

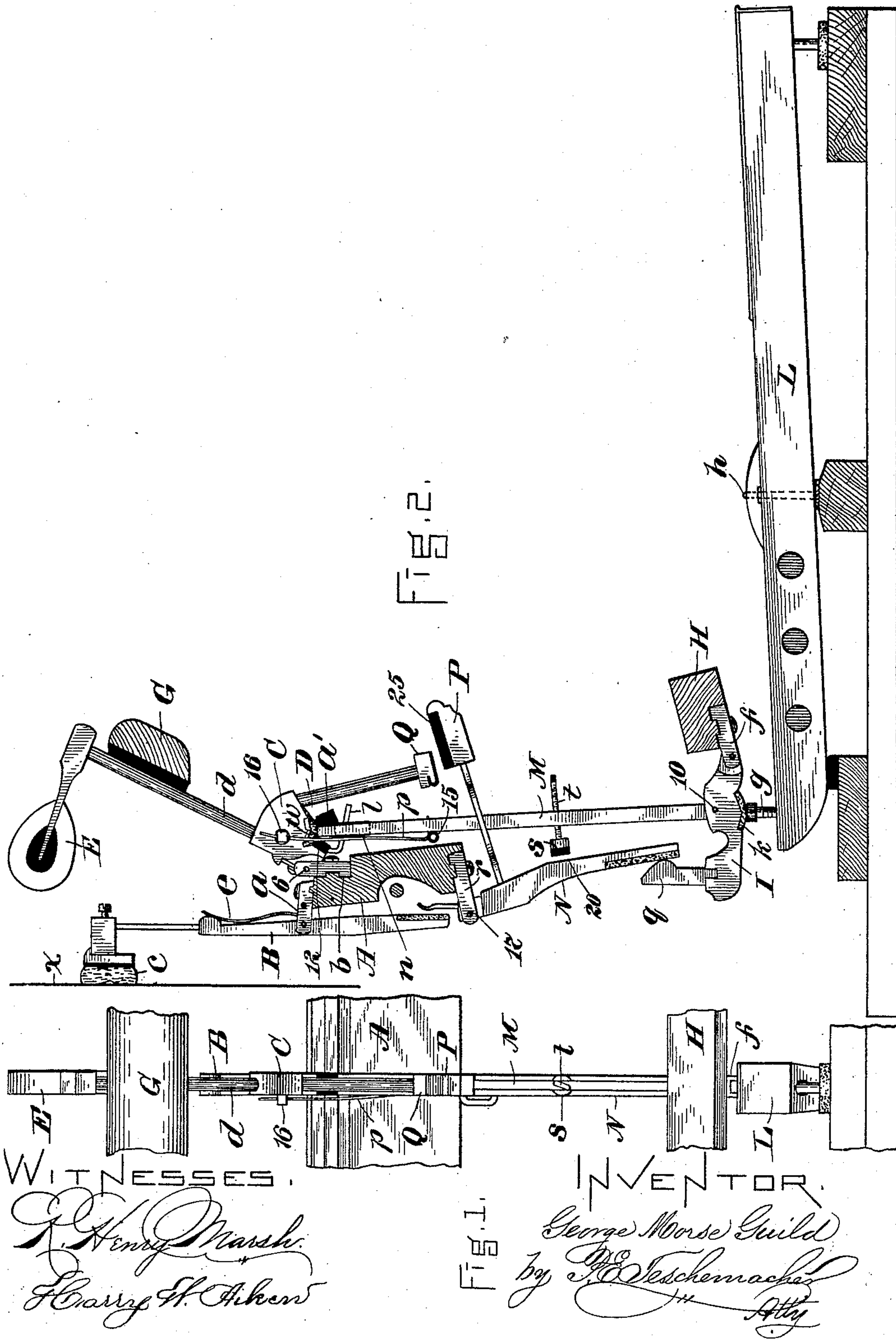
(No Model.)

2 Sheets—Sheet 1.

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UPRIGHT PIANO ACTION.

No. 486,808.

Patented Nov. 22, 1892.



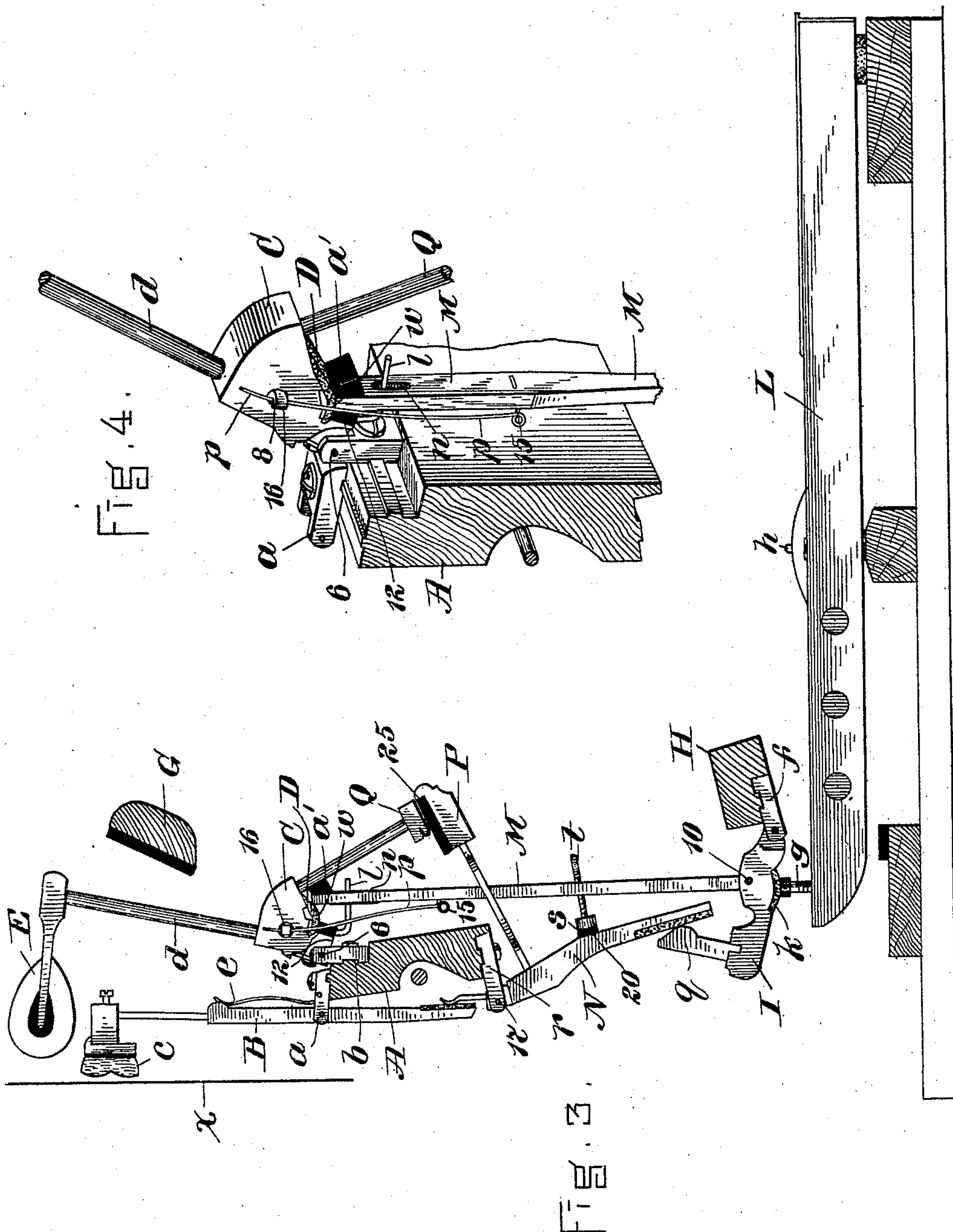
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WITNESSES.

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INVENTOR.

George Morse Guild
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UNITED STATES PATENT OFFICE.

GEORGE MORSE GUILD, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO L. A. GUILD, OF SAME PLACE.

UPRIGHT-PIANO ACTION.

SPECIFICATION forming part of Letters Patent No. 486,808, dated November 22, 1892.

Application filed March 7, 1892. Serial No. 424,073. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MORSE GUILD, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain Improvements in Upright-Piano Actions, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation of an upright-piano action constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a side elevation of the same with the parts in the positions which they occupy when the key is depressed. Fig. 4 is a detail representing in perspective the jack-butt and hammer-heel, the bumper, and the upper portion of the lifter-rod and jack.

My invention relates to upright-piano actions, and has for its object to simplify and reduce the cost of construction and to produce at the same time a light elastic and powerful action, which will not be injuriously affected by climatic changes, and in which the notes can be repeated in a perfect and effective manner; and to this end my invention consists in certain novel combinations of parts and details of construction, as herein-after set forth and specifically claimed.

In the said drawings, A represents the center rail, to the upper portion of which are secured the flanges *a b*, the former *a* having pivoted thereto the damper-lever B, carrying the damper C, while to the latter *b* is pivoted at 6 the hammer-heel C, the lower portion of which is properly shaped and constructed to form the jack-butt D, (sometimes called the "hammer-butt.")

E represents the hammer, *d* the hammer-stem, G the hammer-rail, and *e* the damper-spring, all constructed in the usual manner.

H is a rail having secured to its under side a flange *f*, to which is pivoted a lever I, which rests upon and is supported by an adjusting-screw *g*, projecting upward from the inner end of the key L, fulcrumed at *h*, the head of the screw *g* bearing upon a cushion *k*, applied to the under surface of the lever I. To the lever I is pivoted at 10 the lower end of an upright rod or bar M, the free end of which

forms the jack, while the opposite end forms the lifter, the entire rod or bar forming what I term a "combined lifter-rod and jack," the upper or free end of which lies directly beneath the jack-butt D and acts upon the same to operate the hammer when raised by the depression of the key L through the lever I, previously referred to, an elastic cushion or stop 12 being provided, against which the upper end of the lifter-rod and jack normally rests, as seen in Fig. 2. The adjusting-screw *g* enables the parts to be readily adjusted to compensate for wear, the head of said screw *g* being preferably provided with holes to receive the end of a rod or other implement by which it may be turned to effect the adjustment required.

l is a guide-pin and hammer-retractor, which projects from the under side of the hammer-heel or jack-butt D and is bent at a right angle to extend forward, as shown, said pin passing through a bushed slot *n*, (shown in Fig. 4,) formed at the free end of the lifter-rod and jack. The pin *l*, which takes the place of the guide-flange hitherto used, works smoothly and without any friction in the slot *n* and forms a simple, cheap, and effective guide for steadying and preventing the lifter-rod and jack from having any lateral movement, whereby it is kept at all times exactly in line with the jack-butt D, as required. A further advantage possessed by this guide-pin is that after the hammer has struck its blow upon the string and the key has been released the weight of the lifter-rod and jack and mechanism connected therewith will be brought upon the guide-pin by the contact of the end of the slot *n* therewith and thus transmitted to the hammer-heel, operating positively in this manner as an assistant device to insure the instant retraction or withdrawal of the hammer in case the joint should be affected by dampness and rendering it necessary to employ only a very light and inexpensive hammer-spring, thus materially reducing the cost of the action and rendering the touch of the instrument very light and elastic.

The hammer-spring which I prefer to employ in connection with the aforesaid construction consists of a light spring *p*, composed of straight wire, one end being prefer-

ably secured at 15 to the jack or bar M, while its opposite end bears with suitable tension against a rest or projection 16, located on one side of the jack-butt or hammer-heel, and having on its inner side an open slot or notch 8, Fig. 4, to receive the end of the spring *p* and keep it in place, said spring sliding in said slot and by its tension exerting an outward pressure upon the jack-butt or hammer-heel above the level of its pivot or fulcrum 6 to withdraw or retract the hammer on the release of the key L.

To the rear end of the lever I, which raises the lifter-rod and jack, is secured the throw-off arm *q*, which, when the key L is depressed, is caused to act upon the lower end of an intermediate lever N, pivoted at 17 to a flange *r*, secured to the bottom of the rail A, said lever N being thus caused to strike an adjustable button *s*, secured to the end of a regulating-screw *t*, passing through the lifter-rod and jack M, whereby the upper or free end of said lifter-rod and jack is thrown off its seat *w* to allow the hammer to recede from the string *x*, and by means of this screw *t* the operation of these parts may be regulated with the greatest nicety. Furthermore, there is no friction between the button *s* and the lever N, as the button does not slide upon the straight face of the lever while in contact therewith.

The upper or short arm of the lever N is not normally in contact with the lower end of the damper-lever B, but is slightly removed therefrom and is brought into contact therewith to actuate the same, as required, when operated by the throw-off arm *q* on the depression of the key L, and by making the lower arm of the intermediate actuating-lever N of great length and the upper arm above the pivot short, as shown, the leverage is increased, so that the key will move the damper with the greatest ease and without the contact of the short arm of the lever N with the damper-lever B as the key is depressed, being felt by the performer in the slightest degree, even if a stiff damper-spring is employed, the action being by this construction rendered easy and elastic. Furthermore, by employing the throw-off arm *q*, projecting from the end of lever I, to actuate the lever N the necessary amount or range of motion is secured to move the long arm of the said lever N a sufficient distance to produce the required movement of the damper-lever, and as the front face of the lever N at 20 is normally situated some little distance from the regulating-button *s* it does not come into contact with it until the hammer has nearly touched the string, and consequently the lifter-rod and jack M remains under the shoulder or seat *w* of the jack-butt until after the blow has been struck, when it is instantly thrown off its seat *w* into the position shown in Fig. 3, an elastic cushion or buffer *a'*, secured to the free end of the lifter rod and jack being by this movement brought into contact with the bumper Q, to be hereinafter described, which thus forms a back-stop

therefor. By this means the blow of the hammer upon the string is given with its full force before the lifter-rod and jack commences to be thrown off the shoulder or seat *w* of the jack-butt, resulting in the full force of the blow upon the key being always transmitted to the string. As the key L is depressed an increased tension in a backward direction is put upon the spring *p* by the movement of the parts into the position shown in Fig. 3, the spring being thus ready to act in the proper direction to effect the recession of the hammer at the proper time, and as the lifter-rod and jack commences to fall on the release of the key L the tension of the spring *p* under the arrangement described acting upon the said lifter rod and jack in an inward direction causes its free or upper end to be instantly returned to its original position beneath the seat *w* of the jack-butt against the stop 12, as seen in Fig. 2, ready for a repetition of the blow of the hammer. By this construction I am enabled to reseat the free end of the lifter-rod and jack beneath the jack-butt the moment the key L is relieved of the pressure of the finger, the parts being thus ready for another blow when the hammer has receded but a short distance from the string, which gives me the advantage of being enabled to repeat rapidly without removing the finger from the key and at the same time cause the hammer to give a fine and perfect blow each time it strikes the string.

By arranging the light spring *p* in the manner described to perform the double function of a hammer-spring and a spring for reseating the lifter-rod and jack beneath the jack-butt it can be made of very much lighter wire than any hammer-spring hitherto used, thereby giving the instrument a much lighter and more delicate touch, as the full force of the spring is not felt on the key until just before the blow is struck, the ordinary hammer-spring and hammer-spring rail hitherto necessary being by this construction entirely dispensed with, thereby still further reducing the cost of construction.

P is the back-catch, which is secured to and projects at or nearly at a right angle from the front side of the intermediate lever N by which the damper-lever B is operated. This back-catch P is provided with an elastic cushion 25, which, when the lever N is actuated by the throw-off arm *q* on the key being depressed, as described, is brought up firmly and squarely against the lower end of a long bumper Q, projecting down from the hammer-heel C, serving as it is pressed against said bumper to hold the hammer from rebounding as soon as it has struck the string and has fallen back, as seen in Fig. 3. By thus securing the back-catch to the lever N and making the bumper Q of great length, so that its lower end will have an extended range of motion as the hammer swings on its pivot, the back-catch and bumper will always be at or nearly at right angles to each

other, causing the pressure of the back-catch to be always exerted upon the bumper end-wise or in the direction of its length, holding it firmly and securely, whether the blow of the hammer be a light or a powerful one, and consequently there will be no tendency of the end of the bumper to slide or slip down on the back-catch, as has heretofore been liable to occur, and which is very objectionable, as it produces a wedging of the back-catch and bumper together and a consequent choking of the action, owing to their failure to separate on the release of the key. With this construction any extra pressure on the key to produce a powerful blow of the hammer will only cause the back-catch to be pressed more firmly against the end of the bumper without any slip in any direction, and as soon as the key is released the back-catch and bumper will separate at once, leaving the parts free to operate as before described, while when the key is being depressed the back-catch and bumper are kept at a short distance apart and only come into contact when the hammer falls back from the string, the bumper being then instantly caught by the back-catch and held firmly, as required, until the key is released, when the weight of the back-catch will assist in returning the lever N to its normal position, as seen in Fig. 2.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an upright-piano action, the combination, with the hammer and hammer-heel, the latter provided with a rest or projection 16, the jack, and the jack-butt co-operating with the latter, of the spring *p*, secured at one end to the jack and having its opposite or free end in contact with the rest or projection 16, said spring sliding on said rest and exerting an outward pressure against the same, substantially as and for the purpose set forth.

2. In an upright-piano action, the combination of the lever I, pivoted to the rail H, the lifter-rod and jack pivoted at its lower end to said lever I and provided with the regulating-button *s*, the throw-off arm *q*, projecting from the lever I, and the intermediate lever N, arranged between the throw-off arm and the button *s*, substantially as set forth.

3. In an upright-piano action, the combination of the lever I, pivoted to the flange of the rail H and actuated by the key L, the lifter-rod and jack M, pivoted to said lever I and provided with the regulating-button *s* and slot *n*, the throw-off arm *q*, secured to the lever I, the intermediate lever N, arranged between the throw-off arm and the button *s*, the jack-butt, hammer-heel, and hammer, the guide-pin *l*, projecting through the slot *n*, and the spring *p*, the latter connected at one end with the lifter-rod and jack M and at the opposite end with the jack-butt or hammer-heel, all operating substantially as described.

4. In an upright-piano action, the combination of the lever I, the lifter-rod and jack M, pivoted thereto, the lever N, operated by the

lever I, the hammer-heel having the jack-butt formed thereon, the back-catch P, secured to the lever N, and the bumper Q, projecting from the hammer-heel and adapted to be caught and held by the back-catch as the lever N is actuated, substantially as described.

5. In an upright-piano action, the combination of the lever I, the lifter-rod and jack M, pivoted thereto, the lever N, operated by the lever I, the hammer-heel having the jack-butt formed thereon, a spring connected at one end with said lifter-rod and jack and at the opposite end with the hammer-heel or jack-butt, the back-catch P, secured to the lever N, and the bumper Q, projecting from the hammer-heel and adapted to be caught and held by the back-catch as the lever N is actuated, substantially as set forth.

6. In an upright-piano action, the combination of the lever I, pivoted to the flange of the rail H, the lever N, operated by the lever I, the lifter-rod and jack M, pivoted to the lever I and provided with the button *s*, the hammer-heel having the jack-butt formed thereon, the spring *p*, the back-catch P, secured to the lever N, and the bumper Q, projecting from the hammer-heel, all operating substantially as described.

7. In an upright-piano action, the lifter-rod and jack pivoted to the lever I and provided with the regulating-button *s*, in combination with the hammer-heel having the jack-butt formed thereon, the intermediate lever N, the throw-off arm *q*, projecting from the lever I and adapted to move the lever N into contact with the button *s*, and the spring *p*, adapted to seat the lifter-rod and jack beneath the jack-butt and retract the hammer after the blow, substantially as set forth.

8. In an upright-piano action, the combination of the lever I, the lifter-rod and jack pivoted thereto and provided with the regulating-button *s* and slot *n*, the hammer-heel having the jack-butt formed thereon, the intermediate lever N, the throw-off arm *q*, projecting from the lever I and adapted to move the lever N into contact with the button *s*, the spring *p*, connected at one end with the lifter-rod and jack and at the opposite end with the jack-butt or hammer-heel, and the guide-pin *l*, projecting through the slot *n*, formed in the free end of the lifter-rod and jack, substantially as set forth.

9. In an upright-piano action, the lever I, pivoted to the flange of the rail H, the lifter-rod and jack pivoted at its lower end to said lever I, and the hammer-heel having the jack-butt formed thereon, the latter provided with the seat *w* and stop 12, in combination with the key L, provided with the adjusting-screw *g*, the latter adapted to contact with the under side of the lever I to lift the same, substantially as described.

10. In an upright-piano action, the combination, with the lever I, provided with the throw-off arm *q* and pivoted to the rail H, the lifter-rod and jack M, pivoted at its lower end to

said lever I and provided with the regulating-button *s*, and the hammer-heel *C*, having the jack-butt *D* formed thereon, of the lever *N*, the back-catch *P*, secured to and projecting from the front side of the lever *N*, and the elongated bumper *Q*, projecting down from the hammer-heel and adapted to be caught and held without slip by the back-catch as the lever *N* is actuated, substantially as set forth.

11. In an upright-piano action, the combination of the damper and damper-lever, the latter pivoted to the flange *a* of the rail *A*, the hammer and hammer-heel, the latter having the jack-butt formed thereon, the lever *I*, pivoted to the rail *H* and having the lower end of the lifter-rod and jack pivoted thereto, and an intermediate lever *N*, operated by the lever *I* and adapted to actuate the damper-lever on the depression of the key, substantially as set forth.

12. In an upright-piano action, the combination of the damper and damper-lever, the latter pivoted to the flange *a* of the rail *A*, the intermediate actuating-lever *N*, the lever *I*, pivoted to the rail *H* and provided with the throw-off arm *q*, the latter adapted to move the lever *N* to actuate the damper-lever on the depression of the key, the lifter-rod and jack pivoted to the lever *I*, and the jack-butt *D*, substantially as described.

13. In an upright-piano action, the combination of the rail *A*, flange *a*, hammer *E*, hammer-heel *C*, having the jack-butt *D* formed thereon, the lifter-rod and jack *M*, provided at its free end with the slot *n* and having the adjustable button *s*, the spring *p*, having one end connected with the hammer-heel or jack-butt, and the other end with the lifter-rod and jack, the guide-pin *l*, projecting from the hammer-heel and engaging the slot *n*, the lever *I*, pivoted to the flange of the rail *H* and having the lifter-rod and jack pivoted thereto, said lever *I* being provided with the throw-off arm *q*, the key *L*, provided with the adjust-

ing-screw *g*, the lever *N*, the back-catch *P*, secured to the lever *N*, and the bumper *Q*, projecting from the hammer-heel, all constructed and arranged to operate substantially as set forth.

14. An action for upright-pianos, substantially as described, the same consisting of the rail *A*, flange *a*, hammer *E*, hammer-heel *C*, having the jack-butt *D* formed thereon, the lifter-rod and jack *M*, provided at its free end with the slot *n* and having the adjustable button *s*, the spring *p*, having one end connected with the hammer-heel or jack-butt and the other end with the lifter-rod and jack, the guide-pin *l*, projecting from the hammer-heel and engaging the slot *n*, the lever *I*, pivoted to the flange of the rail *H* and having the lifter-rod and jack pivoted thereto, said lever *I* being provided with the throw-off arm *q*, the key *L*, provided with the adjusting-screw *g*, the lever *N*, the back-catch *P*, secured to the lever *N*, the bumper *Q*, projecting from the hammer-heel, the damper *c*, damper-lever *B*, pivoted to the flange *a* and adapted to be actuated by the lever *N*, and the damper-spring *e*, all constructed and arranged to operate substantially as described.

15. In an upright-piano action, the combination of the lever *I*, pivoted to the flange *f* of the rail *H*, the lifter-rod and jack *M*, pivoted at its lower end to said lever *I* and provided with the adjustable button *s*, the hammer-heel having the jack-butt *D* formed thereon, the throw-off arm *q*, projecting from the lever *I*, the lever *N*, and the key *L* with its adjusting-screw *g*, the latter forming a rest for the lever *I*, all operating substantially as set forth.

Witness my hand this 2d day of March, A. D. 1892.

GEORGE MORSE GUILD.

In presence of—

P. E. TESCHEMACHER,
HARRY W. AIKEN.