

UNITED STATES PATENT OFFICE.

WILLIAM T. WAITE, OF KANSAS CITY, MISSOURI, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO GEORGE H. CONOVER AND JAMES F. CONOVER, OF SAME PLACE.

IMPROVEMENT IN UPRIGHT-PIANO ACTIONS.

Specification forming part of Letters Patent No. **173,377**, dated February 8, 1876; application filed November 11, 1875.

To all whom it may concern:

Be it known that I, WILLIAM T. WAITE, of Kansas City, Jackson county, Missouri, have invented a new and useful Improvement in the "Actions" of Upright Piano-Fortes, of which the following is a specification:

My invention relates to an improved "repeating action" for upright pianos.

In the accompanying drawing, Figure 1 is an elevation, showing the various parts of my action in their normal positions. Fig. 2 represents the positions the operative parts assume when the hammer is about to strike the wire, the jack being shown engaged with the knuckle-cushion, and the repeating-lever out of contact with the spur of said knuckle. Fig. 3 shows the positions the operative parts assume at the instant of the hammer's recoil from the wire, the jack being disengaged from the knuckle-cushion, and the repeating-lever being in contact with the spur of said knuckle. Fig. 4 shows the hammer retracted far enough to allow the jack to be re-engaged with the knuckle-cushion by the stress of the spring which couples said jack to the repeating-lever. Fig. 5 is a vertical section through the butt-block and its accessories. Fig. 6 is a vertical section through the toe of the jack. Of the above illustrations Figs. 5 and 6 are drawn on an enlarged scale.

A represents a portion of the bed-plate of an upright-piano action. B represents a part of one of the keys, which latter is pivoted to the bed-plate at *b*, in the usual manner. C is the customary cushion or pad, upon which the key rests when in its normal position, as shown in Fig. 1. The key B is furnished on the upper side of its inner end with customary adjustable block D, for attachment, by pivot *d*, of the vertical connecting-rod E, common to upright pianos. The rod E is coupled at *e* to a vertically-vibrating arm, F, that is pivoted at *f* to a hanger, G, which depends from a rail, H, which extends longitudinally of the action. The front or free end of arm F is provided with a cushion, I. Pivoted at or near the mid-length of arm F, as at *j*, is my repeating-lever J, whose upper end is protected with a leather or other elastic bearing, *j'*. Located

near the upper end of lever J is a projection, K, shod with pad *k*. Pivoted to the arm F at a point about midway between the cushion I and bearing *j*, as at *l*, is a customary jack, L, whose toe *L'* is slotted at *l'*, in order that said toe may not come in contact with the rod M, that carries the back-catch *m*. This rod is rigidly secured to the arm F. *n* is the cushion of an adjustable stop, N, against which the upper surface of toe *L'* impinges when the key B is operated, so as to force the point of the jack from its engagement with the notch of the hammer-butt, and to enable the hammer to fall back, and, if desired, be reprojected by the repeating mechanism J *j*, as hereinafter explained. Secured to the upper side of the supporting-rail H is the butt-block O of the hammer. Said block has pivoted to it at *o* the knuckle P, or hammer-butt, which carries the shaft R of the customary cushioned hammer *r*. Said knuckle has projecting from it a cushioned stop, S, whose contact with the back-catch *m* prevents any recoil movement of the hammer. Fitted within the butt-block O is a plate-spring, U, which bears against the heel *p* of the knuckle in such a manner as to force back the entire action to its normal position, and thereby obviate the necessity of applying a comparatively heavy load to the key B, as is usually done. Projecting from the knuckle P is a spur, V, which is adapted at the proper moment to come in contact with the upper or free end of repeating-lever J. W is the customary cushion in the hammer-knuckle for the jack L to operate on. X is a cushion for supporting the hammer R *r* when the key B is in its normal position. Y is a spring, which extends from the repeating-lever J to the jack L.

The operation of my "action" is as follows: When in its normal position, the key B and hammer R *r* rest upon their respective cushions C and X, the jack L being engaged under the cushion W, and the stop S being out of contact with the back-catch *m*. As soon, now, as the outer end of key B is depressed, the free end of vertically-vibrating arm F is elevated accordingly, and its attachments at once assume new positions with reference to each

other. The moment this arm begins to lift, the jack L, by its engagement with the cushion W, causes the knuckle P to turn upon its pivot *o* until the hammer *r* strikes the wire T, at which time the extremity of the jack becomes liberated from the knuckle, in consequence of the toe L' striking the stop N. (See Fig. 3.) It is evident that the hammer would at once fall back upon the cushion X, and that the key B would have to be completely depressed in order to strike a second blow, unless some provision were made whereby the performer could arrest the descending hammer, and impel it forward again against the wire. This provision consists of the repeating-lever J, spur V, and connecting-spring Y, whose conjoint action is as follows: At the very moment of contact of toe L' with stop N the coupling medium Y acts to draw the free end of repeating-lever J far enough forward to insure the engagement of the cushion *j'* with the spur V, so as to allow but the very slightest retreat of the hammer. In this position of the parts the least depression of the outer end of the key B will be sufficient to insure the re-engagement of jack L under the cushion W, because the tension of the spring Y is sufficient to effect this re-engagement the moment the arm F drops far enough to free the toe L' from stop N. (See Fig. 4.) The hammer can

now be struck against the wire with as much force as though the key had been allowed to drop completely down upon its cushion C, and without losing the time necessary for such a depression of the key.

The spring U, being located so near the center of motion of knuckle P, will readily restore the action to its normal position as soon as the key is relieved from the pressure of the operator's finger, so as to obviate the expense and annoyance attendant upon the use of heavily-loaded keys, and give the action a light and elastic touch.

I claim as my invention—

1. In combination with the vertically-vibrating arm F *f* I, actuated by the key B, substantially as described, the repeating-lever J *j*, jack L, knuckle P W V, and the spring Y, as and for the purpose specified.

2. In combination with the butt-block O *o* and knuckle P *p*, I claim the bent spring U, all constructed and arranged for restoring the action to its normal position, substantially as described.

In testimony of which invention I hereunto set my hand.

WILLIAM T. WAITE.

Attest:

L. H. SHERWOOD,
GEO. H. CONOVER.