

No. 658,545.

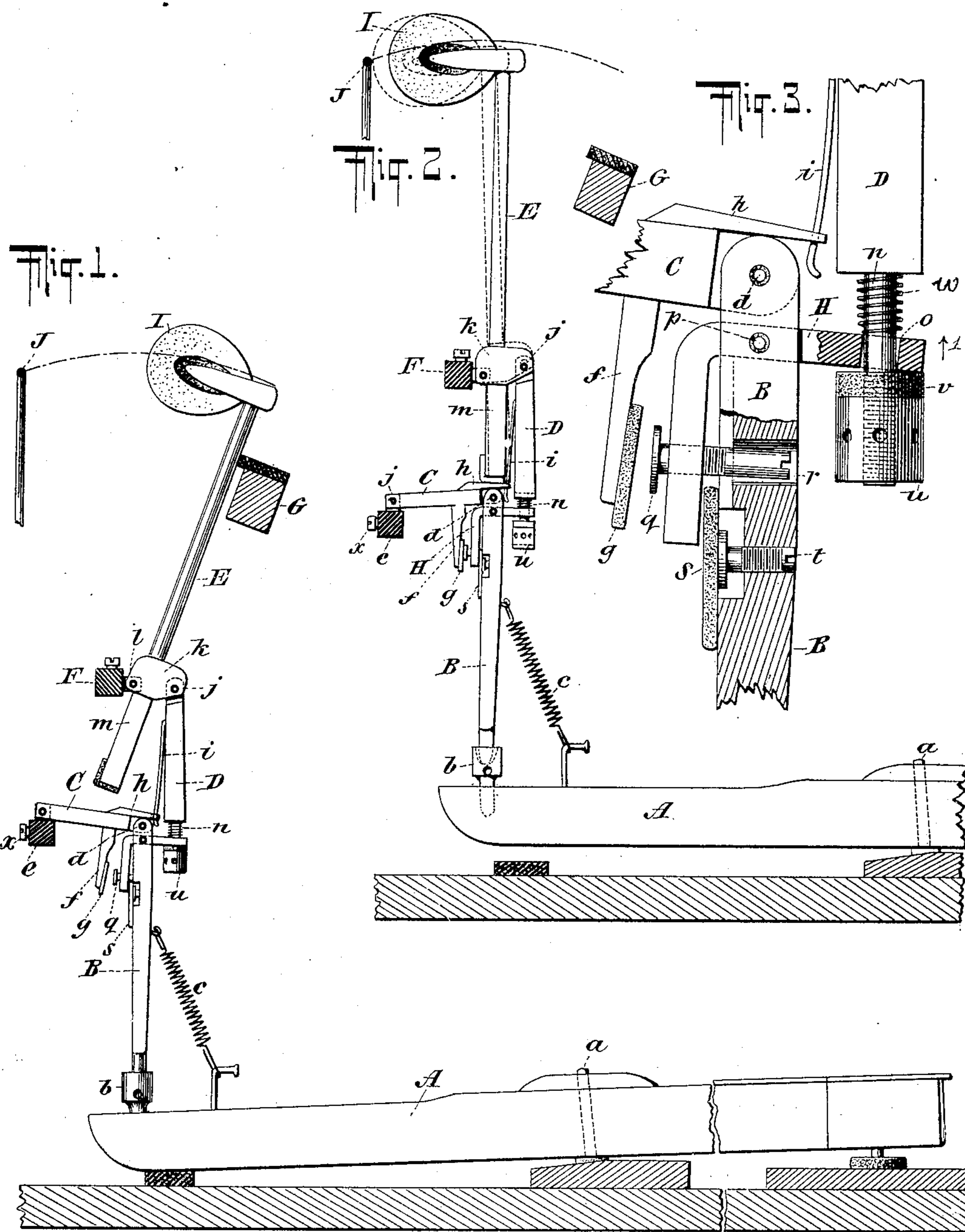
Patented Sept. 25, 1900.

E. M. HAMILTON.

PIANO ACTION.

(Application filed Nov. 23, 1899.)

(No Model.)



WITNESSES:

Gustav Peterson
Charles Smith

Fig. 4.

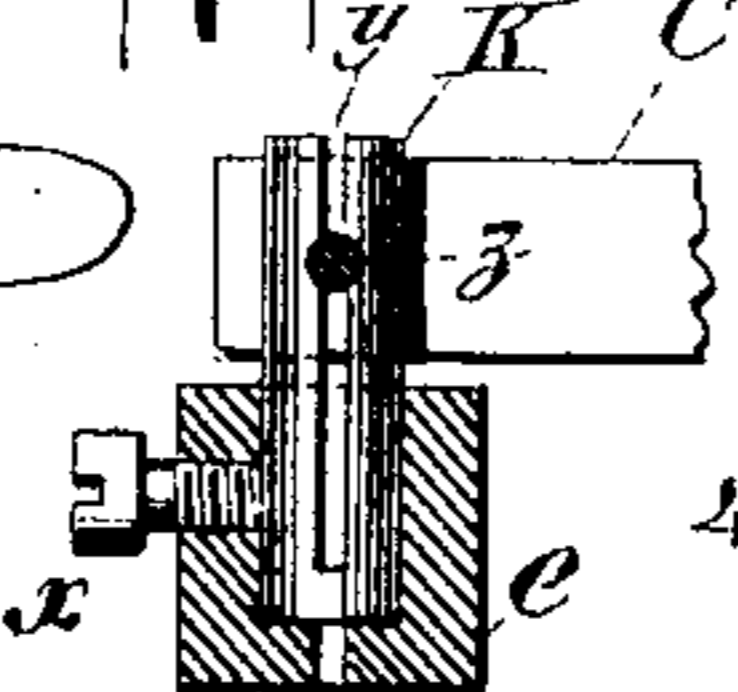
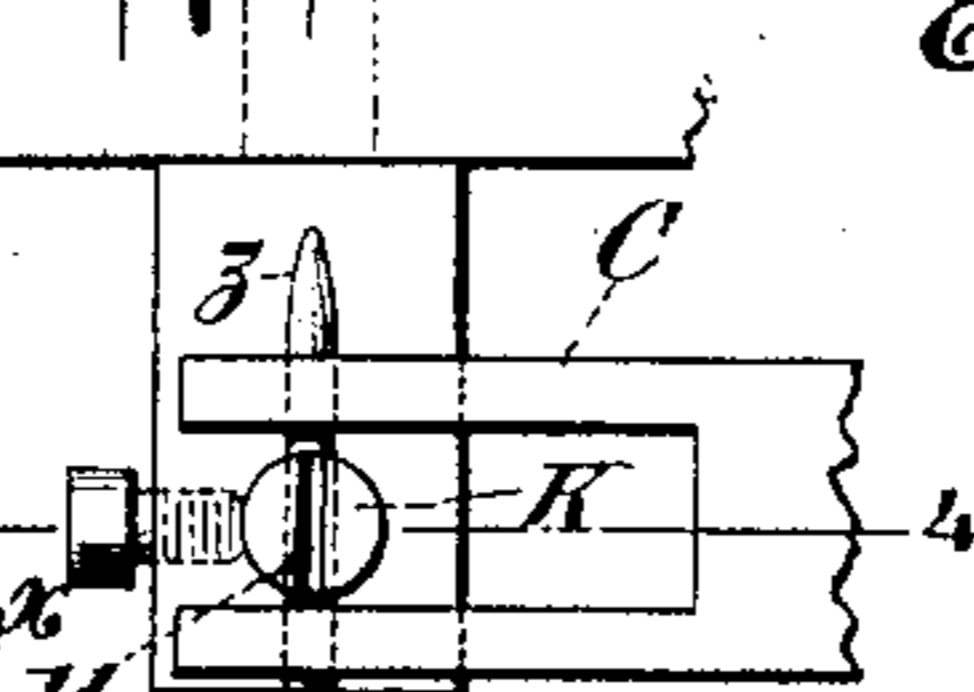


Fig. 5.



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EMERY M. HAMILTON, OF NEW YORK, N. Y.

PIANO-ACTION.

SPECIFICATION forming part of Letters Patent No. 658,545, dated September 25, 1900.

Application filed November 23, 1899. Serial No. 737,991. (No model.)

To all whom it may concern:

Be it known that I, EMERY M. HAMILTON, a citizen of the United States, residing at New York, (Flushing,) Queens county, State of New York, have invented certain new and useful Improvements in Piano - Actions, of which the following is a full, clear, and exact description.

My invention relates to piano-actions; and the object of said invention is to provide a more simple and efficient action than heretofore, which cannot possibly be blocked, and wherein a quick return of the hammer is provided and wherein a very short return movement of the key from the depressed position will enable the performer to effectively operate the hammer, whereby repetitions of the stroke of the hammer can be quickly and efficiently effected.

To these and other ends which will appear in the following description my invention consists in the novel arrangement and combination of parts to be hereinafter described and claimed.

In the accompanying drawings, wherein like characters indicate corresponding parts in the various views, Figure 1 is a side view of a piano-action embodying a sufficient number of parts of a piano-action to illustrate my invention. Fig. 2 is a like view of the same, with parts broken away, the view illustrating the parts in different positions from those illustrated in Fig. 1. Fig. 3 is an enlarged fragmentary detail side view of a portion of the device, with parts broken away to better illustrate the construction. Fig. 4 is an enlarged detail side view, partly in section, of a portion of the device to be hereinafter described, the view being taken on the line 4 4 of Fig. 5. Fig. 5 is a top view of the same.

In the drawings, A indicates a piano-key, which is pivoted at *a* and may be of any desired construction. The rear end of the piano-key is shown provided with the usual capstan-screw *b*, in which an extension-piece or pilot B is seated. This pilot may be further connected to the key by means of the spring *c*. The upper end of the pilot is pivoted at *d* to a link C, which in turn is pivoted at its opposite end to a rail *e*. The link C is provided with a depending arm *f*, which carries

a felt *g*. The upper face of the link C is provided with an inclined face *h* for purposes which will be hereinafter described, and seated within a recess of this inclined portion *h* is a free end of a spring *i*, that is connected to what for want of a better designation may be termed a "jack" D. This jack D is pivoted, as indicated at *j*, to the butt *k* of a hammer E. The hammer-butt *k* is likewise pivoted to a hammer-rail F, as indicated at *l*. The hammer E has depending therefrom an extension *m*, which is provided with felt that is adapted to bear upon the incline *h* of the link C when the parts are in the position represented in Fig. 2 of the drawings to act as a check for the hammer. When the parts are in the normal position, the stem of the hammer is adapted to bear upon a felt carried upon a suitable rail G. The jack D is provided on its lower end with an extension *n*, that is preferably made of metal and is adapted to project through an aperture *o* (see Fig. 3) of what I term a "clutch" or "clamping" plate H, which is pivoted, as indicated at *p*, to the extension B. This clutch-plate is preferably made of metal and may be bent at right angles, as shown. The clamping-plate carries a suitable abutment *q*, which in the present instance is illustrated as a headed adjustable set-screw, the adjusting end of which is adapted to project through an aperture in the pilot, as indicated at *r*. The depending member of the clamping-plate is limited against movement in one direction by a felt *s*, which may be adjusted by a set-screw *t* or otherwise. The lower end of the extension *n* is provided with a capstan-screw *u*, which is adjustably carried thereon by suitable screw-thread connections or otherwise. The upper face of this capstan-screw carries a felt *v*, against which the lower side of the clamping-plate H is adapted to bear, the parts being normally maintained in this position by a coiled spring *w*.

From the foregoing description it will be seen that when the parts are in the position illustrated in Figs. 1 and 3 of the drawings the clamping-plate will be slightly inclined and that a binding action of the walls of the aperture *o* will be exerted upon the extension *n* of the jack and that any upward movement

of the pilot B when the parts are in this position will cause the jack D to be elevated with it. As the pilot, with the clamping-plate, is elevated by a depression of the outer end of the key A the abutment *q* will be brought into contact with the felt *g*. This felt *g* constitutes a cooperating abutment for the abutment *q*, and the upper portion of the clamping-plate will by this action be moved in the direction of the arrow 1 to the releasing position, which will relieve the binding action on the extension *n*; thereby permitting a slight downward movement of the jack independently of the clamp. It should be understood that the abutments *q* and *g* are so adjusted that the releasing of the jack from frictional engagement with the clutch or clamping plate will take place just before the hammer-head I has been brought into contact with its string J, and after the hammer-head has struck the string it will be free to pass back to the full-line position represented in Fig. 2 of the drawings, so as to be carried out of the path of vibration of the string. This movement of the hammer back from the dotted-line to the full-line position in Fig. 2 of the drawings is effected by the spring *i*, which is brought into contact with the depending portion *m* of the hammer just before the hammer has reached the limit of its operating movement. In some instances the weight of the parts and the rebound of the hammer may be depended upon to move the hammer-head out of the path of the vibrating string; but I prefer to employ the spring *i*, inasmuch as it provides absolutely and under all conditions against the hammer remaining in the path of the vibrating string. It will likewise be observed that the felt on the depending portion *m* of the hammer is adapted to contact with the incline or checking surface *h* of the link C during the rebound of the hammer and after the tension of the spring *i* is relieved upon the depending portion *m*, and the hammer is thus effectively checked. The instant that the abutment *q* of the clutch or clamp plate is out of contact with its cooperating abutment *g* the coiled spring *w* will force the clamping-plate into the position represented in Figs. 1 and 3 of the drawings, and a binding-action of the clamp upon the extension *n* of the jack will take place, and the parts are again in condition to vibrate the hammer. The spring *w* not only tends to force the clamp to the locking position, but it has the additional important function of maintaining the hammer up in a position which corresponds substantially to the full-line position represented in Fig. 2 during a portion of downward or retrograde movement of the extension-piece B and the parts connected thereto. By these means the key may make a considerable movement toward the initial position without effecting a corresponding movement of the hammer, so that a quick repetition may be effected.

It will be observed that there is absolutely

no possibility of blocking the action. The so-called "jack" is constantly connected to the clamping-plate, notwithstanding that it is not always in frictional engagement therewith. It will likewise be observed that the various parts of my piano-action can be adjusted so as to readily regulate the action of the parts and to determine when the "break" shall take place—that is to say, at what period in the forward movement of the hammer the clamp will release the jack. The links C and the hammer-butts *k* are preferably united to their respective rails by cylindrical mounting-pins K, (see Figs. 4 and 5,) which are adapted to be seated in suitable recesses contained in the rails and are secured against movement therein by suitable means, such as set-screws *x*. Each of these pins is split, as indicated at *y*, to receive a pivot-pin *z* of the movable part, such as the link C. The pivots *z* are each secured in place in the mounting-pin by compressing the split portion of the pin by means of a set-screw *x* to secure the pivot against movement. It will be observed that by this construction the movement can be readily adjusted to its proper position upon the rails *e* and *f* and the set-screws *x* can be turned to maintain the mounting-pins and the piano-movement in the properly-adjusted position.

The employment of the retracting-spring *c* to connect the extension-piece B and the key A enables me to dispense with the weights ordinarily employed.

While I have shown and described with considerable detail one form of piano-action embodying my invention, I would have it understood that I do not limit myself to the construction shown and described, since I am aware that various changes in detail may be made without departing from the spirit of my invention, which consists, essentially and broadly, in the interpositioning of a frictionally-controlled clutch between the key and the hammer, which clutch shall be operative to move the hammer in the forward movement thereof and to automatically release said hammer before or at the completion of the stroke.

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

1. In a piano-action, the combination of a key, a hammer and intermediate mechanism between said hammer and key for transmitting motion from one to the other of said parts, said intermediate mechanism comprising a frictional clutch for moving the hammer in the direction of its operating stroke.

2. In a piano-action, the combination of a key, a hammer and intermediate mechanism between said hammer and key for transmitting motion from one to the other of said parts, said intermediate mechanism comprising a frictional clutch for moving the hammer in the direction of its operating stroke and means for automatically releasing said clutch from frictional engagement.

3. In a piano-action, the combination of a key, a hammer and intermediate mechanism between said hammer and key for transmitting motion from one to the other of said parts, said intermediate mechanism comprising a frictional clutch normally in frictional engagement to move the hammer in the direction of its operating stroke and adjustable means coöperating with said frictional clutch for automatically releasing said connection from frictional engagement at any desired point in the forward movement of the hammer.

4. In a piano-action, the combination of a key, a hammer and constantly-connected intermediate mechanism between said hammer and key for transmitting motion from one to the other of said parts, said intermediate mechanism comprising a frictionally-controlled clutch carried by a moving part of the action and adapted to move the hammer in the direction of its operating stroke and an abutment with which said clutch is adapted to contact before the hammer reaches the limit of its movement in the direction of its operating stroke, whereby the clutch will be released and a backward or clearing movement of the hammer will be permitted after it has completed its operating stroke.

5. In a piano-action, the combination of a key, a hammer and intermediate connections between said key and hammer for transmitting motion from one to the other of said parts, said intermediate mechanism comprising a friction-clutch and a jack connected at one end to the hammer and at the other end to said friction-clutch which is normally in engagement with said jack and is adapted to free the jack to permit a movement independent of the clutch before the hammer reaches the limit of its operating stroke.

6. In a piano-action, the combination of a key, a hammer and intermediate connections between said key and hammer for transmitting motion from one to the other of said parts, said intermediate mechanism comprising a pilot, a clamping-plate pivoted to said pilot and having an aperture therein, a jack connected at one end to the hammer and having an extension at the other end thereof which projects through the aperture in the pivoted clamping-plate so that the plate exerts a binding force upon the extension when the plate is in one position and will permit the jack to move independently thereof when the plate is in another position, means for

normally maintaining the plate in the binding position and means for moving the plate to free the jack.

7. In a piano-action, the combination of a key, a hammer and intermediate mechanism between said key and hammer for transmitting motion from one of said parts to the other, said intermediate mechanism comprising a jack connected to one end of the hammer-butt and having an adjustable extension, a clamping-plate carrying an abutment and having an aperture therein through which the extension of the jack projects and which is normally in frictional engagement with the clamping-plate, a spring interposed between said jack and clamping-plate and an abutment which coöperates with the abutment upon the clamping-plate, one of said abutments being adjustable with relation to the other to vary the release of the jack.

8. In a piano-action, the combination of a key, a hammer having an extension which forms a checking member, a spring with which said checking member contacts when the hammer reaches substantially the limit of its operative stroke and intermediate mechanism between said key and hammer for transmitting motion from one of said parts to the other, said intermediate mechanism comprising a jack connected at one end to the hammer-butt and having an adjustable extension, a pilot, a clamping-plate pivoted to the pilot, said plate carrying an abutment and having an aperture therein through which the extension of the jack projects and which is normally in frictional engagement with the clamping-plate, a spring interposed between said jack and the clamping-plate and an abutment which coöperates with the abutment on the clamping-plate, one of said abutments being adjustable with relation to the other to vary the release of the jack.

9. In a piano-action, the combination of a split cylindrical mounting-pin, seated in the aperture of a rail, a pivot secured within the split portion of said pin by the compression of the parts thereof, a movable part of the action connected to said pivot and a set-screw for compressing the split portion of the pin to secure the pivot to the pin and the pin in the adjusted position on the rail.

EMERY M. HAMILTON.

Witnesses:

CHARLES E. SMITH,
GEO. E. MORSE.