The present invention relates to improvements in plucked string instruments, such as instruments of the harpsichord family, including spinets and harpsichords, and more particularly to an improved string plucking mechanism for such instruments.

In plucked string instruments of the indicated type, which are fundamentally harps placed horizontally, the strings of the instrument are plucked by plucks operated from a keyboard instead of being plucked by the fingers of the player. When a key is depressed by the player's finger, a jack usually made of wood rises, causing the pluck, which may be a quill or a small piece of synthetic resin or leather, to rise and to pluck the string. The pluck is attached to the jack which rests on the inside end of the key. Thus, when the key is released, its pivotal movement causes the jack to fall and the pluck, which is fixed to a movable tongue in the jack, slides silently past the string. When the jack comes to rest, a small tongue of felt automatically dampens the string, i.e. stops its vibrations.

The repetition of this procedure every time the key is depressed is made possible by the fact that the pluck is fixed to a pivotal tongue which pivots outwardly when the jack falls. The extent of this pivotal movement of the tongue must be limited, however, to avoid its touching an adjacent string.

It is one primary object of the present invention to provide a string plucking mechanism of this general type, wherein the pluck is readily accessible for easy repair and/or for replacement of the pluck.

It is another object of this invention to provide an improved adjustable stop for the pivotal movement of the tongue.

String plucking mechanism for harpsichords, spinets and like musical instruments conventionally include a shank defining an elongated rectangular slot extending between two side walls and two end walls; a tongue extending in the slot and having two end walls associated and cooperating with respective ones of the slot side walls, and two opposite sides extending between the tongue end walls; a pluck carried by, and projecting from, one of the tongue sides at one tongue end; stop means mounted on the shank for limiting the pivotal movement of the tongue out of a plane defined by the slot; and spring means mounted on the shank and biased for normally holding the tongue in the slot plane.

In one aspect, the present invention provides a pivoting joint mounting the tongue in the slot at the other end of the tongue and permitting pivoting of the tongue in a plane defined by the pluck and perpendicularly to the sides of the tongue, the joint comprising a pivot pin engaged in an associated and cooperating bore, the pivot pin and the bore extending perpendicularly to the sides of the tongue. The spring means is biased against the one side of the tongue at the other end thereof.

In one embodiment of this invention, the pivot pin projects from the other side of the tongue at the other end thereof and the shank has a portion extending into the slot and defining the associated and cooperating bore of the pivoting joint.

In another aspect of the invention, the spring means is a spring movably mounted on the shank whereby the spring end normally biased against the other tongue end may be removed therefrom, preferably by turning the spring in a bearing in the shank.

Preferably, the shank defines a guide slot contiguous with the slot pivotally holding the tongue and this guide slot receives the spring end when the same is biased against the other tongue end.

In yet another aspect of the invention, the stop means includes an adjustable stop extending outside the plane defined by the slot and arranged for engagement with the other side of the tongue at the one end thereof when the tongue is pivoted.

The above and other objects, advantages and features of the invention will become more apparent in the following detailed description of a preferred embodiment thereof, taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a side view, partly in section, of a conventional string plucking mechanism;
FIG. 2 is a similar view of a mechanism according to the invention; and
FIG. 3 is a front view of FIG. 2, viewed from the right.

Referring first to FIG. 1 and the conventional string plucking mechanism shown therein for purposes of comparison with the improved mechanism of this invention illustrated in FIGS. 2 and 3, the shank 1 of the mechanism is seen to define a slot 2 wherein the tongue 3 is mounted for pivotal movement about axle 4. Tongue 3 carries pluck 5 projecting at one end of the tongue from one side thereof and a spring 6 is mounted on the shank and is biased against the opposite side of the tongue at the other end thereof, the spring 6 extending into a recess 5' in the tongue and tending to pivot the tongue out of the plane of slot 2 towards the left, as viewed in FIG. 1.

The pivotal movement of the tongue under the bias of spring 6 is limited by the engagement of the associated and cooperating oblique end surface 7 of tongue 3 and oblique end wall 8 of slot 2. When these two oblique surfaces are in engagement, further outward movement of the tongue is stopped. The upper end of tongue 3 has an oppositely inclined surface 9 associated and cooperating with a set screw 10 mounted in the upper end of shank 1. Engagement of set screw 10 with oblique upper surface 9 of the tongue prevents its pivotal movement out of the plane of slot 2 to the right, as viewed in FIG. 1.

It is evident that repeated frictional engagement of the surfaces 7, 8 will wear them out, making frequent repairs necessary to avoid undue outward swinging of the tongue. Furthermore, when the tongue is to be removed from the shank, it is necessary first to remove spring 6 and then also to remove the very tiny axle 4 on which the tongue is pivotally mounted. Finally, this conventional mechanism does not permit adjustment of the pivoting angle of the pluck.

These and other disadvantages are overcome by the structure illustrated in FIGS. 2 and 3. As shown there in, shank 11 defines elongated rectangular slot 12 extending between side walls 12a, 12b and two end walls. Tongue 13 is mounted for pivotal movement in the slot, the side walls of the slot constituting guide surfaces for the pivotal movement of the tongue. The shank is preferably made of a synthetic resin material but may be of metal or other rigid material therefor.

The fulcrum for the pivotal movement of the tongue is provided by a pivoting joint mounting the tongue in the slot and permitting pivoting of the tongue in a plane defined by the plucking 14 and perpendicularly to the sides of the tongue. The illustrated joint comprises a pivot pin 15 projecting at one end of the tongue from one side thereof and engaging a bore 16 in a portion 17 of the shank extending into slot 12, the pivot pin 15 extending into the
bore 16 and holding the tongue 13 therein for pivotal movement. Tongue 13 also carries plectrum 14 projecting from the opposite side of the tongue at the other end thereof, the tongue having two end walls 13a, 13b associated and cooperating with side walls 12a, 12b of the slot whereby the tongue is guided during its pivotal movement out of the plane of slot 12 to the left, as viewed in FIG. 2, and in the direction of extension of slot side walls 12a, 12b and tongue end walls 13a, 13b.

The pivoting joint 15, 16 between the tongue 13 and shank 11 may have any suitable cross section and may be, for instance, of rectangular, triangular or round configuration. As clearly seen in FIG. 2, the bore 16 is beveled to permit the pivot pin to execute the pivoting movement about its axis.

Obviously, the pivoting joint may equally well comprise a pivot pin extending from shank portion 17 into a corresponding bore in tongue 13, which is a mechanically equivalent pivot structure. Another equivalent pivoting joint is constituted by two pins projecting from one part and receiving therebetween a pin projecting from the other part.

An S-shaped spring 18 is mounted on the shank and is biased with its upper end 19 against the lower end 20 of the tongue, the spring end 19 being received in a guide slot 21 in the shank contiguous to slot 12 when the same is biased against tongue end 20. As shown, the spring is movably mounted with its opposite end in a bore 26 in the shank whereby the spring end 19 may be removed from the tongue end 19 by turning the spring in bore 26.

The pivoting movement of the tongue is limited in both directions. Set screw 22 mounted in the upper end 25 of shank 11 is associated and cooperates with inclined upper surface 23 of tongue 13 to limit movement of the tongue out of the plane of slot 12 to the right, as viewed in FIG. 2. An adjustable stop 24 is mounted on the back surface of the shank to limit pivoting of the tongue to the left, as viewed in FIG. 2. In a very simple embodiment, this adjustable stop may be a rectangularly bent synthetic resin element adjustably mounted in a tap hole in upper end 25 of the shank.

While the present invention has been described and illustrated in conjunction with one specific embodiment thereof, it will be understood that many variations and modifications may occur to those skilled in the art without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:
1. A string plucking mechanism for plucked string instruments comprising
   (a) a shank,
   (1) the shank defining an elongated rectangular slot extending between two side walls and two end walls;
   (b) a tongue arranged in said slot,
   (c) a plectrum carried by, and projecting from, one of the sides of the tongue at one end of the tongue;
   (d) a pivoting joint mounting the tongue in the slot at the other end of the tongue and permitting pivoting of the tongue in a plane defined by the plectrum and perpendicularly to the sides of the tongue;
   (3) the joint comprising a pivot pin engaged in an associated and cooperating bore, the pivot pin and bore extending perpendicularly to the sides of the tongue;
   (e) stop means mounted on the shank for limiting the pivoting movement of the tongue out of a plane defined by the slot; and
   (f) spring means mounted on the shank and biased for normally holding the tongue in the plane defined by the slot.
2. The string plucking mechanism of claim 1, wherein in the shank is of rectangular transverse cross section.
3. The string plucking mechanism of claim 1, wherein the one end of the tongue is obliquely inclined in respect of the one side thereof and said stop means includes a set screw mounted in said shank and extending from one of the end walls of the slot into engagement with the obliquely inclined tongue end, thus preventing pivoting movement of the tongue in the direction of said one side.
4. The string plucking mechanism of claim 1, wherein the pivot pin projects from the other side of the tongue at the other end thereof and the shank has a portion extending into the slot and defining the associated and cooperating bore of the pivoting joint.
5. The string plucking mechanism of claim 1, wherein the spring means is biased against the one side of the tongue at the other end thereof.
6. The string plucking mechanism of claim 5, wherein the shank defines a guide slot contiguous with the slot pivotally holding the tongue for receiving the spring end when the same is biased against the other tongue end.
7. The string plucking mechanism of claim 6, wherein the shank defines a guide slot contiguous with the slot pivotally holding the tongue for receiving the spring end when the same is biased against the other tongue end.
8. The string plucking mechanism of claim 1, wherein the stop means includes an adjustable stop extending outside the plane defined by the slot and arranged for engagement with the other side of the tongue at the one end thereof when the tongue is pivoted.

References Cited by the Examiner
FOREIGN PATENTS
936,819 9/1963 Great Britain.
RICHARD B. WILKINSON, Primary Examiner.