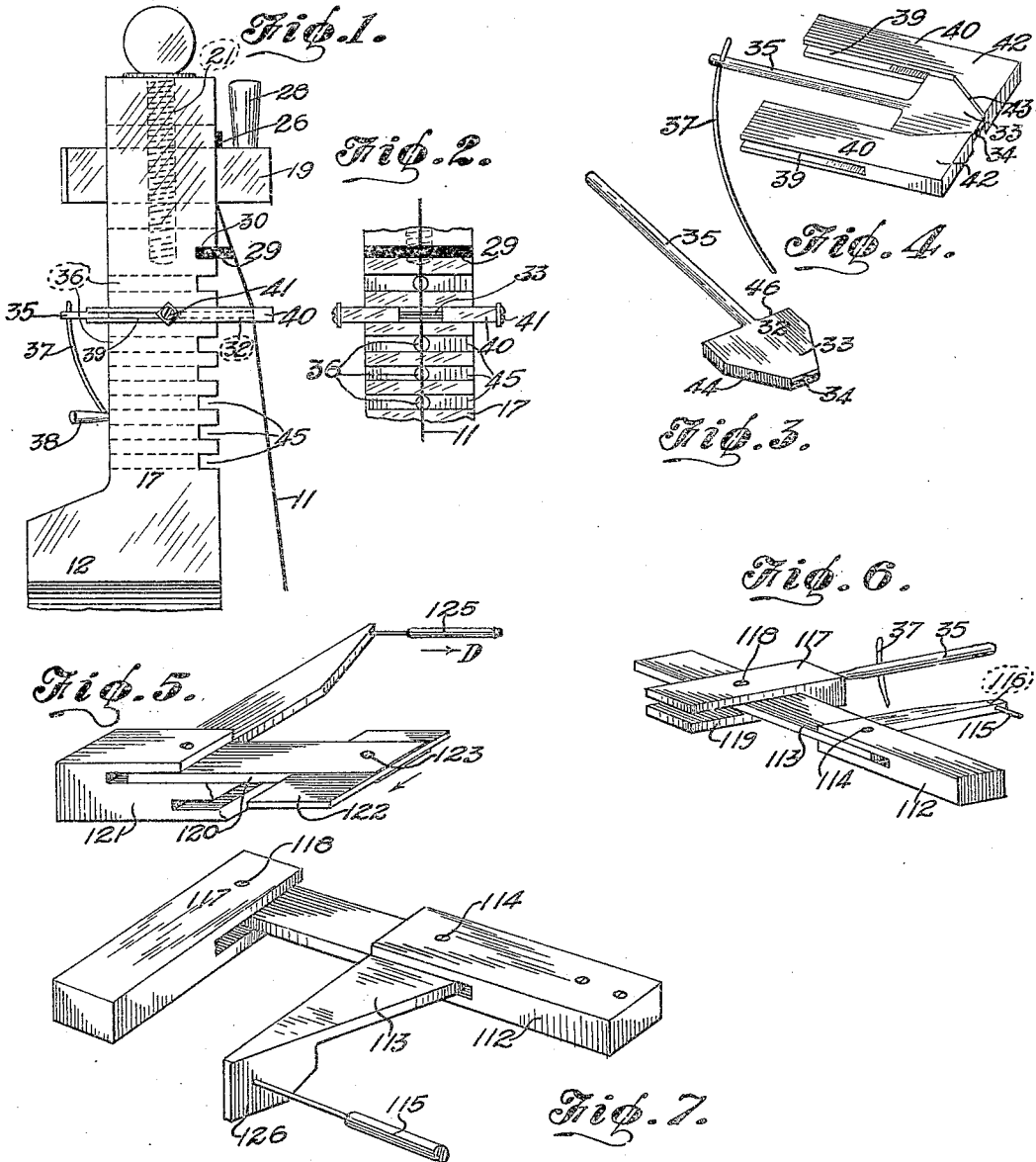


H. SCHLEMMER.  
 STRING FINGERING DEVICE.  
 APPLICATION FILED JAN. 20, 1908.

953,104.

Patented Mar. 29, 1910.

2 SHEETS—SHEET 1.



Witnesses:  
 J. W. Chisinger  
 Elliott R. Goldsmith.

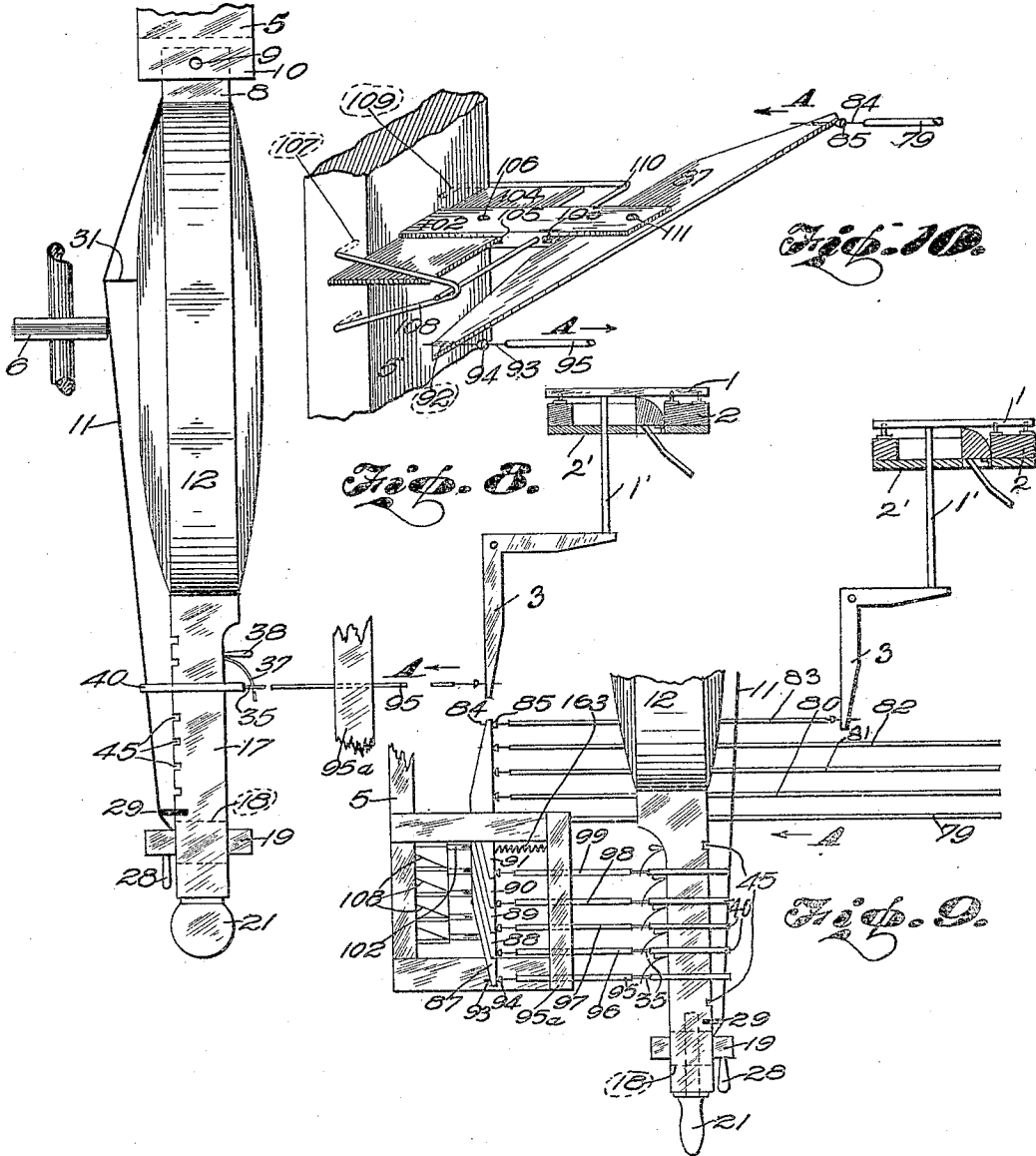
Inventor:  
 HENRY SCHLEMMER,  
 By Hugh H. Wagner  
 His Attorney.

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2 SHEETS—SHEET 2.



**Witnesses:**

J. Waldo Chrisinger.  
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**Inventor:**

HENRY SCHLEMMER,  
By Hugh N. Wagner,  
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# UNITED STATES PATENT OFFICE.

HENRY SCHLEMMER, OF EFFINGHAM, ILLINOIS.

STRING-FINGERING DEVICE.

953,104.

Specification of Letters Patent.

Patented Mar. 29, 1910.

Application filed January 20, 1908. Serial No. 411,759.

*To all whom it may concern:*

Be it known that I, HENRY SCHLEMMER, a citizen of the United States, residing at the town of Effingham, in the county of Effingham and State of Illinois, have invented certain new and useful Improvements in String-Fingering Devices, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to musical instruments, especially to instruments of that class in which vibration of a string is caused by a bow (such as violins, violas, violoncellos, etc.), and relates more particularly to those parts by which the operator "stops" the string, *i. e.*, determines the length of string which is allowed to vibrate.

Although the subject-matter of this application is particularly intended to be used in connection with the violin-playing mechanism shown and described in my pending application for patent, Serial Number 401,387, filed November 9, 1907, it is, nevertheless, capable of use in other relations and on many instruments other than violins, and can be applied to any stringed instrument in which the note to be played is determined by the act of the operator in "stopping" the string at a predetermined point (among such instruments being banjos, guitars, mandolins, and the like).

In the drawings forming part of this specification, in which like numbers of reference denote like parts wherever they occur, Figure 1 is a side view of the neck of an instrument equipped with the string-stopping device; Fig. 2 is a top view of the same parts shown in Fig. 1; Fig. 3 is a perspective view of one of the dampers or stop-keys detached from other parts; Fig. 4 is a perspective view of one of the stop-keys and the guides within which same moves; Figs. 5, 6, and 7 illustrate forms of action for imparting movement to the stop-keys; Fig. 8 is a side view of an instrument equipped with a stop-key and a side view of one of the manual-keys by which same is operated, most of the intermediate connecting mechanism or action being removed; Fig. 9 is a side view of an instrument equipped with a plurality of stop-keys, showing part of the action and one of the keys by which said keys are controlled; and Fig. 10 is an en-

larged detail of part of the action shown in Fig. 9.

As will be evident from reference to my said pending application, Serial Number 401,387, I have invented a mechanism by which a plurality of instruments of the violin class can be played by a single operator who sits at a key-board practically identical with the ordinary piano or organ key-board. Depression of each manual-key 1 of said key-board 2 causes one note to be played, suitable action being intermediate each key 1 and the particular instrument that key controls. As this action and the general organization of my mechanism are fully described and claimed in my aforesaid pending application, I have herein described and shown only enough of such action parts to explain the method employed to control the operation of the devices for regulating the vibratory string-length, which devices form the subject-matter of this application. It should be understood, however, that this action, so far as concerns these parts (which are hereinafter called "stop-keys") is merely illustrative and may be replaced by any other mechanism or apparatus suitable for actuating and controlling the stop-keys. In my said violin-playing mechanism each instrument is rocked or otherwise moved into engagement with a bow or plucker the position of which does not change, and the string-stopping device herein shown serves the additional function of causing such movement of the instrument. In case, however, it should be found necessary to change this construction and instead to move the bowing means so that same will engage a fixed instrument, the instrument-strings will still be properly stopped by the invention herein described and claimed. These stop-keys, accordingly, can be used for the sole purpose of stopping the string, or they can be used to move the instrument without stopping the string, or they can be used both to stop the string and to move the instrument, as circumstances may render desirable.

Each instrument to be played is movably supported by the frame-work and is moved the proper distance to carry its string or strings into and out of engagement with a bow or plucker by the act of the operator in depressing the particular manual-key 1 of the key-board 2 by which said instrument is

controlled, the movement of said manual-  
keys being communicated to the respective  
instruments controlled thereby by appropriate  
action, such, for example, as that  
shown in my said pending application, Serial  
Number 401,387. Preferably the instruments  
are pivotally mounted, and, to the  
body of each instrument, at a point adjacent  
to its tail-piece, is fastened a thin strip 8  
which is pivoted by a pin 9 in the support  
or hanger 10, and upon pin 9, or any other  
suitable pivot, the violin or other instrument  
12 is rocked and its string 11 carried  
into and out of engagement with a bow or  
plucker, such, for example, as rotating  
wheel 6.

In the neck 17 of the instrument is a perforation 18 in which slides a block 19 which  
is drawn in one direction or the other by  
screw 21, string 11 being secured to block 19  
by a plug 28, so that the string is tuned by  
turning screw 21. A saddle 29 is fitted into  
a recess 30 in neck 17, upon which saddle  
and the bridge 31 the string 11 rests, the distance  
between the saddle and the bridge being  
the greatest length of the vibratory part  
of the string. To stop the string at various  
points intermediate the saddle and bridge  
(as is done by the fingers in playing by  
hand), a stop-key or damper 32 is provided.  
Said key comprises a flat, blade-like end 33,  
the outer straight edge of which is notched  
at 34 to receive the string 11, and a shank or  
stem 35 which passes through a perforation  
36 in the neck 17. A spring 37 secured by a  
plug 38 to the neck passes through a perforation  
near the end of the shank 35, and keeps  
the blade 33 of the key normally pressed  
toward the neck 17 and out of contact with  
string 11. The sides of the blade-like end 33  
slide in recesses 39 in guide-blocks 40 which  
blocks are secured by screws 41 one on each  
side of the neck 17. Blocks 40 terminate in  
inwardly-projecting beveled heads 42, against  
the slanting edges 43 of which the beveled  
edges 44 of the key-ends 33 strike, so that,  
as key 32 is pressed toward the string 11,  
its end 33 will be wedged in between the  
blocks 40, and, as the pressure upon key-stem  
35 continues and increases, the blocks 40 will  
be pushed forward, carrying therewith the neck  
17 of the instrument 12, and, since each instrument  
is movably mounted, to move its neck forward  
or backward will carry the instrument to such  
position that its string 11 passes into or out of  
engagement with the bow 6. The face of neck  
17 is notched or grooved at 45, the inner edge  
46 of each key-end 33 being adapted to seat  
in one of said recesses during such time as the  
damper or key 32 is not thrust forward against  
the string 11. When any key 32 is pressed  
forward against the blocks 40, it is held so  
rigidly as practically to form one piece with the neck. The key,

accordingly, is immovable when the string 11  
is vibrating, and a clear tone is produced,  
while if the key 32 were loose enough to  
move from side to side, a disagreeable rattling  
tone would result.

As explained more particularly in my  
said pending application, each instrument  
can be arranged to play only one note, or it  
may play several notes, the number of notes  
which any instrument plays depending upon  
the complement of keys 32 and associated  
parts provided. Assuming, for example,  
that the instrument is equipped with an *a*  
string and that it is to play note *a*, key 32  
and blocks 40 may be placed at any point on  
the neck 17, the head 33 being so deeply  
notched at 34 as not to stop the string at all.  
Such a key will, of course, properly move  
the instrument so that its string 11 will be  
bowed whenever desired, but the string, not  
being stopped, will sound its open tone, in  
this case, *a*. If the same instrument be  
used to play *a*-sharp, the head 33 of key 32  
must be of such shape that it will stop the  
string, and the key must be placed at such  
distance from the saddle 29 as to make the  
vibratory string-length that required for  
playing *a*-sharp. If *b* is the note to be  
played, the key 32 must be placed still farther  
away from the saddle 29, and so on.

If any one instrument is to play several  
notes, it is best to provide same with as  
many grooves 45, keys 32, etc., as there are  
notes to be played (such an instrument being  
shown in Fig. 9), and, when that number  
of keys 32, etc., is provided, the head 33  
of that stop-key 32 nearest the saddle 29 is  
so deeply recessed at 34 that it will not stop  
string 11, yet, at the same time, will move  
the instrument against its bow. If that key  
32 first in order be thrust forward by the  
action, the instrument will be moved forward  
so that its string 11 will be properly bowed  
but as the full length of the string is  
allowed to vibrate, owing to the depth of  
the notch 34 of said key, the string sounds  
an open tone, playing *a*, assuming, as before,  
that the instrument is equipped with an  
*a* string. When the key 32 normally fitting  
into the second groove 45 is thrust forward  
(said key being the one shown by way of  
example in Figs. 1 and 2) the instrument is  
moved, as before, but, in addition to moving  
the instrument, this key stops the string 11  
at such a point that *a*-sharp will be sounded.  
When the key normally held in the fourth  
groove 45 is thrust forward (said key being  
the one depicted by way of example in Fig.  
8) the instrument will sound *c*, and so on,  
the number of notes which any instrument  
can sound depending on the number of keys  
32 and associated parts provided, and the  
note to be played because of the movement  
of any given key 32 being determined by  
the distance of that key from the saddle 29

and the note to which the string 11 is tuned. Although but a few of the instruments used in my violin-playing mechanism are intended to play more than one note, it is well to provide the neck 17 of each instrument with several grooves 45 and perforations 36 (seven of each being shown in the drawings) so that each instrument can, with no other adjustment than fixing its stop-key or keys 32 in the proper place or places, be used to play any or all of the notes within the compass of its string 11. Thus, each instrument will be readily interchangeable with any other instrument of the same kind.

When any instrument equipped with the stop-keys herein described is to be tuned, it is moved by hand so that its string 11 will engage the bow-wheel 6. Since the spring 37 keeps the stop-key 32 normally pressed away from the string 11, and since moving the instrument by hand does not move the stop-key, the instrument, when moved by hand, will play the open tone of the string, no matter what note it would play were the instrument moved into playing position by the stop-key. In the violin-playing mechanism referred to, provision is made for playing each note of the chromatic scale, either by providing a separate instrument for each note, or by equipping one of the instruments to play several notes. In cases where each note is played by a different instrument it is undesirable (though, of course, feasible) to tune each instrument to the note it is to play, since only an expert tuner could then properly tune all the instruments. Instead, several instruments are each equipped with strings all normally playing the same note. For example, the notes *a*, *a*-sharp, *b*, *c*, *c*-sharp, *d*, and *d*-sharp can be played on violins each equipped with an *a* string, the string of each of these instruments except the one that plays *a* being stopped at the proper point intermediate the saddle 29 and bridge 31. All the instruments of that group, however, are tuned alike to *a* by pushing same by hand toward the bow, thus obviating the necessity of tuning each half-tone by itself.

The screws 41 which bind the blocks 40 to the neck 17 pass through slots 39 in said blocks. The blocks can thus be adjusted with great exactness, sliding same back or forth while the screws are loosened so as to regulate precisely the forward thrust permitted the keys 32, which thrust terminates when the keys strike the blocks. Since the degree of pressure upon the string 11 exerted by the key 32 determines the pitch of the tone, and since this pressure can be increased or diminished by lengthening or shortening the stroke of keys 32, it is obvious that the point at which the blocks 40 are secured will control the pitch of the tone, and that by altering the position of

blocks 40, the instrument can be tone-regulated.

In order that the operation of the stop-keys 32 may be more fully understood, some forms of action adapted to actuate the same are shown in the drawings. As hereinabove stated, the instruments are preferably controlled from a key-board 2, depression of any one of the various manual-keys 1 of which causes the instrument that key controls to play the desired note. The first members of the trains of action parts shown in this application are suitably connected to keys 1 by parts neither shown nor described in this application since their construction and operation are fully set forth in my pending application, Serial Number 401,387. Projecting downwardly from each key 1, (Figs. 8 and 9) is a rod or link 1<sup>1</sup>, which passes through a guide opening in the board 2<sup>1</sup> on which all of keys 1 are mounted. Each rod 1<sup>1</sup> is secured to and rocks a bell-crank 3, suitably mounted for pivotal movement. Each bell-crank is in turn flexibly connected to a rod or link 95 which has its opposite end connected to the stop 40. In Fig. 9, the bell-crank 3 is shown connected to rod 83, this arrangement being a second form of mechanism for transmitting motion from the keys to the stops.

In Fig. 9 are shown rods 79, 80, 81, 82, and 83, which rods are, of course, moved by depression of the proper manual-keys. Each of said rods carries a flexible screw-threaded rod 84, upon which is a nut 85, said rod passing through a perforation 86 in the end of one of the levers 87, 88, 89, 90, and 91, which are engaged, respectively, by rods 79, 80, 81, 82, and 83. Through a perforation at 92 in the opposite end of each of said levers 87, 88, 89, 90, and 91, a flexible member 93 passes, on which members nuts 94 are screwed, and by said flexible members 93 levers 87, 88, 89, 90, and 91 are connected, respectively, to rods 95, 96, 97, 98, and 99, each of which bears upon a shank 35 of one of the keys 32. It follows, accordingly, that depression of the proper manual-key will be communicated through rod 79, lever 87, and rod 95 to that key 32 nearest the saddle 29 on the instrument shown in Fig. 9, each part moving in the direction indicated by arrows A, and that depression of any other manual-key 1, through the action members connected thereto, will cause a forward thrust of that stop-key 32 which said manual-key controls, whether said stop-key be on the same or any other instrument, so that depression of the proper manual-key will cause any desired note to be sounded by the particular instrument provided to play that note.

Each of the levers 87, 88, 89, 90, and 91 is pivoted at 111 in a holder 102, which holder is slotted at each end, lever 87 (to use this as

an example of the construction common to the others) being in slot 103, and a cross-piece 104 in slot 105. Holder 102 slides upon piece 104 or is secured thereto, holder 102 being bifurcated to receive piece 104 and being fastened by means of screw 106. In one of the supports 5 are recesses to receive the intumed ends 107 of wire yoke 108 and the intumed end 109 of wire 110, which passes through a perforation in the lever-holder 102. Yoke 108 is fitted over the end of wire 110, and by these two members holder 102 is secured in any desired position upon support 5. Since the action must be very delicately adjusted, and the distance from pivot 111 to support 5 regulated with great exactness, in order that lever 87 may be in the precise position to give the proper throw to that key 32 which said lever 87 controls, the holder 102 can not be permanently secured to support 5, as by glue, screws, or the like, but is held by the wire members 108 and 110 which can be bent by pliers so as to pivot lever 87 at the point necessary to secure pivot 111 in the precise position required therefor. Owing to the fact that the connection between lever 87 and pin 95 is flexible, and the pins 95, 96, etc., pass through a perforated guideblock 95<sup>a</sup>, the end of pin 95 will not slip or slide on stop-key shank 35 which same engages.

Modified forms of action parts are shown in Figs. 5, 6, and 7. In Fig. 6 is shown a yoke 112 between the arms of which bell-crank 113 is pivoted, said bell-crank rocking upon pivot 114 when pulled by a longitudinally-extending rod 115 flexibly connected to bell-crank 113 through a perforation 116 in one arm of the bell-crank. To the other arm a small block 117 is pivoted at 118, which block is slotted at 119 to straddle the bell-crank arm and bears upon the end of a key-stem 35, and, as bell-crank 113 is properly rocked block 117 presses the key 32 forward. Since block 117 is pivotally mounted on the bell-crank 113, it will not rub or slide upon the end of shank 35. Fig. 5 depicts groups of action parts in which the bell-cranks 120 are held in slotted blocks 121, and are themselves slotted, flat blades 122 being pivoted in the slots at 123, each of which flat blades engages one of the key-stems 35. When rods 125 are pulled by the depression of the proper manual-key, bell-cranks 120 will be rocked. Fig. 7 depicts a slight modification of Fig. 6, the bell-crank 113 in this instance having an ear 126 through which connecting rod 115 passes. It should be understood that blocks 112 and 121 may be fastened to their respective supports by wires 108 and 110 in a manner similar to that employed to bind holder 102 to its support 5.

It will be observed that in the instruments employed in this mechanism their respective

strings 11 are stopped by pressing them away from the neck, while in a hand-played violin the string to be stopped is pressed toward the neck. In the hand-played violin, moreover, the bridge is sometimes held in position on the belly of the instrument by the strings alone, and the stopping of any string causes an increased pressure on the bridge, and tends to hold same in place more firmly than before. Since, however, in this invention the stopping of the string is occasioned by pushing it away from the neck, thereby lessening the pressure which holds the bridge upon the belly of the instrument, it is well to secure the bridge to the belly by glue, screws, or otherwise so that the bridge can not drop out of position when the instrument is played.

When the instrument is to be played, the bows 6 are rotated by any suitable means. To play the desired note or notes the player depresses the appropriate manual-key or keys 1, just as if he were playing an organ or piano, and the depression of such key or keys 1 is translated by the action into forward thrust of the stop-key or keys 32 controlled thereby. Each key 32 (unless notched so deeply at 34 as not to engage the string 11 at all) will, as it is thrust forward, stop the string 11 and then wedge itself against the blocks 40 so as to move the instrument to a point where its string 11 is bowed by wheel 6 or some equivalent device. Since the stop-key engages and stops string 11 before said string comes into contact with the bowing means, any tendency toward playing false notes, which might otherwise be present, is eliminated. When the note has been played long enough, the player's finger is removed from key 1, and springs 37 and 163 return all parts to starting position.

As hereinabove stated, this invention can be applied to any stringed instrument in which the note to be played depends upon the point at which the string of the instrument is stopped. The term "violin" in the appended claims is used as indicating generically all instruments of that character, and not merely to cover instruments of the particular size and shape ordinarily designated as "violins."

Having thus described my said invention, what I claim and desire to secure by Letters-Patent is:

1. A violin having a perforated neck, a stop-key the stem of which passes through said perforation, a block the end of which projects inwardly to a point where it is interposed in the path of travel of the stop-key head, a string so placed that said stop-key will engage same before engaging said block, and means for moving said key into engagement with said string and block.

2. The combination of a violin, a movable

member provided with a head the outer edge of which engages the string of the violin, one of the side edges of said head being beveled, a block carried on said violin, said block having a slanting edge, and means for causing said member to move into engagement with the string of the violin, said beveled edge of said head being thereby caused to engage said slanting edge of said block.

3. The combination of a violin, a movable member provided with a head the outer edge of which engages the string of the violin, the side edges of said head being beveled, a pair of blocks carried one on each side of the neck of said violin, each of said blocks having a slanting edge, and means to cause said member to move into engagement with the string of the violin, the beveled edges of said head being thereby caused to engage said slanting edges of said blocks.

4. The combination of a violin, the neck of which is perforated and grooved, a movable member comprising a head and a stem, the stem of which passes through the perforation and the head of which normally seats in said groove, and means for moving said member to a point where its head engages the string of the violin.

5. The combination of a violin, the neck of which is perforated and grooved, a movable member comprising a head and a stem, the stem of which passes through the perforation and the head of which normally seats in said groove, and means for moving said member to a point where its head engages the string of the violin, said head being notched to receive the string.

6. The combination of a violin, means to stop the string thereof by pushing same outwardly from the violin-neck, and means against which the end of said string-stopping means is adapted to strike.

7. The combination of a violin, a movable member adapted to stop the string of the violin, a slotted guide for said movable member carried upon the violin, and fastening means passing through said slot to bind said guide upon the violin.

8. The combination of a violin, a movable member adapted to stop the string of the violin, means against which said movable string-stopping member is adapted to strike, whereby to render said movable member fixed with relation to said violin through the remainder of its throw, and means to adjust the position of said first-mentioned means with respect to said violin, thereby to determine the extent of throw permitted said movable member.

9. The combination of a violin, a movable member adapted to stop the string of the violin, and means carried by said violin and engaged by said movable member when

same has been moved a predetermined distance, said means being adapted then to hold said movable member in fixed relation to said violin.

10. The combination of a violin, a movable member adapted to stop the string of the violin, and a pair of grooved blocks against which said movable member is adapted to strike, the side-edges of said movable member being normally retained within said grooves.

11. The combination of a violin, a stop-key slidably projected through the neck of the violin, a member engaging the key, a pivoted lever to move said member, the connection between said member and said lever being yielding, a rod to pull said lever, and a manual-key to operate said rod, said stop-key being acted on from behind the violin neck to engage the string opposite said neck.

12. The combination of a violin, a stop-key for same, a member in contact with the stop-key, a lever to actuate said member, a yoke in which said lever is pivoted, a support therefor, and wire means to bind said yoke to said support.

13. The combination of a violin, a stop-key for same, a member in contact with the stop-key, a lever to actuate said member, a yoke in which said lever is pivoted, a support therefor, and yielding means to bind said yoke to said support.

14. The combination of a violin, a stop-key for same, a member in contact with the stop-key, a lever to actuate said member, a yoke in which said lever is pivoted, a support therefor, and a flexible means to bind said yoke to said support.

15. The combination of a violin, a stop-key for same, a member in contact with the stop-key, a lever to actuate said member, a yoke in which said lever is pivoted, a support therefor, and a pair of wires, one engaging the other, to bind said yoke to said support.

16. The combination of a violin, a stop-key for same, a member in contact with the stop-key, a lever to actuate said member, a yoke in which said lever is pivoted, a support therefor, and a wire passing through said yoke.

17. The combination of a violin, a stop-key for same, a member in contact with the stop-key, a lever to actuate said member, a yoke in which said lever is pivoted, a support therefor, a wire passing through said yoke, and a keeper engaging and locking said wire.

In testimony whereof I have affixed my signature in presence of two witnesses.

HENRY SCHLEMMER.

Witnesses:

E. KUNKLER,  
HENRY HOENE.