W. M. BRUCE, Jr.

HARMONIC BELL FOR TELEPHONES.

APPLICATION FILED SEPT. 11, 1907.

920,261.

Patented May 4, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

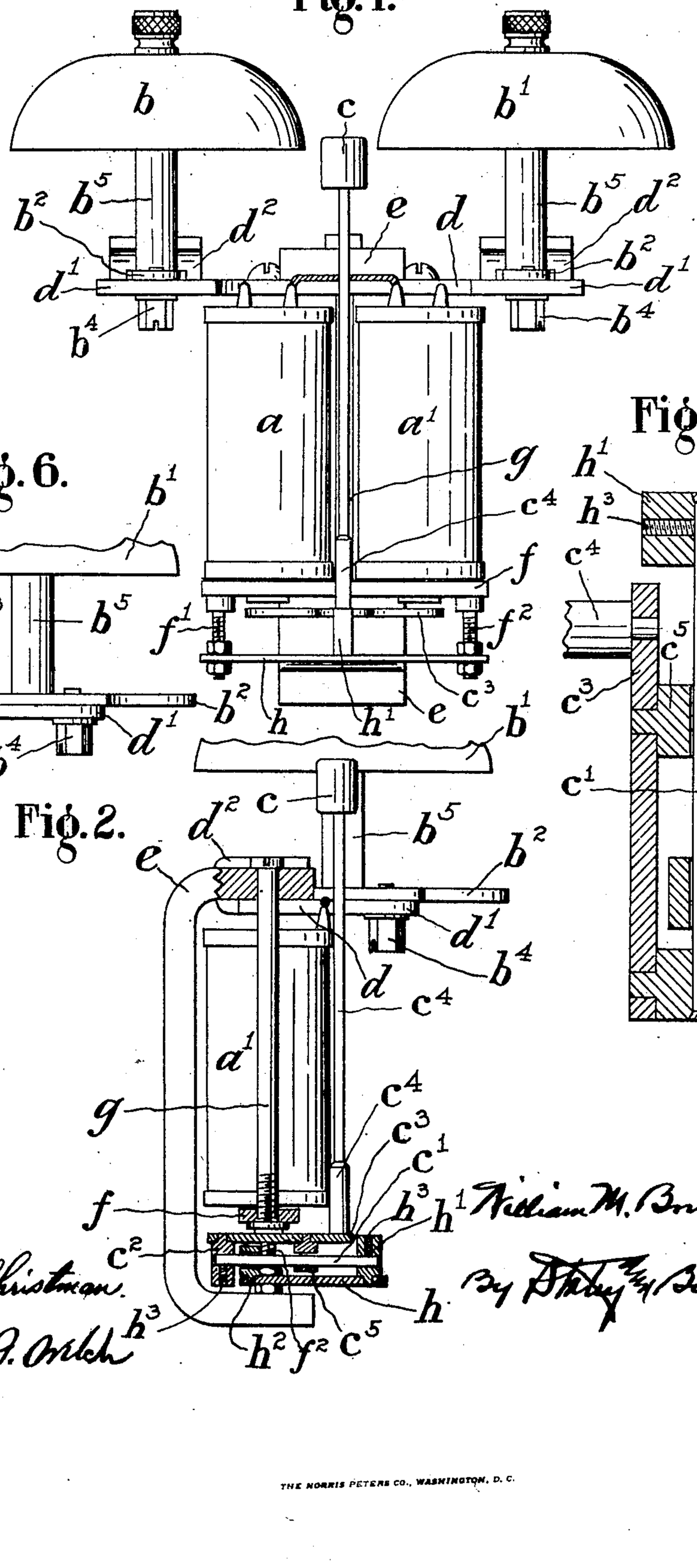

Fig. 6.

Fig. 2.

Fig. 5.

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2 SHEETS—SHEET 2.

Fig. 3.

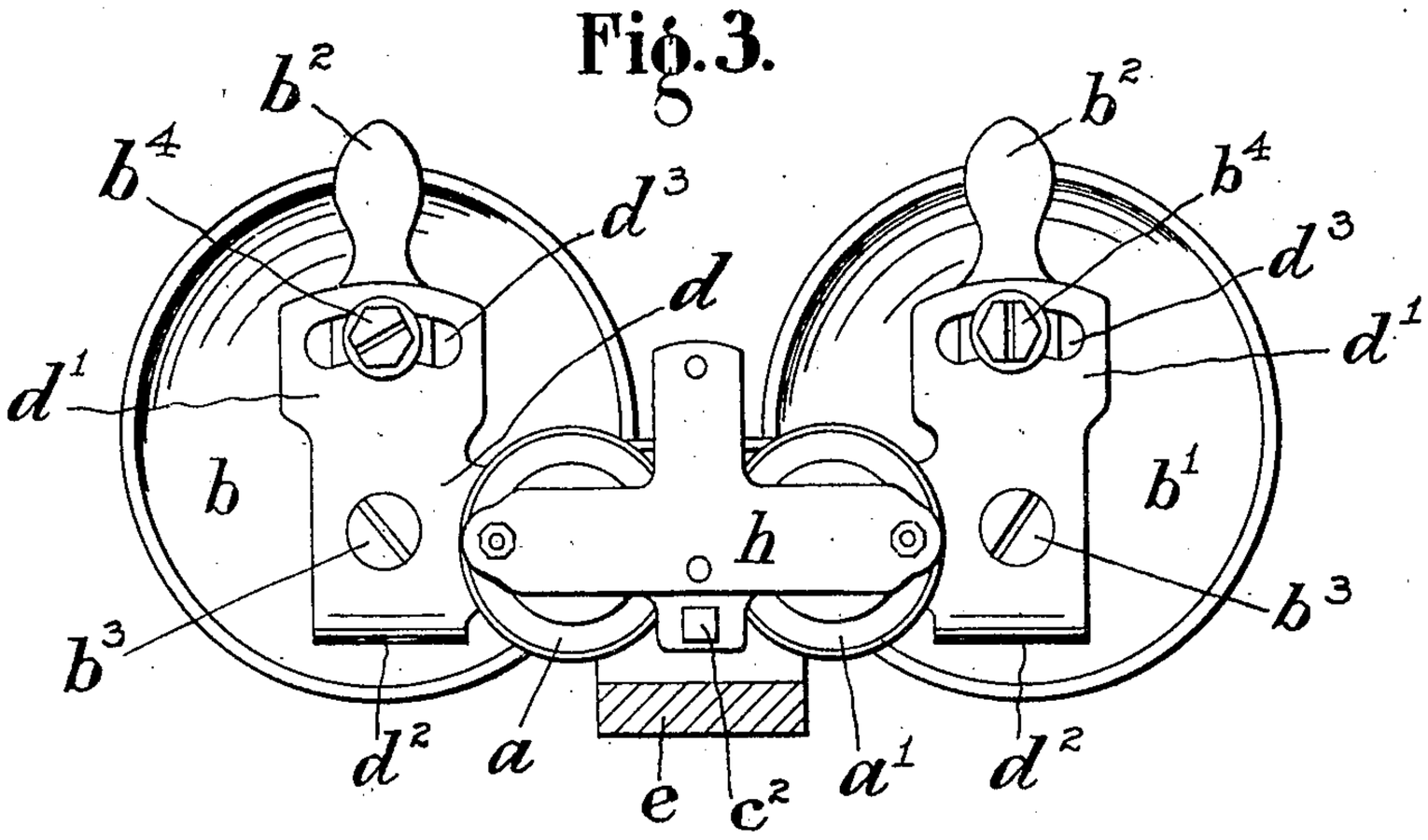
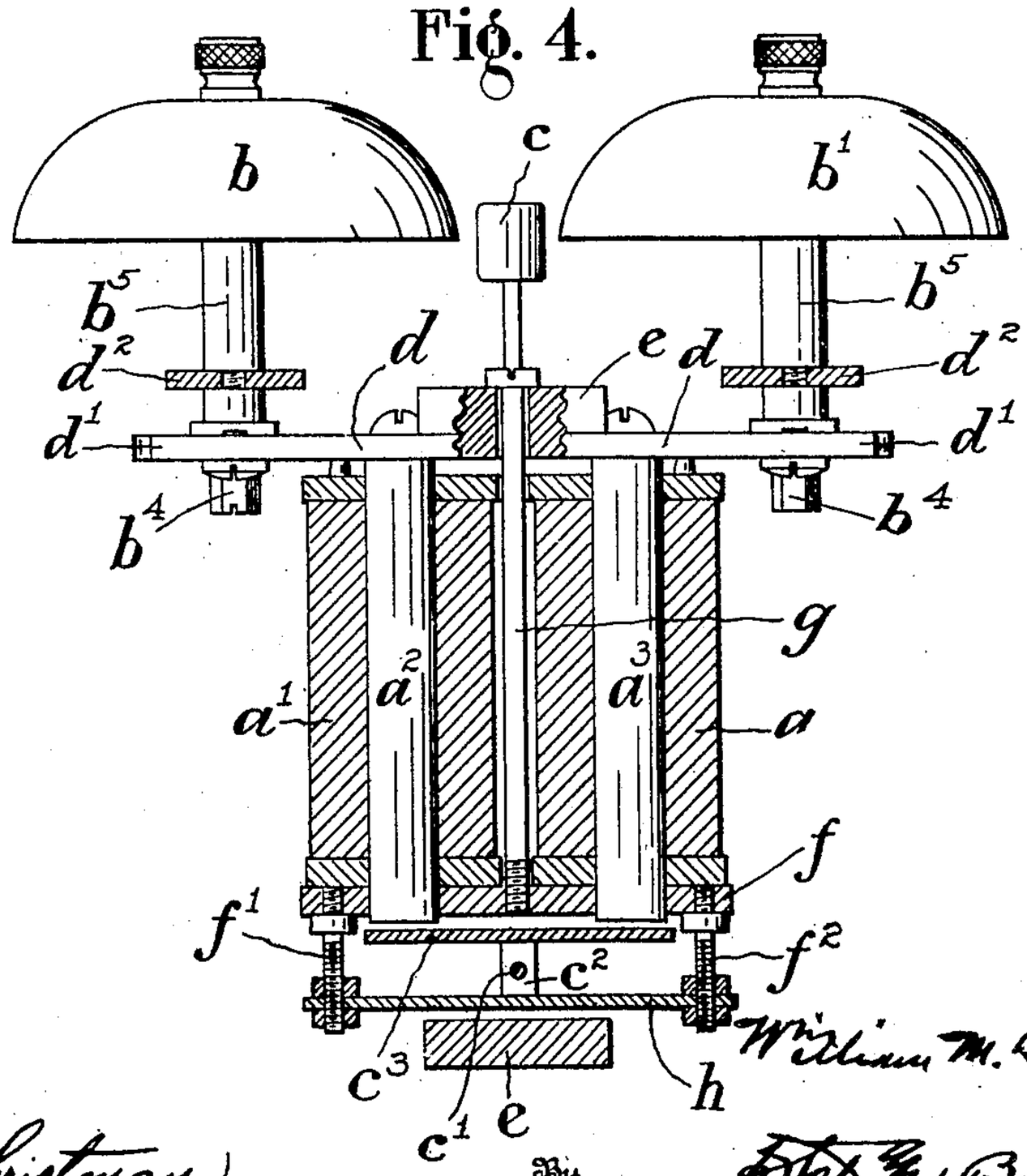


Fig. 4.



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UNITED STATES PATENT OFFICE.

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HARMONIC BELL FOR TELEPHONES.

No. 920,261. Specification of Letters Patent. Patented May 4, 1909.

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To all whom it may concern:

Be it known that I, WILLIAM M. BRUCE, Jr., a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Harmonic Bells for Telephones, of which the following is a specification.

My invention relates to improvements in call bells for telephones and especially bells that are known as harmonic bells those in which the vibrating mechanism is tuned or adjusted in unison with alternating currents of different rapidity or cycle.

In the accompanying drawings which form a part of this specification Figure 1 is a front elevation of a bell embodying my invention. Fig. 2 is a sectional elevation of the same the section being taken between the coils of the electro magnet. Fig. 3 is a bottom view of the same. Fig. 4 is a sectional elevation through the coils. Fig. 5 is a sectional view in detail of the clapper spring and vibrating mechanism. Fig. 6 is a detail view in side elevation of the bell supporting and adjusting device.

Like parts are referred to by similar characters of reference in the several views.

In said drawings, a and a^1, represent the coils of the usual electro magnet, b and b^1, represent the bells or gongs and, c, the clapper which is adapted to vibrate between these gongs.

E, is a permanent magnet which is magnetically connected to the pole pieces of the coils to effect their proper polarization to insure the vibration of the clapper by the current impulses passing through the coils.

All the parts of the bell are supported on a frame, d, which extends longitudinally across the tops of the magnet coils, a and a^1, and is formed at the front at each end with extensions, d^1, and at the rear with upturned portions, d^2, which are bent back upon themselves to form lugs or connecting portions by means of which the bell is screwed to the box or receptacle which contains the same. The cores, a^2 and a^3, of the coils, a and a^1, are connected directly to this frame piece, d, as is also the permanent magnet, e. The coils are supported at the lower end by a cross-bar, f, which is perforated to receive the ends of the cores, a^2 and a^3 and is also provided with a screw-threaded opening at the center to receive the end of a clamping screw, g, which passes down through the permanent magnet, e, the frame piece, d, and between the coils, a and a^1, and screws into the cross-bar, f, thus clamping these parts firmly into position. This cross-bar, f, carries the studs, f^1 and f^2, which are each screw-threaded and project downwardly and form hangers for the clapper and armature mechanism. This clapper and armature mechanism is constructed as follows:—A T-shaped piece, h, is perforated at the ends of the bar portion to receive the studs, f^1 and f^2, and formed on its upper side with two projecting studs, h^1 and h^2. These studs, h^1 and h^2, may be formed rigidly with this cross-bar made integral therewith or may be firmly and rigidly secured thereto. The stud, h^1, is permanently and rigidly attached to one end of the rod, c^1, formed of brass or of similar metal and passing through the stud, h^2, which is provided with an opening sufficiently large to permit this rod to pass through but to not commit it rigidly thereto. To the opposite end of this rod, c^1, there is secured by a permanent connection a lug or projection, c^2, formed on or attached to the armature piece, c^3, to which is also riveted the clapper stem, c^4, of the bell clapper, c. This armature piece, c^3, also carries a second lug or projection, c^5, which is pierced to receive the rod, c^1, which passes through the same. By this construction the clapper, c, and the armature are pivoted to the supporting plate, h, by means of the rod, c^1, and is permitted to vibrate by the torsional elasticity of said rod one end of said rod being rigidly attached to the armature plate and the other to the support. The intermediate lugs on the armature and the plate, h, being adapted to support the rod and allow it the necessary rotative movement to permit the clapper to vibrate between the gongs.

Means are provided for adjusting the gongs to and from the clapper, this consists preferably of a lever, b^2, pivoted at one end as shown at, b^3, and at the other provided with a clamping bolt, b^4, passing through a

slotted opening, d^3, in the frame piece, d. Each of these levers, b^2, carries a stud, b^5, which carries a bell gong. By loosening the clamping bolts, b^4, and moving the levers on the pivoted connections the bell gongs may be moved to or from each other or to or from the clapper.

I have shown the torsional rod, c^1, secured at its respective ends to the lugs, h^1 and c^2, of the supporting plate and the armature support by means of small set screws, h^3. These set screws are used really as temporary fastenings until the parts are adjusted in their proper positions after which the rod, c^1, is brazed or otherwise securely and integrally attached to its respective lugs so as to become in fact a part thereof. The ends of the rods being preferably riveted as shown in Fig. 5 as well as brazed, sweated or otherwise permanently attached to said rods.

By the construction thus described it will be seen that I have formed a harmonic bell that is both simple in its construction and easy of manufacture. The importance, however, of the method of securing the clapper and armature and its support is much greater than the simple ease of manufacture as I have found in practice that, by the use of this particular construction of employing a torsional rod of brass or similar metal permanently secured at one end to the supporting plate and at the other to the armature and clapper carrying plate so that this rod furnishes both the support and the spring for said clapper, that I am enabled to assemble these bells and coils so as to operate on the particular cycle for which they are intended without the necessity of tuning or selecting the bell clapper to its particular magnet. By this particular construction I make the clapper rod and clappers in suitable sizes for the respective number of cycles to which the bell is to be tuned and I am enabled to assemble these bells and have them work perfectly on the different cycles without the necessity of selecting the clapper except as to the particular sizes adapted to the particular cycles. I have usually made these bells tuned to four different cycles and I make the clappers of four different sizes. The peculiar method of attaching and supporting the armature and the bell clapper mechanism is such that the vibration necessary to respond to the particular alternating current cycle to which it is tuned is secured by taking any one of a given number of clappers of the size adapted for the cycle. This has proved to be a decided advantage over bells heretofore used where it has been necessary to select and tune each clapper for the particular magnet of the cycle for which it is intended.

By my construction I can make the clappers in quantities and each clapper of the particular size will when assembled work perfectly in its bell without the necessity of selecting the weights or otherwise adjusting the same.

It should be noted that the screw-threaded studs, f^1 and f^2, are each provided with nuts adapted to rest on opposite sides of the lower supporting plates and by means of which the side supporting plate is clamped in its position and by which it can be readily adjusted to secure the proper adjustment of the armature and clapper mechanism. By moving the plate to or from the coils the air gap between the armature and the coils is adjusted as desired and by reason of the rigid attachment at the one end of the torsional rod to this plate the same means also provides means for properly adjusting the clapper in its relative position with the gongs.

Having thus described my invention, I claim:—

1. In a harmonic bell and in connection with the bell gongs and the magnets thereof, a clapper, an armature plate, and a supporting plate, a torsional rod connected at one end to the armature plate and at the other to the supporting plate forming the sole connection between the two and serving both as a pivot and spring for the clapper, as specified.

2. In a harmonic bell, the coils and armature, adjustable bell gongs and a clapper, means for supporting said clapper, which means embodies a torsional rod connected at one end to said armature and at the other to a normally stationary support so as to form the sole supporting connections for the clapper, as and for the purpose specified.

3. In a harmonic bell, clapper mechanism consisting of a supporting plate and an armature plate, two or more lugs on each of said plates and a torsional rod forming the sole connection between said plates, said rod passing through said lugs and being permanently connected at one end to one of said lugs on the supporting plate and at the other end to one of the lugs on the armature plate, substantially as specified.

4. In a polarized bell, a supporting plate and an armature plate, two or more lugs on each of said plates, a torsional rod forming the sole connection between said plates, said rod passing loosely through one of said lugs on each of said plates and permanently connected at one end to one of the lugs on the supporting plate, and at the other end to one of the lugs on the armature plate, and a clapper connected permanently to said armature plate, as and for the purpose specified.

5. The combination in a bell such as described of a frame, adjustable bell standards on said frame, a permanent magnet connected to said frame, coils secured to said frame by a central screw which passes down-

wardly between said coils, an adjustable supporting plate below said coils having lugs thereon, an armature plate supported by said supporting plate, and a clapper on said armature plate, a torsional rod forming the sole connection between said armature plate and supporting plate, said torsional rod being connected at one end to said supporting plate and at one end to said armature plate, as and for the purpose specified.

In testimony whereof, I have hereunto set my hand this 3rd day of September, 1907.

WILLIAM M. BRUCE, JR.

Witnesses:

CHAS. I. WELCH,

MARY WALL.