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Does the Law of Conservation of Energy Always Apply?

Surendra Kumar, Satyam Awasthi
Independent Researchers
Lucknow(U.P)

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Abstract:: As we know that energy can not be create nor destroy it always converted to one form to another form. In this paper I tried to find out such a condition in which there is no energy conservation is apply and output energy is greater than the input energy(theoretically). In this condition I take a light frame, square in shape with 2 frame and in the middle, there is cylinder (mass =M, Radius =R) which is connected with light rod having radius = 2R (twice of cylinder's radius but massless). When we allow to come down at inclined plane, after reaching to the ground it strikes with obstacle (point "A")
Then due to collision it rotate (conservation of Angular Momentum) and gives more energy than potential energy of the cylinder due to height (h= BC)

Keywords— Conservation of Energy, Conservation of Angular Momentum

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I. INTRODUCTION

In this paper I tried to find out a condition in which energy conservation does not applying

Because (fig. 1) cylinder which attached between 2 similar light frame in square shape having mass =M and Radius =R , it attached with another massless rod which has radius =2R and massless. As we know thatpotential energy of the body is equal to its final kinetic energy, when we allowed to slide on frictionlessinclined plane from height(BC = h) then when it reaches to ground then its final kinetic energy is equal to its potential energy but cylinder collide with small obstacle (point "A").It will rotate because of conservation of angular momentum and its radius of rod which is attached to the cylinder Will get higher angular impulse because of radius is twice but moment of inertia remains the same.

Angular momentum always occurs whether its collision is elastic or inelastic ,here in this papers we increases the radius but not the mass of cylinder so , angular momentum increases

M*V* 2R= angular momentum , with twice radius but massless

$I*w= 1/2MR^2 * w \Rightarrow w= 4*V/R$,

If we not taken have rod's radius , then angular velocity = 2*V/R (R is the radius of cylinder) ,

Then we obtain less surplus energy because of decrease in length(2R to R) of rod's nor increase in mass of cylinder ,

Lets solve the problems

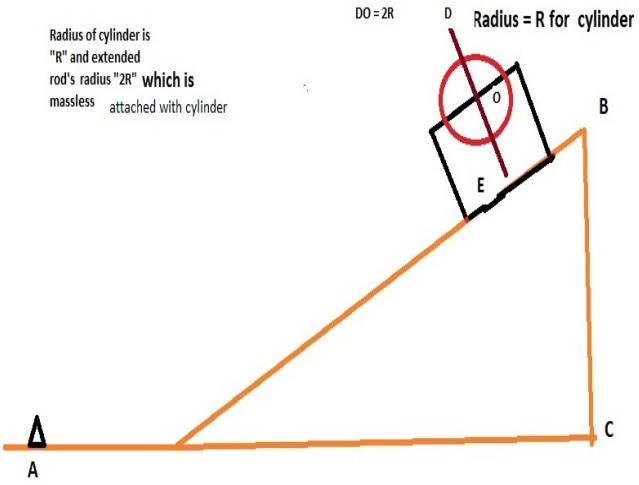

Figure 1.

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Now,

Frame is situated at height =h (BC)

Potential energy = Mgh …….. (1)

After reaching to ground , Kinetic energy= ½ M V^2 **…….(2)**

Now both energy have same value

Mgh= 1/2M V^2 , now velocity at ground is V= $(2gh)^{1/2}$ …… (3)

Radius of cylinder = R , Mass =M

Length of rod = 4R , massless

DO = 2R

Now,

This frame is not collide with obstacle(which is fixed) it passes because of 2 frame ,one behind , but cylinder's rod will collide with obstacle and produces rotational motion because of angular momentum.

Angular momentum of cylinder before collision = angular momentum after collision

M*V* 2R= ½(MR^2 *w (because MVR= moment of inertia *angular velocity)

Thus, w = (4 *V)/R …….. (4)

Final kinetic energy of cylinder

½(1/2MR^2) w^2 …… since I= ½ M R^2 , moment of inertia of cylinder axis passing through center and perpendicular to surface area

From this equation and (4)

Kinetic energy= 1/4M*R^2 *(4*V/R)^2 ,

K.E =4*M*V^2 = 4*2*g*h*M= 8* Mgh …. (it is excess energy which 8 times of input energy)

If we take the case of inelastic collision , still conservation of angular momentum occurs, take half angular momentum transfer to cylinder => M*V*R,

Then energy obtained using same above equation

KE = 2* Mgh

Energy obtained only twice .

Result : after the collision energy obtained as rotation its 8 times of its potential energy and when radius becomes "R" then we only obtained 2 times of potential energy

Conclusion:

Above problem we can interpretate that energy somehow we can obtained surplus energy Because of moment of inertia is not changing but radius changes due to Rod's length which is responsible for increase in angular impulse, thus, increases angular velocity

This system can be modified by any researcher to mitigate the climate change and global warming

Reference:

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