Opinion on the Two-Stage Mechanical Oscillator

Most of the discoveries in the field of Classical Mechanics were made in the 18th Century and are embodied in Sir Isaac Newton's Three Laws of Motion. So it is surprising and unexpected that a new discovery in this field of science might be made in the last 10 years. Never-the-less, this seems to be the case with the unusual properties of the Two-Stage Mechanical Oscillator designed by Veljko Milkovic.

Newton's First Law describes the action of inertia as a property of mass. It states that "a body at rest tends to stay at rest, and a body in motion tends to stay in motion, unless acted upon by an external force." The Second Law describes the relationship between an impressed force and the mass acceleration that results. It states that "the rate of change of momentum of a body is directly proportional to the force acting upon it." The Third Law describes a reactionary response between masses and their points of reference. It states that "for every action, there is an equal and opposite reaction."

The study of a swinging pendulum relates to all three of these Laws of Motion. Once in motion, the pendulum remains swinging until friction at its pivot point and air drag slow it down. Its back and forth motions describe a complex set of accelerations and decelerations produced by the action of gravity on the mass of the pendulum. And finally, the centrifugal force produced by the angular momentum of the pendulum at the bottom of its swing is perfectly balanced by the constrained centripetal force in the arm the pendulum is hanging from. So, for centuries, everyone has been content to believe that this set of motions and forces has been completely understood.

The Two-Stage Mechanical Oscillator is most easily described as a balance beam with a pendulum hanging on one side and a fixed weight attached to the other side. When the pendulum is not swinging, the two sides are balanced for both weight and mass, and the beam is at rest. As soon as the pendulum is put in motion and begins to swing back and forth, the balance beam begins to gyrate up and down at twice the frequency of the pendulum's swing. Once in motion, the pendulum's swing is described by a set of conserved forces and will only slow down due to the pivot point friction and air resistance. The up and down gyrations of the balance beam are, however, another matter entirely.

With the pivot point of the pendulum now free to move, the centrifugal force of the downward swing is free to act on the moveable beam, while the countering centripetal force remains a constrained force within the arm the pendulum is hanging from. This remarkably simple, mechanical arrangement, liberates a useable force that can be harnessed to produce real work at the other end of the beam, that is not countered by an "equal and opposite" reactionary force in the machine. So, when the pendulum swings down, it lifts the weight on the opposite side of the balance beam, thereby accomplishing real work, (Work = Force x Distance) measured in Newton-Meters. When the pendulum reaches the top of its swing, it experiences a brief moment of weightlessness, as it reverses the direction of its swing. At that moment, the side of the balance beam with the fixed weight on it becomes heavier, and it drops with a large force indicative of the unbalanced condition. Each time the pendulum swings back and forth once, the weight is lifted and dropped twice. Neither the lifting of the weight, nor its dropping, nor the removal of work from the movement of the beam, impress any forces on the pendulum that act to damp out its free oscillation.

This situation apparently creates a special case where Newton's Third Law of Motion does not apply. It allows the machine to tap a combination of Gravity and Centrifugal Force as an "external force", as described in the First Law, and thereby create new, useful energy as a result. Measurements by Milkovic and others have confirmed, under favorable circumstances, that 12 times more energy is available to perform useful work at the other end of the balance beam than is required to keep the pendulum swinging. This certainly ranks as one of the most important discoveries in science in the last 300 years.

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