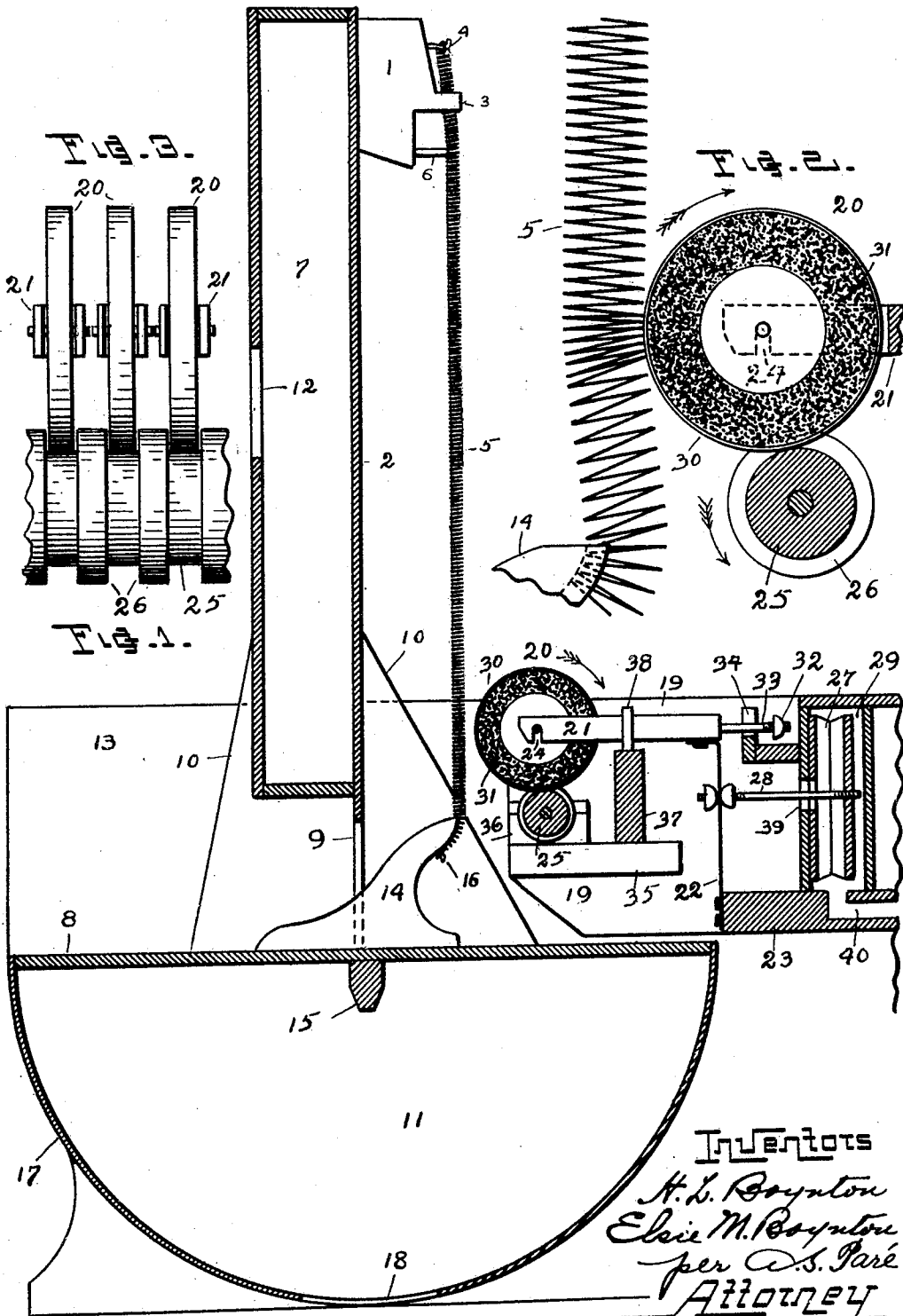


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 SPRING SOUNDER.
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1,409,657.

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Specification of Letters Patent. Patented Mar. 14, 1922.

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To all whom it may concern:

Be it known that we, HARRY L. BOYNTON and ELSIE M. BOYNTON, citizens of the United States, and residents of the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Spring Sounders, whereof the following is a specification.

This invention relates to a musical instrument, that is an instrument, in which the musical tones are due to longitudinal vibrations from helical wire extension spring sounders, of suitable sizes, graduating in length from 2 to 27 inches, and graduating in diameter from $\frac{1}{8}$ of an inch to $\frac{1}{4}$ of an inch wire, graduating in gage from No. 4 to No. 22 (American steel wire gage), in combination with friction wheels, sounding boards, and sound boxes.

In the accompanying one sheet of drawings we have represented enough parts of an instrument containing the invention to fully illustrate the same, and the invention may be best understood from a study of the drawings and the subjoined description thereof.

In the drawings:—

Figure 1 is a sectional elevation showing one of the helical wire extension spring sounders, the sounding boards and sound boxes, one of the friction wheels, and actuating mechanism.

Figure 2 is a diagrammatic view to show the effect of the friction wheel upon the spring sounder, while engaged.

Figure 3 is a fragmentary view of the drive roller and friction wheels at right angles to Figure 1, the point of view being between the spring sounders and the action behind friction wheels.

In the figures;—The reference numeral 1, represents one of the blocks secured to the perpendicular sound board 2, and having on, or as a part of it, the nut 3, the hook 4, to which one end of the spring sounder 5 may be attached, and the sign post 6.

The blocks with the parts above mentioned, are designed to have the function of transmitting the vibrations from the springs 5 to the sound board 2 and are placed at different points on the sound board, to correspond with the lengths of their respective springs to form a chromatic scale. By properly placing these blocks, the spring sounders need no tuning after being attached.

The perpendicular sound board 2, extends across the entire upper part of the instrument, and constitutes a support for the sound box 7, sound board 2, at each end engages the horizontal sound board 8, which also extends across the entire length of the instrument, thereby forming an inverted T shaped sound board. 9 is an aperture between sound board 2, and sound board 8. The end-brackets 10, are designed to serve as end blocks for the lower sound box 11 as well as for holding sound box 7 and sound board 2, in a rigid position with sound board 8. Sound box 7, is provided with an aperture 12, in its back, otherwise, is without apertures. Aperture 12 is of truncated wedge shape, and extends nearly the whole length of the box. It may be about two inches at one end and about one-half inch at the other.

Reference numeral 13, represents one of the standards or end supports for the entire instrument.

The tail pieces 14 of which there is one for each of the spring sounders 5, are placed on sound board 8 over base bar 15. Screw hook 16, on the tail piece 14 is to hold the end of the spring sounder at that point.

Sound box 11, is formed by curved back board 17, mounted upon end brackets 10, and joined to sound board 8. Sound box 11, is provided with an aperture 18, nearly its full length.

End plates 19, one at each end, hold the actuating mechanism together.

The friction wheel 20 is moved to and from spring sounder 5 by a fork 21 attached to a flat spring 22 secured to base rail 23. The friction wheel is held by its trunnion engaging slots 24, in the fork 21. When it is desired to remove a friction wheel, the fork is raised until the slots 24 free the trunnions and the wheel is then taken out and replaced as desired. This may be accomplished without deranging any of the other wheels.

The flat spring 22, in the form of an L, holds the friction wheel in a tensioned contact upon the drive roller 25, which extends the full length of the action, and is provided with grooves 26, to guide friction wheels.

Spring 22 serves also as a connection between the fork and the pneumatic 27 by means of the adjustable prolong wire 28.

When the pneumatic chamber 29 is inflated, the pneumatic 27 collapses, and by means of the adjustable prolong wire 28, the spring 22 and the fork 21, are thrust forward, forcing thereby the revolving friction wheel 20 against the spring sounder 5, as shown particularly in Figure 2.

The continuous rotation of the drive roller 25, in the direction indicated by the arrow, revolves the friction wheel 20, in the opposite direction, as indicated by the arrow in Fig. 2. The friction wheel 20, parallel to spring sounder 5, has a friction band 30, of a composition which grasps the coils of the spring 5, as shown in Fig. 2. By the continuous revolving of friction wheel 20, the coils of spring sounder 5, are grasped and released in quick succession, thus setting up a longitudinal vibration along the entire length of spring sounder 5. The cushion wheel 31, gives flexibility to friction band 30, allowing same to seat itself securely upon the drive roller 25, and acts also as an absorbent to any over vibration from the sounder.

By this means, the coils are not forced away from the grasp, until the cushion has compressed it the required amount, then the spring between the cushion wheel and the tail piece, extends as shown in Figure 2, until the tension therebetween becomes great enough to cause the spring to break away from the cushion wheel and retract to its normal position. By this means, the entire flexible spring between the tail piece 14 and the nodal rest 6, is pulsated in a longitudinal manner.

An adjustable check nut or distance button 32 is provided on the threaded prolong wire 33 of fork 21 and acts as a stop against the extension rail 34, by means of slots therein. A block 35 is fastened on the end plate 19 and acts as a rest for the bearing 36, and the guide rail 37, which extends across the action, and is fitted with a number of pins 38, that act as guides for the forks 21. A boring 39 through the pneumatic 27 and its chest 29 permits the free passage of the air to and from the interior of the pneumatic during operation. The adjustable prolong wire 28 extends through the hole 39. In the lower part of the pneumatic chest, is a boring 40, which acts as a conductor between the chest and the primary action, (not shown).

Having thus described our invention, and an embodiment of it, in the full, clear and exact terms required by law, and knowing that it comprises novel, useful and valuable improvements in the art to which it pertains, we here state that we do not wish to be limited to the precise construction and arrangement of the several parts, as herein set forth, as the same may be variously mod-

ified by a skilled mechanic without departing from the spirit of the invention.

What we claim and desire to secure by Letters Patent of the United States, is the following, to wit:—

1. In a musical instrument, the combination with helical wire extension spring sounders, of a cushion wheel parallel with each sounder, said cushion wheel consisting of a hub with trunnions, a band of friction composition upon said wheel, and drive roller for revolving said wheel.

2. In a musical instrument, the combination with helical wire extension spring sounders, of friction wheels, and a drive roller for revolving said wheels, said drive roller provided with grooves to guide said friction wheels.

3. In a musical instrument, the combination with helical wire extension spring sounders, of a drive roller, friction wheels having trunnions, and removable means for holding friction wheels in position upon said drive roller, said means comprising forks, provided with slots, said slots engaging trunnions.

4. In a musical instrument, the combination with helical wire extension spring sounders, of a drive roller, friction wheels, forks for holding friction wheels, and means for moving said wheels toward and from spring sounders, said means comprising flat springs secured at one end to base, and at the other to forks, and pneumatics engaging said springs.

5. In a musical instrument, the combination with helical wire extension spring sounders, of a grooved drive roller, friction wheels, and means for adjusting movements of friction wheels toward spring sounders, said means comprising threaded prolong wires secured to forks, and provided with distance buttons, said prolong wires engaging a slotted rail which acts as a guide for prolong wires, and bumper for distance buttons.

6. In a musical instrument, the combination with helical extension spring sounders, of a grooved drive roller, friction wheels, forks for holding friction wheels, and means for guiding said forks, said means comprising a rail provided with pins which hold forks in position.

7. In a musical instrument, the combination with helical wire extension spring sounders, of a drive roller, friction wheels, forks with slots engaging trunnions of friction wheels, and means for forming a tension between friction wheels and drive roller, said means comprising flat springs in the form of an L secured at one end to base and the L to fork.

8. In a musical instrument, helical wire extension springs to act as sounders, in combination with means to vibrate said springs

in a longitudinal manner, said means consisting of a frictional material engaging and bowing said springs, in a parallel manner.

9. In a musical instrument, helical wire
5 extension spring sounders, provided at each end with a separate sound board and sound box, in combination with means for vibrating said sounders in a longitudinal manner, said means consisting of wheels with a band

of frictional material upon said wheels, engaging and bowing said sounders in a parallel manner.

In testimony that we claim the foregoing we have hereto set our hands this 11th day of June, 1921.

HARRY L. BOYNTON.
ELSIE M. BOYNTON.