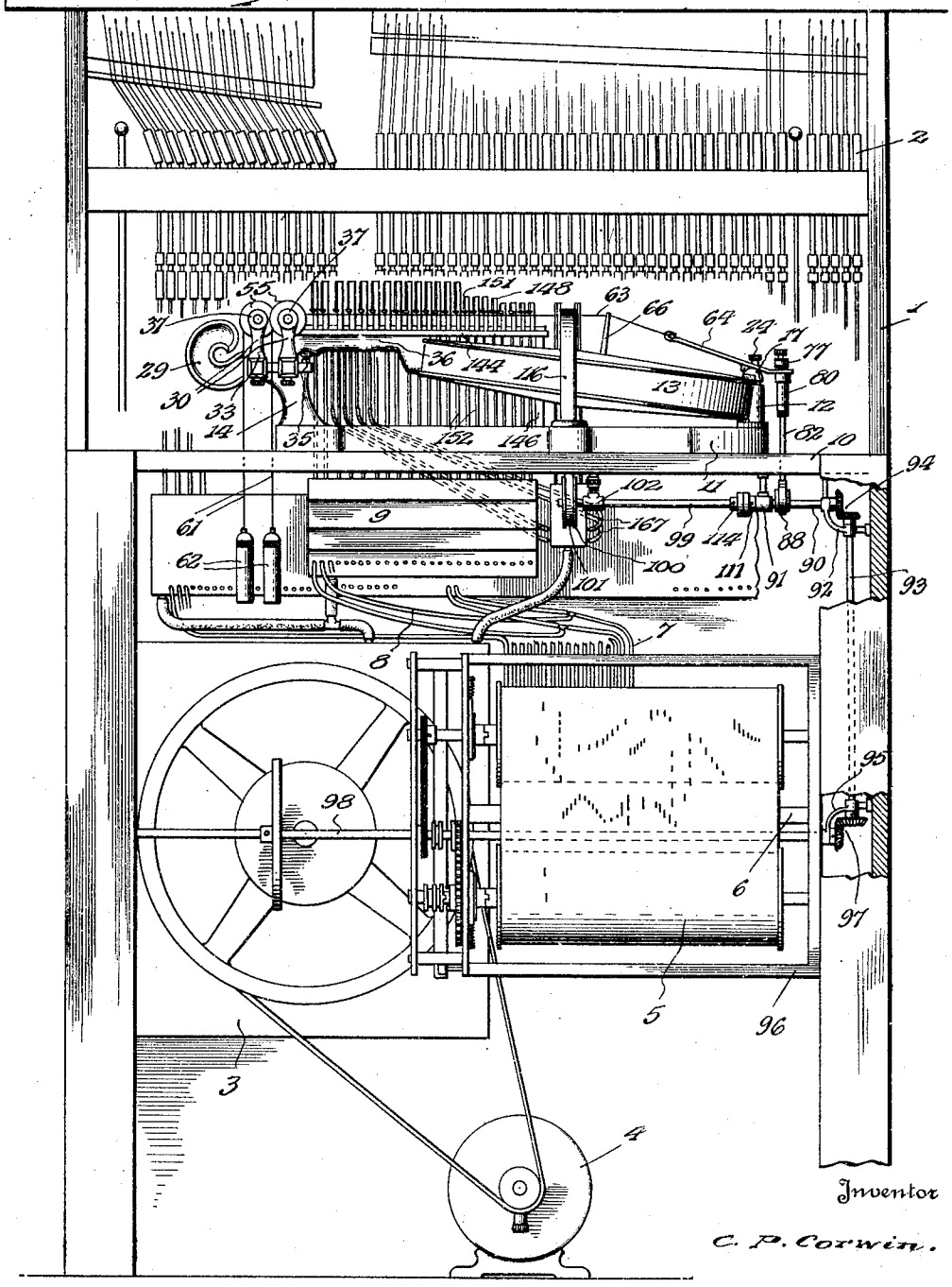
Dec. 31, 1929. C. P. CORWIN 1,742,057

SELF PLAYING VIOLIN

Filed March 16, 1927 8 Sheets-Sheet 1

Fig. 1.



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SELF PLAYING VIOLIN

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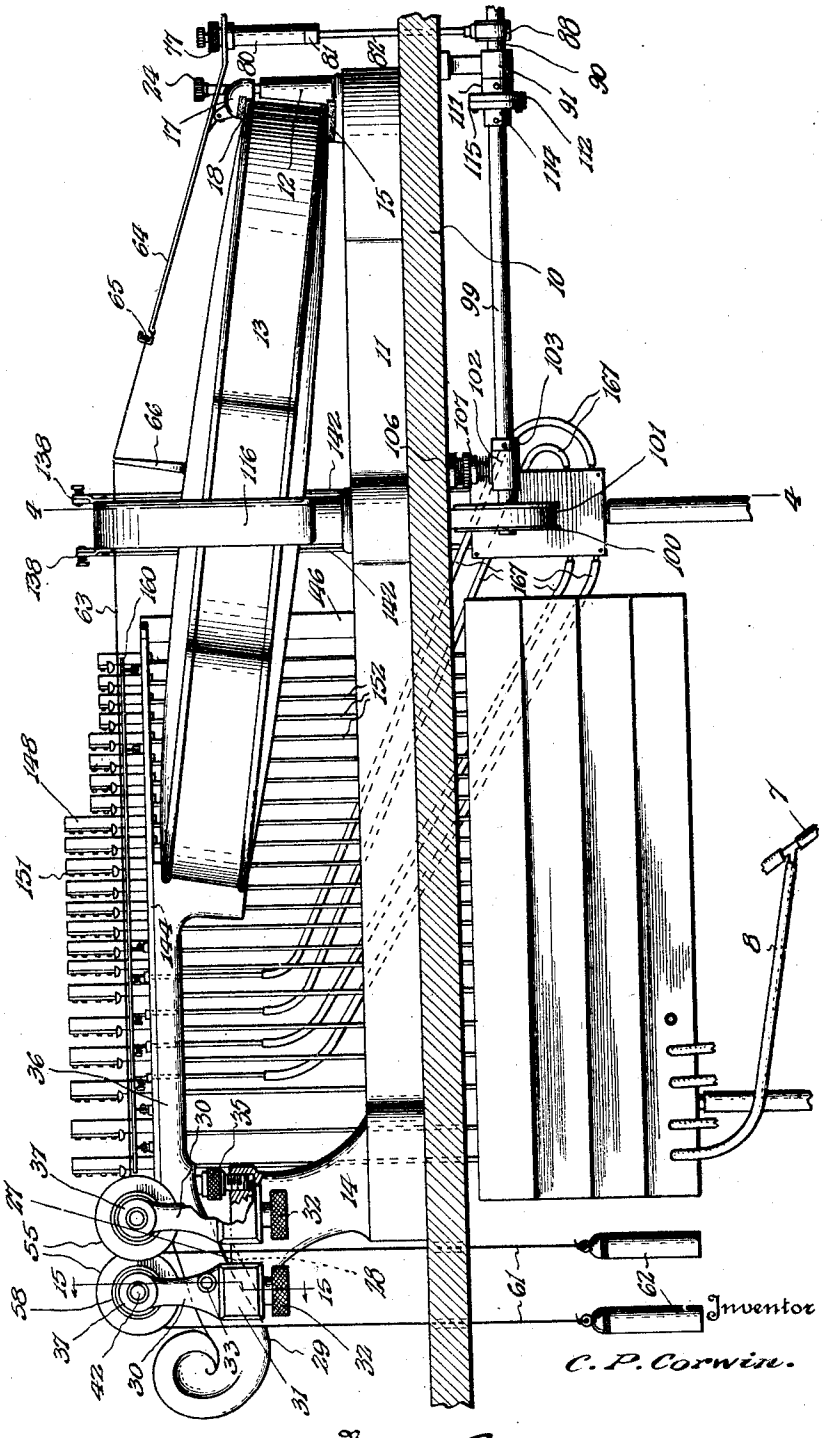


Fig. 2.

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SELF PLAYING VIOLIN

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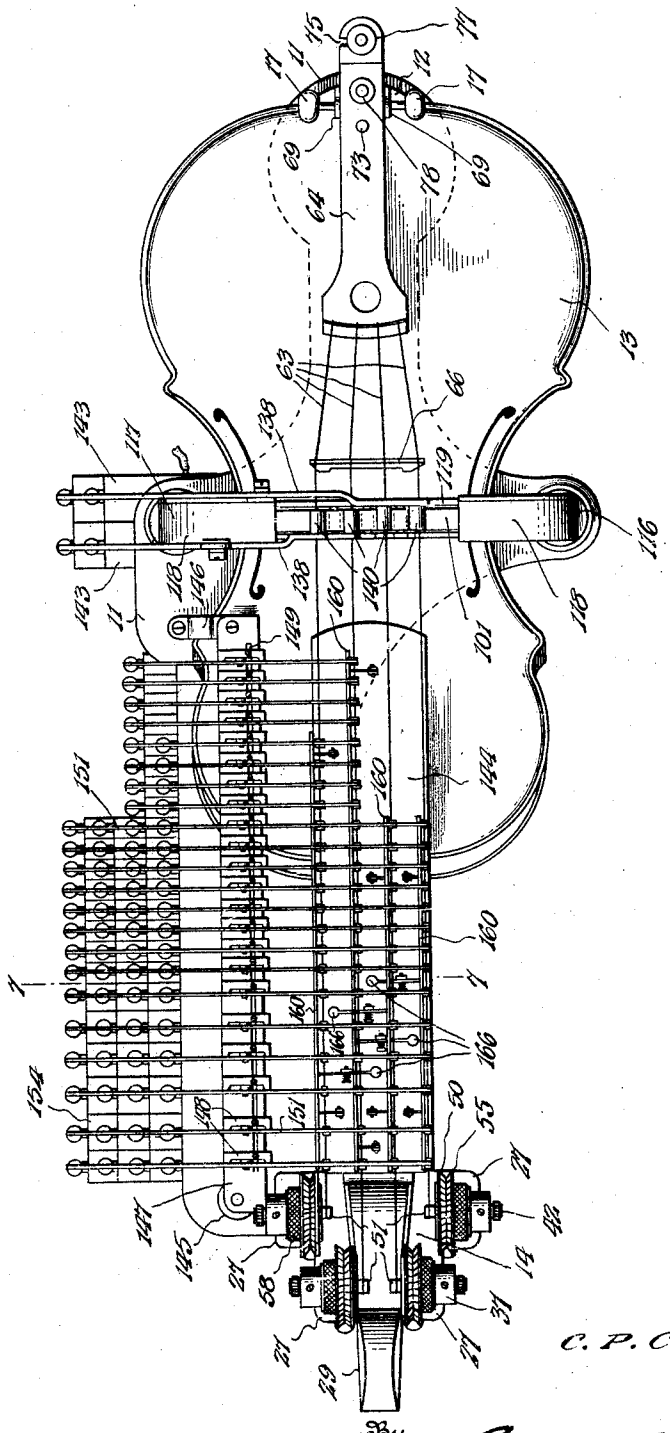


Fig. 3.

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Dec. 31, 1929. C. P. CORWIN 1,742,057

SELF PLAYING VIOLIN

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Fig. 4.

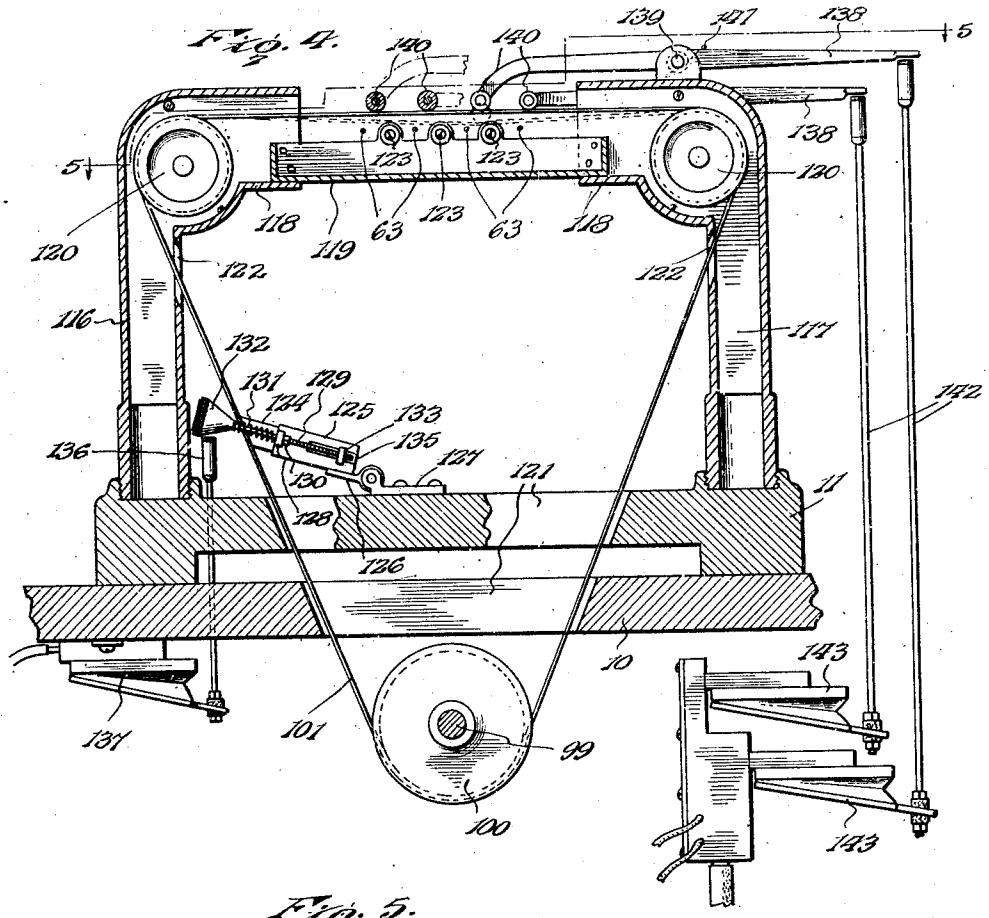


Fig. 5.

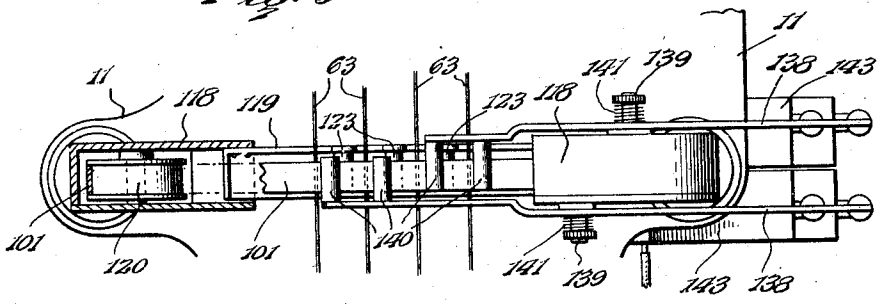
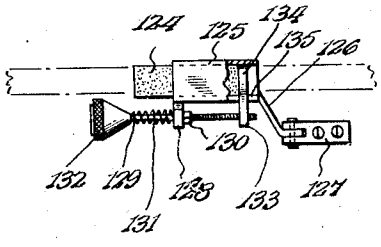


Fig. 6.



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SELF PLAYING VIOLIN

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Fig. 7.

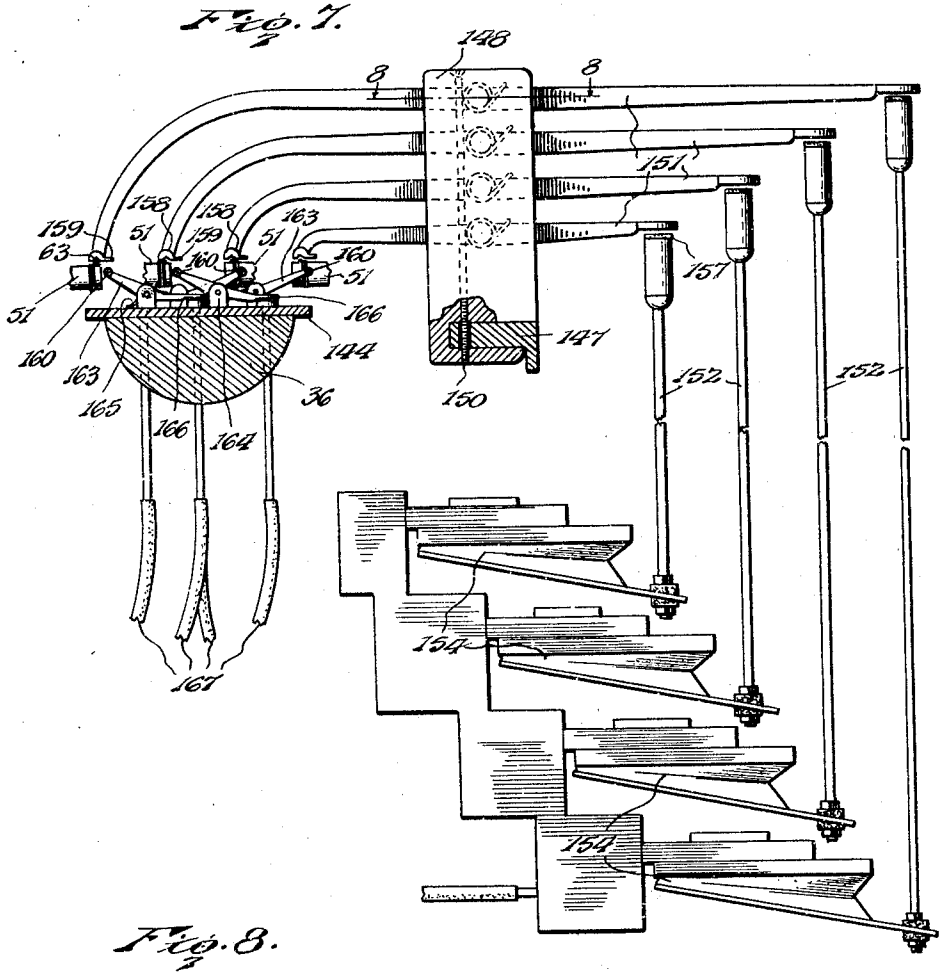
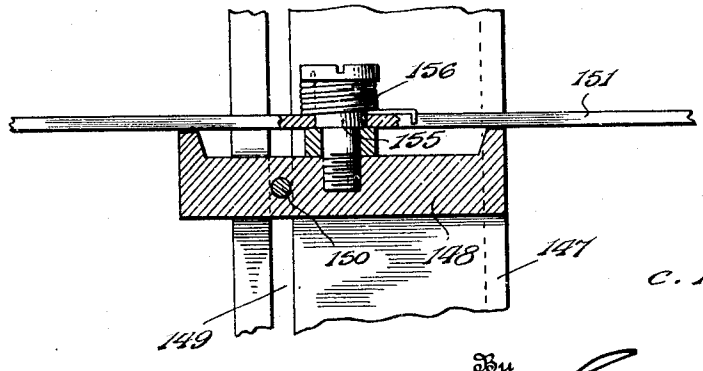


Fig. 8.



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SELF PLAYING VIOLIN

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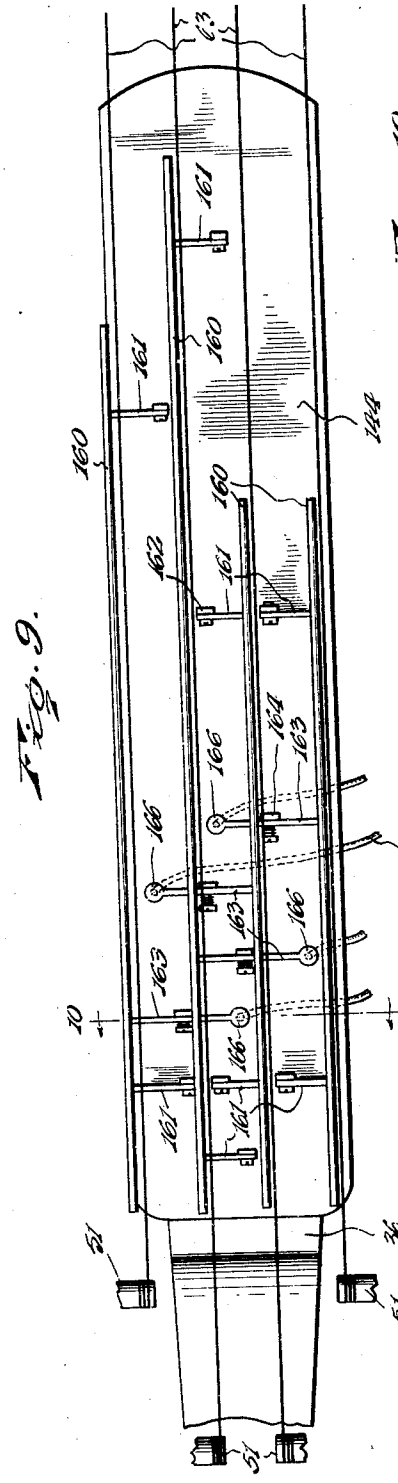


Fig. 9.

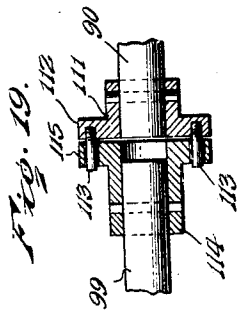


Fig. 19.

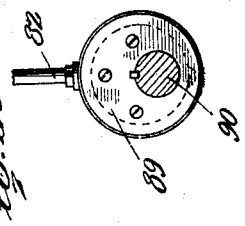


Fig. 20.

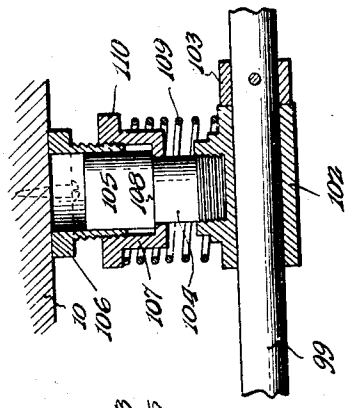


Fig. 18.

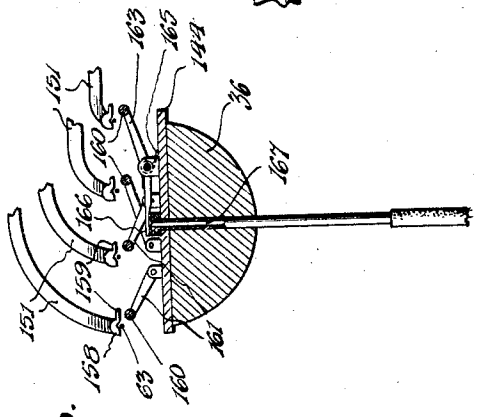


Fig. 10.

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SELF PLAYING VIOLIN

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Fig. 11.

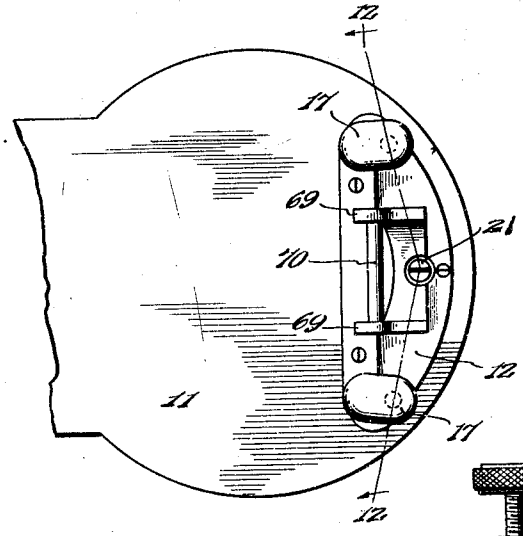


Fig. 12.

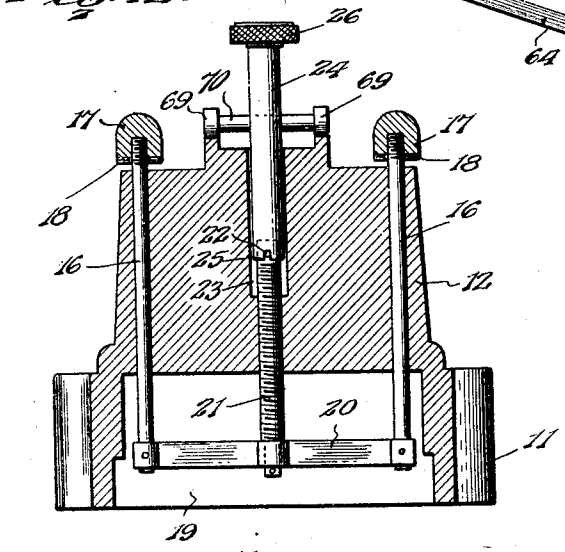


Fig. 13.

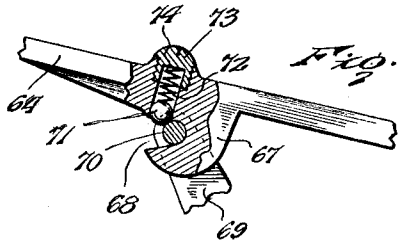
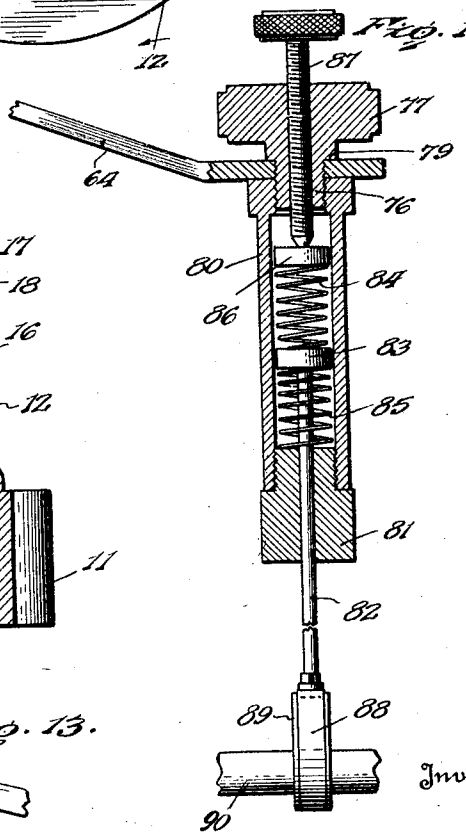


Fig. 14.



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Dec. 31, 1929. C. P. CORWIN 1,742,057

SELF PLAYING VIOLIN

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Fig. 15.

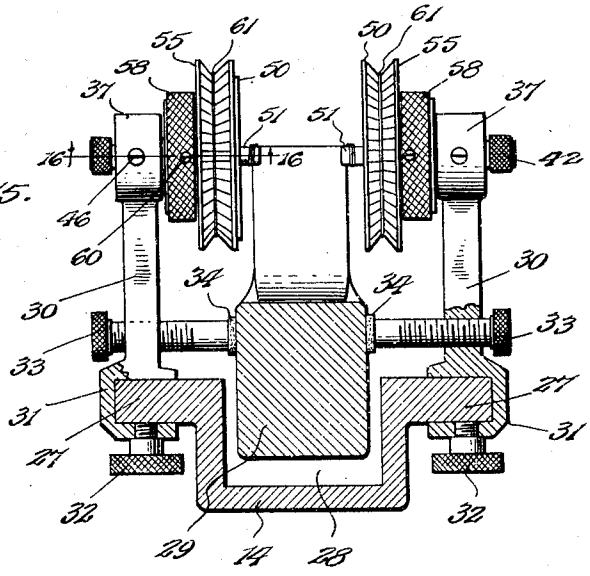


Fig. 16.

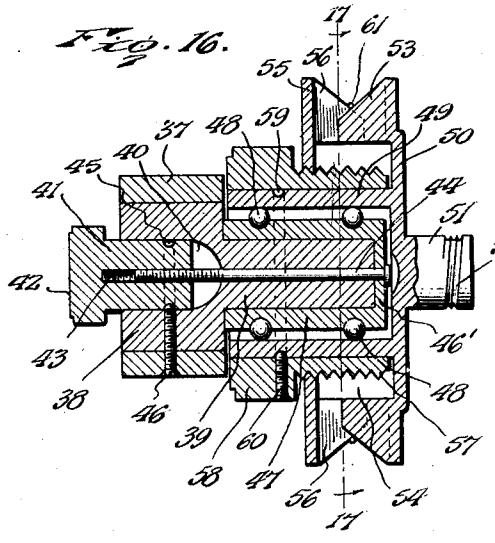
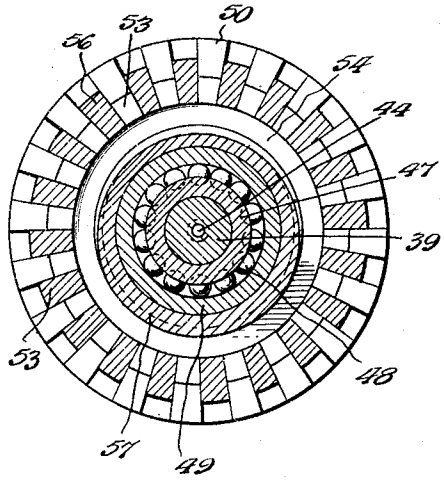


Fig. 17.



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Patented Dec. 31, 1929 1,742,057

UNITED STATES PATENT OFFICE

CHARLES P. CORWIN, OF BROWNWOOD, TEXAS

SELF-PLAYING VIOLIN

Application filed March 16, 1927. Serial No. 175,782.

This invention relates to automatic musical instruments and has special reference to self-playing violins, the primary object of the invention being to provide an apparatus in which a violin will be played automatically and produce tones of high musical quality. Another object of the invention is to provide novel means whereby the playing of the instrument may be controlled by a music sheet, such as those employed in piano players. Another object of the invention is to provide an improved bowing device and means whereby the operation of the bow will be controlled by the elements selecting the notes to be produced by the bow. The invention also seeks to provide an improved tremolo mechanism as well as improved means for applying rosin to the bow, and seeks to improve generally the elements of a self-playing violin to the end that an entirely satisfactory rendition of music will be obtained. The invention is illustrated in the accompanying drawings and will be hereinafter fully set forth, the novel features being particularly pointed out in the appended claims.

In the drawings:

Figure 1 is a front elevation of my improved self-playing violin showing the same arranged in connection with a player piano, the front of the casing being removed;

Fig. 2 is an enlarged elevation, partly in section, of the violin and the parts immediately adjacent the same;

Fig. 3 is a plan view of the mechanism shown in Fig. 2;

Fig. 4 is an enlarged transverse section on the line 4—4 of Fig. 2;

Fig. 5 is a view, partly in top plan and partly in horizontal section, on the line 5—5 of Fig. 4;

Fig. 6 is a detail sectional view of the rosin-applying device;

Fig. 7 is an enlarged transverse section on the line 7—7 of Fig. 3;

Fig. 8 is an enlarged detail section on the line 8—8 of Fig. 7;

Fig. 9 is an enlarged plan view of the finger board of the instrument showing the valves mounted thereon;

Fig. 10 is a transverse section on the line 10—10 of Fig. 9;

Fig. 11 is an enlarged detail plan view of the means for securing the tail end of the violin body in position;

Fig. 12 is a vertical section on the line 12—12 of Fig. 11;

Fig. 13 is an enlarged detail view showing the means for mounting the tailpiece;

Fig. 14 is an enlarged vertical section through the tremolo device;

Fig. 15 is an enlarged transverse section on the line 15—15 of Fig. 2;

Fig. 16 is a section on the line 16—16 of Fig. 15;

Fig. 17 is an enlarged section on the line 17—17 of Fig. 16;

Figs. 18 and 19 are detail sections through the supports for the bow-driving shaft.

Fig. 20 is a sectional elevation of the cam shown in Fig. 14.

Referring more particularly to Fig. 1, I have illustrated in a more or less conventional manner a well-known form of piano player to which the violin mechanism has been added. The casing 1 is the usual piano casing and a part of the piano action is shown at 2. The player mechanism comprises a wind chest 3 operated by a motor 4 which is preferably a small electric motor, and the mechanism is controlled through a music sheet 5 passing over a tracker bar 6, the tubes 7, extending from the tracker bar and controlling the action of the pneumatics whereby the piano action is actuated, having branch tubes 8 connected therewith and extending to a pneumatic plant 9 whereby the playing of the violin is controlled. It is to be understood, however, that the violin may be operated independently of a piano and mounted in a casing which contains only the violin and the means for playing it. It is also to be understood that the violin may be played in connection with any other automatic instrument, although it will most frequently be employed in connection with a piano and operated in proper consonance therewith. In the particular arrangement illustrated, a shelf 10 is secured rigidly within the case 1 by any convenient means and a base or bed plate 11 is

secured on the shelf, the violin being supported upon the base or bed plate.

At one end of the bed plate 11 is mounted a post or standard 12 adjacent which the tail end of the violin body 13 is arranged and by which it is supported, while at the opposite end of the bed plate a post or standard 14 is erected to support the head of the instrument, the said posts or standards being conveniently and preferably formed integral with the bed plate. At the foot of the post 12, a pad 15 of felt or other similar sound-deadening material is provided and the violin body rests upon this pad, as shown most clearly in Fig. 2, whereby contact of the body with metal is prevented and metallic sound in the notes produced is avoided. Within the post or standard 12, I provide clamping rods 16 which extend vertically therethrough and are equipped at their upper ends with heads 17 adapted to project over the top of the violin body at the tail end thereof and bear upon the same, as shown in Fig. 2, these clamping heads being provided with pads 18 of felt or the like so that the contact of metal with the top of the violin body is avoided. The lower ends of these clamping rods are disposed within a hollow portion or chamber 19 provided in the bed plate and a connecting bar 20 is secured to the lower extremities of the clamping rods so that the said rods will be maintained in proper relation and will be actuated simultaneously in order to secure or release the violin body, and it may be noted that the clamping heads 17 are threaded onto the rods so that they may be easily removed when repair or renewal of the pads 18 is necessary. Mounted centrally in the post 12 is a screw or threaded rod 21 having its lower end swiveled in the connecting bar 20 and having its upper end provided with radial pins 22 and disposed within an enlarged bore 23 of the post, the said bore opening through the top of the post, as shown clearly in Fig. 12. An adjusting pin 24 is provided of tubular formation whereby it may be inserted in the bore 23 and engaged over the upper extremity of the screw or threaded rod 21, the lower end of this adjusting pin being provided with notches 25 adapted to engage the pins 22 on the threaded rod, as will be understood upon reference to Fig. 12. The upper end of the pin is provided with a knurled head 26 whereby it may be easily rotated, and it will be understood from what has been said that, if the pin be inserted and rotated, the screw 21 will be caused to move vertically within the post 12 and the clamping rods 16 thereby shifted so as to release or secure the violin body.

The post 14 is of a somewhat flared formation at its upper end and at said end is formed with the lateral longitudinally extending flanges 27, while the extreme forward portion of the said post is beveled or cut away between the ends thereof at its top, as indicated at 28, to accommodate the head 29 of the violin. Brackets 30 are provided at the head end of the instrument, and these brackets are arranged in pairs with one member of each pair on each side of the post, each bracket having a foot portion 31 shaped to fit around the edge of the respective flange 27 and carrying in its under side a set bolt 32 adapted to be turned home against the under side of the respective flange whereby the bracket will be secured in place. Immediately above the flanges 27, one bracket on each side of the instrument is equipped with a set bolt 33 arranged to bear against the side of the head 29 whereby the head will be firmly clamped and supported in the desired position, each of said clamping screws or bolts being equipped at its inner end with a felt pad 34, corresponding to the pads 15 and 18 previously mentioned. It will thus be seen that the violin is supported firmly without any contact with metal surfaces so that all metallic quality will be eliminated from the notes produced by the instrument. If desired, the instrument may be further supported by a small bolt or threaded post 35 fitted in the top of the standard 14 at the inner side of the same and bearing against the bottom of the head 29 at the junction of the same with the neck 36, this post or supporting screw being equipped with a felt pad, as will be understood.

The upper end of each bracket 30 is enlarged to form a collar or hub member 37 receiving the enlarged head 38 of a pin 39 which projects inwardly from the bracket and is equipped with a smooth bore of relatively small diameter. The head 38 is provided with a central bore or chamber 40 and in said bore or chamber is mounted a turning pin 41 having a knurled head 42 on its outer end whereby it may be easily manipulated. This turning pin or plug 41 is provided with a central threaded bore 43 receiving the outer threaded end of a pin 44 extending axially through the pin 39, as clearly shown in Fig. 16. The plug 41 is also provided with an annular groove 45 receiving the inner end of a set screw 46 mounted in the hub 37 whereby rotation of the plug will be permitted but endwise movement thereof will be prevented. The inner end of the pin 44 is fixed to the inner closed end 46′ of a thimble 47 which fits closely around the pin 39 and is provided circumferentially with raceways receiving bearing balls 48. Fitting about the balls 48 is a sleeve or hub 49 fixed to or formed integral with a disk 50 from the inner side of which projects a peg 51 having a spirally disposed groove 52 upon its circumference to receive a violin string, and it will be noted that the groove 52 is so disposed that when the string is wound thereon it will move axially of the peg toward the disk, the inner end of the sleeve or hub member 49 being disposed

initially close to or against the inner end of the head 38 and the collar or hub 37, as shown in Fig. 16. The disk 50 is provided on its outer face with marginal lugs 53 arranged equi-distantly about the entire circumferential extent of the disk and providing a clear space 54 at their inner sides around the sleeve or hub 49. An outer disk 55 is provided to mate with the disk 50, and this disk 55 is provided with similar lugs 56 which are arranged alternately with the lugs 53 so that the two disks and the lugs will constitute a grooved pulley, the working diameter of which may be varied by shifting the disks relatively toward each other or apart. The outer disk 55 is provided with a central opening whereby it may fit around the hub or sleeve 49, and this opening is threaded to be engaged with a spool or drum 57 which fits closely about the sleeve or hub 49 and is equipped at its outer end with an enlarged head 58 whereby it may be turned as desired. In the outer circumference of the sleeve 49 near the outer end thereof is an annular groove 59 which receives the end of a set screw 60 secured in the head 58 so that rotation of the spool or drum upon the sleeve 49 is permitted but relative endwise movement is prevented. It will now be seen that, if the head 58 be rotated about the sleeve 49, the spool 57 will be also rotated and by reason of the threaded engagement between the spool and the disk 55 the latter will be caused to move toward or from the disk 50. The outer edges or surfaces of the lugs 53 and 56 are inclined so that they converge toward the centers of the disks thereby defining a groove in which a cable 61 may be disposed. This cable is formed of a spring wire and is wrapped about the pulley less than one full turn and arranged to depend from the pulley at the outer side of the respective bracket 30, a weight 62 being attached to the lower end of each wire and thereby serving to maintain the same taut at all times. These weights will be properly adjusted so as to maintain the normal tension upon the violin string which is attached to the respective peg 51 and stretching of the string or the effects of temperature variations thereon will thus be automatically compensated by the weights and spring wires. The strings will be initially tuned by hand turning of the disks 50 and 55 so that the strings will be wound upon the respective pegs 51 to be given the proper tension, and then, by rotating the head 58, the disk 55 may be caused to move toward or from the disk 50 so that the weights 62 will maintain the tension of the string at all times. The strings 63 are disposed above the neck 36 of the instrument and extend from the respective pegs 51 to the tailpiece 64, being attached to the tailpiece at the forward free end of the same, as indicated at 65, in the usual or any convenient manner. The intermediate portions of the strings pass over the bridge 66 and, except at the bridge, the intermediate portions of the strings are entirely free of the violin body. The tailpiece 64 is disposed over the central longitudinal line of the violin body and on its under side is provided with a pendent hook or lug 67 having a notch 68 in its front side, the said hook or lug being adapted to enter between lugs or ears 69 on the upper side of the post 12 and engage with a pivot pin 70 mounted transversely between said lugs 69 and supported thereby. The tailpiece will thus be pivotally or rockingly mounted upon the post and, in order to prevent accidental detachment of the tailpiece, a ball 71 is mounted in a socket 72 formed in the tailpiece, the upper end of the socket being closed by a plug 73 and a spring 74 being disposed within the socket between the plug and the ball so as to press the ball to the lower end of the socket. It will be understood that the lower end of the socket is contracted slightly so that, while the ball may project through the same, it cannot escape therefrom. When the tailpiece is moved forwardly so that the notch 68 will ride into engagement with the pivot pin 70, the ball will be pressed upwardly but as soon as the notch clears the center of the pin 70 the ball will spring outwardly so as to engage the pin and thereby retain the tailpiece thereon.

The outer end of the tailpiece is extended beyond the tail end of the violin body and is formed with a laterally extending notch 75 whereby it may be engaged around the threaded shank 76 of a plug 77. The tailpiece is also provided with an opening 78 therethrough to permit the insertion of the adjusting pin 24 when necessary. The plug 77, as shown in Fig. 14, is constructed with a shoulder 79 adapted to engage the upper side of the extension of the tailpiece and clamp the same against the upper end of the tremolo tube 80, the shank 76 of the plug engaging the upper end of the tube and closing the same, as clearly shown. The lower end of the tremolo tube is closed by a plug 81 which is threaded into the tube and has a central bore accommodating an eccentric rod 82, a plunger 83 being carried by the upper end of the said rod within the tube and coiled springs 84 and 85 being disposed within the tube respectively above and below the plunger. A follower 86 rests upon the upper end of the spring 84 and an adjusting screw 87, threaded through the plug 77, bears upon the said follower so that the tension of the spring may be regulated. The tension of the spring 85 is regulated by properly adjusting the plug 81 and the springs should be so adjusted as to have equal tension whereby the plunger 83 will be balanced within the tube. The eccentric rod 82 has its lower end attached to an eccentric strap 88 encircling an eccentric 89 secured upon the shaft 90 which is disposed below the shelf 10 and

supported by a bearing 91 depending from the shelf adjacent the inner end of the shaft and by a bearing bracket 92 adjacent the outer end of the shaft. The bracket 92 also provides a bearing for a vertical transmission shaft 93 which is geared to the shaft 90 through beveled pinions 94 and has its lower end mounted in a bearing bracket 95 disposed between and supported by the side of the case 1 and the frame or box 96 which supports the tracker bar 6 and the parts for actuating the music sheet. The lower end of the shaft 93 is operatively connected by beveled pinions 97 with the driving shaft 98 which is geared to the motor 4, as shown in Fig. 1. It will thus be seen that the tailpiece not only serves as a support for the outer or rear ends of the violin strings but is also rockingly mounted and will be constantly oscillated through a small arc as the machine operates, the rotation of the driving shaft 98 being transmitted to the eccentric 89 whereby the plunger 83 will be constantly reciprocated and inasmuch as this plunger will act upon the tremolo tube through the springs 84 and 85 the tube will follow the movements of the plunger and, of course, rock the tailpiece which is firmly secured to the tube. This tremolo action is very desirable in violin playing and by providing the tremolo mechanism I am enabled to obtain the same effect when a long note is played as when a violin is played by hand. On short notes, the tremolo effect is not noticeable.

The shaft 90 is coupled to a shaft 99 and the latter shaft is equipped at its inner end with a pulley 100 about which the belt bow 101 is trained and by which the bow is driven. In playing, the bow is pressed into contact with a selected string, as will be presently fully described, and it is, of course, necessary to maintain a certain tension upon the bow at all times so that it will take motion from the rotation of the pulley 100. When the bow is pressed into contact with a string, the tension thereon is increased and I provide means to accommodate this increased tension without increasing the wear upon the bow at its point of contact with the driving pulley. To this end, the inner end of the shaft 99 is mounted in a yieldingly supported bearing sleeve 102, and a stop collar 103 is secured upon the shaft at one side of the bearing whereby to maintain the proper alinement of the pulley and the bow. The bearing sleeve 102 is secured upon and carried by the lower end of a plunger 104 which has an enlarged upper end 105 slidably fitted within a tubular hanger 106 secured rigidly to the under side of the shelf 10. A thimble or sleeve 107 is threaded onto the lower end of the hanger 106 and has a central opening to accommodate the plunger 104, the lower end of the thimble providing a support for the plunger by engaging the annular shoulder 108 defined by the lower end of the head 105. An expansion spring 109 is coiled around the plunger and the thimble between the bearing sleeve 102 and the annular flange 110 at the upper end of the thimble, the spring tending constantly to expand, so that the proper primary contact between the driving pulley 100 and the belt bow 101 will be maintained, but yielding when increased tension is put upon the bow by pressing the same into contact with a string to be played. Obviously, the tension of the spring 109 may be regulated by properly adjusting the thimble 107 upon the hanger 106. Obviously, when the inner end of the shaft 99 vibrates in response to the variations in the pressure upon the belt bow as just described, the said shaft tends to lose its axial alinement with the shaft 90 and to compensate for this movement I provide a flexible coupling which is shown in detail in Fig. 19. To the inner end of the shaft 90 is pinned or otherwise secured a collar 111 having an annular flange 112 from which project studs 113. Secured upon the outer end of the shaft 99 is a similar collar 114 having an annular flange 115 and through the said flange are formed openings adapted to receive the studs 113 so that the rotation of the shaft 90 will be transmitted through the flange 112 and the studs 113 to the flange 115 and thence to the shaft 99. The openings through the flange 115, however, are of somewhat greater diameter than the studs 113 so that, while the desired rotation of the shaft 99 will be effected, there will be permitted sufficient lateral or oscillatory movement to accommodate the oscillation at the inner end of the latter shaft.

Rising from the bed plate 11 at the front and rear edges of the same and between the ends thereof in a vertical plane occupying the same relation to the vertical plane of the bridge 66 that the bowing point of an ordinary violin bears to the bridge of the instrument are hollow posts 116 and 117 provided with transverse extensions 118 at their upper ends which are connected by and serve as supports for a box or tray 119. At the upper end of each post and at the meeting end of the respective extension or housing 118 is mounted an idler pulley 120, and the belt bow 101 is trained about these pulleys so as to extend between the arms or housings 118 over the tray 119 and over the violin strings, the portion of the bow between said pulleys being normally horizontal, as shown in Fig. 4. The shelf 10 and the bed plate 11 are constructed with slots or openings 121 to accommodate the belt bow and in the inner side of each post is an opening or slot 122 for the same purpose. The bow may be constructed of any suitable material possessing the desired flexibility and durability and it acts upon the strings so as to produce a note by being pressed into contact with a selected

string by the action of a selected rocker arm, as will be presently described. At the top of the tray 119 are mounted rollers 123 which alternate with the violin strings and serve to support the bow when it is depressed so that it will be maintained out of contact with all the strings except the string which is to be played. This will be understood upon reference to the dotted lines in Fig. 4. In addition to serving as a support for these stop rollers 123, the box or tray 119 also serves as a receptacle for the rosin or dust which may drop from the bow as it passes over the strings. In order to apply rosin to the bow, I provide a block of rosin 124 which is fitted in a tubular holder 125 and projects from the same to bear upon the bow as it passes upwardly from the driving pulley 100, as shown in Fig. 4. The holder 125 is provided with an arm 126 at its inner end, which arm is pivotally or hingedly secured to a bracket or plate 127 secured on the bed plate 11, as shown. At the outer end of the holder 125 is a lug or bearing 128 through which passes a rod 129 rotatably mounted in said lug and held against endwise movement therein by a nut 130 at one side of the lug and a spring 131 coiled around the rod at the opposite side of the lug between the same and an enlarged head or finger piece 132 on the rod. The inner end portion of the rod 129 is threaded and engaged in an ear 133 extending laterally from a follower 134 which is fitted within the holder to bear against the inner end of the rosin block 124, the holder being constructed with a longitudinal slot 135 in its side to accommodate the sliding movement of the follower and its ear. As the rosin wears away, the head or handle member 132 is rotated so that through the engagement of the threaded portion of the rod 129 with the extension or ear 133 the follower will be drawn outwardly so as to feed the rosin to the belt and maintain the desired contact therewith. The parts are so arranged that they gravitate toward the belt bow, as will be understood upon reference to Fig. 4. In order to relieve the bow of the weight of the rosin and thereby avoid excessive wear upon the bow, a lifter 136 is arranged immediately below the finger piece 132 and controlled by a pneumatic 137 which is, in turn, connected operatively with the rewind elements of the music sheet-actuating mechanism so that, when the rendition of a composition has closed and the music sheet is being rewound, the lifter 136 will be raised against the finger piece 132 and the holder 125 swung upwardly about the pivotal mounting thereof so as to break contact between the rosin block and the bow.

Pivoted upon the post 117, or the arm or housing 118 projecting from the upper end thereof, are four rocker arms 138 which extend in both directions from their respective pivots 139 and have their inner ends disposed adjacent the vertical planes of the respective violin strings, the arms being so arranged that, if any one arm is rocked, the bow will be pressed into contact with the violin string adjacent the end of said arm. Each arm is equipped at its inner end with a roller 140 disposed substantially parallel with the adjacent violin string whereby the bow will be pressed evenly into contact with the string in an obvious manner, it being noted that the arms are disposed two upon each side of the supporting standard and are of different lengths so that the rollers will be in proper relation to the respective strings. Of course, the specific arrangement of these rocking arms is not essential and they may be variously arranged so as to accomplish the desired result. It is also to be noted that the rollers 140 carried by the rocker arms are in somewhat staggered relation to the rollers 123 upon the tray 119 so that the bow pressing roller will engage the bow between the string which is to be played and the nearer bow supporting roller. The rocker arms are each subjected to the action of a tension spring 141 disposed at the pivot of the arm and so arranged as to normally hold the roller 140 out of pressing contact with the belt bow. The outer end of each rocker arm is disposed over a lifter 142, the lower end of which is connected to a pneumatic 143 whereby the arms will be selectively actuated in the operation of the apparatus. It will be understood that there is a pneumatic 143 and a lifter 142 arranged to cooperate with each rocker arm and these pneumatics 143 are selectively actuated by the action of fingers which are, in turn, controlled from the music sheet as will presently appear. It may be here noted that the pneumatics employed in the operation of my self-playing violin are of well known form and are such as are very generally employed in player-piano actions. Inasmuch as the pneumatics, in themselves, do not form a part of my invention, I have illustrated the same throughout the drawings in a more or less conventional manner.

A finger board 144 is secured upon the neck 36 of the violin and projects over one end of the violin body, and extending between posts 145 and 146 upon the base or bed plate 11 is a frame bar 147 disposed approximately in the same horizontal plane as the finger board 144. Secured upon this frame bar 147 are brackets or posts 148 and the frame bar is constructed with a longitudinal slot 149 to receive the long bolts or screws 150 which pass vertically through the respective brackets or posts 148 whereby the said brackets may be secured in the desired positions upon the frame bar. Upon each bracket 148 are mounted fingers 151 which have their inner ends disposed over respective strings 63 and their outer ends disposed over lifters 152, the said lifters being controlled by

pneumatics 154 selectively actuated through the tubes 7 and 8 from the tracker bar, as will be understood. These fingers 151 are arranged in such number and in such position that their inner ends are located over the violin strings at the points where the said strings are pressed by the fingers of a musician when playing a violin by hand so that when any one finger is rocked to press upon a string a corresponding note will be produced. The fingers 151 are pivotally mounted upon studs 155 threaded into the sides of the respective brackets 148 and each finger is subjected to the action of a tension spring 156, corresponding to the tension springs 141 previously mentioned, so that the fingers will be normally held out of contact with the respective violin strings and in proper position to be actuated by the lifters 152, and it may be here noted that the said lifters as well as the lifters previously described are equipped with pads or cushions, indicated at 157, at their upper ends whereby the sounds of impact which would detract from the pleasure of listeners will be eliminated. The working end of each finger is equipped with a presser tip 158 which may be notched or recessed, as shown in Fig. 7, whereby to effect positive engagement with a violin string, and these presser plates or tips are each constructed with a lateral extension 159 which is adapted to engage and rock a valve operating bar 160. There are four of these valve bars 160, as shown most clearly in Fig. 9, and each bar is carried by an arm 161 near each end which arm is pivoted to a lug or bracket 162 upon the finger bar 144. Extending laterally from each valve operating bar 160 is a lever 163 which is pivoted between its ends upon a lug 164 on the upper side of the finger bar and is influenced by a spring 165 so that a valve 166 carried by the free end of the lever will be normally held over the upper end of an air tube 167 to close the same. Each air tube 167 extends to and controls one of the pneumatics 143 so that, when any finger 151 is rocked to engage a string 63 at any point along the string, a valve 166 will be opened and the corresponding pneumatic 143 will be actuated to cause the proper rocker arm 138 to act upon the bow and effect contact between the bow and the same violin string. It will thus be seen that the action of the bow is dependent upon the action of the respective fingers and the fingers are selectively actuated to produce the proper note from any string through the operation of the music sheet. The valves and cooperating air tubes may be disposed at any preferred position upon the finger bar and neck of the instrument and it will generally be found most convenient to arrange the valve nearer the head of the instrument than at points over the body of the violin inasmuch as interference with the resonance of the body is, therefore, avoided and the tubes may be more easily arranged so as not to interfere with any of the other parts of the apparatus. As shown most clearly in Fig. 7, the valve actuating bars 160 are disposed close to and parallel with the respective strings but are at one side of the strings so that, when a finger has been depressed to bear upon a violin string, the extension 159 at the end of said finger will be also caused to bear upon the adjacent valve bar and rock the same so that the valve connected with said bar will be opened.

The several working parts of my apparatus are simple in construction and are compactly arranged so that they may be easily disposed within a violin case or other casing without requiring any enlargement of the same or any change in the form thereof, and the tones produced by the instrument will be musical in quality and cannot be easily distinguished from the tones produced by a violin played by hand in the usual manner.

Having thus described the invention, I claim:

1. In a self-playing violin, the combination with a violin body, of means for supporting strings above the body, a constantly moving bowing device arranged above and transverse to the strings, fingers arranged to engage the strings selectively for determining the vibratory length thereof, and means controlled by the several fingers for pressing the bowing device into contact with the finger-selected string.

2. In a self-playing violin, the combination with a violin body, of means for supporting strings above the body, a bow movable across the strings, a plurality of fingers arranged to selectively bear upon the strings and controlled by a music sheet, a plurality of rocker arms arranged to selectively bear upon the bow and effect engagement of the same with a finger selected string, and operative connections between the several fingers and the rocker arms whereby the actuation of any finger will cause the corresponding rocker arm to press the bow into contact with the same string which is engaged by the finger.

3. In a self-playing violin, the combination of a violin body, a neck extending from the body, strings supported above the body and the neck, a bowing element movable across the strings, valves on the neck, an operating device for each valve, said devices being respectively arranged adjacent the violin strings, fingers controlled by a music sheet for bearing upon the violin strings, selective means whereby the fingers when bearing upon a violin string will engage a valve-actuating device to open the corresponding valve, a plurality of rocker arms arranged to bear upon the bowing element,

and connections between the valves and the rocker arms whereby the said arms will be selectively actuated to effect engagement of the bow with the same string which is engaged by a finger.

4. In a self-playing violin, the combination with a violin body, and strings supported above the body, of valve bars supported for rocking movement adjacent the respective strings, valves connected with the respective valve bars, fingers arranged to selectively engage the violin strings and simultaneously rock a valve bar to open the connected valve, a bowing device, and means controlled by the valves for causing the bowing device to act upon the same string which is engaged by a finger.

5. In a self-playing violin, the combination of a violin body, a finger bar supported from the body, strings supported over the finger bar, a plurality of fingers mounted at the side of the finger bar and arranged to selectively engage the strings, said fingers being provided at their string-engaging ends with extensions, valve bars mounted for rocking movement upon the finger bar and extending longitudinally thereof to be engaged by said extensions, valves mounted on the finger bar and connected with said valve bars, a bowing device, and pneumatic connections between the respective valves and the bowing device whereby to cause the bowing device to engage the same string which is engaged by a finger.

6. In a self-playing violin, the combination of a violin body, strings supported above the body, a plurality of fingers mounted at the side of the body and controlled by a music sheet to selectively engage the strings, a presser element at the end of each finger having a recess in its under side to engage over the respective string, valves mounted adjacent and below the strings, means on the fingers for actuating the valves, a bowing device, and means controlled by the valves for effecting engagement between the bowing device and the selected string.

7. The combination of a bed plate, a violin supported upon said bed plate, a frame bar rigidly supported above the bed plate and provided with a longitudinal slot, said frame bar being disposed at one side of and parallel with the neck of the violin, a plurality of posts resting on said frame bar, devices passing through the posts and the slot in the bar to secure the posts to the bar, a plurality of fingers pivotally mounted upon the side of each of said posts, tension springs acting upon the fingers at pivots thereof to hold them normally in inoperative position, and sheet-controlled means whereby to selectively effect engagement between the fingers and the violin strings.

8. In a self-playing violin, the combination of a violin body, strings disposed longitudinally above the body, a tailpiece pivotally mounted upon the violin body and supporting one end of each string, tuning pegs mounted at the head of the violin and having the strings attached thereto, means for oscillating the tailpiece in a direction toward and from the violin body, and means for automatically maintaining the tension upon the strings.

9. In a self-playing violin, the combination of a violin body, strings disposed above the body, tuning devices mounted adjacent the head of the violin and having the strings attached thereto, a tailpiece pivotally mounted upon the body and carrying the opposite ends of the strings, a bowing device, means for selecting a string to be played, means controlled by the last-mentioned means for effecting engagement between the bowing device and the selected string, and means operating in consonance with the bowing device to oscillate the tailpiece in a direction toward and from the body.

10. In a self-playing violin, the combination of a violin body, strings supported above the body, a tailpiece carrying the ends of the strings, means for selecting a string to be played, a bowing device controlled by the last-mentioned means for playing the string, and a tremolo device connected with the outer end of the tailpiece and operating in consonance with the bowing device.

11. In a self-playing violin, the combination of a violin body, strings disposed above the body, a tailpiece pivotally mounted upon the body to rock toward and from the same and carrying the ends of the strings, said tailpiece being extended beyond the violin body, means for selecting a string to be played, a bowing device controlled by the last-mentioned means for playing the selected string, a tremolo tube connected to the extended portion of the tail piece, and means operated in consonance with the bowing device to vibrate the tremolo tube.

12. In a self-playing violin, the combination of a violin body, strings disposed above the body, a tailpiece pivotally mounted upon the violin body and carrying the ends of the strings, means for selecting a string to be played, a bowing device controlled by the last-mentioned means to play the selected string, a tremolo tube carried by the outer end of the tailpiece, a plunger disposed within the said tube, tension devices within the tube acting upon the opposite sides of said plunger, means for equalizing the tension devices, and means connected with the plunger and operating in consonance with the bowing device to vibrate the plunger and the tremolo tube.

13. In a self-playing violin, the combination of a supporting structure, a violin body secured on said structure, strings disposed above the violin body, a tailpiece pivotally

mounted upon the body and carrying the ends of the strings, means for selecting a string to be played, a bowing device controlled by the last-mentioned means to play the selected string, a shaft mounted on the supporting structure, means for rotating said shaft, connections between said shaft and the bowing device, a tremolo element secured to the rear end of the tailpiece and including an eccentric rod, and an eccentric on the shaft connected with said rod whereby to vibrate the tremolo device.

14. In a self-playing violin, the combination of a violin body, strings disposed above the body, a tailpiece pivoted on the violin body and carrying the ends of the strings, means for selecting a string to be played, a belt bow arranged in proximity to the strings and controlled by the last-mentioned means to play a selected string, a tremolo device connected to the tailpiece, a shaft disposed below the violin body and operatively connected with the tremolo device, a second shaft flexibly coupled to the first-mentioned shaft and operatively engaged with the belt bow, a yieldable support for the second-mentioned shaft whereby to maintain an even tension upon the belt bow, and means for rotating the shafts.

15. In a self-playing violin, the combination of a violin body, strings supported above the violin body, means for selecting a string to be played, a belt bow arranged to travel over the strings and controlled by the last-mentioned means to play a selected string, a shaft, a pulley on said shaft engaging the belt bow to actuate the same, means flexibly connected to the shaft for rotating the same and a support for the shaft adjacent said pulley comprising a bearing sleeve through which the shaft passes, a hanger supported above the shaft, a thimble adjustably mounted on the hanger, a plunger connected to the bearing sleeve and supported by the thimble and movable axially therein, and an expansion spring disposed between the bearing sleeve and the thimble.

16. In a self-playing violin, the combination of a bed plate, a post rising from the bed plate at one end of the same, a violin body having one end resting upon the bed plate at the base of said post and cushioned thereon, means for supporting the head of the violin, clamping rods extending through the post and provided at their upper ends with clamping heads arranged to engage over the violin body, and means housed in the post for actuating the clamping rods to release or secure the violin body.

17. In a self-playing violin, the combination of a bed plate, posts rising from the bed plate at the ends thereof, a violin having one end supported by the bed plate at the base of one post, means on the other post for securing the head of the violin, clamping rods extending vertically through the one post and equipped at their upper ends with heads to engage over the violin, a connection between the lower ends of said clamping rods, a screw swiveled at its lower end in said connecting bar and housed in the post, and means for rotating said screw whereby to release the clamping heads from the violin or engage the heads with the violin.

18. In a self-playing violin, the combination of a violin body, strings disposed above the body, hollow posts mounted at opposite sides of the body, a bow consisting of an endless belt moving through the posts and having an upper run extending over and across the strings between the upper ends of the posts, means for imparting travel to the bow, a plurality of rocker arms mounted on one of the posts and each having an end arranged over the upper run of the bow and adapted to depress the same into engagement with a selected string, and spaced supports below the upper run of the bow cooperating with the rocker arms whereby to maintain the bow out of engagement with the strings other than the selected string.

19. In a self-playing violin, the combination of a violin body, strings disposed above the body, posts mounted at opposite sides of the body, a bow consisting of an endless belt supported by the posts and having an upper run between the posts trained across the strings and above the same, a tray connecting the upper ends of the posts below the bow, a plurality of rollers disposed below and transversely to the upper run of the bow adjacent the respective springs and journaled in the sides of the tray, and means for effecting engagement between the said run of the belt and a selected string, the rollers at the sides of said string holding the belt out of engagement with the other strings.

20. In a self-playing violin, the combination of a violin body, strings disposed above the body, posts mounted at the opposite sides of the body, a bow consisting of an endless belt guided and supported by said posts with its upper run extending over the strings, a rosin receptacle carried by and between the said posts below the strings, and means for effecting engagement between the upper run of the belt and a selected string.

21. In a self-playing violin, the combination of a violin body, strings supported above the body, a bow consisting of an endless belt having an upper run extending over the strings, means for effecting engagement between the belt and a selected string, means for applying rosin to the belt as it passes to the strings, and means for automatically rendering the last-mentioned means inoperative when the apparatus is inactive.

22. In a self-playing violin, the combination of a violin body, strings supported above the body, a bow consisting of an endless belt

having an upper run extending over the strings, means for effecting engagement between the bow and a selected string, a rosin holder pivotally mounted below the strings in position to gravitate toward a side run of the bow and apply rosin thereto as it travels to the strings, and means for automatically shifting said holder from the bow when the bow is inactive.

23. In a self-playing violin, the combination of a violin body, strings disposed above the body, a bow comprising an endless belt having a run extending across the strings, means for effecting engagement between the bow and a selected string, a rosin holder arranged to apply rosin to the bow as it travels to the strings, and means for feeding rosin through the holder to the bow.

24. In a self-playing violin, the combination of a violin body, a support for the tail end of the body, a post arranged under the head of the violin and constructed at its upper end with longitudinal laterally extending flanges, brackets secured on said flanges, means mounted in some of said brackets for clamping the head of the violin, strings supported over the violin, and tuning devices mounted on said brackets and having the strings connected therewith.

25. In a self-playing violin, the combination of a violin body, means for securing the tail end of the body, a post arranged under the violin head, brackets mounted on said post, clamping screws mounted in said brackets to engage the opposite sides of the violin head, and a supporting element adjustably mounted in the top of the post and bearing against the under side of the violin head.

In testimony whereof I affix my signature.

CHARLES P. CORWIN. [L. S.]