O. H. ARNO.

Mechanical Musical Instrument.

No. 198,866. Patented Jan. 1, 1878.

FIG. 1.

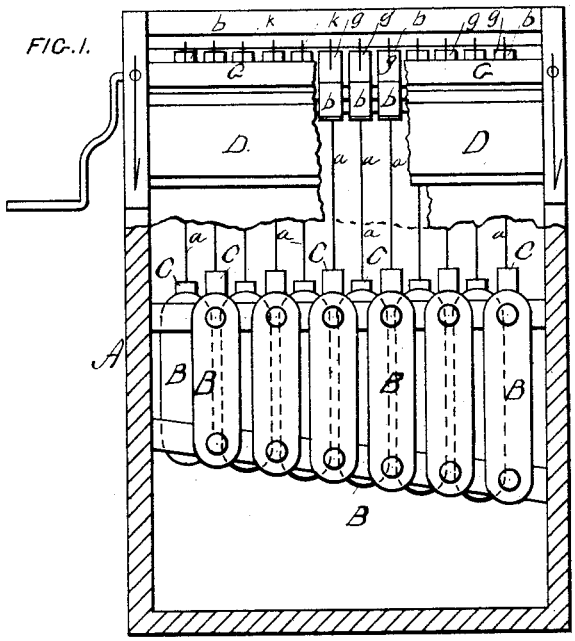



FIG. 4.

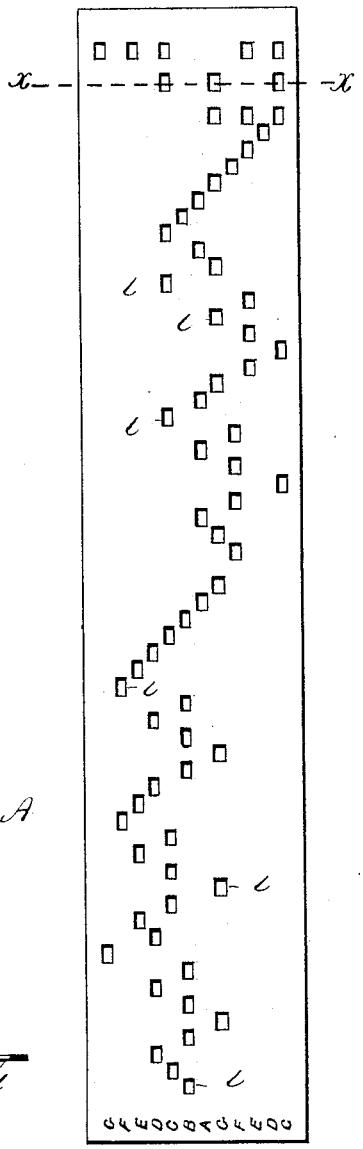



FIG. 2.

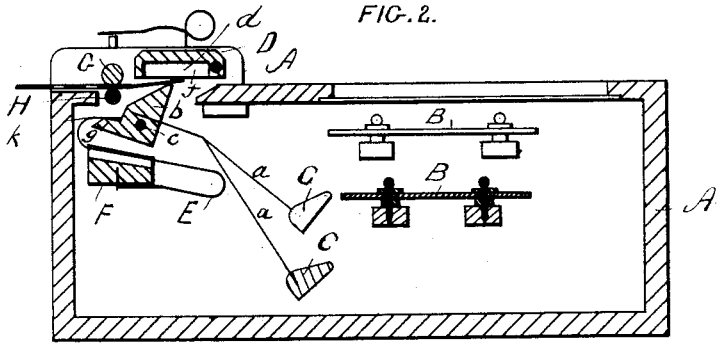



FIG. 3.

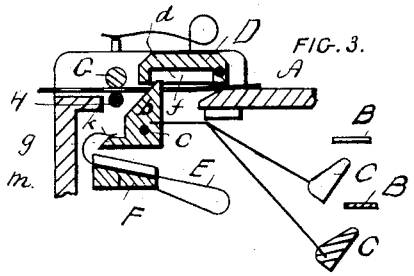



FIG. 5.

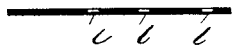


FIG. 6.

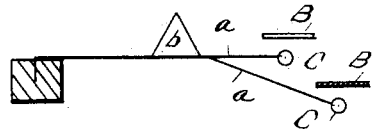
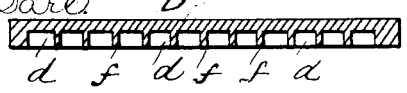



FIG. 7.

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# UNITED STATES PATENT OFFICE.

OLIVER H. ARNO, OF SOMERVILLE, MASSACHUSETTS.

## IMPROVEMENT IN MECHANICAL MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. **198,866**, dated January 1, 1878; application filed November 16, 1877.

*To all whom it may concern:*

Be it known that I, OLIVER H. ARNO, of Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Musical Instruments, of which the following is a specification:

This invention relates particularly to automatically operating hammers for producing musical tones from metal and glass plates, bells, wires, &c.; and it consists in the arrangement of the hammers, substantially as hereinafter described, for operation by the passage of a perforated strip of paper or other sheet material, to secure the playing of the tune on the sound-producing plates.

In the accompanying drawings, Figure 1 is a plan view, and Fig. 2 a longitudinal vertical section, of a musical instrument constructed according to this invention; Fig. 3, a view in detail, and Fig. 4 a plan view of a strip of paper, showing openings in same, adapted for the playing of a tune; Fig. 5, a view in cross-section, on line *x x*, Fig. 4; Fig. 6, a view in modification, and Fig. 7 a view in detail.

In the drawings, A represents a casing or frame carrying metal plates B, which are arranged in two series, one above the other, in a similar manner to their arrangement in a harmonicon or glockenspiel, &c. Each plate B is properly tuned, and for each there is a separate hammer, C, and these several hammers C are carried by separate stems *a*, which are all hung by a similar butt-piece, *b*, upon a common fulcrum-rod, *c*, and thereon arranged to work separately and independently of each other, and to have their several butt-pieces in the same horizontal plane, under a stationary horizontal bar, D, but which bar, for convenience of lifting it from the said butt-pieces, is pivoted at each end to the frame A. The under side of this bar D has a cavity, *d*, opposite to and over the butt-piece of each hammer-stem *a*, and the several cavities *d* are separated by walls *f*.

Each butt-piece *b* has a tail-piece, *g*, and on the upper side of each of these tail-pieces bears the free end *k* of a bent and curved spring, E, which, at its other end, is fastened to the rail F of the frame A; and this spring E, in each instance, in reacting, throws the hammer-head in relation to which it is arranged against the metal plate to which it belongs, and thereby sounds the same.

G and H represent two horizontal feed and pressure rolls, for feeding a strip of paper prepared with openings, such as shown at *l*, Figs. 4 and 5, to and between the under side of the bar D and the upper side of the butt-pieces *b*. This strip, as it passes under the said bar D, similarly depresses all of the several hammers against their respective springs E, as shown in Fig. 2, and so holds them depressed during the passage of the said strip, except when an opening in the strip comes opposite to and over a butt-piece, *b*. The latter then allows the lever opposite thereto to be acted upon by its spring, and thereby secures the sounding of the metal plate to which said hammer belongs.

With an arrangement of tuned plates or other sound-producing devices, and with a hammer arranged for each plate, substantially as above described, it is obvious that under the passage of a strip of paper, &c., provided with openings arranged relatively to the plane of movement of the several hammers under the cross-bar D, the hammers can be made to automatically operate from the action of their respective springs, and thus secure the automatic playing of a tune upon the said tuned plates.

As the spring of each hammer-lever bears upon the upper surface of the tail-piece *g* to each lever, the hammer, after it is thrown against its metal plate, falls back therefrom, free from action of the spring, which, during the meantime, has come to its normal position, and at rest on the bearing *m* in rail F.

The stem of the hammer may be made of spring metal, to throw the hammer, as shown in Fig. 6, thus dispensing with a spring separate from the hammer and its stem.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of a sound-producing plate, B, or its equivalent, a hammer-head, C, a spring-lever stem, *a*, having a butt-piece, *b*, and a bar, D, with a strip of paper or other sheet material adapted to pass between the

said bar and butt-piece, the whole being constructed and arranged to operate substantially as and for the purpose described.

2. The rail F, having the attached bent and curved spring E, in combination with the butt-piece *b*, having a spring-hammer, C, and a tail-piece, *g*, against the upper side of which the free end of the bent spring bears, whereby said spring, in its reaction, throws the hammer against the sounding-plate, substantially as and for the purpose described.

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