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BOWING MECHANISM FOR SELF PLAYING STRINGED INSTRUMENTS

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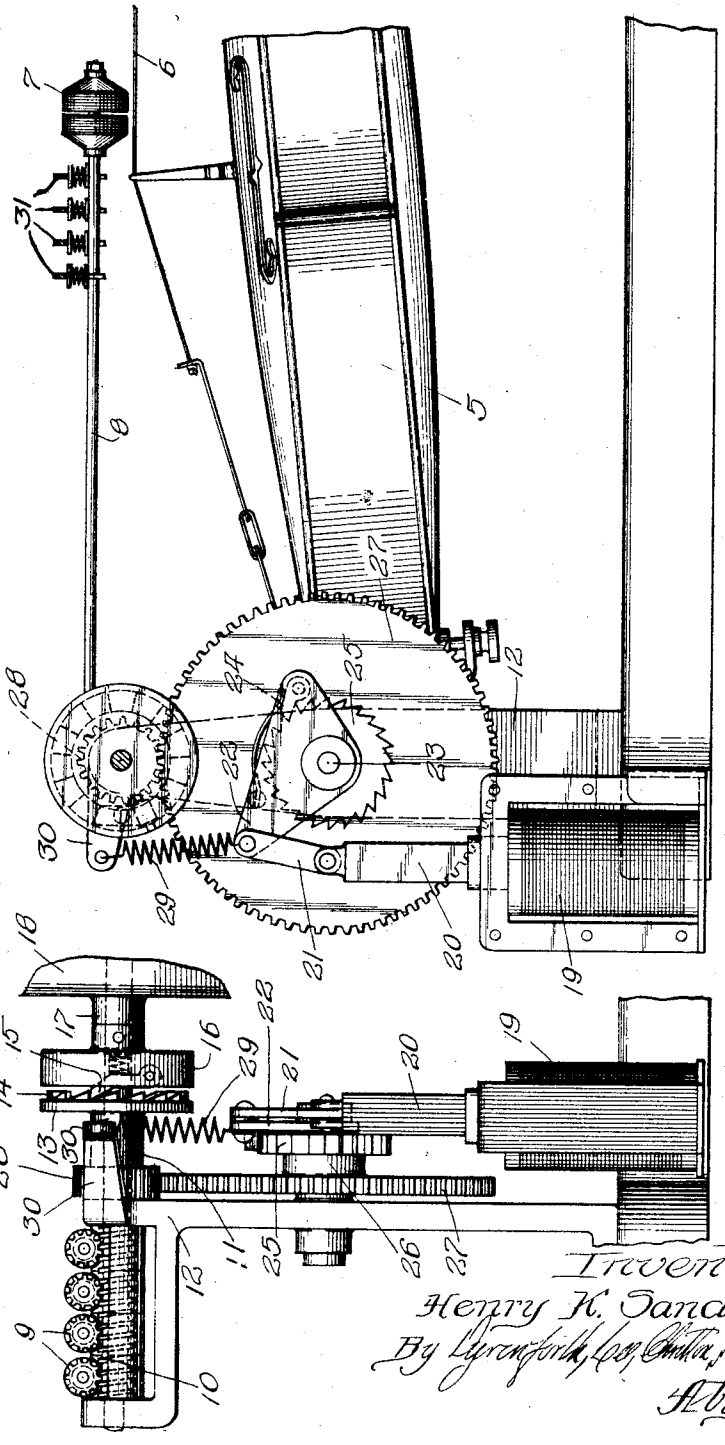

Fig. 2.

Fig. 1.

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BOWING MECHANISM FOR SELF-PLAYING STRINGED INSTRUMENTS.

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To all whom it may concern:

Be it known that I, HENRY K. SANDELL, a citizen of the United States, residing at 929 Sheridan Road, Evanston, in the county of Cook and State of Illinois, have invented new and useful Improvements in Bowing Mechanism for Self-Playing Stringed Instruments, of which the following is a specification.

This invention relates to improvements in bowing mechanism for self-playing stringed instruments, particularly of the viol type, and will be fully understood from the following description, illustrated by the accompanying drawings, in which:

Figure 1 is an end elevation of a device embodying the present invention, the instrument proper not being shown; and

Fig. 2 is a vertical sectional view showing the device of the present invention in side elevation, an instrument being shown.

The present invention relates particularly to self-playing stringed instruments of the viol type in which a rotating sounder or bow member is employed for each string of the instrument, for example, as illustrated in my prior Patent No. 855,021, dated May 28, 1907. Referring more particularly to the drawings, the numeral 5 indicates the stringed instrument, for example, a violin, provided in the usual manner with strings 6. Above each string 6 is mounted a bow or sounder member 7, each of which is provided with a shaft 8 extending longitudinally of the instrument and provided at its end with a gear 9. Each of these gears 9 meshes with a constantly rotating worm 10 driven by shaft 11. The worm 10 and the bow shafts 8 are suitably mounted on a supporting bracket 12.

At the end of the worm shaft 11 is mounted a face plate 13 on which are provided the inclined projections 14, with which co-operates the spring pressed pawl 15 suitably mounted in a co-operating clutch plate 16 secured to the shaft 17 of the bow motor 18 (shown diagrammatically). The arrangement of the projections 14 and the pawl 15 on the co-operating clutch plates is such that the worm shaft 11 driving the bow shafts 8 is rotated with the bow motor shaft 17, but the worm shaft 11 and the corresponding clutch plate can be rotated more rapidly than the bow shaft.

Means are provided for imparting to the worm shaft 11 and through it to the bow shafts 8, movement more rapid than the movement of the bow motor shaft for the purpose of simulating the quick bow stroke frequently used in violin playing. In the present embodiment of the invention, the quick stroke of the bows is produced by the means hereinafter described.

A suitable electromagnet 19 is provided, having a core 20 normally out of central position in the coils of the electromagnet. The electromagnet illustrated is one adapted to be operated by alternating current. The end of the core 20 is connected by means of a link 21 to a suitable lever member 22 pivoted on a stub shaft 23 mounted on the bracket member 12. The lever 22 is likewise provided with a spring pressed pawl 24 which engages a ratchet wheel 25 mounted on a sleeve 26 which is rotatable on the shaft 23. To the sleeve 26 is likewise secured a gear 27 which meshes with a smaller gear 28 secured to the worm shaft 11. A spring 29, secured at one end to a projection 30 from the bracket 12 and at the other end to the link 21, provides for the return of the core 20 of magnet 19 to its normal, decentered position when the magnet is not energized.

The operation of the device will be readily understood. In the playing of the violin, the bow motor 18 is constantly rotating, driving through the clutch members 13, 14, 15 and 16 the worm shaft 11 and with it the bow shafts 8. The bows 7 are depressed to the keys by any suitable means, as shown in my prior patent above referred to, for example, the operating fingers 31, diagrammatically illustrated. When a quick bow stroke effect is desired, the electromagnet 19 is energized by any suitable means, for example, a manually operated key or a perforation in a note sheet. The energizing of the magnet 19 pulls down the core 20 to central position and with it the lever 22. The movement of the lever 22 is transmitted through pawl 24, ratchet wheel 25 and gear 27 to the gear 28 and the worm shaft 11, which is momentarily rotated in a forward direction at an accelerated rate of speed. The worm shaft 11 carries with it the bow shafts 8 and the quick stroke effect is thereby imparted to the bows or sounders 7.

It is readily apparent that any other suitable device may be substituted for the elec-

tromagnet 17, for example, a direct current electromagnet construction may be employed, or any suitable mechanical or pneumatic device.

I claim:

1. In self-playing stringed instruments, sounder members for the strings, means for imparting movement to said sounder members, said means including a rotatable shaft, a bow motor, and a clutch member interposed between said shaft and said bow motor, and means for imparting to said shaft accelerated movement independently of said bow motor.

2. In self-playing stringed instruments, sounder members for the strings thereof, means for imparting movement to said sounders, said means including a shaft, a bow motor, and a clutch member interposed between said shaft and said bow motor, a gear secured to said shaft, a second gear meshing with said gear and means for imparting to said second gear movement independently of the movement of the bow motor.

3. In self-playing stringed instruments, sounder members for the strings thereof, means for imparting movement to said sounders, said means including a shaft, a bow motor, and a clutch member interposed between said shaft and said bow motor, a gear secured to said shaft, a second gear meshing with said gear, a ratchet wheel movable with said second gear, a pawl-lever co-operating with said ratchet wheel and electromagnetic means for imparting movement to said pawl-lever.

HENRY K. SANDELL.