

Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		LINEAR VIBRATING MOTO FOR SEX TOY		
First Named Inventor/Applicant Name:		Robin F Elenga		
Filer:		Robert Walter Bergstrom/Joanne Bourguignon		
Attorney Docket Number:		35099.002PROV		
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Miscellaneous-Filing:				
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Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
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Title of Invention:	LINEAR VIBRATING MOTO FOR SEX TOY
First Named Inventor/Applicant Name:	Robin F Elenga
Customer Number:	34395
Filer:	Robert Walter Bergstrom/Joanne Bourguignon
Filer Authorized By:	Robert Walter Bergstrom
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File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		35099_002PROVAPP.pdf	1598017	yes	8
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	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Provisional Cover Sheet (SB16)		1	2	
	Specification		3	8	
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	29647	no	2
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Warnings:					
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Total Files Size (in bytes):			1627664		
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Doc Code: **TR.PROV**

Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (04-07)

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Provisional Application for Patent Cover Sheet					
This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)					
Inventor(s)					
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Given Name	Middle Name	Family Name	City	State	Country
Robin	F.	ELENGA	Seattle	WA	US
All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add
Title of Invention		LINEAR VIBRATING MOTOR FOR SEX TOY			
Attorney Docket Number (if applicable)		35099.002PROV			
Correspondence Address					
Direct all correspondence to (select one):					
☒ The address corresponding to Customer Number			☐ Firm or Individual Name		
Customer Number			34395		

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.	
☒ No.	
☐ Yes, the name of the U.S. Government agency and the Government contract number are:	

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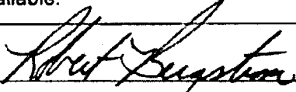
Document Description: Provisional Cover Sheet (SB16)

PTO/SB/16 (04-07)

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☒ Yes, applicant qualifies for small entity status under 37 CFR 1.27 ☐ No					
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Signature				Date (YYYY-MM-DD)	2009-05-18
First Name	Robert	Last Name	Bergstrom	Registration Number (If appropriate)	39906
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LINEAR VIBRATING MOTOR FOR SEX TOY

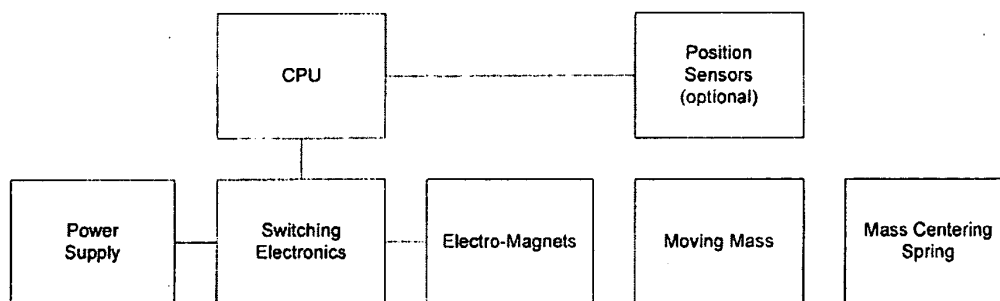
OVERVIEW

This patent covers several variations of a linear resonating vibration motor primarily for use in adult sex toys.

While most vibrating motors used for adult toys use rotary motors that push an off-center weight around to create vibrations, this invention moves a weight back and forth (linearly) to create vibrations.

THE MAJOR COMPONENTS

While there are several variations on the design, they all have the following common components. These components can be assembled in a variety of configurations to create the desired vibrations.

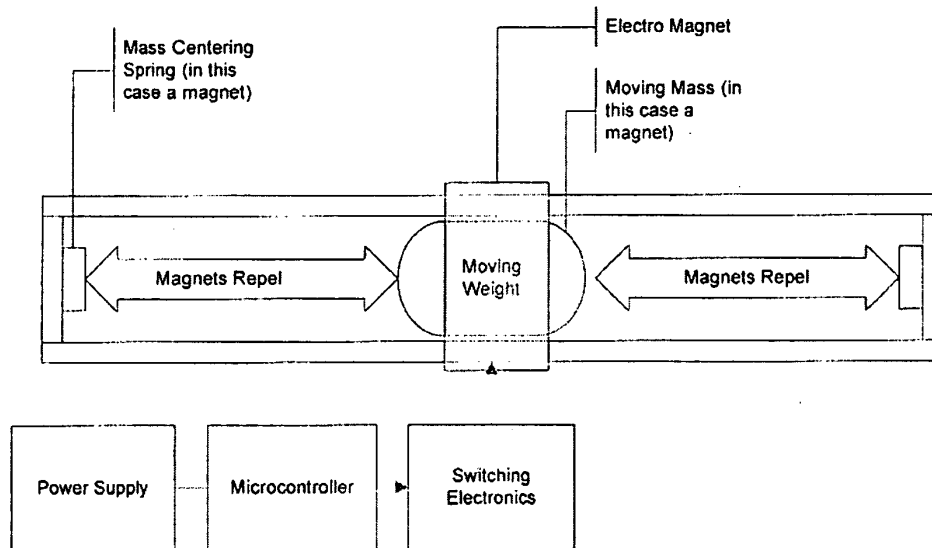


- Power Supply – can be battery or plug in power source
- Switching Electronics – allow the CPU to switch the power to the electro-magnets on and off at high rates of speed.
- CPU – microcontroller or other processor
- Electro-magnets – used to move the moving mass
- Position Sensors – these sensors can be used to allow the CPU to sense either the position of the moving mass and/or the vibrations that are being created. Hall-Effect, accelerometers, voltage or other sensors accomplish this.
- Moving Mass – the weight that moves back and forth generating the vibrations

- **Mass Centering Springs** – The springs make the Moving Mass return to its' center position. These springs may be magnetic, coil springs, gas pressure or elastomer.

THE THUMPER DEVICE – THE BASIC CONCEPT

The following diagram shows a basic 'Thumper' linear vibrator. The unit creates vibrations by forcing the moving magnet to move back and forth.



The Microcontroller sends pulses in to the switching electronics that turn power on and off to the electromagnet at fairly high rates of speed. The way the electromagnet is wired, it can be charged to attract and/or repel the moving mass. As the magnet approaches that spring it slows and reverse back towards the center. By charging the electromagnet in the correct way (push or pull) at the appropriate time, the device pushes/pulls the magnet so that it is, in effect, bouncing from one end of the device to the other end. The effect of the moving mass moving back and forth creates vibrations in the body of the device that holds these components. This process continues until the device is turned off.

THE THUMPER – VARIATIONS

MOVING MASS

In the basic concept diagram, above, to create vibrations, the moving mass moves back and forth fast and hard enough to vibrate the mass of the entire device, which includes the power supply (battery), the case, the electronics, and etc. for the user to feel the vibrations.

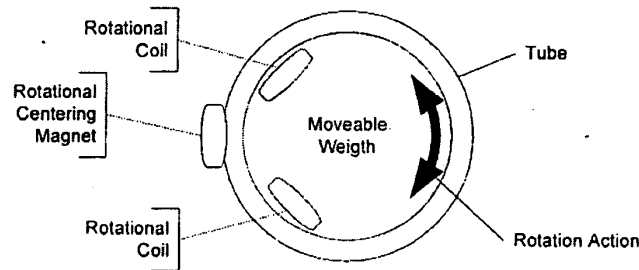
An alternative would be to build the moving mass to contain the power supply (batteries), electronics, electro magnet, etc, instead of using just the weight of the magnet to create the moving mass. In this method, the weight of the non-moving parts would be minimized, maximizing the vibration.

ROTATION OF THE MOVING MASS

In the basic concept diagram, the moving mass moves longitudinally creating vibration. The moving mass may also rotate while it is moving longitudinally, or while the moving mass is stationary from a longitudinal perspective. This may be achieved by using either permanent magnets and/or electro magnets. If permanent magnets are used, the moving mass will rotate back and forth on a fairly predictable and stable nature. If electro-magnets are used, the microcontroller may power one or more electro-magnets as the moving mass moves longitudinally to create rotational action as desired or programmed.

By using multiple Rotational Coils, the extent to which the Moving Mass rotates can be altered (i.e. a set of Rotational Coils that make the moving mass rotate 90° and another set that make it rotate back and forth 120°).

The following diagram shows a cross section of a device. It shows a moving mass inside of a tube. There are electro-magnets in the moving mass as well as a rotational centering magnet on the external surface. This design will make the moving mass rotate as it moves longitudinally.



MULTIPLE MOVING MASSES

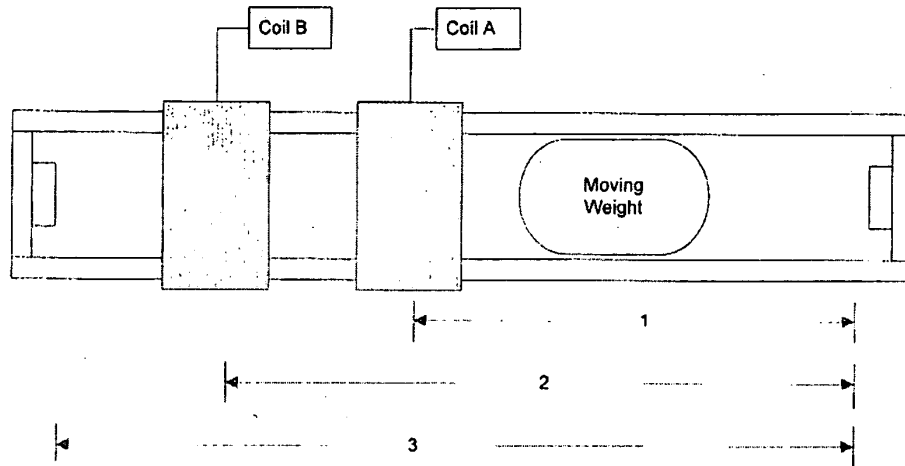
A device may have multiple moving masses. They may have different weights, lengths of travel, or other dimensions that will allow them resonant or vibrate at different frequencies. This will allow the creating of a device that has multiple resonant frequencies.

MULTIPLE RANGE OF MOTIONS

A device may use a moving mass that may have different range of motion controlled by one or more electromagnets. This allows for different frequency/amplitude combinations in a single device.

The following diagram shows a device with a moving mass in a tube. Each end of the tube has magnets (springs) that repel the moving mass. There are two electro-magnets wrapped around the tube. These coils may be used to drive the magnets (creating vibration) and/or to repel the magnet to change the

effective length of the amplitude that the moving mass uses. When Coil B is turned on to repel the moving mass, the effective length of travel is reduced to something less than '2'. When addition if Coil A is turned on to repel the moving mass, the effective length of travel is reduced to something less than '1'.



DAMPENING IN THE DEVICE

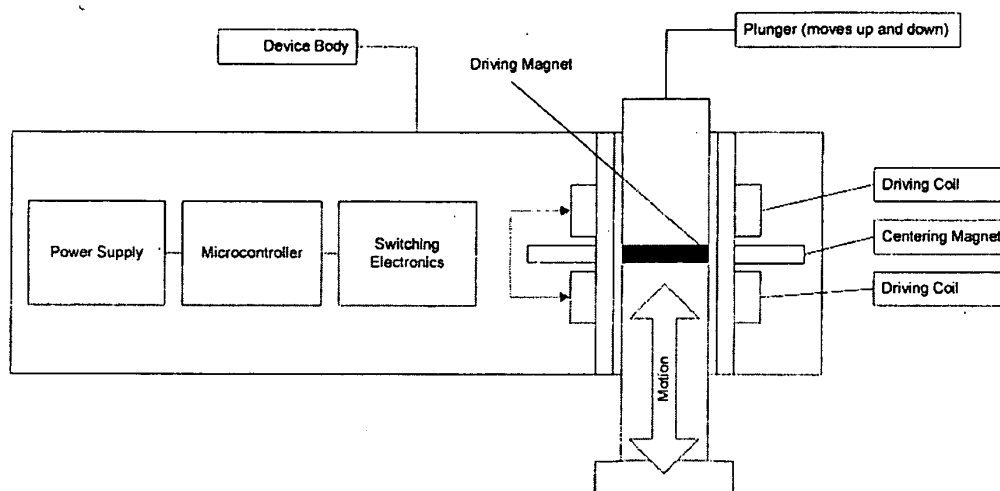
In the device described above, the moving mass moves back and forth within a tube. If the tube is sealed, any air in the tube that is in front of the moving mass will have to go around the moving mass. This will create a dampening effect and potentially an air bearing that will have the effect of minimizing the friction between the moving mass and the tube. The amount of dampening can be altered by:

- Putting a hole in the middle of the moving mass to allow air to go through the moving mass, instead of around it.
- Putting fins on the side of the moving mass that keep it centered in the tube, yet allow more air to go around the moving mass
- Putting holes in the tube on each end that allow air to escape the tube as the moving mass approaches that end of the tube.

THE PATTYCAKE DEVICE - THE BASIC CONCEPT

The following diagram shows a basic 'Pattycake' linear vibrator. The unit creates vibrations by forcing the plunger to move up and down.

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The Plunger is held in place within the device because it has a (driving) magnet inside of it that wants to remain centered inside the magnetic field of the Centering magnet in the device. The plunger may easily be pushed out of the device for cleaning.

The Microcontroller sends pulses in to the switching electronics that turn power on and off to the electromagnets (Driving Coils) at fairly high rates of speed. As the electromagnet is charged, it tends to repel (or attract) the driving magnet in the Plunger, moving out of center with the Centering Magnet. When the electromagnets are not charged or the charge is reversed, the plunger moves the other way in an attempt to re-center itself with the centering magnet. This process continues until the device is turned off with the moving mass moving back and forth, thus creating vibrations in the body of the device that holds these components.

THE PATTYCAKE – VARIATIONS

DIFFERENT PLUNGERS FOR DIFFERENT RESONANT FREQUENCIES

In certain devices, a user can put in different plungers. Each plunger has a different resonant frequency because of a number of factors, primarily the mass of the plunger and/or the strength of the Driving Magnet. The device can be programmed to sense the plunger or the resonant frequency by a training run. In devices with hall-effect sensors, accelerometers, and/or other methods to sense when the plunger is resonating, it can train itself to run at the proper frequencies for a particular plunger.

SINGLE OR MULTIPLE CENTERING/DRIVING MAGNETS

The diagram, above, shows the device with a single Centering magnet in the Device Body and a single Driving magnet in the Plunger. A device may have one or more of each of the Centering and Driving magnets.

ALTERNATIVE SPRINGS

In the Pattycake description, above, the device uses a magnet in the device body and a magnet in the Plunger to make the Plunger body center itself in device body. A device may have a mechanical (probably a coil or flat) spring to make the plunger tend to want to center in the device.

ROTATIONAL MOTION

A device may be equipped with springs or magnets to make the plunger tend to rotate as it moves up and down as described in the section, above, for the thumper.

Claims:

1. An adult sex toy comprising:
 - a power supply;
 - a CPU that receives power from the power supply;
 - a mass;
 - electromagnets that linearly move a mass within the sex toy to create vibrations;
 - switching electronics that allow the CPU to switch power to the electromagnets on and off at high rates of speed; and
 - position Sensors that allow the CPU to sense either the position of the mass and/or the vibrations that are being created.
2. The adult sex toy of claim 1 wherein the mass vibrates at between 120hz and 350hz .



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO.	TOT CLAIMS	IND CLAIMS
61/179,109	05/18/2009		110	35099.002PROV		

CONFIRMATION NO. 8206

34395
OLYMPIC PATENT WORKS PLLC
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SEATTLE, WA 98104

FILING RECEIPT



0000000036134356

Date Mailed: 06/04/2009

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Applicant(s)

Robin F. Elenga, Seattle, WA;

Power of Attorney:

Robert Bergstrom--39906

If Required, Foreign Filing License Granted: 05/22/2009

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/179,109**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

LINEAR VIBRATING MOTOR FOR SEX TOY

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