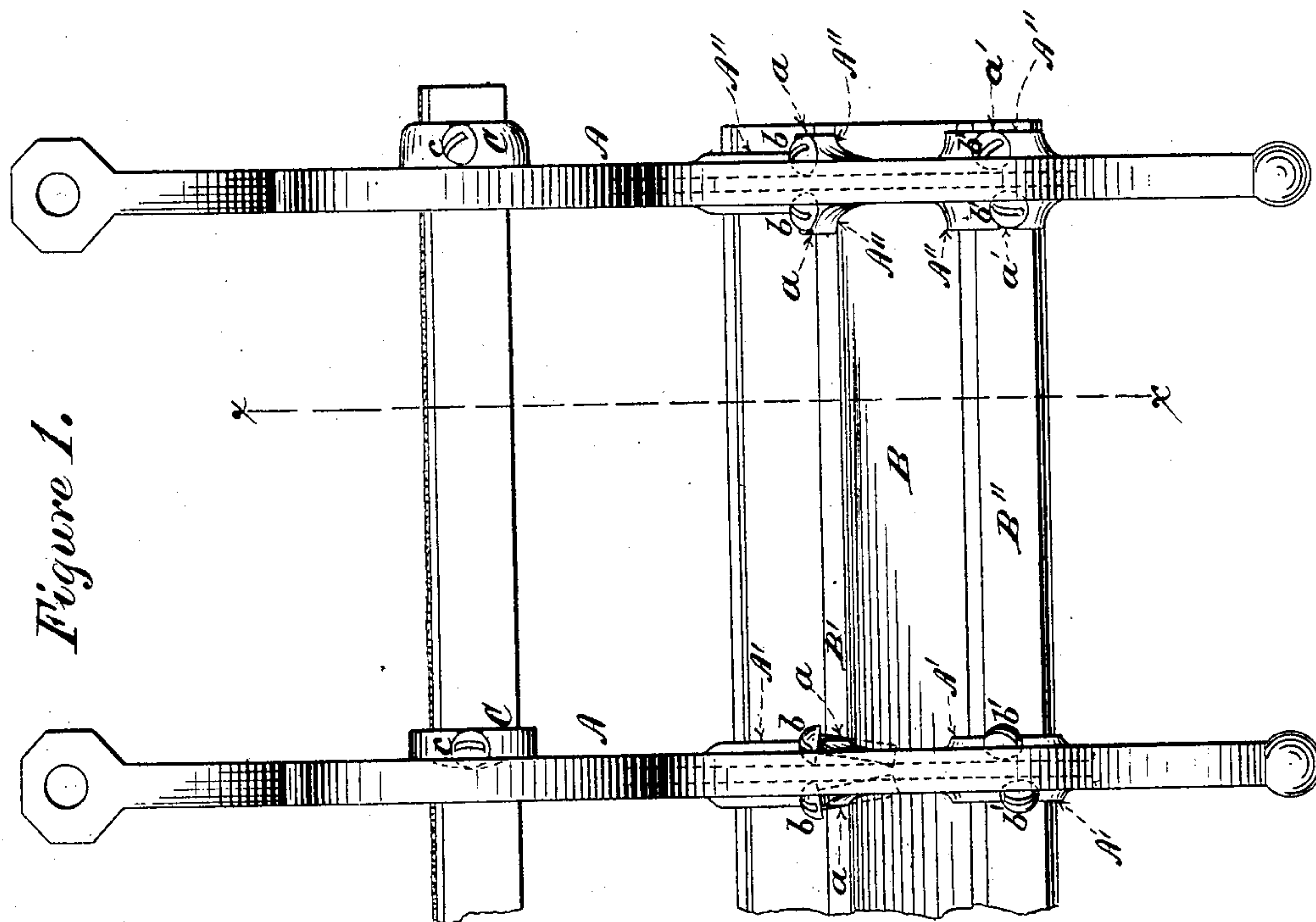
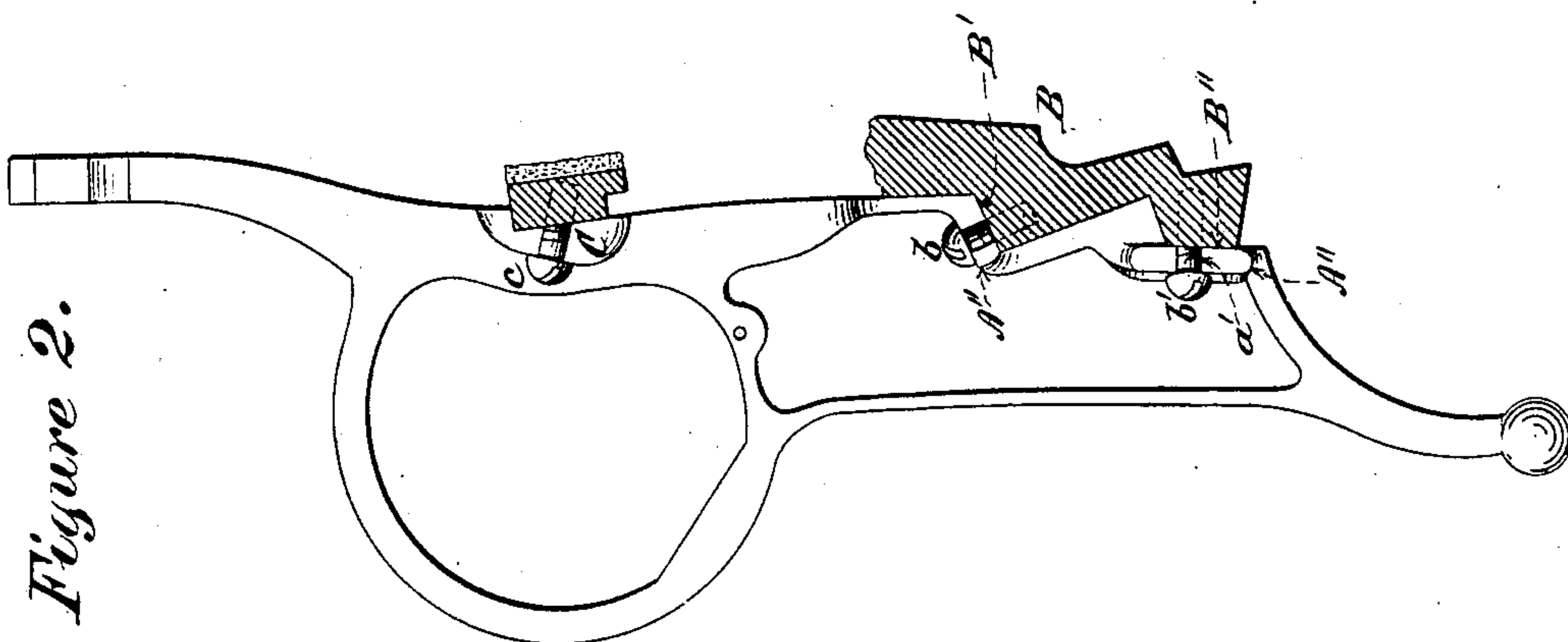


C. F. T. STEINWAY.
Piano-Action and Action-Frame.

No. 226,462.

Patented April 13, 1880.



Witnesses:

Edu^d Payson

M. L. Adams.

Inventor:

C. F. T. Steinway
Per Edw. C. Zimsky
Atty.

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Figure 4.

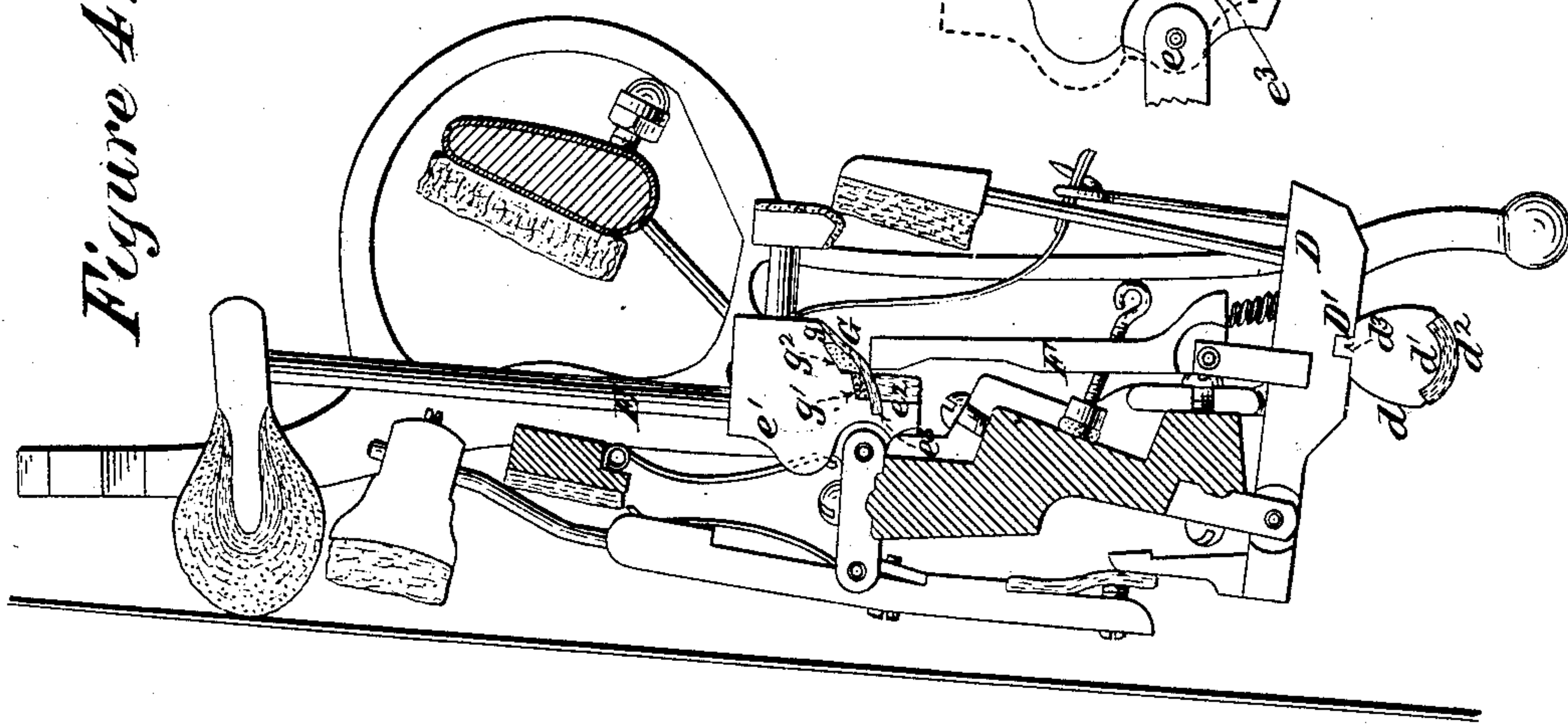


Figure 5.

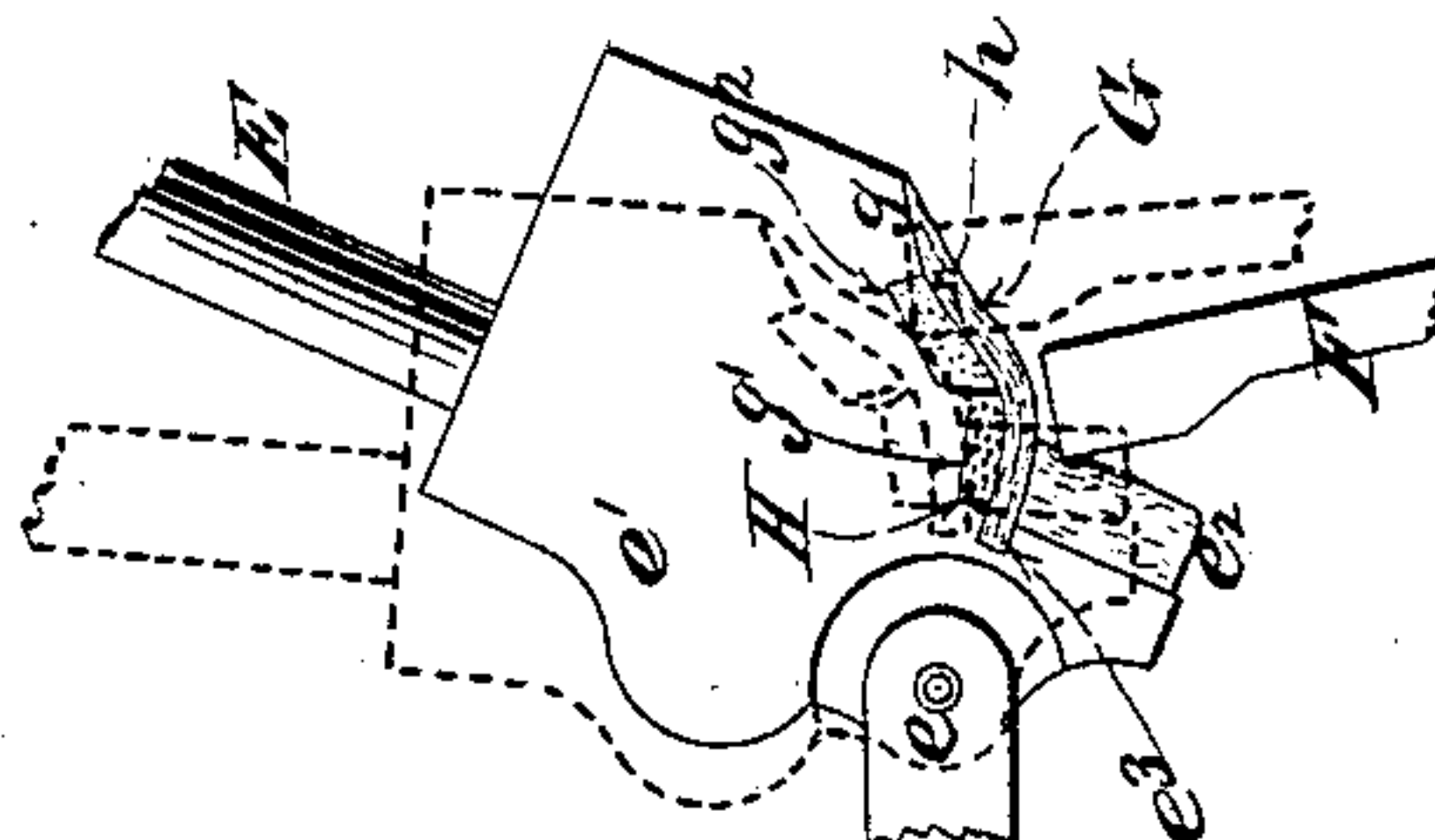
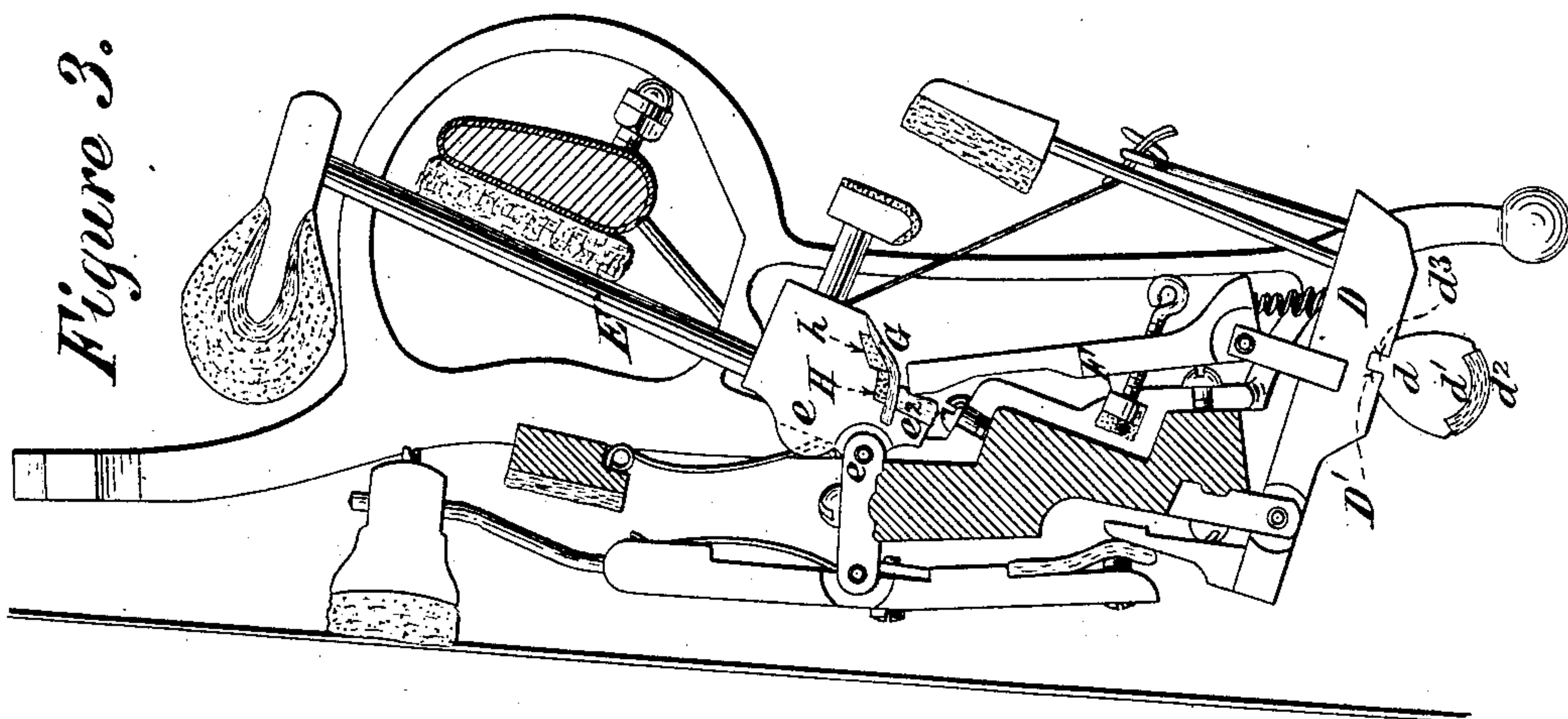


Figure 3.



Witnesses:

Edw^d Payson
M. L. Adams.

Inventor:

C. F. J. Steinway
Per Edw. E. Zumbly
Atty.

UNITED STATES PATENT OFFICE.

CHRISTIAN F. THEODOR STEINWAY, OF NEW YORK, N. Y.

PIANO-ACTION AND ACTION-FRAME.

SPECIFICATION forming part of Letters Patent No. 226,462, dated April 13, 1880.

Application filed January 14, 1880.

To all whom it may concern :

Be it known that I, CHRISTIAN F. THEODOR STEINWAY, of the city and State of New York, have invented certain Improvements in Piano-Actions and Action-Frames, of which the following is a specification.

The first part of my invention, which relates to that class of piano-action frames having horizontal wooden rails secured to vertical metallic standards or hangers introduced transversely into the frame at convenient distances apart, consists in casting upon the standards laterally-projecting notched flanges or lugs, for the purpose of receiving the screws by which the rails are secured to the standard, and in so arranging the bearings of the hammer-rail upon the standard that the screws by which it is fastened are inserted convergently into the wood, thus having a binding effect and constituting a fastening which cannot be loosened by any shrinkage of the wooden rail.

The second part of my invention, which relates to the mode of cushioning the nose of the hammer-butt in a piano-action, and also to the mode of cushioning the jack-lever bearing which receives the impact of the key or tappet by which force is transmitted for operating the action, consists in backing the felt or cloth shield which is applied to the nose of the hammer-butt, and against which the end of the jack strikes, with two pieces of elastic cloth or felt, the adjoining edges of which form an obtuse angle, the piece of cloth nearer the axis of the hammer-butt being preferably harder than the other, and the hammer-butt being preferably slightly recessed to receive the more elastic adjoining piece of cloth. This mode of cushioning affords a sharp corner or transverse line, defining the harder part of the cushion, and a more abrupt bend in the outer shield than can be made when a single piece of heavy cloth is employed, as heretofore, in which case the bend is necessarily curved upon a longer radius.

My cushion for the hammer-butt, to which I have given the name of "double cushion," greatly increases the nimbleness of the action by lessening the range of oscillation required for the disengagement and re-engagement of the jack with the hammer-butt.

My double cushion presents a comparatively

hard surface to receive the impact of the heavier blows of the jack, and a more elastic surface to receive those less violent impacts of the jack which are made when the repetition is too rapid to permit the jack to drop to its normal position after each blow. This part of my invention further includes the cushioning of the jack-lever bearing with a strip of felt or heavy cloth, glued at its ends to the end walls of a slightly-curved recess formed in the face of a wooden shoulder projecting downward from the under side of the jack-lever. The outer surface of the strip of felt or cloth thus applied forms a rolling bearing for the key or tappet by which the jack-lever is lifted, and, by reason of being fastened at the ends, the entire strip of felt or cloth is in a condition of longitudinal tension. This mode of fastening the cushion-strip in place and utilizing the longitudinal elasticity of the cloth capacitates it for withstanding long-continued use without losing its elasticity to such an extent as to cause a noise or thud to be made by the blow upon it of the key or tappet which lifts the jack-lever.

Finally, this part of my invention consists in providing the jack-lever with a wooden shoulder the grain of which is substantially perpendicular to the lever, and which is fastened by means of a narrow tongue, which is glued in a slot or recess formed in the bottom of the jack-lever.

By this mode of construction I guard against any diminution in the amount of projection of the shoulder from the jack-lever, and consequent variation in the relation of the jack-lever with the key or tappet which operates it, which might result from the shrinking of the material if the shoulder and jack-lever were formed of one piece of wood, or if the grain of the wood of the shoulder were parallel with the under surface of the jack-lever.

The accompanying drawings, which represent my improvements embodied in an upright piano, are as follows:

Figure 1 is a rear elevation of a portion of the action-frame, and Fig. 2 is a vertical section of the frame through the line *xx* on Fig. 1. Fig. 3 is a transverse vertical section exhibiting the action in a state of rest. Fig. 4 is a similar section, showing the relative positions

of the end of the jack and the nose of the hammer-butt when the hammer is in the act of striking, immediately before the disengagement of the jack. Fig. 5 is a full-sized elevation of a hammer-butt the nose of which is provided with my improved double cushion, showing in solid lines the normal position of the jack and butt, and indicating in dotted lines the relative positions assumed by the parts preparatory to the delivery of the thrust of the jack when the action is employed for rapid repetition.

The drawings represent a portion of a piano-action frame composed of the metallic standards or hangers A, introduced transversely into the frame at convenient distances apart.

The hammer-rail B is secured to each standard by the screws b b and b' b' , which are respectively inserted through the notches a a and a' a' cast in the laterally-projecting flanges A' and A'' on the inner edges of the standards.

It will be observed that the bearings B' and B² of the hammer-rail upon those parts of the standard through which the fastening-screws pass are at such an angle with each other that the fastening-screws are inserted convergently in the rail, and hence pull against each other, so that any shrinkage of the hammer-rail, instead of loosening the connection of the rail with the standard, has the effect of tightening it by increasing the strain on the heads of the fastening-screws. This prevents the vibration of the rail in case of shrinkage and permanently maintains the rail in proper relation to the standard.

By casting the notches in the flanges of the hangers I avoid the difficulty of boring holes for the screws, which ordinarily requires a long slender drill, and is difficult because of the extreme hardness of cast flanges. The necessity for boring holes in the flanges in which the fastening-screws will make a tight fit is obviated by my invention of angular bearings for the rail upon the standard and convergently-inserted holding-screws.

It will be seen that I provide notched flanges on both sides of the standard for the reception of the rail-screws, and I preferably insert the adjoining screws on the opposite sides of the standard in slightly-inclined directions, so that these screws are also relatively convergent. I also cast laterally-projecting notched flanges or lugs C upon the standards for the reception of the screws c , by which the damper-guard or hammer-spring rail is fastened.

The end standards of the frame may be provided with the wider notched flanges A'', and it will be convenient to provide those of the standards which are introduced intermediately into the frame with the narrower notched flanges A', in order that the flanges may not interfere with any portion of the action.

The advantages resulting from this mode of securing the horizontal rails to the standard are alike important in both upright and horizontal piano-action frames, and are equally

attainable in both cases by the employment of this part of my invention.

My jack-lever D is provided with a downwardly-projecting wooden shoulder, d , having upon its lower edge a recessed curved face, d' . The curved face of the recess is cushioned by a strip of felt or thick woolen cloth, d^2 , which is stretched over it and glued at its ends to the end walls of the recess, the radius of the curve and the length of the cushioned strip being such that in operation, as the bearing rolls upon the key or other object by which the jack is lifted, there remains constantly interposed between the curved face of the wooden shoulder and the key or end of the tappet which operates the lever a section of cloth which, by reason of being stretched and glued at its ends, is both longitudinally and transversely elastic. The wooden shoulder d is provided with a narrow tongue, d^3 , which is glued in the transverse slot D' formed in the under side of the jack-lever, the grain of the wood of which the shoulder d is composed being substantially perpendicular to the under surface of the jack-lever. The hammer-butt E oscillates upon the usual pivot e , and has its lower end, e' , provided with the usual cushion e^2 , against which the inner corner of the jack F bears when the action is at rest.

In operation the end of the jack strikes against that part of the cloth or felt shield G immediately adjoining the cushion e^2 . The shield G is a strip of cloth or felt glued at one end in a transverse recess, e^3 , in the arm e' of the hammer-butt, and glued at the other end to the inclined face g , which forms the upper part of the nose of the hammer-butt. Immediately above that part of the shield G which is over the upper end of the cushion e^2 , I apply the preferably hard cloth H, which is glued to the inclined face g' , forming the lower part of the nose of the hammer-butt, and extends outwardly a slight distance beyond the face of the cushion e^2 .

Between the two faces g and g' of the hammer-butt I form another face, g^2 , which is slightly recessed, and to which I glue the more elastic strip of cloth h , the inner or lower edge of which immediately adjoins the higher or outer edge of the harder cushion-strip H.

It will be seen that the two cushion-strips H and h form an obtuse angle with each other, and that there is hence a sharp bend in the cloth shield G, which is backed up by the two cushion-strips H and h . The presence of this sharp bend in the shield G diminishes the range of outward oscillation required for the disengagement of the upper end of the jack from the nose of the hammer-butt, and when the hammer has delivered its blow correspondingly diminishes the range of backward oscillation required to enable the jack to re-engage the nose of the hammer-butt in position to repeat the operation of the hammer.

In the ordinary method of construction, where the cushion is composed of a single strip of cloth, the nose is necessarily more round-

ing, the curve being necessarily on a longer radius, and the upper end of the jack requires therefore a greater range of outward oscillation in order to clear it from the hammer-nose, and correspondingly a like greater range of backward oscillation to enable it to re-engage the nose.

I preferably employ the harder cushion-strip H to receive those more violent thrusts of the jack when it starts from its normal position under the influence of a powerful stroke upon the key. When the strokes upon the key are rapidly repeated the end of the jack engages that part of the shield opposite the more elastic cushion-strip *h*, because in such case the strokes are repeated before the hammer and jack have time to fall fully back to their normal positions.

The angle of the more elastic part of the cushion and its degree of elasticity suitably adapt it for engagement and disengagement with the end of the jack during a rapid succession of strokes upon the key.

I claim as my invention—

1. A metallic standard for a piano-action frame provided with laterally-projecting notched flanges or lugs for the reception of the screws by which the horizontal rails of the frame are secured, substantially as described.
2. A metallic standard for a piano-action frame, and a wooden hammer-rail, in combination with convergently-inserted screws for securing the hammer-rail to the standard, substantially as and for the purpose set forth.
3. A cushion for the jack-lever bearing, which receives the impact of the tappet or key by which the action is operated, composed of a strip of thick cloth, felt, or other suitable material, fastened at its ends for the purpose

of utilizing the longitudinal elasticity of the cloth, substantially as shown and described.

4. The jack-lever D, provided with the downwardly-projecting wooden shoulder *d*, having upon its lower edge the recessed curved face *d'*, covered with the thick felt or woolen cloth *d²*, glued at its ends to the end walls of the recess, substantially as and for the purpose set forth.

5. The shoulder *d*, carrying upon its lower face the cushion *d²*, and provided upon its upper end with the narrow tongue *d³*, for insertion in the slot D' in the under side of the jack-lever, the grain of the wood of which the shoulder is composed being substantially perpendicular to the under side of the jack-lever, substantially as and for the purpose set forth.

6. A double cushion for the nose of the hammer-butt, composed of an external shield of felt, cloth, or other suitable material, backed up with two adjoining strips of thick cloth glued to two inclined faces upon the nose of the hammer-butt, and forming an obtuse angle at their meeting edges, substantially as and for the purpose set forth.

7. In a double cushion for the nose of the hammer-butt, the combination of the shield G with the harder cushion-strip H and the more elastic cushion-strip *h*, the two strips H and *h* being glued to the faces *g'* and *g²* of the hammer-butt E at such a relative inclination that the meeting edges of the two strips H and *h* form an obtuse angle, substantially as shown and described.

CHRISTIAN F. THEODOR STEINWAY.

Witnesses:

CONSTANTIN SCHMIDT,
HENRY ZIEGLER.