

(No Model.)

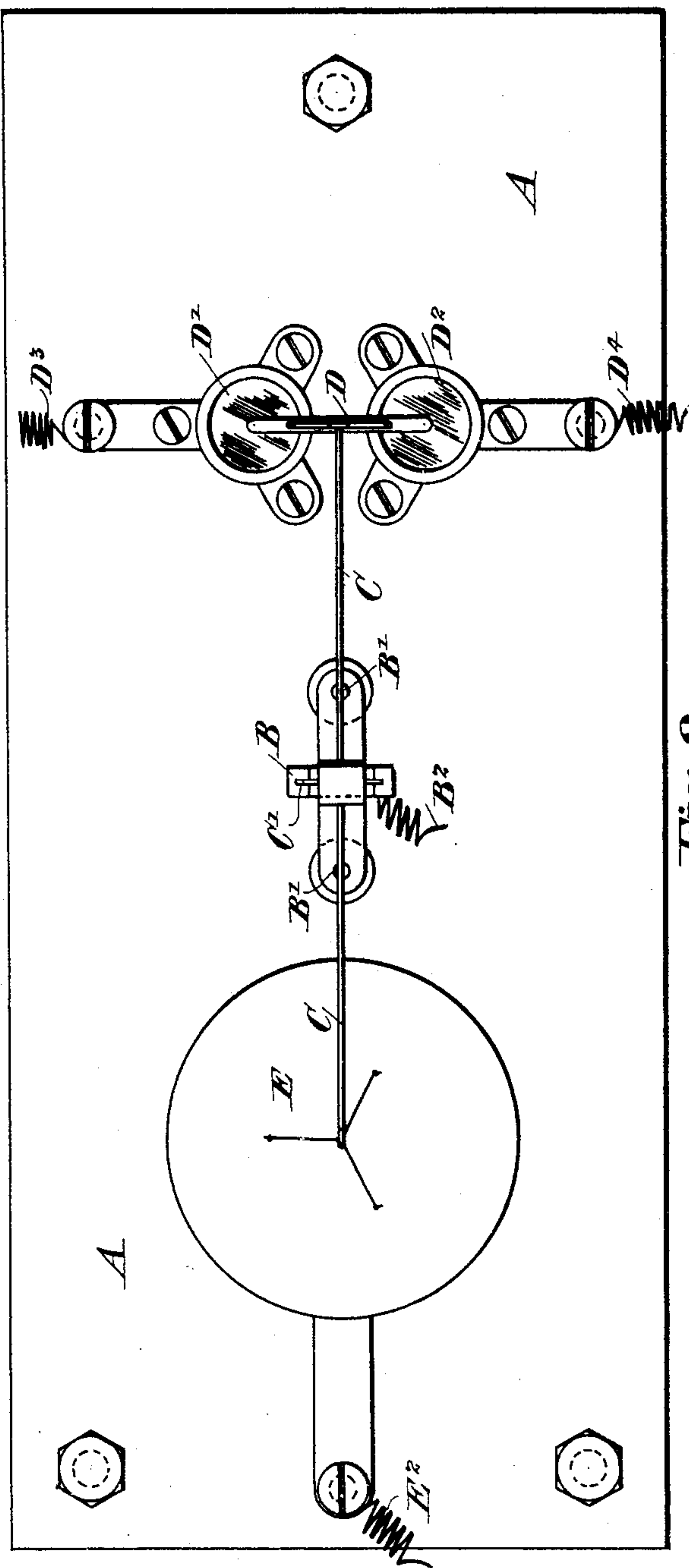
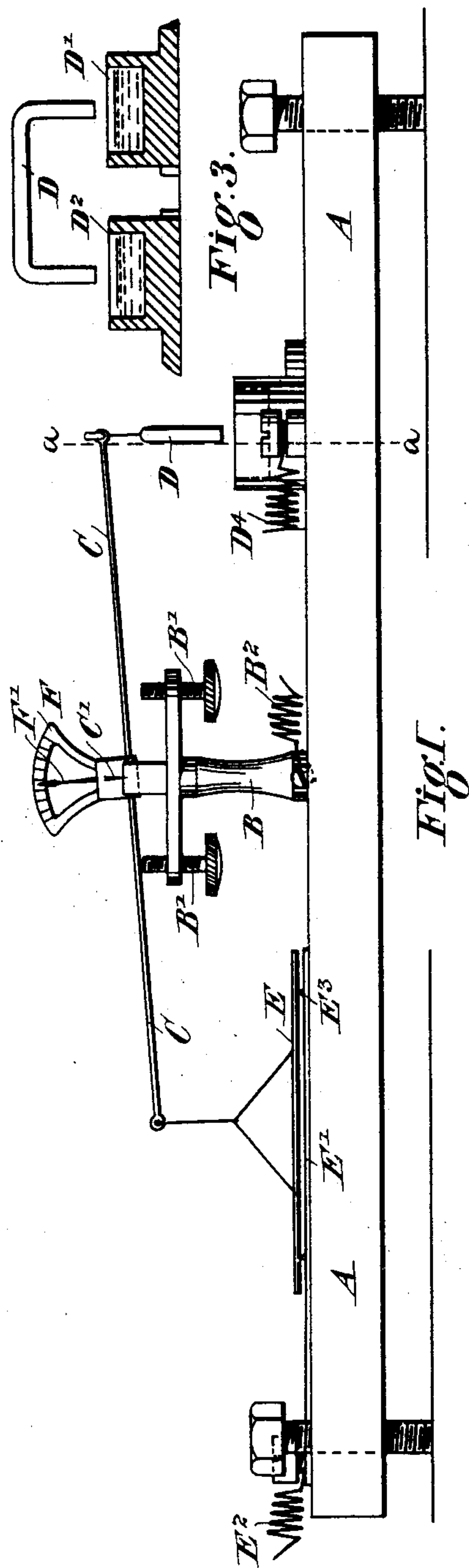
2 Sheets—Sheet 1.

A. U. ALCOCK.

ELECTROSTATIC SWITCH AND PHASE INDICATOR.

No. 482,032.

Patented Sept. 6, 1892.



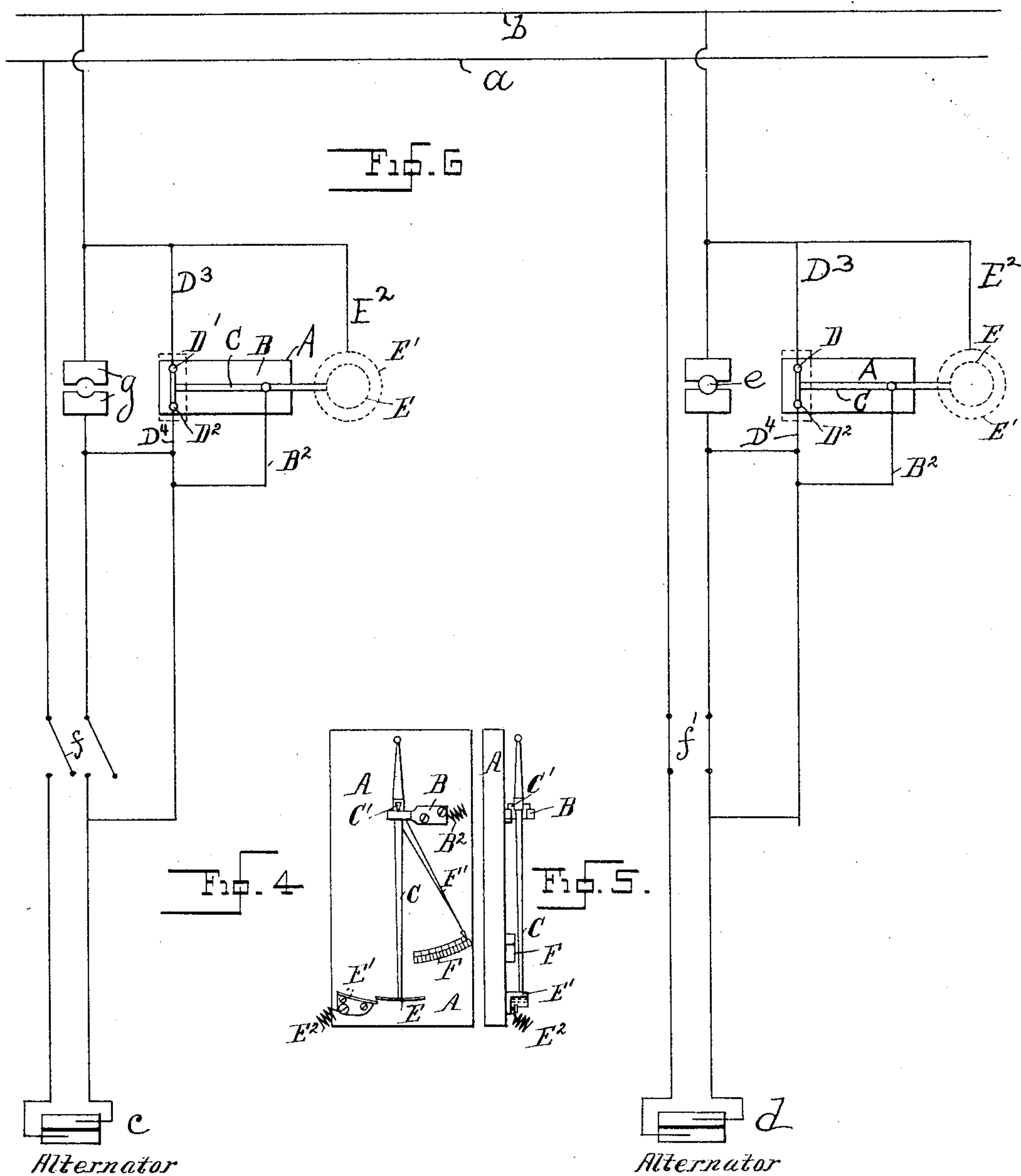
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2 Sheets—Sheet 2.

## ELECTROSTATIC SWITCH AND PHASE INDICATOR.

Patented Sept. 6, 1892.



Witnesses  
W. A. Courtland

Nellie L Pope

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ALFRED U. ALCOCK  
BY HIS ATTORNEY

Edward P. Thompson



# UNITED STATES PATENT OFFICE.

ALFRED UPTON ALCOCK, OF MELBOURNE, VICTORIA.

## ELECTROSTATIC SWITCH AND PHASE-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 482,032, dated September 6, 1892.

Application filed May 26, 1891. Serial No. 394,106. (No model.) Patented in Victoria April 15, 1891, No. 8,657.

*To all whom it may concern:*

Be it known that I, ALFRED UPTON ALCOCK, a subject of Her Majesty the Queen of the United Kingdom of Great Britain and Ireland, and a resident of 206 Russell Street, Melbourne, Victoria, Australia, have invented new and useful Improvements in an Electrostatic Switch and Phase-Indicator, (for which I have received a patent in Victoria, No. 8,657, dated April 15, 1891,) of which the following is a specification.

This invention has been designed, mainly, for automatically throwing alternators in parallel, while, also, it may be employed to indicate when the line-currents or machines are in phase. The construction of the instruments is based on the known law that when two electrically-charged bodies are of unlike sign they attract each other and when of like sign they repel each other. In order to explain clearly how I apply said law or principle in instruments for the before-stated purpose, I will describe my invention by reference to the attached sheet of drawings, in which—

Figure 1 is a side view, and Fig. 2 a plan, of an electrostatic switch and phase-indicator, Fig. 3 being a section at *a a*, Fig. 1. Fig. 4 shows a front view, and Fig. 5 a side view, of a pendulum phase-indicator. Fig. 6 is a view, partly in diagram, for use in showing the alternators and circuits employed in the practical operation of my invention. The alternators are indicated by the word "alternator."

In Figs. 1, 2, and 3, A is a horizontal base-plate of non-conducting material, having upon it a post B, supporting on its top the knife-edge bearings C' of a balance or rocking beam C, the travel of which may be adjusted by thumb-screws B'. Post B is coupled by line B<sup>2</sup> with the machine or alternator that is to be thrown in parallel. The beam C carries at one end by a non-conducting suspensory a copper or aluminum link D, arranged above two disconnected mercury-cups D' D<sup>2</sup>, the former being connected with the main line or circuit D<sup>3</sup> and the latter to the one pole or line D<sup>4</sup> of disconnected machine, such line having an interposed hand-switch.

At the other end of beam C is carried by conducting-suspensories an aluminum or other metallic disk E, arranged above a corresponding metallic disk E' upon base A and

connected to the alternator that is in circuit by line E<sup>2</sup>, the suspended disk E being in contact through beam C and post B with the machine that is to be thrown in. E<sup>3</sup> are distance-pieces to prevent metallic contact of disks. F is a dial attached to post B, and F' a finger attached to beam C to allow of its position being noted.

The operation and action of this instrument are as follows when it is desired to throw an alternator into a circuit being fed by other machines: Having brought the machine to a corresponding potential existing on the mains and thrown in an artificial load corresponding to the load it will take up on circuit, I now switch one pole direct onto one main and the other through electrostatic switch. The action of the switch will prevent the machine going into main circuit unless in phase with running machines, as it follows should the machine not be in phase then the disks of balance will be oppositely electrified, and hence attraction, which results in lifting the link on the other end of rocking arm out of mercury-cups and leaving the circuits open; but the moment the machines are synchronized the disks will be similarly charged and repel one another, resulting in the circuit being completed and throwing the machine onto main.

The instrument is shown and described as only applied to one pole, though I would preferably utilize it in practice for both poles of machine.

In Figs. 4 and 5, which show the alternative construction of the instrument when it is only required as a phase-indicator, parts corresponding with those hereinbefore described are marked by similar letters, C being a pendulum centered at C' upon a bracket B, secured upon a plate A of non-conducting material; E, disk at lower end of pendulum, and E' fixed plate or disk, while B<sup>2</sup> and E<sup>2</sup> are the lines from machines. F is a dial, and F' pointer or indicator attached to pendulum.

In Fig. 6 are shown two alternators and main-line conductors *a b*. The alternator *d* is included in circuit with the main line through the circuit-closers *f'* and plug *e*. Now let the circuit-closers *f'* be closed. Under the conditions already explained at length the charges on the plates E E' will cause the terminal D' D<sup>2</sup> to be closed in the manner ex-



plained. In order to insure better connection than can be done through the mercury, the plug, like *e*, may be inserted between the terminals *g*.

5 What I claim, and desire to secure by Letters Patent of the United States, is—

1. A system of electrical distribution consisting of the combination of electric alternators, circuit-closers therefor, and means for  
10 operating said circuit-closers, consisting of relatively-movable plates respectively charged by different alternators.

2. A system of electrical distribution consisting of the combination of two electric alternators, a main line in circuit with one of  
15 said alternators, circuit-closers in circuit with the other alternator, and means controlling said circuit-closers, consisting of relatively-movable plates of an electric condenser, which  
20 plates are respectively connected to the two alternators.

3. An electrostatic switch and phase-indicator constructed of the beam *C*, suitably supported and carrying at its one end the disk *E*  
25 and at its other end the link *D*, in combination with the disk *E'* and mercury-wells *D'* and *D''*, all arranged and connected substantially as described and illustrated.

4. A system of electrical distribution consisting of the combination of a circuit-closer, 30 alternators in circuit therewith, and means controlling the circuit-closer, consisting of electrically-charged bodies within inductive distance to one another.

5. An electrostatic switch consisting of the 35 combination of a circuit-closer, relatively-movable plates of a condenser controlling said circuit-closer, and an indicating device controlled by said plates or plate.

6. The combination, in an electrical system 40 of distribution, of main-line conductors, alternators in parallel circuit therewith, circuit-closers in circuit between the main-line conductors and the alternators, and relatively-movable plates charged by said alternators 45 and engaged to said circuit-closers.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 16th day of April, A. D. 1891.

ALFRED UPTON ALCOCK.

Witnesses:

BEDLINGTON BADGCOMBE,  
FRED CHAMBERLAIN.