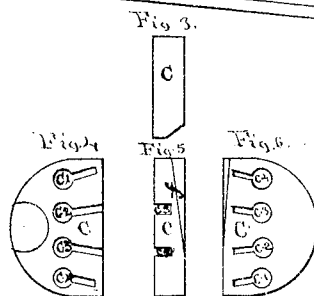
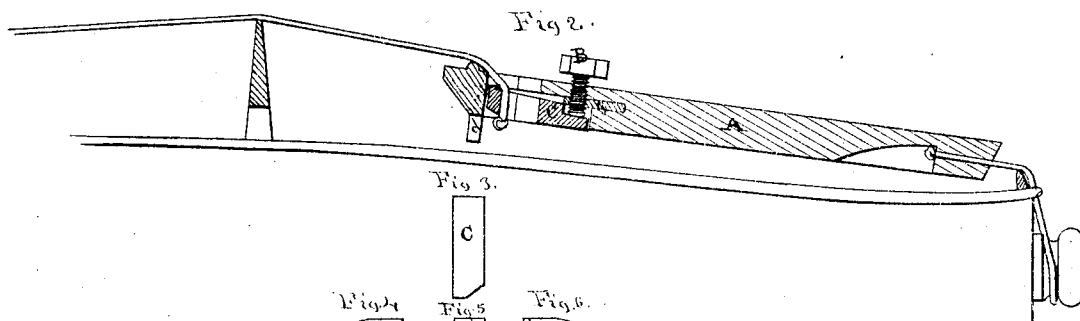
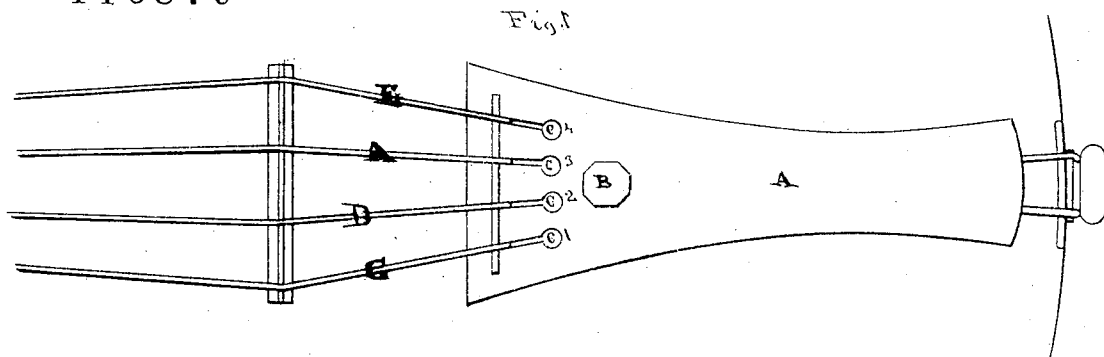


Kilburn Smith's
Improvement in musical stringed instruments

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PATENTED JUL 11 1871



Witnesses
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UNITED STATES PATENT OFFICE.

KILBURN SMITH, OF LOWELL, MASSACHUSETTS.

IMPROVEMENT IN MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. 116,879, dated July 11, 1871.

To all whom it may concern:

Be it known that I, KILBURN SMITH, of Lowell, in the county of Middlesex and State of Massachusetts, have invented a certain new and useful Improvement in Musical Instruments, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing making part of this specification, in which—

Figure 1 is a plan of that part of a violin to which my improvement is applied. Fig. 2 is a longitudinal sectional elevation. Figs. 3, 4, 5, and 6 are different elevations of my invention and improvement detached from the instrument.

This invention relates to an improvement in musical instruments of the viol kind, such as the violin, the cello, and bass-viol, or other instruments whereon the strings are attuned by drawing or tightening them with operating-screws or pegs. This invention has for its object to provide a supplementary or auxiliary and simultaneous string-tuning mechanism arranged within or upon that part of the instrument which holds the knotted ends of the strings, whereby the pitch or tone of the instrument may be flattened or sharpened to accord with another instrument or instruments without disturbing or changing the position of the ordinary tuning-screws. This invention consists of a peculiarly-constructed device or mechanism which is arranged within a recess in the under side of the string-holding tail-piece of a violin or other similar instrument, and is slotted to correspond with the string-slots in the tail-piece, and operated by a screw, or by equivalent means, to tighten or to slacken all the strings simultaneously, but each in a different degree, and thereby flatten or sharpen the pitch or tone of the instrument by a single operating mechanism. My invention also consists in the process, substantially as described, of retuning or raising or lowering the pitch or tone of a musical stringed instrument of the viol kind by tightening or slackening all the strings at once, said strings being connected with and actuated by a fulcrum-lever adjusted by a screw or its equivalent.

In the said drawing, A represents the string-holding tail-piece, constructed and slotted for the strings in the usual way. In the under side of the tail-piece, and near its forward end, I form a recess a little more than half the thickness of

the stock. An adjusting-screw, B, is inserted through the tail-piece, and generally through a metal plate, *g*, at or near the rear part of the recess, by which to adjust or operate the tuning mechanism or string-tightening lever C. This string-tightening lever or attuning mechanism is constructed as clearly shown in Figs. 3, 4, 5, and 6 of the drawing, and its shape in the horizontal plane may conform to the shape of the recess before described, and in the recess I place this lever against the lower end of the adjusting-screw, and connect and draw the strings D, A, E, and G, as shown in Figs. 1 and 2. The string-receiving slots *c* in the lever come directly under those in the tail-piece, and in the lower side of the lever these slots terminate each about the same distance from the forward or straight fulcrum end, but in the upper side of the lever the termination of the slots is varied relatively with the fulcrum of the lever, which is on an angle and on the line *f* across the forward end. It will be seen that the slot *c*³ in the lever is cut entirely through the forward end, and nearly down to the fulcrum-line *f*. This slot *c*³ is for the reception of the D-string, which, when the instrument is in tune with itself, requires the least amount of motion and apparently the greater power of leverage to give the required change in the pitch or tone. The slot *c*² is also cut through the end of the lever, and terminates a little farther from the fulcrum-line. The slot *c*² is for the reception of the A-string, which requires a little more motion and apparently less leverage than the D-string to preserve the required uniform pitch of one with the other, and this degree of motion and leverage is suitably varied by varying the distance between the termination of the slot and the fulcrum-line. The slot *c*¹ terminates a little back of the end of the lever and farther from the fulcrum. This slot *c*¹ is for the reception of the E-string, which requires a little more motion and apparently less leverage than the A-string to preserve the uniform pitch, and the degree of motion and leverage is suitably varied by thus increasing the distance between the fulcrum and the termination of the slot. The G-string, which enters the slot *c*⁴, requires about half the motion and apparently less leverage to preserve its pitch than the E-string. The formation of the fulcrum with its greatest projection at the side and near the horizontal center of the

lever, and in line with the G-string, and the termination of the slot c^1 a little back of the end of the lever, creates a sufficient distance between the two operating points and provides for the required amount of motion and leverage to preserve the uniform pitch of this with the other strings, when all of them are acted upon simultaneously by the operating and angle-fulcrumed lever C, constructed and applied as shown and described, and operated by an adjusting-screw, B, or other mechanical equivalent.

After my improvement has been applied to a musical stringed instrument in practice, the instrument is first attuned in the usual way—that is, so as to be in tune with or of itself, and when thus attuned the pitch or tone of the instrument is liable, from various causes, such as change of temperature, humidity, &c., to become sharpened or flattened, so as not to accord with other instruments. In such cases, in order to raise or lower the tone or pitch of the instrument, I simply turn the adjusting-screw B a little in the right direction, which actuates the tuning-lever, and either tightens or slackens all the strings

simultaneously, and each in a suitable degree, and immediately brings the instrument again in tune with the other instrument or instruments, and at the same time keeps it in tune with itself.

I contemplate that skillful artisans may modify my invention in various ways, and that a lip or shouldered flange, d , may be applied to the under side and across the forward end of the tail-piece, and the fulcrum-lever take its bearing against this flange, and thus avoid the formation of the recess for the reception of the lever.

I claim as my invention—

The adjusting-lever C, constructed as described, with an end fulcrum, f , and varying string-slots c , c^1 , &c., applied to the tail-piece A, or to that part of the instrument which holds the knotted ends of the strings, and actuated by a screw, or its mechanical equivalent, for the purpose of adjusting all the strings simultaneously.

KILBURN SMITH.

Witnesses:

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