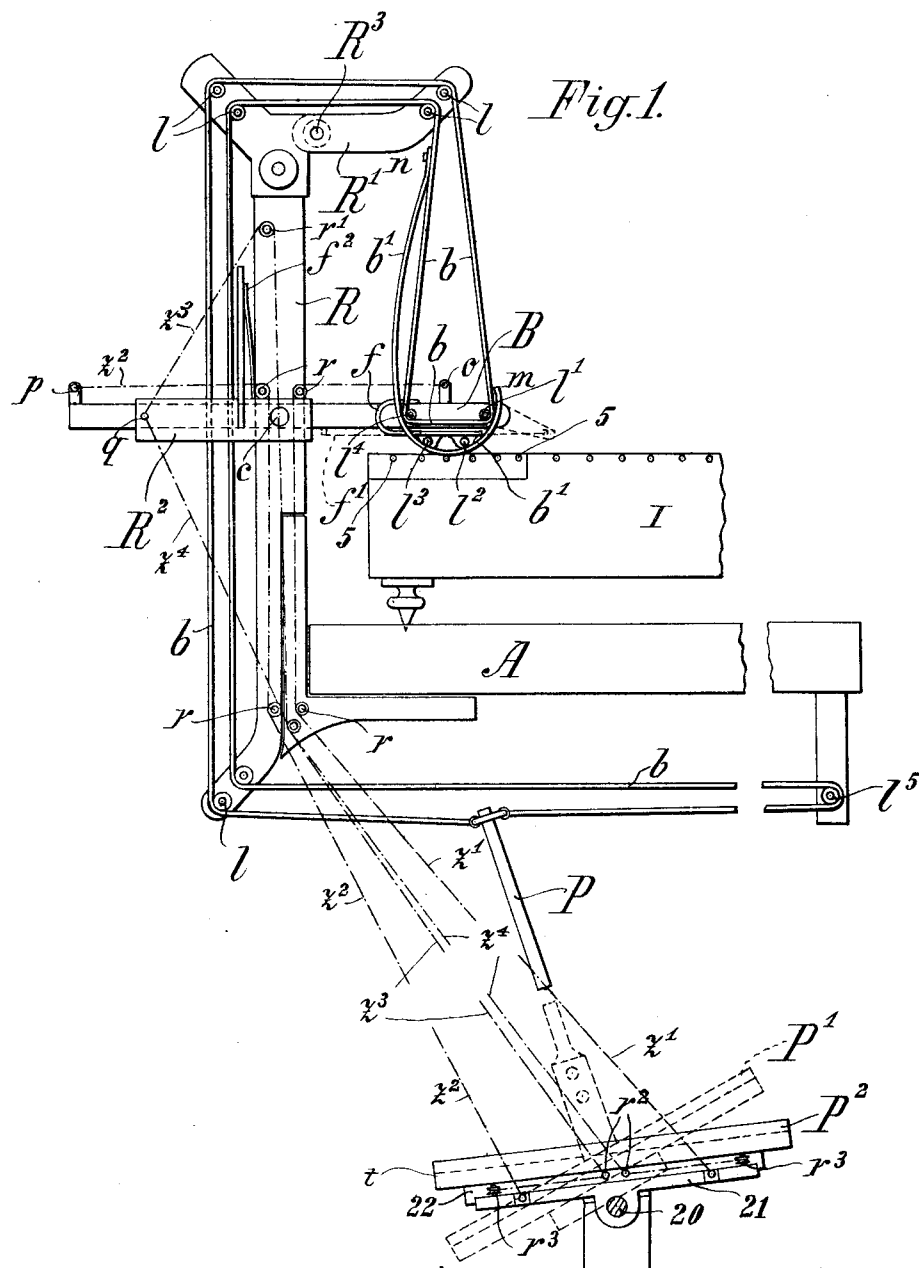
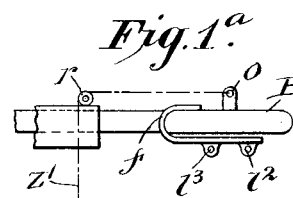
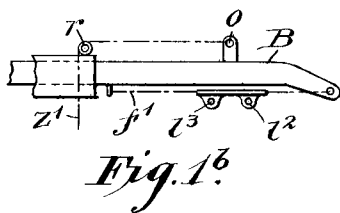
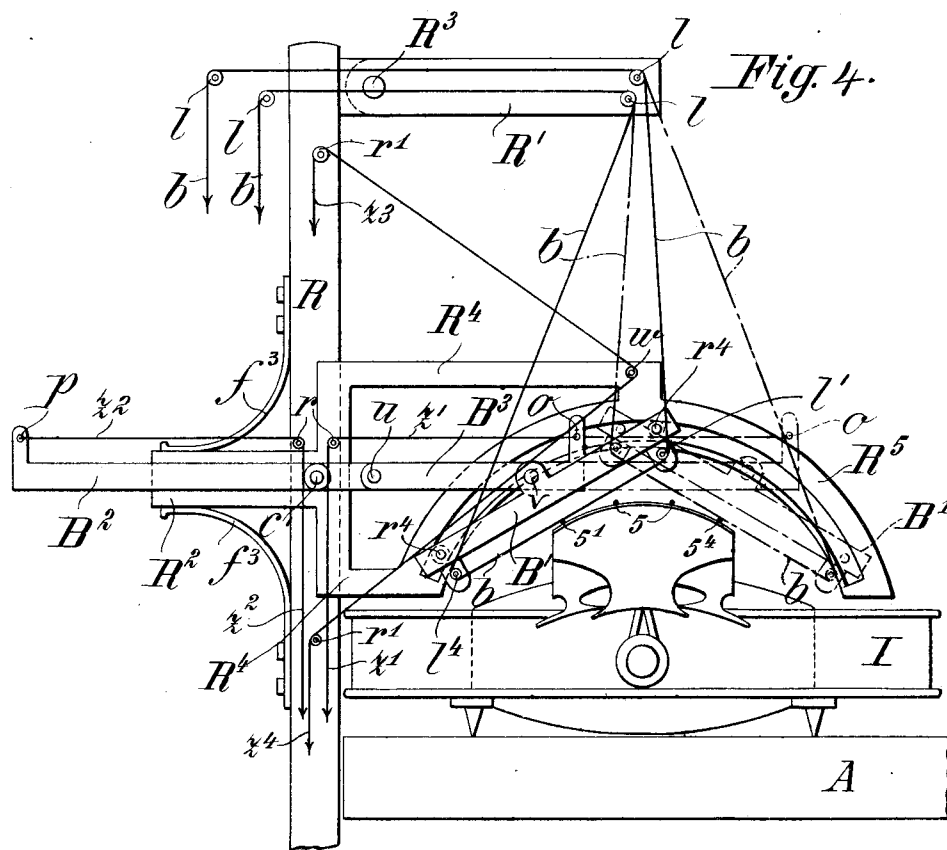




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BOWING DEVICE FOR ZITHERS, VIOLINS, AND OTHER STRINGED INSTRUMENTS.
APPLICATION FILED OCT. 29, 1908. Patented July 30, 1912.
1,034,293. 4 SHEETS—SHEET 2.



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Fig. 2

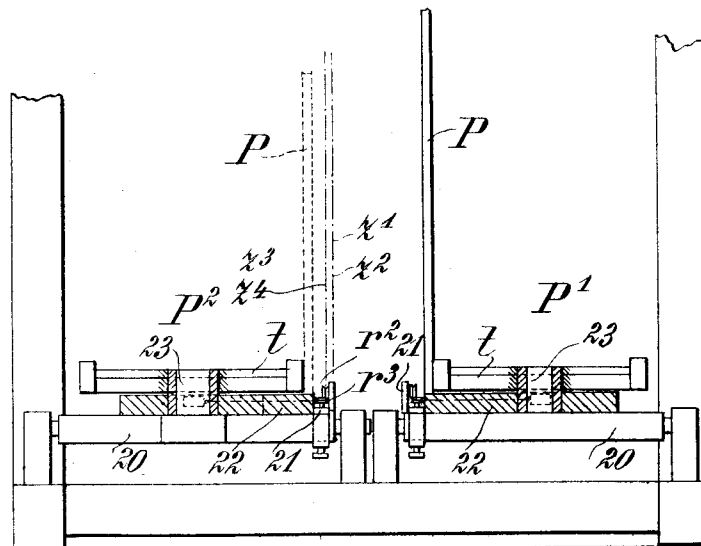
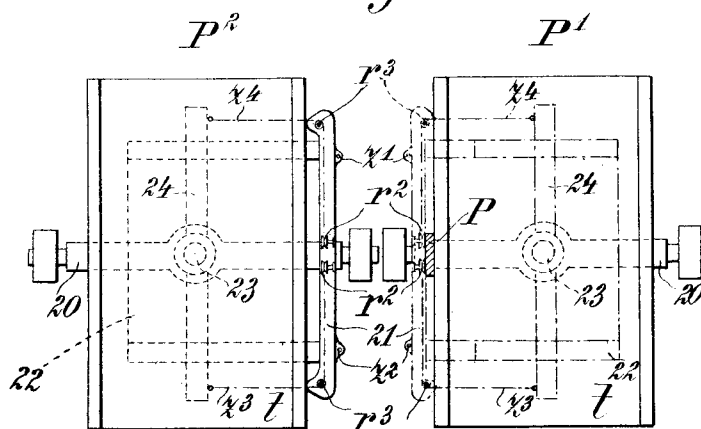


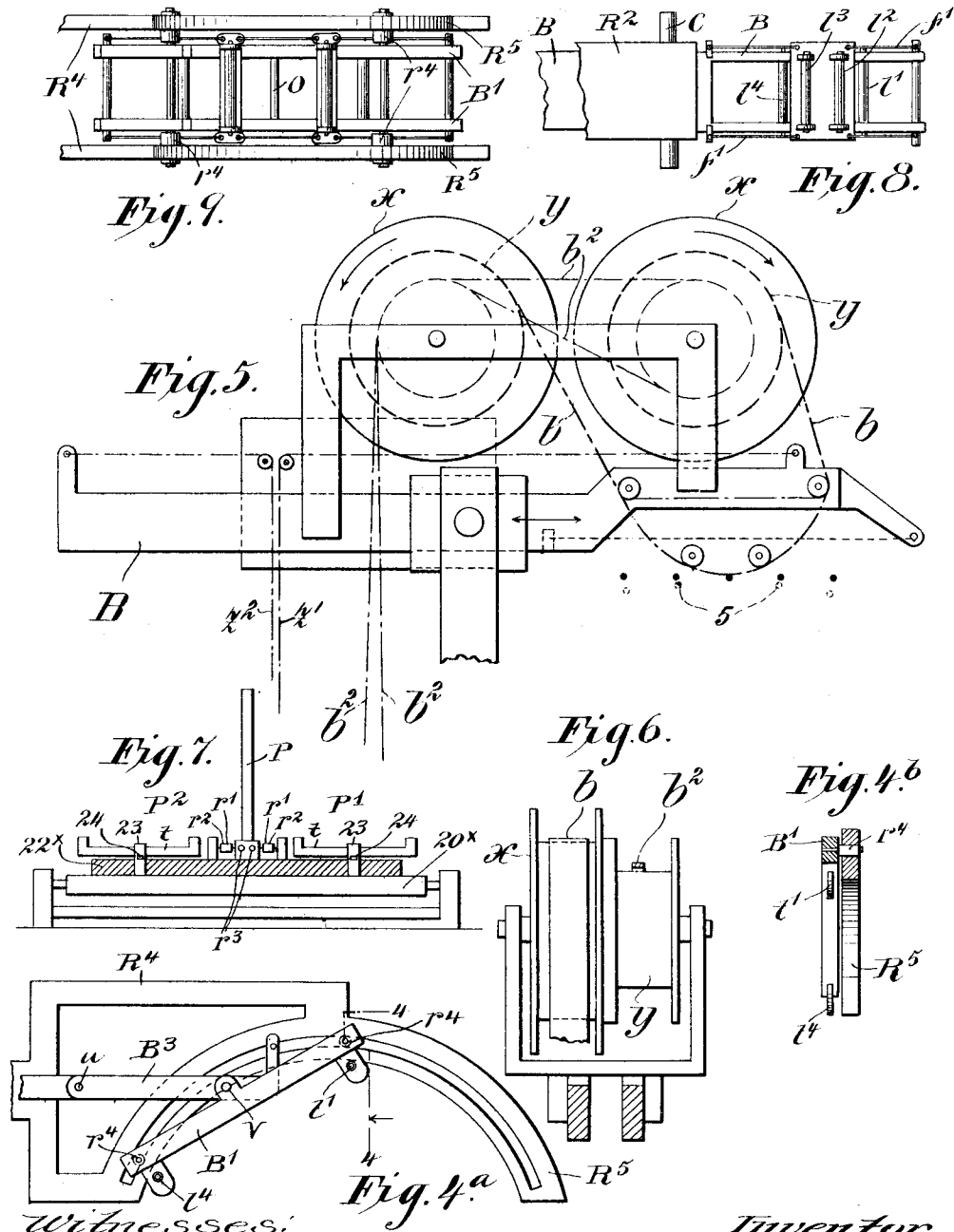
Fig. 3



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UNITED STATES PATENT OFFICE.

JOSEPH VON PEICHL, OF VIENNA, AUSTRIA-HUNGARY.

BOWING DEVICE FOR ZITHERS, VIOLINS, AND OTHER STRINGED INSTRUMENTS.

1,034,293.

Specification of Letters Patent.

Patented July 30, 1912.

Application filed October 29, 1908. Serial No. 460,026.

To all whom it may concern:

Be it known that I, JOSEPH VON PEICHL, a subject of the Emperor of Austria-Hungary, residing at Vienna, Empire of Austria-Hungary, have invented certain new and useful Improvements in Bowing Devices for Zithers, Violins, and other Stringed Instruments, of which the following is a specification.

10 In known bowing devices for stringed instruments such as zithers, violins and the like, an endless bowing band guided over rollers to and fro between the strings of the fret-board is caused to operate by means of
15 ordinary pedal devices and is pressed toward the strings desired to be engaged by the bowing band either by an electro-magnetic device or by means of selecting keys for every string actuated by the fingers of
20 the right hand, the said fingers under these conditions being restricted in playing accompaniments, as in zither playing. In other known devices of this class separate bow bands and pedals are arranged for
25 every string to be bowed, and in other similar devices revolving disks for every string have been used with bowing devices, the said disks being moved or actuated by spring means.
30 The present invention, however, relates to an improved bowing device wherein both the desirable reciprocating or sweeping motion of the bow band and the adjustment of the position of the band or other bowing
35 means for all the different strings of the instrument to be bowed can be effected solely with one or at most two bilaterally acting biaxial pedals so that the right hand of the operator can be employed exclusively for
40 playing an accompaniment, with the advantage of yielding a fuller effect of accompaniment than can be attained, for instance, in modern zither playing.

45 The improved bowing device is not only applicable in various ways to zithers but also to violins and other stringed instruments of this kind.

50 In the drawings: Figure 1 illustrates a side elevation of one form of the device shown broken away in part and applied to a zither disposed upon a table. Figs. 1^a and 1^b are detail views showing, respectively,

different means for increasing the elastic action of the horsehair attachment of the bowing band. Fig. 2 is a front elevation, 55 partially in section, of the bilaterally acting biaxial pedal arrangement. Fig. 3 is a plan view of the said pedal arrangement. Fig. 4 is a side elevation, partially broken away, of a modified form of the bowing device 60 adapted for playing instruments with curved fretboards, such as violins and the like. Figs. 4^a and 4^b are detail views of the means for guiding the modified form of bowing device shown in Fig. 4. Fig. 5 is a 65 side elevation, partially broken away, of a bow provided with guiding rollers, as shown in Figs. 1 and 4, and with revolving rollers for the bowing band. Fig. 6 is an end view, partially in section, of one of the revolving 70 rollers as shown by Fig. 5. Fig. 7 shows a further modified form of the pedal arrangement. Figs. 8 and 9 are two top plan views of a modified form of means for increasing the elastic action of the horsehair attach- 75 ment of the bowing band.

Referring to Fig. 1, a bowing band *b* extends from a pedal arm *P* over rollers *l* to *l'*, passes from *l'* to *l''* through the bow *b* and over further rollers *l*, *l''* back again to the 80 said pedal arm in the form of an endless bolt. The pedal arm and operating mechanism are located below the support for the instrument to be played with the bowing device. The support in this case is a table *A* 85 on which a zither or analogous instrument *I* is placed near the frame of the improved bowing mechanism, the latter comprising an upright *R* having an upper roller carrier *R'* connected to the upright by a spring hinge 90 *R''* which automatically compensates for the differences of tension which may arise in the band during the shifting movement of the bow *B*. The bowing band *b* instead of passing between the strings 5 of the instru- 95 ment *I*, as in other well known arrangements, is disposed within the bow *B* in the shape of an approximately semicircular loop and is held above the strings and capable of sweeping each separate string with- 100 out touching the adjacent strings if duly adjusted by means of the pedal device. The bowing band *b* is provided in part with horsehair or other suitable material *b'* ex-

tending from the point m to the point n and shiftably attached to the band at the latter point, (for example by means of small loops at the ends of the horsehair attachment b' , said loops being removably suspended upon headed bolts secured to the band b at the said points). In order to increase the elastic action of the horsehair attachment, the latter engages yielding rollers l^2, l^3 mounted on the bow, for instance by means of a metallic spring carrier f , or by means of lengths of tightly stretched twine, as indicated by the dotted lines at f' . The band b runs in this case as a simple pulling band only over rollers l' and l^4 mounted on the bow B and the horsehair strip b' is guided over the yielding rollers l^2, l^3 upon which the band b cannot exert any pulling action.

The pedal device is provided with one or at the most two pedals P', P^2 capable of being oscillated vertically around a horizontal axis 20 and also laterally around a pivot 23, see Fig. 3, projecting from the supporting plates 22 of the respective footboards t . The supporting plate 22 of each footboard together with a double-arm 21 connected thereto or mounted thereon is fixed to the respective axis 20. In the construction shown by Figs. 1, 2 and 3, only the supporting plate 22 of the pedal P' carries an arm P connected to the band b , as hereinbefore described, and when this pedal is operated it produces the desired reciprocating bowing motion of the band. The second pedal P^2 serves in this instance principally for shifting the bow B together with the band loop b' across the strings 5 of the instrument I located underneath, by means of belts z', z^2 passing from the ends of the double arm 21, as shown by Fig. 1, over rollers r to the bow B and fixed thereon at o, p . By actuating the pedal P^2 on its axis 20 one of the belts, for instance z' is pulled, and the other belt z^2 is correspondingly relaxed, and the loop b' is pulled toward the supporting and sliding frame R^2 , and vice versa.

From one terminal point q of the frame R^2 , belts z^3, z^4 are guided over rollers r', r^2, r^3 to the ends of a longitudinal bar 24 fixed under the footboard t , and are made fast to said bar. If, for example, the footboard of the pedal P^2 is turned in one direction around the pivot 23, the belt z^3 , for instance, will be pulled, the belt z^4 will correspondingly yield and the frame R^2 carrying the bow or having the latter arranged within the same and which is pivoted at c on the upright R , will turn in such manner that the band loop b' will be pressed toward the strings 5 of the instrument to be bowed, and vice versa. A spring f^2 , as shown by Fig. 1, counteracts the tension of the belt z^3 and

forces the frame R^2 to regain its horizontal position whenever the tension in z^3 relaxes or ceases, and this same operation ensues or is performed by the upper one of the two springs f^2 shown in Fig. 4. Belts similar to the belts z^3, z^4 may also be provided in connection with pedal P' and be utilized for obtaining musical effects. The pedal P^2 can also be provided, instead of with the pulling belts z' and z^2 , with an arm P for actuating a second bow band and a second bow in a manner similar to the arrangement just described. In the latter case each band, together with the corresponding bow will be actuated exclusively by its own pedal like the band of a separate bowing device and the oscillation of the actuated pedal around its axis 20 will produce a bowing or sweeping motion of the bow band controlled thereby and the lateral turning of the footboards t around their pivots 23 will produce the shifting motion of the actuated bow across the strings 5 of the instrument located underneath.

In the arrangement hereinbefore described, it has been assumed that the instrument I used in connection with this arrangement is provided with strings lying in a horizontal plane as in the case of a zither. A very simple modification of the bowing mechanism shown by Fig. 1 will suffice to render the said arrangement also applicable and operative with instruments provided with a curved fretboard, like the violin and similar instruments. This modification is shown by Fig. 4 and instead of forming the bow B in a practically solid piece and guiding the same in a straight line, as shown by Fig. 1, the bow is composed of three parts B', B^2, B^3 articulated at u and v so that the bow piece B' which is traversed by the bow band b can be guided, for instance, in a segmentally slotted piece or support R^5 fixed to the arm R^4 which is pivotally connected at c to the main carrier or upright R of the frame. The center of curvature of the guiding slot of the piece R^5 coincides with the center of the arc of the strings of the instrument and the bow piece B' is guided in the slot of the piece R^5 , for instance, by means of rollers r^4 carried by the bow piece B' . The movement of the bow across the strings is effected quite in the same manner as in the arrangement hereinbefore explained by belts $z' z^2$ running from points o and p over rollers r to the pedal, as shown by Fig. 1, while the belts z^3 and z^4 running from the point w of the arm R^4 over rollers r' to the pedal serve to transmit the lateral movements of the footboard of the pedal to the supporting arm R^4 and guiding piece R^5 for the purpose of oscillating these parts in a vertical plane and thereby controlling the in-

tensity of tone produced by the instrument I. Springs f^3 (Fig. 4) connected to the sliding frame R^2 serve to return the arm R^4 and piece R^3 to initial position.

5 In the form of the device shown by Fig. 4 the bow band b actuated by the pedal arm P runs in the bow piece or part B' over rollers l' , l^4 and touches in the extreme position the strings $5'$ and 5^4 of the instrument respectively, but the arrangement shown in Fig. 1 for guiding the band in the form of a band loop and for obtaining the yielding operation of rollers l^2 , l^3 can also be used in the modified arrangement shown by Fig. 4.

15 In the arrangement shown by Fig. 4 the instrument I being assumed to be a violazither or a violin is also placed upon a table A similarly to the arrangement of the zither as shown by Fig. 1 and the strings of the instrument are to be fingered by the left hand in the same manner as in the zither arrangement. The violin, together with the string sweeping device shown by Fig. 4, may also be disposed for instance upon a suitable stand so as to permit it to be held and fingered in the ordinary manner of violin playing.

20 The ends of the part of the band that is guided through the bow B and is sweeping the strings may, for obviating the effect of tension differences originated in the band b , be attached to revolving rollers x , x (Figs. 5 and 6) mounted upon the bow and arranged to be revolved by means of the pulling belts b^2 passing from the arm of the pedal device (Figs. 1, 2 and 3) over the driving drums y , y (Figs. 5 and 6) connected to the respective rollers x , x so that this modified bowing band can be wound upon one roller x and unwound from the other, and vice versa, operating in this manner as a bowing band partaking in all the movements of the bow, the tension of the band not, however, varying as it is wound on one roller and unwound from the other. In the case of the application of these rollers the upper part of the supporting frame (R, Fig. 1) and the arm (R') of the same are dispensed with and the belts z' , z^2 serve as in the examples previously described to shift the bow together with the rollers and the drums mounted upon it.

It is obvious that in the case of the bow being built up in three parts as shown by Fig. 4, the revolving rollers x , x are to be mounted completely on the headpart B' of the bow through which the bowing band to be attached to the said rollers is passed.

60 The bowing device embodying a single band b , the arm P, Figs. 2 and 3, together with the two footboards t and the corresponding pivots 23 may also be mounted upon one common supporting plate 22^x , as

shown by Fig. 7, so that the whole pedal device will have one common axis of rotation. In this latter construction the sweeping motion will be effected by turning both pedals in common around an axis 20^x , the displacement of the bow across the strings of the instrument being performed by turning the pedal P' around the pivot 23 and the control of the pressure of the band upon the strings being effected by turning in a similar manner the pedal P^2 , or vice versa.

What is claimed is:

1. A mechanical bowing device for zithers, violins and other similar stringed instruments, comprising a movable carrier having rollers, a bow band traversing the rollers of the said carrier and constituting with the carrier the complete bow, and two bilaterally-acting biaxial pedals with connections for shifting the bow transversely of the strings and controlling the pressure of the bow band upon the respective strings.

2. A mechanical bowing device for stringed instruments, comprising a bilaterally acting biaxial pedal device, bowing means adjustable relatively to the strings to be bowed and actuated exclusively by means of the said pedal device, connecting means between the pedal device and bowing means, guiding means for the said connecting means, and means to guide the bowing means transversely of the strings.

3. A mechanical bowing device for the violin type of stringed instruments, comprising a movable bow traversed by a bow band, a curved track for said bow, a bilaterally acting biaxial pedal device connected to the bow, and a curved guiding piece corresponding to the said track.

4. A mechanical bowing device for the violin type of stringed instruments, comprising a bilaterally acting biaxial pedal device, a stand carrying the bowing means and the instrument to be bowed, a curved guiding piece for guiding the bowing means transversely over the strings of the instrument to be bowed, and means operatively connecting the said pedal device and bowing means for actuating the latter exclusively by the said pedal device.

5. A mechanical bowing device for the violin type of stringed instruments, comprising a bilaterally acting biaxial pedal device, bowing means, connecting means between the said pedal device and bowing means, guiding means for the said connecting means, and mechanisms to actuate, guide, and adjust the said bowing means relatively to the strings of the instrument to be bowed.

6. The combination with a stringed instrument, of a movable carrier having a bow band thereon to coöperate with all the strings of the instrument, and a bilaterally

acting biaxial pedal device for actuating the
carrier and bow band and comprising a pair
of pedals in which one or more pedals are
mounted to turn vertically and laterally, the
5 pair of pedals controlling the movement and
pressure of the carrier and bow band.

In testimony whereof I have hereunto set

my hand in presence of two subscribing witnesses.

JOSEPH VON PEICHL.

Witnesses:

JOSEF RUBASCH,
ROBERT W. HEINGARTNER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."