

**Dec. 19, 1939.**

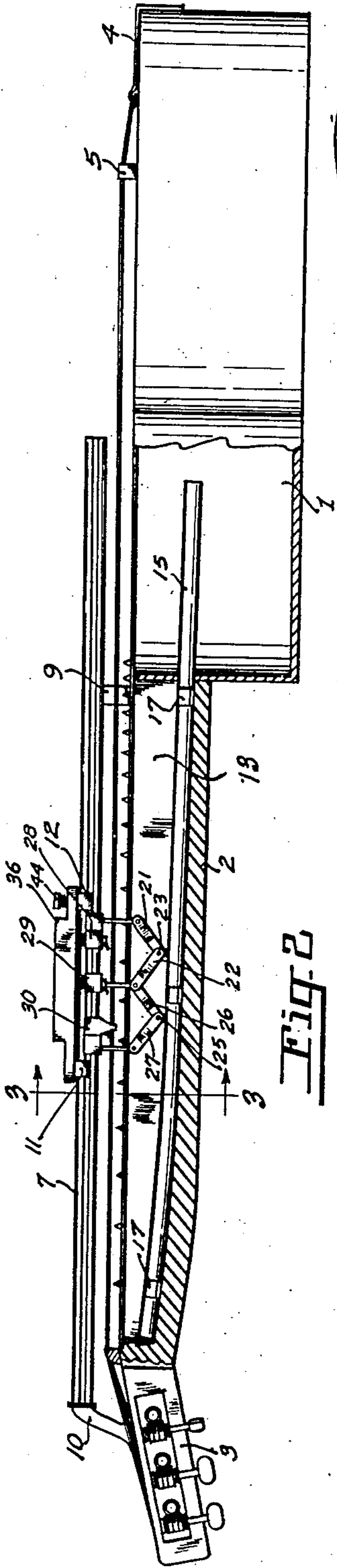
J. W. NEAL

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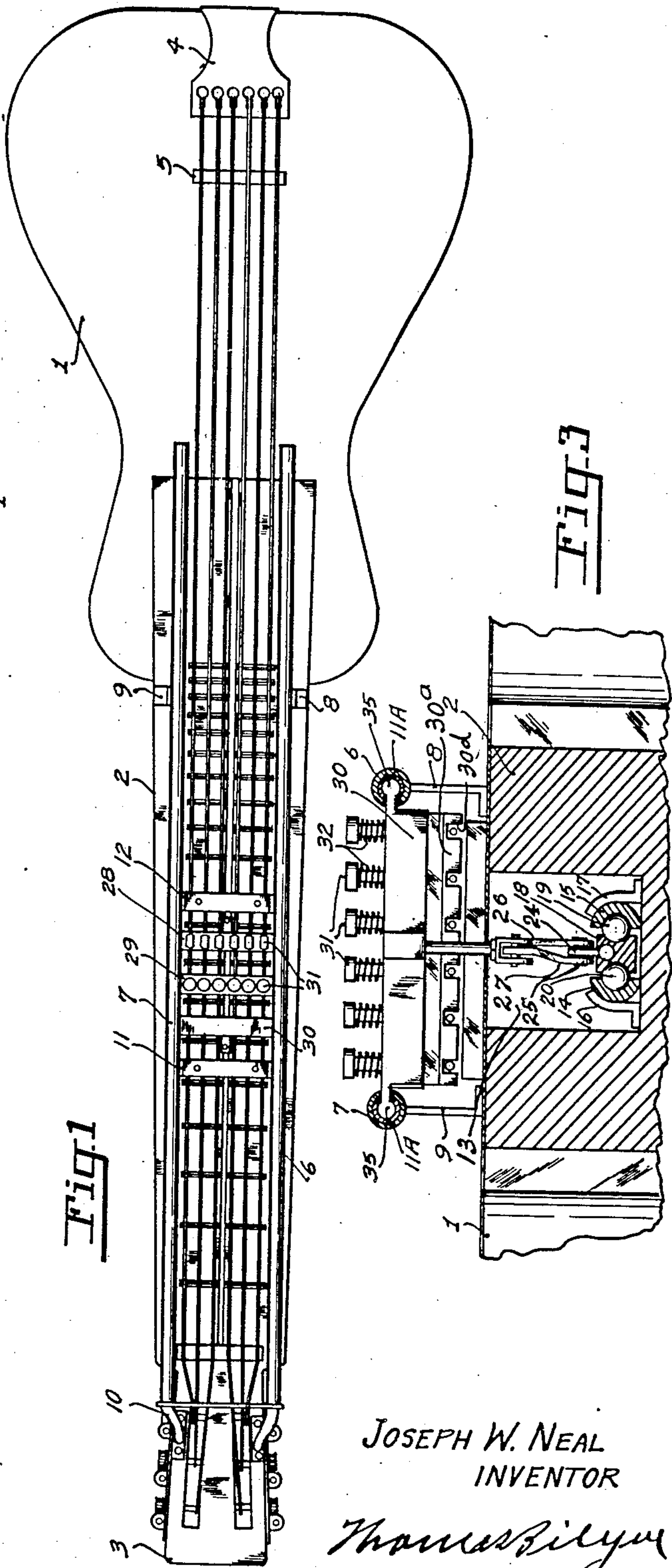
GUITAR

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**25th**



**Fig. 1**

**Fig. 3**

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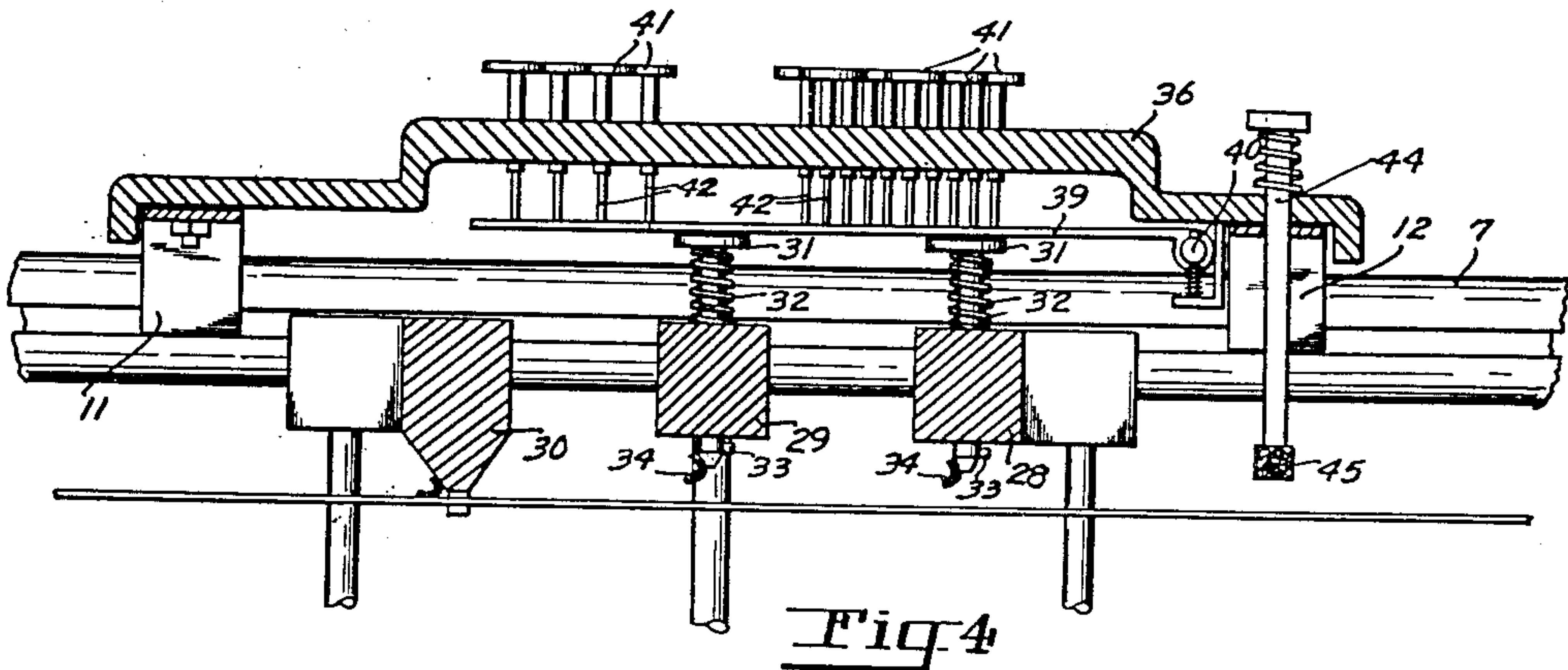


Fig. 4

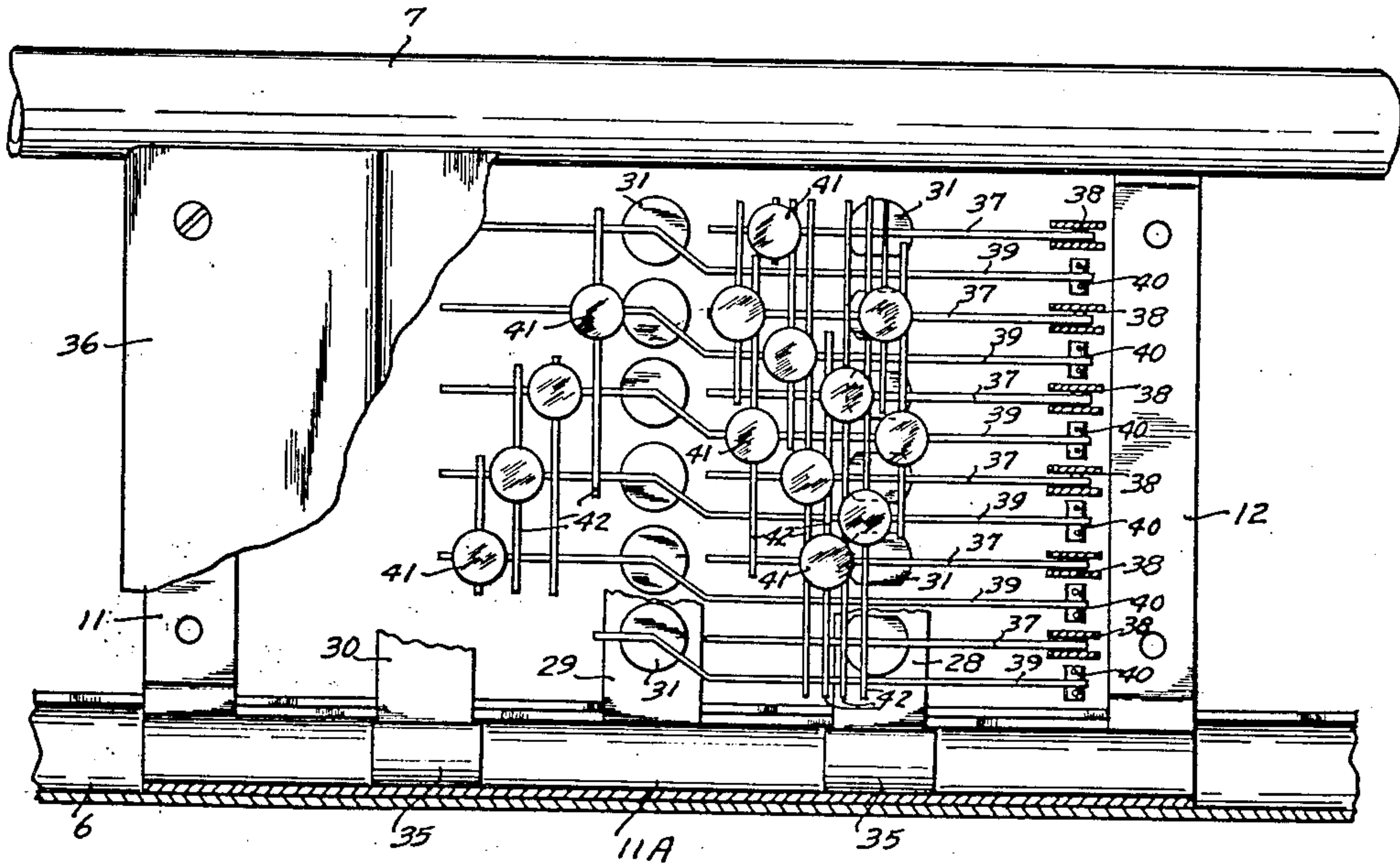


Fig. 5

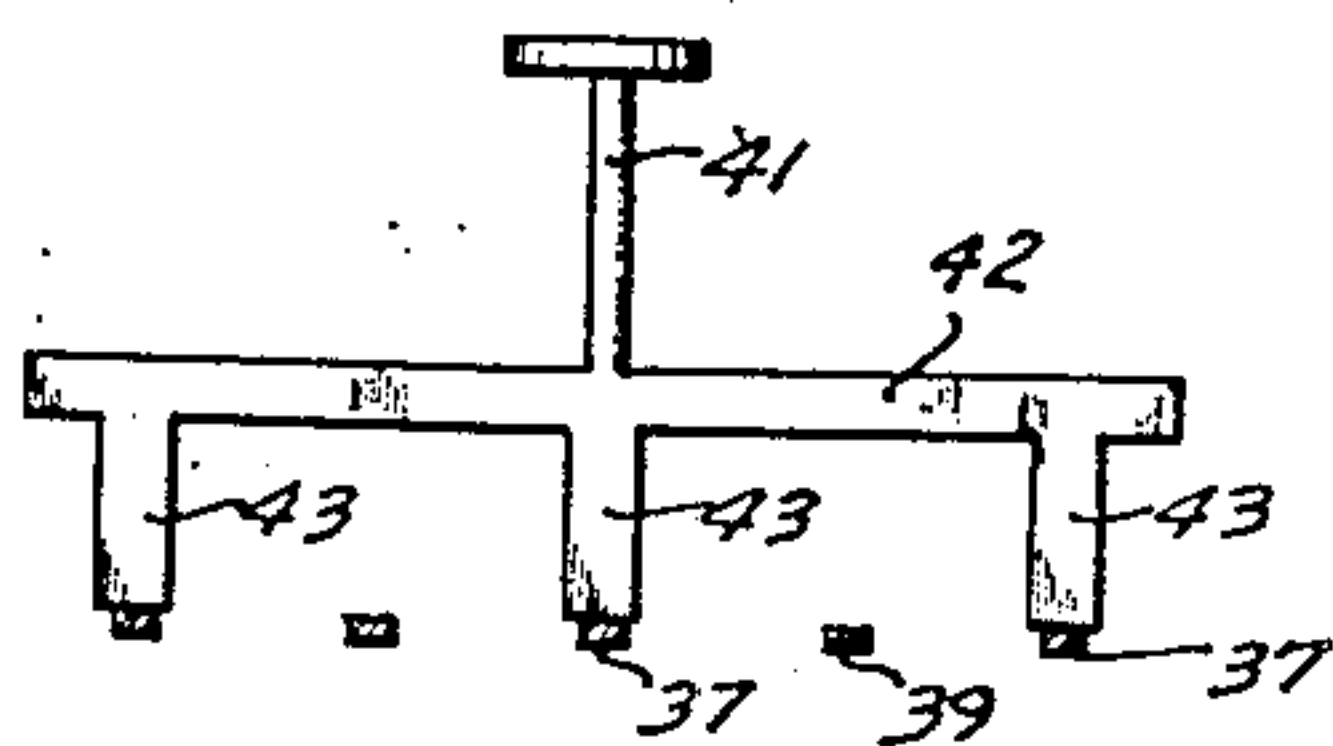


Fig. 6

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## UNITED STATES PATENT OFFICE

2,183,579

## GUITAR

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Application January 19, 1935, Serial No. 2,535

11 Claims. (Cl. 84—317)

My invention relates to improvements in stringed instruments of the lute class, and has particular reference to a novel form of mechanism for playing such instruments.

5 My invention is particularly adapted for use upon guitars and particularly to the steel guitar.

I provide a plurality of guides running longitudinally of the neck of the guitar and between the nut and the bridge of the guitar. Stop supports cooperate with the guides. I make these stop supports three in number, the outer one of which is in normal contact with the strings, the other two of which carry stops for finger manipulation that are normally out of engagement with the strings of the instrument. Co-operating means is provided for automatically moving the stops toward and away from each other as the keyboard is manually moved longitudinally of the neck of the instrument and along the guides.

The primary purpose and object of my invention is to provide a stringed musical instrument that may be played in full harmony.

25 A further object of my invention is to provide a mechanism to be used upon stringed musical instruments that will produce the combination of all possible tones or to provide a harmonious group of tones having the widest possible range.

30 A still further object of my invention consists in the production and adaptation of my device to stringed musical instruments that permits the production of all major, minor, seventh, diminished seventh, augmented and ninth chords in their various inversions.

35 A still further object of my invention is to provide an apparatus which operates from the nut to the twenty-fifth semi-tone above with all the effect of the single steel producing all major, minor, seventh, diminished seventh, augmented and ninth chords in all positions in full harmony.

40 With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts, the essential elements of which are set forth in the appended claims, and a preferred form of embodiment of which is hereinafter shown with reference to the drawings which accompany and form a part of this specification.

In the drawings:

50 Fig. 1 is a plan view of a steel guitar to which has been adapted one of my improvements as hereinafter to be described.

Fig. 2 is a side view, partially in section, of the instrument illustrated in Fig. 1.

55 Fig. 3 is a sectional end view of the neck of

the instrument. This view is taken on line 3—3 of Fig. 2, looking in the direction indicated.

Fig. 4 is a sectional side view of the keyboard.

Fig. 5 is a plan view of the keyboard. The keyboard is shown with the cover removed. 5

Fig. 6 is a side view of one of the cross bars that are to be manipulated by the key stems of the keyboard.

Like reference characters refer to like parts throughout the several views. 10

Preliminary to a more detailed description of the drawings, it may be stated that the illustrated embodiment of the inventive concept includes a conventional guitar having a body 1, a neck 2, a tuning head 3, and the usual complement of 15 strings secured to the tailpiece 4. The strings pass over the bridge 5, and are secured to the tensioning devices which are a part of the tuning head 3. These parts are of well known construction and arrangement in stringed instruments of the lute class and constitute no part of the present invention. 20

Disposed longitudinally of the instrument intermediate the nut and the bridge is a guide member having parallelly disposed guide cylinders 6 and 7 which form a guideway for a stop support assembly. In the illustrated embodiment these guide cylinders are positioned at either side of the neck 2 in superposed relation to the strings of the instrument. Supporting brackets 8 and 9 act as supports for the free ends of the guide cylinders 6 and 7 and maintain them in spaced relation to the neck 2 and body 1 of the instrument. The guide member is secured upon its one end to the tuning head 3 as by a head support 10, and the brackets 8 and 9 may be secured to either the neck 2 or the body of the instrument, as desired. 35

The guide cylinders 6 and 7 are cylindrical in cross section and are formed with continuous longitudinal slots in their opposed side walls. Cross supports 11 and 12 extend transversely of the guideway formed by the guide cylinders 6 and 7 and are secured to a cylinder member 11A disposed within each of the guide cylinders 6 and 7. Each cylinder member 11A is also provided with a longitudinal slot, the openings in the guide cylinders 6 and 7 and in the cylinder members 11A being correlated to form a continuous passage therethrough to the longitudinal recess therewithin. 40 45 50

A longitudinal recess 13 is disposed centrally of and extends longitudinally of the neck of the instrument. Guide bars 14 and 15 are disposed within the recess and are spaced apart to form a 55



guideway for the stop pin spacing mechanism, said guide bars being secured within the recess as by brackets 16 and 17. A slide 18 is interposed between the guide bars 14 and 15 and maintained in spaced relation thereto by means of anti-friction bearings 19 and 20. The opposed faces of the guide bars 14 and 15 and of the slide 18 are milled to form a raceway for said bearings.

A pair of links 21 and 22 is secured to the slide 18 at a common point 23. A second slide 24 is disposed within the slide 18 and a pair of links 26 and 27 is connected thereto at a common point 25. The free end of the link 21 is secured to a stop pin holder 28. The free ends of the links 22 and 26 are secured to a stop pin holder 29, and the free end of the link 27 is secured to a stop 30, comprising a mechanism presently to be described.

The stop pin holders 28 and 29 and the stop 30 are disposed transversely of the instrument intermediate the guide cylinders 6 and 7. The stop pin holder 28 and the stop 30 have cylindrical members 35 secured to each of their ends which slidably engage the cylinder member 11A, while the stop pin holder 29 is rigidly secured to the cylinder member 11A. It will be apparent, therefore, that the stop pin holder 29 remains stationary relative to the cross supports 11 and 12, and that the stop pin holder 28 and the stop 30 are movable with relation to the cross supports 11 and 12 and to the stop pin holder 29.

Each of the stop pin holders 28 and 29 are recessed to carry stop pins 31, which are so arranged that there is one stop pin in each of the stop pin holders 28 and 29 for each string of the instrument. Each of the stop pins has a spring 32 disposed between its head and the stop pin holder to maintain said stop pin normally out of engagement with the strings of the instrument. Each stop pin 31 is also provided with a lug 33 to prevent disengagement of the pin from the stop pin holder, and is also provided with a deadening element, as a piece of felt 34, to deaden any sound which may be caused when the stop pin strikes the string. The stop 30 is provided with spaced transverse recesses for the purpose of receiving the strings and maintaining their correct spacing intermediate the nut and the bridge, and is also provided with a deadening element, as a piece of felt, to arrest the whine of the strings when the stop 30 is moved longitudinally thereover.

The mechanism just described, which comprises the cylindrical members 11A, the cross supports 11 and 12, the stop pin holders 28 and 29, and the stop 30, is movable longitudinally of the instrument, the cylindrical members 11A slidably engaging the guide cylinders 6 and 7. Due to the fact that the distance between the guides 6 and 7 and the guide bars 14 and 15 increases from the head of the instrument toward the body, as illustrated in Figure 2, longitudinal movement of the stop pin support assembly will cause the distance to vary between the stop pin holders 28 and 29, and between the stop pin holder 29 and the stop 30. The relative movement of these parts is effected by the hinge-like movement of the associated links 21—22 and 26—27, which close to move the stop pin holders together, and which open to move the stop pin holders apart, as the assembly is moved from end to end of the guideways. By this construction, the stop pin holders automatically are positioned to permit the stop pins, when depressed, to come in contact with

the strings of the instrument at the correct places above the frets.

The harmony of an instrument embodying the present invention is dependent upon the spacing of the slides 18 and 24 from the stop pin supports 28 and 29 and stop 30. The reason for this is that the relative positions of the stop pin holders 28 and 29 and stop 30 with respect to the frets is determined solely by the pull or spread of the links 21—22 and 26—27, as affected by movement of the stop pin support assembly between the nut and the twenty-fifth semi-tone. As the stop pin assembly is moved toward the nut the links are spread apart by reason of the convergence of the respective guideways, and the stop pin holder 28 and stop 30 are moved away from the stop pin holder 29 to conform to the wider spacing of the frets. As the stop pin assembly is moved toward the bridge the links are pulled inwardly, by reason of the increasing distance between the respective guideways, and the stop pin holder 28 and stop 30 are caused to move toward the stop pin holder 29 to conform to the narrower spacing of the frets.

A key plate 36 is secured to the cross members 11 and 12. In order to obtain the chords by manipulation of each of the stop pins, I have developed a key system, shown in detail in Figures 4 and 5. Bars 37 are hinged upon their one end as shown at 38 and each bar extends over and lies upon its respective stop pin disposed within the stop pin holder 28.

A plurality of bars 39 are hinged as shown at 40 and extend over and lie upon their respective stop pins disposed within the stop pin holder 29. A plurality of keys 41 are disposed through the key plate 36 and have actuating bars 42 secured to their ends beneath the key plate. The actuating bars 42 have lugs 43 depending therefrom which contact the bars 37 and 39. These lugs 43 are so placed that the bars 37 and 39 may be selected to give the chord desired.

The drawings illustrate fourteen combinations of notes, or chords. I do not wish, however, to be limited to that number, as more or less might be used, depending upon the skill of the musician.

A pin 44 is disposed through the key plate 36 and has secured to its lower end a sound deadening element as a bar of felt 45. This pin is used when it is desired to suddenly deaden vibrations of the strings as when playing staccato notes.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the embodiment herein shown and described, as it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow.

Having now described my invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

1. In a device of the class described, a pair of parallelly disposed guides running longitudinally of and superposed the neck of the instrument, a second guide disposed below and in spaced relation with the pair of guides, the second guide uniformly increasing in spaced relation with the pair of guides rearwardly from the head of the instrument, a plurality of stop pin holders movable relative to the guides and for being automatically moved toward each other when the assembly is moved in one direction and for being



moved away from each other when the assembly is moved in the opposite direction, a keyboard, key manipulative stems secured to the keyboard, and means effecting communication with the strings of the instrument when certain ones of the keys are manipulated.

2. In a device of the class described, an upper guide and a lower guide extending longitudinally of the neck of the instrument, the top and bottom guides not being parallel with each other, a linkage connection disposed between the respective guides, stop pin holders associated with the top ends of the links and so arranged that they move toward and away from each other as the same is moved along the guides, stops disposed within the stop pin holders, means for normally maintaining the stops out of engagement with the musical strings of the musical instrument, a plurality of bars hingedly secured on their one end to a journal pin and each being in registry with predetermined ones of the stops, keys arranged in spaced relation to form a key board, and means communicating the keys with the hinged bars.

3. In an instrument of the class described, a guide member disposed longitudinally of and superposed the neck of the instrument, a second guide member disposed in spaced relation to said first guide member, the spacing between said guide members increasing from the nut toward the bridge of the instrument, a plurality of stop pin holders movable relative to said guides, a plurality of stops disposed in said holders, said stop pin holders being automatically moved toward each other when the assembly is moved in one direction and moved away from each other when the assembly is moved in the other direction, and means to effect communication between said stops and the strings of the instrument.

4. A string stop assembly for use with the strings of a musical instrument, comprising a plurality of string stop members movably mounted on the assembly, and means on said assembly for imparting relative movement to said stop members as they are moved along the strings to space said stop members in conformity with the tone spacings along the strings.

5. A string stop assembly for use with the strings of a musical instrument, comprising a plurality of string stop members movably mounted on the assembly, and means on said assembly for moving one of said stop members with respect to another of said stop members as they are moved along the strings to space said stop members in conformity with the tone spacings along the strings.

6. In a stringed instrument of the class described, a string stop assembly mounted for movement along the strings of the instrument, one

of said string stop members movably mounted on the assembly, and means on said assembly for imparting relative movement to said stop members as they are moved along the strings.

7. In a stringed instrument of the class described, a string stop assembly mounted for movement along the strings of said instrument, a plurality of stop members movably mounted on the assembly, means on the assembly for movably mounting one of said stop members for movement with respect to another of said stop members as the assembly is moved along the strings, and means for imparting spaced relation of varying degrees between the stop members as the assembly is moved.

8. A string stop assembly for use with the strings of a musical instrument, comprising a plurality of string stop members movably mounted on the assembly, means on said assembly for imparting relative movement to said stop members as they are moved along the strings, said stop members being mounted normally out of engagement with the strings of the instrument, and means to effect communication between said stops and said strings.

9. A string stop assembly for use with the strings of a musical instrument, comprising a plurality of stop members, and means on said assembly for movably mounting one of said stop members for movement with respect to another of said stop members as the assembly is moved along said strings, and means for moving said stop members toward each other when the assembly is moved in one direction, and for moving said stop members away from each other when the assembly is moved in the other direction.

10. In a stringed instrument of the class described, a keyboard mounted adjacent the strings of the instrument, a stop assembly mounted for movement along said strings, a plurality of stop members movably mounted on said assembly and operatively connected with said keyboard for engaging said strings, means on said assembly for imparting spaced relation of varying degrees between the stop members as they are moved along said strings, and means for causing one or more of said stop members to engage one or more of said strings as each key of the keyboard is manipulated.

11. In an instrument of the class described having a plurality of strings, a string stop assembly mounted for movement along the strings of said instrument, a plurality of stop members movably mounted on said assembly, means to cause certain of said stop members to engage one or more of said strings, said stop assembly being movable along the strings with one or more of said stop members in engagement therewith.

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