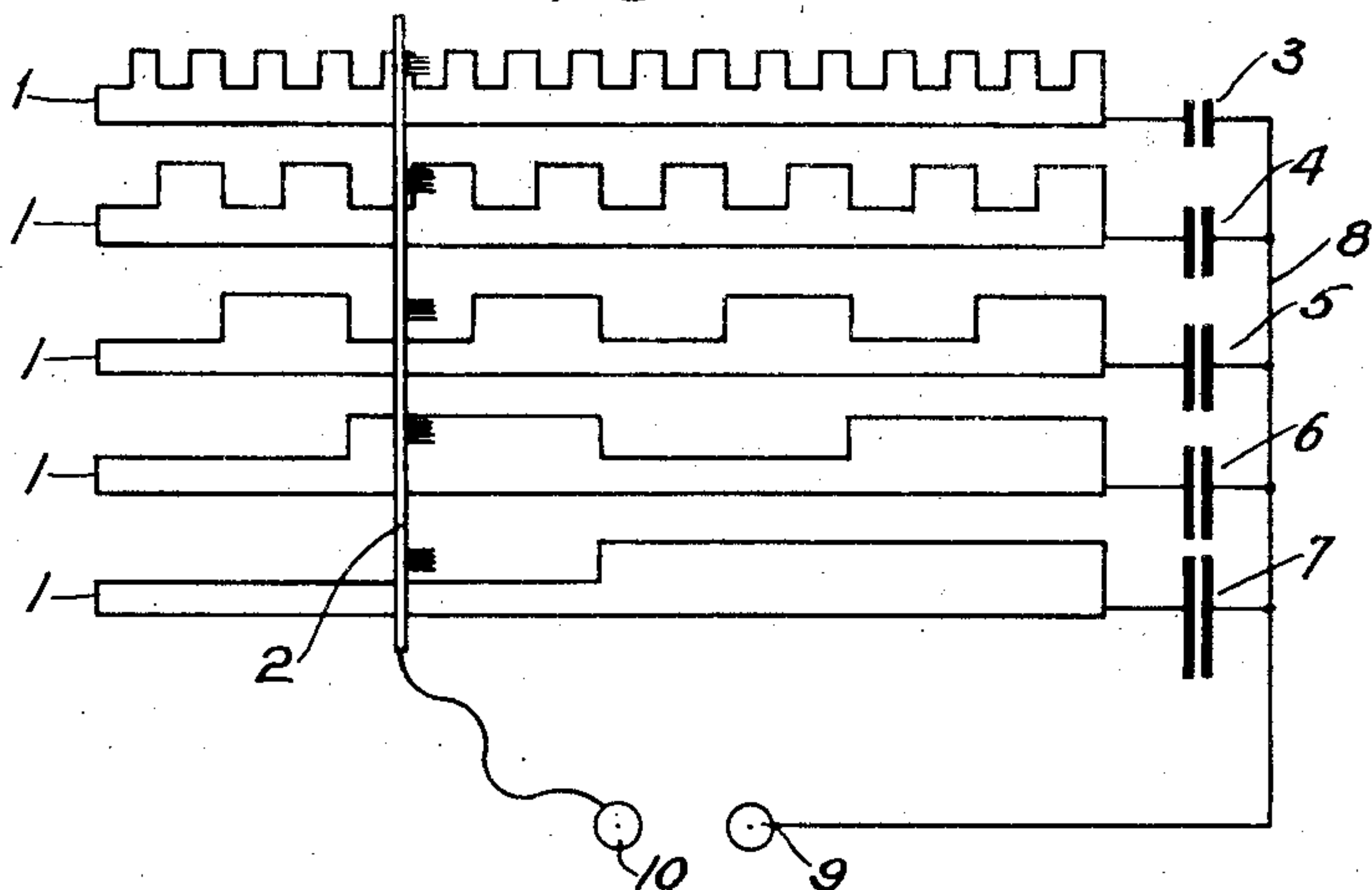
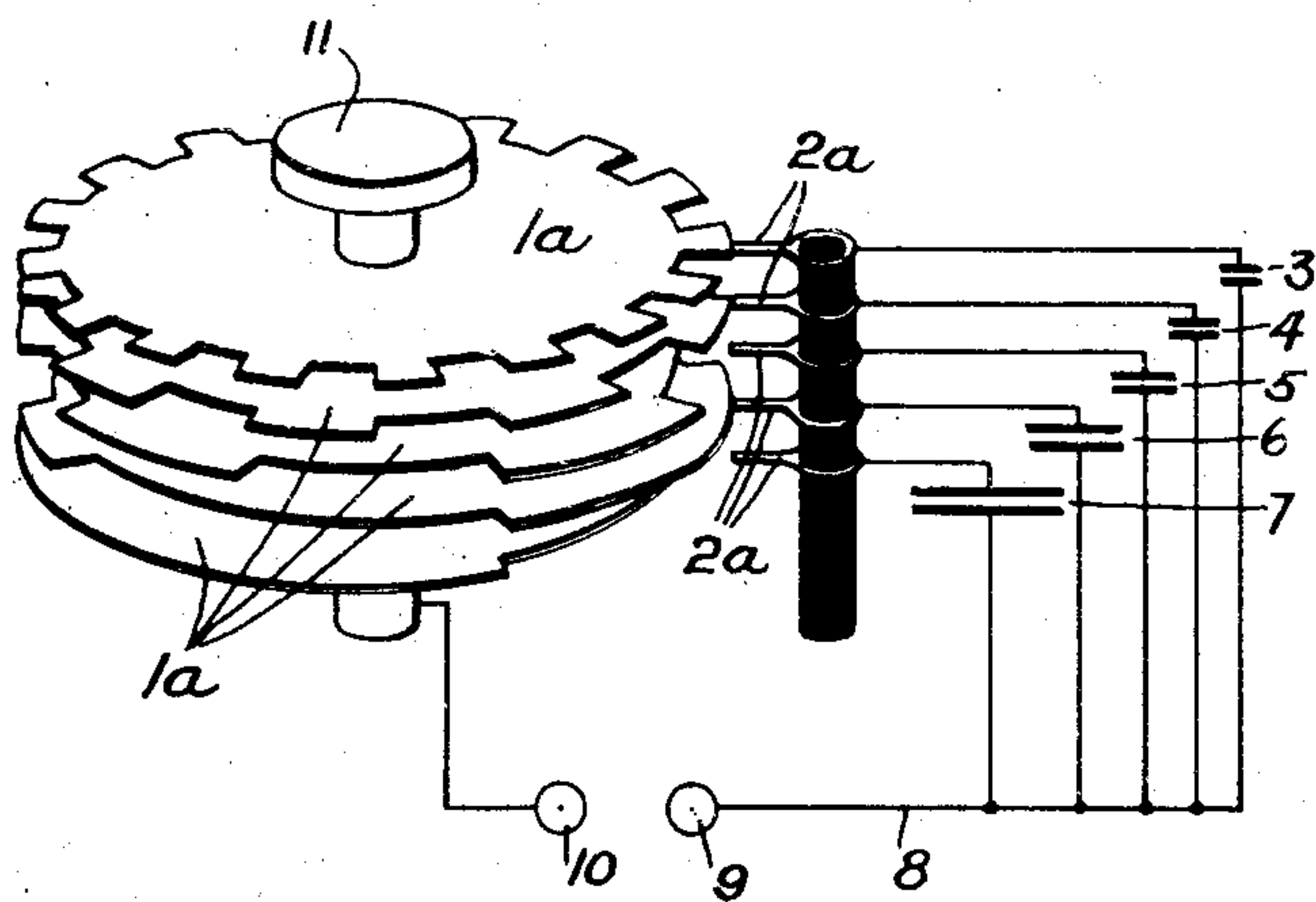


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

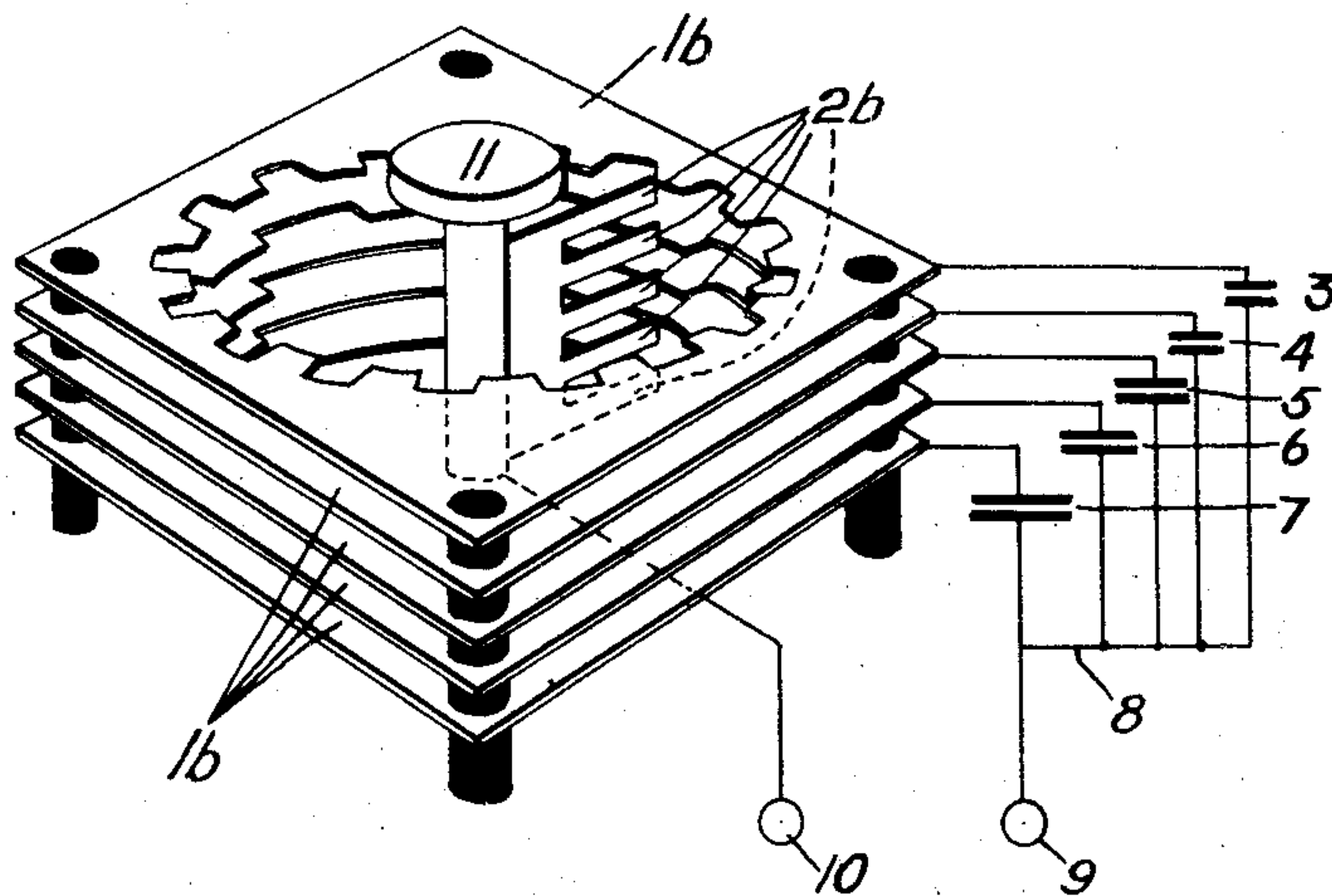
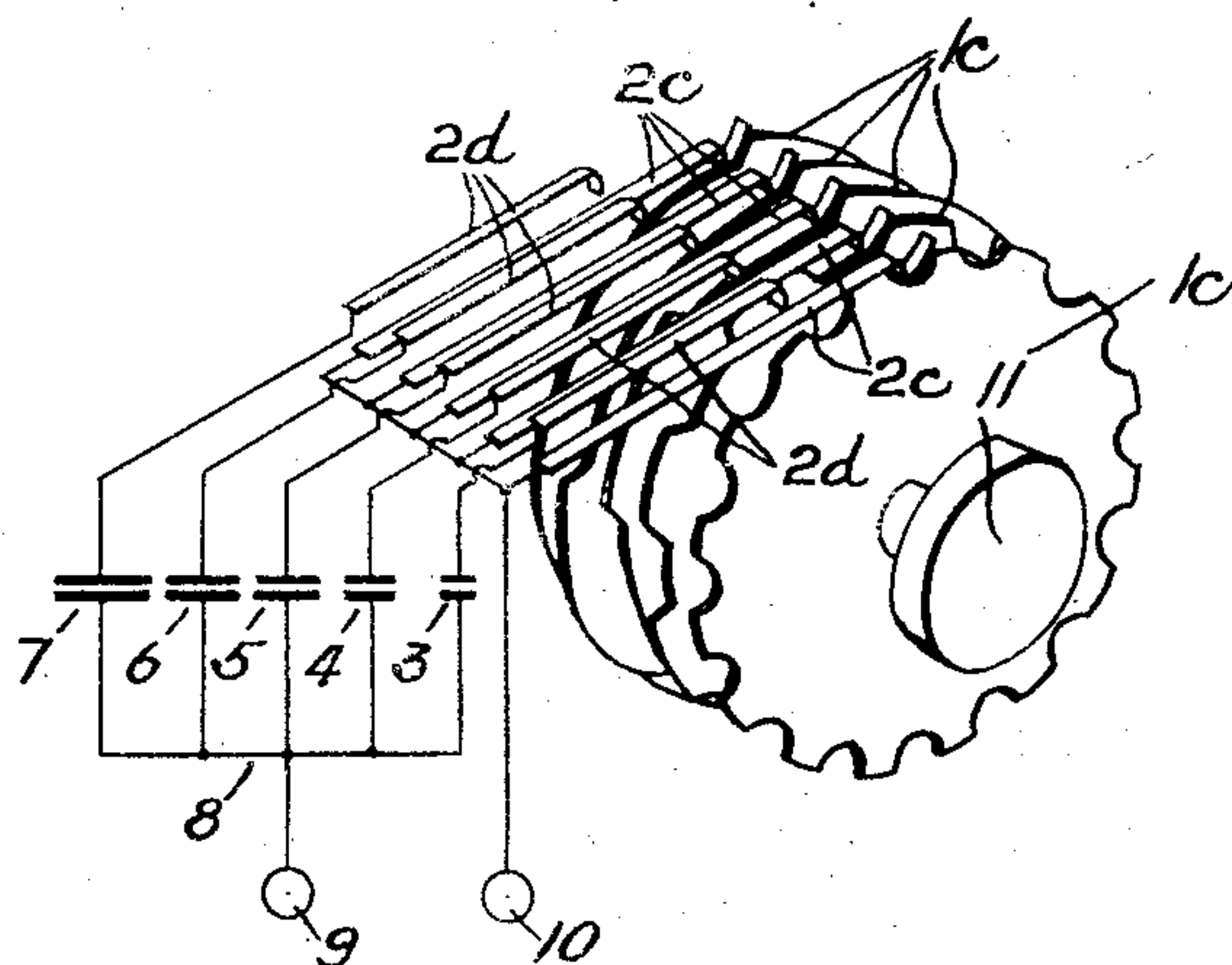


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ADJUSTABLE CONDENSER.

1,350,279.

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Application filed February 7, 1918. Serial No. 215,937.

To all whom it may concern:

Be it known that I, PAUL J. HOWE, a citizen of the United States of America, and resident of Ridgewood, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Adjustable Condensers, of which the following is a specification.

My invention relates to improvements in adjustable condensers, and comprises contact means in combination with condensers of progressively increasing capacity, whereby the several condensers may be placed in circuit singly, or in parallel in their various possible combinations of two, three, four, etc., and thereby a number of progressively changing capacity values may be obtained, very much greater in number than the number of individual condensers contained in the instrument, and with a total variation of capacity much greater than the range of capacity of the several condensers of the instrument, taken singly; and, furthermore, the various changes of capacity may be obtained by the operation of a single operating member (which usually is rotatable), instead of by operating a large number of contact pegs, as is usually the case.

The object of my invention is to simplify adjustable condensers, to permit the obtaining of a large number of condenser or capacity values by means of a relatively small number of condensers and by the operation of a single operating member, and in general to make the device simple, easy to operate, and relatively inexpensive.

I will now proceed to describe my invention with reference to the accompanying drawings, in which certain embodiments of my invention are illustrated, and will then point out the novel features in claims. In the said drawings:—

Figure 1 is a diagrammatic view illustrating the nature of the contact devices employed and the connections of the individual condensers of the instrument to the contact device.

Fig. 2 shows a perspective elevation of one of the contact devices which may be employed, and also shows the condensers of the instrument connected to the brushes of that contact device.

Fig. 3 is a view, similar to Fig. 2, showing an alternative form of contact device.

Fig. 4 is a view, similar to Fig. 2, showing a further alternative form of contact device.

Referring first to Fig. 1. Numerals 1 designate a number of toothed contact bars, and 2 designates a brush adapted to travel over the teeth of bars 1, and 3–7 inclusive designate condensers, of progressively increasing capacity, each connected on one side to one of the bars 1, and all connected in parallel to a bus-bar 8, itself connected to a binding post 9. The brush 2 is connected to a companion binding post, 10. The bars 1 are toothed in the well-known manner so as to provide, by contact of brush 2 with teeth of one, or more or all of said bars, simultaneously, all possible combinations of single or in parallel connections of the condensers 3–7 taken by twos, threes, fours, etc. to the binding posts.

One set of condensers which has been employed in the arrangement shown have capacity values of $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, 1, and 2 microfarads respectively. But sets of condensers having other rates of progression may be employed, and the rate of progression is not necessarily regular.

The bars 1, shown in Fig. 1, may be considered to be “developments” (using that term in its geometric sense) of the various toothed contact combination members of the contact devices shown in other figures of the drawings. Of course, a greater or less number of condensers, with a corresponding greater or less number of contact bars, toothed to correspond to the various possible or desirable combinations of the number of condensers used, may be employed.

In the alternative form of contact device shown in Fig. 2, there are a number of contact disks 1^a, toothed as are the bars 1 of Fig. 1, and a number of corresponding brushes, 2^a, each arranged to contact with the teeth of one of the disks 1^a, and each connected to a corresponding condenser. The disks may be rotated in unison by a head 11. In this Fig. 2 arrangement all of the disks are in electrical connection, and the several brushes 2^a are insulated from one another; an arrangement equivalent to dividing the brush 2 of Fig. 1 into sections insulated from one another and each connected to one of the condensers of that figure, and connecting all of the bars 1 of that

Fig. 1 together; an arrangement which would be the equivalent of, and the reverse of, that shown in Fig. 1.

In the arrangement shown in Fig. 3, there
5 are a number of open-center plates, 1^b ,
toothed internally, and insulated from one
another, and a corresponding number of
brushes, 2^b , mounted to be rotated together
by the head 11 (and which may also be re-
10 garded as parts of a single broad brush,
since they are all in electrical connection).
The teeth of the various plates are arranged
to present the various possible combinations.

In the arrangement shown in Fig. 4, a
15 plurality of toothed cams, 1^c , mounted to
be rotated together by the head 11, operate
according to combinations by twos, threes,
and fours, and the complete combination of
five, brushes 2^c , moving them into contact
20 with, or permitting them to drop away from
contact with, spring contact members 2^d .
From an operating point of view, the con-
tact device of Fig. 4 offers advantages over
those shown in Figs. 1, 2 and 3; but func-
25 tionally, all of the contact devices shown
are equivalents of one another.

What I claim is:—

1. The combination, with a series of five
condensers of progressively varying values,
30 of contact means and a single operating
member therefor, said contact means com-
prising means adapted, under control of
said operating member, to connect said con-
densers singly or in various combinations
35 in parallel of twos, threes, fours, etc., to
suitable terminals.

2. The combination, with a series of con-
densers of progressively varying values of
at least five in number, of a contact device
40 therefor comprising contact means, one for

each condenser, and other contact means ar-
ranged to make contact with said first-men-
tioned contact means in various combina-
tion of twos, threes, fours, etc., and a
single operating member. 45

3. The combination, with five condensers,
of values such that by taking them singly,
in order, or in various parallel combina-
tions by twos, threes, fours, etc., a regular
progression of capacity values may be ob- 50
tained, of suitable terminals and contact
means comprising a single operating mem-
ber together with contact members arranged
to connect said condensers to said terminals
in various parallel combinations by twos, 55
threes, fours, etc., as well as singly, to give
a regular progression of capacity values.

4. The combination, with four or more
condensers, of a contact device adapted to
connect said condensers, in parallel in vari- 60
ous combinations of twos, threes, fours, etc.,
and comprising a series of pairs of contact
members, one pair for each such condenser,
one of said contact members of each such
pair connected to the corresponding con- 65
denser, and a series of toothed cams, one
for each such pair of contact members and
arranged to cause the said contact members
of the corresponding pair to make or break
contact with each other, said cams arranged 70
to rotate together and toothed to connect
said condensers in parallel in various com-
binations, of twos, threes, fours, etc.

In testimony whereof I have signed this
specification in the presence of two subscrib- 75
ing witnesses.

PAUL J. HOWE.

Witnesses:

H. M. MARBLE,

ETHEL JOHNES.