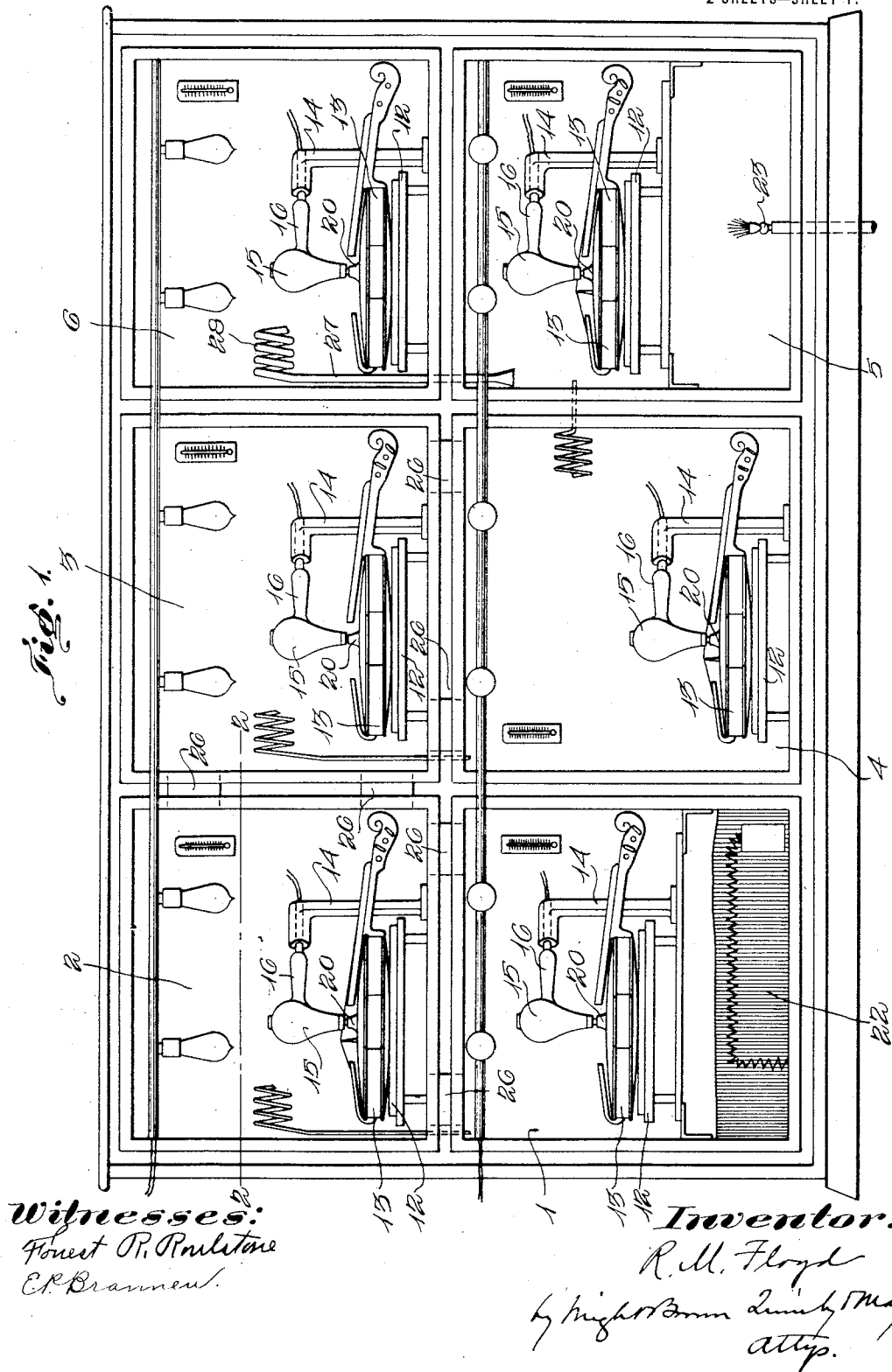


# METHOD OF AND MEANS FOR INCREASING THE RESONANCE OF SOUND MODIFYING WOODEN BODIES.

Patented Sept. 5, 1916.

2 SHEETS—SHEET 1.



R. M. FLOYD.  
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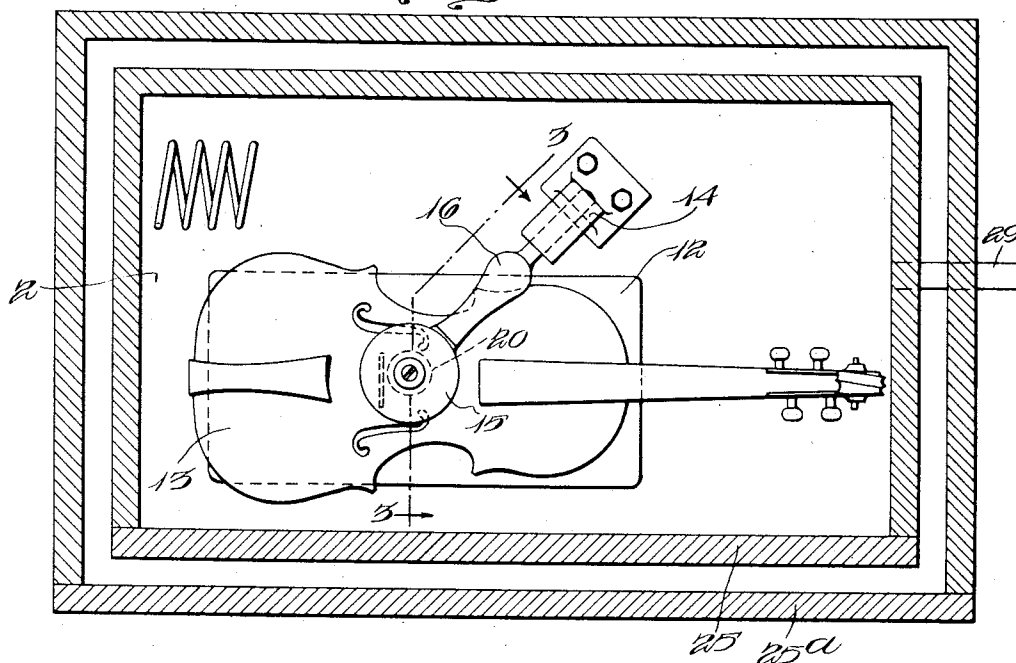
1,197,116.

APPLICATION FILED JUNE 8, 1915.

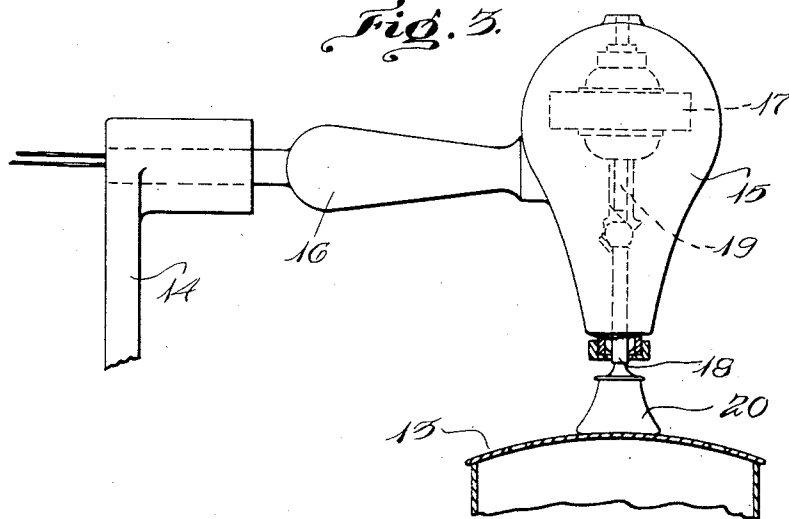
Patented Sept. 5, 1916.

2 SHEETS—SHEET 2.

*Fig. 2.*



*Fig. 3.*



*Witnesses:*

*Ernest A. Telfer*  
*Forest R. Roulstone*

*Inventor*

*R. M. Floyd*  
*by Mifflin Brown Quincy May*  
*Attys.*

# UNITED STATES PATENT OFFICE.

ROSCOE MARRINER FLOYD, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO BOSTON CONSERVATORY OF MUSIC AND COLLEGE OF ORATORY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

METHOD OF AND MEANS FOR INCREASING THE RESONANCE OF SOUND-MODIFYING WOODEN BODIES.

1,197,116.

Specification of Letters Patent.

Patented Sept. 5, 1916.

Application filed June 8, 1915. Serial No. 32,990.

*To all whom it may concern:*

Be it known that I, ROSCOE MARRINER FLOYD, a citizen of the United States, and resident of Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Methods of and Means for Increasing the Resonance of Sound-Modifying Wooden Bodies, of which the following is a specification.

It is well known that long continued vibration of a resonant body is a very important factor in securing and maintaining the resonance required to clarify and improve the tone of a musical instrument of which the body forms a part, and that a marked deterioration of the tone due to absence of vibration when a fine instrument is infrequently used, or has been disused for a considerable period, is at once detected by an expert.

It has been proposed to indirectly vibrate a violin body to improve its tone-modifying action by a long continued mechanical bowing of the strings, the vibrations being imparted from the strings to the body through the usual connections between the strings and body. This method is open to at least two objections, one of which is its indirectness and the length of time required to produce an appreciable result, and the other is the wear of the strings by the mechanical bow.

The invention has for its object to obviate these objections by making provision for the rapid improvement of the resonance qualities of a mechanical instrument, by means of vibrations applied to the body of the instrument, without injury to the strings, and, if desired while the strings are absent.

The invention also has for its object to utilize conjointly mechanical vibration and thermal action in improving the tone-modifying effect of a violin body or the like, by subjecting the same successively to different temperatures ranging from a relatively low to a relatively high temperature while it is being mechanically vibrated.

The invention consists in the hereinafter described improvements in method and apparatus for improving the tone-modifying action of resonant wooden bodies, such as the bodies of violins and violoncellos, or body

members thereof, such as the unassembled tops and backs, or other bodies, such as sounding boards of pianofortes.

Of the accompanying drawings forming a part of this specification: Figure 1 represents a side view of an apparatus comprising a plurality of compartments, each adapted to contain a violin and each provided with mechanical means for vibrating the violin body in accordance with my invention; Fig. 2 represents a section on line 2—2 of Fig. 1, and a plan view of the parts below said line; Fig. 3 represents a section on line 3—3 of Fig. 2.

The same reference characters indicate the same or similar parts in all the views.

I will first describe one of the compartments shown by Fig. 1 and the contents thereof. The said compartment, which may be the compartment 2 shown by Fig. 1, is provided with a rest or support 12, which is preferably a horizontal table and is adapted to support a violin body 13. 14 represents a fixed bracket or standard within the compartment 2, said standard constituting a part of the means employed for presenting a rapidly moving applicator to the top of the violin body 13. In the drawing the applicator 20 is illustrated as attached to a shaft 18, the upper end of which is eccentrically connected with the drive shaft 19, of an electric motor 17, said motor, and the shafts 18 and 19, being located within a casing 15, having an arm 16 rigidly secured to the bracket 14. By reason of the eccentric connection between the shafts 18 and 19, said shaft 18 receives a gyratory motion, which motion is communicated to the applicator 20. The mechanism thus described and illustrated in Fig. 3, is but one of many types of such devices, numerous instances of which will be found in Class 128 of the *Manual of Classification of Subjects of Inventions of the United States Patent Office*, sub-class 16, Movement cure. The applicator 20, which may be cup-shaped and of rubber vulcanized so that it is somewhat yielding, is attached to the outer end of the shaft 18 and is rapidly oscillated thereby, said applicator being held by the said supporting means in direct contact with the top of the violin body 13.

The applicator 20 and the means for im-

PELLING it are of common and well-known construction in so-called massaging apparatus. I have selected this form of applicator as suitable for my purpose, and I do not specifically claim the said applicator nor the means for impelling it. Neither do I limit myself to this form of applicator and impelling means in the carrying out of my invention.

The violin body being in place on the support 12 and the applicator applied thereto, the motor 17 is driven to move the applicator with great rapidity and impart thereto several thousand vibrations per minute. The number of vibrations per minute may be varied, the preferred minimum being ten thousand and the preferred maximum eighty thousand vibrations per minute.

I have found that by subjecting the violin body to the action of the applicator 20 for a considerable length of time, say a week, the resonance of the violin body is increased and a quality imparted thereto equal to that which would be imparted by many years of practically constant playing on the strings with a bow.

The direct application of a rapidly moving applicator to the body 13 permits the amplitude of the vibrations imparted thereto and the frequency of said vibrations to be varied as may be desired, these being results which are not possible when the body is vibrated by a mechanical bow through the strings of the instrument.

In further carrying out my invention I prefer to utilize thermal action conjointly with vibration, and to this end I provide a cabinet having a plurality of compartments, such as the compartments 1, 2, 3, 4, 5 and 6 represented by Fig. 1, each compartment containing a support 12 and an applicator 20.

The compartment 1 is provided with refrigerating means indicated more or less diagrammatically at 22. In this compartment I propose to maintain a temperature at or below freezing. The compartment 2 may be kept at a somewhat higher although relatively low temperature by radiation from the compartment 1. The compartments 3 and 4 are maintained at successively higher temperatures than the compartments 1 and 2, the temperature of the compartment 4 being preferably maintained below sixty degrees, while the temperature in the compartment 3 is preferably maintained at a lower degree.

The compartment 5 is artificially heated by means of a burner or other heater 23, and may be maintained at a temperature of approximately one hundred and thirty-two degrees Fahrenheit. The compartment 6 may be maintained at a lower degree than the compartment 5, but at a higher degree than the compartment 4.

I find that by vibrating resonant wood in

the presence of air or other gaseous fluid at different temperatures ranging from below freezing to approximately one hundred degrees above freezing the fibers are freed from resinous substances and left free to respond, in the case of a violin, to the slightest touch of the bow upon the strings.

Each of the described compartments may have double walls, as indicated by Figs. 1 and 2, to form non-conducting air spaces around them, and each compartment may be closed hermetically or otherwise by a removable front or door 25, or by two doors 25, 25<sup>a</sup>, as shown by Fig. 2. Each compartment may be charged with a gaseous fluid or mixture other than atmospheric air; for example, each or any compartment may be charged with ozone, which I believe would be of some assistance in arriving at the results aimed at.

Any suitable means may be employed for modifying the temperature of the compartments 2, 3 and 4 by the temperature of the compartment 1. For example, said compartments may be connected by flues or passages 26 of relatively large capacity, and adapted to conduct cold air from the compartment 1 to the compartment 2, from the compartment 2 to the compartment 3, and from the compartment 3 to the compartment 4. The compartment 6 may receive relatively warm air from the compartment 5 through a tubular conduit 27 having a coiled portion 28.

The air or other gaseous fluid may be maintained at a pressure differing from that of atmospheric air and may be rarefied by exhausting the air to produce a partial vacuum, or may be compressed above the pressure of the atmosphere.

In Fig. 2, a conduit 29 is shown, which may be connected either with an air exhausting device, or an air compressing pump, not shown.

I have found that by rarefying the air to a pressure of approximately two pounds, the effect of the mechanical vibration is materially improved.

While I prefer to embody the apparatus in the form of a cabinet as shown, I do not limit myself thereto, and may support the resonant wooden body in the open air. It is also obvious that the apparatus may be embodied in a cabinet having but one compartment.

Having described my invention, I claim:

1. The method of improving the resonance of wooden bodies which consists in imparting rapid vibrations directly to the said body by massaging a portion of the surface thereof.

2. The method of improving the resonance of wooden bodies which consists in placing the body within a closed chamber filled with a gaseous fluid maintained at a desired fixed

temperature, and imparting rapid vibrations to said body by massaging a portion of the surface thereof.

5 3. The method of improving the resonance of a resonant wooden body, which consists in imparting rapid vibrations directly to said body in the presence of a gaseous fluid, the pressure of which is different from that of the atmosphere.

10 4. The method of improving the resonance of a resonant wooden body, which consists in imparting rapid vibrations directly to said body in the presence of a rarefied gaseous fluid.

15 5. The method of improving the resonance of a resonant wooden body, which consists in imparting rapid vibrations directly to said body in the presence of a gaseous fluid, and successively varying the temperature of said fluid from a relatively low to a relatively high degree.

20 6. An apparatus for improving the resonance of a resonant wooden body, comprising a support for said body, a motor, an applicator, means for imparting a rapid vibration to said applicator, and means for ap-

plying the applicator in direct contact at a fixed position with the supported body to vibrate said body by the massaging action imparted to the body by the applicator. 30

7. An apparatus for improving the resonance of a resonant wooden body, comprising a plurality of compartments, and means for maintaining progressively different degrees of temperature in said compartments, each compartment being provided with a body support, and means for vibrating said wooden body. 35

8. An apparatus for improving the resonance of a resonant wooden body, comprising a compartment adapted to be closed, a body support, means in said compartment for vibrating said wooden body, and means for controlling the pressure of a gaseous fluid in said compartment. 40

In testimony whereof I have affixed my signature, in presence of two witnesses. 45

ROSCOE MARRINER FLOYD.

Witnesses:

C. F. BROWN,  
P. W. PEZZETTI.