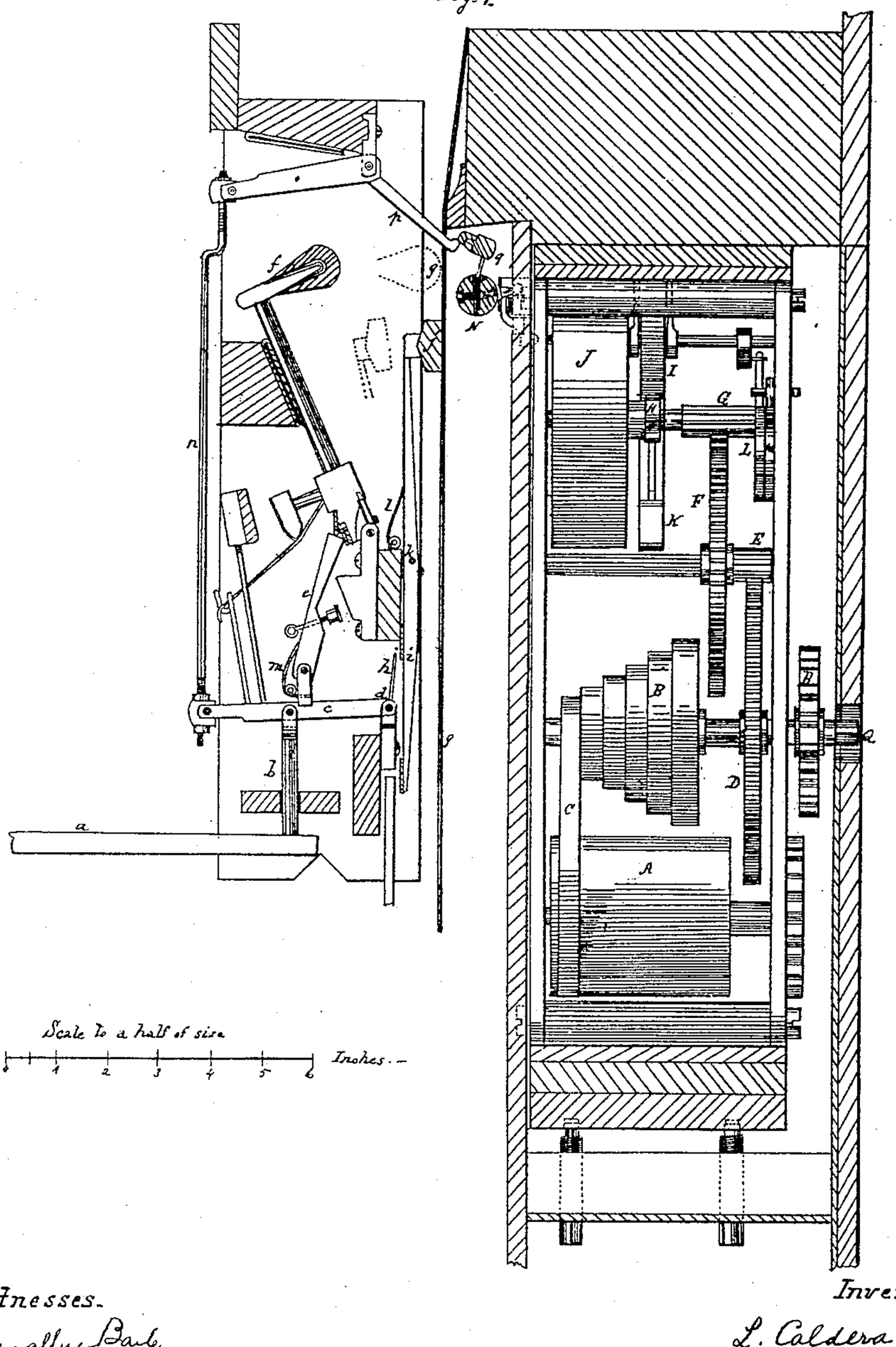
2 Sheets—Sheet 1.

L. CALDERA & L. MONTU.

PIANOFORTE.

No. 75,362. Patented Mar. 10, 1868.

Fig. 1.



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2 Sheets—Sheet 2.

L. CALDERA & L. MONTU.

PIANOFORTE.

No. 75,362. Patented Mar. 10, 1868.

Fig. 2.

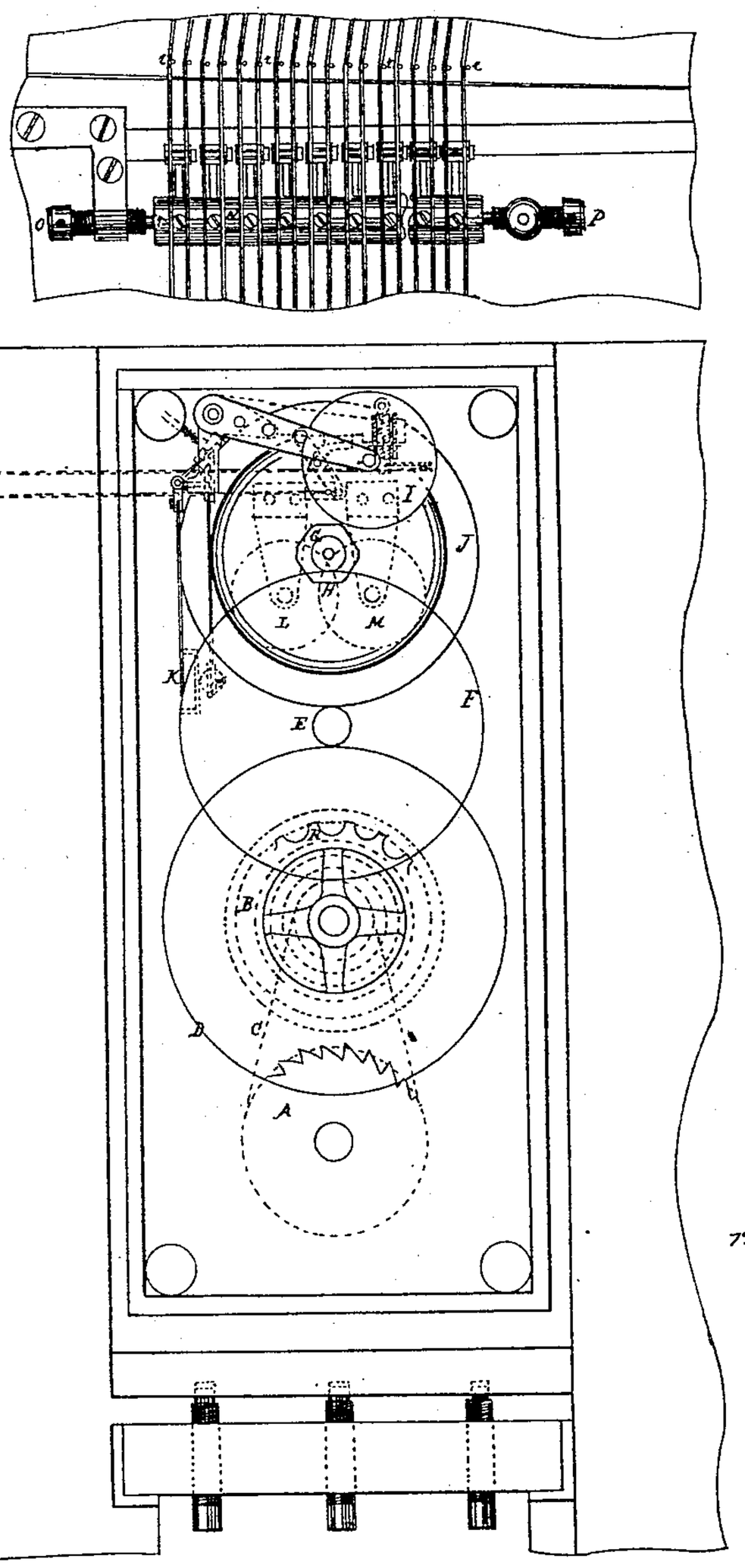
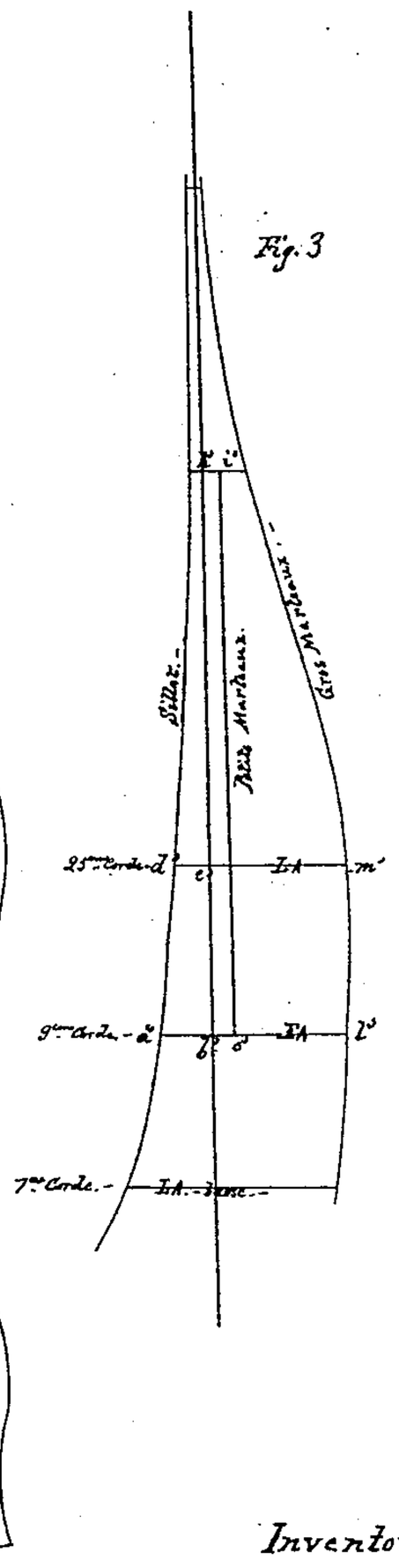


Fig. 3



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United States Patent Office.

L. CALDERA AND L. MONTU, OF TURIN, ITALY.

Letters Patent No. 75,362, *dated March* 10, 1868.

PIANO-FORTE.

The Schedule referred to in these Letters Patent and making part of the same.

TO WHOM IT MAY CONCERN:

Be it known that we, L. CALDERA and L. MONTU, of Turin, in the Kingdom of Italy, have invented a certain new and improved Piano-Forte, called Melo-Piano; and we hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings.

One of the most common objections made to the piano is that it lacks fullness in its tones. The sole instrument by which the strings are enabled to prolong their vibrations consists at present of the loud or foot-pedal, which can be used at pleasure by the pianist. By this means the duration of the waves of sound can be prolonged only during the "forte" passages in a piece of music; whilst during the "piano" passages—that is to say, the passages in which the sound should have but little intensity—the sounds obtained are muffled, weak, and possessed of little fullness or duration.

The principal feature of our invention consists in an improvement which renders the tones of the piano sweet and prolonged, resembling those produced by a bow or by a wind-instrument. In order to attain this result, we have conceived the idea of combining with each pair of strings a little metallic hammer, covered with felt, and provided with an elastic or spring handle. We impart to this little hammer a very rapid oscillatory movement, by means of clock-work, or equivalent mechanism, which actuates a wave-faced cam, by which the oscillations are produced. The oscillations of the little hammer follow each other at intervals of time shorter than the duration of waves of sound, and consequently a continuous and even sound is produced.

To enable others to understand and use our invention, we will now proceed to describe the manner in which the same is or may be carried into effect by reference to the accompanying drawings, in which—

Figure 1 represents a side-elevation of our improved mechanism applied to the ordinary mechanism of a piano.

Figure 2 is a front view of the same.

The key *a* of the key-board lifts the little cylindrical rod *b*, and consequently the lever *c*, which turns on its pivot *d*. This movement of the lever *c* raises the hopper *e*, which throws forward the hammer *f* upon the string *g*. During this time the metal rod *h*, mounted on the axis of the lever *c*, is brought in contact with the shank of the felted damper *j*, which rests on the string, and forces it to move, on its axis *k*, away from the string, which is thus permitted to vibrate. This arrangement of mechanism is new, and devised by us. The reaction of the springs *l m* suffices to bring all the parts back to their normal position. The rod *n* has also, during the same time, caused the lever *o* to turn upon its centre, and, consequently, by drawing back the other arm of the lever *p*, to disengage the little hammer *g*, which we have before mentioned. This little hammer, which is actuated by a spiral spring in the barrel A, immediately commences to vibrate with great rapidity; and thus are produced sounds prolonged and sweet, like those produced by a bow.

The organization of the clock-work movement will be readily understood. The barrel A actuates the conical fusee B, through the medium of the belt C. The toothed wheel D, mounted on the arbor of the fusee, imparts motion to the pinion E, and, consequently, to the wheel F, the pinion G, and the wave-faced cam H. The projecting parts of this cam successively strike against the roller I, thus imparting a rapid oscillatory movement to the little hammer *g*. The fly-wheel J and the regulator K serve only to regulate the movement. The rollers L and M rolling against the axis of the cam render its movement less difficult, by preventing friction to a certain extent. All the little oscillatory hammers are fixed on the same arbor, N, which extends the length of the piano. The movement of the arbor is facilitated by supporting it on two pointed screws O P.

In order to wind up the apparatus, a key may be fitted on the shank Q, or, preferably, a crank may be employed, which is placed outside of the piano-case, and communicates with the wheel R, through the medium of a Vaucanson, or band-chain, or other suitable mechanism. This method of vibrating the strings through the medium of the hammers *q*, gives rise to a new line of pins *r*, a new curve of the wrest-plank, and a new line for the striking of the strings by the hammer *f*.

Figure 3 represents these curves, which are constructed as follows:

A straight line, *b' h'*, is drawn, which is divided into as many equal parts as there are strings to the piano—for instance, five octaves or sixty-one strings. At all the points of division perpendiculars are erected, which serve to determine the two curves. On the perpendicular at *b'* we take *a' b'*, equal to one-fourth of the actual distance between the wrest-plank and the point at which the large hammers strike, and *b' l'*, equal to three-fourths of the

same distance. The points a' and l' will be the respective points of the two curves. As the form of the wrest-plank for very heavy or very sharp tones is the same, we will consider $a'\ l'$ as the ninth string of the key-board. In order to obtain the distance corresponding to the twenty-fifth string, we take $e'\ d'$, equal to one-fifth of the length of $a'\ l'$, and $e'\ m'$, equal to four-fifths of $a'\ l'$. The points d' and m' will be the respective points of the two curves. We obtain in a like manner the other points of the curves, which are then traced through all the points. By drawing a line, $c'\ l'$, parallel to $b'\ h'$, and 0 m. 004 mill. below, we have the line of striking of the small hammers q.

Having now described our invention, and the manner in which the same is or may be carried into effect, what we claim, and desire to secure by Letters Patent, is—

1. The method of prolonging the vibrations of the strings of a piano, substantially in the manner and by the means herein shown and described.

2. The combination, with the ordinary striking-hammer, damper, and other parts of the action of a piano, of an auxiliary oscillatory or vibratory hammer and clock-work, or equivalent mechanism, for imparting the desired motion to the same, substantially in the manner and for the purposes herein shown and described.

In testimony whereof, we have signed our names to this specification before two subscribing witnesses.

L. CALDERA,
L. MONTU.

Witnesses:
C. LAFOUD,
JAMES HAND.