

J. L. HALL.
ALARM DEVICE FOR GUN TURRETS.
APPLICATION FILED MAY 20, 1908.

913,493.

Patented Feb. 23, 1909.
2 SHEETS—SHEET 1.

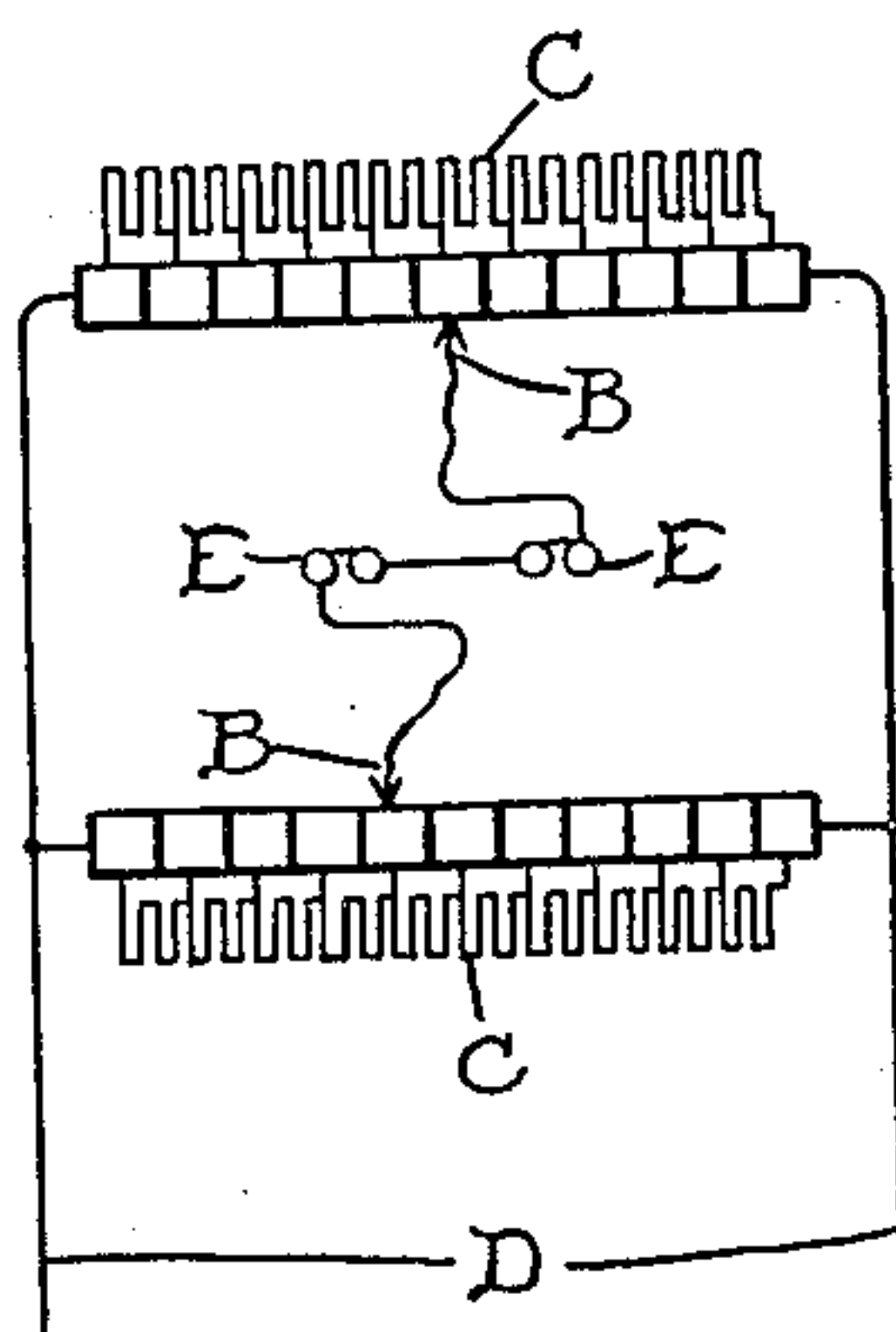
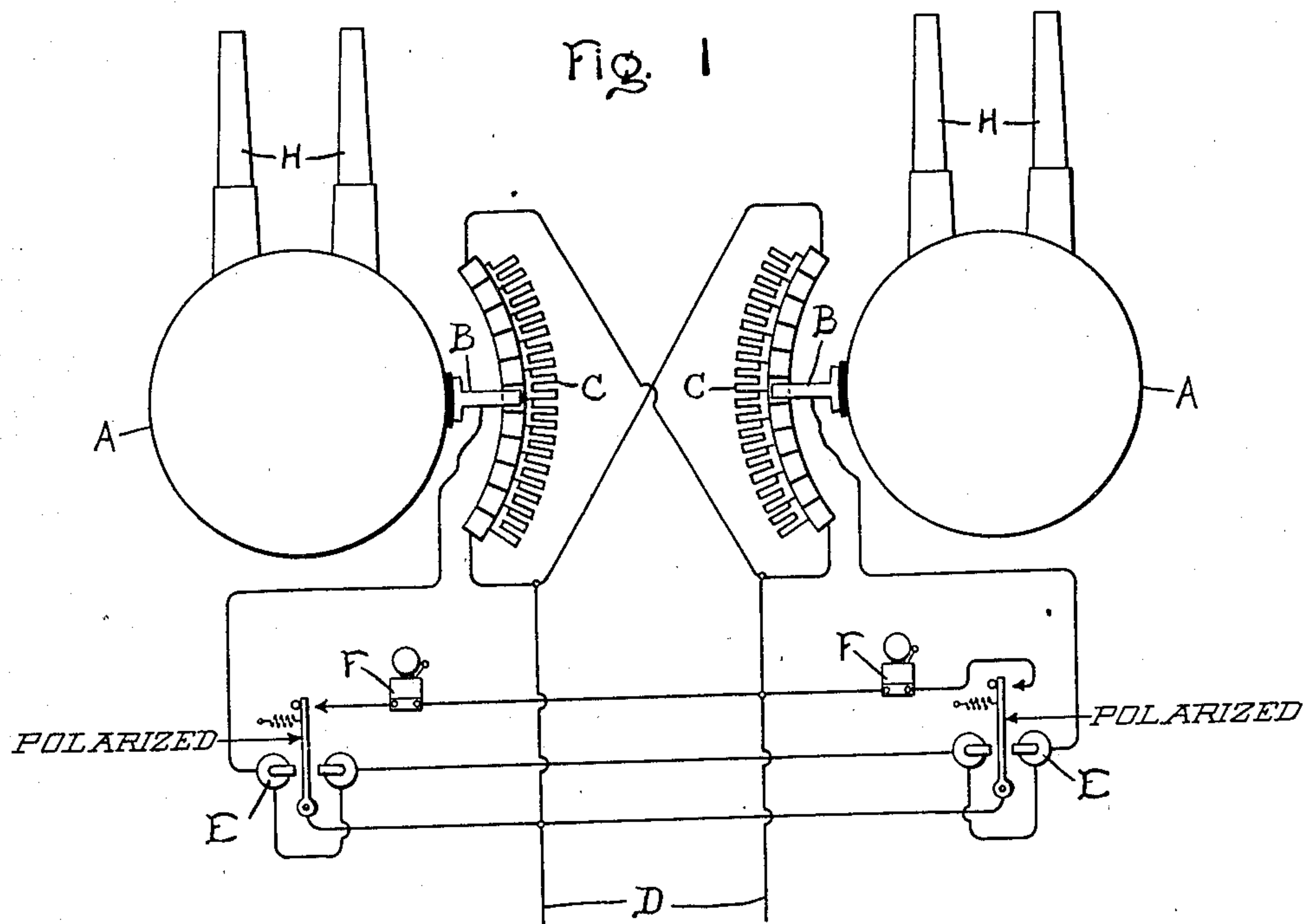


Fig. 2

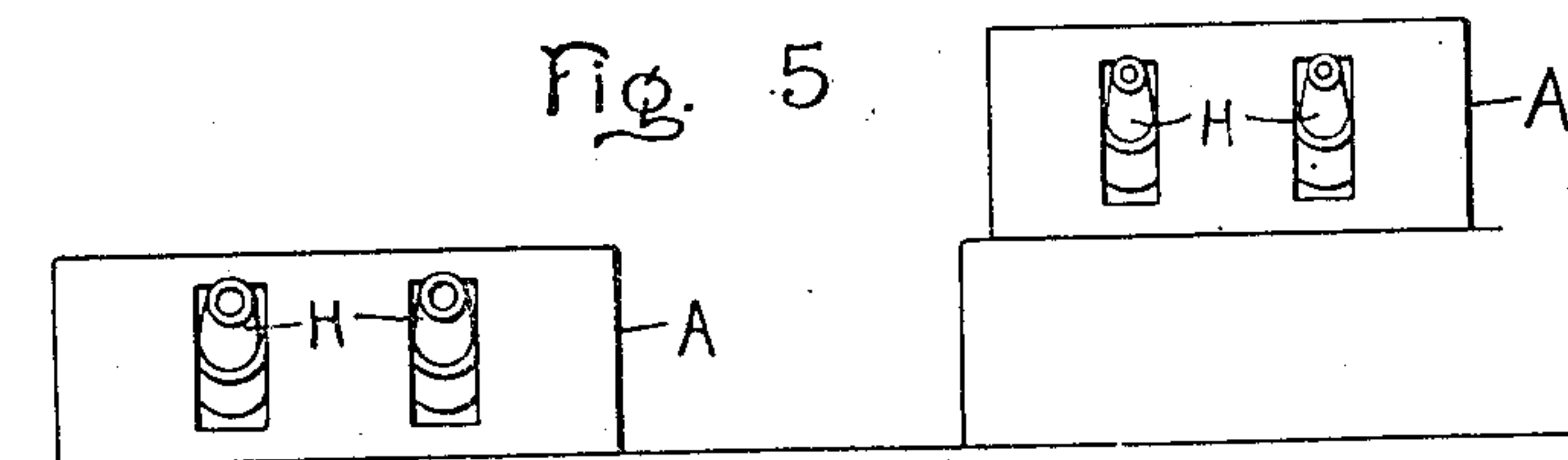
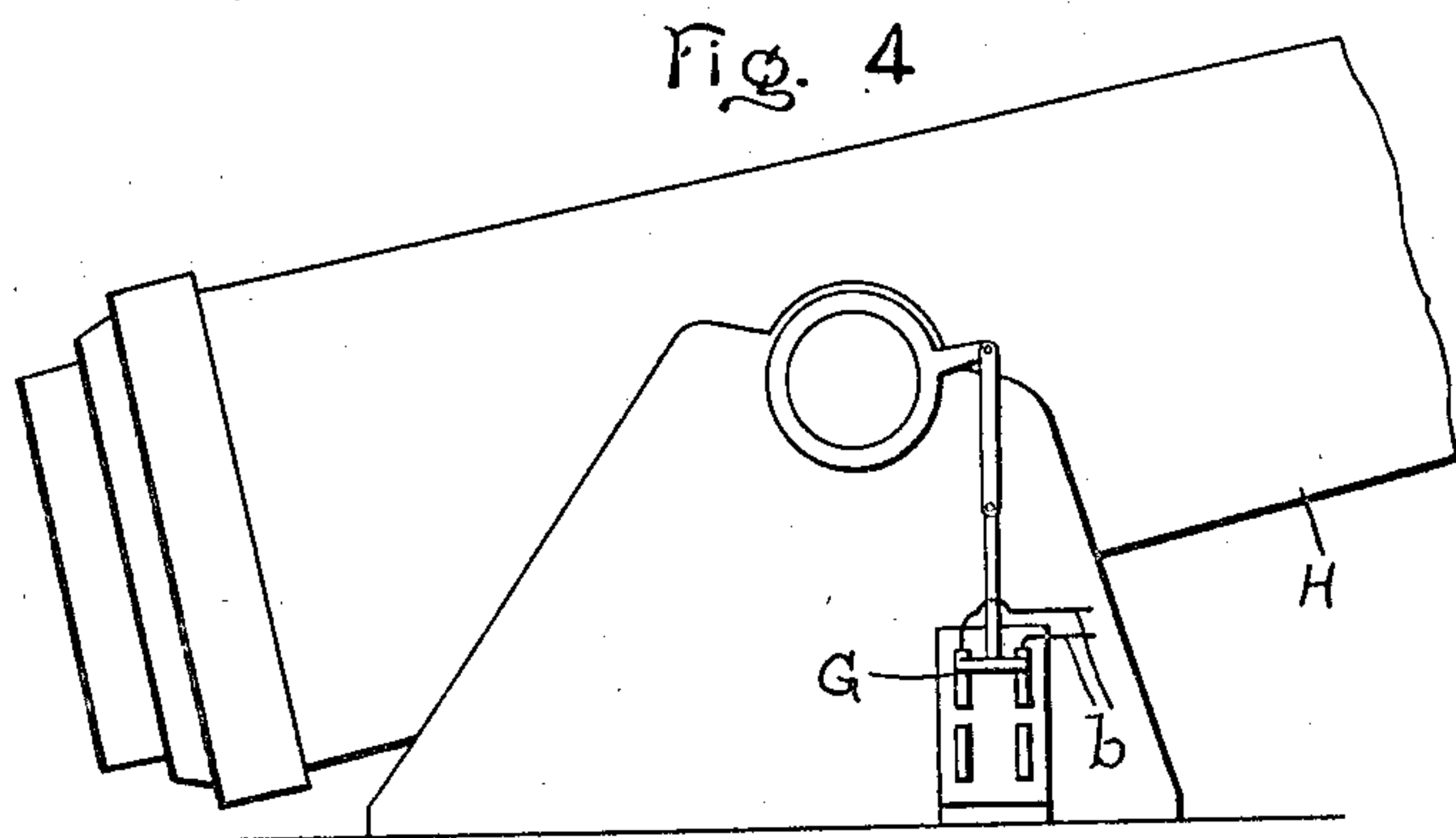
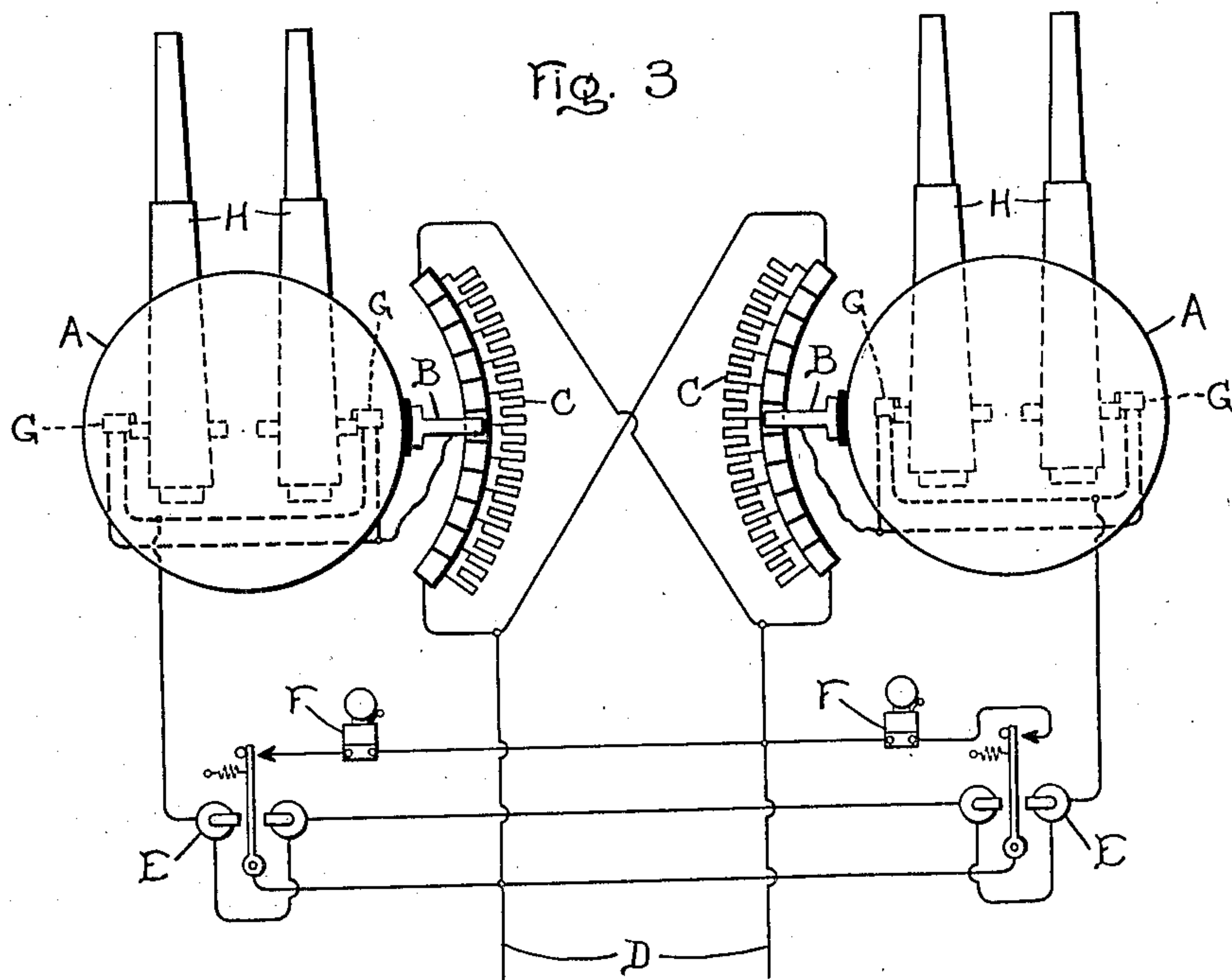
WITNESSES:
J. Earl Ryan,
J. Ellis Allen

INVENTOR
JOHN L. HALL.
BY *Albert S. Davis*
ATTY.

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UNITED STATES PATENT OFFICE.

JOHN L. HALL, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ALARM DEVICE FOR GUN-TURRETS.

No. 913,493.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed May 20, 1908. Serial No. 438,874.

To all whom it may concern:

Be it known that I, JOHN L. HALL, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Alarm Devices for Gun-Turrets, of which the following is a specification.

My invention relates to alarm devices for gun turrets and its object is to provide simple and reliable means for giving an alarm when two adjacent gun-turrets on a battleship are trained at such angles that the fire of one will affect the fire of the other. The limit for the permissible movement of the guns of one turret toward the other turret depends upon the direction in which that other turret is trained. The alarm should therefore be so arranged that it is controlled by the movements of both turrets, and is operated only when the turrets are moved into certain relative positions. By providing such an alarm, it makes it possible to control each turret freely at any time, throughout the range consistent with the position of the other turret at that time; while, if either turret is moved so that the fire from either may affect the other, the alarm is automatically given. To obtain in a simple manner the joint control by both turrets, I employ a connection, somewhat similar to that of a Wheatstone bridge.

My invention will best be understood by reference to the accompanying drawing, in which—

Figure 1 shows diagrammatically a pair of gun-turrets provided with an alarm device arranged in accordance with my invention; Fig. 2 is an explanatory diagram; Fig. 3 shows a modification adapted for turrets at different elevations; Fig. 4 is a diagrammatic view of contacts controlled by the gun elevations; Fig. 4 is a diagrammatic view of contacts controlled by the gun elevation; and Fig. 5 shows a pair of turrets at different elevations.

In Fig. 1, A A represent diagrammatically a pair of adjacent gun-turrets on a battleship. B B represent a pair of contact-brushes controlled by the movement of the two turrets, respectively. The operative connections between the turrets and these contacts may be arranged in any suitable manner. For the sake of simplicity, I have shown these contacts mounted directly on

the turrets themselves. C C represent a pair of resistances, each provided with a series of stationary contacts over which the brushes B B move. These resistances C C are connected in parallel to a supply-circuit D. The brushes B B are connected to each other through a circuit which includes the magnet windings of a pair of polarized relays E, the contacts of which control the circuits of signal lamps or the operating magnets of a pair of bells or other alarm devices F F, which are placed one in each turret. The guns are represented by H H.

With the turrets in the positions shown, the brushes B B contact with equipotential points on the two resistances, and no current flows through the magnet windings of relays E E. If, however, either turret is moved, the brushes B B will no longer bear on equipotential points of the resistances, and a current will flow through the circuit connecting them. This will best be understood by reference to Fig. 2, which shows a simplified diagram of the connections. It is seen from this diagram that the connections are in effect those of a Wheatstone bridge. If the brushes B are relatively displaced in one direction, a current flows through relays E E in one direction, while if the relative brush displacement is in the opposite direction, a current flows through the relays in the opposite direction. The connections of the relay are so made that if either turret is moved, so as to train its guns away from the other turret, the current that flows through the relays E E is in such a direction as merely to hold the armatures more firmly against their back-stops. If, however, the guns of either turret are moved toward the other turret, the current, which flows through the relays E E, will shift their armatures and actuate the alarm bells F F. The alarm bells will stop ringing either when the first turret is returned to its first position, or when the second turret is moved so as to train its guns farther away from the first turret. The described arrangement automatically extends the angle over which each turret may be moved, whenever the other turret is moved so as to render that extension of the angle of the first turret permissible.

In the drawings, I have shown the brushes B B so arranged that they lie on equipotential points on the two resistances when the guns on the two turrets are trained in parallel directions. Obviously, by adjusting the po-

sitions of the brushes B B, with respect to the positions of the turrets, the alarm device may be caused to operate when the lines of fire of the two turrets make any given angle.

5 In the case of turrets at different elevations, it is not necessary that the alarm device should be operative at all times. For instance, if a pair of turrets are arranged as in Fig. 5, it is obvious that the gun fire of the
10 two turrets can interfere only when the guns in the left-hand turret are trained above the horizontal plane, while the guns in the right-hand turret are trained below the horizontal plane, or at angles where the blast from the
15 guns of one turret would injure those on the other turret. Accordingly, for such an arrangement of turrets I prefer to modify the control of the alarm device, as shown in Fig. 3. In this figure, the circuit of contacts
20 B B is led through contacts G G controlled by the elevation of the guns. These contacts are so arranged as to open the circuit of contacts B B, and thereby to render the alarm devices inoperative whenever the elevation
25 of the guns is such that the fire from the two turrets can produce no interference. The arrangement of contacts G G is shown diagrammatically in Fig. 4, which shows the arrangement for the lower of two turrets. The
30 leads *b*, leading to contacts B B in Fig. 3, are connected to stationary contacts, which are arranged to be bridged when the gun H is elevated. When the gun is depressed, the circuit of leads *b* is open. This modification
35 automatically renders the alarm device inoperative, except when it is needed.

I do not desire to limit myself to the particular construction and arrangement of parts here shown, but aim in the appended
40 claims to cover all modifications which are within the scope of my invention.

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

1. In combination with a pair of gun-tur-
45 rets, a supply-circuit, a pair of resistances connected in parallel to said circuit, each provided with a series of contacts, a pair of contacts adapted for relative movement over said two series of contacts respectively, the
50 relative movements of the two contacts being controlled respectively by the movements of said turrets, a circuit connecting said movable contacts, an alarm device, and controlling means for said device included in the last-mentioned circuit.
55

2. In combination with a pair of gun-tur-
rets, a supply circuit, a pair of resistances connected in parallel to said circuit, each provided with a series of contacts, a pair of con-
60 tacts adapted for relative movement over said two series of contacts respectively, the relative movement of the contacts being controlled respectively by the movements of said turrets, a circuit connecting said movable contacts,

an alarm device, an operating magnet for 65 said device, and a polarized relay included in the last-mentioned circuit controlling said operating magnet.

3. In combination with a pair of gun-tur-
rets, a supply circuit, a pair of resistances 70 connected in parallel to said circuit, each provided with a series of contacts, a pair of movable contacts adapted to move over said two series of contacts respectively and controlled respectively by the movements of 75 said turrets, a circuit connecting said movable contacts, an alarm device, and controlling means for said device included in the last-mentioned circuit and responsive to a current therein in one direction only. 80

4. In combination with a pair of gun-tur-
rets, a supply circuit, a pair of resistances connected in parallel to said circuit, each provided with a series of contacts, a pair of 85 contacts adapted for relative movement over said two series of contacts respectively, the relative movement of the contacts being controlled respectively by the movements of said turrets, a circuit connecting said mov- 90 able contacts, an alarm device, controlling means for said device included in the last mentioned circuit, and means for rendering the alarm device inoperative in certain relative positions of the gun.

5. In combination with a pair of gun-tur- 95 rets, a supply circuit, a pair of resistances connected in parallel to said circuit, each provided with a series of contacts, a pair of contacts adapted for relative movement over said two series of contacts respectively, the 100 relative movement of the contacts being controlled respectively by the movements of said turrets, a circuit connecting said movable contacts, an alarm device, controlling means for said device included in the last- 105 mentioned circuit, and contacts controlled by the elevation of the guns controlling the alarm device.

6. In combination with a pair of gun-tur-
rets, a supply-circuit, a pair of resistances 110 connected in parallel to said circuit, each provided with a series of contacts, a pair of movable contacts adapted to move over said two series of contacts respectively and controlled respectively by the movements of 115 said turrets, a circuit connecting said movable contacts, an alarm device, controlling means for said device included in the last-mentioned circuit, and contacts controlled by the elevation of the guns included in said 120 last mentioned circuit.

In witness whereof, I have hereunto set my hand this 19 day of May, 1908.

JOHN L. HALL.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.