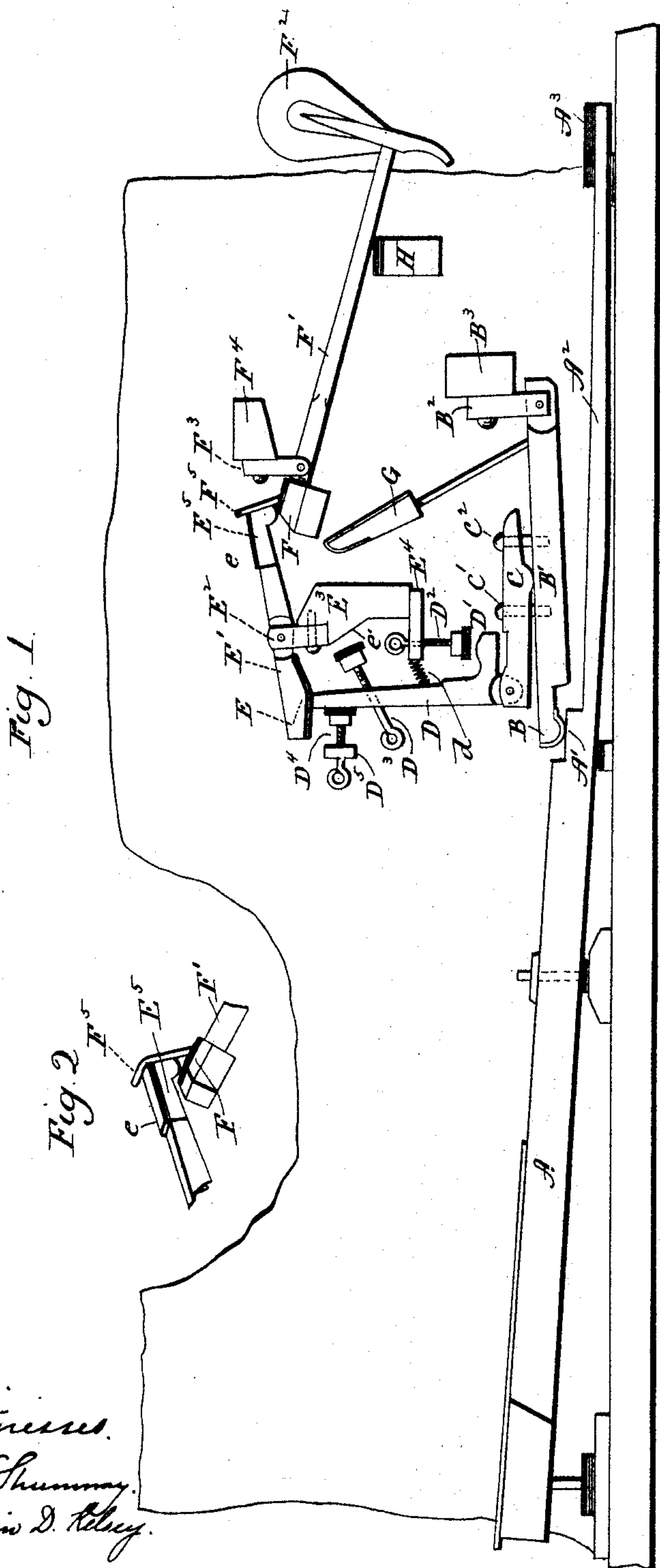


(No Model.)

M. STEINERT.
PIANO ACTION.

No. 585,716.

Patented July 6, 1897.



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UNITED STATES PATENT OFFICE.

MORRIS STEINERT, OF NEW HAVEN, CONNECTICUT.

PIANO-ACTION.

SPECIFICATION forming part of Letters Patent No. 585,716, dated July 6, 1897.

Application filed July 29, 1896. Serial No. 600,876. (No model.)

To all whom it may concern:

Be it known that I, MORRIS STEINERT, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Piano-Actions; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a view in side elevation of one form which a piano-action constructed in accordance with my invention may assume; Fig. 2, a broken perspective view showing the butt of the hammer-arm, the rear end of the hammer-lever, and the hook coacting with those parts.

My invention relates to an improvement in pianoforte-actions, the object being to enable every performer, whether possessed of technical skill or not, to produce crescendo and diminuendo, portamento, and color and tone effects, so that he may, to a remarkable degree, express his own feeling and temper through it, whereby the instrument, though still remaining a mechanical instrument of percussion, becomes less palpably so and more clearly related in action and quality of tone to instruments which are played directly or more directly by hand—such, for instance, as the harp, clavichord, and violin. By my invention, also, I am enabled to produce upon the pianoforte not only string-like tones—as, for instance, the tones of the violoncello—but also tones of organ quality.

With these ends in view my invention consists in a pianoforte-action having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

It is well known that when in 1709, or thereabout, Bartolommeo Cristofori, the Paduan harpsichord-maker, combined a hammer with a key and produced the pianoforte, he named the instrument “piano-a-forte,” because of its capacity of being played so as to produce soft or loud tones by causing the hammers to strike gentle or forcible blows upon the strings; but Cristofori was unable to bridge the gap between the piano and forte tones in his instrument, nor have any of the inventors

or makers who have followed him been able to do it, so that the modern pianoforte, although enormously more powerful and brilliant in tone than the instrument of Cristofori, is still open to the objection that his instrument was—namely, that it is too palpably mechanical, too plainly an instrument of percussion, and that between the soft tones and the loud tones crescendo and diminuendo effects and effects of color and feeling cannot be secured to anything like the degree in which they are secured in instruments like the clavichord and those instruments in which the performer has more direct control over the strings than in the ordinary pianoforte.

Having from my boyhood been a student of, and a performer upon, the clavichord, I have for many years studied to embody its sympathetic quality, which is characterized by A. J. Hipkins, F. S. A., as its “tender intimate timbre,” and secure the close connection which it establishes between the instrument and the performer in a pianoforte, and this my present invention accomplishes.

In carrying out my invention as herein shown the key A is constructed at its inner end with a shoulder A' and provided with a long inwardly-extending damper-arm A², furnished with a felt cushion A³, and coacting with damper mechanism of any approved construction not requiring description here. The movement of the key is transmitted through its shoulder A' to the knuckle-like forward end B of a fly-lever B', which is pivotally suspended by its rear end from a slotted block or flange B², secured to a rail which I shall call the “fly-lever” rail B³. The said fly-lever supports upon its upper face the fly, which may be of any approved construction and which is adjustably secured in place by means of screws C' and C². The forward end of this lever is slotted for the pivotal connection with it of the jack or hopper D, which is constructed at its lower end with a rearwardly-extending tripping-arm D', which coacts with a regulating-screw D² in throwing the upper end of the jack rearward as the key is depressed. The upper end of the jack coacts with an obtuse-angled escapement-face E, formed upon the lower face of the forward end of a horizontally-arranged escapement or

hammer-lever E' , which I shall hereinafter call the "hammer-lever," this lever being pivotally mounted in a slotted block or flange E^2 , secured to a rail E^3 , which I shall hereinafter call the "hammer-lever" rail. The said hammer-lever rail is furnished at its lower end with a strip E^4 , carrying the regulating-screw D^2 , before mentioned. A small spiral spring d is interposed between the strip E^4 and the jack for restoring the same to its normal position under the forward portion of the escapement-face E when pressure upon the key is removed. This spring may be constructed and arranged in any approved manner and is properly termed the "jack-spring." The rear end of the hammer-lever has a knuckle-like terminal E^5 , having its upper face provided with a cushion e of felt and coacting with the upper face of the butt F of the hammer-arm F' , the rear end of which carries the hammer F^2 . The said hammer-arm is pivotally hung in a slotted block or flange F^3 , secured to a hammer-rail F^4 . An additional and more intimate connection between the hammer-lever and hammer-butt is secured by means of a wire hook F^5 , mounted in an inclined position in the butt of the hammer-arm and arranged to engage with the terminal E^5 of the hammer-lever. The jack D is furnished near its upper end with a regulating-screw D^3 , mounted in an inclined position and coacting with an inclined face e' , formed upon the hammer-lever rail E^3 for regulating the rearward play of the jack, the outward play of which is regulated by means of a regulating-screw D^4 , mounted in a rail D^5 . The fly-lever B' carries a back-check G , mounted in an inclined position in its rear end and coacting with the butt F of the hammer-arm F' . The hammer is normally supported upon a hammer-rest H , consisting of a cushioned rail arranged in a plane parallel with the planes of the other rails.

It will be seen from the foregoing description that in my improved action the movement of the key is not transmitted directly to the hammer-arm, but rather through the medium of several articulated parts comprising the fly-lever, the fly, the jack, and the hammer-lever. The articulations of these parts give a mobility to the action which I may compare to the mobility which the wrist and hand have through the articulation of their bones. Through such an articulated action I secure a sympathetic and yielding or nervous stroke of the hammer upon the hammer-string as distinguished from the violent blow delivered by a hammer of an ordinary piano upon its strings. In addition to this I control the hammer by modifying its escapement through the medium of the jack and the obtuse-angled escapement-face of the hammer-lever. As the outer end of the key is depressed, the jack lifts directly against the said face, with the effect of operating the hammer so as to strike the string. The tripping-arm D' of the jack then engages with the regu-

lating-screw D^2 , and the jack is thrown rearward into engagement with the forward portion of the obtuse-angled escapement-face, whereby the hammer is held out of contact with, but close to, the string and in such relation thereto that by a sympathetic and nervous manipulation of the key while the same is still partially depressed and without permitting it to entirely recover its normal position the string may be again struck so as to color the tone.

A pianoforte provided with my improved action may be played piano or forte and the gap between those tones may be made use of in the production of intermediate tones and of crescendo and diminuendo effects not before attained, at least in the same way, in the pianoforte. The character of the stroke I secure upon the strings, and the prolongation I effect of the control of the hammer enables me also to produce portamento effects, as well as those effects which may more properly be described as legato.

Another marked peculiarity of a pianoforte containing my action is that the character of the stroke is so modified that the striking of the hammers upon the strings is scarcely perceptible, while in pianofortes as ordinarily constructed, and especially those of the highest grade, the violence of the impact of the hammers upon the strings is very marked and unpleasant.

It is apparent that in carrying out my invention some changes from the construction herein shown and described may be made, and I would therefore have it understood that I do not limit myself to such construction, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a piano-action, the combination with a key, of a lever pivotally suspended by one of its ends above the key and having its opposite end arranged to coact therewith for operation thereby, a jack pivotally connected with the said lever, a hammer-lever having one of its ends arranged to coact with the upper end of the jack, and a hammer the butt-end of the arm of which is acted upon by the opposite end of the hammer-lever.

2. In a pianoforte-action, the combination with a key, of a lever the forward end of which coacts with the key, for operation thereby, while its rear end is pivotally suspended at a point above the key, a jack connected with the fly-lever, a hammer-lever the forward end of which is acted upon by the jack, and a hammer, the butt-end of which is acted upon by the opposite end of the hammer-lever.

3. In a pianoforte-action, the combination with a key, of a fly-lever pivotally suspended by its rear end and engaged at its forward end with the key for being lifted thereby, a

fly mounted upon the said fly-lever, a jack pivotally mounted in the fly, a hammer-lever having its forward end arranged to coact with the upper end of the jack, and a hammer, the butt of the arm of which coacts with the rear end of the hammer-lever.

4. In a piano-action, the combination with a key, of a fly-lever pivotally suspended at one end above the key and coacting at the other end therewith for operation thereby, a fly mounted upon the fly-lever, a jack mounted on the fly and provided with a rearwardly-extending tripping-arm, a regulating-screw for engagement with the said arm, a hammer-lever having an obtuse-angled escapement-face with which the upper end of the jack coacts, and a hammer the butt-end of the arm of which coacts with the opposite end of the hammer-lever.

5. In a pianoforte-action, the combination with a key, of a lever suspended by its rear end and having its forward end engaged with the key for operation thereby, a jack connected with the said lever, a hammer-lever upon which the jack acts, a hammer, the butt of the arm of which coacts with the rear end of the hammer-lever, and a back-check mounted in the said fly-lever and coacting with the butt of the hammer-arm.

6. In a pianoforte-action, the combination with a key, of a fly-lever pivotally suspended by its rear end and engaging at its forward

end with the key, a fly mounted upon the said fly-lever, a jack pivotally mounted in the fly, a hammer-lever the forward end of which coacts with the upper end of the jack, a hammer the butt of which coacts with the rear end of the hammer-lever, a hook mounted in the butt of the hammer-arm and coacting with the rear end of the said hammer-lever, and a back-check mounted in the fly-lever and coacting with the butt of the hammer-arm.

7. In a piano-action, the combination with a key, of a lever pivotally suspended by its rear end above the key, and adapted at its forward end to coact with the key for operation thereby, a back-check mounted in the rear end of the said lever and extending upwardly therefrom, a jack connected with the said lever, a hammer-lever having its forward end formed with an obtuse-angled escapement-face which coacts with the upper end of the jack, a hammer having a hammer-arm the butt-end of which coacts with the opposite end of the hammer-lever and with the said back-check.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

MORRIS STEINERT.

Witnesses:

LILLIAN D. KELSEY,
FRED. C. EARLE.