

No. 709,630.

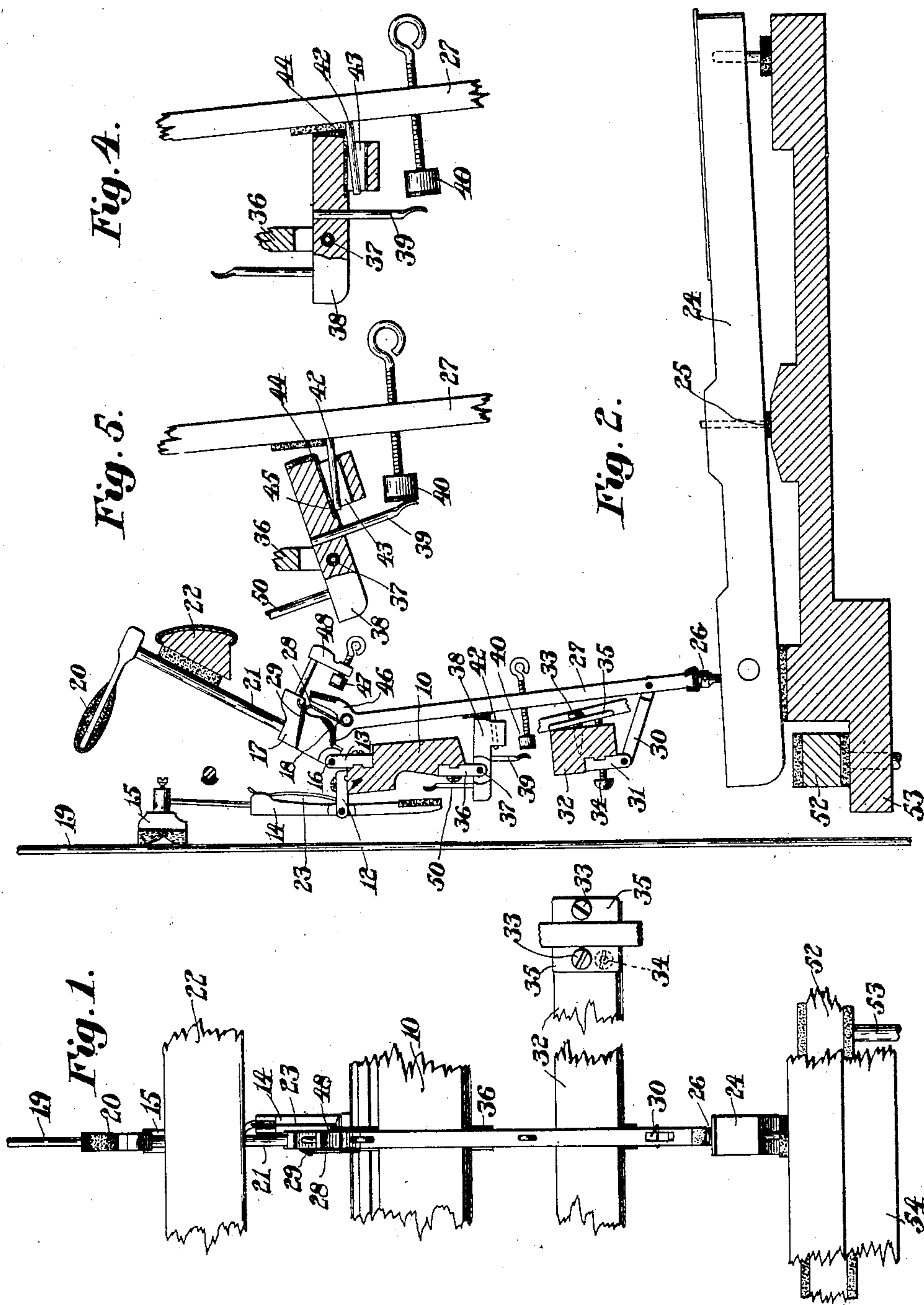
Patented Sept. 23, 1902.

G. M. GUILD.  
PIANOFORTE ACTION.

(Application filed Dec. 17, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:  
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F. B. Spaulding

Inventor:  
George Morse Guild,  
by *P. E. Teschemacher* Atty.

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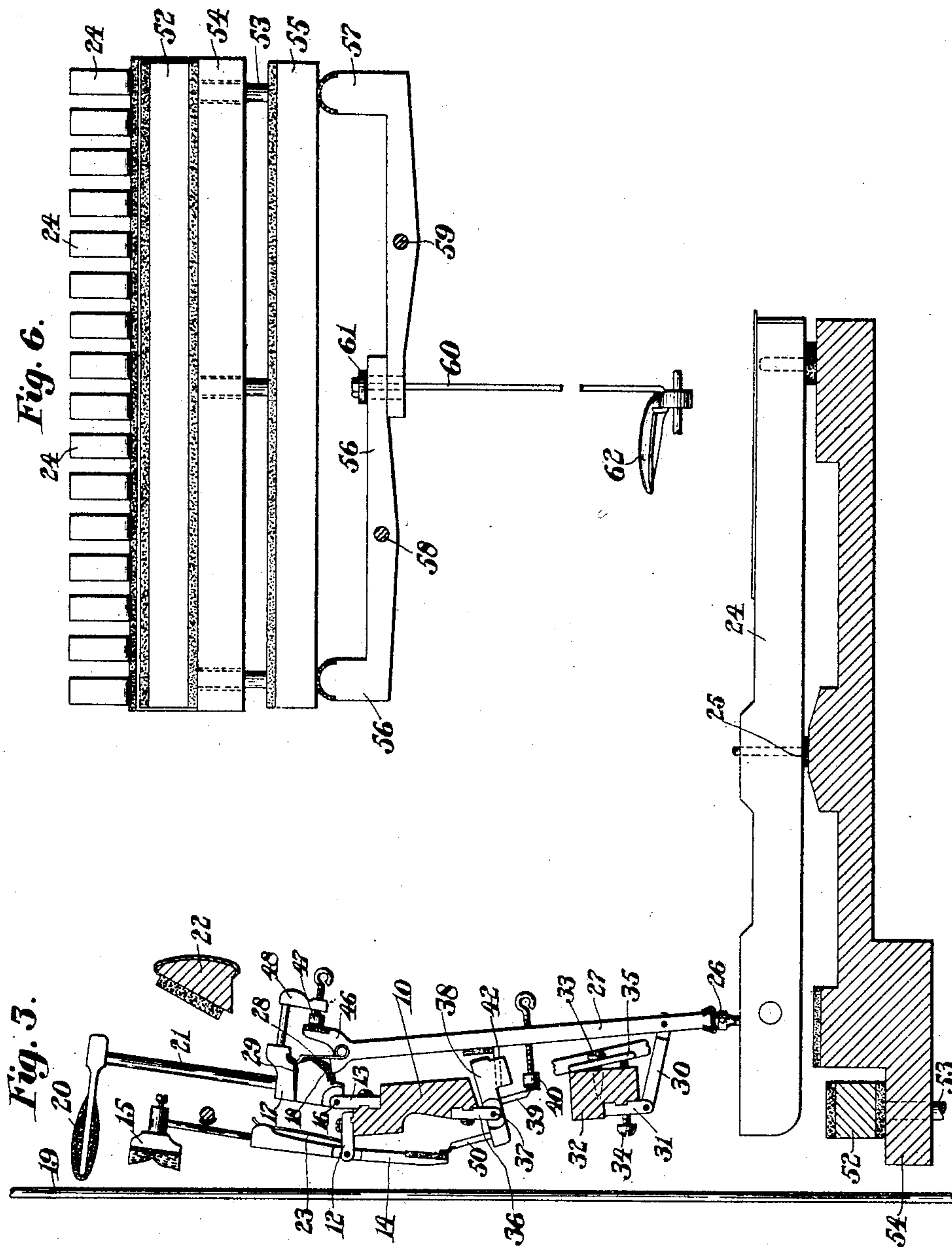
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*Inventor:*  
*George Morse Guild,*  
*by J. E. Teschemacher*  
*Atty.*



# UNITED STATES PATENT OFFICE.

GEORGE MORSE GUILD, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO  
LOUISE ADAMS GUILD, OF CAMBRIDGE, MASSACHUSETTS.

## PIANOFORTE-ACTION.

SPECIFICATION forming part of Letters Patent No. 709,630, dated September 23, 1902.

Application filed December 17, 1901. Serial No. 86,298. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE MORSE GUILD, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Pianoforte-Actions, of which the following is a specification.

My invention has for its object to materially simplify and improve the construction of upright-pianoforte actions whereby I am enabled to produce a more perfect action than heretofore and at a greatly-reduced cost.

A further object of my invention is to secure a more powerful blow of the hammer as well as more perfect and rapid repetitions of the same.

These objects I attain by the construction shown in the accompanying drawings, in which—

Figure 1 is a front elevation of an upright-pianoforte action constructed in accordance with my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a similar side elevation with the parts in the position which they occupy when the key is depressed. Figs. 4 and 5 are enlarged sectional details of the throw-off lever and the adjacent portion of the lifter-rod and jack, showing the parts in two different positions. Fig. 6 is a rear elevation of the lower portion of the action, illustrating the pedal-operated device for lifting the rear ends of the entire series of key-levers.

In the said drawings, 10 represents the center rail, to the top of which are secured flanges 12 13, the former having pivoted thereto the damper-lever 14, carrying the damper 15, while to the latter is pivoted at 16 the hammer-butt 17, the lower portion of which is properly shaped and constructed to form the jack-butt 18. 20 represents the hammer, 21 the hammer-stem, 22 the hammer-rail, and 23 the damper-spring, all constructed in the usual manner.

24 represents the key-lever, fulcrumed at 25 and carrying at its rear end an adjusting-screw 26, on the head of which bears the lower end of an upright rod 27, at the upper end of which is formed the jack, the entire rod forming what I term a "combined lifter-rod and jack," the jack portion of which lies directly beneath the jack-butt 18 and acts upon

the same to operate the hammer when raised by the depression of the key 24.

28 denotes the hammer-retracting spring, which is secured at its lower end to the combined lifter-rod and jack and is connected at its upper end with the hammer-butt 17 by means of a light cord 29.

To the lifter-rod and jack 27 near its lower end is pivoted an arm or link 30, the opposite end of which is pivoted to the flange 31 of a rail 32, adjustably secured by means of screws 33 34 to a bracket 35, said link 30 being inclined downward from the flange 31, whereby the lower end of the lifter-rod and jack is thrown outward as it is raised by the depression of the key. The rail 32 is secured to the bracket 35 by screws 33, passing through the bracket and entering the front side of the rail 32, while the screw 34 passes through the rail from the rear and takes a bearing against the bracket, whereby the rail is forced away from the bracket when permitted by loosening the screws 33. By making the rail 32 movable toward and from its supporting-bracket by means of the screws 33 34, as above described, the distance of the jack from the center or hammer-butt pivot 16 may be adjusted with great nicety to regulate the movement of the hammer in accordance with the dip or stroke of the key, and thus cause the hammer to properly strike the string when the key is depressed.

To a flange 36 at the bottom of the rail 10 is pivoted at 37 a throw-off lever 38, preferably having a slight downward inclination toward the front and provided with a downwardly-extending arm 39, which is adapted to be brought into contact with an adjustable throw-off button 40, projecting rearwardly from the lifter-rod and jack 27. The front end of the lever 38 lies in contact with the rear side of the lifter-rod and jack at a point intermediate between its ends and forms a center or fulcrum, on which it will turn as it is raised by the key, whereby as its lower end is thrown outward by means of the link 30 the jack at its upper end will be continuously carried inward toward the center pin or hammer-butt pivot 16, thus securing a continuous solid bearing of the jack against the jack-butt until the hammer has nearly reached the



string, so that it is impossible for the blow to fail when the key is rapidly struck in repeating.

The throw-off lever 38 is actuated by the 5 lifter-rod and jack 27 through the medium of a pin 42, projecting from the rear side of said lifter-rod and jack and fitting loosely within a bushed recess or aperture 43 in the throw-off lever, as shown in Figs. 4 and 5. The 10 throw-off lever is normally inclined downward with respect to the axis of the pin 42, so that when the lifter-rod and jack is in its lowest position, with the hammer at its greatest distance from the string, the pin 42 takes 15 a bearing against the throw-off lever at a point 44, Fig. 4, at the front end of the opening 43, which is located at a considerable distance from the fulcrum 37 of the lever, so that during the first portion of the upward movement 20 of the lifter-rod and jack the throw-off arm 39 is caused to move very slowly toward the throw-off button 40; but as the lifter-rod and jack continues to rise the outer end of the pin 42 takes a bearing against the throw-off 25 lever at a point 45 much nearer to the fulcrum 37, as shown in Fig. 5, whereby the movement of the throw-off lever 38 is greatly accelerated, so that the arm 39 will act quickly on the button 40, and thus cause the jack to 30 be thrown off its seat by the slight remaining downward movement of the key to relieve the hammer and allow it to recede from the string. The hammer can thus be carried close to the string 19 before the throw-off arm 35 39 touches the throw-off button 40, at which time the key has nearly reached the limit of its downward movement. Consequently the entire "throw-off" of the jack to release the hammer must be accomplished with what little 40 remaining downward movement is left for the key, which remaining movement is multiplied by reason of the pin 42 acting at this time on the throw-off lever much nearer to its fulcrum, as above described, and produces the 45 desired result in a most satisfactory manner.

By my improved construction I keep the jack in position under the jack-butt until the hammer is close to the string, when by the accelerated movement of the arm 39 of the 50 throw-off lever by reason of the pin 42 acting on the lever 38 nearer to its fulcrum the jack is instantly thrown off its seat into the position shown in Fig. 3 and the hammer thus released by the slight remaining downward 55 movement of the key, the upper end of an arm 46, projecting from the jack, being at that instant brought into contact with an adjustable back stop or catch 47, secured to an arm 48, projecting from the hammer-butt, by 60 means of which the hammer is caught and prevented from again striking the string after the delivery of the blow, a perfect back-catch being thus provided, by means of which the hammer after striking a powerful blow is 65 held close to the string ready for a rapid repetition of the blow, if desired. I am thus enabled to produce a most perfect and rapid

repetition of the note by the manipulation of the key and at the same time cause the hammer to give a fine and perfect blow every time 70 it strikes the string. To the throw-off lever 38 is secured an upwardly-projecting arm 50, the upper end of which when the key is depressed is brought into contact with the lower end of the damper-lever 14 to actuate 75 the same at the proper time, the spring 23 serving to retract said damper when the key 24 is released.

I will now describe the device which I employ in lieu of the ordinary soft-stop to soften 80 the blow of the hammer on the string, reference being had particularly to Fig. 6. Beneath the lower ends of the entire series of key-levers 24 and at a short distance therefrom I arrange a long bar 52, which is mounted 85 on vertical pins 53, sliding freely through cloth-bushed openings in the key-bed 54 and secured at their lower ends to another long bar 55, which rests on the outer ends of two levers 56 57, fulcrumed at 58 59. The inner ends 90 of these two levers 56 57 are lapped one over the other and through their ends is passed a rod 60, having a button 61 at its upper end, which rests on the end of the upper lever 56. The lower end of the rod 60 is suitably connected 95 with a soft-pedal 62, which when depressed will, through the connections described, raise the bars 55 and 52, the latter raising the ends of the key-levers 24 to a predetermined distance, which is limited by a 100 suitable stop—in this case the bottom of the key-bed with which the bar 55 is brought into contact—and in this manner the front ends of the entire series of keys are simultaneously depressed to carry the hammers close to the 105 strings and hold them in such position, so that when the keys are struck they will be capable of producing only a light soft blow of the hammers upon the strings.

What I claim as my invention, and desire 110 to secure by Letters Patent, is—

1. In a piano-action, the combination with a combined lifter-rod and jack extending from the hammer-butt to the key and a downwardly-inclined link pivoted at one end to a support 115 and at its opposite end to the lifter-rod and jack near its lower end, whereby said lower end is thrown outward as it is raised, of a rest or bearing contacting with the rear side of said lifter-rod and jack between its ends and 120 forming a center or fulcrum on which it will turn, whereby a continuous inward movement of its upper end toward the hammer-butt pivot is produced as its lower end is forced outward. 125

2. In a piano-action, the combination with a combined lifter-rod and jack extending from the hammer-butt to the key, and means whereby the lower end of the lifter-rod and jack is thrown outward as it is raised, of a rest or 130 bearing contacting with the rear side of said lifter-rod and jack between its ends and forming a center or fulcrum on which it will turn, whereby a continuous inward movement of



its upper end toward the hammer-butt pivot is produced as its lower end is forced outward, and a throw-off device for producing a sudden withdrawal of the jack from the shoulder of the hammer-butt when the hammer has nearly reached the string.

3. In a piano-action, the combination with a combined lifter-rod and jack extending from the hammer-butt to the key, and means whereby the lower end of the lifter-rod and jack is thrown outward as it is raised, of a rest or bearing contacting with the rear side of said lifter-rod and jack between its ends and forming a center or fulcrum on which it will turn, whereby a continuous inward movement of its upper end toward the hammer-butt pivot is produced as its lower end is forced outward, a throw-off device for producing a sudden withdrawal of the jack from the shoulder of the hammer-butt when the hammer has nearly reached the string, and a back-catch for holding the hammer close to the string.

4. In a piano-action, the combination with a hammer-butt, the latter having the jack-butt formed thereon, of a lifter-rod and jack extending from the key to the jack-butt, a key for actuating said lifter-rod and jack, a hammer-retracting spring connected with the lifter-rod and jack, a downwardly-inclined link pivoted at one end to a support and at its opposite end to the lower portion of the lifter-rod and jack, whereby the lower end of the latter is thrown outward as it is raised, a throw-off lever bearing at its front end against the rear side of the lifter-rod and jack and connected therewith by a pin projecting from said lifter-rod and jack into a hole at the front end of the lever, said lever forming a center or fulcrum for the lifter-rod and jack on which it will turn when its lower end is thrown outward, to produce a continuous inward movement of its upper end toward the hammer-butt pivot.

5. In a piano-action, the combination with a lifter-rod and jack provided with a rearwardly-extending pin and a throw-off button, of a throw-off lever provided with an arm adapted to be brought into contact with said throw-off button, and the front end of said lever forming a rest or fulcrum for said lifter-rod and jack on which it will turn as it rises to operate the hammer, the inner end of said pin during the first part of the upward movement of the lifter-rod and jack taking a bearing against the front end of the throw-off lever to raise the same slowly, and the outer end of said pin when near the termination of its upward movement taking a bearing against said throw-off lever at a point much nearer to its fulcrum, whereby the movement of said lever is accelerated to produce a quick throw-off during the latter part of the stroke of the key.

6. In a piano-action, the combination with a lifter-rod and jack extending from the hammer-butt to the key and provided with a rearwardly-extending pin, and a throw-off button

beneath the same, and means whereby the lower end of the lifter-rod and jack is thrown outward as it is raised, of a throw-off lever having a downwardly-extending arm adapted to be brought into contact with the throw-off button, said lever bearing at its front end against the rear side of the lifter-rod and jack and forming a center or fulcrum on which the latter will turn as it is raised, and having an aperture at its front end for the free reception of said pin, the inner end of the latter during the first part of the upward movement of the lifter-rod and jack taking a bearing on the lever at the front end of its aperture, and the outer end of said pin when near the end of its upward movement taking a bearing against the upper wall of said aperture at a point much nearer to the fulcrum of the lever to thereby accelerate the movement of the latter and produce a quick throw-off when the key is near the end of its stroke.

7. In a piano-action, the combination with a combined lifter-rod and jack extending from the hammer-butt to the key, of a rest or bearing contacting with the rear side of said lifter-rod and jack between its ends and forming a center or fulcrum therefor on which it will turn, and a downwardly-inclined link pivoted at one end to said lifter-rod and jack and at its opposite end to a support, whereby the lower end of said lifter-rod is thrown outward as it is raised, said support being made adjustable toward and from its bracket to vary the normal distance of the jack from the hammer-pivot in accordance with the dip or stroke of the key.

8. In a piano-action, the combination with a combined lifter-rod and jack extending from the hammer-butt to the key, and a downwardly-inclined link pivoted at one end to a support and at its opposite end to the lifter-rod and jack near its lower end, whereby said lower end is thrown outward as it is raised, of a rest or bearing contacting with the rear side of said lifter-rod and jack between its ends and forming a center or fulcrum on which it will turn, whereby a continuous inward movement of its upper end toward the hammer-pivot is produced as its lower end is forced outward, and a spring for holding said lifter-rod and jack against said rest or fulcrum.

9. In a piano-action, the combination with the hammer-butt, the latter having the jack-butt formed thereon, of a lifter-rod and jack extending from the key to the hammer-butt and provided with a rearwardly-extending pin and a throw-off button beneath the same, a key for actuating said lifter-rod and jack, a hammer-retracting spring connected with the lifter-rod and jack, means whereby the lower end of the lifter-rod and jack is thrown outward as it is raised, a throw-off lever having a downwardly-extending arm adapted to be brought into contact with the throw-off button, said lever bearing at its front end against the rear side of the lifter-rod and jack



and forming a fulcrum on which the latter  
will turn as it is raised, and having an aper-  
ture at its front end for the free reception of  
the pin projecting from the lifter-rod and  
5 jack, whereby the throw-off lever is actuated  
by the lifter-rod and jack, a damper, damper-  
lever and damper-spring, an arm projecting  
upwardly from the rear end of the throw-off  
lever and acting on the damper-lever as the

front end of the throw-off lever is raised by 10  
the lifter-rod and jack.

Witness my hand this 27th day of Novem-  
ber, A. D. 1901.

GEORGE MORSE GUILD.

In presence of—

P. E. TESCHEMACHER,  
F. B. SPAULDING.