

969,121.

Patented Aug. 30, 1910.

2 SHEETS—SHEET 1.

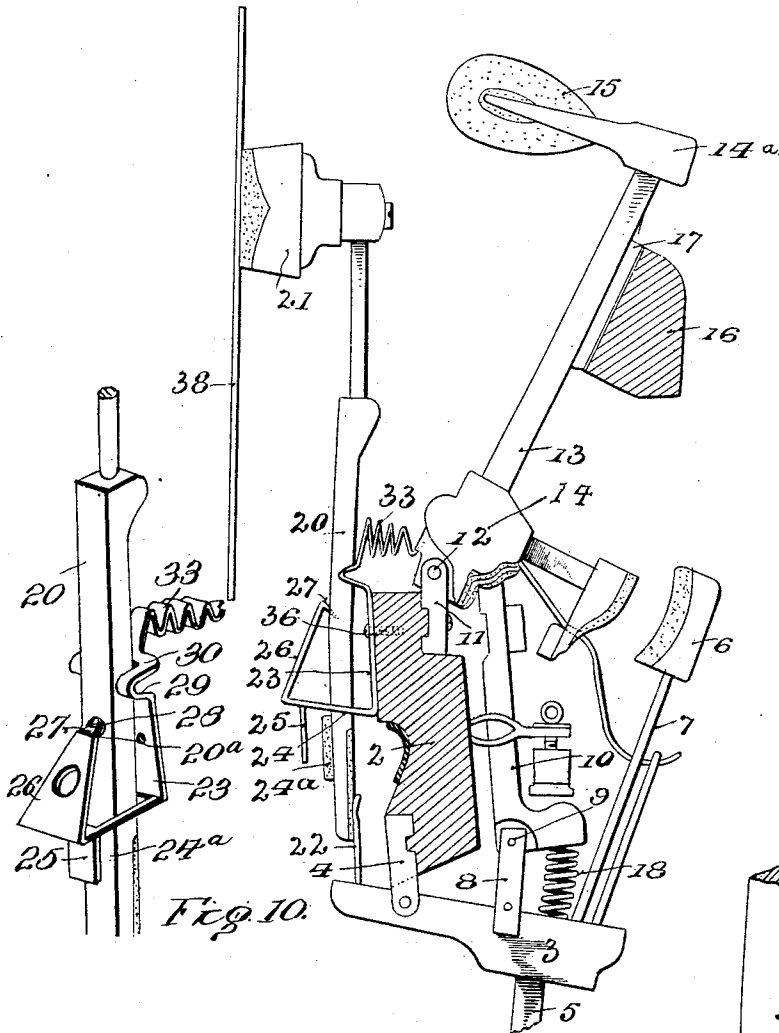


Fig. 1.

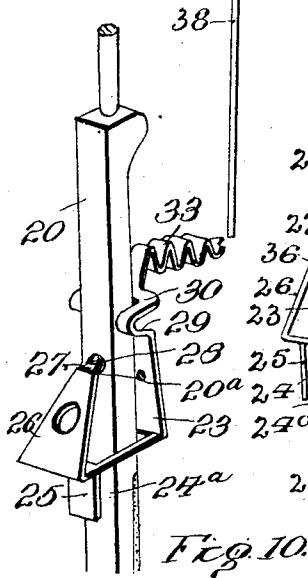


Fig. 2.

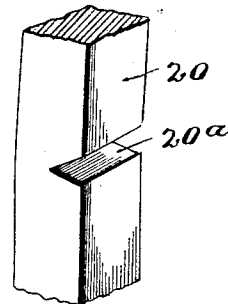
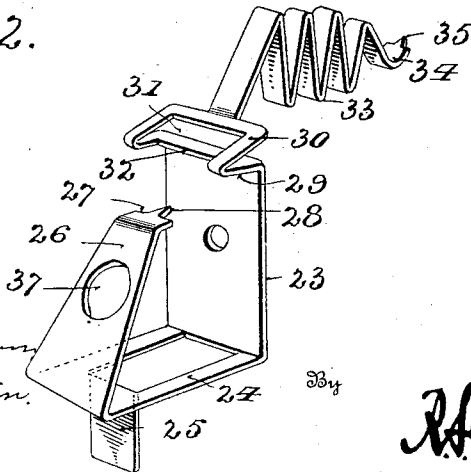


Fig. 3.

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2 SHEETS—SHEET 2.

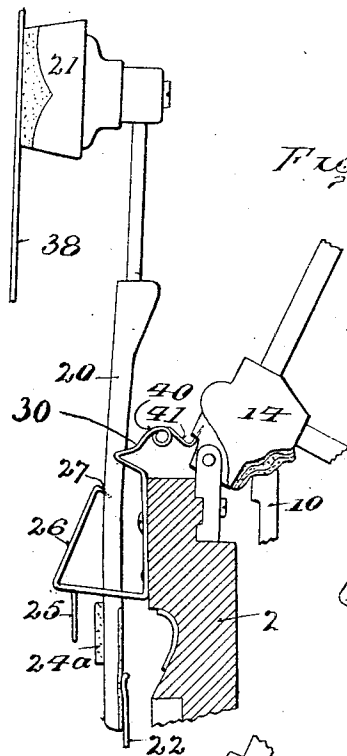


Fig. 4.

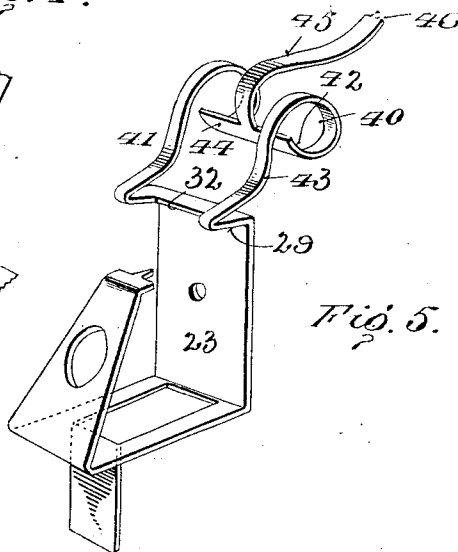


Fig. 5.

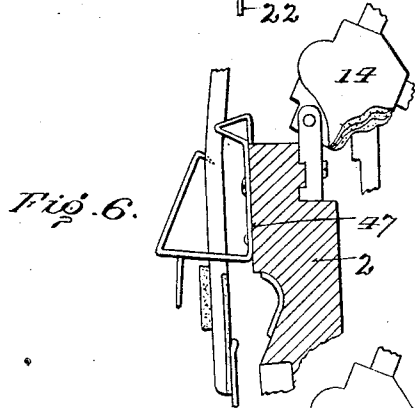


Fig. 6.

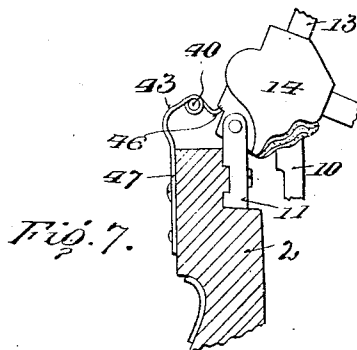


Fig. 7.

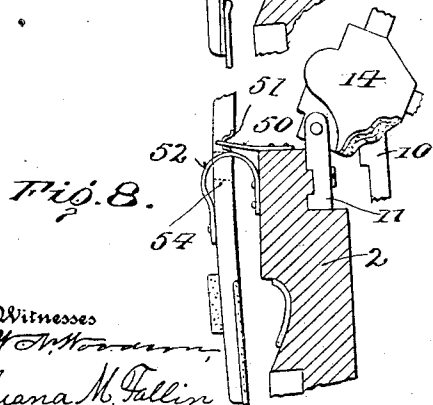


Fig. 8.

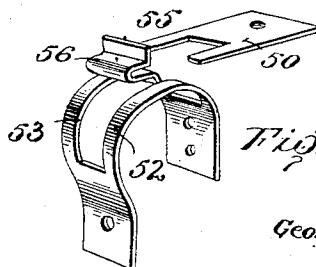


Fig. 9.

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UNITED STATES PATENT OFFICE.

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PIANOFORTE-ACTION.

969,121.

Specification of Letters Patent. Patented Aug. 30, 1910.

Application filed May 24, 1909. Serial No. 497,850.

To all whom it may concern:

Be it known that I, GEORGE C. SNYDER, citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Pianoforte-Actions, of which the following is a specification.

My invention relates to piano actions, and particularly to a resilient supporting means for the damper, and spring for the hammers thereof.

In piano actions, as usually constructed the hammers and damper levers are pivoted in flanges, the contracting faces thereof and the pivot pins being bushed with cloth or felt. In damper levers of the usual construction it is common to use an upwardly extending spring whose end is deflected and bears against the inner face of the damper lever. When the damper lever moves the end of this spring moves along the face of the lever. There is much friction at the point of contact between the damper spring and the damper lever, the felt bushing used at this point is liable to wear through or be eaten by moths, and the result is that the damper lever lags. Moreover, in this construction, when the spring is broken it is difficult to replace it with a new one without destroying the flange which supports the damper lever.

The object of my invention primarily is to reduce the friction between these parts; that is, at the pivotal points of the damper levers and the points of contact between the damper levers and hammer butts and their respective springs, reduce the cost of making, assembling and repairing these parts, and to increase the efficiency of the action.

A further object is to provide a pivotal bearing for the damper in one piece with the damper lever spring, and further to provide in conjunction therewith a hammer lever spring by which the lever shall be resiliently returned after action.

A still further object is to provide a spring for the damper and hammer of a piano action, so constructed as to engage with the damper and hammer with a minimum of friction and provide means whereby said springs shall flex at a point distant from their point of engagement with the hammer or damper.

The invention comprehends broadly the

provision of means for mounting the damper lever which consists of a strip of metal bent at one end to form a knife edge upon which the damper lever has pivotal engagement, the other end of said spring extending past the plane of the damper and then being inwardly bent or inclined and formed with an angular point which engages with the damper lever in a notch thereof. Preferably, that end of the strip which forms the knife edge pivot for the damper lever is extended and folded or rolled upon itself, and then extended into engagement with the butt of the hammer. It will be seen that such a construction provides not only for mounting the damper lever most effectively, but also provides for the combination of a damper lever spring with the spring engaging the hammer butt, this spring being of such form that it flexes not at its point of engagement with the hammer, but at a distance therefrom.

In the drawings I have shown the action as applied to an upright piano, and have also shown views of modifications of the preferable form.

In these drawings: Figure 1 is a side elevation of a piano action with a spring of the form devised by me, the action rail being in section. Fig. 2 is a perspective view of the damper lever support and spring and hammer spring shown in Fig. 1. Fig. 3 is a detail perspective of a fragment of the damper lever showing the notch therein. Fig. 4 is a like view to Fig. 1 showing a modified form of spring support. Fig. 5 is a perspective view of the spring support shown in Fig. 4. Fig. 6 is a like view to Fig. 4 showing a modified form of damper spring. Fig. 7 is a like view to Fig. 4 showing a modified form of hammer spring. Fig. 8 is a like view to Fig. 4 showing another modification of the damper spring, and Fig. 9 is a perspective view of the damper spring shown in Fig. 8. Fig. 10 is a perspective view of the damper-lever and the spring shown in Fig. 2 engaged therewith.

In order to fully illustrate my invention I have shown in Fig. 1 a portion of the piano action of an upright piano action, and therein 2 designates the main rail of the piano, 3 the wippen, 4 one of the flanges connecting the wippen to the lower edge of the main rail, and 5 the abstract.

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6 designates the usual back check supported by the wire 7. The wippen 3 is pivoted to the usual flanges 8 which support the jack 10, this jack being pivoted to the flanges by pivot pin 9.

11 designates one of the butt flanges which are attached to the upper edge of the rail 2 by any usual means. The hammer lever is pivoted at 12 to the flange 11, as shown, and is engaged on its under and outer face by the end of the jack 10.

13 designates the shank of a hammer, 14 the hammer butt, 14^a the head, and 15 the felt forming the end of the head 14.

16 designates the hammer rail provided with the usual felt face 17. A spring 18 is interposed between the wippen and the jack 10 as usual. This construction is all as found generally in piano actions, and so far as described does not form any part of my improvements.

The damper lever 20 is pivoted at its middle and at its upper end is provided with the head 21. As stated before, this damper lever has usually been attached to the action rail 2 by means of flanges, these flanges and the pivot for the damper lever being provided with a bushing of felt or like material. The lower end of the damper lever is adapted to contact with the spoon 22 which are supported in the extremity of the wippen.

Referring now to the form of the invention shown in Fig. 1, 23 designates a strip of metal which is adapted to be rigidly attached to the action rail 2 and to project slightly above the same. At its lower end this strip 23 is outwardly and slightly upwardly bent, as at 24, a tongue 25 being cut out of this portion 24 and downwardly turned to form a stop for the damper lever against which the felt pad 24^a will contact when the damper lever is turned. At the extremity of the outwardly bent portion 24 the metallic strip is upwardly and somewhat inwardly extended toward the damper lever as at 26, and then inwardly bent as at 27. This inwardly bent portion 27 is preferably formed with the projecting tooth 28 which engages in a small recess 20^a formed in the outer face of the damper lever. The damper lever support and spring is resilient, and hence the parts 26 and 24 act as a spring and press inwardly against the outer face of the damper lever, holding it in its supported position, as will be later described, and resisting any turning of the damper lever upon its pivot.

The upper end of the strip 23 is outwardly bent as at 29, and then inwardly bent as at 30, or, in other words, folded upon itself thereby forming a crimp. These two folds 29 and 30 are cut out as at 31 to permit the passage of the damper lever between the edges of the strip and within the cut out portion. It will be seen from Fig. 2 that

this cut away portion 29 provides a knife edge 32 which engages with a groove 20^a formed in the inner face of the damper lever. It will thus be seen that the projecting portion 29 provides a knife-edge fulcrum and that the extremity 27 of the spring 24 is lower than the fulcrum of the damper and hence that the spring will force in the lower end of the damper lever, moving the upper end outward or against the strings 38 of the piano.

As a means of supporting and acting upon the damper lever, the strip 33 may not extend beyond the damper, but may consist merely of the parts which I have above described, as shown in Fig. 6. The strip, which ends at the bend 30, will thus provide a fulcrum for the damper lever and the spring therefor, and it will be seen that cutting away the folds 29 and 30 to provide an opening 31 also provides projecting portions on each side of the damper lever which prevent lateral movement of the damper lever with relation to its fulcrum.

To provide a spring for actuating the hammer, I extend the strip 23 beyond the portion 30, and may there coil this extended portion, or plicate it, and then extend it so that the extremity of the spring will engage with the hammer butt. In the construction shown in Fig. 1, the strip 23 beyond the portion 30 is folded upon itself in a zigzag manner, or, in other words, is plicated, as at 33, thus forming a number of reversely turned V-shaped points. These V-shaped bends preferably become shorter and shorter from one end of this plicated spring to the other. The extremity of the spring thus formed is upwardly bent, as at 34, and engages in a transverse groove or notch formed in the adjacent face of the hammer butt 14.

It will be seen from the drawing that there is no frictional contact between the extremity 34 of the spring 33 and the hammer butt. In the usual construction of piano actions a round wire spring is used which is suspended from a rail between the damper lever and the hammer shank. This rail also serves as a back stop for the damper. The said spring contacts with a bushed groove on the face of the hammer butt. When the hammer is actuated this spring has a rubbing contact which is, of course, productive of considerable friction. In my construction the part 25 in Fig. 1 acts as a stop and the flexing of the spring takes place at its middle and thus there is no friction between the butt of the hammer and the spring. The extremity 34 of the spring may be and preferably is reduced as much as possible so as to form a point 35 like the tooth 28 upon the damper lever spring. Thus as little contact as possible is provided between the butt of the hammer and the spring. This

eliminates the necessity of the bushing between these parts and does away with wear and consequent clogging.

It will be seen that the spring 23 is attached to the action rail 2 by a screw 36. In the ordinary form of piano action it is difficult to remove the dampers without destroying the flanges which pivotally support the damper lever. In my construction it is only necessary to open the spring 26, remove the damper lever, and pass the screw driver through the opening 37 formed in the material of the part 26 of the spring directly opposite the screw 36. Then strip 23 may be easily detached and replaced by a new strip when necessary.

In Fig. 4, I show a modified form of damper supporting spring and hammer actuating strip. It is precisely similar to the strip previously described, as far as regards the support of the damper and the spring therefor. The difference in the construction lies in the fact that I provide a coil 40 intermediate between the fold 30 and the extremity of the hammer spring. In order to provide this coil I continue the slot 32 along the portion 41 of the spring to the point 42 so as to form two opposed spring arms 43, these arms being joined by a cross bar 44 from which extends a spring tongue 45 located at its base between the arms 43. The extremity of the spring tongue is upwardly bent and formed into a point 46 which engages with the butt 14 of the hammer. In this form of my invention, as in the form previously described, the flexing of the spring takes place intermediate the extremities of the spring and not at its contact point with the butt of the hammer. Therefore there is no friction between the spring and the hammer butt, but the spring moves at right angles to the face of that portion of the hammer which engages with the spring.

While I prefer to make the damper spring and its base or support in one piece with the hammer spring, as above described, it is obvious that I may make the hammer spring separate from the damper spring support, in which case the hammer spring will consist, as shown in Fig. 7, of a base 47 which is attached to the face of the action rail and then extends directly upward above the action rail to form the part 43 which is then formed into a spring by folding or coiling the material, such coil being shown at 40, Figs. 5 or 7. This manner of making the spring for the hammer is to be used in those portions of a piano where a damper is not used, and permits of the use of sufficiently light metal in the spring to get the requisite light pressure against the hammer butt. It is also to be noted that the plications 33 (shown in Figs. 1 and 2) do not touch each other when the spring is flexed, do not rub

upon each other, and in consequence the spring is frictionless though giving to the movement of the hammer butt. This is also true of the coil 40. The tongue 45 does not touch the arms 43, and consequently when the spring is flexed there is no friction between the parts.

In Figs. 8 and 9 I show still another form of damper lever support and spring. To this end I provide on the upper edge of the action rail 2 a projecting plate 50 whose knife edge engages with a notch 51 in the rear face of the damper lever so as to provide a fulcrum therefor. The support for the lever consists of a spring plate 52 which is bent into an approximate U-shape. The middle portion of this spring plate is cut away, as at 53, to permit the passage of the damper lever therethrough. The extremities of the spring plate are attached, one to the outside face of the damper lever and the other to the face of the action rail at a point below the point of attachment of the plate to the action rail, so that the spring will tend to force the lower end of the lever, below its pivotal point, toward the action rail. While I have shown the spring plate 52 as cut out at 53 for the accommodation of the lever, it will be obvious that the lever itself may be cut away, as shown in dotted lines at 54, to permit the spring to pass through the lever. This is an equivalent construction and acts in precisely the manner as if the spring was cut out. I may form a bushing for the inside face of the notch on the damper-lever by cutting out a tongue 55 from the slot 53 and folding this tongue as at 56 so as to extend into the notch of the damper lever and bind the same. This construction is clearly shown in Fig. 9.

The advantages of my invention reside in the simplicity of the parts, the cheapness with which it can be constructed and the fact that complication of pieces is avoided.

The particular advantage due to my improvement resides in the extremely fine bearing or fulcrum given to the damper lever which eliminates frictional contact and clogging, for the reason that the area of contact is reduced to a minimum.

My invention conduces to simplicity and economy in the manufacture of the device and the combined springs are so simply made that they may be easily replaced if damaged and at very little cost.

It is obvious that the details of the structure described above may be varied without affecting the spirit of the invention, and I do not wish to be limited to said details.

Having described my invention, what I claim is:

1. The combination with a damper lever of a piano action, of a spring therefor, said spring being disposed substantially parallel to the face of the damper lever and having

a base on which it is supported, the end of the spring being inwardly bent toward the face of the lever and having rocking engagement with the lever at its extremity.

- 5 2. The combination with a damper lever of a piano action, said lever having a recessed face, of a spring therefor having a base on which it is supported, the free end of the spring extending into said recess and having a rocking engagement with the damper lever.
- 10 3. The combination with a damper lever of a piano action, said lever having a recessed face, of a spring therefor having a base on which it is supported, the free end of the spring being formed with a tooth projecting into the recess, said damper lever having a rocking engagement with the tooth.
- 15 4. The combination with a damper lever of a piano action, of a spring therefor, the base of the spring being fixed, the spring then extending outwardly away from the damper, then inwardly toward the damper lever, and the end of the spring having rocking engagement therewith.
- 20 5. The combination in a piano action, of an action rail, a damper lever, a fulcrum extending beyond the face of the action rail, and a spring holding the damper lever in engagement with said fulcrum.
- 30 6. In a piano action, the combination with an action rail, of a damper-lever, and a spring attached to the action rail having a projection on its face upon which said damper-lever fulcrums, said spring forcing the damper-lever into engagement with said projection.
- 35 7. In a piano action, the combination with an action rail having a knife-edged projection extending from the face of the rail, of a damper lever having a transverse recess in its face into which said projection extends, the projection thereby forming a fulcrum for the damper, and a spring attached to the action rail extending past the damper lever and engaging with the outer face of said lever at one side of the fulcrum, said spring holding the felted end of the damper lever against the strings of the instrument and holding the damper lever in engagement with its fulcrum.
- 50 8. In a piano action the combination with an action rail and a knife-edge projection extending outwardly therefrom, said projection being notched in the center of its edge to form opposed outwardly projecting sides, of a damper engaging with said projection and fulcrumed thereupon and supported between the two projecting sides of the same, and a spring holding the upper end of the damper in engagement with the strings of the instrument and also holding the damper in fulcruming engagement with said knife-edge projection.
- 60 9. In a piano action, the combination with an action rail and a knife-edge projection

extending from said rail, said projection being notched at its end to receive a damper, of a damper lever supported on said projection and in said notch, and a spring supported on the action rail, the end of the spring extending past the damper lever and engaging with the front face thereof beyond the knife-edge, thereby holding the damper in contact with the strings of the instrument.

10. In a piano action the combination with an action rail and a damper lever, of a damper support comprising a metallic strip bent to form a base attached to the action rail, said base having an outwardly extending knife-edged projection to form a fulcrum for the damper lever, said strip beyond the base being resilient and extended outwardly away from the base and then inwardly bent toward the action rail and engaged with the outer face of the damper lever.

11. In a piano action the combination with an action rail and a damper lever, of a damper lever support and spring formed of a strip of metal the strip being outwardly bent at one point to form a knife-edge fulcrum for the damper lever, the end of said spring being outwardly bent and slotted for the passage of a damper, then extending upward and inward toward the lever and formed at its extremity with an inwardly projecting end portion engaging against the face of the damper lever at one side of the fulcrum point thereof.

12. In a piano action the combination with an action rail and a damper lever having a recess in its face, of a damper-lever-support and spring comprising a metallic strip attached to the face of the rail, the strip at one point being outwardly bent and having a transversely extending notch for the reception of the damper lever, said outwardly bent portion being knife-edged, the end of the strip opposite to the notched portion being outwardly bent and slotted for the passage of the damper lever and formed with a projecting stop with which the lever contacts, the extremity of the strip beyond the outwardly bent portion being extended toward the rail to form a spring and then inwardly bent and provided with a tooth engaging with the recess in the face of the damper lever.

13. In a piano action the combination with a hammer of a spring for the hammer having a base, the free end of the spring engaging with the butt of the hammer, the intermediate portion of the spring having a plurality of folds.

14. In a piano action the combination with a hammer, of a spring therefor, one portion of said spring forming a base whereby it is supported and adapted to be attached to an action rail, the free end of the

spring engaging with the butt of the hammer, and the intermediate portion of the spring being formed with a plurality of reversely V-shaped folds which collapse and expand as the spring flexes.

15. In a piano action, the combination with an action rail, a damper lever supported on one side of the action rail, and a hammer on the other side thereof, of a strip attached to the action rail, then outwardly bent away from the action rail to form a fulcrum for the damper lever, then extending from the damper lever to the hammer butt, the intermediate portion of the strip being resilient and being bent upon itself to form portions flexing in the direction of movement of the hammer.

16. In a piano action, the combination with an action rail having a projection upon its face forming a damper fulcrum, a damper lever fulcrumed upon said projection, and a hammer fulcrumed upon the action rail, of a metallic strip attached at its middle to the action rail, one end of the strip being resilient and being extended outward beyond the face of the damper lever and then inward toward the damper lever and having a rocking engagement therewith, the other end of the strip being also resilient, being bent upon itself and then extending to have a rocking engagement with said hammer.

17. In a piano action the combination with an action rail, a damper lever, and a hammer pivoted to the action rail on the face of said rail opposed to the damper, of a combined damper lever support and spring for the damper lever and for the hammer, comprising a metallic strip attached at its middle to the face of the action rail, one end of the strip being resilient and extending outward and then returned toward the action rail and contacting with the face of the damper lever, said strip adjacent to its point of attachment to the action rail being crimped upon itself to form a fulcrum for the damper lever, said strip being then extended transversely across the action rail and bent upon itself to form a resilient flexing portion and then engaging with said hammer.

18. In a piano action the combination with an action rail, a hammer pivoted to one face of the rail and a damper-lever carried upon the other face of the rail, of a combined damper lever support and spring, comprising a strip attached to the face of the action rail, the lower end of the spring extending outward and then upward into engagement with the outer face of the damper, said strip above the action rail being crimped

to form a fulcrum for the damper lever, said fulcrum being notched to receive the damper lever between the sides thereof, the strip being then formed into a plurality of resilient folds, the extremity of the spring engaging with the butt of said hammer.

19. A spring for piano actions, comprising a flat strip formed to provide a base attachable to the side of an action rail, one extremity of the strip being outwardly bent, then upwardly bent and provided with an inwardly projecting tooth, the other end of the strip being bent toward the inwardly-turned end of the first-named extremity, the center of the strip at this point being slotted for the passage of a damper-rod, said strip beyond the end of the slot being folded upon itself to form a plurality of V-shaped folds, the extremity of the strip being formed to engage the hammer of a piano.

20. The combination with an action rail and a damper lever, of a fulcrum for said lever consisting of a projecting strip of metal the plane of which is transverse to the length of the damper lever, said strip being formed with a knife-edged projection, and a spring for holding the damper lever in engagement with the knife-edge of the strip.

21. The combination with an action rail and a damper lever, of a strip attached to the face of the action rail and projecting therefrom, said strip having a knife edged projection, said damper lever having a slot into which said knife-edge projects and thereby forms a fulcrum for the lever, and a spring for forcing the lower end of the damper lever toward the action rail and holding the damper lever against said knife edge.

22. The combination with an action rail and a damper lever, of a projecting strip attached to the action rail, said strip being formed with a projection notched to form two projecting side portions, the end of the strip between said side portions being knife-edged, the damper lever being transversely slotted for engagement between the projecting side portions of the strip with said knife edge, and a spring for forcing one end of the lever in the direction of the action rail and thereby holding the damper lever in fulcruming engagement with said knife-edge.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE C. SNYDER. [L. s.]

Witnesses:

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JOHN A. HENDERSON.