

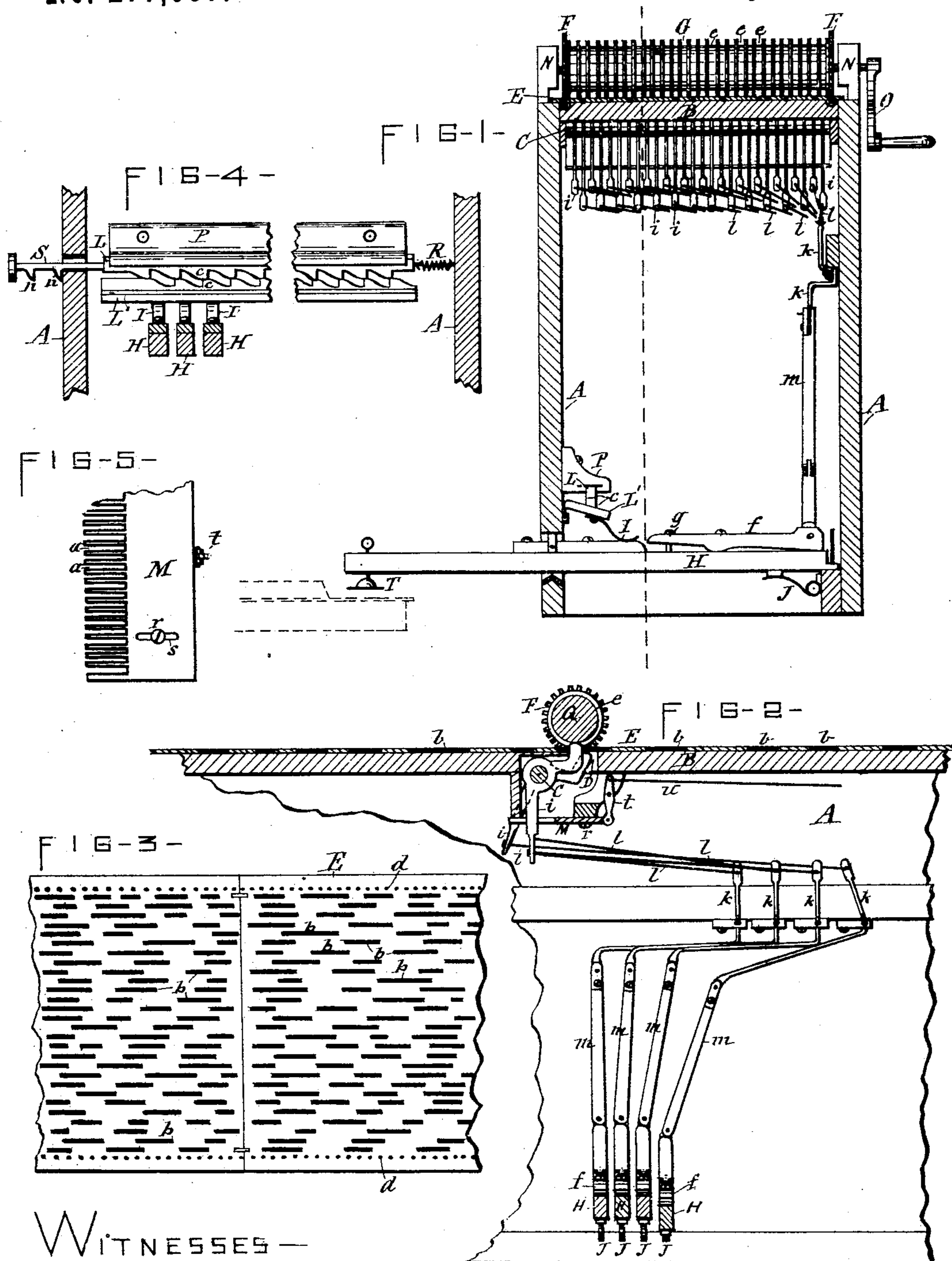
(No Model.)

J. SCHWERTNER.

KEY BOARD ATTACHMENT FOR MUSICAL INSTRUMENTS.

No. 277,067.

Patented May 8, 1883.



WITNESSES —

Wm. C. Raymond.

C. Beaudry.

INVENTOR —

Joseph Schwertner
per D. H. L. & Co. N.Y.
his atty.

UNITED STATES PATENT OFFICE.

JOSEPH SCHWERTNER, OF ITHACA, NEW YORK.

KEY-BOARD ATTACHMENT FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 277,067, dated May 8, 1883.

Application filed January 22, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH SCHWERTNER, of Ithaca, in the county of Tompkins, in the State of New York, have invented new and useful Improvements in Automatic Actions for Pianos and Organs, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to that class of musical instruments in which the note-producing mechanism is automatically actuated by means of a perforated sheet drawn past pivoted levers which receive motion by their engagement with the perforations of said sheet, and transmit said motion to the note-producing mechanism by suitable connections with the same.

My invention consists in improved construction and combination of the devices for transmitting motion to the note-producing mechanism, and also in certain novel means for regulating and adjusting the action of said devices, all as hereinafter more fully described, and specifically set forth in the claims.

In the accompanying drawings, Figure 1 is a vertical transverse section of my invention adapted for operating on the key-board of a piano. Fig. 2 is a longitudinal section of the same. Fig. 3 is a plan view of the sheet which, in conjunction with the pivoted levers, imparts motion to the note-producing mechanism. Fig. 4 is a detail view of the devices for adjusting the pressure of the hammer which strikes the keys of the piano, and Fig. 5 is a detached plan view of the device for restraining the action of the levers when released from the perforated sheet.

Similar letters of reference indicate corresponding parts.

A represents a horizontally-elongated wooden case, provided on its top with a horizontal cross plate or table, B, extending the length of the case. On a shaft, C, extended across the case at the under side of the plate B, are pivoted a series of bell-crank levers, *i i*, one for each key or note of a piano, organ, or other similar musical instrument to be played. Directly over the upper or free end of the levers *i i* the top-plate B is formed with an opening, D, through which said levers protrude

when in their operative position, as hereinafter explained.

E is a sheet of metal or other suitable material, provided with series of slots *b b*—one series for each lever *i*, and arranged in the path of the same—the length of the slots being gaged according to the length of the sound to be produced from the key played thereby, in the manner hereinafter explained. The two longitudinal edges of the sheet E are provided with perforations *d d* of uniform size and uniform distances apart to serve as a rack, which is engaged by a pinion, F, fixed to the ends of a roller, G, which is extended across the top of the sheet E directly over the free end of the levers *i i*, and is journaled in suitable bearings, N, on opposite sides of the case A. This roller is provided with circumferential grooves *e e*, one for each row of slots *b b* of the sheet E, and in range with said slots. The grooves *e e* allow the levers *i i* to play through the slots *b b*, while the body or main part of the roller limits the motion of the levers by its encounter therewith. By means of a crank, O, attached to the end of the roller-shaft or axle, said roller, with its pinions F F, is rotated, and by the engagement of said pinions with the rack *d* of the sheet E the latter is moved longitudinally on the top plate, B. During this movement of the sheet E the slots *b b* thereof come in coincidence with the free ends of the levers *i i*, which swing through said slots and into the grooves *e* of the roller, at the bottom of which grooves they strike the body of the roller, and are thus arrested. When the solid portion of the sheet at the end of the slot *b* encounters the lever *i* it throws said lever out of the slot *b*, and causes it to rest against the under side of the sheet until the arrival of another slot *b*, which again allows the lever to swing through it, as aforesaid. This action of the levers *i i* is transmitted to the note-producing mechanism of a piano, organ, or similar musical instrument by the following instrumentalities:

Along the side of the case A are hung a series of elbow-levers, K K, which have one of their arms projecting upward and the other extended horizontally or at right angles from it. The upper ends of the levers K are each

connected with the lower end of one of the bell-crank levers *i i*, by a rod, *l*, as best seen in Fig. 2 of the drawings. To the opposite end of the levers *K* is connected a jointed or flexible push-bar or pitman, *m*, which in turn is adjustably connected with a lever or hammer, *H*, which is extended across the lower portion of the case *A*, and projects with one end through the side of the case, and is pivoted on said side. Said adjustable connection between the pitman *m* and hammer *H*, consisting of a bar, *f*, pivoted on top of the hammer *H*, so as to allow it to rock endwise thereon, the pitman *m* being connected to one end of said bar *f*, and a set-screw, *g*, passing through the opposite end of the bar and into the hammer *H*, holds said bar adjustably in its position, the tightening of the set-screw drawing down that end of the bar *f* to which it is connected, and the resultant raising of the opposite end of the bar producing increased pressure thereon of the pitman *m*.

In order to impart to the hammer *H* an elastic action similar to that produced by a person's fingers when playing on the keys of a piano, I employ two springs, *I* and *J*, pressing, respectively, upon the top and against the under side of the hammer. The spring *J* is connected to the side of the case *A*, underneath the inner end of the hammer, and exerts greater pressure than the spring *I*, so as to cause said hammer, when relieved of the pressure of the pitman, to strike the key of the instrument. The spring *I* is arranged at the opposite side of the interior of the case, and its action is made adjustable by connecting it to a bar, *L'*, extended the length of the case and hinged at one edge to the side thereof. The top of this bar is provided with cam-projections *c c*, and over these is arranged a longitudinal slide-bar, *L*, having corresponding cams *c c*, said slide-bar being hung in a dovetail groove in a block, *P*, which is firmly attached to the side of the case *A*. A spring, *R*, connecting one end of the slide-bar *L* with the case, tends to draw said bar in one direction, and a draw-bar, *S*, connected to the opposite end of the slide-bar and projecting through a suitable opening in the end of the case, and having ratchet-teeth *n n*, adapted to engage the exterior of the case, serves as a means for drawing the slide-bar toward that end of the case. In drawing the slide-bar in the last-mentioned direction the points of the cams *c c* of the two bars *L L'* are brought over each other, thereby depressing the hinged bar *L'*, with its springs *I I*, and causing the latter to exert increased pressure on the hammer *H*. The outer end of the hammer is arranged over the keys of the instrument to be played, and is provided with a suitable pad, *T*, with which to strike the key.

In the operation of the described apparatus the pressure of the spring *J* on the under side of the inner end of the hammer *H* imparts an

upward pressure to the push-bar or pitman *m*, and this strain upon the pitman tends to swing the levers *K*, so that by its draft on the connecting-rod *l* it throws the upper or free end of the levers *i i* through the opening *D* in the top plate, *B*, and into the groove *e* of the roller *G*, so long as said opening *D* is unobstructed. By introducing under the roller *G* a sheet, *E*, having slots *b*, gaged and disposed in accordance with the notes and time of the music to be played, the slots of said sheet will allow the levers *i i* to project above the top plate, *B*, for the period required for said slots to pass over the opening *D*. The encounter of the solid portion of the sheet at the end of the slot *b* with the protruding end of the levers *i* depresses the latter and causes the same to rest against the under side of the sheet until another slot *b* is brought into coincidence with it, as before described. While the levers *i i* protrude through the slots *b* of the sheet *E* the resistance against the upward pressure of the pitman *m* is removed, and the spring *J* is allowed to throw up the inner end of the hammer, thus causing the outer or free end of the same to strike the key of the instrument, and upon this it is held according to the length of the slot *b* in the sheet *E*. The action of the levers *i i* incident to their encounter with the solid portions of the sheet presses down the push-bar or pitman *m* and inner end of the hammer *H*, and thus lifts the outer end thereof clear of the key of the instrument, which latter position is represented in Fig. 1 of the drawings.

In order to prevent all the hammers *H H* from simultaneously striking the keys of the instrument when the sheet is withdrawn from under the roller *G*, I arrange in front of the lower limbs of the levers *i i* a plate, *M*, having slots *a a*, through which the respective levers pass, said slots being of sufficient length to allow the levers the requisite play. This plate *I* connect to a suitable support by screws *r*, passing through slots *s* in the plate. By means of a lever, *t*, pivoted on the case and connected at one end with the plate *M*, and provided at the opposite end with a manipulating rod or cord, *u*, said plate can be pushed toward the levers *i i* and caused to swing said levers so as to bring their upper or free end below the top of the table or plate *B*, in which position they can be held until a sheet, *E*, is introduced between the roller *G* and said top plate.

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

1. In combination with the perforated sheet *E* and levers *i i*, the bell-crank levers *K K*, connecting-rods *l l*, the spring-actuated hammers *H H*, pivoted intermediately of their length, and the push-bars *m m*, pressing on the rear ends of said hammers, substantially as described and shown.

2. The combination, with the hammer *H*, of the springs *I* and *J*, bearing, respectively,

against the top and bottom of the hammer, as
and for the purpose specified.

3. In combination with the hammer H, the
spring I, spring-bar L', provided with cams *c*,
5 and the slide-bar L, having corresponding
cams, substantially as and for the purpose set
forth and shown.

4. In combination with the levers *i i*, the
plate M, provided with slots *a a* and *s*, attach-
10 ing-screw *r*, and the lever *t*, substantially as
shown and described, for the purpose set forth.

In testimony whereof I have hereunto signed
my name and affixed my seal, in the presence
of two attesting witnesses, at Syracuse, in the
county of Onondaga, in the State of New 15
York, this 30th day of December, 1882.

JOSEPH SCHWERTNER. [L. S.]

Witnesses:

C. H. DUELL,
F. H. GIBBS.