Chronometric Concepts

Philip Abernethy

2019

Introduction

Building on the success of earlier sculptural clock work the following pages illustrate six new conceptual timepieces that have been in design phase over the past 3 years.

The new designs explore the craft of clockmaking with a more refined and technical approach than previous sculptural works however the intent to illustrate and convey the fascinating history of Horology is ever present. My interest in escapements as mechanical sculpture is still a significant feature in the work with several new adaptations of the gravity escapement including the new *X Gravity* escapement.

I've also developed a new format of table clock that minimizes the exposed gearing in order to showcase escapements and their operation. The new format accommodates the application of any type of escapement to the piece.

Should any of the designs be of interest
please contact me for more details.

Best regards,

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Nautical Gravity

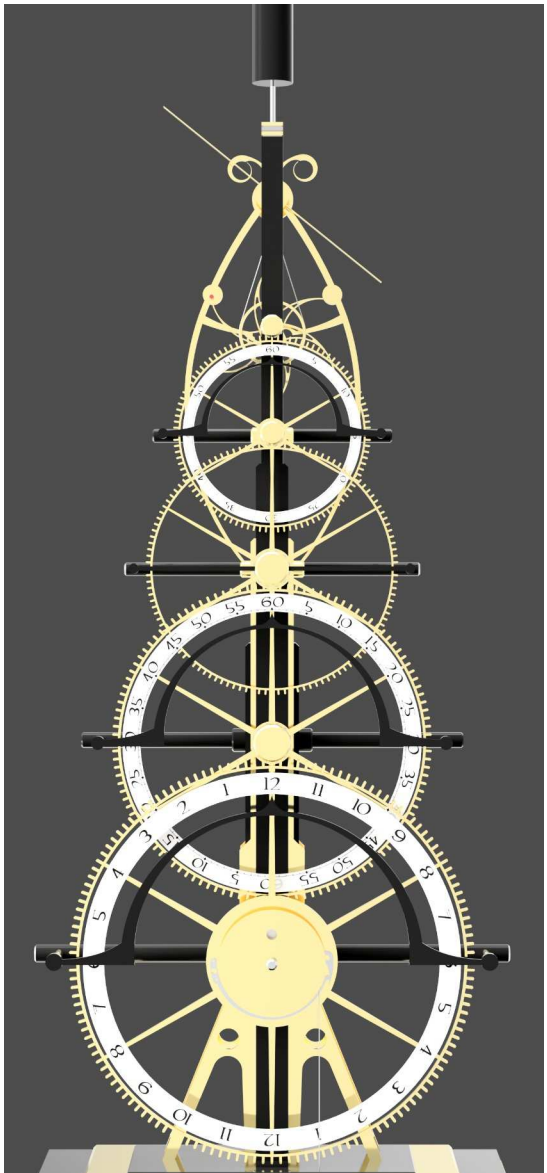
Escapement Type: Double 3 Legged Gravity
Double Ended Seconds Pendulum
Winding: Manual
Overall Dimensions: 87 H 30 W 175 D cm

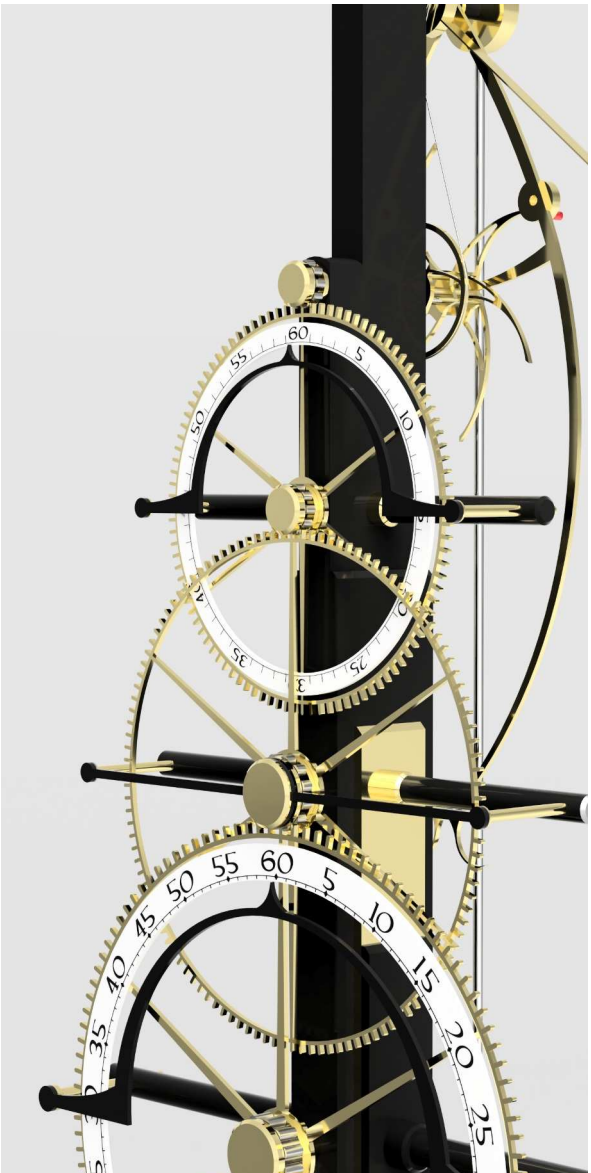
As the design was coming together, I could not help seeing a nautical theme, hence the title. I'm reminded of the ocean going clippers of the 19th century, their romantic elegance, majesty and beauty of their lines.

Following on with the nautical theme I would utilize Harrison's Chordal Pitch for the wheels and roller pinions. John Harrison (1693-1776, famous for his discovery of Longitude, developed this type of gearing to minimize rolling contact between the wheel teeth and pinion. I've used this type of gearing in several other works and have found it to be very efficient and durable.

The double ended seconds pendulum would provide a comforting cadence to any setting. The time would be set via move-able dial rings and power for the clock is provided by a constant force spring hidden within the base of the clock.

The finish would be satin black steel complimented by gold lacquered or gold plated components.





Arching Gravity

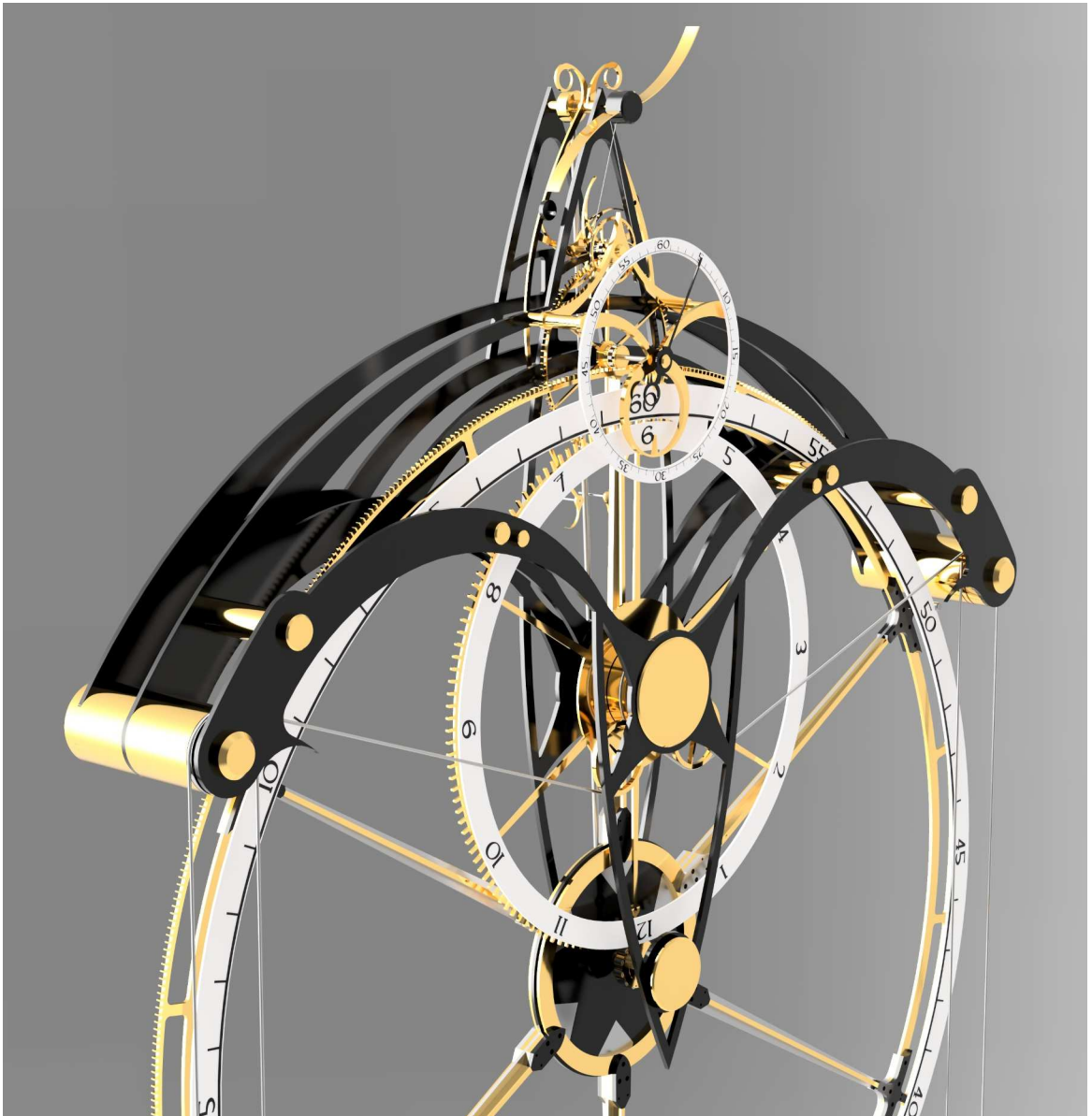
Escapement Type: Double 3 Legged Gravity
Seconds Pendulum
Winding: Automatic
Overall Dimensions: 120 H 75 W 12 D cm

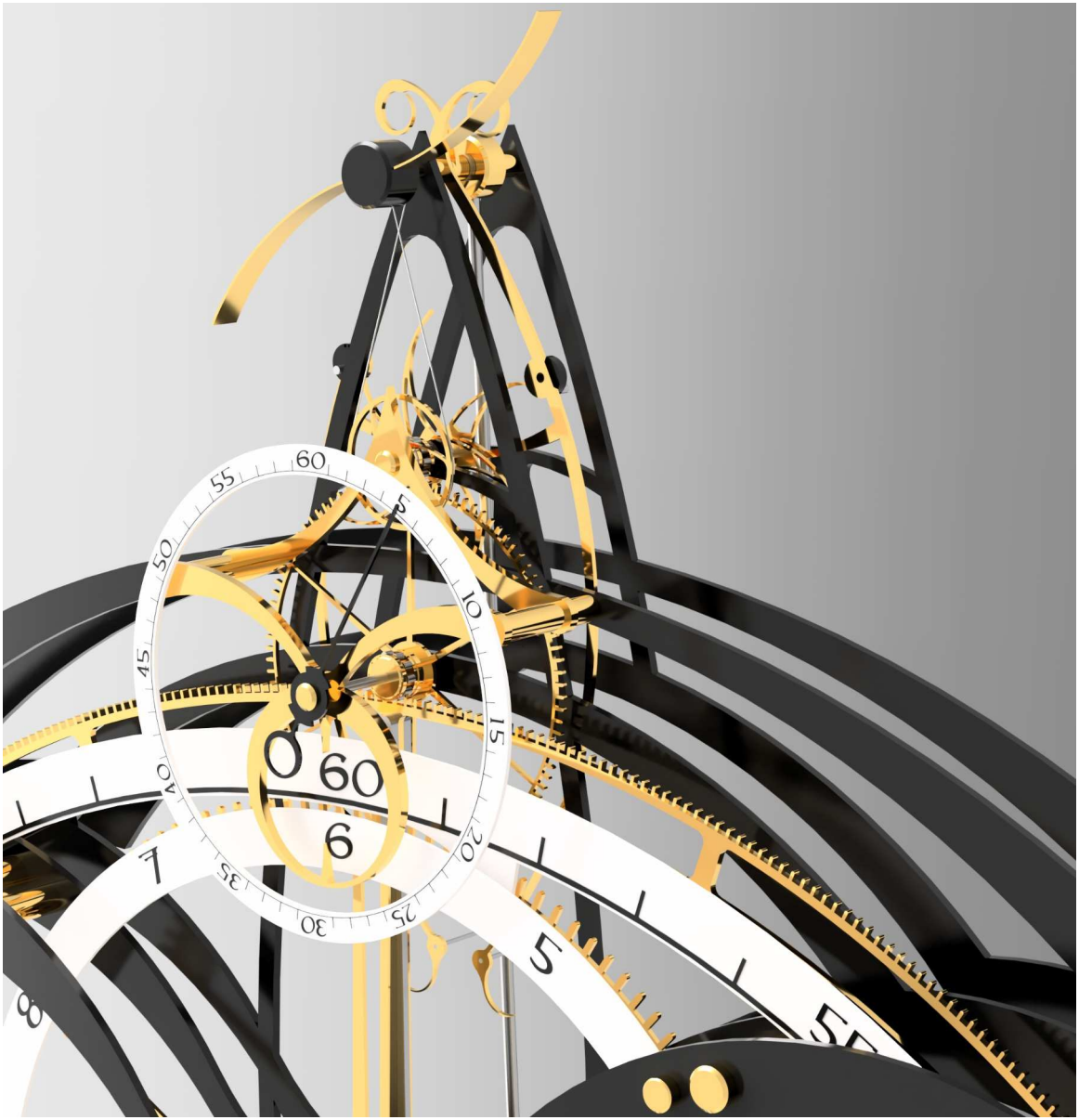
Arching Gravity features a substantial wheel of 576 teeth in Harrison's Chordal Pitch arrangement. Suspended gracefully from an arcing steel frame with an exposed double 3 legged gravity escapement driving a seconds pendulum.

Time is read via movable rings passing a register, behind which the activity of the escapement, the speed dampening fan and alternately lifting gravity arms counters the slow revolutions of the large wheels.

By necessity the work would only be available as an automatically wound work, with winding occurring every few hours.

The finish would be satin black steel complimented by gold lacquered or gold plated components.

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X Gravity

Escapement Type: Gravity
Seconds Pendulum
Winding: Automatic or manually wound
Overall Dimensions: 210 H 50 W 20 D cm

X Gravity would employ a unique escapement of my own design based on the Gravity escapement geometry. Tandem linked wheels with cams reset the gravity arms at each impulse of the pendulum. The pendulum is suspended on Harrison type anti-friction wheels as he used in his early sea going clocks

An animation illustrating the escapements operation can be seen on line in the *In Development* section of my website or by scanning the QR code below.

The example illustrated would be automatically wound, however, a manually wound version is possible.

The case would be of a piano black finish with gold plated trim.
Interior lighting above the clock movement would highlight the movement.

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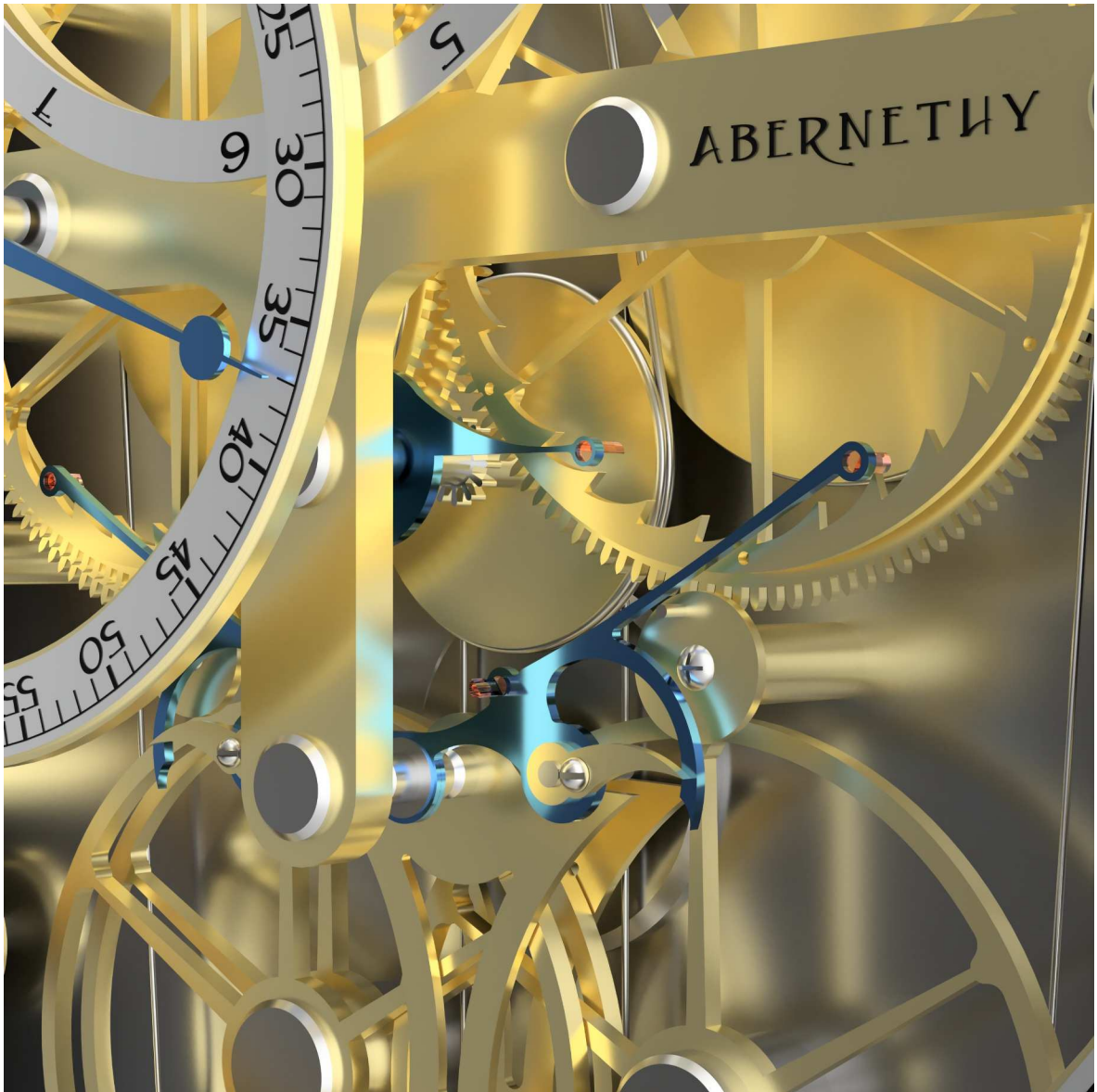
ABERNETHY


ABERNETHY

Standing Gravity

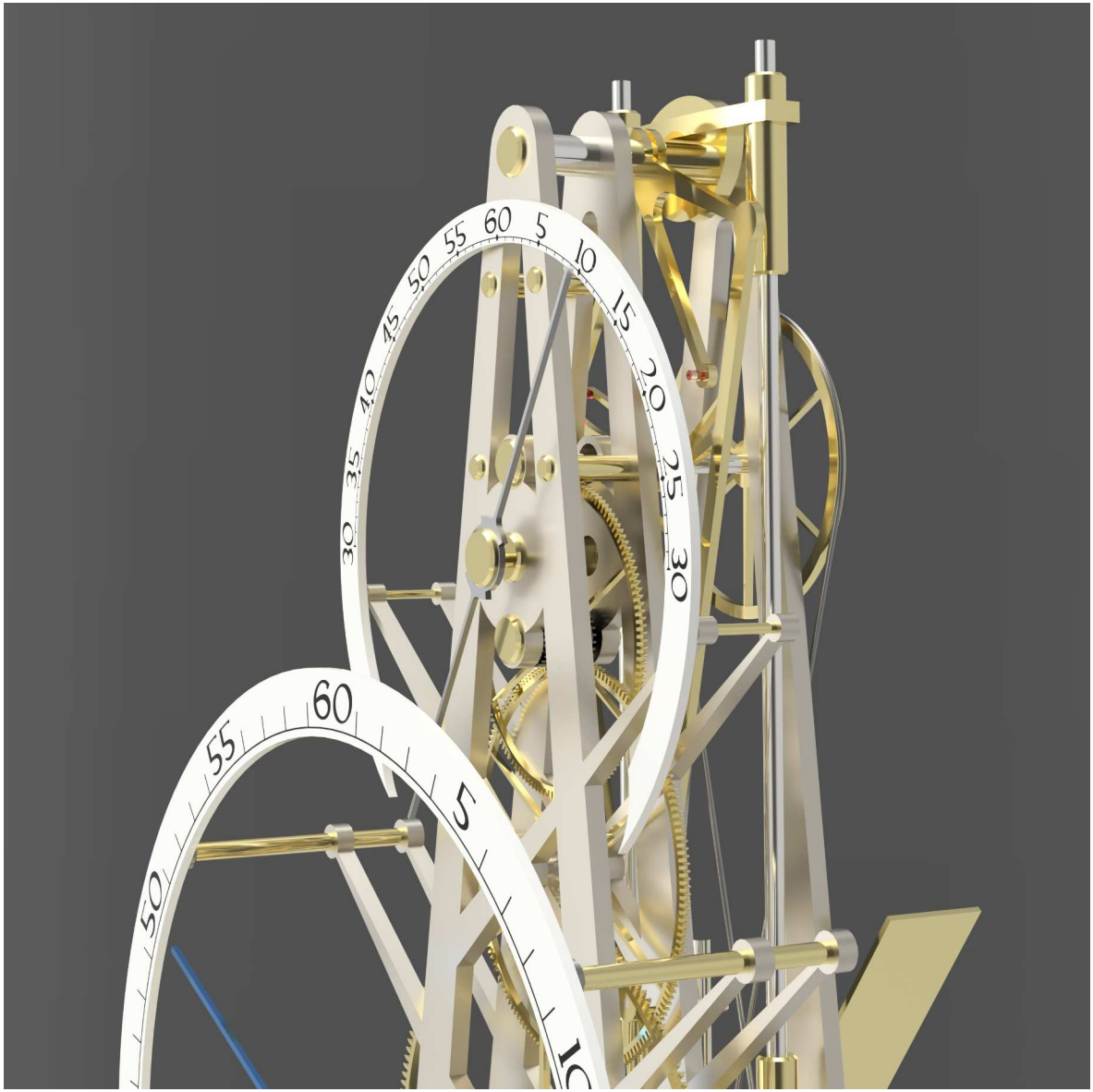
Escapement Type: Double 3 Legged Gravity
Seconds Pendulum
Winding: Manual or Automatic
Overall Dimensions: 200 H 26 Dia cm

Once while in London I spent a great deal of time in the Energy Hall of the Science Museum admiring the 19th century engineering works. There is an efficient understated beauty in the engineering works of that period, which no doubt appeals to my North of England industrial ancestry.

Standing Gravity is reminiscent of that period with its structural plates, cam arm linkage pendulum suspension and angular gravity arms.

Housed under a glass dome and lit from below the time would be read via movable rings displaying hours, minutes and seconds.

The finish would be satin black steel complimented by gold lacquered or gold plated components.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Anti-Phase Gravity

Escapement Type: Modified Gravity
Double Anti-phase Seconds Pendulum
Winding: Automatic or manually wound
Overall Dimensions: 175 H 30 W 17 D cm

Double pendulum clocks are uncommon due to their complexity. However, when arranged in anti-phase they can be made more stable by transmitting energy back and forth between the duo. Essentially the pendulums are communicating with one another to cancel errors.

About a dozen double pendulum clocks have been made over the history of Horology. My interpretation would be driven by a modified gravity escapement acting on both pendulums with the conversation taking place via a flexible coupling.

Interior lighting above the movement. Black piano case.

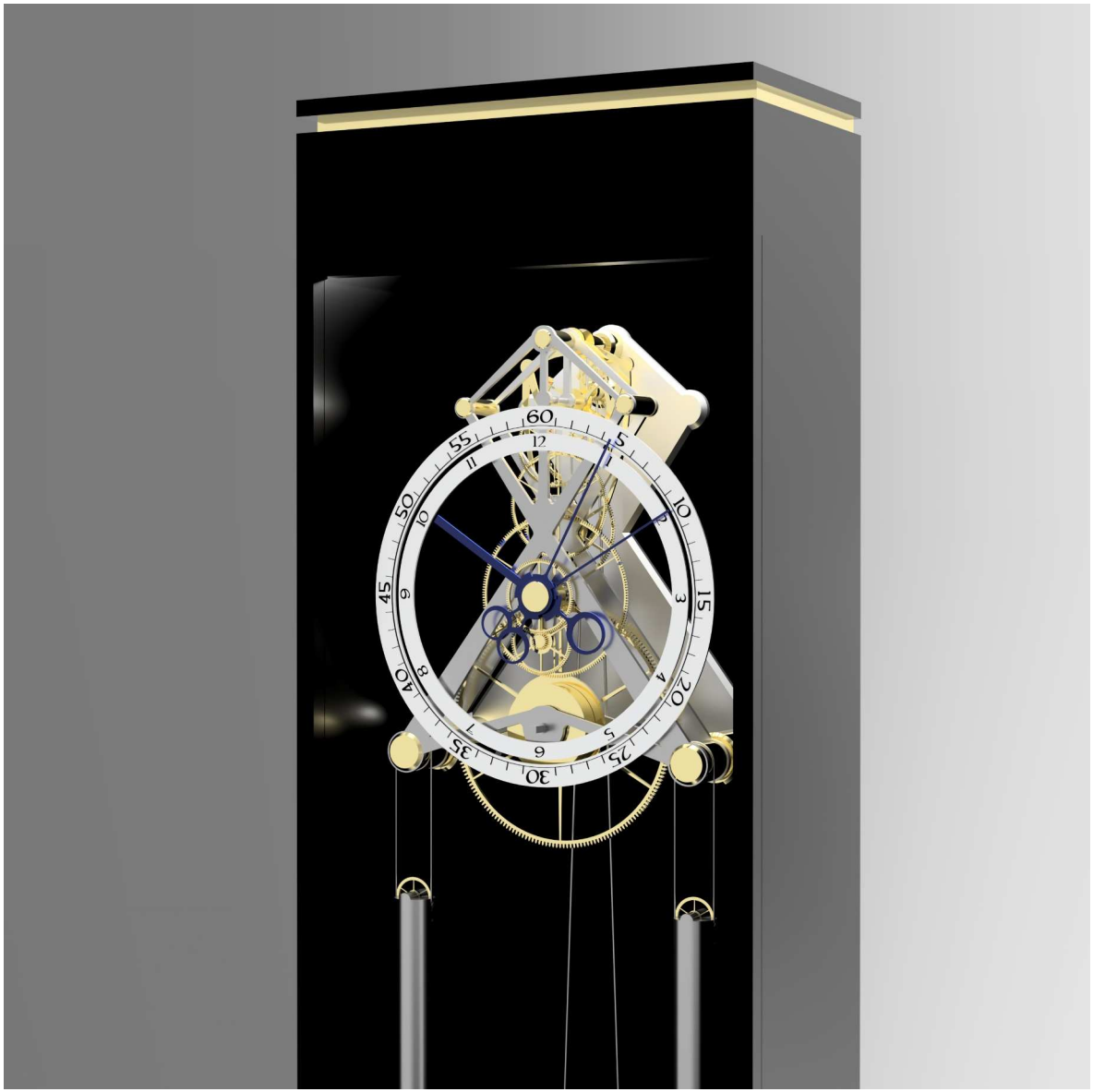
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Table Series

Escapement Type: Various
Winding: Automatic or manually wound
Overall Dimensions: 65 H 27 Dia cm

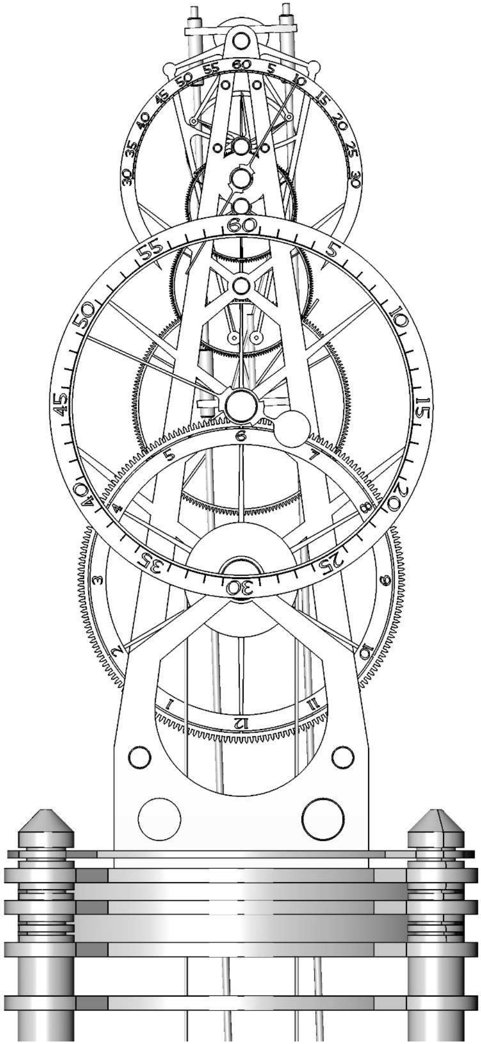
Given my interest in escapements I've always had it in mind to create a timepiece where the escapement is the focal point. Minimizing the number of visible gears to just the escapement and motion work of the hands by placing the gear train in the base leaves the focus on those two arrangements.

A mystery clock of sorts, I've designed the clock to be adaptable to any type of escapement. The example illustrated is a modified Grasshopper escapement. However the choice is yours, if you have a preferred escapement I'd be happy to work it into a sculptural format.

The novel winding method occurs by way of a lever arrangement operating through a slot in the base. The series can also be made available as an automatically wound clock.

A good resource illustrating a variety of historic escapements can be seen courtesy of Ken Kuo (Taiwan) on his Youtube channel. Ken has studied and made many great animations of most known escapements and variations on them, including some of my own experimental escapements.

The QR code below links to his channel.



Details

Each clock can be aesthetically customized to suit prior to commissioning. Typically the works take a year to produce and test with the exception of the floor standing clocks, which owing to their complexity would take approximately 2 years. As the designs are at this point just that, some elements may, by necessity, change for technical accommodations.

Every effort is made to design the works in such a way as to need minimal maintenance through the appropriate selection of engineering materials, sealed bearings, hardened pinions and by keeping the need for lubrication to an absolute minimum.

For gallery commissions please contact me to discuss
your requirements. Bespoke commissions always welcome.

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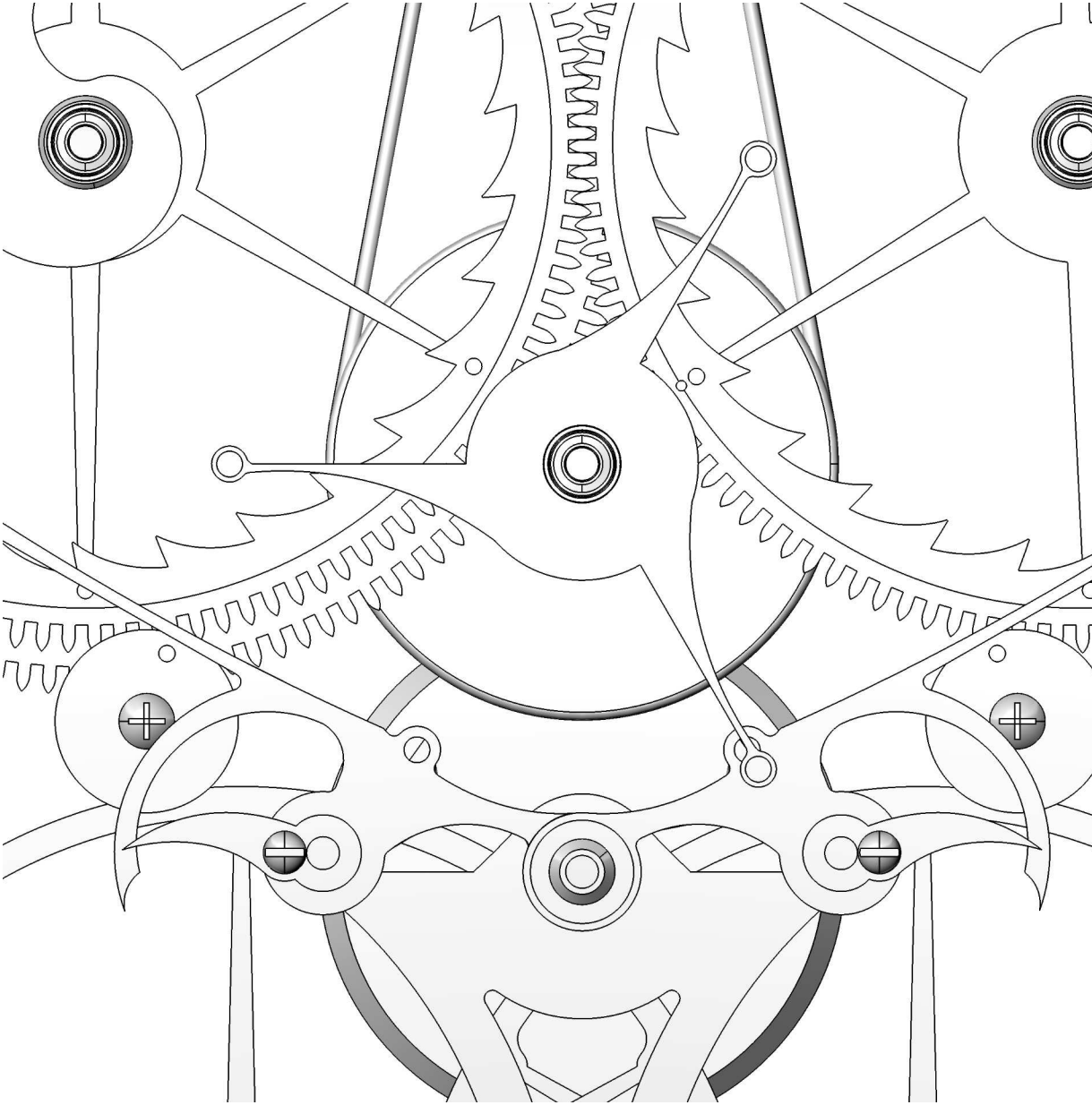
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