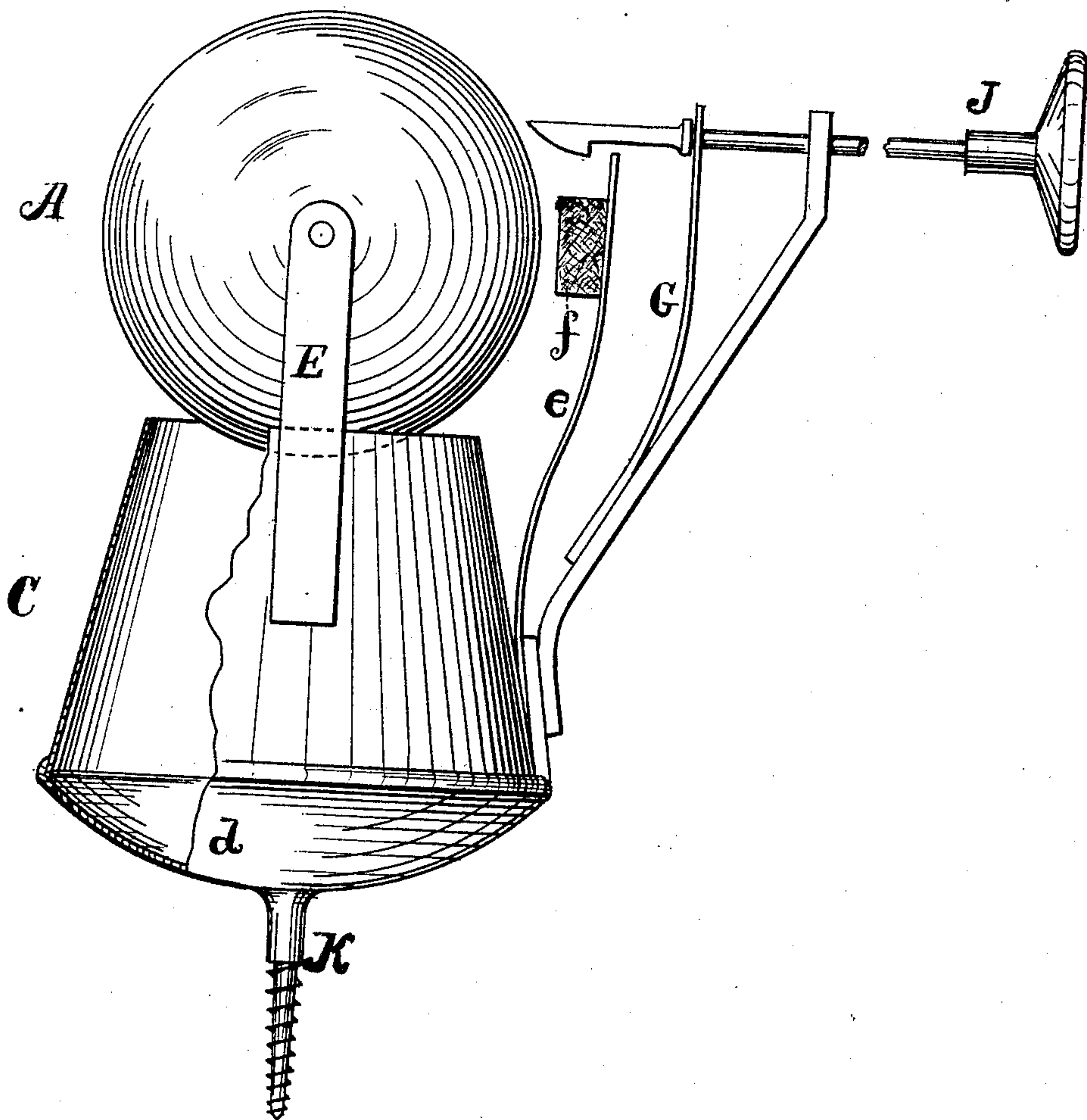


F. M. HILL & F. L. WING.
BELLS.

No. 175,605.

Patented April 4, 1876.

Fig. 1.



Witnesses:
Henry C. King
O. C. Isbell

Inventors:
Frederick M. Hill
F. L. Wing

UNITED STATES PATENT OFFICE.

FREDERICK M. HILL AND FRANK L. WING, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN BELLS.

Specification forming part of Letters Patent No. **175,605**, dated April 4, 1876; application filed November 4, 1875.

To all whom it may concern:

Be it known that we, FREDERICK M. HILL and FRANK L. WING, of Brooklyn, New York, have invented an Improvement in Bells and Gongs, of which the following is a specification:

The following is a description of our newly-invented bells and gongs, and the manner of making and using the same. It will enable any person skilled in the art to manufacture and use them, when aided by the drawings hereto annexed.

Our invention relates to all kinds of bells and gongs.

The improvement consists in obtaining purer tones, which are also of very long duration, and also easily aroused. We also obtain a great variety of pitches—that is, an extensive scale of tones—from which single bells may be selected for all useful purposes.

We make our improved bells and gongs by taking either an ordinary bell or gong, or a thin metal curvature of similar shape, in which latter case the tone given is inferior by itself. We combine such a vibrator with a “resonator” in tune with it; the latter sympathetically responds, and there is heard a combination tone, in part like a bell, but voice-like, and superior to the clang of a bell, the initial tone from the vibrator being purified, and also increased, by the vibrating air-column in the cavity or resonator. This improvement, therefore, relates to the great defect of all bells and gongs—to wit, their harsh clangs, consisting of harsh high overtones, which predominate over the pure fundamental tone. These are so difficult to obtain in the registers below concert “C” that large masses of metal will only produce them for practical use. By our improvement, on the contrary, we are able to get a compass of from six to seven octaves of tones by using metal of the thickness of rolled brass as kept in stock by the manufacturers.

As to the shapes of the vibrators, they may be of either of the ordinary varieties. We prefer a part of a hollow sphere, which gives vibrations which last for a longer time than usual.

In Figure I, A shows a vibrator, attached by an arm, E, to the air-holder or resonator C. This may be of any material or shape, provided it responds to the tones given by A.

The shape shown in the drawing, besides being a resonator, acts as a condenser and reflector of the sound, and is caused by the construction of the bottom of the vessel, which acts as a concave reflector, and is marked *d*. We have determined what capacity of air-holder is required to respond to any given tone by experiment. These air-holders or resonators depend upon the law of the sympathetic resonance of columns of air, and so may be of any convenient material or form.

The drawing shows one of our improved bells and striking attachments. *e* is a heavy spring, carrying a striker or hammer, *f*. More musical tones are given when this hammer is clothed with felt or otherwise softened. *G* is a second spring, which carries back, when moved by the pull *J*, the small spring *e*, which at a certain point flies back and strikes *A*. Other varieties of spring apparatus may be used, if desired. *K* is a screw firmly attached to the air-holder, as shown. By means of this the entire mechanism may be readily fastened in any place required. *E* is a shaft firmly attached to the air-holder. This shaft has a small arm, which passes through the center of the vibrator *A*, and holds the latter in its position over the cavity *C*.

The mechanisms for actuating the tones must of course be modified to suit each of the uses to which bells are put. The fastenings between the air-holders and vibrators will also require modification to accommodate the size and weight of church and other large bells, as thin castings or stamped forms may be employed for this purpose.

We claim as our invention—

1. The combination of either a bell or gong, or similarly-shaped curvature, with an air-chamber which will respond to the vibrations of the bell, gong, or curvature, substantially as described.

2. A striker, *f*, in combination with a vessel or tube and a vibrating curvature, substantially as described, and for the purposes above set forth.

FREDERICK M. HILL. [L. S.]
FRANK L. WING. [L. S.]

Witnesses:

O. C. ISBELL,
C. H. WING.