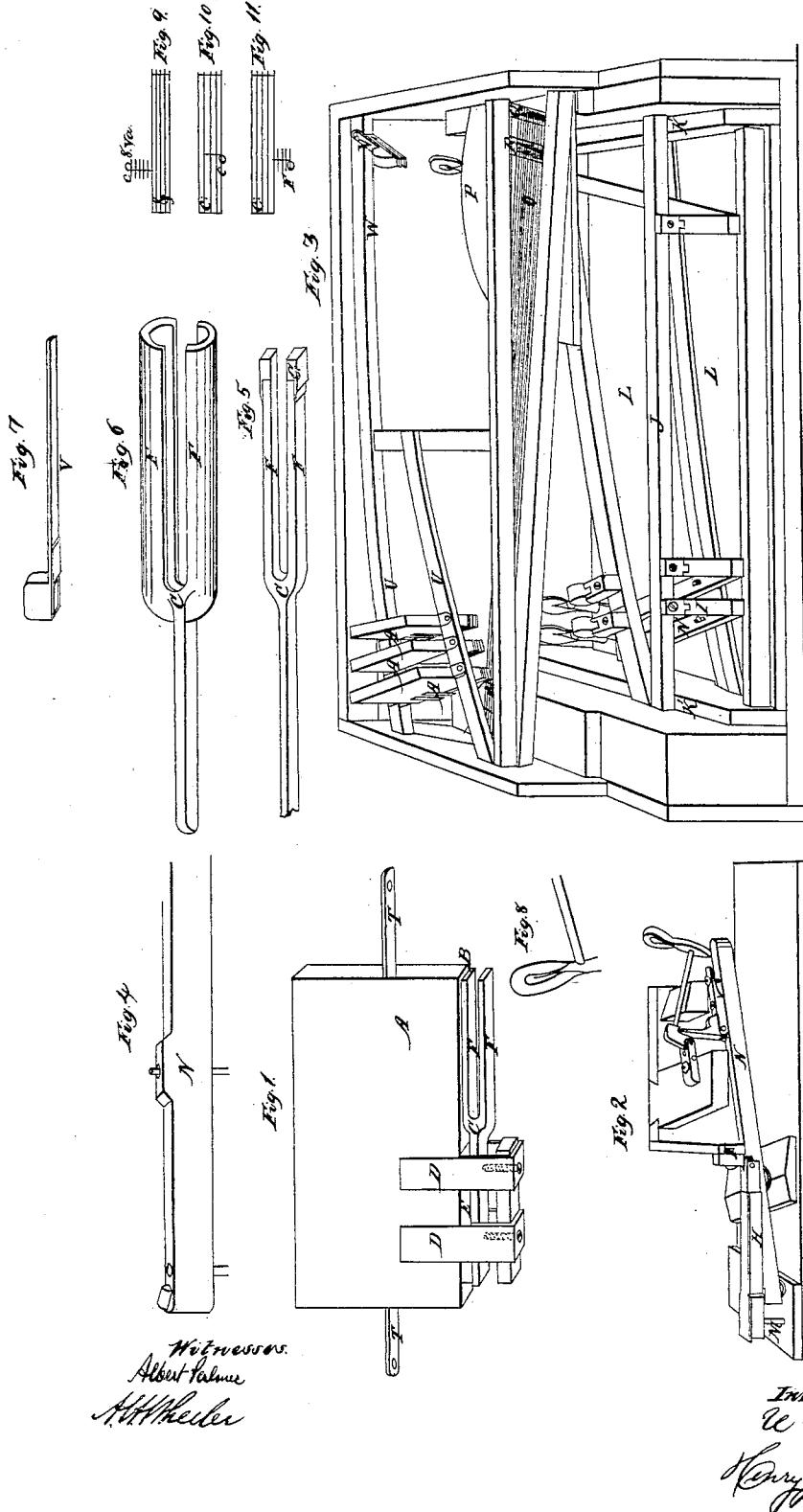


U. C. HILL & H. J. NEWTON.  
MUSICAL INSTRUMENT.

No. 27,288.

Patented Feb. 28, 1860.



# UNITED STATES PATENT OFFICE.

U. C. HILL, OF JERSEY CITY, NEW JERSEY, AND HENRY J. NEWTON, OF NEW YORK, N. Y.

## MUSICAL INSTRUMENT.

Specification of Letters Patent No. 27,288, dated February 28, 1860.

*To all whom it may concern:*

Be it known that we, URELI C. HILL, of Jersey City, in Hudson county and the State of New Jersey, and HENRY J. NEWTON, of New York, in the county and State of New York, have invented, made, and applied to use certain new and useful Improvements in and Pertaining to Instruments of Music (called and named in Letters Patent issued by the United States of America, dated June 19, 1847, and numbered 5,164, the "hillino," a patent for improvements in the same having been issued February 9, 1858, numbered 19,296;) and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon, in which—

Figure I, a view of one of a series of cellos employed, showing the cast metallic fork attached thereto; Fig. II, a view of the hammer for striking the forks and strings employed, and the means of operating the same; Fig. III, a view of interior of the instrument of music as made by us, showing the position and mode of placing the cells with cast metallic forks attached, hammers for operating forks and strings, sounding-board, and interior framework; Fig. IV, a view of the under-key operated by the over-key, and by the action of which, the hammers, striking the forks and strings, are operated. Fig. V, a view of one of a series of cast metallic forks used and which are attached to the cells, as shown in Fig. I. In this drawing (Fig. V) the extension formed by soldering or riveting soft metal upon the ends of the fork prongs, is shown. Fig. VI, a view, showing the peculiar form of cast metallic fork employed, namely, cylindrical; Fig. VII, a view of one of a series of smaller cells employed, and placed in that portion of the instrument beyond the sounding board. Fig. VIII, a view of one of the hammers, employed for striking the strings or cast metallic forks attached to the cells; Fig. IX, the highest note in the scale formed by the cells; Fig. X, the note made by the lowest cell; Fig. XI, the lowest note in the bass.

The nature of the improvements as made by us, consists, first, in the employment of forks, cast from composition metal, instead of forged forks, which have previously been

used; second, the use of strings and a sounding board, for a few of the lower notes of the instrument; third, the new method, for extending or opening the distance between the hammer-strokes of the piano-forte action employed in this instrument, by means of an over and under key; fourth, the employment of metallic forks of a cylindrical form; fifth, making the width of the metallic fork used, correspond with the width of the cell, to which it is attached, for the purpose of putting the cells into fuller and stronger vibration; sixth, in the mode we employ for facilitating the tuning of the cast metallic fork, namely by extending the prongs of the same, by soldering or riveting soft metal thereto.

*Of the cells.*—A cell (A) is a box of two sides and four edges; on one edge of which is the mouth or opening (B) over which the cast metallic fork (C) is placed and held in position by screws, passing through two strips of metal (D, D) [soldered to the cell A,] on to leather or rubber cloth, and screwing into a piece of wood over the fork handle (E).

*Of the forks.*—The forks or tuning-forks, as heretofore used in the construction of this instrument, have been forged from fine cast steel, and finished up by filing, grinding and polishing. We, now for the first time, have adopted the plan of casting them of composition metal.

*Of the metal.*—A composition metal, namely, one part of tin and four of copper we have found a good proportion for the purpose—for small forks, about one part of tin and three of copper. The advantages attending the use of cast metallic forks, may be enumerated as follows: 1. Facility and economy of making a large number of any desired pattern. 2. Quality of tone, freedom from rust, and the facility for soldering to the prongs of the same, the soft metal.

We, also make the forks of an entirely new form, namely, cylindrical, which appears to produce a more penetrating and brilliant tone and which, (were the forks forged from steel) would prove too expensive. For the purpose of agitating the air in the cell (A), we make the forks (C) of the same width as the cell (A), whether the fork (C) be flat or cylindrical. The prongs of the fork (F, F) are made of uniform thickness, namely, if the prongs be flat (as

shown in Fig. V) let the thickest side of the prong not exceed one-eighth of an inch in thickness, as in casting, one side must be a little thicker than the other. For the prongs 5 of the cylindrical forks, let them be of uniform thickness throughout the whole scale. This remark will also apply to forks cast flat. The cylindrical forks may be cast considerably thinner, provided they vary in 10 width according to the cells to which they are attached and in length in proportion to the gravity or acuteness of sound. The forks should be cast so smooth that no filing will be required and it will be only necessary to cut or saw them off the required 15 length. For smoothness, let them be cast in iron chills.

*Facility in tuning.*—We fasten by soldering or riveting, upon the extreme ends of the prongs (F, F) of the fork (C) soft metal (G), which when soldered or riveted forms (as it were) an extension of the prong (F). We find lead excellent for this purpose. In order that the fork may be readily 20 tuned, it will be necessary to make the fork (C) somewhat lower in pitch than required—then with a sharp tool or knife, trim off the soft metal (G) riveted to the prongs (F) until you arrive at the exact 25 pitch desired. This extension of the prongs (F, F) with soft metal (G) may be made wider and thicker than the prongs (F, F), if the cell (A) will permit and if thought necessary to cover the mouth (B) of the 30 cell (A) and to assist in the greater strength of the vibrations and tone.

*Of the over and under keys.*—To obtain the necessary room, for placing in a moderately curved line, the sixty-six cells employed, (particularly the twenty lower ones) 40 we extend the action, by a combination of two keys, so as to open the keys on their back ends. The short over key (H) is fastened by a butt (I) to a strip of wood (J) 45 extending from right to left and fastened by the cheeks (K, K) of the key-frame (L). The piece (J) on which the butt (I) is fastened is about one inch back of the name-board, as in piano-fortes, so that the name-board (unshown) will prevent the key (H) 50 from being raised up too high. This short over key (H) has a pin (M) under its front end to keep it steady. The under key (N) is put in motion, by pressing the finger on 55 the short over-key (H) which rests on the long under key (N) by the combination of which, the same function is performed as by using a single key in a piano-forte.

*General construction.*—For the sake of 60 constructing an instrument of less weight, smaller in size and cheaper, we propose combining a series of fourteen strings (O) a little thinner for the lower bass as used in piano-fortes. These strings (O) run over a 65 sounding board (P) in the treble part of

the instrument—the strings (O) are attached to an iron frame (Q) as in the piano-forte.

The bridge (R) is to pass from the sounding board (P) on the treble side through the iron plate which is cast to the iron bar as 70 in piano-fortes.

The cells of which we intend employing sixty-six are provided with metal projections (T, T) at either end for supporting them in their places, by passing screws or 75 dowels through the same and attaching them firmly to the cross pieces (U, U). As the cells become small and light they are made with a long piece of metal (V) for the purpose of fastening to the back strip (W) 80 across the instrument, which should be sufficiently wide for the purpose.

The instrument may be constructed in a bottom of frame-work two and one half inches thick; on the left or bass end, there 85 must be a block extending across from back to front, about eight inches wide, to which the case is fastened.

On the treble part of the instrument is the sounding board (P) resting on a narrow 90 block extending from back to front, into which block, the iron plate is screwed.

Any good piano-forte maker, can from the above description construct the iron-bar frame, sounding board—put on the strings 95 arrange action &c.

*Scale of sizes of cells and strings.*—In a full sized instrument, going down in the bass to F, there are fourteen strings (O) commencing at this note a little higher than 100 the same strings in a piano-forte, one string to a note. Above are sixty six cells (A A) 105 extending as high as the seven octavo C piano. The lowest cell is about two feet long, twelve inches wide and one and one half inches thick and makes this note G. These cells are graduated down to about three quarters of an inch long, three eighths wide and one quarter thick which will be C, the highest note on this particular scale. 110 The lowest key will be about fourteen inches long from the front end of the over-key to the hammer stroke—the upper key nearly thirty three inches. The cells are about one quarter of an inch apart on the fronts of them, and run somewhat circular as seen in Fig. III—they open fan-like to over one inch in the backs of the cells in the bass—still less so in the higher cells. The iron bar on the very treble of the instrument is 115 not over five inches from the front end of the key—in the extreme bass about fifteen inches. The upper string will come nearly or quite under the first or lowest fork-prong, so that the fork-line must be set one quarter of an inch higher than the string. The hammer line will be on a curve.

What we claim and desire to secure by Letters Patent is—

1. The use or employment of cast metallic 120

forks, in the place of forged ones previously used, when the same shall be arranged and operated as herein described.

2. The combination of the strings (O) sounding board (P) cells (A A) and forks (C C) when arranged and operated as herein set forth.

3. The combination of the over key H with the under key N, for the purpose of extending the action at the back ends of the under keys, when the same shall be arranged and operated as herein specified.

4. Casting the forks (C, C) in a cylindrical form, for the purpose of adding strength of vibration to the cells (A A). 15

5. The extension of the fork-prongs (F F) by soldering or riveting soft metal (G) to the same as herein described, for facilitating the tuning of the same.

U. C. HILL.

HENRY J. NEWTON.

In presence of—

ALBERT PALMER,

A. SIDNEY DOANE.