March 18, 1969 F. STANTON 3,433,110

WHEELED VEHICLE WITH A VIBRATORY HAMMER

Filed Jan. 10, 1966

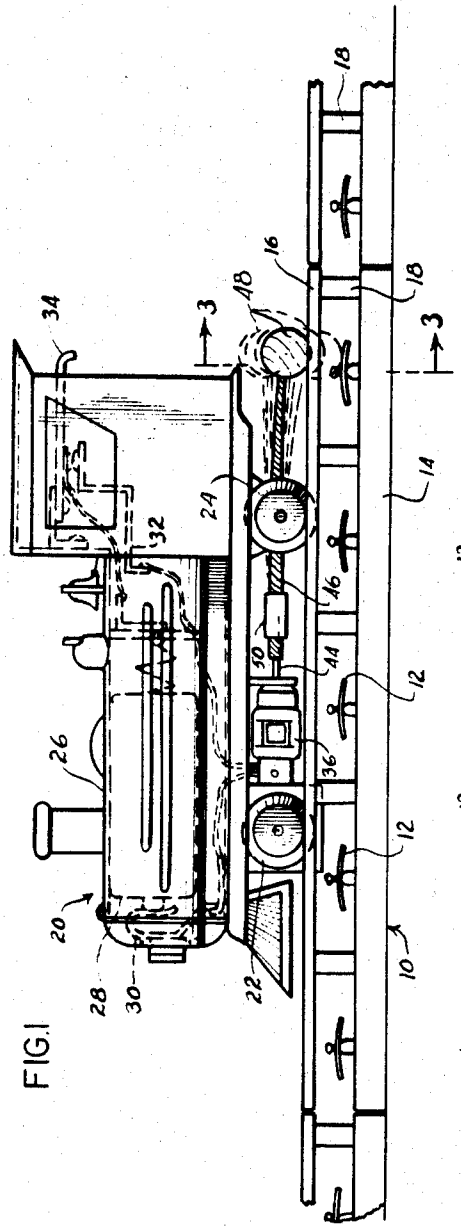


FIG.1

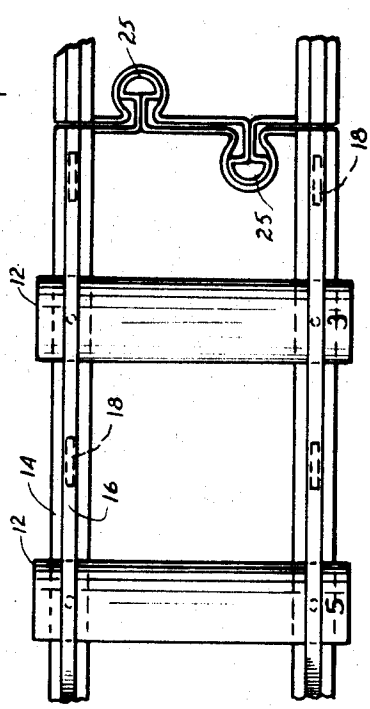


FIG.2

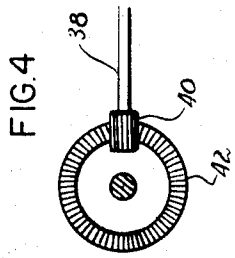


FIG.4

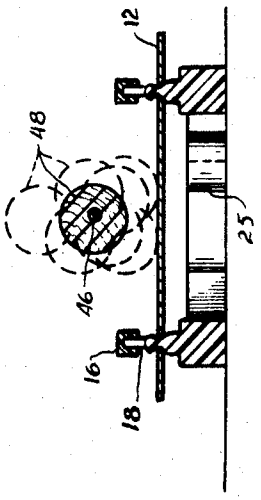


FIG.3

INVENTOR.
FRANK STANTON

BY Sandoe, Neill, Schottler & Wicker

ATTORNEYS

United States Patent Office 3,433,110 Patented Mar. 18, 1969

3,433,110

WHEELED VEHICLE WITH A VIBRATORY HAMMER

Frank Stanton, New York, N.Y., assignor to Cragstan Industries, Inc., New York, N.Y., a corporation of New York

Filed Jan. 10, 1966, Ser. No. 519,507
U.S. Cl. 84—102 4 Claims
Int. Cl. G10f 1/08

ABSTRACT OF THE DISCLOSURE

This is a vibratory hammer for use in a xylophone type toy in which a hammer carried on a vehicle moving along a predetermined path strikes tone bars in the path. It consists of an elongated flexible shaft coupled to the drive shaft of the vehicle so as to be rotated axially by rotation of the drive shaft. A hammer is eccentrically mounted on the flexible shaft so as to deflect the rotating flexible shaft and carry the hammer repetitively into striking engagement with the tone bars in the path.

This invention relates to xylophone type toys and, more particularly, relates to an improved wheeled vehicle adapted for translatory motion along a track having spaced apart tone bars to be struck by hammer carried in the wheeled vehicle and in which the hammer carried by the vehicle is vibrated for repetitively striking the tone bars.

It is one object of this invention to provide an improved mechanism for vibratory energizing of an xylophone hammer.

It is a further object of this invention to provide an improved vibrating hammer and carrier therefore adapted for movement along a track arrangement having tone bars sequentially positioned to be struck by the vibrating hammer in order to play a tune.

In accordance with these objects, there is provided, in a preferred embodiment of this invention, a wheeled vehicle having drive wheels and idler wheels adapted to engage the rails of a track arrangement including transversely extending tone bars. A battery is coupled to a motor which drives the drive wheels to advance the vehicle along the track. A hammer is carried by the vehicle which is vibrated rapidly so as to strike each of the tone bars with a series of impacts to generate a repetitive tingling of each of the tone bars.

A single rotary electric motor is provided, both to drive the drive wheels through reduction gear arrangement and to energize the vibratory hammer. For this purpose, the hammer is mounted on the free end of the flexible shaft and eccentric to the axis thereof. The drive motor shaft is coupled both to the drive wheels and the flexible shaft. As the shaft is rotated, the eccentric mass of the hammer will result in deflection of the shaft and the hammer will describe a circular path, deflecting from the center position by an amount dependent upon the eccentric mass, the eccentricity, and the spring constant of the shaft. The excursion of the hammer is controlled so that the hammer engages each tone bar in sequence as the vehicle proceeds along the track.

Having briefly described this invention, it will be described in greater detail along with other objects and advantages in the following portions of the specification, which may best be understood by reference to the accompanying drawings, of which:

FIG. 1 is an elevation view of the vehicle of this invention on a typical track;

FIG. 2 is a top view of the track;

FIG. 3 is a cross section taken on lines 3—3 of FIG. 1; and

FIG. 4 is a detail view of a portion of the drive of the vehicle of FIG. 1.

In the figures, there is shown an xylophone type toy consisting of a track arrangement **10** having a plurality of transversely extending tone bars **12** located between the supporting beam **14** and the rails **16** which are supportably held above the beam by vertically extending rail supports **18**. The tone bars **12** are positioned between the beam and the rail and are preferably equally spaced apart so as to simulate the cross ties of a railroad or similar type road. A wheeled vehicle **20** is provided, which vehicle is adapted to travel on the rails **16** of the track arrangement **10**. For this purpose, the drive wheels **22** and the idler wheels **24** may be flanged for secure engagement with the rails. For convenience, the track may be formed in sections interlocking by the dovetailed engagement **25** shown in FIG. 2.

The vehicle illustrated is exemplary only since various body styles may be used in different applications.

The wheeled vehicle consists of a body **26** which encloses the energy source such as a battery **28**. Electric energy is drived from the opposite poles of the battery by leads **30** and **32** respectively. A switch **34** is provided to controllably apply the electrical energy to a drive motor **36** which is the miniature electric motor commonly used in toys. The shaft of the drive motor extends outwardly from both sides of the motor casing. One end **38** of the shaft drives the drive wheels as, for example, through a pinion and ring gear arrangement **40** and **42** respectively. The other end **44** of the shaft is coupled to a horizontally extending flexible shaft **46**. For example, the shaft may comprise tightly coiled wire which is both strong in the horizontal direction and extremely flexible in the vertical direction. A hammer **48** is mounted on the free end of the shaft, which hammer is eccentrically mounted with respect to the axis of the shaft as is best shown in FIG. 3. As the shaft **46** is rotated, the eccentrically mounted hammer mass will cause the flexible shaft **46** to deflect and the hammer **48** will describe a circular path. The displacement of the hammer from its rest position will depend upon the eccentric mass, the amount of eccentricity and the spring constant of the flexible shaft **46**. The deflection is adjusted so that the hammer excursion will, in the lower position thereof, strike the tone bar **12**. Of course, the circular path will be interrupted by the impact and the path will be irregular as shown in FIG. 3. However, the cyclic rate of impact remains quite steady. Since the rotation of the eccentric hammer is of a much faster rate with respect to the linear speed of the vehicle, the hammer will strike each tone bar a plurality of times before the drive wheels move the wheeled vehicle over the tone bar. In this manner, a very pleasant xylophone type sound emanates from the repetitively struck sound bars as the wheeled vehicle proceeds along the tracks **16**. For toy production, economy of fabrication is, of course, a necessity. It is rarely desirable to attempt to manufacture tolerances precisely enough to give the exact excursion distance. However, with a coiled spring shaft, the excursion rate may be controlled in simple and efficient manner by applying damper to the shaft such as an adhesive tape **50** taped around a portion of the shaft. The tape dampens the excursion of the hammer by changing the spring rate of the taped portion of the shaft. In this way, simple adjustment of the assembled toy to the desired conditions of use can be adjusted.

What is claimed is:

1. A wheeled vehicle adapted for movement along a controlled path having spaced apart tone bars to be struck as the vehicle proceeds along said path which comprises drive wheels adapted to guide said vehicle along said path, an electric motor, a gear box coupling said electric motor to said drive wheels, a flexible shaft, said flexible shaft being coupled to said electric motor for rotation therewith,

a hammer coupled to the end of said flexible shaft, the center of gravity of said hammer being displaced from the axis of said flexible shaft, said flexible shaft being positioned so that said hammer is adjacent to, but out of contact with, said tone bars when said shaft is stationary and, when said shaft is rotated, the eccentricity of said hammer will cause said hammer to describe a circular path engaging said tone bar at one position thereof.

2. A wheeled vehicle in accordance with claim 1 which includes a battery mounted on said wheeled vehicle and switch means controllably coupling the energy from said battery to said drive motor.

3. A wheeled vehicle in accordance with claim 1 in which said wheeled vehicle includes a gear case extending downwardly between said drive wheels and in which said electric motor is mounted adjacent said gear case with the shaft thereof entering said gear case in driving engagement with said transmission, the other end of said drive shaft

extending horizontally rearwardly of said vehicle, said flexible shaft being coupled to said rearwardly extension of said motor shaft.

4. A wheeled vehicle in accordance with claim 1 in which said flexible shaft comprises a coiled spring shaft.

References Cited

FOREIGN PATENTS

1,256,651	2/1961	France.
846,826	8/1961	Great Britain.

RICHARD B. WILKINSON, *Primary Examiner.*

G. H. MILLER, JR., *Assistant Examiner.*

U.S. Cl. X.R.

84—404; 46—192, 243