July 22, 1969 MATSUZO KOSUGE 3,456,543

TOY XYLOPHONE PLAYING DEVICE

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Fig. 1

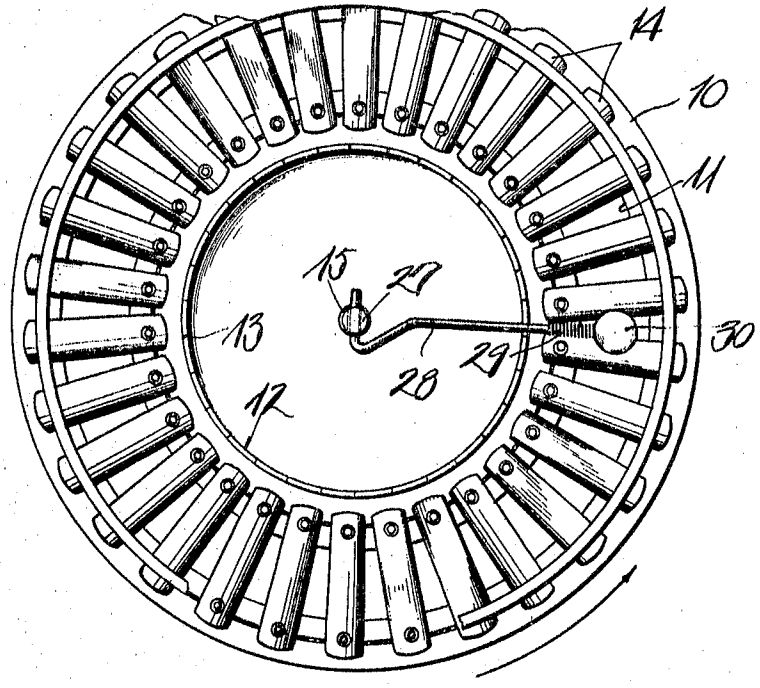
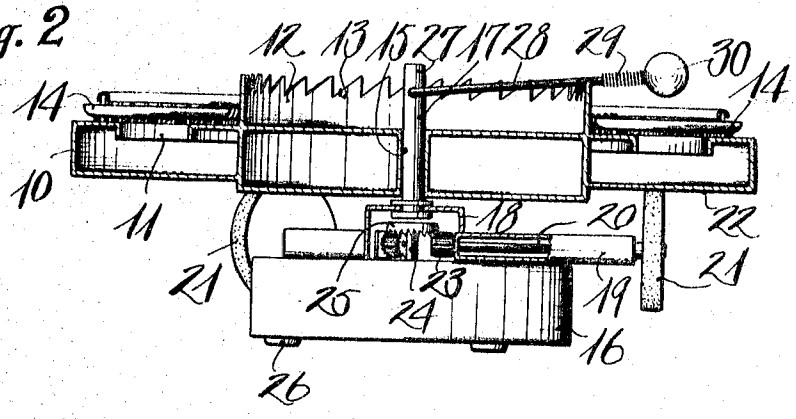


Fig. 2



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TOY XYLOPHONE PLAYING DEVICE

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Fig. 3

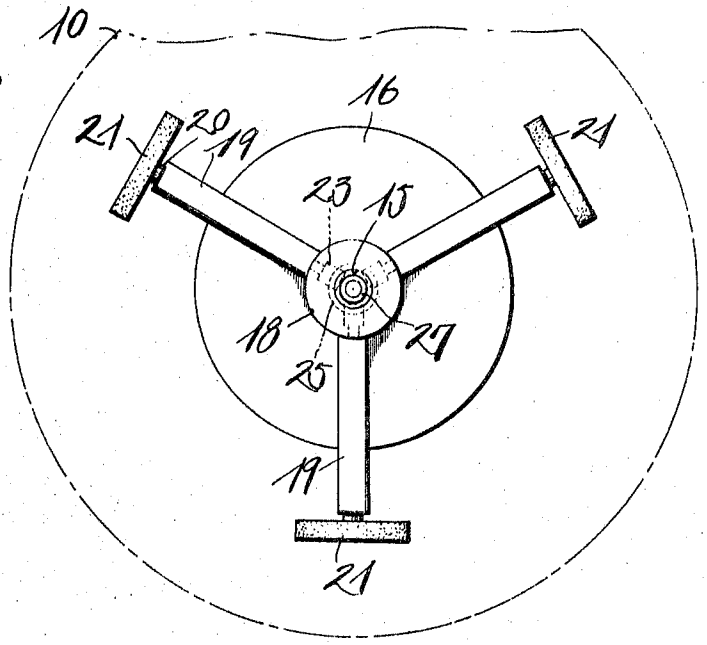

Fig. 4

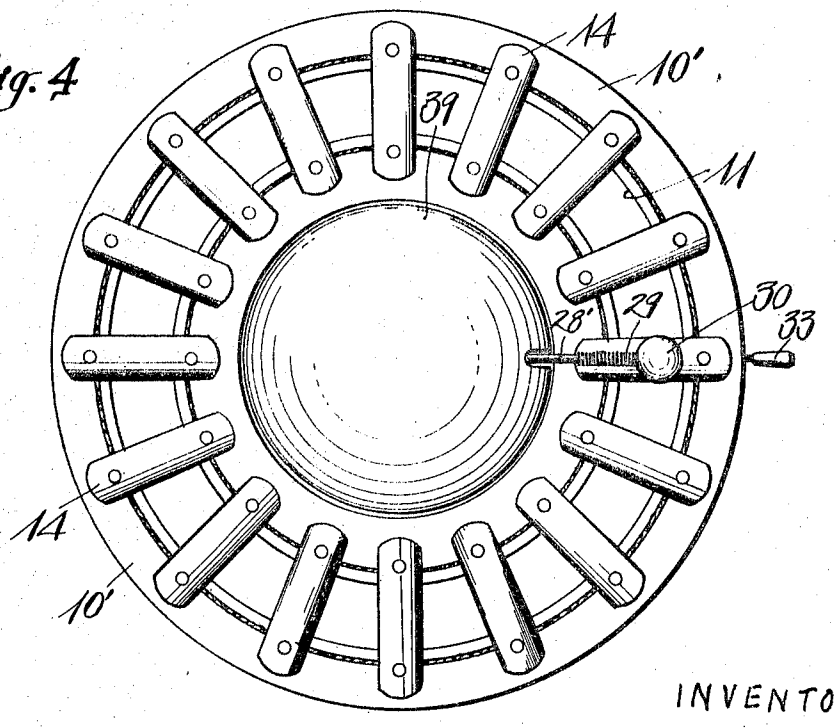

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Fig. 5

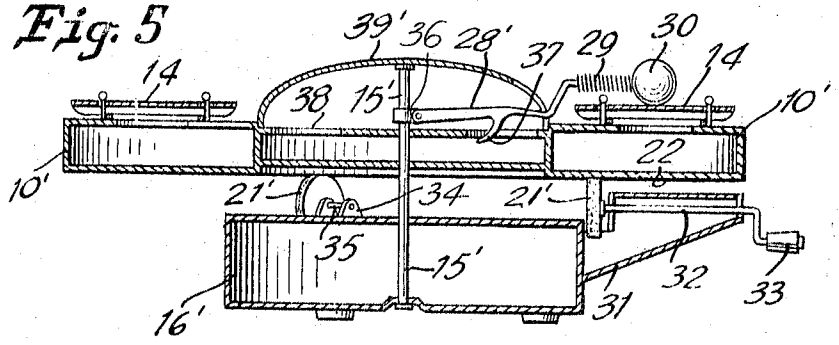

Fig. 6

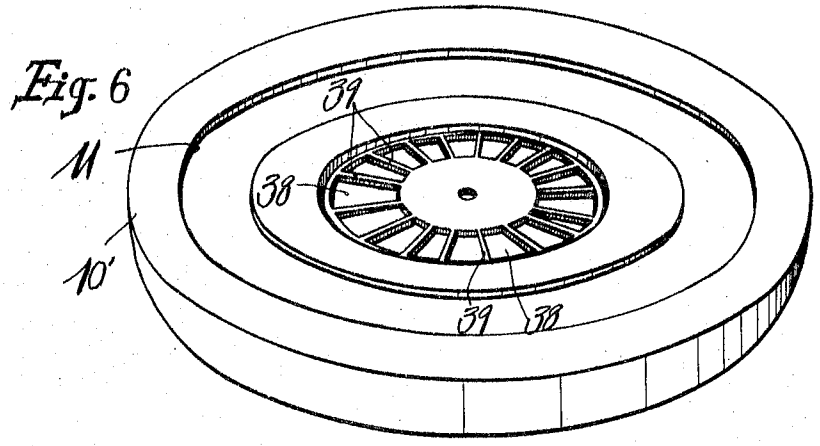

Fig. 7

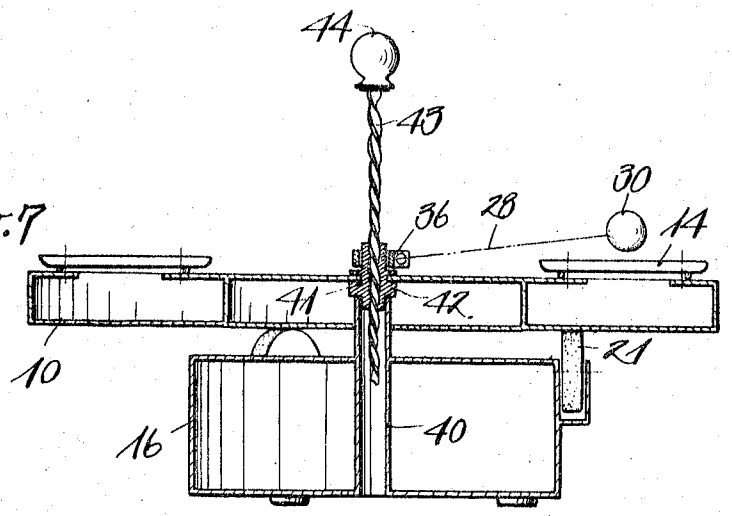

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Fig. 8

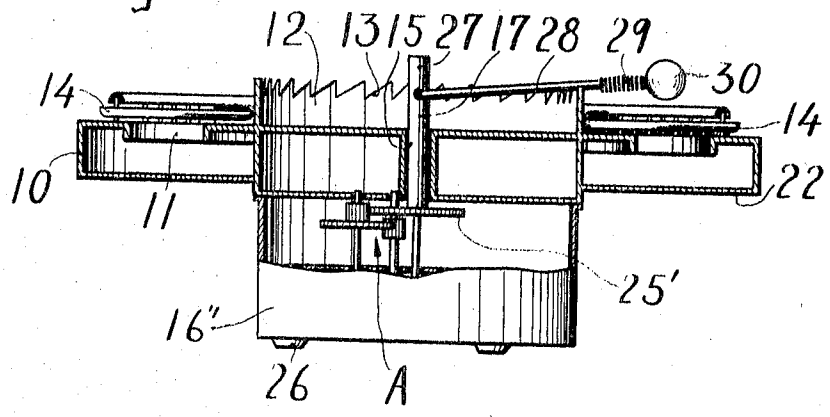
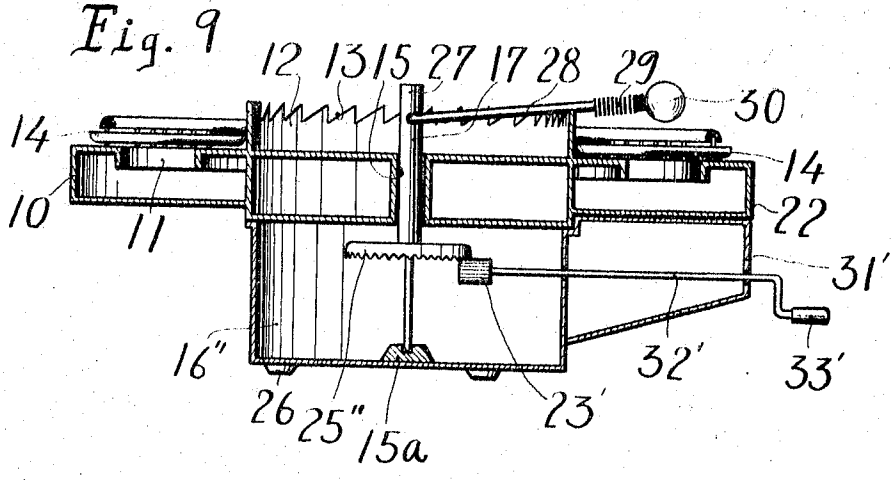


Fig. 9



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3,456,543

TOY XYLOPHONE PLAYING DEVICE

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Claims priority, application Japan, May 2, 1966, 41/40,811
Int. Cl. G10f 1/08
U.S. Cl. 84—102 8 Claims

ABSTRACT OF THE DISCLOSURE

A toy xylophone playing device comprises a hollow disk formed with an annular slot or groove in its upper surface near its outer periphery, and xylophone bars, each corresponding to a respective scale note, arranged radially across the slot. Radially inwardly of the slot, the disk has an upwardly extending cylindrical wall with a serrated upper edge, the number of serrations corresponding to the number of bars. A shaft extends axially upwardly of the disk and pivotally supports an arm engaging the serrations and having an orb hammer connected to its outer end by a coil spring. As relative rotation is effected between the arm, on the one hand, and the bars and the serrations as a unit, on the other hand, the ball is caused to strike against successive bars, which are arranged in order to play a melody. The rotation may be effected by a motor by manual means such as a crank. In place of the serrated cylindrical wall, the radially inner portion of the upper wall of the hollow disk may be formed with a grating defined by radial bars equal in number to the number of xylophone bars, the hammer arm carrying a projection movable over this annular grating.

Summary of the invention

This invention relates to a musical toy, and more particularly relates to a toy xylophone playing device capable of endlessly playing a certain melody.

It is an object of the present invention to provide entertainment and amusement for children by providing a toy xylophone playing device capable of mechanically and endlessly playing a certain melody.

Another object of the present invention is to provide a toy xylophone playing device of the kind adapted for automatically playing a xylophone associated therewith by the operation of a power unit mounted therein.

It is a further object of the present invention to provide a toy xylophone playing device of the kind adapted for mechanically playing a xylophone associated therewith by the operation of a manually operated means.

It is still further object of the present invention to provide a device of the kind described above which can be used as a toy for musical education of children.

It is also an object of the present invention to provide a device of the kind described above which is portable, simple in operation, and which can be manufactured and sold at a reasonable cost.

These and other objects and advantages will appear more clearly from the following description in connection with the accompanying drawings in which:

FIGURE 1 is a plan view of one embodiment of the present invention as operated by means of a power unit, such as an electric motor, spring motor, etc.;

FIGURE 2 is a partly sectioned side elevation view of the embodiment shown in FIGURE 1;

FIGURE 3 is a plan view of the embodiment shown in FIGURES 1 and 2, from which a xylophone carrying disc has been removed, illustrating a portion of the disc driving means employed therein;

FIGURE 4 is a plan view of another embodiment of the present invention wherein a crank mechanism is provided so that the xylophone carrying disc can be rotated manually;

FIGURE 5 is a sectional side elevation view of the embodiment shown in FIGURE 4;

FIGURE 6 is a perspective view of a disc element employed in the embodiment shown in FIGURE 5;

FIGURE 7 is a sectional side elevation view of another embodiment of the present invention wherein a manually operated spiral push-rod is provided so that the xylophone carrying disc can be rotated by manual pressure on said rod;

FIGURE 8 is a side elevation view, partly in section, of another embodiment of the invention; and

FIGURE 9 is a vertical diametric sectional view through a further embodiment of the invention.

Description of the preferred embodiments

A preferred embodiment according to the invention will be set forth in the following description with references being made to FIGURES 1 to 3. In these figures, like portions or parts are designated with like numerals.

Referring now to the drawings, there is shown a hollow disc **10** which is provided with an annular slot or groove **11** on its upper surface adjacent its circumference, and which is provided, inwardly of said groove, with a cylindrical portion **12** formed with an upwardly projecting wall having serrations **13** on its upper edge. A number of replaceable iron xylophone elements **14** are radially arranged and mounted, to traverse annular groove **11**, at predetermined intervals on the disc **10**, in accordance with predetermined respective scale notes for a certain melody. The number of the xylophone element bars **14** corresponds with that of the serrations **13**, and the elements **14** carried by the disc **10** are rotated together with said disc. The disc **10** is provided with an axial bore **15** for a supporting shaft **17**. The shaft **17** extends upwardly through the axial bore **15** of the disc **10**, and is secured at its lower end to an annular bracket **18** mounted on the central portion of a base casing **16**. The bracket **18** has, on its circumference, three sleeves **19** which extend radially, sleeves **19** receiving respective shafts **20**, the outer end of which is provided with a roller **21** made from rubber material, each of the rollers **21** being in frictional contact with the bottom surface **22** of the disc **10**. The inner ends of the three shafts **20** extend into the bracket **18** and are provided with respective pinions **23**, pinions **23** being engaged, in the bracket **18**, with a crown gear **25** fixedly mounted on a shaft **24** projecting upwardly from the central portion of the base casing **16**.

The base casing **16** is provided with a plurality of rests at its bottom and has therein a power unit, such as a dry cell operated motor, spring motor etc. (not shown), and the shaft **24** is mechanically rotated in one direction by means of the power unit. The upper end portion **27** of the shaft **17** extends upwardly along an axis of the cylindrical portion **12** of the disc **10**, and pivotably supports a swingable hammer arm **28** which can be swung vertically, arm **28** extending in the radial direction of the disc **10** and having at its free end a coiled spring joint **29** having an orbicular or spherical hammer-head **30**. The hammer-head **30** is maintained in a position to strike the middle portion of each of the xylophone elements **14**.

In operation, when the power unit provided in the base casing **16** is actuated, the shaft **24** starts to rotate and rotates the rollers **21** which turn the hollow disc **10** in one direction, such as the direction indicated by the arrow shown in FIGURE 1. As the disc **10** turns, the cylindrical portion **12** thereof turns simultaneously therewith, and the hammer arm **28**, which rests by its weight on a bottom portion of the serrations **13** formed at the top of said

cylindrical wall **12**, is repeatedly moved up and down in accordance with the shape of the teeth or serrations **13**. Accordingly, when the arm **28** is lifted by means of a projection or serration **13**, the hammer-head **30** is detached upwardly from the xylophone element **14** that the hammer-head **30** has just struck, and, when it falls into the bottom recesses between each projection **13** and the next projection **13**, the hammer-head strikes the next xylophone element **14**. In this case, the spring joint **29** imparts to the hammer-head **30** a spring action.

It is noted that the position recess of the each bottom of teeth, that is to say, the lowest position at which said arm **28** rests must be considered and designed such that the hammer-head **30** can be dropped down to the most suitable portion of each xylophone element **14** during rotation of the disc **10**. Such relationship between each recess of the teeth and each xylophone element **14** is of fundamental importance, and must be applied to any embodiment according to the present invention.

It is further noted that the foregoing embodiment may be modified variously. For example, disc **10** can be fixedly supported by an appropriate means, while supporting shaft **15** can be rotatably mounted in the axial bore of said disc so that the hammer-head **30** can be adapted for successively striking said xylophone elements by the rotation of said shaft **15**.

Referring now to FIGURES 4 to 6, there is shown another embodiment of the present invention wherein a power unit is not provided. This embodiment has the same mechanism as that of the foregoing embodiment except for the means for imparting the hammer arm up-and-down motion and such description as might overlap the description made with respect to the foregoing embodiment will be omitted.

As may be seen from FIGURE 5, the bracket **31** secured to a side portion of a base casing **16** pivotally supports a crank arm **32** having, at its free end, a handle **33** and, at its inward end, a driving roller **21'** made from rubber material. The bracket **34** mounted on a portion of the upper surface of said casing **16'** pivotally supports the shaft **35** having at its outward end a guide roller **21'** made from rubber material. It is to be noted that another guide roller (not shown) is provided in the same manner as aforementioned. Indicated by numeral **10'** is a hollow disc having thereon a number of xylophone elements **14** as in the foregoing embodiment. The disc **10'** is pierced through its center by a supporting shaft **15'** projecting upwardly from the center of the bottom wall of base casing **16** and is rotatably supported by the three rollers **21** at its bottom wall **22**. Indicated by numeral **28'** is a hammer arm pivotally secured at its base to a connecting member **36** fixedly mounted on an upper portion of shaft **15'** as projected above disc **10'**, arm **28'** having connected to its free end a hammer-head **30**, through the medium of a spring joint **29**, and at its middle portion a resilient sledge-shaped tail piece **37** extending downwardly. Tail piece **37** is designed such that it can be dropped into wedge-shaped apertures **38** of the annular grating defined between frames **39**. This grating is formed in the inner portion of the upper wall of hollow disk **10'**. The frames or bars **39**, which extend radially, are relatively narrow and the number of the frames **39** corresponds with that of the xylophone bars or elements **14**. When the tail piece **37** is lifted on a frame **39**, the hammer arm **28'** is raised, and, as the tail piece **37** falls into a wedge-shaped hole **38'**, hammer-head **30** drops and a xylophone element **14** is struck thereby. A cap **39'** is fixedly mounted on the upper end of the shaft **15'** and covers a central portion of the upper surface of the disc **10'**.

In operation, as the handle **33** is manually operated, the driving roller **21'** is rotated and the disc **10'** is driven for rotation. Accordingly, as long as the handle **33** is kept operated manually, the xylophone is kept played mechanically.

Turning now to FIGURE 7, there is shown another embodiment of the present invention, wherein an improved manual driving means for rotating the disc is provided. As shown in the drawing, the embodiment includes a tubular supporting shaft **40**, an annular nut **42** having a threaded bore **41**, a spiral rod **43** of low pitch and a knob **44**. Shaft **40** projects upwardly from the center of the bottom wall of a base casing **16** and pivotably supports, at its upper end, a xylophone carrying disc **10** through the medium of the nut **42** fixedly mounted in the center portion of the upper wall of the disc **10**, spiral rod **43** being engageable with the thread of nut **42**. When the user inserts rod **43** into bore **41** and depresses it with the knob **44**, the disc **10** is forced to rotate in one direction and then keeps turning by inertia, thereby enabling the xylophone to be mechanically played. As for hammer driving means, any one of the aforementioned two hammer driving means can be used for this embodiment. In this connection, it is noted that to keep the disc **10** rotating even after the inertia has been weakened, it is necessary to provide a known pawl and ratchet mechanism (not shown) between the nut **42** and the disc **10**. Also, it is to be noted that any one of the aforementioned base casings **16** and **16'** does not need to be shaped cylindrically, and that the rollers **21** and **21'** may be of elastic materials such as nylon, plastic etc. instead of rubber. It is further noted that the exterior surfaces of the device according to the present invention can be ornamented with various designs such as colorful flowers, birds, butterflies etc.

Referring now to FIG. 8, there is illustrated another embodiment of the present invention including a power unit in the same manner as in the embodiment shown in FIGS. 1, 2 and 3. The embodiment shown in FIG. 8 differs from the embodiment of FIGS. 1, 2 and 3 in that the hollow disk **10** is fixedly supported by a base casing **16''**, while supporting shaft **17** is rotatably mounted in an axial bore in the disk so that hammer-head **30** can be revolved to successively strike the xylophone bars or elements **14**, by rotating shaft **17**. Except for the omission of such parts as the rollers **21**, etc., the embodiment of FIG. 8 has substantially the same components as the embodiments shown in FIGS. 1, 2 and 3, so that detailed description thereof is believed unnecessary. In FIG. 8, parts or portions identical with those of FIGS. 1, 2 and 3 have been designated by the same numerals as used in FIGS. 1, 2 and 3.

The arrow A indicates a gear train which transmits power from the power unit (not shown) provided in base casing **16''** to the shaft **17**, the power being transmitted through a gear **25** fixed to shaft **17**. When shaft **17**, hammer-head **30** successively strikes the xylophone elements or bars **14** do to such rotation.

FIG. 9 illustrates a further embodiment of the invention which is manually operated and has, other than the substitution of the manual operating means for a power operating means, the same construction of the embodiment shown in FIG. 8 so that detailed description of certain parts of FIG. 9 is not necessary. In FIG. 9, those parts or portions identical with the parts or portions shown in FIG. 8 have been designated by the same reference numerals as used in FIG. 8.

The embodiment of the invention shown in FIG. 9 includes a bracket **31'** which is secured to a side wall of a base casing **16''** and rotatably supports a crank arm **32''** having, at its free end, a handle **33'** and, at its inner end, a pinion **23'**. This pinion **23'** meshes with a crown gear **25''** fixedly secured on shaft **17**. Shaft **17** is rotatably supported, at its lower end, by a bearing **15***a* at the center of the bottom wall of casing **16''**. Disk **10** is fixedly supported by casing **16''**, in the same manner as in FIG. 8.

As handle **33'** is manually operated, pinion **23'**, meshing with crown gear **25''**, is rotated and thus shaft **15** is rotated. The xylophone is kept playing mechanically as long as handle **33'** is manually rotated.

As may be seen from the foregoing description, the device according to the present invention can not only

amplify the sound produced from the xylophone elements, but also can produce a very beautiful tone by a resonant action effected by said hollow disc which serves as a resonant box. Furthermore, the xylophone elements can be replaced by another set of xylophone elements for a different melody and, when the user wishes to enjoy another melody, he has only to replace the elements with another set of elements.

It is also noted that the device can be handled very easily by children and is attractive in appearance.

Thus, the various objects of the present invention as aforementioned may be effectively attained by the features and advantages of the device as described above.

What I claim is:

1. Toy xylophone playing device comprising, in combination, a disk having an annular groove in its upper surface; a plurality of xylophone bar elements positioned on said disk to extend radially across said groove on the upper surface of said disk, and spaced from each other along said annular groove; said xylophone bar elements each corresponding to a respective scale note and said xylophone bar elements being arranged serially in accordance with a predetermined melody; a base casing; a supporting shaft projecting upwardly from the center of said base casing and rotatably through a central portion of said disk; a hammer arm pivotally connected at its inner end to the upper end of said shaft for swinging movement upwardly and downwardly relative to said xylophone bar elements; a hammer head mounted at the free end of said arm to strike said xylophone bar elements; said disk and said shaft being relatively rotatable; means operable to effect such relative rotation; and means operable, responsive to such relative rotation, to swing said hammer arm to cause said hammer head to strike said xylophone bar elements successively to play said melody repetitively during such relative rotation.

2. Toy xylophone playing device, as claimed in claim 1, in which said disk is rotatable and said shaft is fixed against rotation; a plurality of rollers mounted on said base casing and supporting said disk for rotation; said means operable to effect such relative rotation comprising motor means in driving relation with said rollers.

3. Toy xylophone playing device, as claimed in claim 1, in which said disk is rotatable and said shaft is fixed against rotation; a plurality of rollers mounted on said base casing and supporting said disk for rotation thereof; said means operable to effect such relative rotation comprising a manually operable crank mechanism in driving connection with one of said rollers to rotate said disk.

4. Toy xylophone playing device, as claimed in claim 1, including means mounting said disk for rotation relative to said shaft; a nut secured centrally of said disk and having an axially extending spirally threaded bore; a spiral push rod, of low pitch, engaged in said bore of said nut; said spiral push rod being manually reciprocable axially of said nut to rotate said disk.

5. Toy xylophone playing device, as claimed in claim 1, in which said means operable to swing said hammer arm during such relative rotation comprises a cylindrical wall extending coaxially upwardly from the upper surface of said disk, the upper edge of said cylindrical wall being formed with a plurality of serrations equal in number to the number of said xylophone bar elements.

6. Toy xylophone playing device, as claimed in claim 1, in which said means operable to swing said hammer arm during such relative rotation comprises a resilient tail piece on said arm; and an annular grating formed in the upper surface of said disk and including a plurality of radially extending grating bars bounding wedge-shaped apertures equal in number to the number of said xylophone elements; said tail piece swinging said arm, during said relative rotation, as it passes over said grating bars and into said apertures.

7. Toy xylophone playing device, as claimed in claim 1, including means supporting said disk fixed against rotation; and means rotatably supporting said shaft.

8. Toy xylophone playing device, as claimed in claim 7, in which said means effecting swinging of said hammer arm during rotation of said shaft comprises a cylindrical wall extending upwardly and coaxially from the upper surface of said disk; the upper edge of said cylindrical wall being formed with a plurality of serrations equal in number to the number of said xylophone bar elements.

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U.S. Cl. X.R.

46—191; 84—404