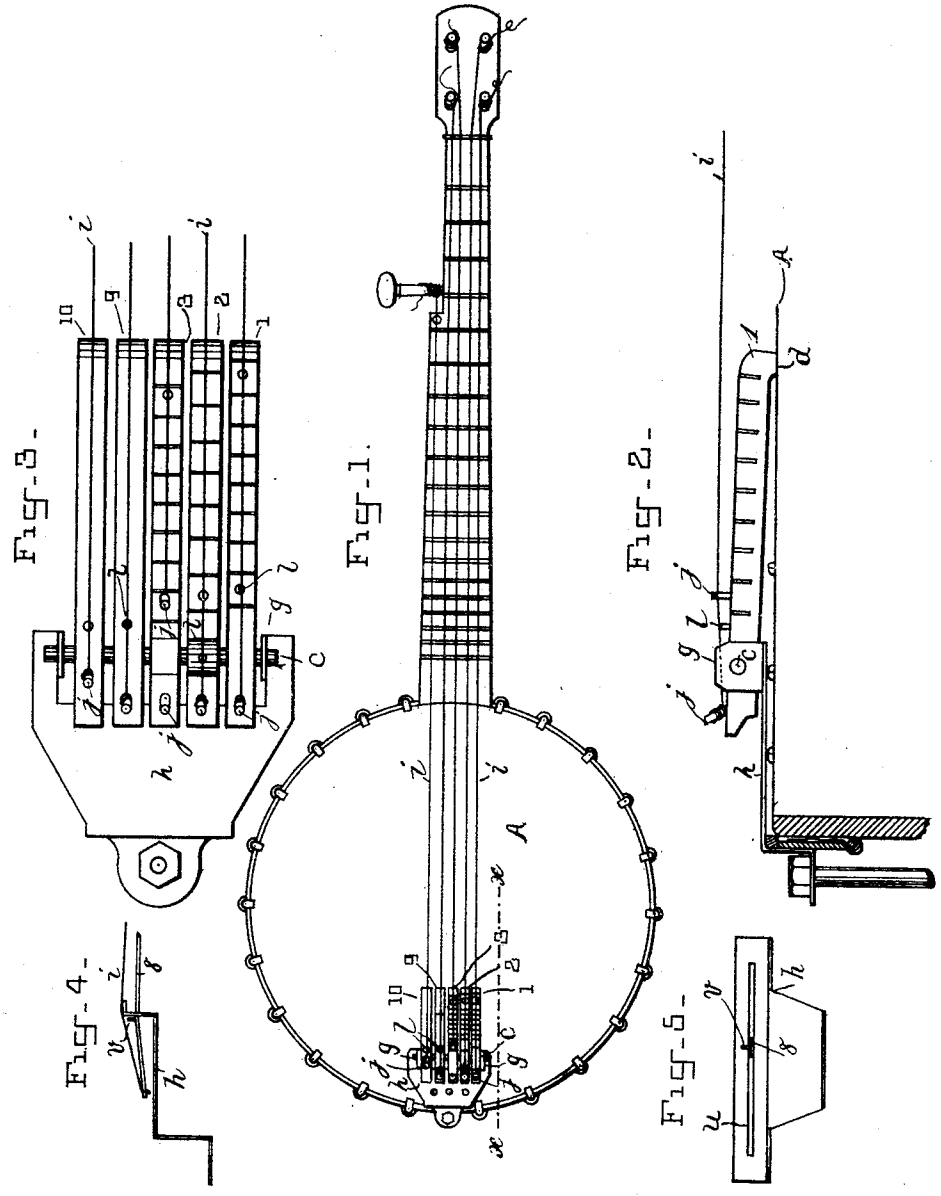
(No Model.) 3 Sheets—Sheet 1.

J. BARNES.

BRIDGE FOR MUSICAL INSTRUMENTS.

No. 457,833. Patented Aug. 18, 1891.



WITNESSES =

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INVENTOR =

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Fig. 6.

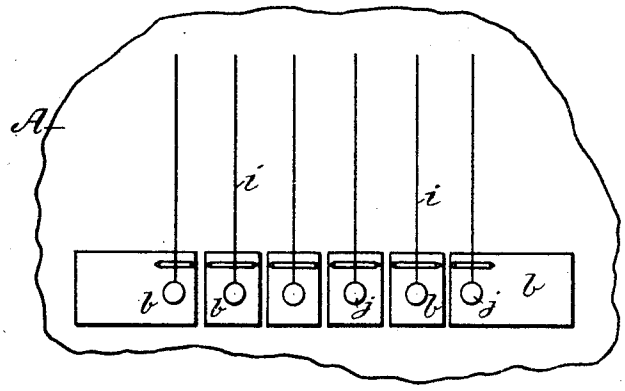


Fig. 7.

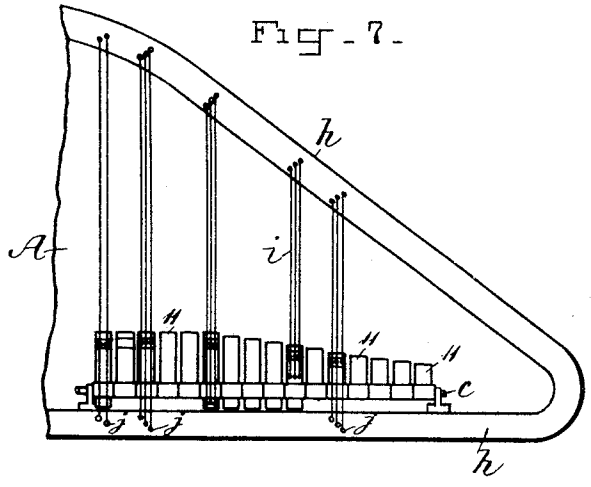
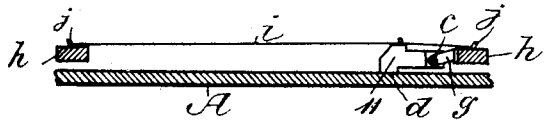


Fig. 8.



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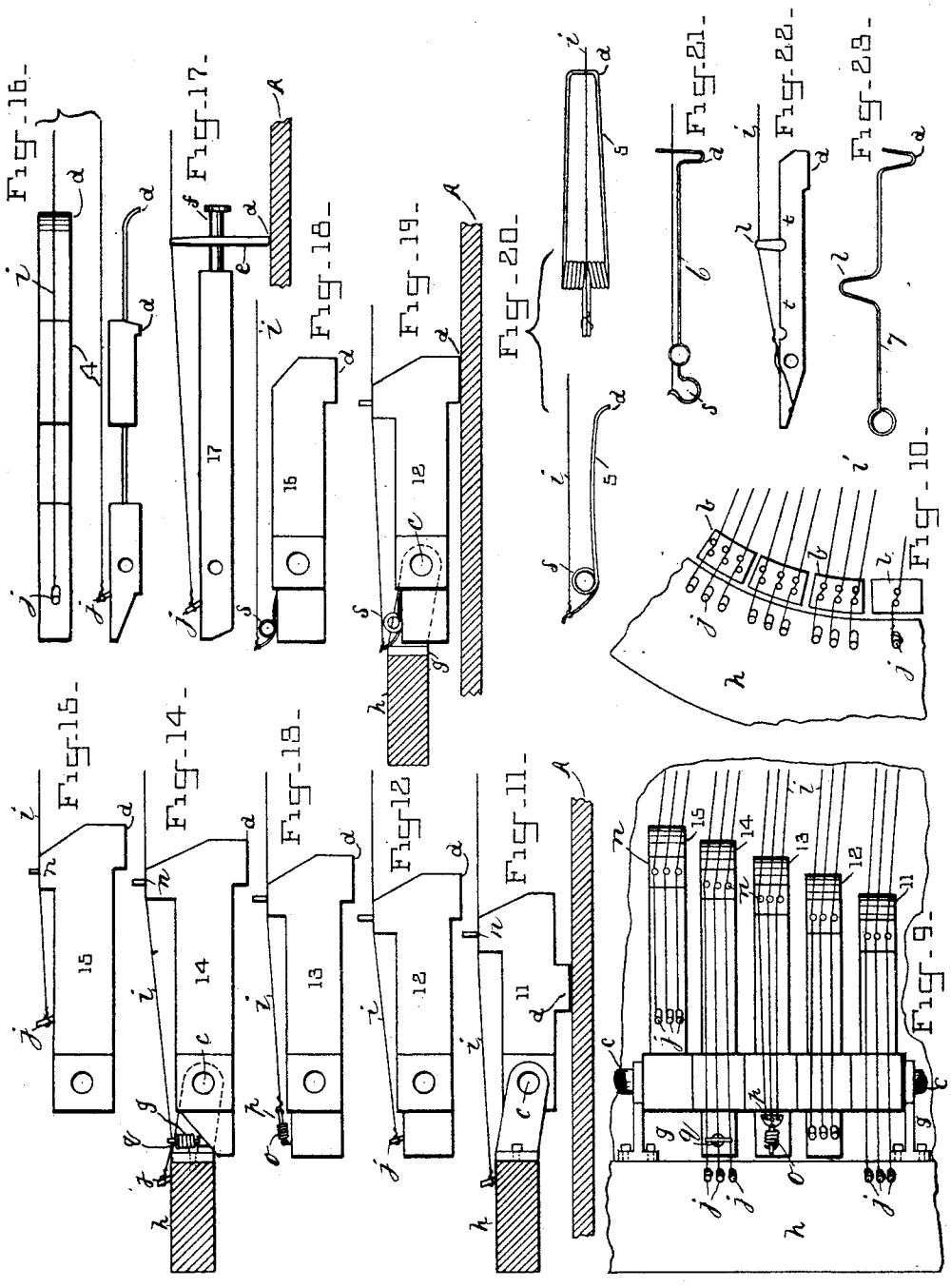
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UNITED STATES PATENT OFFICE.

JOSHUA BARNES, OF BROOKLYN, NEW YORK.

BRIDGE FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 457,833, dated August 18, 1891.

Application filed July 23, 1890. Serial No. 359,675. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA BARNES, a citizen of the United States, and a resident of Brooklyn, county of Kings, State of New York, have invented new and useful Improvements in Bridges for Musical Instruments, of which the following is a specification.

My invention consists in independent bridges for the different strings in stringed musical instruments or chord combinations of strings, the purpose of which is to enable each string or chord to take effect on the sounding-board or head of the instrument unaffected by the restraint imposed by the ordinary continuous bridge for all the strings whereby the power, volume, and quality of the tones are increased.

My invention also consists in a lever-bridge device whereby the vibratory effect of the strings on the sounding board or head of the instrument is magnified; and my said invention also consists in various features of construction, arrangement, and mode of mounting the bridge and connecting the strings, all as hereinafter more fully described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a plan view of a banjo having a bridge contrived in accordance with my invention. Fig. 2 is a section of a portion of the same on the line *x x* and enlarged. Fig. 3 is a plan view of the bridge device detached from the rest of the instrument and also enlarged. Fig. 4 is a side elevation of the bridge-holding plate in a modified form of construction and a modified form of bridge. Fig. 5 is a front elevation of the devices represented in Fig. 4. Fig. 6 is a plan view of a portion of a guitar, showing the bridge of independent parts for each string applied to it. Fig. 7 is a plan view, and Fig. 8 a transverse section, of part of the string-frame of a piano, showing the application of my improved bridge to such instruments. Figs. 9 and 10 are plan views of portions of the string-frame and sounding-board of a piano, showing various modifications of the bridge and arrangements of the strings therewith. Figs. 11 to 15, inclusive, are side elevations of the several parts of the bridge shown in Fig. 9, respectively, with a section of part of the string-frame and sounding-board in Fig. 11 and of the string-frame only in Fig. 14. Fig. 16 represents a plan and side view of a modified form of construction of the lever-bridge device. Fig. 17 is a side elevation of another modified arrangement of the lever-bridge device, with part of a sounding-board in section. Figs. 18 and 19 are side elevations of lever-bridge devices, showing different ways of connecting the strings, with a part of a sounding-board shown in section in the latter figure. Fig. 20 represents a modified form of lever-bridge in side and plan views, and Figs. 21 to 23, inclusive, represent different forms of lever-bridges in side elevation.

A represents the head of a banjo-belly of a guitar or violin or sounding-board of a piano, which are equivalent devices used in substantially the same way, and all for magnifying the tones of the strings through the instrumentality of a bridge in all the several instruments mentioned. They will be hereinafter called "sounding-board" indiscriminately.

In all these instruments, and in whatever form of the bridge therein, it has always been made in one continuous piece, so that the vibrations of the individual strings or chord combinations of strings have to be transmitted to the sounding-board through a bridge having the rigidity due to such construction, which I have found by experiments that I have made, limits the vibratory influence of the strings on the sounding-boards to a considerable extent, and therefore prevents the full development of the tones to a considerable degree, which I propose to remedy in considerable measure by the employment of a bridge constructed in separate independent parts for the individual strings or combinations of them to be struck together, as in the double or triple chord combinations of pianos.

The bridge may be constructed in various different ways, and so that it delivers the thrust of the string on the sounding-board directly, or through the magnifying effect of the bridge arranged as a lever, and either of rigid or elastic character, and also either attached to the sounding-board or having other attachments to keep it in place and merely resting thereon.

The arrangement of the bridge in separate individual parts for the individual strings or combinations of strings, is shown in the sim-

plest form in Figs. 6 and 10, where *b* represents the bridge in several short pieces divided according to the individual strings, as in the banjo, violin, or guitar, or the chord combinations of strings, as in a piano, and attached to or located on the sounding-board A in suitable position and so that the thrust of the strings on the sounding-board is direct, as in the common arrangement; but the transmission is wholly through the individual part of said bridge belonging to each string or chord group of strings.

In all the other figures I represent the lever arrangement of the bridge, but in various forms and modes of application of the bridge to the instrument and in arrangement of the strings with the bridge, some of which levers, as those numbered from 1 to 8, inclusive, are of elastic or springy construction, contrived in various ways, while the rest, numbered from 9 to 18, inclusive, are rigid levers. These lever-bridges are mounted on a rod *c*, so as to have pivotal support thereon at one point, and to rest at another point, as *d*, on the sounding-board of the instrument. They may have two such bearing-points on the sounding-board, as I have represented in Fig. 16, or more, if desired, the lever being preferably of elastic construction. The point or points bearing on the sounding-board may be adjustable lengthwise of the lever, as I have indicated by the standard *e* in Fig. 17, connected to the end of the lever by the rod *f*, along which said standard may be shifted; but any other approved arrangement for such adjustment may be adopted. The rod *c* is supported in suitable ear-lugs, arms, or brackets *g*, attached to or formed on the string-stretching plate or frame *h*, or any other approved support. The strings *i* may be attached to the string-stretching frame or plate, as in Figs. 7, 8, and 10, and as some are arranged in Fig. 9, or to the bridge, as in the case of the guitar, Fig. 6, by the usual or other hitch-pins *j*, and be stretched over a bearing-point on the bridge to press it onto the sounding-board; but I propose in some cases to connect the strings to the lever-bridge, so that the stress of the strings will thrust the bearing-points of the bridge down on the sounding-board with more or less leverage, either through the leverage alone or by the same and the thrust of the strings stretched over other bearings on the bridge, and I will connect the strings to the lever-bridge either rigidly or by spring devices affording elasticity, having softening effects of the vibratory action on the sounding-board and graduating the stress of the strings as they change by variations of temperature. Such elastic connection of the strings also favors stability in the matter of keeping in tune much longer. The elastic connection of the strings will be used mostly with the rigid-lever bridge, but may also be employed with the elastic bridge when desired.

In Figs. 1, 2, and 3 I have represented the strings connected to the lever-bridge by ordinary hitch-pins *j*, mostly placed back of the pivot-bearing, with a bearing on the bridge, as 1, over which the strings are stretched, but the bearing may be dispensed with, as in the case of part No. 10 of the bridge, Figs. 1 and 3; also as in Figs. 16 and 20. The hitch-pin may also be located on the other side of the pivot-bearing, as in part No. 3 of the bridge, Fig. 3, and part No. 15, Figs. 9 and 15, with or without other bearings *n* on the bridge over which the strings are stretched, as with such bearings Figs. 9 and 15, or any equivalent bearing. The strings may be connected to the bridge or string-frame by a coiled spring, as *o*, Fig. 13, or *s*, Figs. 18, 19, 20, and 21, to which a chord combination or group of strings may be connected by an equalizing-plate *p*, Figs. 8 and 13. The effect of strings thus connected to the bridge by springs is softer tones of better quality, besides the compensating action of the springs in the changes of temperature, which causes greater uniformity, and tuning is not so frequently required. The spring *s* may form part of the lever-bridge, as in Figs. 20 and 21, the whole being made of wire, as in Fig. 20, or of a flat strip of metal, as in Fig. 21 for spring-lever bridges.

Fig. 23 represents another form, in which the bridge may be made of flat spring metal, the bearing 1 being made by a bend of the strip.

Fig. 22 represents an arrangement in which the bearing 1 may be shifted from one position to another, as the notches *t*. In this case the string is tied around the end of the lever-bridge in lieu of the hitch-pin or other means of connecting it.

I also propose in some cases to employ elastic coiled spring-agraffes, as *q*, and prefer when the lever-bridge is used to connect them thereto, as in Fig. 14, for effecting the pressure of the bridge-bearing *d* on the sounding-board. The strings may be stretched over the bearing *n*, as shown in said figure, or not, as preferred.

The string-stretching plate *h* may be made with a slot, as *u*, Figs. 4 and 5, and the lever-bridge as a strip of metal 8, to be inserted through the slot and held against the pull of the string by a stud *v*, as another way of constructing these parts in lieu of the pivot-rod *c* with the hole in the bridge for the pivot.

I claim as my invention—

1. The combination, with the sounding-board and the strings, of a bridge made in separate individual parts for the strings or chord combinations or groups of strings, substantially as described.

2. The combination, with the sounding-board and the strings, of a bridge made in separate individual parts for the strings or chord combinations or groups of strings, and resting loosely on said sounding-board, with means independent thereof for keeping the parts of the bridge in position.

3. The combination, with the sounding-board and the strings, of a lever-bridge having pivotal support independent of said sounding-board, and a bearing thereon whereby the vibratory effect of the strings on the sounding-board is magnified, substantially as described.

4. The combination, with the sounding-board and the strings, of a lever-bridge made in separate individual parts for the strings, or chord combinations or groups of strings, and having pivotal support independent of said sounding-board and bearing thereon, substantially as described.

5. The combination, with the sounding-board and the strings, of a spring-lever bridge made in separate individual parts for the strings or chord combinations or groups of strings, and having pivotal support independent of said sounding-board, and a bearing thereon, substantially as described.

6. The combination, with the sounding-board and the strings, of a lever-bridge made in separate individual parts for the strings or chord combinations or groups of strings, and having the strings connected to the bridge independently of the string-frame, and also having pivotal support independent of said sounding-board and a bearing thereon.

7. The combination, with the sounding-board and the strings, of a lever-bridge made in separate individual parts for the strings or chord combinations or groups of strings, and having pivotal support independently of said sounding-board, and a bearing thereon, and springs connecting the strings with the lever-bridge.

8. The combination, with the sounding-board and the strings, of a lever-bridge made in separate individual parts for the strings or chord combinations or groups of strings, and having pivotal support independent of said sounding-board and bearing thereon, said strings connected to the lever-bridge and stretched over another bearing thereon, substantially as described.

9. The combination, with the sounding-board and the strings, of a lever-bridge made in separate individual parts for the strings or chord combinations of strings, and having pivotal support independently of said sounding-board, and a bearing thereon, said strings connected to the lever-bridge and stretched over another bearing thereon and being adjustable along the bridge, substantially as described.

10. The combination, with the sounding-board and the strings, of a lever-bridge made in separate individual parts for the strings or chord combinations or groups of strings, and having pivotal support independent of the said sounding-board, and a bearing thereon, said bearing being adjustable along the said sounding-board.

11. The combination, with a string or group of strings in a musical instrument, of the elastic or spring agraffe, substantially as described.

12. The combination, with a string or group of strings and a lever-bridge, of the elastic or spring agraffe connected with the lever-bridge and the string or strings, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two witnesses.

JOSHUA BARNES.

Witnesses:
WILFRED B. EARLL,
H. J. MORGAN.