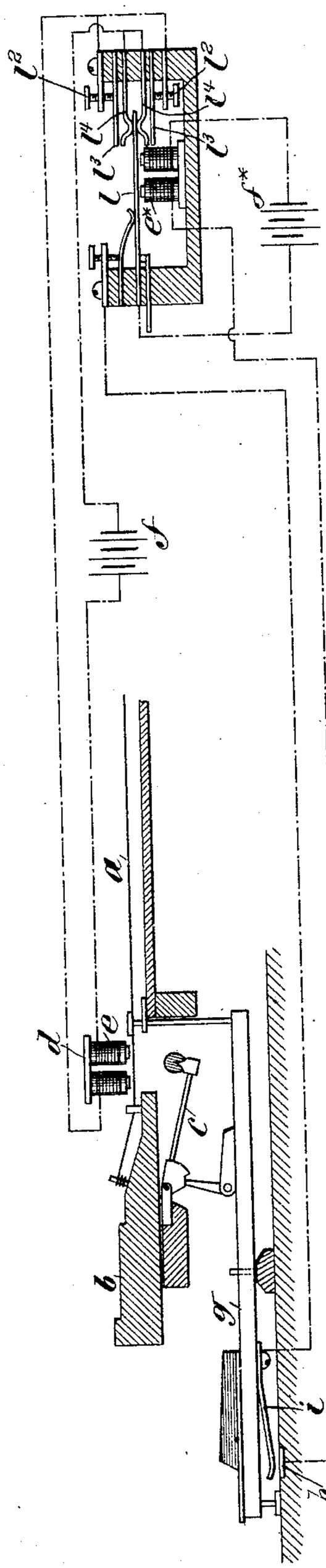
(No Model.)

P. E. SINGER.

ELECTRICAL MUSICAL INSTRUMENT.

No. 501,541. Patented July 18, 1893.



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PARIS E. SINGER, OF LONDON, ENGLAND.

ELECTRICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 501,541, dated July 18, 1893.

Application filed June 16, 1892. Serial No. 436,908. (No model.)

To all whom it may concern:

Be it known that I, PARIS EUGENE SINGER, of 6 Victoria Road, Kensington, London, in the county of Middlesex, England, have invented certain new and useful Improvements in Musical Instruments Actuated by Electricity, of which the following is a specification.

This invention relates to improvements in keyed musical instruments in which electro magnetism is used for vibrating, and sustaining the vibrations of, the sonorous bodies employed in the production of musical notes, as set forth in an application for a patent filed concurrently with the present application. In that application, I described the use of a rotating commutator for breaking and making the electric circuits a given number of times in a second for each note required to be sounded, the vibrations required for each note being determined by its own commutator. I now propose to obtain the like effect by a novel arrangement of metal tongue or free reed, the vibrations of which, when set in motion, will have musical relation to the corresponding string or other sonorous body required to be sounded.

In the accompanying drawing, I have shown an arrangement in which the reed commutator is caused to make and break the circuit which it controls, twice for every complete vibration.

a represents one of the ordinary steel piano strings attached, as usual, by a wrest pin to the wrest plank *b*.

c is a hammer, which may or may not be used for striking the string, to initiate vibration.

Situate above the string, immediately over the part struck by the hammer, is an electro-magnet *e*, pendent from a fixed bar *d*, carried by the pianoforte case. This electro-magnet serves, as is well known, in the absence of a hammer, to impart the initial vibration to the string to be sounded, and also to maintain the vibrations of the string so long as the key corresponding to that string is held down by the finger of the player.

Each note of the instrument is represented by an electro-magnet *e*, and each magnet is separately connected with a battery f^*, or other source of electricity.

g is the playing key, the depression of which is intended to put the electro-magnet *e* into circuit, and keep it excited by the battery, so long as it is desired to sustain a note.

Underlying the whole row of keys *g*, is a plate *h*, connected with an electro-magnet e^*, which serves to operate a vibrating commutator *l*, through a current derived from a second battery *f*. Set above this vibrating commutator *l*, is a contact spring *l'*, which is in electrical connection with a spring *i* carried by the key *g*.

l^2 is a screw stop, which serves to maintain the spring *l'* (which has a tendency to rise) in contact with the reed *l* while in its normal position. The reed *l* is electrically connected with the battery *f*, and it serves to make and break the circuit in which the electro-magnet e^* is situate, with a rapidity due to the vibrations required to sound the note corresponding to the key *g*, the depression of which completes the circuit.

For causing the reed *l* to make and break the circuit which it controls, twice for every complete vibration, I place the reed *l* between two pairs of elastic terminals l^3 l^4, which are respectively in connection with the battery f^*, and have within the circuit the electro magnet *e*. The two terminals l^3 are united so as to become practically one, and the same remark applies to the terminals l^4. The vibration of the commutator *l*, which is effected by the electro magnet e^*, will, by pressing alternately on the upper and lower elastic terminals l^3, and putting them into contact with the terminals l^4, close the circuit of the electro-magnet *e*. Thus, when one pair of terminals is closed, the other is open, and no current passes in that direction. It will now be understood, that upon the depression of the key *g*, the electro magnet e^* will be energized, and caused to attract the vibrating commutator *l;* the circuit of the battery f^* will now be closed by the pressure of the reed upon the elastic terminal l^3, and the electro-magnet *e* energized, to sound the string *a*, but as the commutator *l* is drawn from its contact spring *l'*, the circuit of the battery *f* will be broken, and the attraction of the electro-magnet e^* ceasing, the commutator will recoil, break the circuit in which the electro magnet

e is situate, and instantly close it, by acting on the second set of terminals l^3 l^4, thus producing two impulses in the string *a* for each vibration of the reed commutator.

What I claim is—

In a keyed musical instrument in which the strings or other sonorous bodies are sounded, or their sound is maintained, by electro-magnets, the combination therewith of a vibrating commutator tuned in musical relation to the note it represents, and placed between two pairs of terminals belonging to the circuit in which the electro-magnet of the sounding body is situate, such commutator serving, by each complete vibration, twice to make and break the circuit of that electro magnet, and correspondingly control the vibrations of its string or other sounding body, the commutator magnet being excited by a current separate from that which excites the electro magnet of the sounding body.

PARIS E. SINGER.

Witnesses:
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