

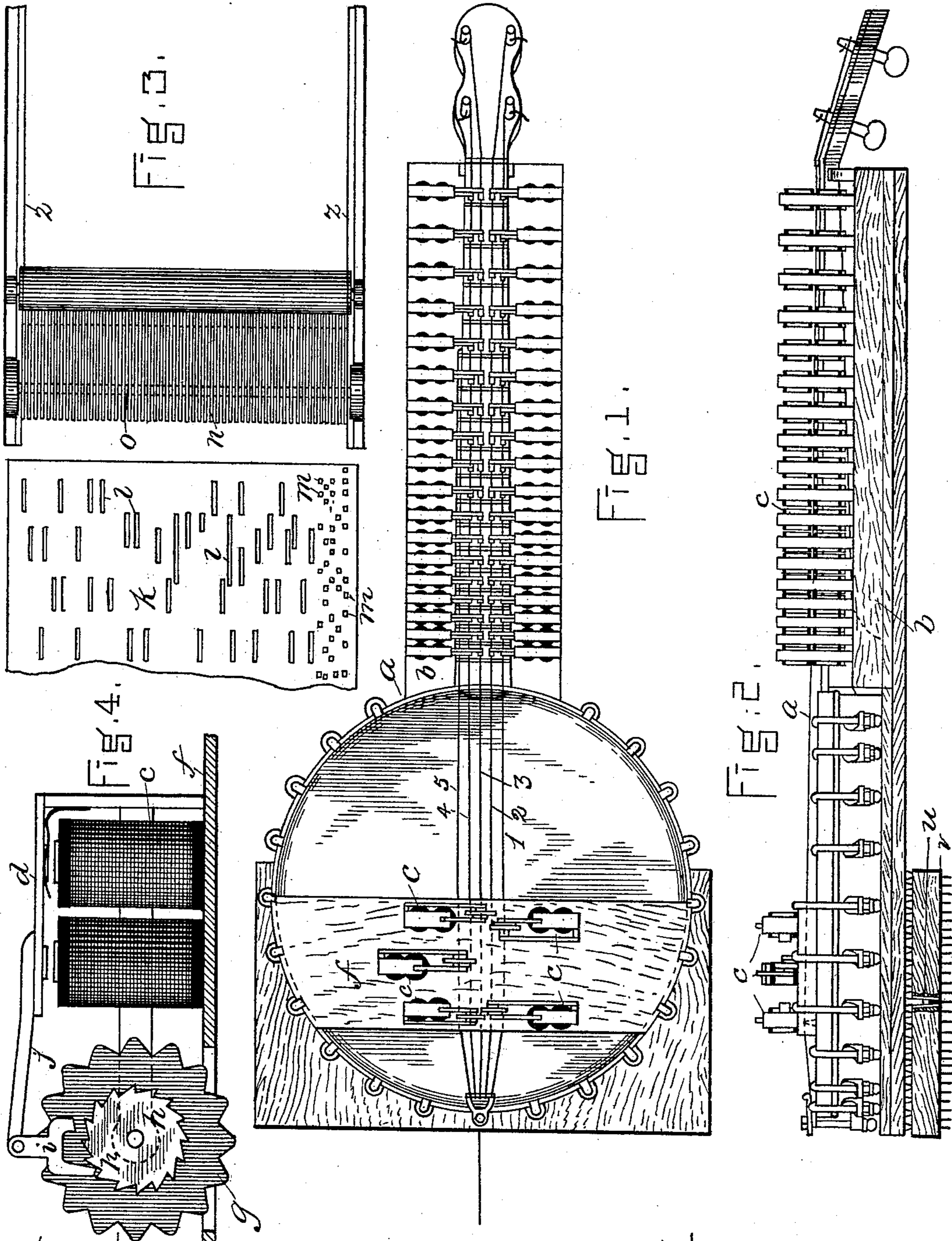
(No Model.)

2 Sheets—Sheet 1.

W. H. GILMAN.  
ELECTRICALLY OPERATED STRINGED MUSICAL INSTRUMENT.

No. 488,520.

Patented Dec. 20, 1892.



WITNESSES.

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Edmundson

INVENTOR.

W. H. Gilman.  
by  
Might, Brown & Horsley.  
ATTYS.

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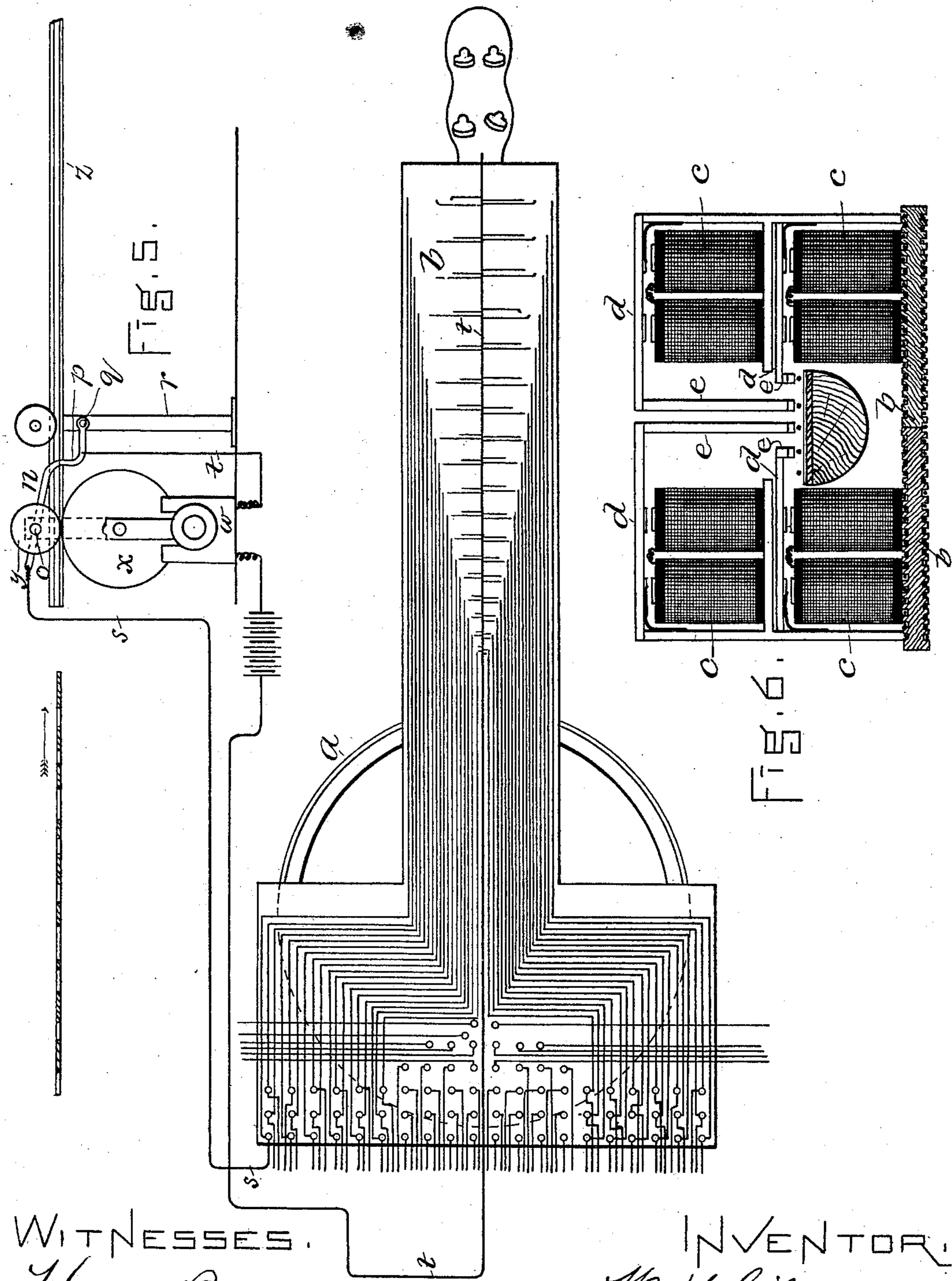
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*Horace Brown*  
*J. H. Macdonald*

INVENTOR.  
*W. H. Gilman*  
by  
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Attys

# UNITED STATES PATENT OFFICE.

WILLARD H. GILMAN, OF BOSTON, MASSACHUSETTS.

ELECTRICALLY-OPERATED STRINGED MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 488,520, dated December 20, 1892.

Application filed March 9, 1892. Serial No. 424,253. (No model.)

*To all whom it may concern:*

Be it known that I, WILLARD H. GILMAN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Electrically-Operated Stringed Musical Instruments, of which the following is a specification.

It is the object of my invention to provide means, capable of being electrically operated whereby tunes may be mechanically played upon a banjo, mandolin, guitar, harp, or other similar stringed instrument.

My invention consists of movable fingers arranged over the strings of the instrument at the frets, which fingers are adapted upon the closing of an electric circuit, to be depressed upon the strings change the vibrating lengths of the strings in order to change the tone.

The invention also consists of means, as star wheels, arranged in proximity to the strings, which wheels are adapted to be moved, upon the closing of an electric circuit, to "pick" the strings and sound notes.

The invention also consists of improvements incidental to the foregoing, as is hereinafter fully described and claimed.

Reference is to be had to the annexed drawings and the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings: Figure 1, is a plan view of my invention. Fig. 2, is a side elevation of the same, a small part being shown in section. Fig. 3, is a plan view of a piece or a sheet of "music" and the means which act directly upon the music sheet. Fig. 4, is a side view, partly in section, showing the means for picking the strings. Fig. 5, is a diagram illustrating a way of forming the electric circuits to actuate the means for picking the strings and depressing the same at the frets. Fig. 6, is a sectional end view of the means for depressing the strings at the frets.

In the drawings: *a* designates a banjo, though it might as well represent a guitar, mandolin, or other stringed instrument, of ordinary construction, and which is arranged upon a suitable frame or base board *b* of wood, or other material.

*c* designates electro magnets arranged along

on opposite sides of the neck of the banjo opposite the several frets, there being in the present instance two electro magnets, one placed above the other on each side of each fret.

*d* designates the armatures of the electro magnets upon the inner free ends of which is a downwardly extending finger *e* arranged directly over a string, as shown in Fig. 6. The finger *e* on the lower electro magnet on one side is arranged over the string 1; the finger of the magnet thereabove over the string 2; the finger of the lower magnet on the opposite side over the string 4; and the finger of the magnet above that last mentioned, over the string 3.

In Figs. 1 and 2, I have shown electro magnets arranged upon a plate or board *f* supported over the head of the banjo, there being five electro magnets in this instance, one for each string of the instrument.

*g* designates a star wheel supported in suitable bearings, there being one such star wheel to each magnet on the board *f* and to each string of the instrument; and each star wheel is so constructed and arranged as that when it is turned to the extent of one of the teeth formed on the periphery thereof, it will pick the string which it is intended to sound.

*h* is a ratchet wheel connected with the star wheel *g*, and arranged to be actuated by a pawl or dog *i*, connected with an arm *j* attached to the armature of the electro magnet, arranged upon the board, all as is most clearly represented in Fig. 4. It will be understood, of course, that there is a ratchet wheel *h* connected with each star wheel *g*.

*k* designates a sheet of fiber board or fiber paper, or other non-conducting material, provided with slotted apertures *l* throughout the major portion of its breadth, and small holes *m* upon one side thereof.

*n* designates a series of fingers pivoted upon a bar or other suitable support *o*, the free ends of said fingers being arranged to drop down into contact with a series of fingers *p* secured upon a bar *q*, extending between standards *r*. Connected with the fingers *n* and *p* are wires *s* *t* of an electric circuit, so arranged as that the circuit may be closed when the finger *n* rests upon the finger *p*, and be broken when said finger *n* is raised from the finger *p*. From each fin-

ger  $n$  its wire  $s$  extends to a thimble  $u$  which projects through the baseboard  $v$  under the head of the banjo, and said thimble is in electrical connection with a wire which extends to one of the electro magnets on opposite sides of the neck of the instrument. The return wire, which is in electrical connection with each magnet, is the wire  $t$ , which, as before stated is connected with each of the fingers  $n$ .

The wires from certain of the fingers  $n$  (in the present instance the lower five fingers  $n$  shown in Fig. 3) extend to the electro magnets on the plate  $f$ , said magnets being also in electrical connection with the return wire  $t$ .

$w$  designates what may be regarded as an electric motor which is adapted to rotate a roll  $x$ , upon which is placed a roll  $y$ .

$z$  are guideways, arranged on a line coincident with the bight between the rolls  $x$   $y$  and having a construction suited to guide the edges of the music sheet  $k$  as it may be passed forward from between the rolls  $x$   $y$ .

Another roll or rod may be placed in suitable position beyond the rolls  $x$   $y$  to keep the sheet down in position in the guideways.

The use of my invention may be described as follows:—Supposing a sheet  $k$  of music to be placed in the guideways  $z$ , entered between the rolls  $x$   $y$ , and the motor to have been set in operation, as the sheet is passed forward in the direction of the arrow, Fig. 5, the free ends of the fingers  $n$  falling within the lines of slots  $l$  will drop through the said slots into contact with the opposite fingers  $p$ , closing the circuit through the said fingers, energizing the electro magnet in said circuit, with the effect of attracting its armature  $d$  and depressing a string at a fret on the neck of the instrument by the descent of the finger  $e$  thereon; and as the free ends of the five fingers represented on the lower side of Fig. 3, meet and drop through the holes  $m$  of the sheet  $k$ , they will in like manner effect the closing of electric circuits therethrough, resulting in the energizing of the magnets on the board or plate  $f$ , and the turning of the star wheels  $g$  to the extent of one tooth, through the medium of the ratchet wheels  $h$ , dog  $i$ , arm  $j$  and armature of the electro magnet, and picking the strings. In this way it will be seen that a sheet of music  $k$  may be prepared so as to close the frets and pick the strings of a stringed musical instrument with absolute correctness.

I will not herein attempt to explain all of the ways in which I have contemplated effecting the energizing of the electro magnets to close the strings at the frets and to pick the said strings, nor do I think it necessary to describe the various constructions or arrangement of means which I may employ, as it is obvious that these may be altered or changed without departing from the nature or spirit of my invention.

Having thus explained the nature of my invention, and described a way of construct-

ing and using the same, I declare that what I claim is:—

1. A stringed musical instrument, comprising in its construction movable fingers arranged over the strings at the frets, which fingers are adapted to be depressed upon the strings to close the frets, a picking device for picking the strings, said fingers and picking device being embraced within an electric circuit, as described.

2. A stringed musical instrument, comprising in its construction movable fingers arranged over the strings at the frets, which fingers are embraced within an electric circuit, whereby by the closing and breaking of the circuit the fingers may be depressed upon the strings, and be freed therefrom, as described.

3. A stringed musical instrument, comprising in its construction a star wheel arranged in juxtaposition to the strings, an electro magnet and its armature, and actuating mechanism intermediate of the armature and star wheel for moving the latter, as described.

4. A stringed musical instrument, comprising in its construction movable fingers arranged over the strings at the frets for closing the strings at the frets, and movable star wheels arranged over the strings at the head of the instrument, for picking the strings, as described.

5. The combination, with a musical instrument and its strings, of an electro magnet, its armature, and a string-depressing finger connected with the armature and arranged over the string, as described.

6. The combination, with a musical instrument and its strings, of a star wheel arranged in proximity to a string so as to pick the same, a ratchet wheel connected with the star wheel, an electro magnet and its armature, and a dog or pawl connected with the armature and adapted to engage and actuate the ratchet wheel, as set forth.

7. The combination with the fingers  $p$  and the pivoted fingers  $n$ , both within an electric circuit and means, as rolls, for passing a perforated sheet between the free ends of the fingers, of the strings of a stringed musical instrument, fingers for depressing the strings at the frets, a picking device for picking the strings, and operating means for the fingers and picking device in electrical connection with the fingers  $n$ , as described.

8. A banjo provided with movable fingers for depressing the strings at the frets, and means, as a movable star wheel, for picking the strings at the head, as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 1st day of March, A. D. 1892.

WILLARD H. GILMAN.

Witnesses:

ARTHUR W. CROSSLEY,  
HORACE BROWN.