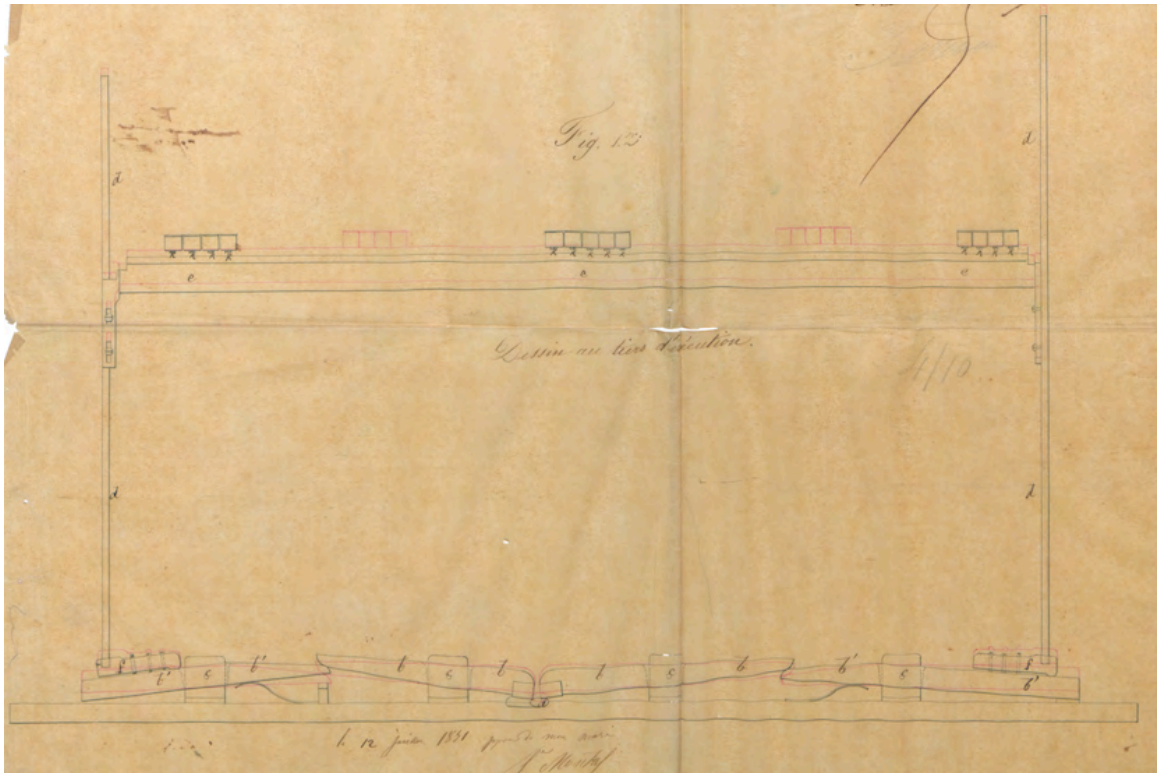
Descriptive memoir in support of a request for a third certified addendum to the fifteen-year patent granted on January 18, 1848 to Mr. Montal (Claude), piano maker, then living at 36 Rue Dauphine, Paris, now on Boulevard Montmartre, for various improvements introduced into grand pianos, square pianos, and upright pianos with vertical, oblique, and semi-oblique strings.

The improvement consists first in a pedal with the name of “expression,” or “nuance,” which allows the sound to be diminished or augmented gradually, depending on how much or little the foot depresses it; at the same time the dip of the keys is modified in proportion to the weakness or strength of the sound, i.e., when the sound is weak the key move down little, and when the sound is louder the keys move farther, without ever exceeding the natural dip of the keys.

This system not only makes the execution of nuances easier, but it can also reduce the amount of study needed to develop independence of the fingers, from the point of view of delicacy of touch.

Plate 1, fig. 1 gives a frontal view of the parts that communicate the movement of the pedal to the mechanism of the keyboard.

Fig. 2 gives a transverse section of the keyboard action, made perpendicularly to fig. 1.



a pedal; **b b’** levers doubly articulated at **c c’; d d** vertical rods to which is fixed a transverse bar covered with felt **e**, with the aid of screws and elongated slots to make it possible to regulate it to different heights. These rods **d d’** rest at their lower end on the extremities of the levers **b b’**, which extremities can be regulated for height by the rockers **f f** using adjustment screws.

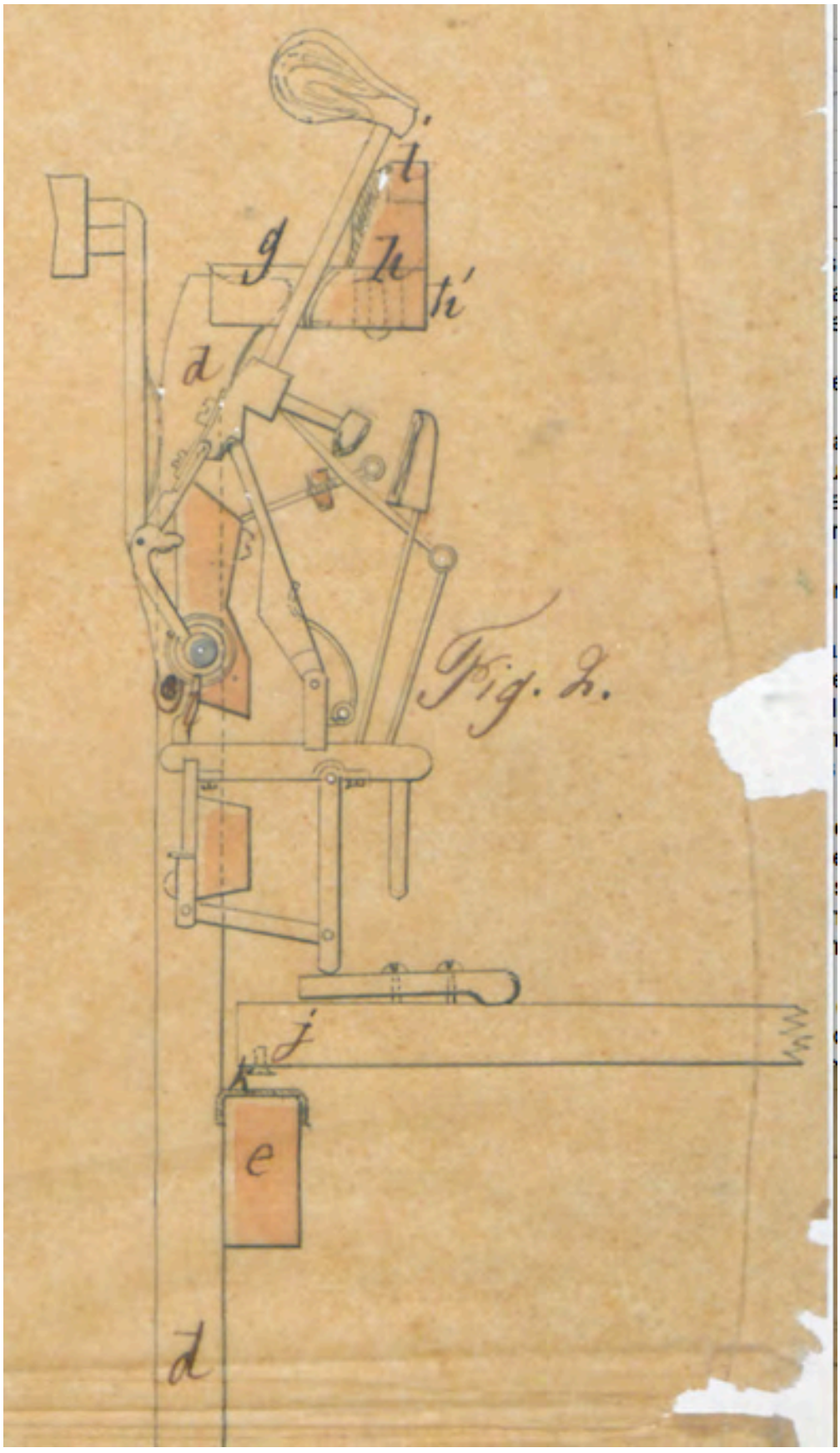


Fig. 2.

The upper end of the rods **d d** is felt or leather covered, and butts against wooden or metal levers **g** attached to the hammer rail **h** to make them pivot on themselves at **i** so as to reduce the throw of the hammers, by moving them nearer to the strings by a second felted bar **h'**, fixed to the bar **h** by screws through its slots. At the same time this takes place, the transverse bar **e** raises the backs of the keys at **j**, so as to lower their fronts and thus to reduce the key dip proportionally to the reduction of the hammer blow, and to maintain the escapements without a gap and close to the nose of the butt, whatever key dip the artist wishes to use.

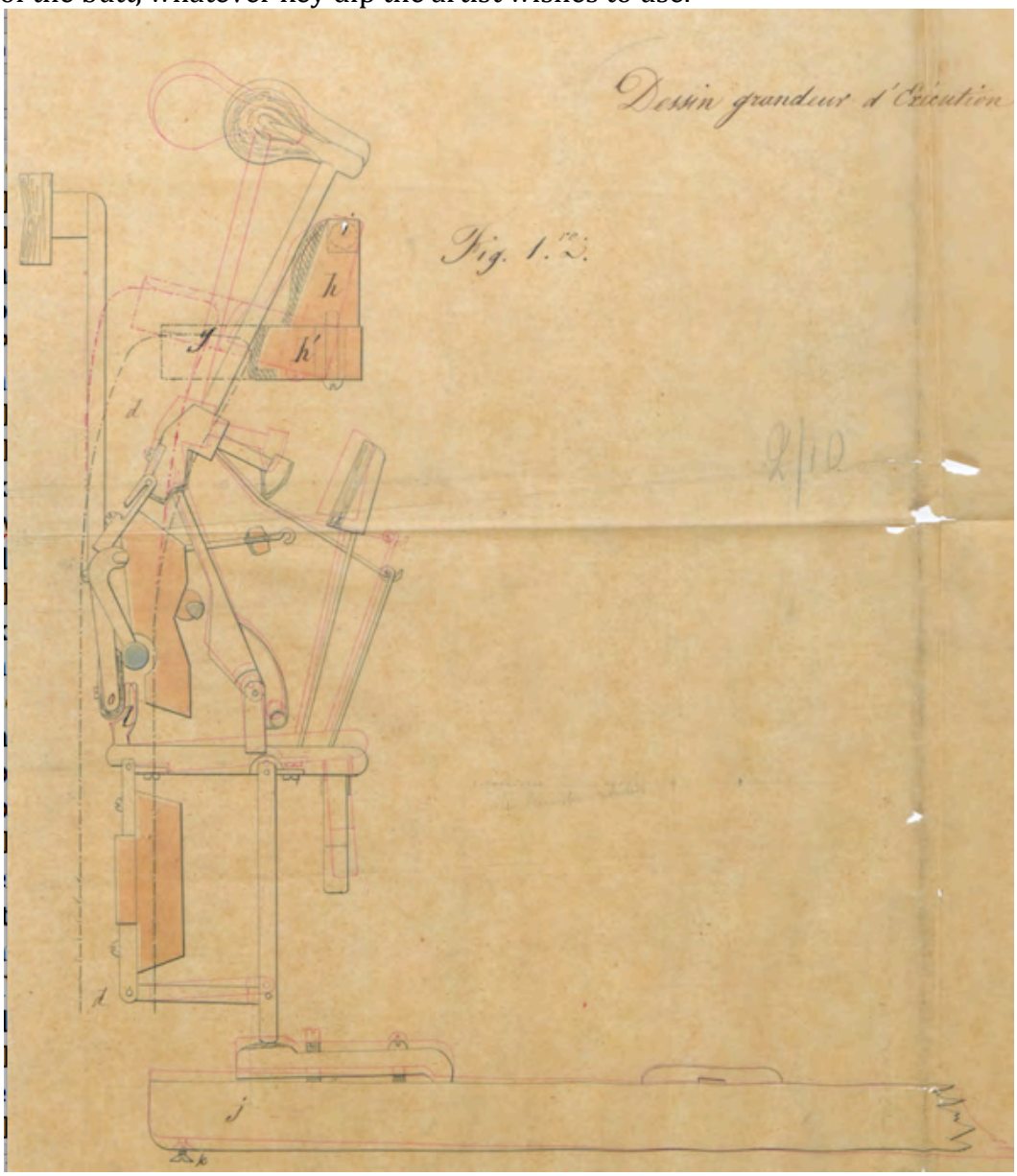


Plate 2 fig. 1 is a cross section of the action in actual size, where you can see the key and the action at rest in black lines and their proportional movements produced by the lowering of the pedal marked by red lines. You can see under the key **j** a screw **k** that bears on the felted rail **l** when this moves, and which is intended to allow the keyboard to be adjusted for the reduced dip. You can also see that the spoon **l** of the

wippen intended to raise the damper is found (when the action is at rest) a short distance from the lower part **o** of the damper, and that it bears against this **o** when the pedal is lowered all the way, so that the damper only rises by the action of the key, and not by that of this pedal, in order that the damper should always bear against the string, whether the pedal is raised or lowered.

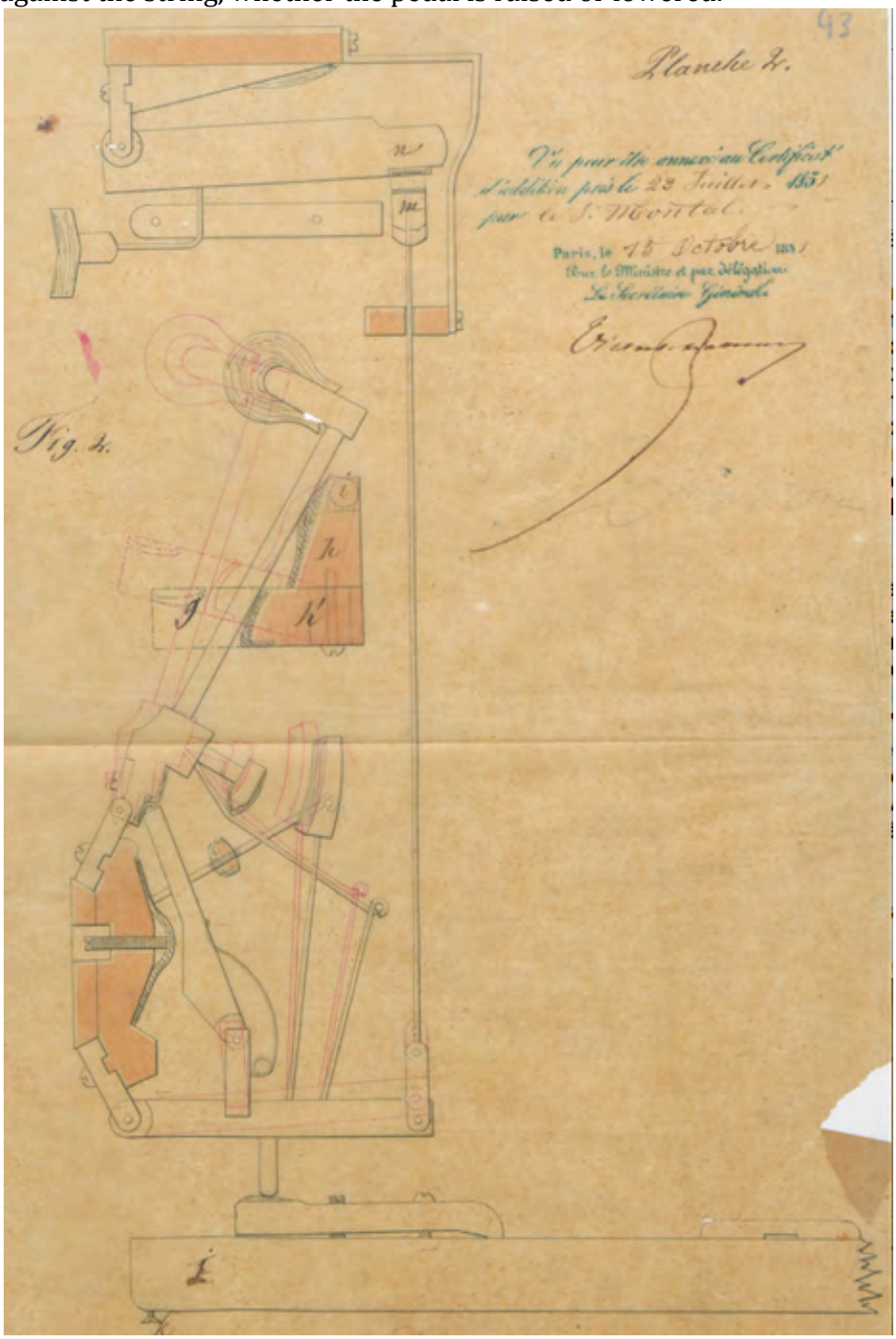


Fig. 2 is a vertical cross section of a so-called English action, with the damper above the hammers; here the hammer rest rail pivots in the same way as in the previous

figure, and the distance between the felt on the head of the rod **m** and the top of the damper **n** is designed to produce the same effect as that resulting from the distance between the spoon **l** and the lower portion of the damper lever in the preceding figure, i.e., when the expression pedal is depressed, the rod **m** approaches the damper **n** without causing it to rise, and only the lowering of the key by the finger makes the damper move away from the string to let it vibrate.

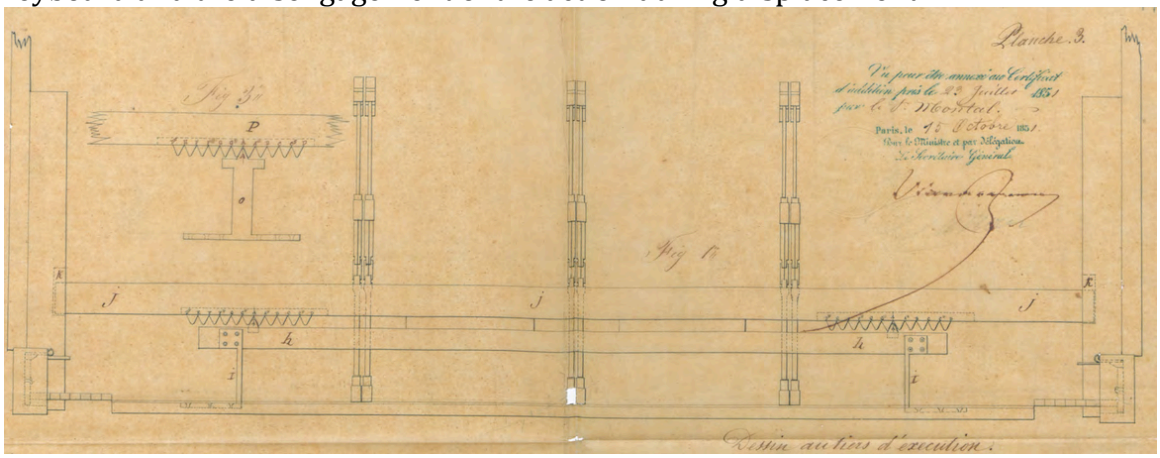
The metal or wooden pivot can be fixed in the rail **h** and pivot in bushed holes drilled into the sides of the action, or fixed on the outside of the action sides, with the help of a drilled plate arranged so that the pivot **I** passes through the sides, and enters a bushed hole in the metal or in the wood of the rail **h** itself; by this means, the hammer rail can be removed by removing the plates, without needing to remove one side of the action.

You can see by this description that the lowering of the pedal makes the hammers approach the strings, reduces the key dip, keeps the escapement close to the nose of the butt, and that the strength of the sound resulting from the larger or smaller hammer movement is proportional to the movement the key makes under the finger, depending how much the pedal is lowered. The same effect can be produced in square and grand pianos by modifying the pedal mechanism to the actions of these pianos.

Secondly, an improvement of counter tension that, in upright pianos, consists of reducing the front and top of the pin block by adding a metal plate curved so as to form along its entire length an angle or arc, depending on the application, so as to give it more solidity, to keep it from splitting, coming unglued, or pulling upward. This plate is pierced in front by as many holes as there are tuning pins, so as to allow these to pass and enter into the wood, and when the pins are pulled down by the strings, they are supported on the lower parts of their respective holes, which holds them, avoids fatiguing the wood, and contributes to solidity and tuning stability. This metal plate is attached by screws or bolts to hold it, the counter tension rods pass through the upper portion of this plate, and the heads or flanges at the ends of the rods bear against the metal, and hold it against the wood to aid and augment the solidity of the pin block. Next to each rod, one can place above and below the metal plate attachments also in metal to keep it from bending or curving across the block. You can see then that by the use of this plate the pin block acquires more solidity, and that the piano will last longer and hold tune longer. You could add several metal bars to the ends of this plate or between the strings, placed parallel to the strings, and with the other end attached to the hitch pin plate by screws allowing you to lengthen or shorten the bars, or these bars could also be cut in the middle and furnished with a reverse thread nut allowing them to be lengthened or shortened as needed. The bars serve as an aid to counter tension due to their ability to be lengthened or shortened at will.

Thirdly, an improvement for the purpose of making pianos transpose, i.e., to give each key the ability to play many notes rising or lowering by semitone from one to

as many as twelve, i.e., the span of an octave, whether all twelve are in the same direction, or some are upward and some are downward, by the displacement of the keyboard and the disengagement of the action during displacement.



See Plate 3, figure 1, which shows an elevation of the system that serves to isolate the action from the keyboard during its displacement. Bar **h** is attached to the keyboard by two metallic or wooden supports **ii** and follows the lateral movement of the keyboard. At its extremities, this bar **h** has a tooth marked with the letter **a**. Above this bar is found another bar **j**, covered in felt on the side that slides up and down in the mortises **kk**, cut in the sides of the action. Bar **j** raises the wippens and other parts of the action. This bar also has teeth toward its extremities, which mesh with those of the first bar [**h**] when the keyboard is moved from left to right and from right to left, by the use of a lever under the key bed.

Bar **h** follows the movement of the keyboard, its teeth **a** rub against the teeth of bar **j**, which rise to the height of the tooth during half the movement and allow it to descend during the second half. Each movement being of the width of a key or of a tooth, the keys are moved under the neighboring note without fail, the bar having raised all the wippens and parts attached to them during the movement. You can see that each movement of the keyboard to the left will lower by a semitone, and each movement to the right will raise it by the same amount.

The interval of each tooth in this bar is designated on the right by the letters a, a#, b, c, c#, and d, on the left by the letters g#, g, f#, f, e, d#, these letters designating in music the notes of the chromatic scale so as to know the names of the notes and the number of semitones one has transposed.

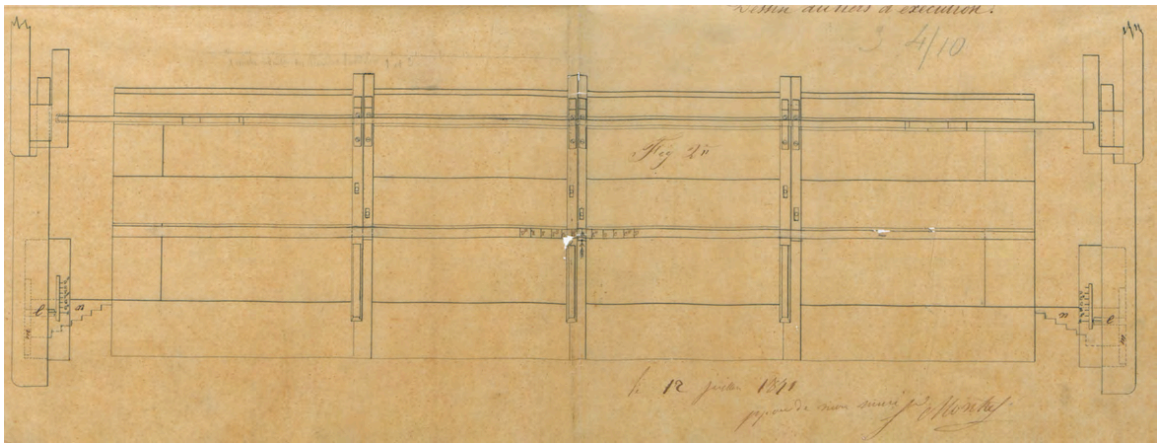


Fig. 2 shows the design of the keyboard with the accessories that regulate its movement. To the right and left of the keyboard is found a little button **ll**, each of which moves an interior slide **mm**. Next to these slides are fixed slotted plates **nn**.

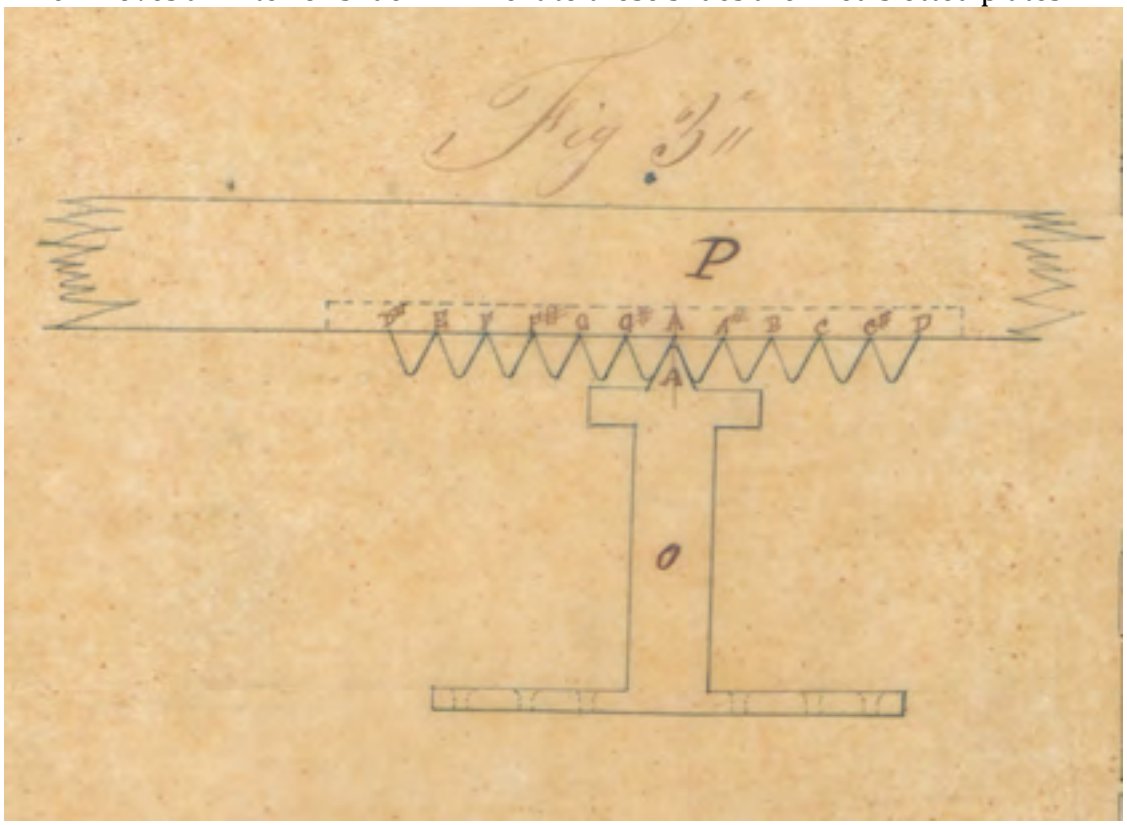


Fig. 3 shows another means to isolate the action from the keyboard. Here, two fixtures **oo** of which only one is shown, each have on their upper extremity a tooth **a** that meshes with the teeth in the upper bar **d**, similar to bar **j** in all respects, and produces the same effect.

In place of moving the keyboard by the lever placed under the key bed as described earlier, I can also use an apparatus called a transposition lock, that moves by means of a key that is turned to the right to raise and to the left to lower.

July 12, 1851