

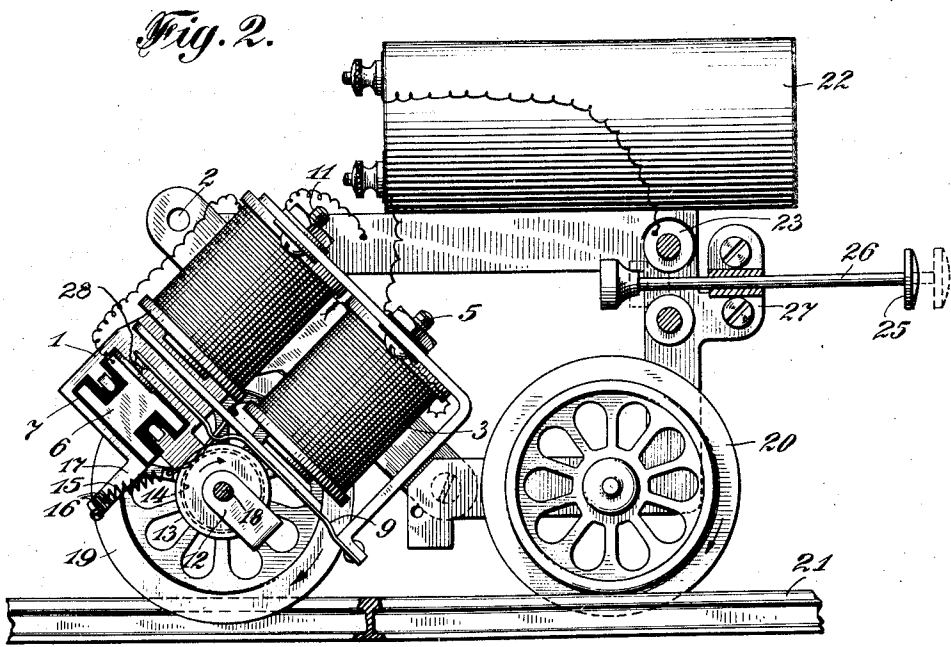
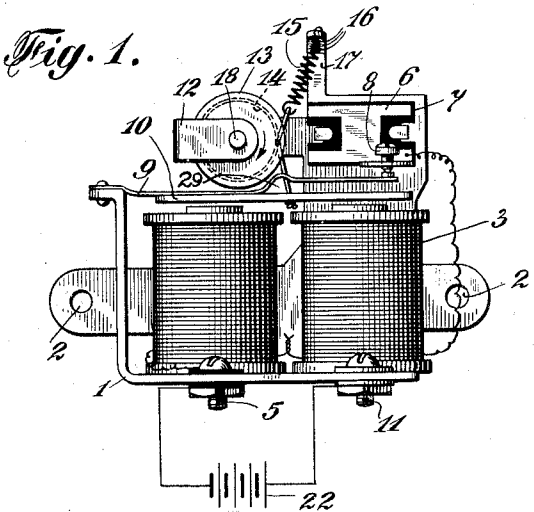
April 15 , 1924.

1,490,125

W. J. O'LEARY

TOY MOTOR

Filed Aug. 6, 1918



William J. O'Leary  
Inventor

George Ramsey  
Attorney

By

## UNITED STATES PATENT OFFICE.

WILLIAM J. O'LEARY, OF MONTREAL, CANADA, ASSIGNOR TO MARGUERITE  
V. O'LEARY, OF MONTREAL, QUEBEC, CANADA.

## TOY MOTOR.

Application filed August 6, 1918. Serial No. 248,607.

*To all whom it may concern:*

Be it known that I, WILLIAM J. O'LEARY, a subject of the King of England, residing at Montreal, Dominion of Canada, have  
5 made a certain new and useful Invention in Toy Motors, of which the following is a specification.

This invention relates broadly to motors and more particularly to toy motors.

10 The principal object of the present invention is an efficient toy motor economical to manufacture and characterized by a vibrating member to which is attached a transmission band of light material which is  
15 passed around a driving drum and with the free portion of the band between the drum and the vibrating member disposed at an acute angle relatively to the vibrating member.

20 More specifically one embodiment of the present invention comprises an electrically operated buzzer with a rotating drum mounted adjacent the armature of the buzzer and with a light weight transmission band  
25 secured at one end of the said armature and encircling the driving drum with the other end anchored to a portion of the frame of the buzzer and with the parts so located that the transmission band leaves  
30 the armature at an acute angle.

A further object of the present invention is a cheap efficient and economical toy motor comprising a buzzer with a relatively small driving drum located close to the armature  
35 of the buzzer and with a light driving band extending around the drum and with a tensioning member which may comprise a light coiled spring secured to the free end of the band to maintain the band in frictional engagement with the drum.

40 A still further object of the present invention is to provide a toy vehicle with a motor as specified and with a source of energy to operate the motor, for example, a small  
45 dry battery, carried by the vehicle, and wherein provision is made for disconnecting the source of energy from the motor to conserve the energy when the vehicle has struck an impassable object, such as in bumping in-  
50 to the side of a wall, etc.

It will be apparent that the present invention may be embodied in constructions other than those specifically disclosed herewith and that other and further objects of  
55 the present invention will in part be obvious

and will in part be pointed out in the specification hereafter wherein like parts are designated by like characters throughout the several figures of the drawings.

Figure 1 illustrates one form of the present invention and shows the motor detached  
60 from any specific toy.

Figure 2 shows the motor attached to a vehicle toy, or more particularly an electric locomotive with the covering or superstructure thereof removed.

Heretofore in the toy art it has been customary to utilize small sized motors carrying a field and a rotating armature and adapted to be supplied with current through  
70 a suitable commutator. The high cost of such toys is largely due to the expense of the motor and in substantially all cases electric toys of this character cost several dollars. Furthermore in view of the sliding contacts,  
75 due to the brushes on the commutator and to the more or less complicated character of such motors, there is a liability of the motor being disabled by the rough usage to which toys are ordinarily subjected.

80 The present invention overcomes the difficulties of the known art by providing an efficient small motor, very cheap and economical to manufacture and of such construction as to stand rough usage without being disabled and which is provided with a very simple adjustment that enables the same motor to run effectually on either direct  
85 or alternating current so that toys may be driven by either battery or house currents.

Referring now more particularly to Figure 1 of the drawings which illustrates the motor detached from any particular toy, the main frame 1 which may be a punching from sheet metal is provided with openings 2 through  
90 which suitable rivets or screw bolts may be applied for mounting the motor. This main frame 1 carries an electromagnet 3, one terminal of which is connected with a binding post screw 5 that is insulated from the main frame. The other terminal of the pair of electromagnets is connected to a contact plate 6 which is secured to an insulating member 7 that is mounted on the main frame  
95 so that the contact plate is insulated from the main frame. In Figure 1 the contact plate 6 carries an adjustment screw 8 which is provided with a terminal or contact point adapted to engage the contact point on the breaker spring 9 which carries the armature  
100  
105  
110

10. The breaker spring is secured to a portion of the main frame by suitable rivets or other securing means. The main frame carries a second binding post screw 11 which is in direct contact with the main frame in such manner that the main frame comprises the medium through which the current is lead to the breaker spring and to the spark gap. The foregoing construction is that of a well known signal buzzer and possesses no especial features of novelty except when in combination with the features herein-after specified.

The main frame is provided with a U-shaped extension 12 in which are formed the bearings for a driving drum 13. A light weight transmission band 14 comprising a linen tape or the like is secured to the armature of the buzzer and preferably is wrapped around the driving drum and with the free end of the tape attached to a coiled spring 15 which is anchored in one of the openings 16 in the lug 17 extending from the main frame. It is to be noted this lug carries a plurality of openings which constitute means for varying the tension on the spring, dependent on which opening the spring is anchored in. This variation of the tension varies the speed of the motor.

The invention comprises more especially the combination of the old well known buzzer with a driving drum and a transmission band in such manner that when the armature of the buzzer is vibrated the drum will rotate. This rotation is best secured by constructing the parts in such manner that the transmission band or tape 14 leaves the armature 10 on an acute angle 29. The angular relationship between the transmission band and the armature causes a whipping motion to be imparted to the band and this whipping motion is somewhat similar to transversely shaking the end of a rope which is attached at the other end to a post. Such a motion sets up in the transmission band both transverse and longitudinal waves. These waves contacting with the periphery of the driving drum cause the drum to rotate toward the end of the band which is connected with the armature. This invention further contemplates the construction and combination wherein the adjustment screw 8 for the spark gap may be positioned in such manner that the vibration of the armature may be effected without opening the spark gap due to the elasticity of the breaker spring. Under such adjustment it will be obvious that the armature may be vibrated by supplying the electromagnet 3 with a pulsating current, for example, the ordinary commercial alternating current. It is likewise obvious that the armature may be vibrated by adjusting the spark gap in such manner that the current is broken each time the magnet is energized

and under this condition the motor may be operated on a direct current such as a battery of proper voltage and amperage. It will therefore be seen that the present construction is adaptable for use on either type of current.

Referring now to Figure 2 the motor is shown as mounted upon the frame of a toy electric locomotive and the shaft 18 on which the driving drum is mounted comprises the axle for the driving wheels 19 of the locomotive. The frame also carries another pair of wheels 20 which support the other end of the frame of the locomotive. Preferably all these wheels are flanged and they thus may be constructed to run on toy rails 21. In this embodiment the frame carries a small battery 22 which is connected to cooperate with a switch head 25 mounted on the end of a push rod 26 which is arranged to slide on the main frame 27 and is constructed so that when the switch head is pulled into engagement with the insulated button the parts tend to retain this position whereby one terminal of the battery is grounded to the main frame. Since one terminal of the buzzer is also connected to the main frame and the other terminal of the buzzer is connected directly with the battery it will be noted that the push switch must be closed in order that the current will flow through the electromagnet. When the current is flowing, the buzzer operates to drive the locomotive. If the buffer of the push switch contacts with an obstruction the switch will be opened and the current broken so that the battery is not discharged by operating the motor after the toy has struck an immovable obstruction. This is particularly desirable where the motor is built into toy automobiles and similar constructions adapted to run over the carpet and to strike furniture or side walls of the room.

In view of the extreme simplicity of the present motor, and the fact that it is adapted for direct drive to toys, etc., without using reduction gears, it is especially adaptable for low priced toys and at the same time the toy constructions are simplified so that the life of the toy is extended beyond that of the more complicated devices. In Figure 2 the adjustment screw for the spark break has been omitted and a permanent contact point 28 is provided on the contact plate 6. Where it is desired to run this toy on an alternating current suitable shoes or trolleys are provided and one terminal of the buzzer is connected to the insulated button and the other terminal is connected to the trolley or third rail so that the current may be introduced through the track into the main frame of the device and from the main frame through the insulated button to

the buzzer whereas the return circuit for the current may comprise the trolley or third rail which is electrically connected directly to the buzzer frame.

5 In the operation of these motors when the electromagnet is energized the magnetic forces gradually build up and gradually draw the armature toward the magnets whereby there is a gradually increasing tension on the transmission band to constitute the power stroke. When the current is released or reversed the magnet tends to lose its force quickly and the tension of the armature spring tends to snap the armature back quicker than the movement thereof during the power or pull stroke. There is another element which tends to make the power stroke the slower movement of the transmission band, and that is, that as the band is gradually pulled taut the resistance to the pull of the armature gradually increases. Whereas when the magnetic forces are on the decline a very little slack in the band is sufficient to accomplish the release so that the releasing action occurs quicker than the power stroke. The above specified action produces a continuous creeping action of the waves around the drum which is thereby continuously rotated.

10 I claim—

1. A device of the character described comprising in combination a driving drum, a transmission band encircling said driving drum, a vibrating member directly connected to said transmission band and forming an acute angle with said band on the side toward the drum, and means for vibrating said member in such manner that the power stroke which tensions the said band is slower than the return stroke which loosens the said band whereby the vibration of the said member causes the transmission band to rotate the drum.

2. A motor of the character specified comprising in combination a rotating drum, a transmission band encircling said rotating drum, a vibrating member comprising the

armature of a buzzer and to which said band is attached, means comprising the coils of a buzzer for causing the said member to vibrate, the angle between said member and said band measured on the side in contact with the drum being an acute angle so that the vibration of said member sets up both a transverse and longitudinal movement in said band to produce the waves in the band which cause the band to rotate the drum.

3. A device of the character described comprising in combination a drum, a frame, a transmission band encircling said drum, an armature to which one end of said band is directly secured, said armature being mounted on said frame to be capable of vibratory movement toward and from said drum, an electromagnet adjacent said armature and adapted when suitably energized by a pulsating current to vibrate the said armature and to set up waves in the said transmission band, said band extending toward the drum at an acute angle to said armature whereby the vibration of the said armature produces both longitudinal and transverse waves in the said band to drive the said drum.

4. A motor comprising in combination a driving drum, a flexible transmission member encircling a portion of the drum, a vibrating member mounted upon a spring and moving toward and from said drum, one end of said transmission member being connected to said vibrating means and extending from said means at an angle in a plane substantially at right-angles to the vibration of said means in such manner that the vibration of said means acts directly on the end of said band, and anchoring means for the other end of said band, said angle being an acute angle toward the drum whereby the band is drawn more closely around the drum when the member moves away from the drum and is partially released from the drum when the member moves toward the drum.

WILLIAM J. O'LEARY.