Centripetal Centrifugal Gravity (CCG) Wheel
version 9.2 Wise Wheel

For the working principles of the CCG (pronounced SeeSeeGee) Wheel, you need to first understand what centripetal and centrifugal forces are:
http://www.infoplease.com/encyclopedia/science/centripetal-force-centrifugal-force.html

BTW: There are physicists that state there is no such thing as centrifugal force, only a relative lack of centripetal force.
Be that as it may, I'll use centrifugal (outward seeking) force and centripetal (inward seeking) force as terms/concepts to present the working principles of the CCG Wheel.

The 'working concept' is to use centrifugal force to 'fling' the weights (rollers) outward as far as they are allowed go.

On the left side of the wheel, the weights are allowed to go fully to the rim until they are stopped (constrained) by the weight axles reaching the ends of the slots in the main side wheels. This constraint is a centripetal force.

On the right side of the wheel, the weights are constrained (centripetal force) by the **Centripetal Ramp** (CR). The CR forces the weights inward so that they are not 'balanced' with the weights on the left side of the wheel, thus creating wheel axle leverage torque from gravity (see spreadsheet).

For any gravity wheel to work, there must continually be more weight (and/or more leverage torque) on one side of the wheel than is on the other. In this case, the weights on both sides of the CCG Wheel are identical but are 'shifted' so that the wheel's center of gravity is to the left of the axle. The result is a constant torque on the wheel.

The CCG Wheel will not 'self-start'.
This is a MAJOR difference between the CCG Wheel and 'other' gravity wheel attempts.
The CCG Wheel **requires energy input to bring it up to speed** so that the weights will be flung outward by centrifugal force.

Once up to speed (I calculate about 70 rpm for the 2' design), it should start self-running and accelerating because gravity adds a constant leverage of about 5 ft/lbs on the left side of the wheel REGARDLESS of the speed of rotation.

Math to calculate rpm needed for CCG Wheel to start to produce power from gravity.

Gravity Velocity formulas from http://suncitydave.info/scigrav.htm
Velocity (feet per second) = SQRT (2 * Gravity * Height(feet))

First find Velocity of a mass when dropped from a given Height
4" drop = 0.33333333'
SQRT(2*32*0.33333333333) = 4.618802130422996 fps

Second, find rpm from fps drop.
I'm assuming that if an object is moving upward against gravity, it would need exactly the same energy it would acquire by dropping. For every action there is an identical opposite reaction. Since dropping 4" gives 4.618802130422996 fps, we need to have an object moving at 4.619 fps (or greater) to RISE 4".

Calculating the circumference of a circle with a diameter
(D x π = C).   D = diameter, C = circumference, R = radius, π = 3.14159

Inner weight D = 16” = 1.3333333333’
Inner weight C = 1.333333333333*3.14159 = 4.18878666’
4.618802130422996 fps * 60 = 277.1281278253797 fpm
277.1281278253797 fpm / 4.18878666’ = 66.159523 rpm

http://www.convertworld.com/en/power/Foot-pounds+per+minute.html
5 ft/lbs * 277 ft/min = 1385 ft-lbs/ft/min = 0.04 hp = 31.3 watts

So the weights on the CCG Wheel inner radius ‘should’ rise (toward the 12 o’clock position against gravity) when the inner ‘weight’ radius of the CCG Wheel exceeds 67 rpm. This will assure the weights are moved to the left as the wheel rotates, creating the gravity torque / leverage needed to accelerate the CCG Wheel.

I label the weights starting with #1 at the 12 o’clock position (90°) and proceeding counterclockwise around the wheel; so weight #2 is in the 11 o’clock position.

It shouldn’t matter that the weight #1 is ‘floating’ upward against gravity. My previous experience with gravity wheels is that the wheel ‘knows’ where the weight is in relation to it’s axle regardless if it is ‘attached’ to (or touching) the wheel in any way.

The CR will cause some energy loss due to friction but the moving of weights inward adds acceleration to the wheel. Like a figure skater that pulls in her arms and legs to increase the rpm of her spin.

To physically demonstrate the acceleration of a mass in an ever tightening circle, I think you've seen those 'donation vortexes' where you put in a coin and it spins around as it gradually 'falls' into the center of the vortex. The coin spins faster and faster (rpm is increased) as the vortex gets smaller.
https://www.youtube.com/watch?v=f_lkUR3nJsc
This is because the fps (or fpm) is only reduced by friction, not by the constraint of the centripetal force impressed by the shape of the vortex.

I KNOW it's hard to consider a static shape (like the CR) to be a 'force' but it really is.

An object in motion will continue in a straight line unless a force is exerted externally.

The 'shape' of the CR provides a 'force' that causes the weight to change direction (move inward).

Similarly, the ends of the weight axle slots apply a centripetal 'force' that constrain the weights to move in a circle at the outer radius of the slots.

A common example of a centripetal force is a weight on a string swung around in a circle. The string is applying the centripetal (inward seeking) force, simply by preventing the weight from proceeding in a straight line. The string ‘*constrains*’ the weight to a circular path *without adding or subtracting kinetic energy*. If the constraining ‘centripetal force' is removed (release the string), the weight would continue traveling in a straight line from the point of release.

Some people will think that it takes energy (from the wheel) to move the weights inward against centrifugal force. This is and isn’t true. It does take a ‘force’ to change the direction of a moving mass BUT…

Due to conservation of energy, moving the weights inward actually tries to ADD velocity to the CCG Wheel, causing it to 'want' to accelerate.
The CR, on the right, is stationary and provides the 'centripetal force' needed to move the weights inward at the appropriate time, *using no energy input and taking no energy from the wheel*, to keep this wheel's center of gravity to the left of center.
The CR doesn't add or subtract energy from the wheel directly.

Here's some Math to demonstrate why the wheel would want to accelerate...

The outer weight diameter is 2', which is 6.28318' circumference * 66.159523 rpm = 413.70740603314 fpm. So if released from the centripetal force holding the weights constrained in a circle at 66.159523 rpm, the weights would move away from the wheel in a straight line at 413.70740603314 fpm.

The inner weight diameter is 16" or 1.3333333333' which is moving at 277.1281278252797 fpm (see math above). 277.1 fpm is what is required to raise a weight 4" against gravity using centrifugal force.

So when you move the weights from the outer circumference (moving at 413.7 fpm) to the inner circumference (moving at 277.1 fpm)... The wheel WILL try to accelerate because the weights will want to remain at 413.7 fpm and the inner circumference is only moving at 277.1 fpm.

An acceleration force added to the wheel when the weights are moved inward… This 'added force' is then balanced by the 'loss' of acceleration as the weights leave the CR (at the 1 o'clock position) and need to be re-accelerated out to the main wheel rim velocity. It'd be good to have a flywheel to balance out these forces.

In the current design, the weights will 'roll' on the CR and the weight axle bearings will roll in the wheel slots. Using bearings allows the weight 'axles' to 'counter-rotate' with minimal effect on the rotation of the wheel and/or the axle traveling in the wheel slots.

In the 9.1 version of the CCG Wheel, with no weight axle bearings, the axles would not only have friction against the side of the wheel slots, but the rotation of the axles would 'fight' the direction we are trying to move the weights; like a tire trying to 'drive' the weight outward as we are trying to slide it inward.

The 9.2 version of the CCG Wheel also has a central wheel with a CR on each side. The weights would then look like mini barbells (a weight on each side on the wheel with an axle in the middle). The 'weight assembly' could be assembled into the wheel.

The 9.2 version of the CCG Wheel also has larger diameter weights, to increase the potential energy to be gained.

The 9.2 version of the CCG Wheel has 4" diameter weights that have 0.5" diameter axles.
Weights (at this time) assumed to be 7/8" (0.875") wide, made of steel (could be steel rimmed lead or lead filled tubes?).

The 0.5" weight axles fit through **2 ball bearings** that have an ID of 0.5", OD of 1.125" and a width of 0.3125" (so the total bearing width is 0.625 to stabilize the weights).
https://www.acklandsgrainger.com/AGIPortalWeb/WebSource/ProductDisplay/globalProductDetailDisplay.do?item_code=GGF1ZGD5

The weight axles are ??2.75"?? long
(to go through both weights and the CCG Wheel and to provide 1/16" clearance for the weights on each side of the wheel.

How the weights are attached to the axles is yet to be determined but assume press fit at this time.

The weight axle bearings slide in a 1.15625" wide x 4" long slots in the main wheel (gives 1/32" slip clearance). Bearings and slot slides to be lubricated to reduce friction.

The CCG Wheel is 0.69625" wide (to equal the width of the weight bearings plus 1/32" for side clearance). The CCG Wheel may be made from steel (maybe an engine flywheel, which already has gear teeth to apply the motor to) or wood for prototype...

The CCG Wheel then has a steel **'bearing retainer'** cover on both sides that is 1/16" wide and it has slots to match the main wheel slots except that the slots are 3.5" long and 0.5625 wide (the slots allow the axles to move freely but retain the bearings). The bearing retainer covers are held in place with recessed screws.

The CCG Wheel main axle (0.75" OD) rests in bearings that are built into stands that are attached to the outside of the CRs.
https://www.acklandsgrainger.com/AGIPortalWeb/WebSource/ProductDisplay/globalProductDetailDisplay.do?item_code=GGF1ZGD7

Between the CR and the Wheel stands we add a 1/16" **'Weight Guide Plate'** that is the exact same shape as the CR but extends above it by 1/8" (and then extends around the whole wheel so that the weights are continuously 'guided'?). This plate is intended to 'guide' the weights onto the CR so that they don't go too far off register and grind against the side of the main wheel or hit the Wheel stands.

The two CRs are separated by a CR Spacer Block that holds the CRs 1" apart
(Width of wheel = 0.69625 +
Width of two bearing retainers = 0.125 +
Width of two clearance spaces of 1/16+" = 0.125+)

The CRs are 1" wide, so are 1/16" wider than the weights.

The Wheel stands, the CRs, the CR block and the CR Weight Guides are all bolted together with bolts that go through them all, side to side.

As I stated before, **the CCG Wheel will NOT SELF START**. It requires an energy input to get it up to 'centrifugal' speed, so that the weights will be 'flung' upward and outward against the force of gravity.

After that (the theory is) the weights will distribute themselves to move the wheel's center of gravity horizontally to the (in this case) left of center; allowing gravity leverage to add energy to the wheel.

I do not know how to pre-calculate the horsepower that the CCG Wheel will produce, so my intent is to build one and measure it.

I'll use an inductive motor to spin the CCG up to speed and then, if there is any gravity input, the wheel will continue to accelerate (with 5 ft/lb force) to a higher rpm than the motor is rated for.

As you increase the rpm of an inductive motor, ***it turns into a synchronous generator***! Full details of this are in my Reverse Your Electric Meter, Legally book.

What this means is that the 'motor' I add to the CCG Wheel will become the generator we need to *extract electrical energy from the wheel*; assuming my working theories and design are correct.

Generally, inductive motors will output full rated power (as a generator) when overdriven about 10%... So if this works we might have to put brakes on it, to prevent the motor from becoming overheated from producing too much power.

Once we can calculate the CCG Wheel's actual output power (and assuming it is enough to bother with), we can size the motor so that it is slightly greater than the CCG Wheel's ability to produce power, so the power needed to turn the motor into a generator up to full output will be greater than the CCG Wheel's output power; so the CCG Wheel will 'self-brake' or self-regulate it's speed.

The CCG Wheel may still require some sort of emergency brake, because the 'self-regulation' technique only works if the motor / generator has a load; like feeding the 'excess' power back into the Grid (slowing down or reversing your electric meter).

Measuring the CCG Wheel's energy input and output will be easy, simply flow the electrical input through an 'oldstyle' watthour meter that has a rotary disk. As energy flows in, the disk turns one direction. As the CCG Wheel (theoretically) starts to gain gravity leverage, the disk speed will slow down and (assuming this works as planned) as the CCG Wheel starts to accelerate, the watthour meter's disk will reverse.

The watthour meter will tell us the exact quantity of input and output (if there is any) power.

I expect that there might be a rising energy output even before full motor rpm, because even if the weights don't rise fully to the 12 o'clock position (against gravity), they will still fling outward to the rim diameter by the time they are in the 10 o'clock position, which allows full gravity torque.

1/8 hp motor can be built into one of the CR stands.
https://www.acklandsgrainger.com/AGIPortalWeb/WebSource/ProductDisplay/globalProductDetailDisplay.do?item_code=AOSBLR6403

Calculating motor drive gear size.
CCG Wheel rim diameter = 28 * 3.14159 = 87.96452"
87.96452" * 70 rpm = 6157.5164" / minute = 513.126366666666667 fpm
Motor turning at 1000 rpm. 6157.5164" / 1000 = 6.1575164 circumference = (6.1575164 / 3.14159) = 1.957314727105121" diameter drive gear.
(a typical four-pole motor running on 60 Hz might have a nameplate rating of 1725 RPM at full load, while its calculated speed is 1800 RPM.)

1/15 hp motor calculation:
https://www.acklandsgrainger.com/AGIPortalWeb/WebSource/ProductDisplay/globalProductDetailDisplay.do?item_code=AOS484
Calculating motor drive gear size.
CCG Wheel rim diameter = 28 * 3.14159 = 87.96452"
87.96452" * 70 rpm = 6157.5164" / minute = 513.126366666666667 fpm
Motor turning at 1400 rpm. 6157.5164" / 1400 = 4.398226 circumference = (4.398226 / 3.14159) = 1.4" diameter drive gear.

If the CCG Wheel 'takes off' and starts accelerating, an AC induction motor will turn into a generator that will output it's rated Hp when overdriven about 10%. See my book Reverse Your Electric Meter, Legally for more details on overdriving induction motors.

The CR needs to be designed to minimize a rapid change in position of the weights from the outer to the inner radius. If the angle is too sharp, the weight axle bearings may bind against the wheel slots.

In the 9.2 version of the CCG Wheel, I start the CR at about the 8 o'clock position so that the change in direction angle can be as minimal as possible.
Note: Reducing the weight radius starting at the 8 o'clock position does not dramatically affect (lose) gravity torque because most gravity torque / leverage is generated in the range of 30° above and below the 3 o'clock to 9 o'clock horizontal (0/180°).

In the 9.2 version of the CCG Wheel, I release the weights from the CR just after the 2 o'clock position, so that the energy taken from the wheel to re-accelerate the weights to the outer rim velocity can be balanced with the energy input from the centripetal force of the weights moving inward from the 8 o'clock position. This also gives the weights the TIME they need to rise / re-accelerate to the outer radius.

Centrifugal force can be considered to be an anti-gravity force because it allows the weights to be flung upward and outward against the force of gravity.

The CCG Wheel differs from many other gravity wheels, for examples:
https://www.youtube.com/watch?v=xDF0cugCoMM
https://www.youtube.com/watch?v=XX4lAEcixSA
https://www.youtube.com/watch?v=3vvQ8c0Evjc
because the CCG Wheel uses centripetal/centrifugal forces to move the weights in and out independently of gravity (or springs, etc.) AND does it in a way that the centripetal/centrifugal forces HELP the wheel accelerate instead of acting to limit the wheel's rpm.

If 'other' wheel designs (that shift weights in and out) work at all, they would stop working once centrifugal force prevents the weights from moving inward at the appropriate time.

The CCG Wheel differs significantly from the gravity wheel designs that use weights on both ends of sliding rods and a CR to move the rods from the left to the right.

First, the independent weights on the CCG Wheel can move in and out independently of their opposite counterparts.

Second, independent weights are able to be 'flung' by centrifugal force, whereas 'balanced/connected' weights are not.

Third, independent weights don't require the moving of the additional mass of the rod, with associated frictions.

The CCG Wheel differs significantly from the gravity wheel design that uses springs to move the weights out to the rim and a CR to move the weights in on the rising side.
https://www.youtube.com/watch?v=P_lZgn4pasA
https://www.youtube.com/watch?v=bmjBTSdCiVg

First, there is no need for the complications of springs and catches (KISS principle).
Second, springs ADD both friction and force that are not needed.