No. 814,541. PATENTED MAR. 6, 1906.

C. W. HOGGARD.

DEVICE FOR TESTING STRINGS FOR MUSICAL INSTRUMENTS.

APPLICATION FILED JULY 31, 1905.

2 SHEETS—SHEET 1.

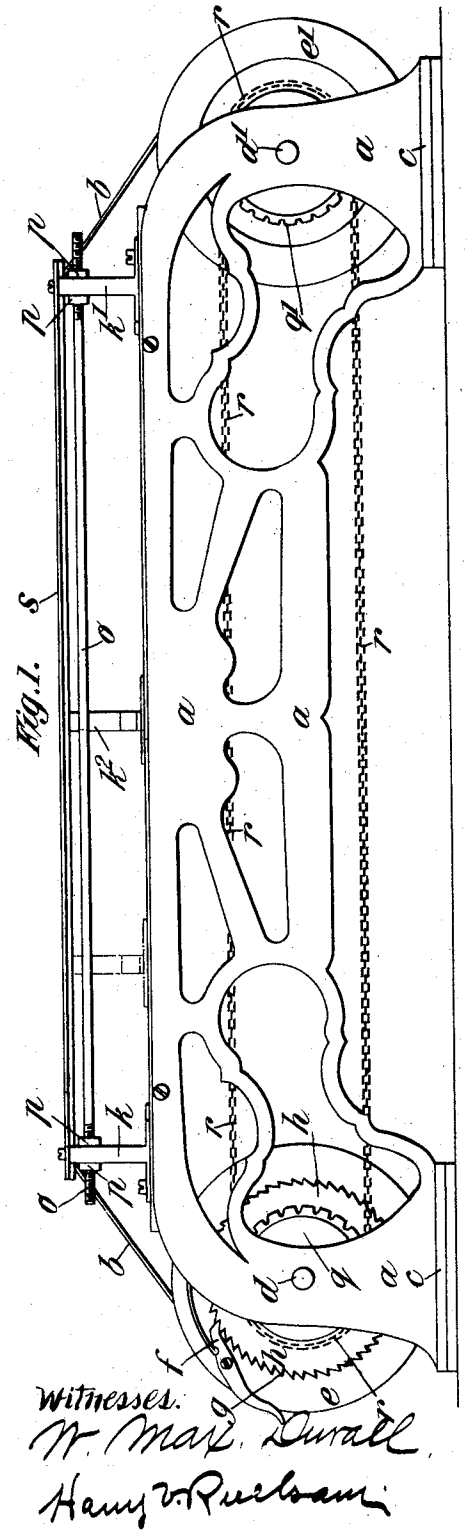

Fig. 1.

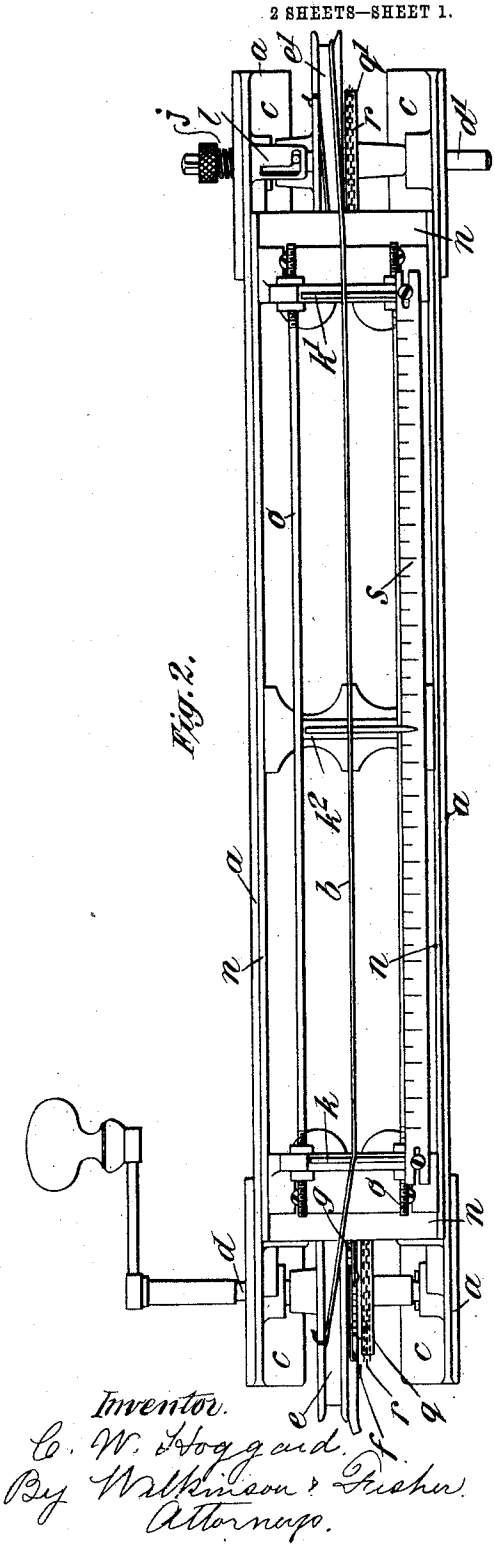

Fig. 2.

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Fig. 3.

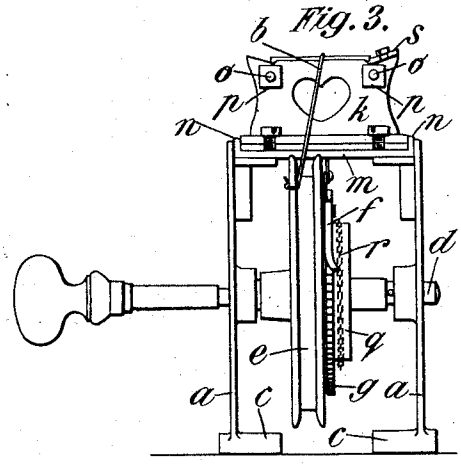
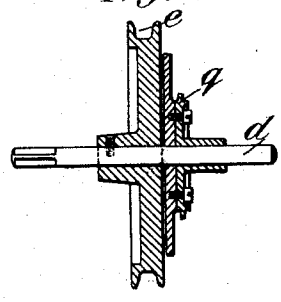


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES WILLIAM HOGGARD, OF PLUMSTEAD, ENGLAND.

DEVICE FOR TESTING STRINGS FOR MUSICAL INSTRUMENTS.

No. 814,541. Specification of Letters Patent. Patented March 6, 1906.

Application filed July 31, 1905. Serial No. 272,032.

To all whom it may concern:

Be it known that I, CHARLES WILLIAM HOGGARD, L. R. A. M., a subject of the King of Great Britain, and a resident of 37 Herbert road, Plumstead, in the county of Kent, England, have invented a new and useful Device for Testing Strings for Musical Instruments, of which the following is a specification.

My invention relates to an improved device for testing the uniformity of gut strings for violins, violoncellos, violas, and like instruments, for which it is important that such strings should be of uniform thickness and quality from end to end of the stretched part; and the objects of my improvements are to test the strings by means of sounds produced by the vibration of different parts of the stretched string itself, so that to a sensitive ear any imperfection caused by varying thickness and character of different parts of the string can be at once detected, the length of string having such imperfect parts being rejected. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of the entire string-testing device. Fig. 2 is a top view, Fig. 3 an end view, and Fig. 4 shows separately an end view of one of the stretching-pulleys.

Similar letters refer to similar parts throughout the several views.

a is a rigid frame consisting of two side plates connected by stays of sufficient length for the string *b*, which is to be tested, and made of light metal, such as aluminium.

c c are feet or supports upon which the frame *a* is carried, and *d d'* are transverse parallel spindles revolving in bearings near the ends of the frame, and *e e'* are pulleys fixed upon the spindles *d d'* between the sides of the frame *a* and of considerable diameter and flat transversely or slightly concave at their outer edge, round which the string *b* to be tested can be readily wound, the part to be tested being stretched between the two pulleys *e e'*. One of the pulleys *e* is fixed upon its spindle, and *f* is a pawl pivoted to one of its sides and near its edge and engaging with the angular ratchet-shaped teeth *g* of a wheel *h*, which turns freely upon the spindle against the side of the pulley *e*, and the ratchet-teeth *g* are numerous and small, so that the pulley *e* can be readily turned round to wind up and tighten the string *b* to any desired extent, the string passing from the upper part of the pulley *e* to the corresponding part of the second pulley *e'*, (fixed on the spindle *d'*,) round which it is wound and fastened and which must be held firmly to prevent it from turning. This second pulley *e'* is fixed in any position by a movable stop sliding in a guide *l* on the frame *a*, so that its end can be introduced into or withdrawn (by a spring *j*) from any one of a series of holes in the side of the pulley *e'*, so that when withdrawn it is held back by a pin fitting in a bayonet-joint in the guide *l*, while when released the pulley is held firmly and prevented from revolving. When the pulley *e'* is being held fast, as described, and the pulley *e* is turned round, it is evident that the string *b* can be stretched between the two pulleys to any desired extent and then held fast. The string *b* to be tested is not, however, stretched directly between the two pulleys *e e'*, but on its way between them passes over the upper transverse edges of two bridges *k k'*, firmly but adjustably fixed near the pulleys *e e'*, round which the string passes, but at a short distance above them, so that the string rises somewhat above the peripheries of the pulleys to the bridges *k k'* and is then stretched over and between the latter in a straight line.

m is a transverse frame having longitudinal flanges *n*, by which the upper edges of the side frames *a* are stayed firmly together, and the supports upon which the bridges *k k'* are carried are fixed upon the upper surface of brackets upon the inside of the side frames *a* by screws which pass through the frame *m* and are screwed into the brackets. The holes for the screws through the supports of the bridges are elongated, so that a certain amount of longitudinal adjustment of the bridge-supports is possible.

The upper inner edges of the flanges *n* of the plate *m* have formed upon them from end to end dovetailed-shaped grooves, made as true as possible, in which slides accurately the base of the support of a third carefully-formed bridge k^2, (which may be made adjustable in height,) which can therefore be moved from end to end directly but with sufficient friction under the stretched string *b*, which touches it lightly.

The lateral edges of the bottom of the adjustably-fixed supports for the bridges *k k'* fit in the ends of the dovetailed grooves, and they are connected and stayed firmly together by strong rods or bars *o*, extending be-

tween them and fixed by nuts *p* upon their screwed ends, which are screwed up when the exact position of the bridges *k k'* has been determined.

Upon the corresponding side of both the pulleys *e* and *e'* is fixed a toothed chain-wheel *q q'* of equal size round which is passed an endless metal chain *r*, gearing with the teeth, so that when one of the pulleys is turned round (the pulley *e'* being set free by the withdrawal of the movable stop from the hole in which it has been engaged) the two pulleys revolve together without affecting the tension of the string *b*, stretched between them, and a fresh part of the latter can be subject to test between the two bridges *k k'*. At the same time the independent turning round of the separate outer part of the pulley *e* for the purpose of stretching the string is not prevented, and when turned to the proper pitch the outer part of the pulley *e* is prevented from turning back by the spring-pawl *f*.

Both pulleys and the string can be retained in the position attained by the stop at *l* in the side of the second pulley *e'*. When the pawl is released, the tested string can be taken off the pulleys.

The exact position of the movable central bridge in relation to the two end ones can be exactly determined by means of graduated marks upon a scale *s* or the like upon the guide fixed upon the supports of the bridges *k k'*, and a corresponding mark or pointer on the movable bridge k^2, so that the stretched string may be divided to give any desired musical interval between its two parts.

The operation of the apparatus is as follows: The string *b*—a violin-string, for instance—which is to be tested is wound and fastened upon the two pulleys or drums *e e'* and is then tightened to the degree required by turning the separate outer part of the pulley *e*, the tension being retained by the spring-pawl *f* and the part of the string between the bridges *k* and *k'* being equal to the length of the stretched string of an ordinary violin. The central bridge k^2 is then moved along the guides in which it moves until the two parts of the string *b* are either exactly equal or are divided into the exact proportion to give definite relative musical tones with the exact intervals when sounded, the precise position of the central bridge k^2 being accurately indicated upon the scale *s*. If after the position has been fixed the two parts are sounded, the notes produced should have an exact relation to each other, (determined by the ear,) and if they do not show this exact relation it is obvious that there must be a defect in the thickness or character of one or other part, and the string so tested is useless for the production of perfect intonation when playing. Any part of the string can be quickly and easily tested in the way described by turning round the two pulleys upon which it is wound and which are connected together so that they move simultaneously, as by the chain-wheels and chain described. At the same time the string can be stretched to any desired extent by means of the separate part of the pulley *e*, round which it is wound.

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

1. In a device for testing the strings of musical instruments, the combination of a supporting-frame, bridges thereon over which the string to be tested is adapted to be stretched to the desired tension coöperating means for stretching said string and moving said string along said frame without varying the tension thereof, substantially as described.

2. In a device for testing the strings of musical instruments, the combination of a supporting-frame, adjustable bridges supported thereby, a scale on the top of said frame, a movable bridge between said adjustable bridges, coöperating means for stretching the string to be tested to the desired tension and moving a new portion of the string along said bridges without varying the tension of said string, substantially as described.

3. In a device for testing the strings of musical instruments, the combination of a supporting-frame, pulleys to which the ends of the string to be tested are attached, a movable part operatively associated with one of said pulleys, whereby the string to be tested may be stretched to and held at the desired tension, a movable stop for limiting the motion of the other pulley, and means for causing said pulleys to move simultaneously, substantially as described.

4. In a device for testing the strings of musical instruments, the combination of a supporting-frame having two parts provided with longitudinal guides on their upper edges, transverse spindles, pulleys for supporting and moving the string to be tested mounted on said pulleys, adjustably-fixed transverse bridges located near the ends of said frame, stays connecting said bridges, a movable bridge sliding in the guides of said frame, and means for connecting said pulleys together so that they will revolve simultaneously, substantially as described.

5. In a device for testing the strings of musical instruments, the combination of a supporting-frame over which the string to be tested is adapted to be stretched, pulleys to which the ends of said string are attached, a movable part operatively associated with one of said pulleys, whereby the tension of the string may be varied, a movable spring-stop adapted to engage the other of said pulleys, and means for connecting said pulleys together so that they will move simultaneously, substantially as described.

6. In a device for testing the strings of musical instruments, the combination of a

frame, a pulley mounted at one end of said frame, and a second pulley mounted at the opposite end of said frame, said pulleys being adapted to receive the ends of the string to be tested, a ratchet-wheel adjacent said first pulley, a spring-pawl carried by said first pulley coöperating with said ratchet-wheel, a spring-operated stop for said second pulley, and means operatively connecting said second pulley with said ratchet-wheel, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

CHARLES WILLIAM HOGGARD.

Witnesses:
ARTHUR E. EDWARDS,
ALFRED T. BRATTON.