A. D. GROVER.

BRIDGE FOR MUSICAL STRINGED INSTRUMENTS.

APPLICATION FILED AUG. 14, 1918.

1,381,187.

Patented June 14, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

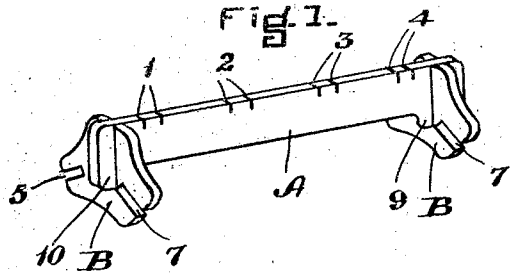


Fig. 2.

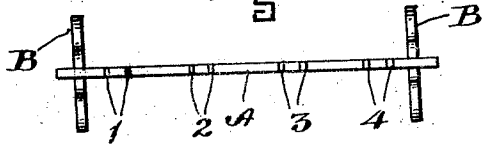


Fig. 4.

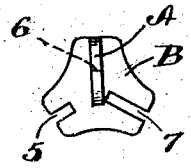


Fig. 3.

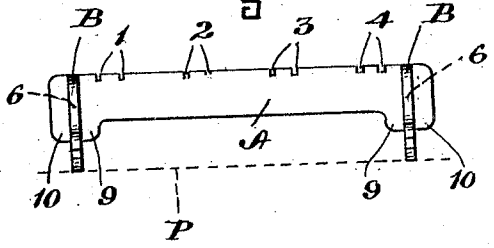


Fig. 5.

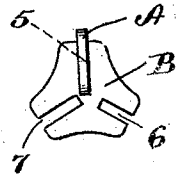


Fig. 7.

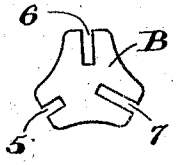


Fig. 6.

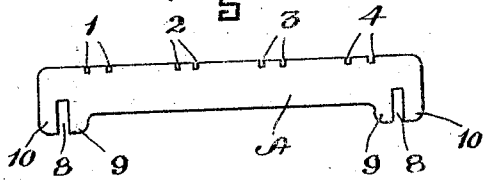
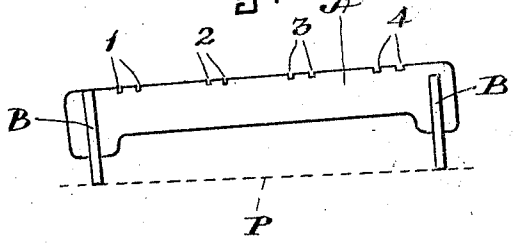


Fig. 7a.



INVENTOR-

Albert D. Grover.

by A. A. Thomas
Atty.

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2 SHEETS—SHEET 2.

Fig. 8.

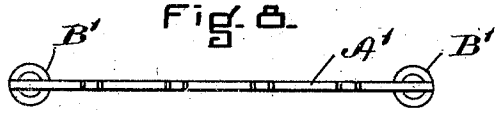


Fig. 11.

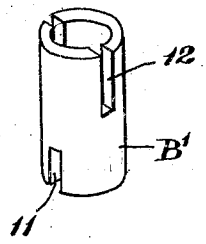


Fig. 9.

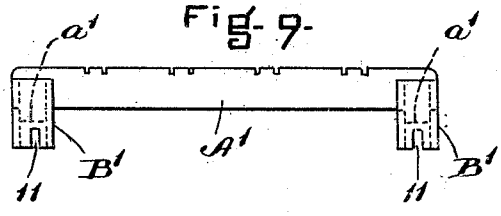


Fig. 10.

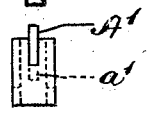


Fig. 13.

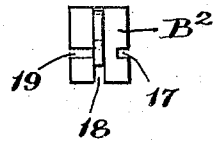


Fig. 12.

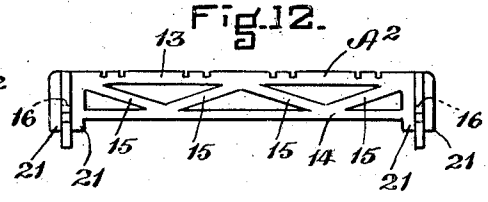


Fig. 14.

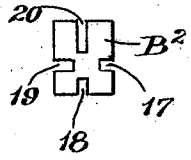


Fig. 16.

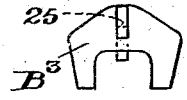


Fig. 15.

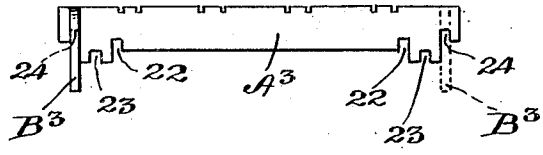


Fig. 17.

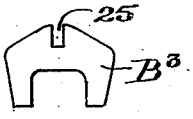


Fig. 19.

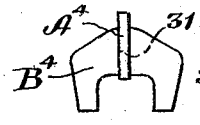


Fig. 18.

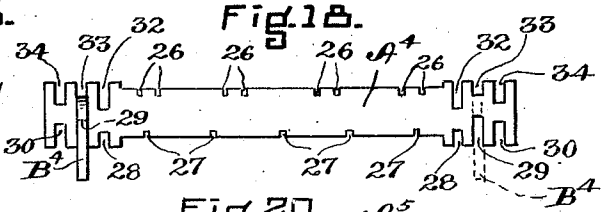


Fig. 21.

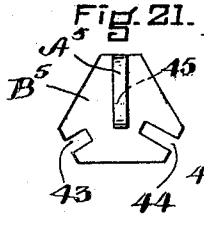
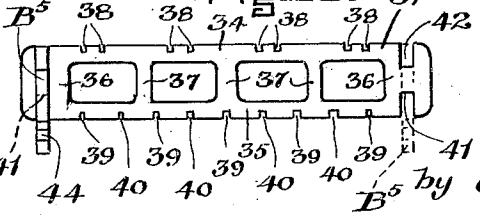


Fig. 20.



INVENTOR.

Albert D. Grover.

by A. A. Thomas

Atty.

UNITED STATES PATENT OFFICE.

ALBERT D. GROVER, OF NEW YORK, N. Y.

BRIDGE FOR MUSICAL STRINGED INSTRUMENTS.

1,381,187. Specification of Letters Patent. Patented June 14, 1921.

Application filed August 14, 1918. Serial No. 249,788.

To all whom it may concern:

Be it known that I, ALBERT D. GROVER, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Bridges for Musical Stringed Instruments, of which the following is a specification.

My invention relates to musical stringed-instruments and has for its object the provision of a new bridge, which embodies several features of novelty.

Considered in one of its aspects, my invention comprises a string-supporting bridge in which the main bar and its supports are connected by slotted portions which interlock and thereby not only prevent the supports from sliding longitudinally of the bar, but also lock the supports against lateral tipping or tilting. Certain of the slots in these interlocking portions are of different depths, so that the height of the bridge may be adjusted in accordance with the requirements of the instrument to which the bridge is to be applied. This adjustment is effected without the use of screws or any additional devices except the bridge bar and its two end supports.

A further object of my invention is to provide a bridge in which the bar is reversible, so that either edge thereof may be brought into string-engaging position. One edge of the main bar may be provided with a certain series of string-engaging notches, and the opposite edge with a different series of such notches, whereby the bridge is adapted for use on all instruments of the banjo and mandolin type.

In certain cases, I prefer to make the string-engaging bar of metal, preferably a light hard metal such as a hardened aluminum having great tensile strength. In its preferred form, this metal bar is of a truss construction, whereby a minimum weight of bar gives maximum strength.

The foregoing and other objects and advantages of my new bridge will become apparent from a detailed description of the several illustrative embodiments shown in the accompanying drawings, in which—

Figure 1 is a perspective view of one of the simpler forms of my new bridge;

Fig. 2 is a plan view of the same;

Fig. 3 is a front elevation of the same;

Fig. 4 is an end view of the same;

Fig. 5 is likewise an end view, but showing the bar engaging in the shortest of the slots in the end supports, whereby the bar is held higher than shown in Figs. 1–4;

Fig. 6 shows a front view of the bar detached from its supports;

Fig. 7 is a view in elevation of one of the supports, clearly showing the slots of different depths by means of which the position of the bar is adjusted;

Fig. 7ª is a view showing how the bar may be supported lower at one end than at the other, for purposes to be explained later;

Fig. 8 is a plan view of a modified form of bridge, in which the slotted end supports are tubular or cylindrical;

Fig. 9 is a front elevational view of the bridge shown in Fig. 8;

Fig. 10 is an end view of Fig. 9;

Fig. 11 is an enlarged perspective view of one of the tubular supports, showing a deep slot at one end and a shorter slot at the other end, the two slots being preferably arranged at right angles;

Fig. 12 is a front view of another form of bridge in which the string-engaging bar is of truss construction, and in which the end supports are flat and rectangular, with four slots each, the slots varying in depth;

Fig. 13 is an end view of the construction shown in Fig. 12;

Fig. 14 is a detached view of one of the supports shown in Figs. 12 and 13;

Fig. 15 shows a bridge (with one of the supports shown in dotted lines) in which the slots of varying depths are formed in the bar instead of in the supports;

Fig. 16 is an end view of the construction shown in Fig. 15;

Fig. 17 is a detached view of one of the supports shown in Figs. 15 and 16;

Fig. 18 illustrates still another form of bridge, in which the bar is provided with string-engaging notches on each edge, and with a plurality of slots of different depths for each edge, so that the bridge may be supported in reverse positions and be adjustable in either of its positions;

Fig. 19 is an end view of the construction shown in Fig. 18;

Fig. 20 shows another form of reversible bridge bar, combined with supports having a plurality of slots of different depths, one of the supports being in dotted lines to show the end slots in the bar; and

Fig. 21 is an end view of the construction shown in Fig. 20.

The simplest form of my new bridge, as I have so far actually used it, is that shown in Figs. 1 to 7a. The completed bridge consists of but three parts—the bar A and the two end supports B. The bar A is shown in the form of a flat bar, provided on its upper edge with a series of properly arranged string-engaging notches. In Figs. 1 to 7a, the bar A is shown provided with four pairs of notches 1, 2, 3 and 4, which are adapted to receive the eight strings of a mandolin banjo. The notches 1, 2, 3 and 4 gradually increase in width from the notches 1 to the notches 4, so as to accommodate the fine and coarse strings, respectively, of the instrument. The arrangement of notches on the upper edge of the bar A will, of course, depend upon the particular instrument to which the bridge is to be applied. For a regular banjo, for instance, the bar A would be provided with five equi-distant notches. The bar A may be made of wood or metal, depending upon the tonal effects it is desired to produce. For instance, in an instrument where gut or silk strings are used (as in a five-string banjo, which is played by picking with the fingers), the bar A should be of wood if it is desired to produce a sharp tone. If in such an instrument it is desired to produce a softer tone, similar to that of a guitar, the bridge bar A should be of metal. I have found, in my experiments, that very satisfactory results are obtained if the bar A be formed of a hard or hardened alminum. I have actually constructed and used bars made of a hardened aluminum sold under the trade name "Acieral," which, I understand, contains about 97% of aluminum. I have found this material to give excellent results. It is light and hard, and possesses sufficient tensile strength to withstand the high pressure of the strings. Ordinary aluminum is not suited for this purpose, according to my experience, because it is soft, brittle and not strong enough. These bridge bars should be made as light and thin as possible to give the best results. Thick and heavy bars are objectionable. By using a hard aluminum I get a bar of great lightness combined with great strength, and one which I found have the requisite qualities for a string-supporting member. I do not wish to be understood, however, as limiting myself to a bar made of this particular metal, and I have mentioned it merely as a preferred construction.

The end supports B shown in Figs. 1 to 7a are approximately triangular in shape, each being provided with three slots numbered 5, 6 and 7. As best shown in Fig. 7, these slots are of different depth, slot 5 being the shortest, and slot 7 the deepest. Slot 6 is of a depth between the other two slots. The slotted portions of the end supports B are adapted to interlock with the slotted portions formed by the slots 8 at the ends of the bar A, as best shown in Fig. 6. The slots 8 are formed by the spaced extensions 9 and 10. When the supports B are attached to the bar A, the extensions 9 and 10 straddle the supports, projecting considerably below the bottom of the engaged slot, while the supports straddle the ends of the bar above the slots 8 thereof. It will be understood, of course, that the slots in the bar and the supports are just wide enough to allow a tight engagement between the parts. By means of these interlocking slotted portions the supports B are locked against movement in any direction relatively to the bar—except, of course, a separation or assembly movement. Not only are the supports locked against a sliding movement along the bar, but they are also locked against a lateral tilting or tipping movement. Furthermore, the supports B are provided with a broad base for every one of the slots, so that the bar A is supported with great stability.

The height of the bar A from the base of the supports (indicated by the dotted line P in Figs. 3 and 7a, which may represent the head of a banjo) depends upon which pair of slots in the supports B is engaged by the bar. In Figs. 1 to 4, the bar engages the slots 6 of the supports. In Fig. 5 the bar engages the slot 5, which is the shortest of the three, and the bar is, therefore, held at its highest position. In Fig. 7a the bar is supported higher at one end than at the other. The left end of the bar (as viewed in that figure) may be said to be supported in the slot 6 of the support B, while the other end of the bar may be said to be supported in the slot 5 of the associated support. The object of thus supporting the bridge bar A higher at one end than at the other, is this: In playing a musical stringed instrument, it is desirable to have the strings as close to the finger-board as possible, so as to make the playing action easy, and yet far enough above the finger-board so that the strings, particularly the lower strings, will not touch the frets as otherwise they will produce a rattling or buzzing. Since the lower strings have a greater amplitude of vibration than the higher strings, it is clear that the lower strings should be at a greater distance from the finger-board than the higher strings. Therefore, in Fig. 7a, the higher strings 1 and 2 are held closer to the finger-board than the lower strings 3 and 4.

It will be clear from the foregoing description of Figs. 1 to 7a, that I have provided a bridge which is exceedingly simple in construction and readily permits the bridge bar to be adjusted to any desired height from the base of the supports, depending upon the particular make or style of instrument on which the bridge is used.

The bridge consists simply of three parts, and no additional parts, (such as screws, pins or the like) are necessary to effect the desired adjustment.

Further illustrative embodiments of my invention are shown in Figs. 8 to 21, which I will now describe in detail.

In the modified form shown in Figs. 8 to 10, the bar A′ is supported by a pair of cylindrical or tubular supports B′. Each of these supports is provided with a pair of slots 11 and 12, the slots 12 being deeper than the slots 11. As shown in Fig. 11, the slots are arranged approximately at right angles to each other. The bar A′ is provided at each end with an extension a' which extends into the tubular support B′ below the engaged slot, as clearly indicated by the dotted lines in Figs. 9 and 10. In this way, the double-locking effect described above in connection with Fig. 1, is also produced in this modification, the extension a' being the equivalent of the slots 8. That is to say, the bar A′ and the supports B′ are locked against relative movement along the length of the bar, and the supports B′ are locked against a tilting or tipping movement. In Figs. 8, 9 and 10, the bar A′ is shown supported in the deeper slots 12 of the supports B′. To support the bar A′ at a greater distance from the base of the supports, the shorter slots 11 are used to engage the bar. It is obvious, of course, that the supports B′ may be provided with additional slots of the desired depth.

In the modification shown in Figs. 12, 13, and 14, the bar A^2 is of metal in the form of a truss construction, which comprises the members 13 and 14 connected by the diagonal braces 15. At its ends the bar is provided with slots 16 adapted to engage in the slots of the supporting members B^2. These members are shown in the form of flat rectangular pieces provided with a plurality of slots of different depths. In the present instance, I have shown four slots numbered 17, 18, 19 and 20, which are of gradually increasing depth. In Figs. 12 and 13, the bar A^2 is shown supported in the deepest slots 20, and is, therefore, held at its lowest position. Since the extensions 21 at either side of the slots 16 project below the slots in the supporting members B^2, when the bridge is assembled, it is clear that the parts are locked against sliding or tilting movement, the same as described in connection with Figs. 1 and 8.

The supports B^2 permit the bar A^2 to be adjusted in four different positions. The number and depth of the slots in the supports B^2, may of course be varied.

In the modification shown in Figs. 15, 16 and 17, the adjustability of the bar A^3 is secured by means of a plurality of slots of different depths arranged at the ends of the bar, while the end supports are provided with only a single slot. In other words, the arrangement shown in these figures is practically a reversal of the arrangement shown in the figures previously described. The bar A^3 of Fig. 15 is provided at each end with a number of slots. In the present instance, I have, for the sake of illustration, shown three pairs of slots in the bar A^3, these slots being indicated at 22, 23 and 24, although it is obvious that the number and depth of the slots may be varied. The end supports B^3 are provided each with a slot 25, adapted to be engaged by any one of the pairs of slots 22, 23 and 24 of the bar A^3. The slots in the bar A^3 are so constructed that when the parts are assembled, the walls of the slots will extend below the bottom of the slots 25 in the supports B^3, so as to produce the same double-locking arrangement described above in connection with the other modifications. From Figs. 15 and 16, for instance, it is clear that the walls of the slot 24 at the left end of the bar A^3 extend below the bottom of the slot 25 of the associated support B^3. In Fig. 15 I have shown only one support in full lines, so as to show more clearly the slots in the bar A^3.

In Figs. 18 and 19 I have shown a construction similar to that shown in Figs. 15 and 16, with the additional feature that the bar A^4 is reversible to bring either edge into string-engaging position. One edge of the bar A^4 is provided with four pairs of string-receiving notches 26, while the other edge of the bar is provided with five string-receiving notches 27. The four pairs of notches 26 are adapted to receive the eight strings of the mandolin banjo, while the five notches 27 are for the strings of the ordinary banjo. The bar A^4 is provided with several pairs of slots of different depths for each set of notches. To hold the notches 26 in string-engaging position, the supports B^4 (of which one is shown in dotted lines) engage in a pair of the slots numbered 28, 29 and 30. The supports B^4, like the supports B^3, are each provided with a slot to interlock with the slots in the bar A^4, in the same manner as interlock the slots in the bars and supports of the modifications previously described. To support the notches 26 in highest position, the supports B^4 engage in the slots 28. The next lower position is secured by the slots 30, and the lowest position by the slots 29 which are the deepest. Similarly, to bring the notches 27 into string-engaging position, the bar A^4 is reversed and any desired pair of the slots 32, 33 and 34 brought into engagement with the slots 31 of the supports B^4. For the sake of clearness, I have indicated one of the supports B^4 in Fig. 18 in dotted lines, so as not to obscure the notches at the right end of the bar.

In the modification shown in Figs. 20 and 21, the bar A^5 is preferably of metal and formed of a truss construction. The bar A^5 comprises the longitudinal members 34 and 35, which are connected together by end braces or cross-pieces 36 and intermediate braces or cross-pieces 37. The member 34 of the bar A^5 is provided with four pairs of string-engaging notches 38, adapted to receive the eight strings of the mandolin banjo. The member 35 of the bar A^5 is provided with two sets of string-receiving notches. One set comprises the five notches 39, spaced equi-distantly and adapted to receive the five strings of the regular banjo. The other set of notches in the member 35 comprises the four notches 40, which are arranged to receive the four strings of what is known as the tenor banjo. Associated with each of the members 34 and 35 of the bar A^5 is a pair of slots 41 and 42, respectively. The bar A^5 is supported by a pair of supports B^5, of which one is shown in dotted lines for the sake of clearness. The supports B^5 are practically like the previously described supports B, in that they are approximately triangular in form and are each provided with three slots numbered 43, 44 and 45. In the drawings, the bar A^5 is shown supported in the slots 45, which are the deepest, and which, therefore, hold the bar in its lowermost position. The next higher position is secured by the slots 44, and the highest position by the slots 43. The interlocking engagement between the slots 41 and 42 of the reversible bar A^5 and the slots 43, 44 and 45 of the supports B^5, is the same as that described in connection with Figs. 1 to 6, and need not, therefore, be repeated.

The truss construction of the bar A^5 may of course, be formed in different ways. The number, form and position of the braces or cross-pieces 36 and 37 may be changed. Preferably, the cross-pieces should be so arranged that each pair of string-receiving notches 38 is about midway between a pair of cross-pieces, as shown in Fig. 20.

While the form shown in Fig. 1 is the simplest, at present I regard the form of bridge bar shown in Fig. 20 as a preferred form, because it is adapted to a greater variety of uses. Not only is the bar A^5 reversible, so as to bring either edge into string-engaging position, but it is adapted for use on three different instruments, and in each of these three different uses it may be adjusted in several different positions. It will be obvious, of course, that the bar A^5 may be supported by other means than the supports B^5, but I have found in actual practice that adjusting the bar A^5 to three different positions by means of the supports B^5, is quite sufficient for all practical purposes.

What I have said above with reference to the material of the bar A, applies fully to the bars A', A^2, A^3, A^4 and A^5. The aluminum compound or composition previously referred to, gives particularly good results with a bar formed of a truss construction, as shown for example in Figs. 12 and 20. These truss bars, as I may call them, are very light and very strong, and for that reason give highly satisfactory results. The bar A^5 can readily be stamped out of metal by a single operation, and can, therefore, be made very cheaply. The supports are preferably made of any light material that can be punched out, such as metal, fiber, hard rubber and the like. They may, of course, be made of other material, such as wood, but in that case they would have to be cut instead of punched. In actual practice I have used a bar similar to A^5, made out of the aluminum compound "Acieral," previously referred to, with the supports B^5 made of fiber. I have found that the use of a bridge bar made of the aluminum composition mentioned, in an instrument having wire strings, produces tones of an extremely loud singing quality and gives a better musical effect than that produced by a bridge in which the bar is made of wood or other non-metallic substance.

Although I have herein shown and described several specific forms of my invention, I would clearly have it understood that I have done so merely for the purposes of illustration. It is obvious that other modifications will occur to those skilled in the art, and that changes and alterations may be made without departing from the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A bridge for musical stringed instruments, consisting of a bar and a pair of end supports separate therefrom, said bar and said supports being provided with interlocking slotted portions, whereby said supports are locked against movement along said bar and against lateral tipping, certain of the slots in said slotted portions being of different depths to enable said bar to be supported at different heights.

2. A bridge for musical stringed instruments, consisting only of three separate pieces, a flat bar and a pair of end supports, said bar and said supports being provided with coöperating means formed integral thereon for directly supporting said bar on said supports at different heights, said means causing said supports to engage the sides of said bar.

3. A bridge for musical stringed instruments, consisting of a bar provided with a pair of slots at the ends, and a pair of sup-

ports having each a plurality of slots of different depths, the slotted ends of said bar being adapted to be brought into interlocking engagement with any desired pair of slots in said supports, whereby the height of the bridge is adjustable.

4. A bridge for musical stringed instruments, consisting of a bar provided with a pair of slots at the ends, and a pair of triangular-shaped supports having each three slots of different depths, the slotted ends of said bar being adapted to be brought into interlocking engagement with any desired pair of slots in said supports, whereby the height of the bridge is adjustable.

5. A bridge for musical stringed instruments, consisting of a bar provided with string-engaging notches on each edge, a pair of end supports separate from said bar, and coöperating means on said bar and said supports for supporting said bar in reversed positions, so that either edge thereof will be in string-engaging position.

6. A bridge for musical stringed instruments, consisting of a bar provided with string-engaging notches on each edge, a pair of end supports separate from said bar, and interlocking slotted portions on said bar and said supports for supporting said bar in reversed positions, so that either edge thereof will be in string-engaging position, said interlocking slotted portions preventing movement of said supports along the bar and also lateral tipping of said supports in both positions of the bar.

7. A bridge for musical stringed instruments, consisting of a bar provided with string-engaging notches on each edge, a pair of end supports separate from said bar, and interlocking slotted portions on said bar and said supports for supporting said bar in reversed positions, so that either edge thereof will be in string-engaging position, said interlocking slotted portions preventing movement of said supports along the bar and also lateral tipping of said supports in both positions of the bar, certain of said slots being of different depths to enable said bar to be supported at different heights when either edge is in string-engaging position.

8. A bridge for musical stringed instruments, consisting of a bar provided with string-engaging notches on each edge and with a pair of end slots for each edge, and a pair of supports separate from said bar and provided each with a plurality of slots of different depths, each pair of end slots in said bar being adapted to be brought into interlocking engagement with any desired pair of slots in said supports, whereby either edge of said bar may be supported in string-engaging position at any desired height from the base of said supports.

9. A bridge for musical stringed instruments, comprising a bar having a series of string-engaging notches on one edge and a different series of string-engaging notches on the other edge, a pair of supports, and interlocking means provided at the ends of said bar and on said supports for supporting said bar with either edge in string-engaging position.

10. In a bridge for musical stringed instruments, a bridge bar having four pairs of string-engaging notches on one edge and a series of nine string-engaging notches on the other edge, said bar having portions extending on each side of said series of notches, and a pair of supports for engaging said extending portions to support the bar with either edge in string-engaging position.

11. In a bridge for musical stringed instruments, a bar having a series of string-engaging notches on each edge and a transversely slotted extension on each side of each series of notches.

12. A bridge for musical stringed instruments, consisting of a bar of light hard metal and a pair of end supports of hard non-metallic material, said bar and said supports being provided with interlocking portions, whereby said supports are locked against movement along said bar and against lateral tipping.

13. A bridge for musical stringed-instruments, consisting of a bar of hard metal which comprises a pair of spaced longitudinal members and a plurality of braces connecting said members, one of said members having a series of string-engaging notches, and means for supporting said bar in string-engaging position.

14. A bridge for musical stringed instruments, consisting of a bar of hard metal which comprises a pair of spaced longitudinal members and a plurality of braces connecting said members, each of said members having a series of string-engaging notches, and means for supporting said bar with either of said members in string-engaging position.

15. A bridge for musical stringed instruments, consisting of a bar of hard metal which comprises a pair of spaced longitudinal members and a plurality of braces connecting said members, one of said members having a series of string-engaging notches, a pair of supports for said bar, and interlocking slotted portions on said bar and said supports for supporting said bar in string-engaging position, certain of the slots in said portions being of different depths to enable said bar to be supported at different heights from the base of said supports.

16. In a bridge for musical stringed instruments, a bar formed out of hard metal and comprising a pair of spaced longitudinal members and a plurality of braces con-

necting said members, one of said members having a series of string-engaging notches along its outer edge.

17. In a bridge for musical stringed instruments, a bar formed out of hard metal and comprising a pair of spaced longitudinal members and a plurality of braces connecting said members, one of said members having a certain series of string-engaging notches along its outer edge, the other member having a different series of string-engaging notches along its outer edge.

18. A bridge for musical stringed instruments, consisting of a bar of hard metal which comprises a pair of spaced longitudinal members and a plurality of braces connecting said members, each of said members having a series of string-engaging notches along its outer edge, said bar having a pair of end slots associated with each of said members, and a pair of supports separate from said bar and provided each with a plurality of slots of different depths, each pair of end slots in said bar being adapted to be brought into interlocking engagement with any desired pair of slots in said supports, whereby either edge of said bar may be supported in string-engaging position at any desired height from the base of said supports.

In witness whereof, I hereunto subscribe my name this 13th day of August, 1918.

ALBERT D. GROVER.