H. K. SANDELL.

SELF PLAYING VIOLIN.

APPLICATION FILED AUG. 5, 1913.

1,094,819.

Patented Apr. 28, 1914.

3 SHEETS—SHEET 1.

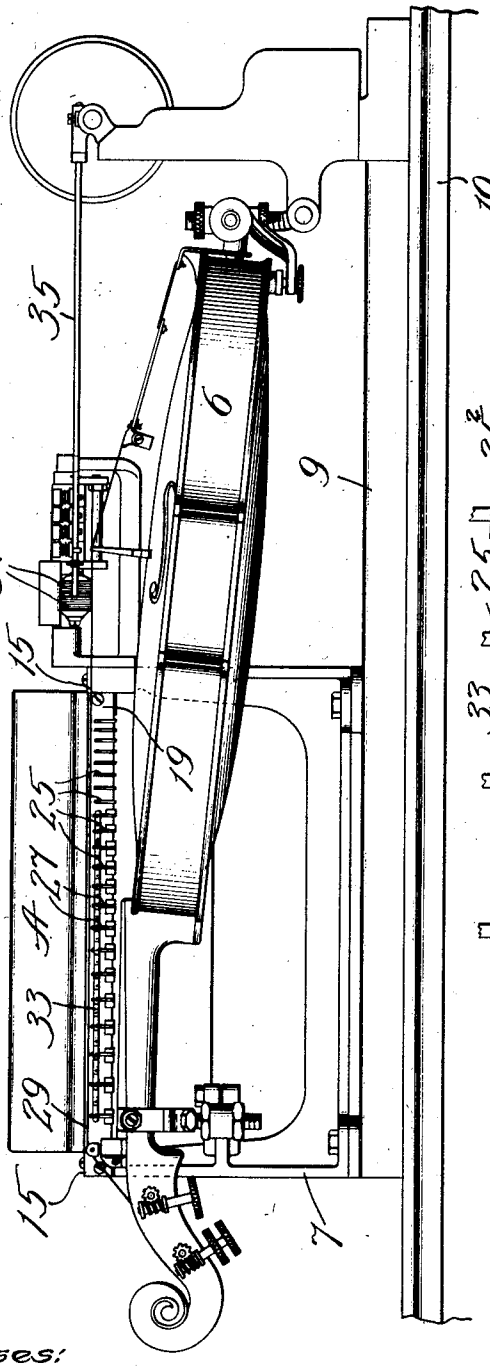

Fig. 1.

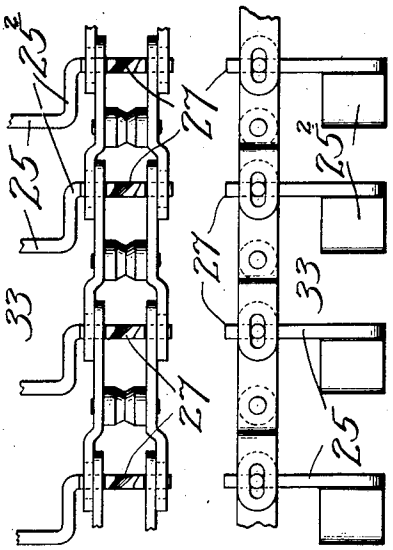

Fig. 2.

Fig. 3.

Witnesses:
E. E. Gaylord.
Chas. H. Buell.

Inventor:
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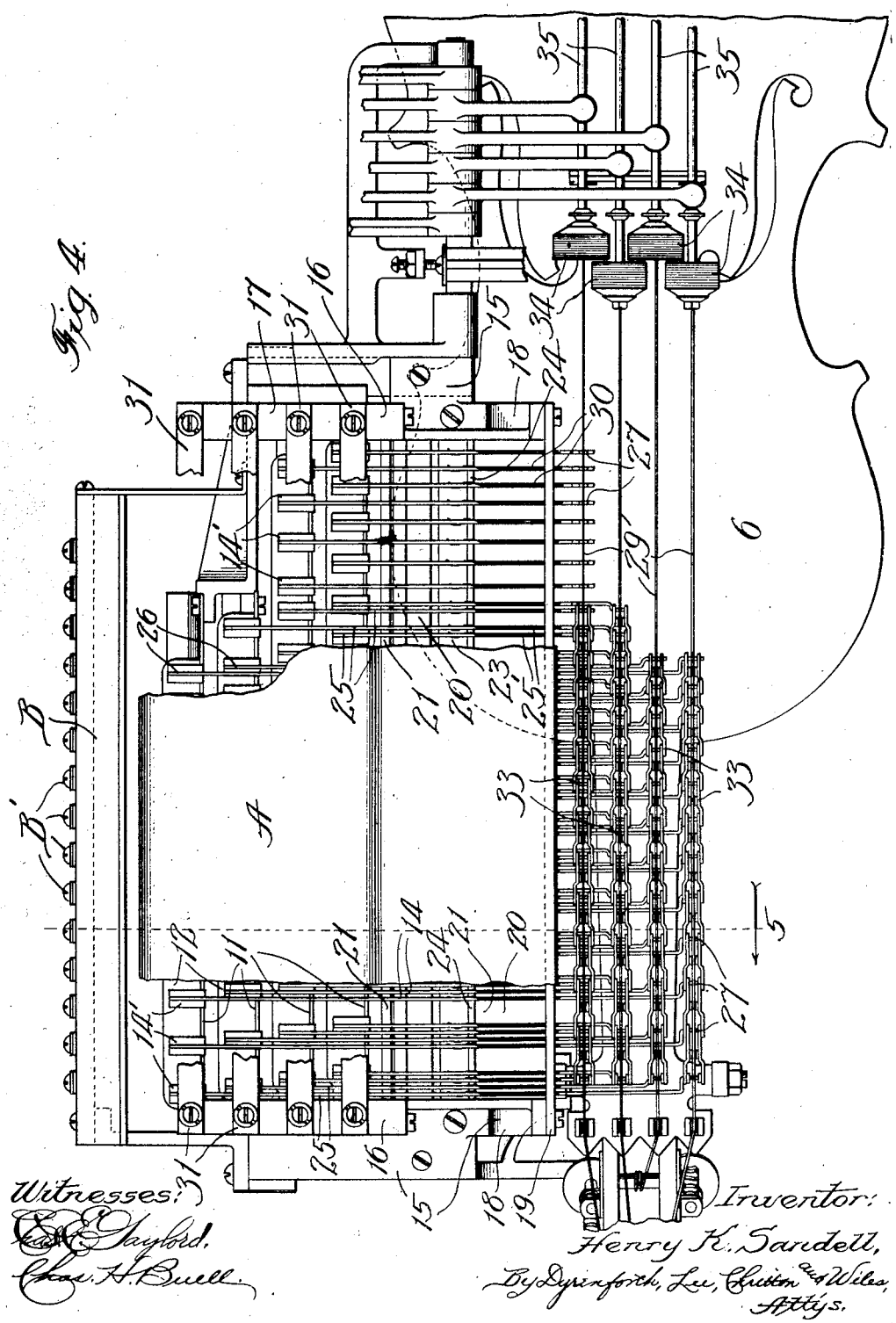
3 SHEETS—SHEET 2.

Fig. 4.



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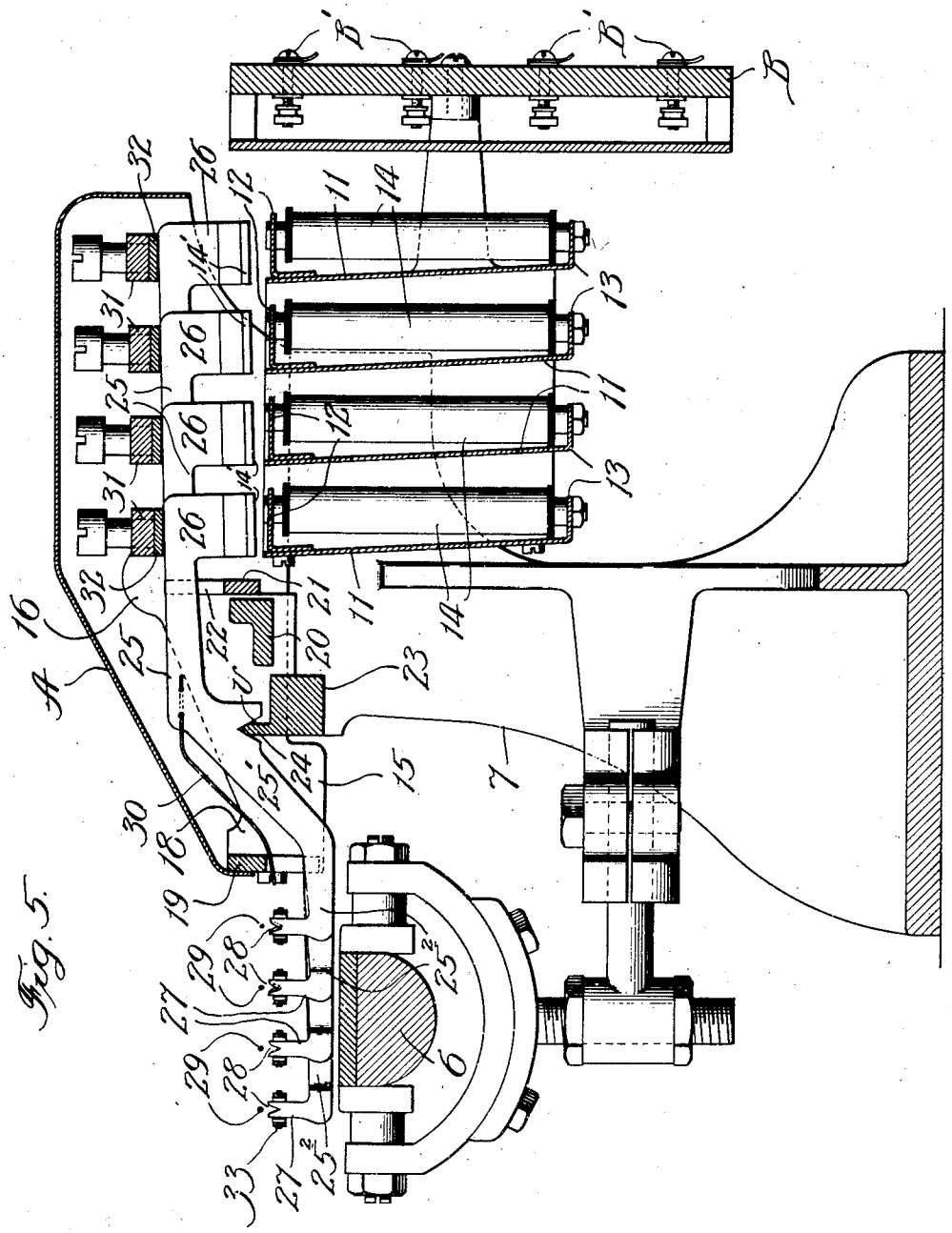

Fig. 5.

Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY K. SANDELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO MILLS NOVELTY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SELF-PLAYING VIOLIN.

1,094,819. Specification of Letters Patent. Patented Apr. 28, 1914.

Application filed August 5, 1913. Serial No. 783,132.

To all whom it may concern:

Be it known that I, HENRY K. SANDELL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Self-Playing Violins, of which the following is a specification.

My present invention is designed primarily as an improvement on the self-playing stringed instrument of Letters Patent of the United States No. 807,871, dated December 19, 1905; and it relates, more particularly stated, to an improvement in the fingering-mechanism of that patent and subsequent patents which have been granted to me for my inventions in self-playing instruments of the viol-class. In this instrument, as it has hitherto been constructed, the fingering mechanism, has all been supported and housed in a casing rising over the neck of the instrument. This mechanism is not only somewhat complicated and cumbersome in appearance, but it covers a considerable extent of the instrument, which it is desirable to have exposed.

The object of this invention is to materially simplify the fingering mechanism and cause it to extend along one side of the neck of the instrument to play against the strings, thereby to leave the neck uncovered and exposed and to avoid the cumbersome appearance, referred to.

In the accompanying drawings, Figure 1 shows a violin in side elevation, equipped with my improved fingering mechanism: Fig. 2 is an enlarged broken plan view of one of the chains for producing the glide-effect from tone to tone in playing the instrument, as described in the aforesaid enumerated patent, and showing its connection with a series of string-fingering levers; Fig. 3 is a broken view of the same in side-elevation; Fig. 4 is a broken plan view showing a violin equipped with my improvement, and Fig. 5 is an enlarged section on line 5, Fig. 4.

A violin 6 is suitably supported at its opposite ends, as and in the position represented in Fig. 1. The support for the neck-end of the violin is on an upright frame 7 rising from a horizontal base 9 upon a shelf 10. Between the upright end-members of the frame extend edgewise thin-metal bars 11 corresponding in number with that of the strings of the violin, these bars being spaced apart and having flanges 12 and 13 extending from one side of each respectively at its upper and lower edges. Between each pair of these flanges is supported a row of electromagnets 14 with their pole-pieces projecting through the upper flanges. The number of electromagnets in each row thereof, which relates to a different violin-string, depends on the number of fingering-devices, hereinafter described, desired to operate against the strings. On the upper ends of the side-members of the frame 7 are secured similar brackets 15, each having a raised lug 16 and a bar 17 extending from it in elevated position across the rows of electromagnets: and these brackets have lower extensions 18 on their opposite ends, projecting beyond the frame, where they are connected by a bar 19. Between the raised lugs 16 extends a lower angular reinforcing bar 20 and adjacent to one side thereof extends edgewise between these lugs a bar 21 having sets of vertical slots 22 in its upper edge, each set consisting of the number of slots corresponding with the number of strings of the instrument (thus of four, for the violin), and the sets being suitably spaced apart along the bar containing them. At the opposite side of the bar 20 a bar 23 extends between the brackets 15 and is provided on one edge with an upwardly-projecting longitudinal rib 24.

In each slot 22 fits edgewise between its ends a bent fingering-lever 25, formed preferably of thin sheet-steel, these levers being all alike, but varying in length to cause the four in each set to reach respectively into alinement with the different cores of a transverse row of the electromagnets 14. These levers being all alike, except as to their different lengths referred to, description of one will suffice. The lever terminates at one end in a depending section 26 carrying an armature 14′ to register with an electromagnet. Toward its opposite end, the lever is formed with a downwardly-inclined section 25′ having a notch, preferably of the V-shape shown at a (Fig. 5), in its lower edge for fulcruming it on the rib 24; and from this inclined section extends a neck 25^2 terminating in an upright head 27 having a notch 28 in its upper end. This notch in the heads for the lighter (D and A) strings is cut on a bevel, as shown, the better to grip these strings.

Each string 29 of the violin is fingered by a series of the levers 25 by the notches in the lever-heads engaging the strings in the direction away from the face of the violin-neck from underneath, or from behind the strings, by depressing the armatured ends of the levers; and light springs 30 extend from the bar 20 into connection with the levers to turn them for depressing their heads 27 away from the strings when the electromagnets become deënergized after having been energized to turn the levers in the direction for attacking the strings.

Bars 31 are fastened at intervals to the opposite bars 17 in position to cause each to extend over a different row of the rear ends of the levers 25, to form stops for those ends in their rise by the tensioned springs 30; and a strip of cushioning-material 32 is provided along the lower surface of each bar 31 for cushioning and rendering noiseless the stroke of the levers against it.

A shield is shown at A covering the described lever-mechanism to protect it; and the frame shown at B, Fig. 5, to be supported on a tongue extending from the upright frame, is for connecting at binding-posts B′ insulated wires in cables (not shown) leading into the frame B through its ends to connect the electromagnets 14 with a supply of electric current.

The chain-devices 33 are connected with the rows of notched lever-heads 27 in the same way and for the same purpose as they are provided on the heads of the vertically-reciprocating rods for fingering the strings according to the aforesaid Patent No. 807,871; and since they present no material additional features of novelty, further reference to them would be superfluous.

The violin herein is played by rotating against the strings sounders 34 on electromagnet-operated motor-rotated shafts 35, all of which may be as described in said patent; and the electric circuits including electromagnets for operating the sounder-shafts and those for working the fingering-levers may be the same as those of said Patent No. 807,871, and similarly opened and closed by a traveling music-sheet, so there is no need of showing and describing herein those features in detail. It is sufficient to state in the present connection that the heads 27 are actuated, by energizing the electromagnets 14 to attract the armatures 14′, to finger the strings 29 by attacking them at the notches 28; and the heads are retracted from the strings, when the electromagnets are deenergized, by the action of the springs 30 on the levers.

By fulcruming the levers as shown at *v*, the attack on the strings of the notched heads is and remains accurate in centering it in the notches, whereby they produce true pitch of the strings and prevent the production of false tones. Moreover the rigid seating of these levers at their notches *v*, on the fulcrum-rib prevents the levers from moving or vibrating longitudinally with the vibrations of the strings.

While it is preferred, as stated, to attack the strings in the direction away from the violin-neck, obviously, without departure from the invention, the levers may be arranged to play the heads against the strings in the opposite direction, which would amount to a mere reversal.

What I claim as new and desire to secure by Letters Patent is,—

1. In combination with a string of a stringed instrument having a neck, a rigid frame extending along one side of said neck in spaced relation thereto, a fulcrum-rib on the frame, spring-retracted levers having V-shaped notches at which they are fulcrumed on said rib, each lever having on its forward end a head extending at a right-angle thereto toward the string, and means for moving the levers on their fulcrum to press the heads against the string.

2. In combination with a string of a stringed instrument having a neck, a fulcrum-rib supported to extend along one side of said neck in spaced relation thereto, spring-retracted levers fulcrumed on said rib, each lever having a head on its forward end extending toward the string and provided in its end with a V-shaped notch beveled on one inner face, and means for moving the levers on their fulcrum to press the notches against the string.

3. In combination with a string of a stringed instrument having a neck, a fulcrum-rib supported to extend along one side of said neck in spaced relation thereto, a bar supported to extend parallel with said rib and containing transverse guide-slots, spring-retracted levers fulcrumed between their ends on said rib and confined to work in said slots, each lever having a head on its forward end extending at a right-angle thereto toward the string, and means for moving the levers on their fulcrum to press the head against the string.

4. In combination with a stringed instrument having a neck, a frame supported to extend along a side of the neck, a bar on the frame having slots in its upper edge, a fulcrum-rib on the frame, electromagnets supported on the frame, spring-retracted levers in said slots and fulcrumed on said rib to extend crosswise of a string of the instrument, said levers terminating at one end in heads extending under the string to be pressed against it and armatures for the electromagnets on the opposite ends of the levers.

5. In combination with a stringed instrument having a neck, a frame supported to extend along a side of the neck, rows of elec-

tromagnets supported on the frame, a bar on the frame having sets of slots in its upper edge, a fulcrum-rib on the frame, spring-retracted levers in said slots fulcrumed on said rib to extend crosswise of the strings of the instrument, said levers terminating at one end in notched heads to be pressed against the strings and at the opposite end in depending sections, armatures on said sections for the electromagnets in said rows, and cushioning-bars on the frame extending over the levers.

HENRY K. SANDELL.

In presence of—
A. C. FISCHER,
D. C. THORSEN.