

966,049.

P. POMERO.
VIOLIN PIANO.
APPLICATION FILED FEB. 5, 1909.

Patented Aug. 2, 1910.

3 SHEETS—SHEET 1.

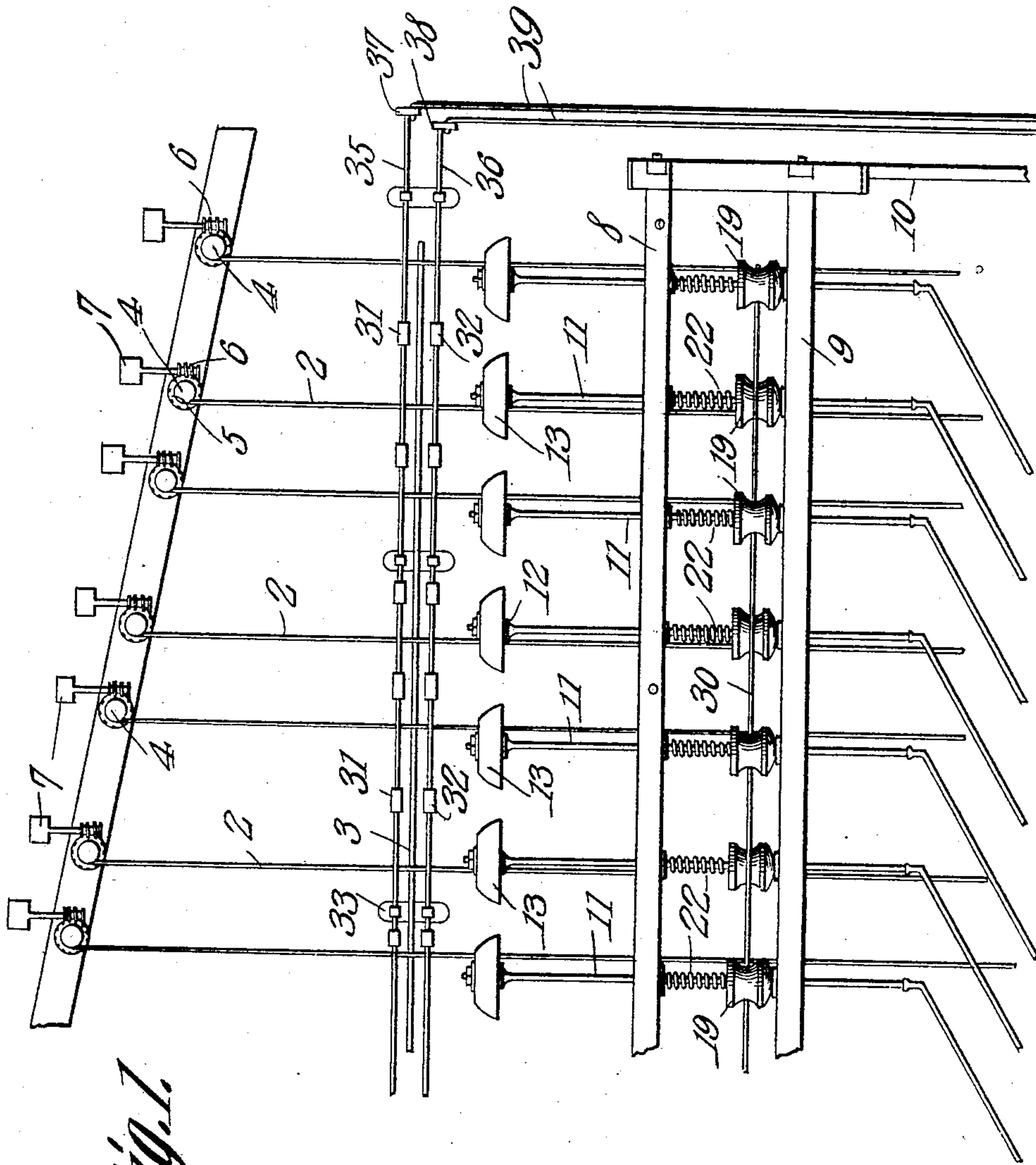


Fig. 1.

Witnesses

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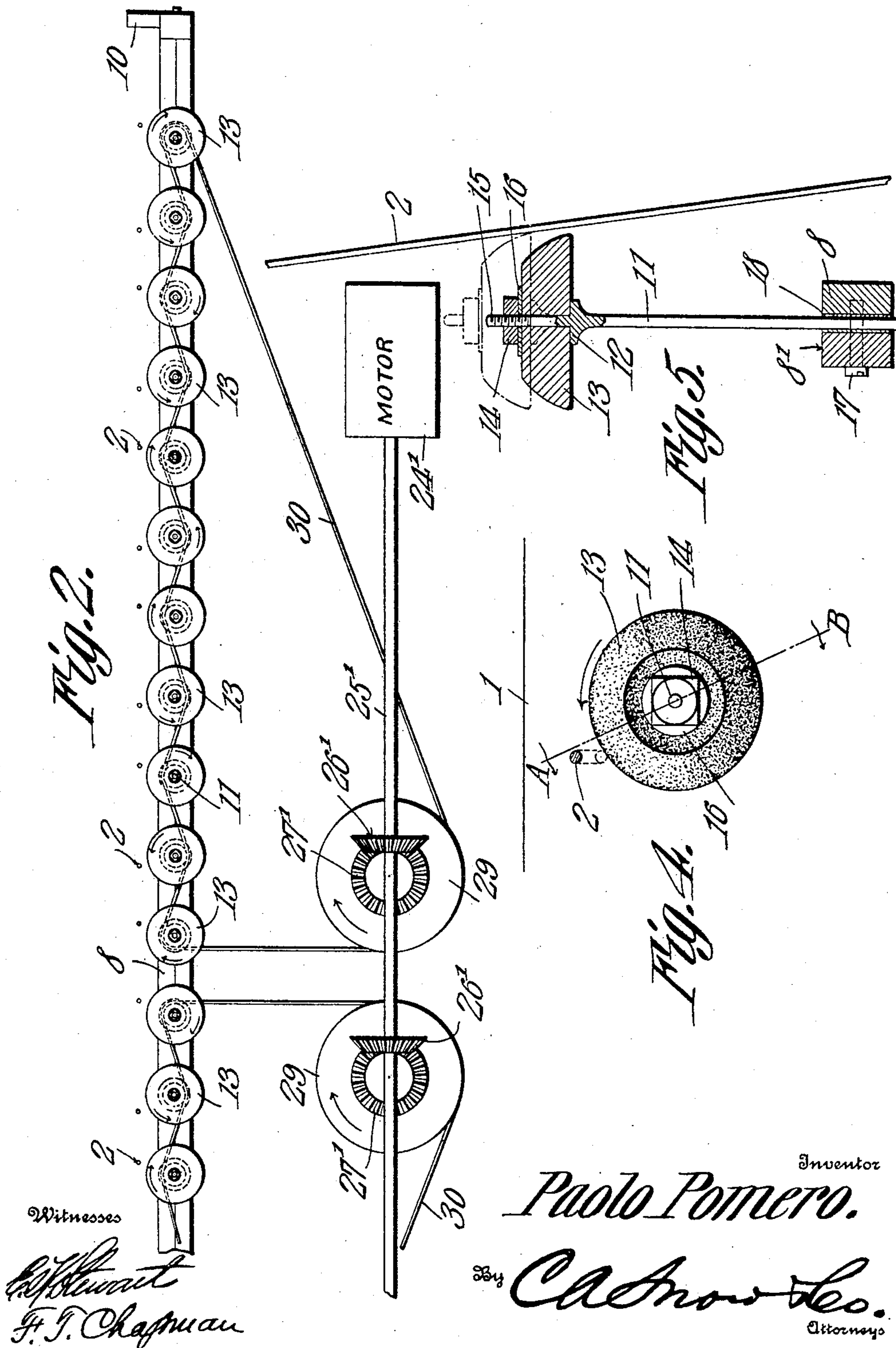
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3 SHEETS—SHEET 2.

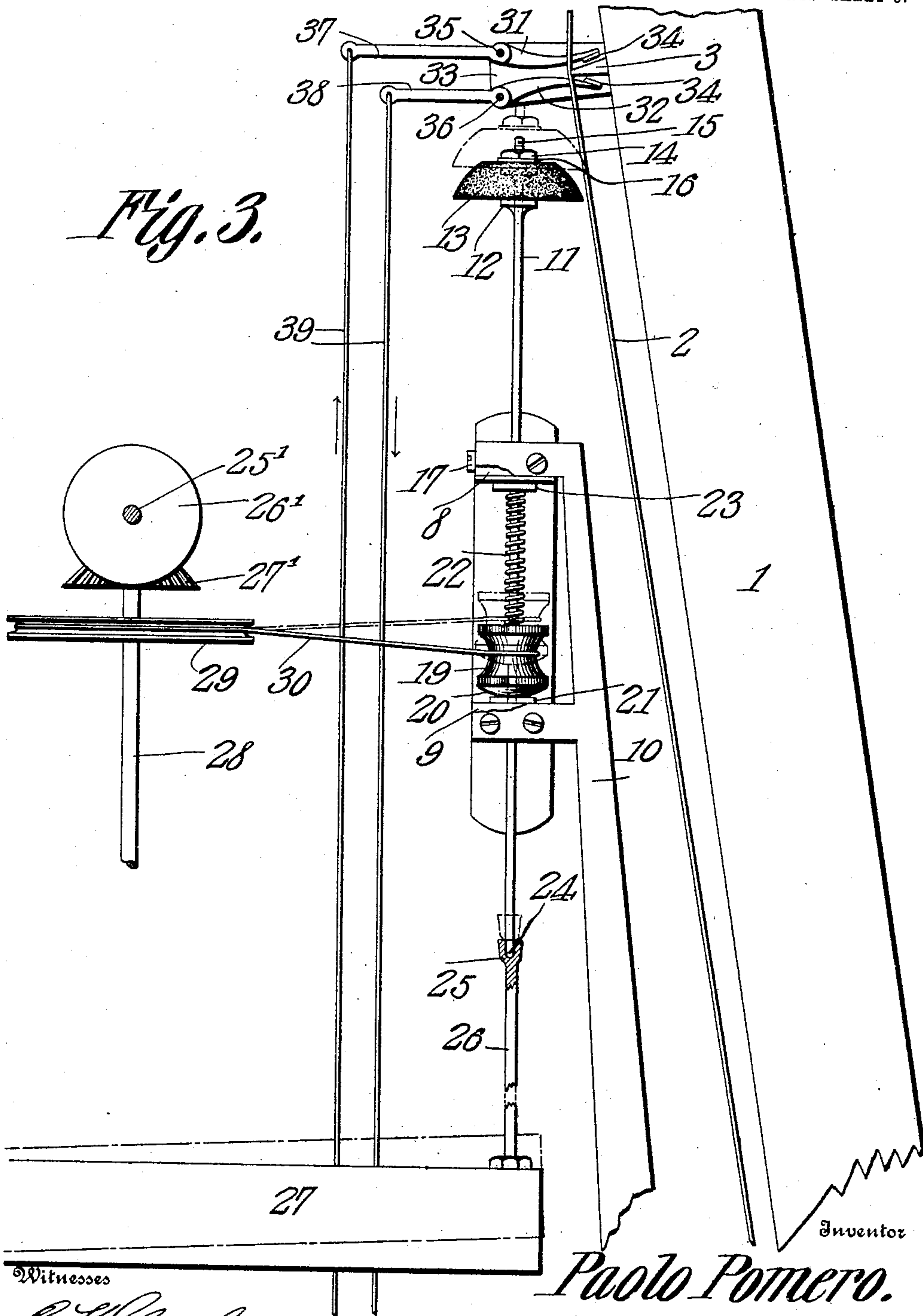


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UNITED STATES PATENT OFFICE.

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VIOLIN-PIANO.

966,049.

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To all whom it may concern:

Be it known that I, PAOLO POMERO, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Violin-Piano, of which the following is a specification.

This invention has reference to improvements in violin pianos and is designed more particularly for the production of the tones of the violin type of musical instrument, the invention being adapted to be used either as a violin type of instrument *per se* or as an adjunct to the piano type of instrument wherein the strings are set in vibration by blows delivered from suitable hammers.

The object of the present invention is to provide means for setting the strings in vibration by means simulating the action of the bow upon the strings of the violin and to obtain the same quality as is obtained by the use of the bow upon the strings of the violin type of musical instrument.

In accordance with the present invention each tone is produced by a separate string, all of the strings being mounted upon a suitable sounding board after the manner of mounting the strings of the violin type of musical instrument upon the body of the violin. The strings are set in vibration at will by means of rotatable bodies or wheels preferably made of a special composition and these wheels are shaped and caused to move into contact with the strings in such manner as to first touch the strings lightly and then rapidly increase in extent of contact with the strings to produce a full and powerful vibration of the latter. Furthermore, the relation of the axis of rotation of the wheel to the string and the direction of approach of the wheel to the string also form important features of the present invention. Also there is provided a means for controlling the sound produced, as to its volume, and this also forms an important feature of the present invention.

The improved violin piano will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, in which drawings,

Figure 1 is an elevation of so much of a musical instrument embodying the present invention as is necessary for an understand-

ing of the invention. Fig. 2 is a plan view of the structure shown in Fig. 1, some parts being omitted and other parts added. Fig. 3 is an elevation showing one of the strings and the operating mechanism therefor, and also showing the damper mechanism, the scale being larger than that of Figs. 1 and 2. Fig. 4 is a top plan view of one of the bowing wheels with one of the strings with which the wheel coacts shown in section. Fig. 5 is a vertical section on the line A—B of Fig. 4.

Referring to the drawings there is shown a sounding board 1 which it will be understood is suitably shaped for the purposes of the invention, and this shape will be determined by the varying length of the strings indicated at 2, which strings will of course vary in thickness, length, and material in accordance with the pitch and tones required, the sounding board also being constructed with a view to the strains due to the tension under which the strings are placed. The strings 2 are held from the sounding board 1 by a bridge or by bridges 3, whether one or more bridges be used being determined by circumstances. Any suitable means may be provided for tuning the strings, such for instance as pegs 4 around which one end of each of the strings is wound and each peg 4 carries a worm wheel 5 engaged by a worm 6 on a shaft carrying a manipulating button 7. Of course any other means of stretching and thereby tuning the strings may be employed, the means shown being simply illustrative.

Along the face of the sounding board and spaced therefrom are two parallel bars 8 and 9 upheld by end frames 10 supported in any suitable manner which however is not shown in the drawings. There may of course be intermediate upholding frames 10 as needed although such intermediate frames are not shown in the drawings.

Extending through the bars 8 and 9 at appropriate points are upright shafts 11 adjacent each to a respective string 2 but located in a plane perpendicular to the face of the sounding board displaced to one side of a similar plane including the respective string 2 which last named plane is parallel with the first named plane and is also perpendicular to the face of the sounding board.

Near the upper end each shaft 11 is ex-

panded into an annular ledge 12 on which is seated a wheel 13 constituting a bowing head and confined to the ledge by a nut 14 applied to the threaded upper end 15 of the shaft 11 and having interposed between it and the wheel a washer 16.

As shown in the drawings, each bowing head 13 is frusto-conoidal in shape, that is the active face curves from the basic end of the bowing head toward the axis of rotation of the head, this being a shape especially adapted for the purposes of this invention, although other shapes of bowing heads may be used though not with the same advantage. The bowing heads 13 may be as small as three-quarters of an inch in diameter and as large as two inches in diameter, although these sizes are not to be taken as definite or necessary sizes or as extreme limits of size. In instruments of the character to which this invention relates it is customary to use free resin or resin lightly cemented to the bowing element. Free resin or resin easily dislodged from the bowing element produces an objectionable dust within the instrument. In order to avoid this accumulation of dust and to make the bowing heads of a durable nature they are made from a composition of matter of which the following may be taken as well adapted for the purpose.

| | | |
|----|--------------------------|-----|
| | Venetian turpentine----- | 10% |
| | Pure resin ----- | 20% |
| | Alum----- | 10% |
| 35 | Caoutchouc----- | 30% |
| | Powdered glass----- | 10% |
| | Glue----- | 20% |

The shafts 11 are each mounted for longitudinal and rotative movement, the rotative movement being about the longitudinal axis of the shaft, and these shafts are so related each to a respective string 2 that when the shaft is raised in the direction of its length the bowing head 13 carried thereby will be brought into engagement with a string 2. The first portion of the bowing head to engage the string is the lower edge thereof which is the portion of the bowing head of greatest diameter. The string is set in vibration and a continuous movement of the bowing head in the direction of its axis of rotation will cause an increase in the extent of contact of the bowing head with the string lengthwise of the latter, this resulting in a corresponding increase in the amplitude of vibration. It will be observed that in the particular showing of the drawings the shafts 11 are all upright while the strings 2 slant toward the shafts so that if continued long enough the upper ends of the strings would ultimately be brought into the vertical plane of all the shafts 11. Of course if the strings were made vertical and the shafts 11 were slanted correspondingly the same result

would be brought about. However for mechanical reasons it is preferred to make the shafts 11 upright and the strings 2 slanting in a manner similar to that shown in Figs. 3 and 5.

In Fig. 4 the direction of rotation of one of the bowing heads 13 is indicated by the arrow and the relation of the bowing head to a string 2 and the relation of both the bowing head and the string to the face of the sounding board 1, shown in dotted lines in Fig. 4, is illustrated, this showing being in a manner diagrammatic. Now when a bowing head 13 is elevated and is brought into engagement with its respective string 2 it does not engage the string on a diameter of the wheel perpendicular to the face of the sounding board 1 but the bowing head engages the string at a point displaced from such diameter so that the string in its vibration will tend to remain in contact with the periphery of the bowing head and to increase the extent of contact lengthwise of the string thus very materially increasing the pull of the bowing head upon the string and thereby causing a correspondingly more pronounced vibration of the string. Whether this be the true explanation of the action of the bowing head upon the string or not, it is found in practice that the tone of the string is very materially improved by displacing the bowing head with relation to the string in the manner described over and above the effect produced when the string is engaged by the bowing head in a diametric plane of the bowing head perpendicular to the face of the sounding board 1.

While the bowing head 13 has been described as made of a certain composition or similar composition it will be understood that it may be made of wood or metal or the like and be peripherally coated with such composition.

To facilitate the assembling of the parts the bar 8 may be provided with a removable front section 8' held to the bar 8 by screws 17 and where a shaft 11 passes through the bar 8 a suitable bearing in the form of a bushing 18 may be provided. It will be understood of course that the bar 9 may have a similar bushing.

Between the two bars 8 and 9 each shaft carries a pulley 19 fast on the shaft and preferably having its lower face rounded as indicated at 20 to bear against a washer 21 of felt or leather or other suitable sound deadening material, the engagement of the pulley 19 with the washer 21, which latter in turn rests on the bar 9, determines the lower limit of travel of the shaft 11.

Surrounding the shaft 11 between the upper face of the pulley 19 and the under face of the bar 8 is a spring 22, there being an interposed washer 23 between the upper end of this spring and the under face of the bar

8. The normal tendency of the spring 22 is to maintain the pulley 19 in engagement with the washer 21. This spring will yield to any sufficient force tending to elevate the shaft 11. The lower end of each shaft 11 extends below the bar 9 and may there be rounded as indicated at 24 to be engaged by a cup bearing 25 on the end of a rod 26 under the control of a lever 27 which as shown in the drawings may be taken as indicative of either a suitable key or as an intermediate member between a key and the rod 26.

The actuating structure represented by the rod 26 and lever 27 is not to be taken as representative necessarily of an actual structure but only indicative of a suitable connection between the keys of the instrument and the shafts 11 since such connections will depend upon whether the shafts 11 are to be actuated from the keys used in connection with an ordinary piano mechanism when the subject matter of the present invention is used as an attachment or adjunct to an ordinary piano or whether the subject matter of the present invention is to be incorporated in a distinct instrument separate from any other instrument.

The driving mechanism for the several shafts 11 whereby rotative motion is imparted to the shafts is indicated in Figs. 2 and 3 and while the driving mechanism there shown is a practical mechanism it is to be understood that the invention is by no means limited to the showing of the drawings since other driving mechanisms may be used as the exigencies of the installation of the invention in other types of musical instruments, or as a distinctive instrument may be used.

In the structure shown in the drawings there is provided a motor 24' of any suitable type whether electric or pneumatic or a water motor of a spring or weight motor or in fact any type of motor. Consequently the showing of this motor is purely diagrammatic. The motor shaft 25' carries one or more bevel gear wheels 26' each in mesh with another gear wheel 27' upon a shaft 28 carrying a pulley 29 which as shown in the drawings is indicated as a grooved pulley preferably though not necessarily of greater diameter than the pulleys 19. A belt 30 is passed around the pulley 29 and thence to a bank of pulleys 19 upon a series of shafts 11. The belt 30 is passed in opposite directions around adjacent pulleys of the series so that adjacent pulleys rotate in opposite directions and the strings 2 are spaced so that the relation of each string to a bowing head or wheel 13 shall be that indicated in Fig. 4.

In Fig. 2 there are indicated two separate series of shafts 11 and bowing heads 13 driven by the one shaft 25', but it will be understood that any suitable number of se-

ries of shafts 11 may be employed and may be driven by a single motor 24' or as many motors as necessary may be used. These are all constructive details which have no necessary bearing upon the invention.

In order to modify the sound emitted by the strings 2 at the will of the operator suitable damping devices may be employed. Instead of directly damping the strings 2 the bridge or bridges 3 may be damped and for this purpose there are provided arms 31, 32 preferably arranged in pairs upon suitable brackets 33 and each lever 31—32 carries a damping head 34, preferably of felt or other suitable material in operative relation to the bridge 3 in such manner that either or both the damping heads 34 may be brought into contact with the bridge 3. In this manner piano and pianissimo effects may be produced. Each lever 31 may be mounted upon a shaft 35 and each lever 32 upon a shaft 36 so that all the levers 31 may be controlled at one time and all the levers 32 controlled at one time. The shaft 35 carries an arm 37 fast thereto and a shaft 36 carries an arm 38 fast thereto. Each arm 37 and 38 is under the control of a respective link 39 leading to a suitable actuating means under the control of the operator. Such actuating means may consist of a suitable pedal or stop, not shown, for each shaft 35 and 36 so that the operator may at will cause all the damper levers 31 to be actuated or all the damper levers 32 to be actuated or the operator may actuate all the levers 31 and 32 at the same time.

The means described for the softening of the tones emitted by the active strings 2 as reinforced by the sounding board will be found effective, but this does not preclude the use of other means for softening the tone and it will therefore be understood that the invention is not limited to the particular means described for this purpose.

It will be observed that because of the peculiar formation of the bowing heads or wheels 13 and their relation to the strings 2 the effect of the bowing heads upon the strings is the same as that of the ordinary bow upon the strings of the violin or other like type of musical instrument and it is within the power of the operator by regulating the extent of movement of the shafts 11 in the direction of their lengths to determine the strength of tone emitted by the active strings the same as is done by the skilled violinist.

It is also possible with the present invention by properly proportioning the strings and other parts of the instrument to produce in one instrument several different effects, such for instance as producing in the one instrument the tones of a violin, the tones of a violoncello, and the tones of a base viol, so that the operator may at will produce the effects

of the several instruments either individually or together as may be desired.

What is claimed is:—

1. A stringed musical instrument provided with rotatable bowing heads shaped to engage the strings to varying extents and movable toward the strings in the direction of the axis of rotation of the heads.
2. A stringed musical instrument provided with rotatable bowing heads each movable toward a string in the direction of the axis of rotation of the head.
3. A stringed musical instrument provided with rotatable bowing heads each movable toward a string in the direction of the axis of rotation of the bowing head, the portion of the head engaging the string approaching the latter at an angle less than a right angle.
4. A stringed musical instrument provided with a separate rotatable bowing head for each string, each bowing head having its active portion shaped to engage the string with a gradually increasing area of contact on the movement of the head toward the string.
5. A stringed musical instrument provided with a rotatable bowing head of conical form with its active face curving from the basic end toward the axis of rotation of said head.
6. A stringed musical instrument provided with a rotatable bowing head movable in the direction of its axis of rotation.
7. A stringed musical instrument provided with a rotatable bowing head movable in the direction of its axis of rotation, said axis of rotation approaching a string at an acute angle.
8. A stringed musical instrument provided with a rotatable bowing head movable in the direction of its axis of rotation, said axis of rotation and a string approaching at an acute angle and the said head decreasing in diameter in the direction of the approach of the axis of rotation toward the string but more rapidly than such approach of the axis of rotation toward the string.
9. A stringed musical instrument provided with a rotatable bowing head having its axis of rotation approximately parallel with but not in any plane passing through the string to be engaged by said head.
10. A stringed musical instrument provided with strings mounted on a sounding board, and rotatable bowing heads, one for each string, each bowing head being movable toward a string with its axis of rotation in a plane perpendicular to the sounding board and displaced with relation to but parallel with a plane perpendicular to the

sounding board and passing through the string.

11. A stringed musical instrument provided with rotatable bowing heads, a shaft for each head mounted for rotative movement and for movement in the direction of its axis, means for rotating the shafts and heads carried thereby, and means for moving the shafts individually in the direction of their axes at will.

12. A stringed musical instrument provided with rotatable bowing heads, a shaft for each head mounted for rotative movement and for movement in the direction of its axis, means for rotating the shafts and heads carried thereby, comprising a pulley on each shaft, a belt engaging the several pulleys of a series of shafts simultaneously and means for driving the belt, and means for moving the shafts individually in the direction of their axes at will.

13. A stringed musical instrument comprising a sounding board, strings thereon, a bridge between the strings and sounding board, means for setting chosen ones of the strings in vibration, and means for modifying the sound comprising dampers, one for each side of the bridge and means for operating either or both dampers at will.

14. A stringed musical instrument provided with rotatable frusto-conoidal bowing heads movable toward the strings in the direction of the axis of rotation.

15. A stringed musical instrument comprising a sounding board, strings thereon, a bridge between the strings and sounding board, means for setting chosen ones of the strings in sustained vibration, and means for modifying the sound comprising dampers, one for each side of the bridge, and means for operating either or both dampers at will.

16. A stringed musical instrument provided with means for setting the strings in vibration comprising bowing heads each having in its active portion a material composed of caoutchouc, glue, powdered glass, alum, and resin.

17. A stringed musical instrument provided with means for setting the strings in vibration comprising bowing heads each composed of caoutchouc, glue, powdered glass, alum and resin.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

PAOLO POMERO.

Witnesses:

CEASAR MARTINI,
EMMA D. CHAPPELL.