

[54] **APPARATUS FOR PLAYING MUSICAL INSTRUMENTS**

[76] Inventors: **Kevin Michael Godley**, 25 Sheepfoot Ln., Manchester; **Laurence Neil Creme**, White Cottage, White Fold, New Mills, both of England

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Primary Examiner—Stephen J. Tomsy
Assistant Examiner—John F. Gonzales
Attorney, Agent, or Firm—Sughrue, Rothwell, Mion, Zinn & Macpeak

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[57] **ABSTRACT**

An apparatus for playing a stringed musical instrument, for example an electric guitar, the apparatus comprising at least one rotatable member adapted for location on the instrument adjacent a string, manually operable means adapted bodily to move the member into peripheral contact with its adjacent string, and means for rotating the member when in such peripheral contact. The rotating means is continuously driven in use of the apparatus. A plurality of rotatable members may be provided in the form of wheels which can be brought into engagement with respective strings and a single shaft continuously driven by an electric motor.

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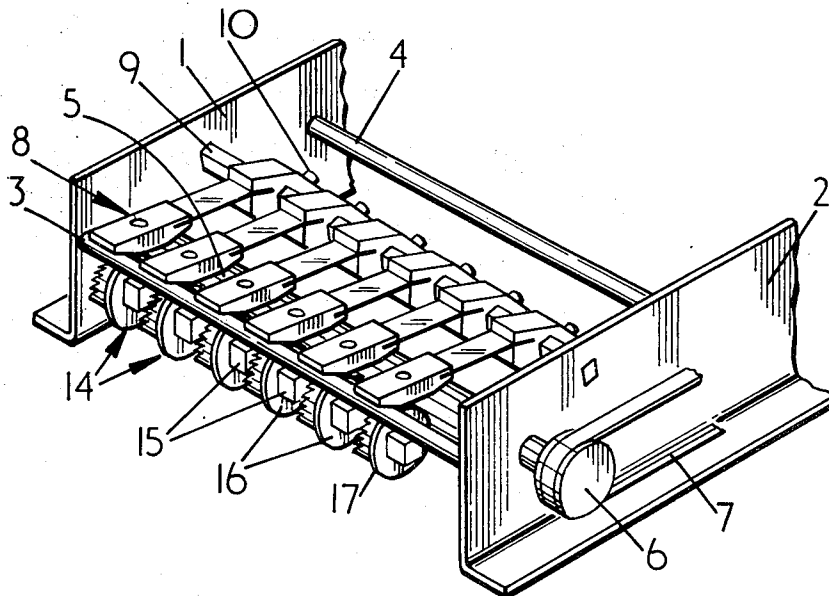
[52] **U.S. Cl.** **84/320**

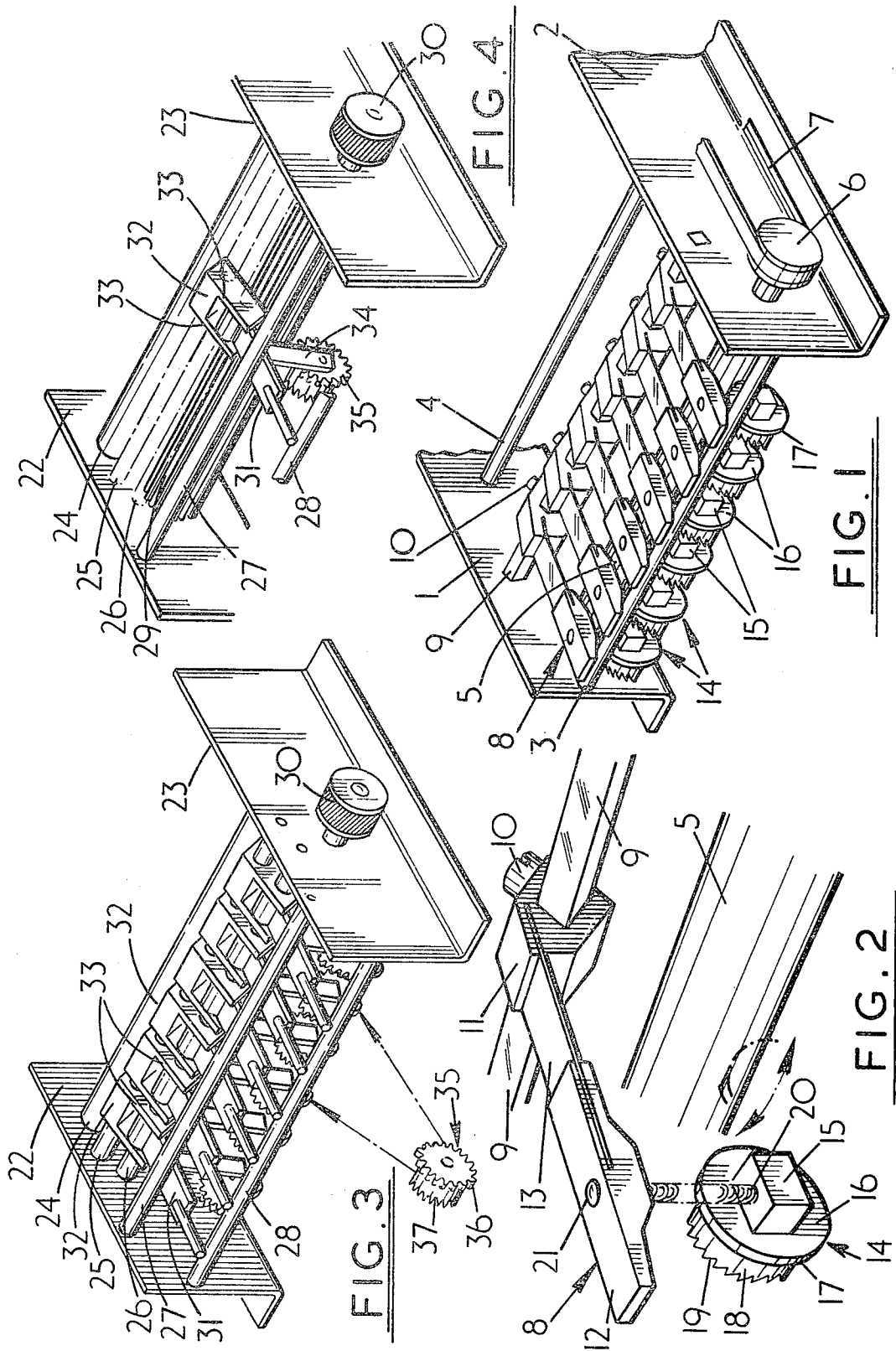
[51] **Int. Cl.** **G10d 3/16**

[58] **Field of Search** 84/320, 7-9, 84/256, 258, 267

[56] **References Cited**
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15 Claims, 4 Drawing Figures





APPARATUS FOR PLAYING MUSICAL INSTRUMENTS

The present invention relates to apparatus for playing stringed musical instruments.

It has been found desirable to provide apparatus with which a continuous note can be obtained from a musical instrument, for example an electric guitar. Electronic arrangements have been produced but have been too expensive for general application.

According to the present invention, there is provided an apparatus for playing a stringed musical instrument comprising at least one rotatable member adapted for location on the instrument adjacent a string, manually operable means adapted bodily to move the member into peripheral contact with its adjacent string, and means for rotating the member when in such peripheral contact, the rotating means being continuously driven in use of the apparatus.

Preferably, the or each rotatable member comprises a wheel supported by an arm which is resilient or pivotal about a supporting member.

Preferably, the rotating means comprises a single shaft arranged to be continuously rotated by an electric motor to which it is mechanically coupled. An individual rotatable member may be provided for each string of the instrument and each member may be driven by the single shaft when in contact with its respective string. In the case of electrical instruments, for example electric guitars, it is necessary to electrically screen the electric motor to prevent the magnetic fields it generates affecting the pick-ups of the guitar and thereby generating undesirable noise. This can be achieved by enclosing the motor in a conductive casing of for example mu-metal.

Embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 shows a cut-away perspective view of one embodiment of the invention;

FIG. 2 shows a component of the FIG. 1 embodiment to an enlarged scale;

FIG. 3 shows a cut-away perspective view of a further embodiment; and

FIG. 4 shows a similar view to FIG. 3, further components of the embodiment having been removed.

Referring to FIGS. 1 and 2, the apparatus illustrated comprises a frame schematically indicated by two side plates 1, 2 and cross-bars 3, 4. It will be appreciated that the frame merely forms a support and may be formed in any manner suitable for this function. A rubber-surfaced shaft 5 is rotatably mounted between the plates and in use is driven continuously by means of a pulley 6 mechanically coupled by a belt 7 to a battery-driven electric motor (not shown).

Six arms 8 (one in respect of each string of a guitar to which the apparatus is adapted to be fitted) are slidably mounted on a square-section cross-member 9 to which they can be secured by screws 10. Each arm comprises a plastics bracket 11 and a plastics lever 12 connected by a strip of spring steel 13 to which they are moulded.

Each arm 8 supports a wheel 14 rotatably mounted on a hub 15. The wheel comprises a disc 16 the peripheral edge 17 of which has a rubber surface and a hollow cylindrical extension 18 coaxial with the axis of rota-

tion of the wheel. The edge 19 of the extension 18 is toothed.

The wheel 14 is supported by a coil spring 20 secured in the lever 12 by a screw 21 and secured in the hub 15 by being screwed into a threaded bore and/or being held by a screw (not shown) extending through the wheel 14 and acting as a pivot pin therefore.

In use, the frame is secured to an instrument with the shaft 5 transverse to the strings thereof, preferably on resilient mountings and advantageously on mountings which permit the fine adjustment of its position both parallel to and transverse to the strings. When so secured, the positions of the arms 8 on the cross-member 9 are adjusted so that the toothed edges 19 of the wheels are located above respective strings of the instrument. The shaft 5 is then driven continuously, and the apparatus can be used.

When a lever 12 is depressed so that it contacts the cross-bar 3, the respective wheel 14 moves in the direction of the arrow in FIG. 2 and its edge 17 is pressed into contact with the shaft 5, and the toothed edge 19 is pressed against the respective string. The contact between the shaft 5 and edge 17 causes the wheel to rotate and the teeth on the edge 19 thus run against the string. A substantially continuous note is thus produced. The flexibility of the strip 13, and in particular the flexibility of the spring 20, prevent the effect of the wheel 14 on the string being unduly harsh. Furthermore, when the wheel 14 contacts the shaft 5 it tends to be twisted slightly ensuring contact between the string and the toothed edge 19.

The position of the cross-bar 3, which acts as a stop for the levers 12, may advantageously be vertically adjustable (not shown).

Referring now to FIGS. 3 and 4, the illustrated embodiment comprises a frame having two side plates 22, 23 linked by five parallel cross-bars 24, 25, 26, 27 and 28. A splined shaft 29 (FIG. 4) is rotatably mounted between the plates 22, 23 and in use is continuously driven by a constant-speed mains-powered motor (not shown) via a cog 30.

Six levers 32 are pivotal about cross-bar 26 from a first position in which they abut cross-bar 27 to a second position in which they abut cross-bar 28, and means (not shown) are provided to bias each lever 31 towards the said first position. Six brackets 32, which each support a pair of parallel limbs 33, are slidably mounted on the cross-bar 25. Means, for example screws (not shown), are provided for locking the brackets 33 on the cross-bar 25. The limbs of each bracket 33 receive between them a respective lever 31 and the transverse position of each lever 31 can thus be independently adjusted. The cross-bar 26 passes in a sliding fit through each limb 33 of each bracket 32.

Each lever 31 supports a limb 34 on which a wheel 35 is rotatably mounted. Each wheel 35 is rotatable about an axis parallel to the cross-bars and is provided with radially-extending teeth 36 adapted to mesh with the shaft 29 when its respective lever 31 is pivoted to the said second position. Each wheel 35 also supports an annular array of axially extending teeth 37.

In use, the illustrated embodiment is securely fixed over the strings of a six-string electric guitar, the cross-bars being arranged substantially perpendicular to the general direction of the strings. The position of the individual brackets 32 on the cross-bar 25 is then adjusted so that the teeth 37 of each wheel 35 contact a

respective string when the respective lever 31 is pivoted to the said second position. When a lever 31 is so pivoted, the teeth 36 of the wheel 35 which it supports mesh with the splined shaft 29 which is continuously rotated. As a result, the wheel 35 also rotates at a constant rate, and the respective string is "plucked" by the axially-extending teeth 37. A continuous note is thus produced.

In both of the described embodiments, the electric motor (not shown) is preferably electrically screened so that, when fitted to an electric guitar, the magnetic fields it generates do not affect the pick-ups of the guitar. The screening may for example take the form of a box of mu-metal which encloses the motor.

A cover is preferably provided from which the levers project to permit use of the apparatus. The edge of such a cover could be used as an alternative to the cross-bar 27 of FIG. 3 which acts as an upper lever stop.

Such a cover may be slidable with respect to the frame so as to cover the levers and prevent their depression when it is not desired to use the apparatus. Alternatively a locking device may be provided which when actuated prevents the depression of the levers.

An additional lever may be provided the depression of which depresses each of the other levers. This would facilitate the playing of chords.

It will be appreciated that, although in the illustrated second embodiment the wheels 35 rotate only when brought into contact with shaft 29 an arrangement could be provided in which the wheels were on arms independently pivotable about the axis of the shaft so that the wheels rotated continuously.

It will also be appreciated that the arm and wheel arrangement may comprise a flexible arm on which a rotatable wheel is rigidly mounted or a rigid arm on which a rotatable wheel is spring-mounted.

It will be further appreciated that the guitar can be played either normally, or with the aid of the illustrated embodiments. The playing apparatus can be located adjacent the bridge of the guitar so that it in no way obstructs normal playing. Furthermore, the playing apparatus may be mounted so as to be movable to an inoperative position when it is not required. Of course, the use of the frets to adjust the effective length of strings is in no way restricted by the playing apparatus.

Any suitable materials may be used for fabricating the components of the present invention, for example plastics, nylon, or metal. Preferably, the wheels and in particular the string-engaging teeth thereof are fabricated from nylon. The wheels may be provided with a resilient string-engaging surface as an alternative to the string-engaging teeth.

The number of the string-engaging teeth on the wheels may be varied as desired to adjust the playing quality, as may the diameter of the circle which they define. Also, the rates of rotation of the wheels need not be the same. In certain circumstances for example

the wheels may be arranged to rotate faster for high frequency strings than low frequency strings.

Means may be provided to stop the drive when the playing apparatus is not required.

5 What I claim is:

1. An apparatus for playing a stringed musical instrument comprising: at least one rotatable member adapted for location on the instrument adjacent a string; a rotatable shaft having its axis located transverse to the strings and substantially parallel to the axis of rotation of the at least one rotatable member; means to continuously rotate the rotatable shaft; and manually operable means adapted bodily to move the rotatable member into peripheral contact with its adjacent string and the rotatable shaft such that the shaft causes said member to rotate.

2. An apparatus as claimed in claim 1, wherein the rotatable member comprises a rotatable wheel supported on an arm.

3. An apparatus as claimed in claim 2, wherein the wheel comprises a disc and an extension from the disc coaxial with the axis of rotation of the wheel, the wheel being supported so that an end surface of the extension can be moved into contact with the adjacent string while the peripheral edge of the disc is engaged by the rotating means.

4. An apparatus as claimed in claim 3, wherein the said end surface of the extension is toothed.

5. An apparatus as claimed in claim 2, wherein the arm is resilient.

6. An apparatus as claimed in claim 5, wherein the arm comprises a strip of spring steel.

7. An apparatus as claimed in claim 2, wherein the arm is rigid and pivotal about a supporting member.

8. An apparatus as claimed in claim 2, wherein the arm is movably secured to a cross-member to permit adjustment of its position relative to its adjacent string.

9. An apparatus as claimed in claim 2, wherein the wheel is resiliently supported on its arm.

10. An apparatus as claimed in claim 9, wherein the wheel is connected to its arm by a spring.

11. An apparatus as claimed in claim 1, wherein the means to continuously rotate the rotatable shaft comprises an electric motor.

12. An apparatus as claimed in claim 11 wherein the rotatable member is provided with a surface which is brought into contact with a surface of the shaft when the rotatable member is brought into peripheral contact with its adjacent string.

13. An apparatus as claimed in claim 12, wherein at least one of the said surfaces is resilient.

14. An apparatus as claimed in claim 12, wherein both the said surfaces are provided with matching teeth.

15. An apparatus as claimed in claim 11, wherein the motor is battery driven.

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