(No Model.) 5 Sheets—Sheet 1.

J. A. WESER.

STRING INSTRUMENT.

No. 580,966. Patented Apr. 20, 1897.

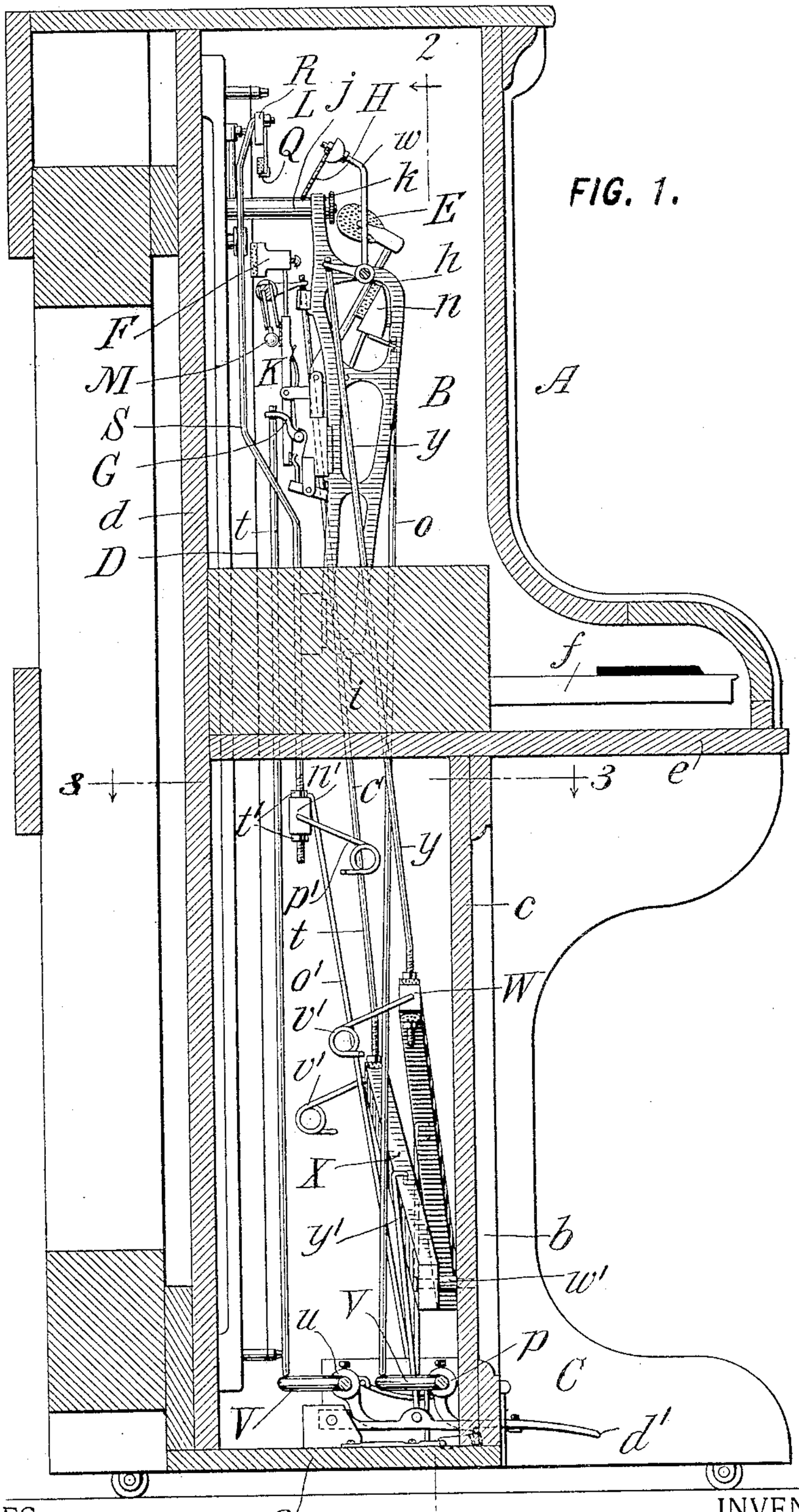

FIG. 1.

WITNESSES:

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Arthur G. Fraser & Co.

(No Model.) 5 Sheets—Sheet 2.

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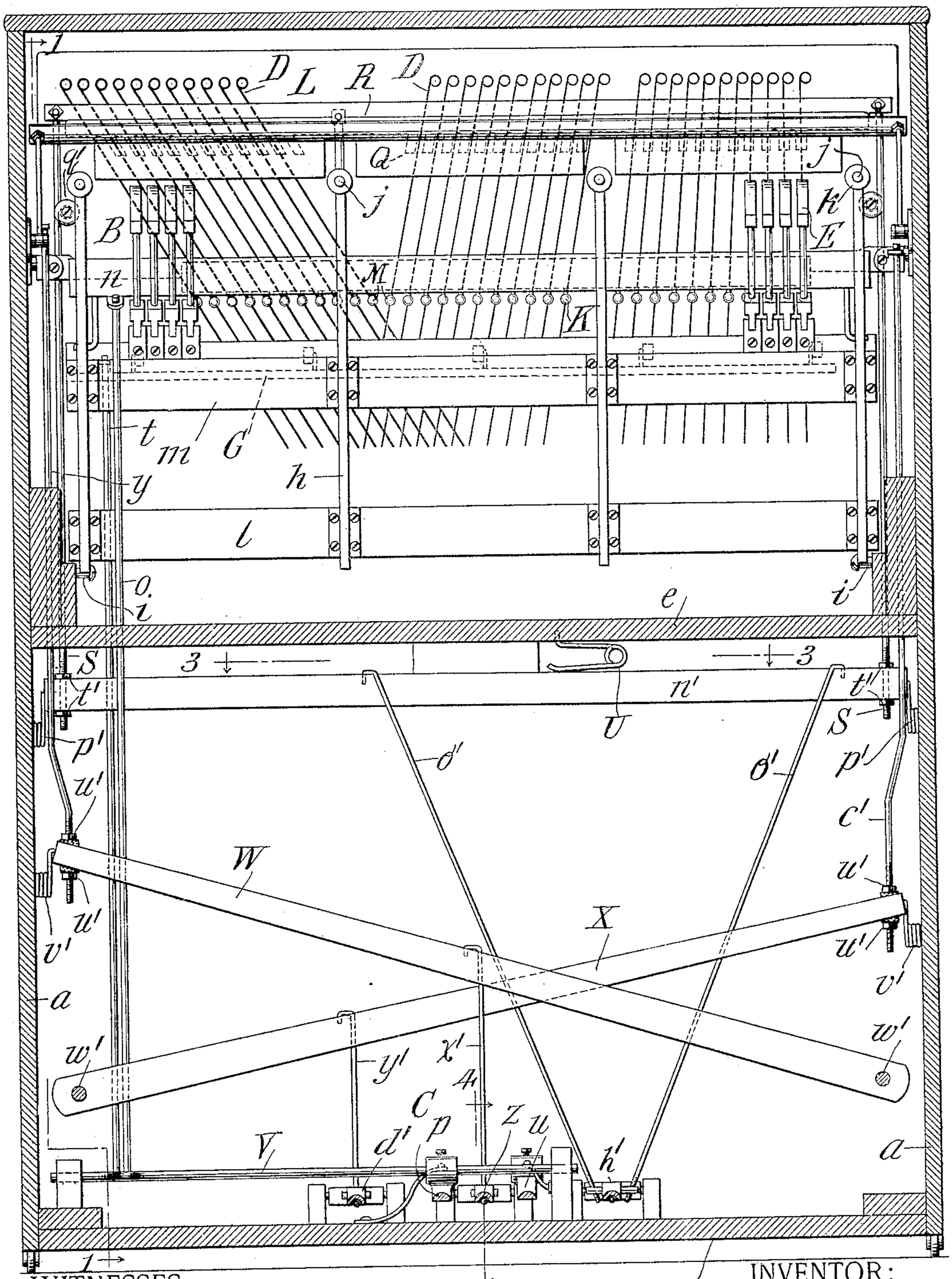

FIG. 2.

WITNESSES:

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(No Model.) 5 Sheets—Sheet 3.

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STRING INSTRUMENT.

No. 580,966. Patented Apr. 20, 1897.

FIG. 3.

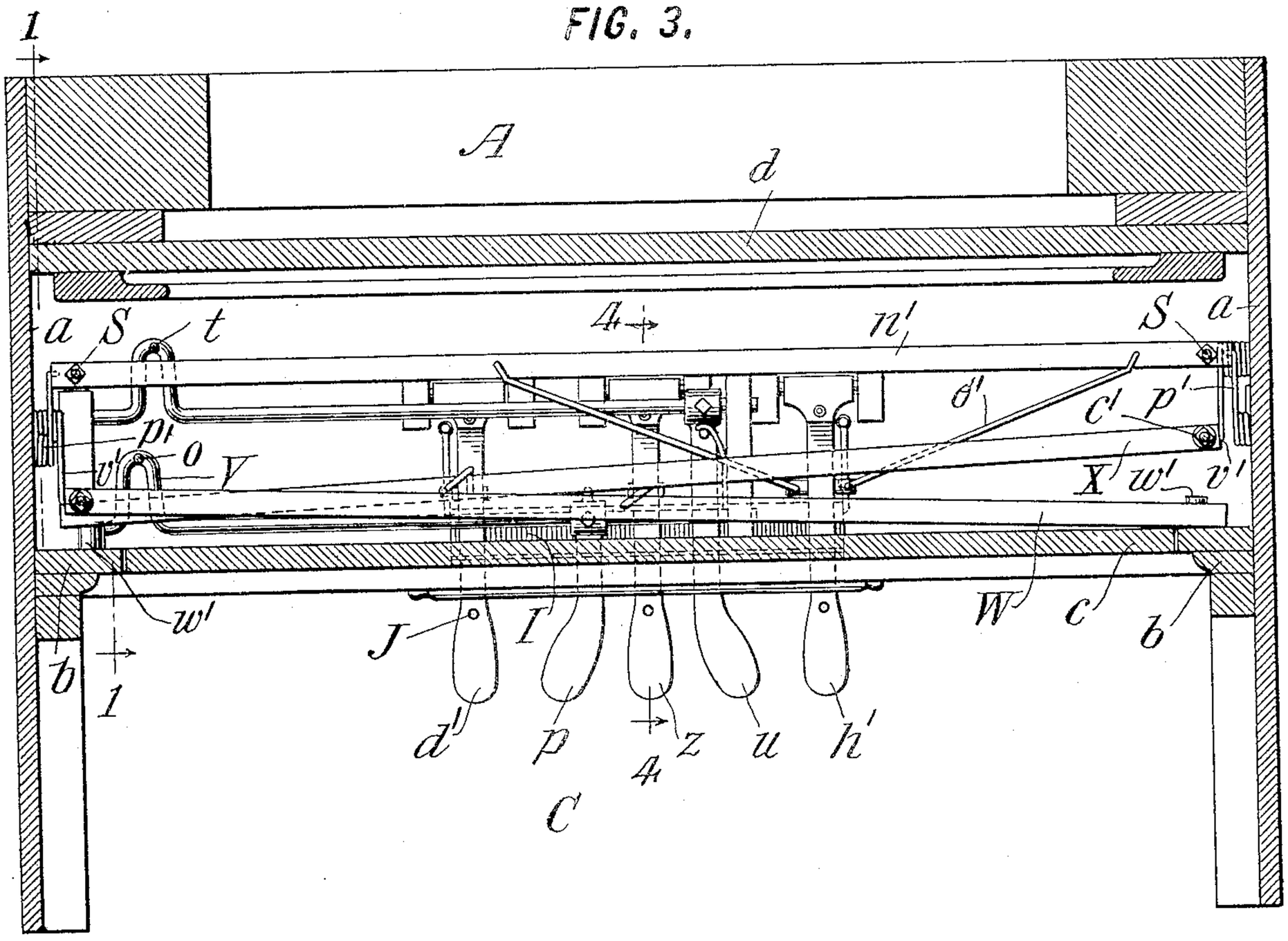
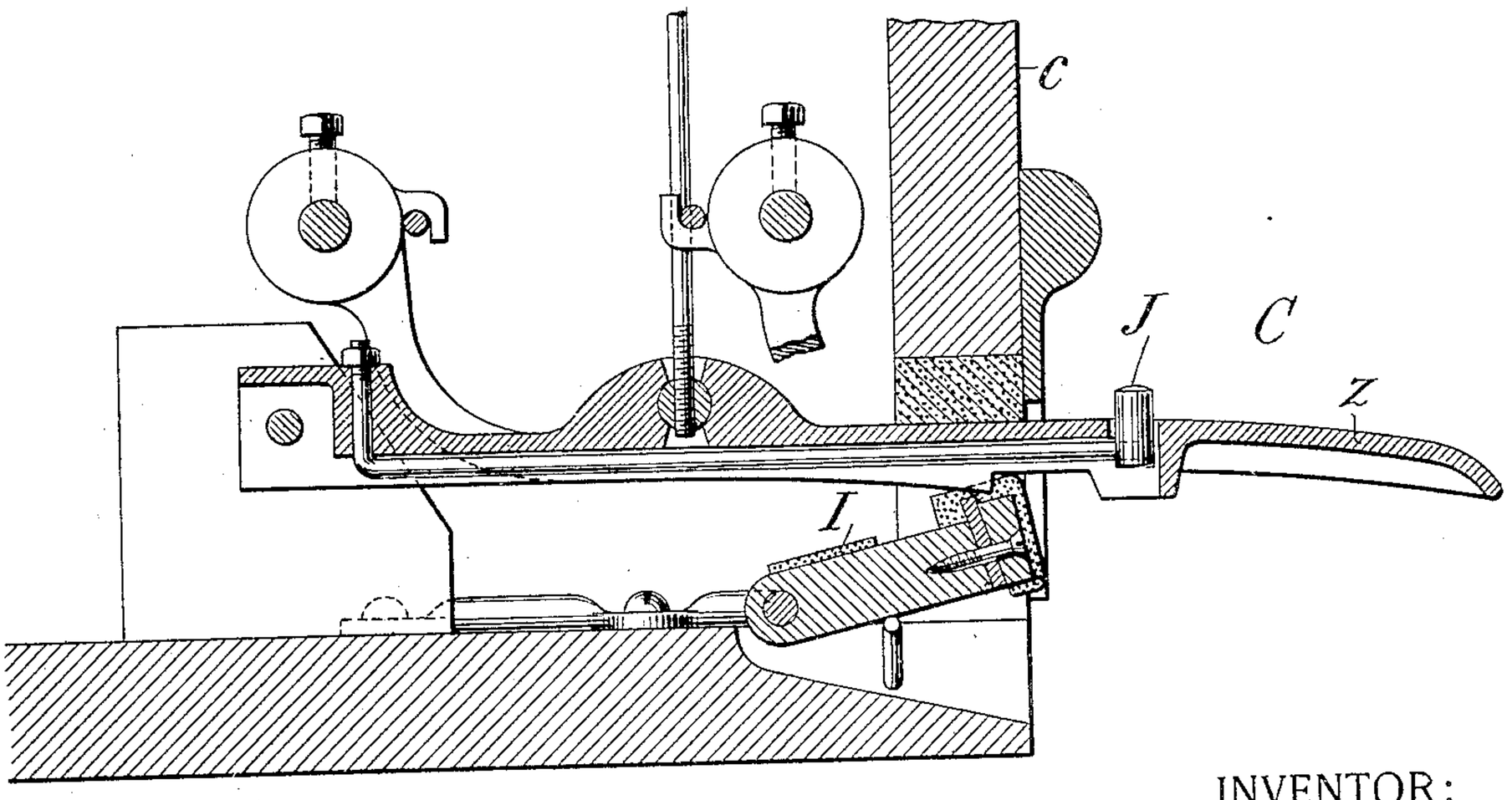


FIG. 4.



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(No Model.)

5 Sheets—Sheet 4.

J. A. WESER.

STRING INSTRUMENT.

No. 580,966.

Patented Apr. 20, 1897.

FIG. 5.

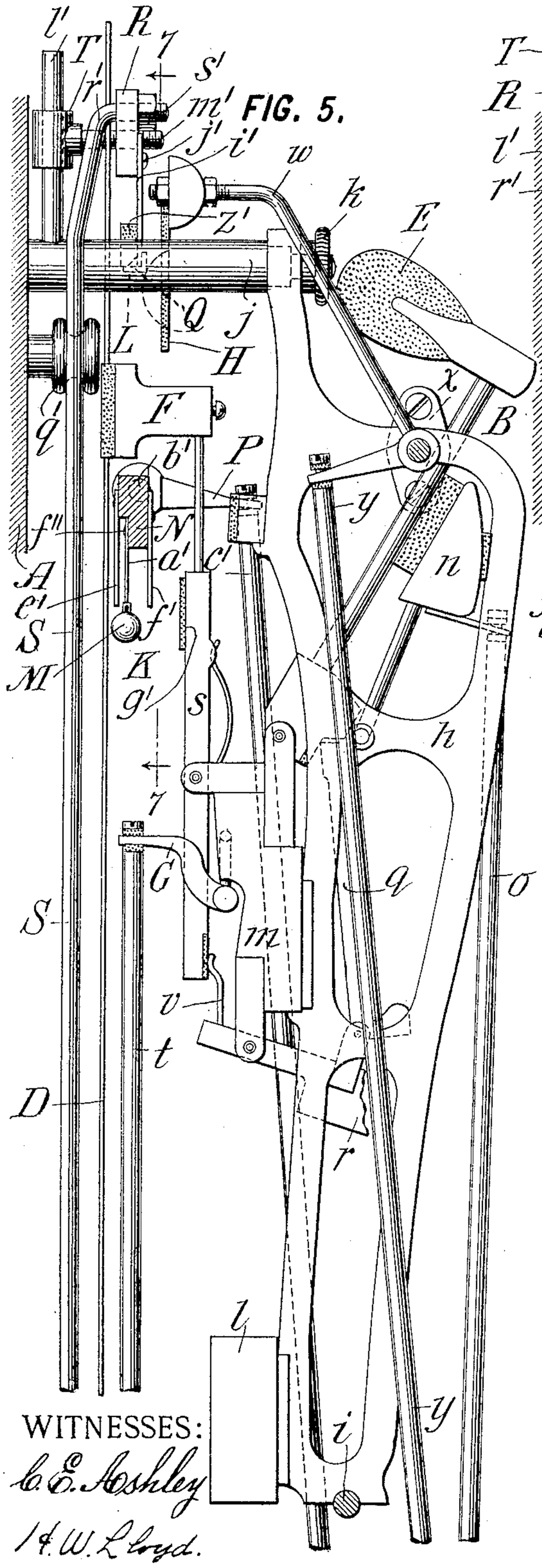
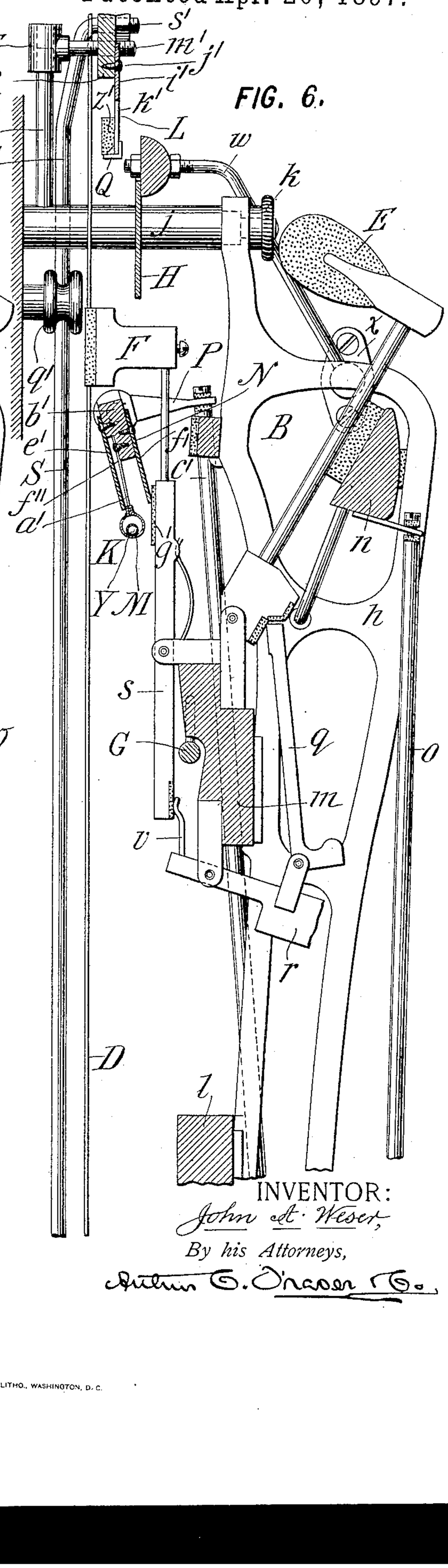


FIG. 6.



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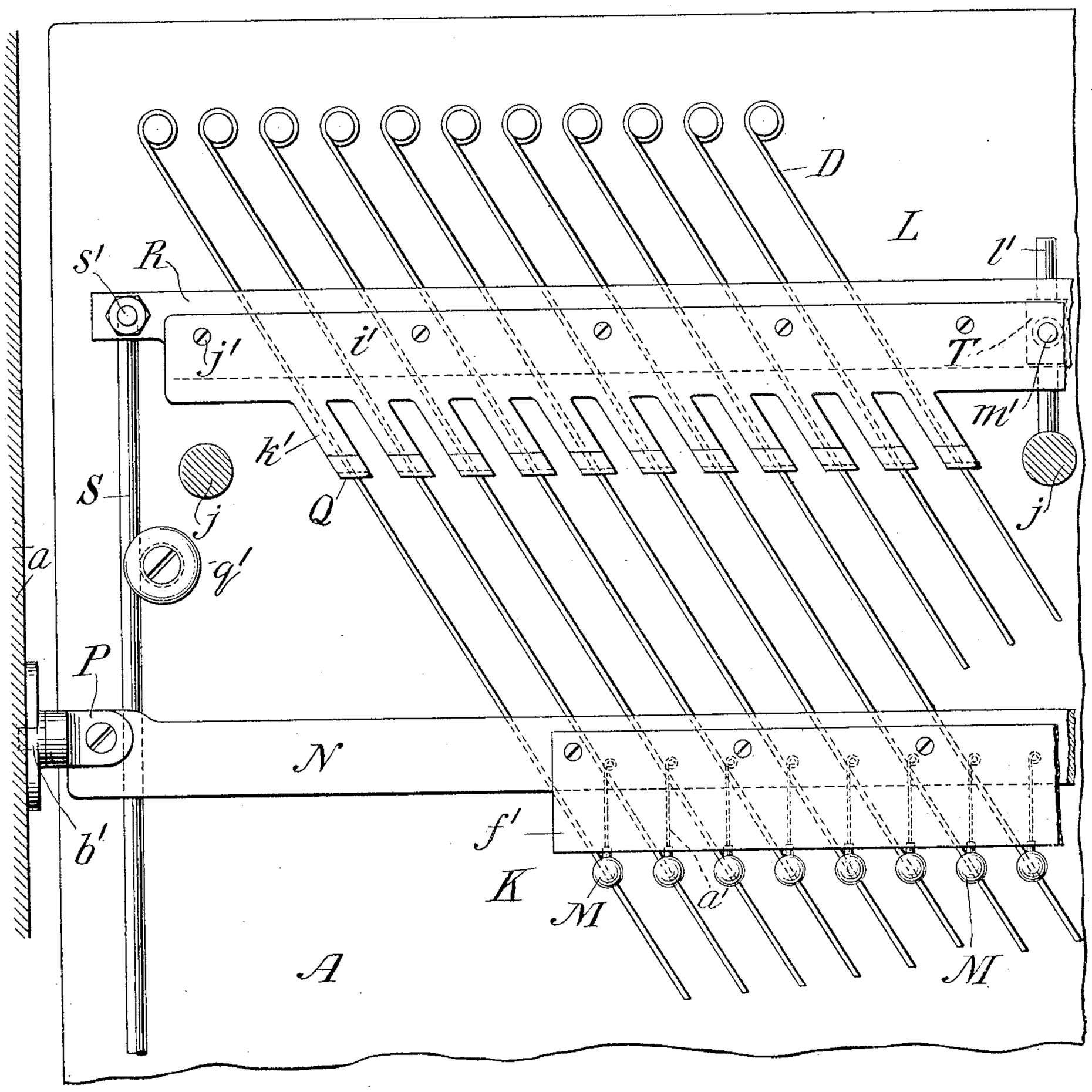
(No Model.) 5 Sheets—Sheet 5.

J. A. WESER.

STRING INSTRUMENT.

No. 580,966. Patented Apr. 20, 1897.

FIG. 7.



WITNESSES:

C. E. Ashley

H. W. Lloyd.

INVENTOR:

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UNITED STATES PATENT OFFICE.

JOHN A. WESER, OF NEW YORK, N. Y.

STRING INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 580,966, dated April 20, 1897.

Application filed June 18, 1895. Serial No. 553,183. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. WESER, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in String Instruments, of which the following is a specification.

This invention relates to string instruments, and particularly to instruments of this character know as "pianofortes," and aims to provide certain improvements in such instruments especially applicable to pianofortes.

Pianofortes are usually provided with devices for modifying the tone produced by the action of the hammers on the strings, for the purpose of producing forte or pianissimo effects, or otherwise modifying the ordinary tones of the instrument. These devices may be termed "harmonic devices." Those usually employed are the damper-lifter, operated by the forte-pedal, the movable hammer-rest, operated by the soft pedal, and the muffler, moved into or out of the path of the hammers by the muffler-pedal.

In addition to the harmonic devices mentioned there have heretofore been used in some cases suspended or pendent vibrators or buttons arranged in vibratory proximity to the strings, out of the path of the hammers, and set in motion by the vibration of the strings when the latter are struck by the hammers, thereby producing a peculiar tonic effect, which vibrators have been carried by an adjustable bar by which their position can be adjusted to make them active or inactive.

Another harmonic device heretofore employed has consisted of a series of tongues provided with hard strikers opposite the strings, a rigid shield between the tongues and the strikers, connected to the tongues so as to be moved with them within and out of the action of the hammers, the strikers being thrown by the hammers against the strings for peculiar effects.

My present invention provides various improvements comprising improved harmonic devices and improved operating mechanism for such parts.

In carrying out my present invention according to its preferred adaptation I provide an improved harmonic device in the nature of a striker interposed between the hammer and the strings, or in position to be operated by a hammer and be thereby caused to act against the strings, either of itself or in conjunction with the action of the hammer on the strings, when in the active position, removable to a neutral position, which is preferably of a metallic or resonant nature and has the effect of a picker in operating on the strings, producing then a distinctive modification or tonic effect, and I also provide an improved combination of a muffler with the striker or picker, and improved operating and adjusting devices for these several parts, all as will hereinafter be more fully set forth.

According to the most complete embodiment of my present improvements the improved tonic devices and the muffler are capable of joint or independent use at will of the operator, and in a pianoforte provided with my improvements the instrument can be used as an ordinary piano or as a muffler-piano or as one provided with either of the improved attachments, both of them, or either or both in conjunction with the muffler. This gives a great scope to the instrument, increasing its capacity, effectiveness, and adaptability for peculiar and novel renditions and expressions and enabling the imitation of the tones of one or several other instruments.

The harmonic devices may be constructed to change the tone of the piano to cause it to resemble, for example, a guitar, mandolin, cithern, banjo, or harp, or one may be especially adapted to tones resembling certain of these instruments and the other to tones resembling other of these instruments.

In the accompanying drawings, which show the preferred adaptation of my invention as applied to the pianoforte, Figure 1 is a transverse section of a pianoforte, showing the action, attachments, and operating mechanism in end elevation, the action parts being in the normal position and the vibrator, picker, and muffler in the inactive position. Fig. 2 is a vertical longitudinal section thereof, showing the parts in the same positions and cut on the line 2 2 in Fig. 1. Fig. 3 is a horizontal cross-section thereof, cut on the line 3 3 in Figs. 1 and 2 and showing the pedals and pedal mechanism. Fig. 4 is an enlarged vertical trans-

verse fragmentary section cut on the line 4 4 in Fig. 2 and showing the pedals and pedal-lock. Fig. 5 is a side elevation, on a larger scale, of the action and improved attachments, showing fragmentarily part of the instrument in transverse section. Fig. 6 is a like view showing the parts in vertical section, the vibrator and picker being in the inactive positions and the muffler in the active position, while in Fig. 5 these parts are all in the active position. Fig. 7 is a fragmentary vertical longitudinal section on the same scale as Figs. 5 and 6, cut on the line 7 7 in Fig. 5 and showing the vibrators and picker in the active position in front elevation opposite the strings.

Referring to the drawings I will now describe the preferred form of my invention as applied to a pianoforte of the construction therein shown.

Let A indicate the casing of a pianoforte; *a*, the side boards thereof; *b*, the front posts thereof; *c*, the front board thereof; *d*, the sounding-board; *e*, the keyboard; *f*, the keys, and *g* the bottom board. Let B represent the action, and C the pedals. The action B is disposed opposite the strings D and comprises a frame *h*, carried on pins *i* from the casing at bottom and posts *j* from the casing at top, being held on this post by removable thumb-nuts *k* or in other manner by which it can be easily removed. The posts *j* are rigidly and permanently secured to a fixed part of the casing, four being usually employed. Between the side frames *h* the action-frame has a small action-rail *l* and large action-rail *m*, serving to connect the side frames. The action carried by this frame consists of hammers E, resting on hammer-rest *n*, lifted by post *o* from the soft pedal *p*, which hammers are operated by jacks *q* from jack-whips *r*, and dampers F, carried by damper-levers *s*, all thrown off by the damper-lifter G, operated by post *t* from the forte-pedal *u* and individually operated by lifters *v* on the whips *r*. In addition to the action there is a muffler H, movable into position between the hammers and strings carried by arms *w*, pivoted to brackets *x* on the casing and moved by rod *y* from the muffler-pedal *z*. I is the lock for locking the muffler-pedal in the depressed or locked position, and J the releaser therefor.

The operation of these parts is usual and well known as far as described, the hammers striking the strings as the keys are depressed, pianissimo effects being produced by limiting the throw of the hammers by raising the hammer-rest through depression of the soft pedal, forte effects being produced by lifting all the dampers by tilting the lifter G through the depression of the forte-pedal, and a further harmonic or modified effect being obtained by the interposition of the muffler between the strings and hammers, either temporarily by depressing the muffler-pedal or throughout a prolonged period by locking this pedal depressed. When thus locked, the pedal is released by depression of the releaser J, which disengages the beak of the lock from the nose on the under side of the pedal.

As thus far described the parts are of usual and well-known, and may be of any suitable or desired, construction and operation so far as my present improvements are concerned.

My present invention provides several features of improvement which I will now proceed to describe in their preferred forms of construction, operation, and combination.

My improvements comprise an improved harmonic device in the nature of a vibrator, embodied in the attachment shown at K, an improved contacting or striking device shown in the attachment lettered L, an improved combination between the latter and a muffler, and certain improvements in the details of construction and operation for parts of these and analogous characters.

The vibrators preferably consist of a plurality of hollow resonant objects M, disposed in vibratory proximity to the strings and contacting therewith as the latter vibrate, depending from a movable carrier N, supported therefrom by flexible non-resonant cords or other suitable provisions *a'* and movable from an active to an inactive position. To effect this movement, the carrier is movable, being preferably carried by a bracket P, swinging on an axial stud *b'* and having an outwardly-projecting arm manipulated by a post *c'* from a vibrator-pedal *d'*, which when down holds the vibrators in the active and when up holds them in the inactive position.

To prevent excessive movement of the vibrators, I provide guards *e'* and *f'*, one at the string side and the other at the action side of the vibrators, disposed to contact therewith or with the supports thereof to limit undue movement and thus prevent accidental striking of the vibrators against parts of the instrument. The guards are preferably both depending guards of soft, stiff, and non-resonant material, as felt or leather, and attached to and moved with the carrier N. The latter is shown as having a rabbet *f'''*, on the side of which the strings *a'* are fastened, and with side faces, upon which the guards are fastened. To further reduce the risk of noise, I also provide guards on the instrument, preferably pieces of soft felt or other non-resonant material *g'*, on the inner faces of the levers *s*, which will deaden or cushion the blow if the vibrators strike these levers. These guards, or either or any two of them, may be used as desired and constructed in any suitable manner. I find the form shown the most effective in operation.

The striking or contacting harmonic device provided by my invention is interposed in the path of the hammers, or operated thereby to strike the strings when the hammers are thrown toward the latter. These devices are

preferably constructed of metal, and consist of strikers or pickers Q, suitably carried, as by a frame or bar R, supported and moved by rods S, operated by the striker or picker pedal h', which when depressed brings the strikers into the active position and when released or raised moves them out of or above the path of the hammers, so that then they are inactive or neutral. As shown, the strikers are depending objects carried elastically by a metal or elastic supporter i', fastened to the carrier-bar R by screws j', by setting up which the supporter can be slightly adjusted relatively to the carrier to properly dispose the strikers opposite the strings, which supporter preferably consists of a single metallic strip extending across all the strings and notched between the strings, so that its intervening portions constitute tongues k', on the lower ends of which the objects q are formed or carried and which, if desired, can be bent to effect radical adjustment of any object Q. The objects Q are best disposed at right angles to the strings, or edgewise thereto, whereby their edge in engaging the string gives a peculiar picking effect to the tone of the latter. As shown, the objects Q are formed of an angular piece of metal soldered onto the tongues in such manner that both the bend of the metal, the thickness of the tongue, and the solder serve to stiffen or reinforce the object at outer side and corner. A soft pad z' is best placed on each picker.

The strikers may be moved against the strings by the hammers in any suitable manner, but I prefer to so locate them relatively to the hammers that their lower ends will be slightly at one side of or above the portion of the hammer striking the strings, as shown in Fig. 5, so that the hammer will strike a slanting blow at the lower side of the strikers, thereby giving to the latter a slight tendency to upward distortion as they are moved toward the string, whereby the picking effect of the strikers on the strings is increased. The best location is to dispose the strikers so that with a normal blow of the hammers the latter will simply act on the strikers, but with an unusually forcible blow they will act both on the strikers and on the strings directly, as it will be in the construction shown in Fig. 5.

While the strikers may be supported otherwise, I prefer to use the elastic support, which is also resonant and stiff enough to permit the application of the hammer-blow to it at any point in its length, as this support immediately throws back the hammer and the striker from the strings and permits the location of the striker in close proximity to the latter.

My invention also comprises means whereby a muffler can be employed in conjunction with and independently of the strikers. The muffler H for this purpose is mounted, preferably, between the strikers and the hammers in such position that when both the strikers and muffler are active the hammers will hit the muffler, move it against the strikers, and through it move the latter against the strings, while when the strikers are in the inactive position the muffler will receive the blow of the hammers and impart it directly to the strings, as usual. Disposing the muffler at the hammer side of the strikers preserves the peculiar metallic or picking effect of the latter on the strings, while softening or modifying the sound through its cushioning effect on the blow and its deadening effect on the strikers or their resonant supporters. With the construction shown the muffler occupies its ordinary position or normal distance in front of the strings, the strikers requiring so little space that they can conveniently be disposed between the muffler and strings without abnormal outward projection of the former.

A feature of my improvements relates to the guiding and adjustment of such movable devices as the carrier for the strikers in pianofortes. This improvement consists in a slide T, adjustably connected to the carrier R and having a vertical sliding connection with the post l', one preferably being employed for each of the two interior posts. The slide is preferably a tubular piece passing over and sliding vertically on a rigid pin l', projecting from the post in this construction at rear of the strings. The slide is best connected to the carrier by a screw-threaded arm m', which screws into the carrier and can be adjusted therein by lifting the carrier until the slide is above the pin l', then rotating the slide to the desired adjustment, and then passing it again over the pin, whereupon it will hold the carrier in the new position relatively to the pin as the slide moves on the latter.

Another feature of improvement relates to the moving of such parts as the carrier R and the frame for effecting such movement under the impulse of the pedal. Such frame consists of a rectangular member, comprising, as usual, the cross-bar or carrier R at top, uprights at side, and a cross-bar n' at the bottom, connected by two links o' to the pedal h' and supported and guided at ends by two guide-springs p', which lift the frame and pedal. The improvement in this device consists in constructing the uprights of this frame of metal, and preferably cylindrical, rods S, stiff enough to transmit the movements, but capable of being bent to give the desired adjustment of the top of the frame, running in grooved rollers q', adjustably bent at r' when needed, having laterally-bent screw-threaded ends s', traversing or connected to the bar R and suitably fastened to the bar, as by nuts, as shown, and having lower screw-threaded ends traversing the bar n' and adjustably clamped thereto by opposing nuts t'.

I preferably supply a counterbalancing-spring U for such movable parts, reacting against them in opposition to the tension of the springs, restoring them and the pedal to a sufficiently-graduated extent to arrest their

restoration without jarring. One such spring is shown in Fig. 2, reacting against the middle upper side of the bar n' and the lower side of the key-rest e in opposition to the upward movement of the pedal and the tension of the springs p'. This has the effect of preventing any thud or sound as the pedal is released and rises with the frame and avoids the necessity of cushioning-felts. It is a superior substitute therefor, since such cushions soon harden and become imperfect.

The posts t for the damper-lifter G, y for the muffler, and c' for the vibrator, and o for the hammer-rest, may be constructed in any known manner. I prefer, however, to use ordinary rigid lifting-posts for the lifter and rest, which are operated by pedal-cranks V, one connected to each of the ordinary pedals u and p, which pedals are lifted by springs in the ordinary or any suitable manner. For the posts y and c' I prefer to employ wire rods, which may be bent as desired, screw-threaded at their lower ends, and there adjustably coupled to the pedal-levers moving them by nuts w' above and beneath the latter. These levers, which are each lifted and guided at their free ends by springs v', are fulcrumed at their other ends on pins w' to the front posts b, the one lever W being pivoted to the right-hand side at front, extending diagonally upward and inward and connected to the muffler-post y at its free end and near its middle by a link x' to the muffler-pedal z, and the other lever being pivoted at the left-hand side, extending diagonally inward and upward at rear of that first mentioned, connected at its free end at the right-hand side to the post c' of the vibrator, being lettered X and connected intermediate of its ends by a link y' to the vibrator-pedal d'.

For convenience I make provision for locking each of the harmonic devices through its pedal, adapting each to move a limited extent without locking, permitting a limited movement of the soft and forte pedals while the others are locked, providing for the unlocking of all locked pedals by the maximum depression of any one, and providing for the separate releasing of any one locked pedal or its maximum operation without locking.

All of these features are accomplished by extending the locking-plate I longitudinally under each of the five pedals, providing each of the pedals d', z, and h' with noses for engaging the beak thereof, and providing each with a releaser J.

In operation the user will throw the harmonic devices into the inactive positions by releasing their several pedals when the instrument is to be used ordinarily. Then the soft and forte pedals will be manipulated as the passages being rendered require. The muffler will also be so manipulated if its use is desired, being either locked in the active position by its complete depression or momentarily depressed without locking by placing the foot on the releaser while its pedal is held down. The vibrator will be thrown into action as desired either temporarily by holding the foot on the releaser as its pedal is depressed, or by only partially depressing it, or throughout a prolonged period by engaging its pedal with the lock. The striking device will be manipulated in like manner. When either of these devices is locked, it will be released when required by the depression of any other pedal to an extent sufficient to disengage the lock. In this way the operator can obtain great variety in expression or tone from the one instrument, and can produce from this instrument passages resembling the simultaneous playing of several different string instruments or the successive playing of different instruments, doing this by throwing one or both of the new attachments into action together, or one and then another into action successively or alternatively, or by using the muffler in conjunction with either or both, or by varying the force of the hammer-stroke to cause it to operate the strikers alone or to both operate the strikers and strike the strings.

It will be understood that my invention is not limited to the particular combination of features, arrangement, or details of construction or operation hereinbefore set forth as constituting the preferred embodiment of the invention, since the invention may be employed in whole or in part according to such combinations, arrangement, details of construction, and operation as circumstances or the judgment of those skilled in the art may dictate without departing from the spirit of the invention.

I do not claim, broadly, as my invention the combination, with the strings of a piano and means for putting the same in vibration, of a series of suspended or pendent strikers, buttons, or vibrators arranged in vibratory proximity to the strings and set in motion by the vibration of the latter, nor do I claim, broadly, an adjustable bar from which said buttons or strikers are suspended, as such structures, broadly speaking, were old prior to my invention, and my invention relates to improvements in instruments having such or analogous features as will be pointed out in the claims forming part of this specification.

It will also be understood that I do not claim, broadly, as my invention the combination, with a series of tongues provided with hard strikers, of a rigid shield between the tongues and the strikers, connected to the tongues, so as to be moved with them within and out of the action of the hammers, but what I do claim in connection with such and analogous structures is the particular features of combination and improvement herein set forth, and pointed out in the claims constituting part of this specification.

The harmonic devices, or either of them, may be located at any suitable point or points

on the instrument to which they are applied, and the parts may be constructed of any suitable materials to obtain resonance or non-resonance, stiffness, elasticity, or flexibility, as desired. I prefer to use a metal, as aluminium, for the vibrators and a sheet metal, as ordinary tin, for the strikers, stiff felt for the ball-guards, and flexible strings for supporting the balls. Within the latter I prefer to place movable weights or objects Y, which are preferably covered with a coating of soft or non-resonant material which modifies their function as sound-producers therein and enables their use as steadiers for the vibrating balls.

The pad *z'*, of felt or soft material, on the pickers Q reduces the harsh tone when the instrument is played lightly. To obtain a full tone, a key will be struck hard.

What I claim is, in string instruments, the following-defined novel features and combinations, substantially as and for the purposes hereinbefore set forth, namely:

1. In string instruments the combination with the strings of vibrators in vibratory proximity thereto and vibrated by the vibration thereof, movably suspended on depending flexible supports, a carrier for said supports, and means for moving said carrier, whereby said vibrators can be adjusted, toward and from said strings, and guards for said vibrators on the opposite sides of said carrier.

2. In pianofortes, the strings, dampers and damper-levers, in combination with a plurality of vibrators disposed opposite the strings and between the latter and the damper-levers, movable between said parts, and guards on the damper-levers in the path of movement of said vibrators, arresting the latter and cushioning them as the vibrators move against the levers.

3. In string instruments, a plurality of depending vibrators, opposite the strings and movable therefrom, a carrier for said vibrators, and guards depending from said carrier at front and rear of said vibrators and arresting the latter against excessive movement.

4. In string instruments, the strings, hammers movable toward the latter, and a carrier crossing the strings, in combination with a plurality of strikers carried by said carrier opposite the strings, in the path of movement of the hammers, and moved by the latter against the strings, said strikers consisting each of an angular piece of metal disposed with its striking part edge to and substantially at right angles to the string, and its other part angular to its striking part, and substantially parallel with the strings.

5. In string instruments, the combination with the strings and hammers, of an object movable against and longitudinally of the strings by the hammers, disposed in the path of movement of, and moved by, the latter.

6. In string instruments, the combination with the strings and hammers, of a striker consisting of a plate disposed edgewise toward, and moved against the strings by the hammers and having a narrow edge opposed to the strings, whereby when striking the latter it produces a picking effect.

7. In string instruments, the strings and hammers, in combination with an object in the path of the latter and moved thereby against the strings, and a stiff supporter for said object and a soft non-resonant pad carried on the face of said supporter adjacent to said object, toward said strings and striking the strings when said object strikes the latter.

8. In string instruments the combination with the strings and hammers of a metal object moved by the latter against the strings, a resonant supporter for said object, and a soft non-resonant pad carried on the face of said supporter adjacent to said object, toward said strings and striking the strings when said object strikes the latter.

9. In string instruments, the strings and hammers, in combination with a metal striker moved by the hammers against the strings, a metal supporter for the striker, and a felt pad on said supporter, projecting beyond said object and striking the strings before the latter.

10. In string instruments, the strings and hammers, in combination with a plurality of strikers adjacent to the strings and moved thereagainst by and in the path of the hammers, and a muffler in the path of the hammers and between the hammers and said strikers transmitting the motion of the former to the latter.

11. In string instruments, the strings and hammers, in combination with strikers in the path of and moved by the hammers, and a muffler movable into and out of the path of the hammers independently of the strikers and between the latter and the hammers.

12. In pianofortes, the strings, action and action-frame post, in combination with a movable harmonic device, a bar carrying the latter, and a guide for said bar consisting of a slide connected to the latter and engaging the post by a sliding connection and adjustable means between said slide and bar for adjusting the position of the latter toward and from said guide.

13. An attachment for string instruments consisting of a plurality of strikers Q adapted to move against the strings of such instruments and having hard striking portions and adjacent soft pads *z'* adapted to strike such strings.

14. In string instruments, the combination with the strings and means for vibrating them, of vibrators in vibratory proximity to the strings, consisting of hollow bodies each having within its hollow interior a movable body.

15. In string instruments, the combination with the strings and means for vibrating them, of vibrators in vibratory proximity to the strings and consisting of hollow bodies each having within its interior a movable body covered with a non-resonant material.

16. In string instruments, the combination with the strings and means for vibrating them, of vibrators in vibratory proximity to the strings, each consisting of a hollow body having within its interior a movable weight.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN A. WESER.

Witnesses:
GEORGE H. FRASER,
THOMAS F. WALLACE.