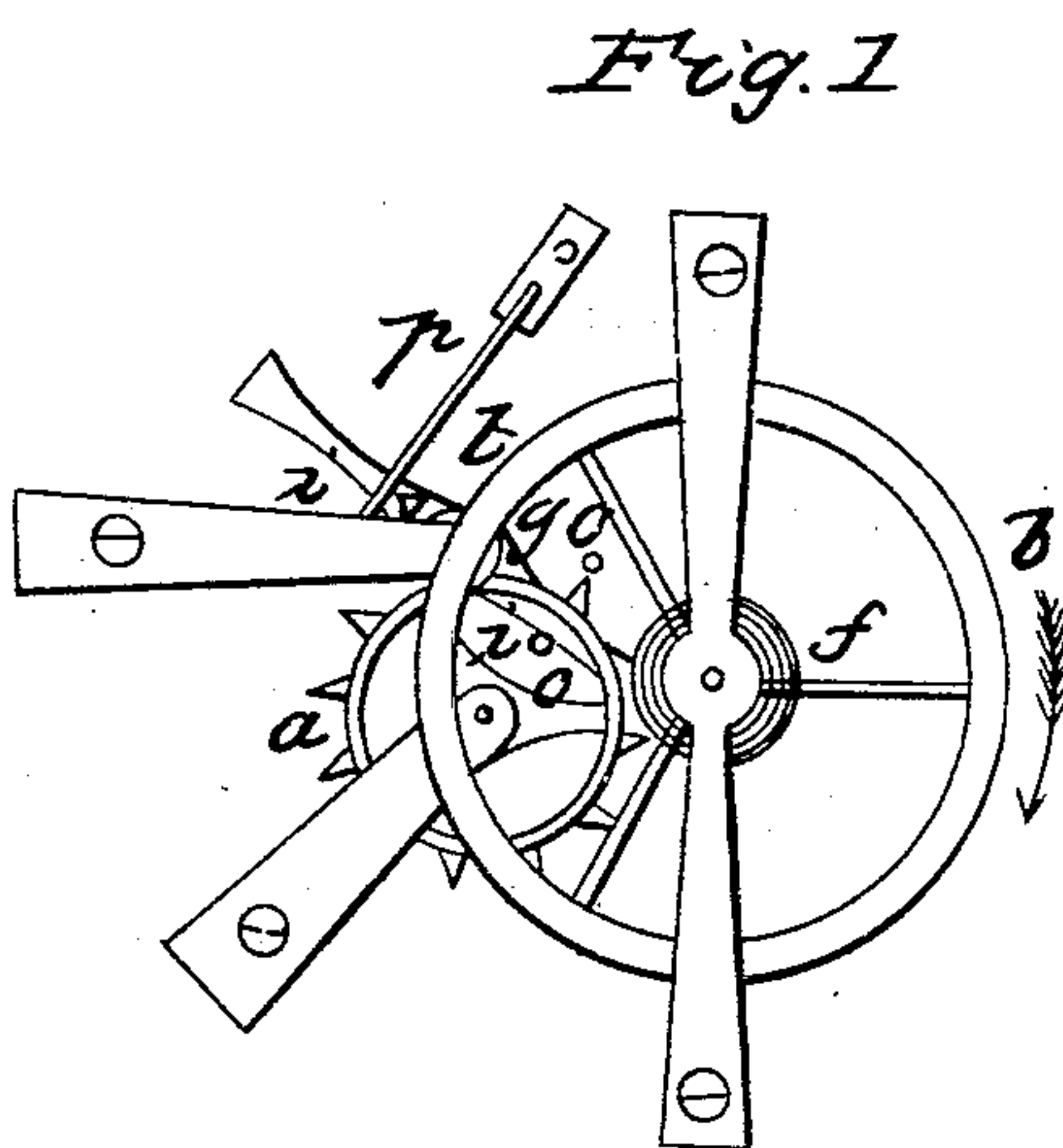
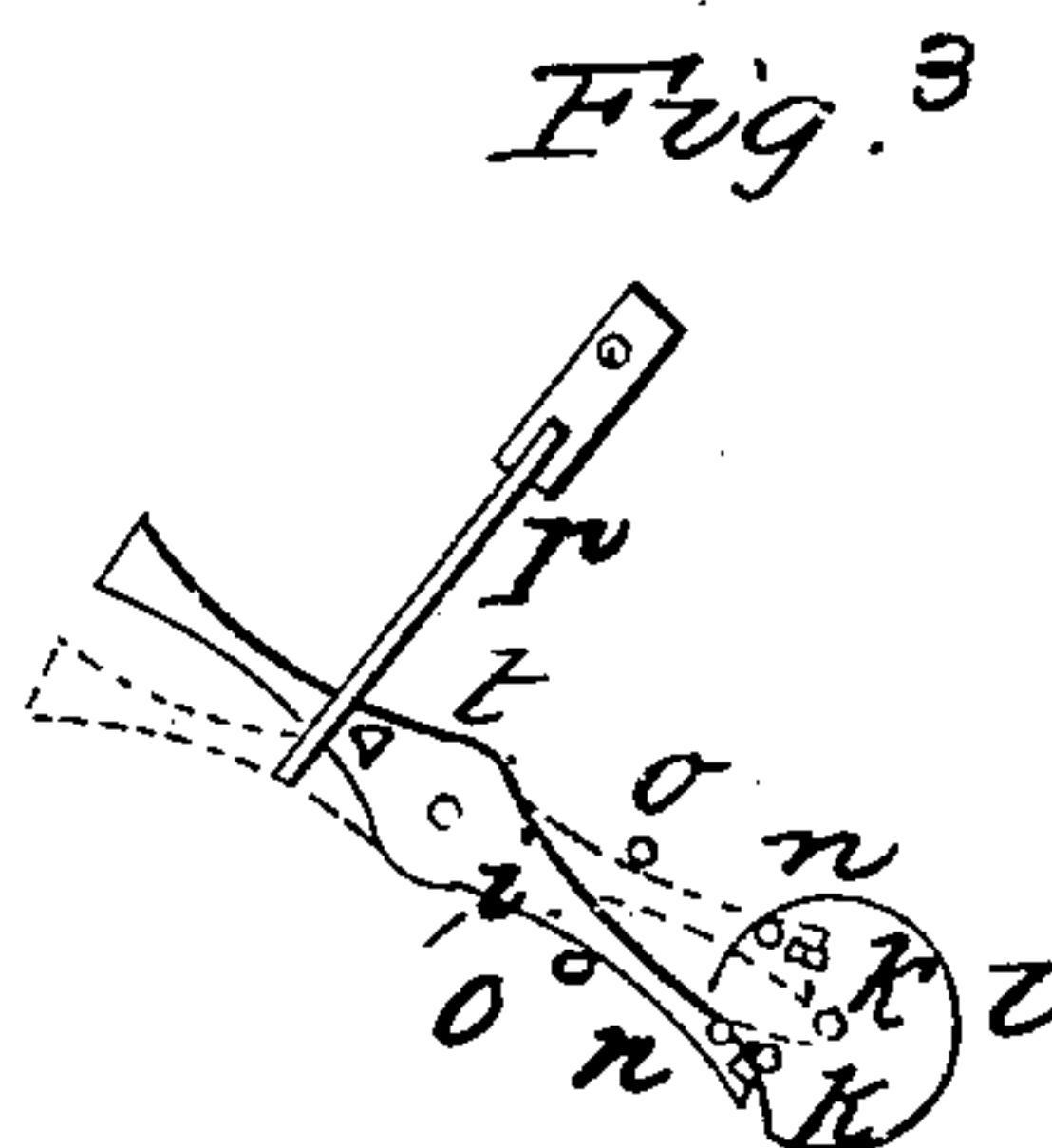
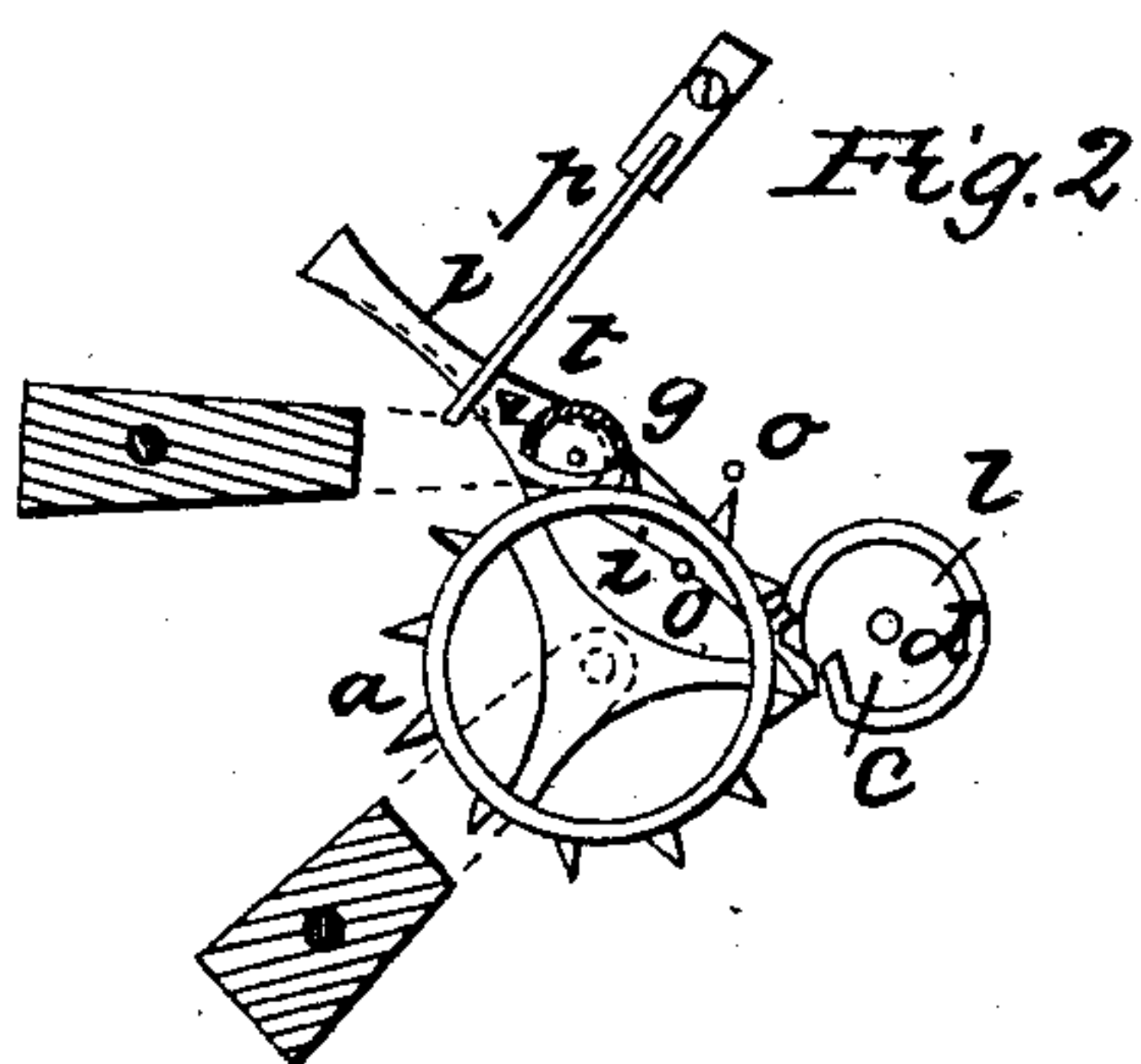


W. H. HAMMOND.  
Escapement for Chronometers.

No. 25,261.

Patented Aug. 30, 1859.



Witnesses  
Wm. H. H. H.  
Andrew DeLacy

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# UNITED STATES PATENT OFFICE.

WM. H. HAMMOND, OF NEW YORK, N. Y.

## ESCAPEMENT FOR CHRONOMETERS.

Specification of Letters Patent No. 25,261, dated August 30, 1859.

*To all whom it may concern:*

Be it known that I, W. H. HAMMOND, of the city, county, and State of New York, have invented certain new and useful Improvements in the Escapements for Chronometers and Watches; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1, is a plan of the said movement; Fig. 2, a sectional plan just below the balance; and Fig. 3 another sectional plan just below the escapement wheel.

The same letters indicate like parts in all the figures which are on an enlarged scale.

My said invention relates to improvements in watches and chronometers with the view to render the escapement more sure and to guard against irregularity of movement. And the nature and scope of my said invention will be better comprehended after understanding the mode of construction and operation.

In the accompanying drawings (*a*) represents the escapement wheel moved by any of the usual means employed in watches, the teeth of which in succession give the required impulse to the balance wheel (*b*) by coming in contact with the pallet (*c*) on the cylinder (*d*) of the verge or arbor of the balance wheel. This impulse turns the balance wheel in one direction which winds up the hair spring (*f*) the tension of which then turns the balance back the other way.

The moment one tooth of the escapement wheel has passed and given the impulse to the balance it must be stopped until the pallet on the verge is brought to the right position to receive another impulse from the next tooth of the escapement wheel. This alternate holding and releasing of the escapement wheel is effected by a vibrating hollow semi-cylinder (*g*) attached to the arbor of a vibrating lever (*i*). The hollow side of the vibrating semi-cylinder is toward the escapement wheel. It should be of a diameter a little less than the distance between any two teeth of the escapement wheel so that when the vibrating lever (*i*) is in the position represented by full lines in

the drawing one tooth of the escapement wheel bears against, and is held in repose by the outer surface of the semi-cylinder, the overlapping being such that when the lever (*i*) vibrates to the opposite direction, and reaches the position represented by red lines in Fig. 3, the tooth of the wheel is liberated, and the wheel is turned by the motive power, that is, by the main spring, until the same tooth strikes against, and is arrested by the inner face of the hollow semi-cylinder on the opposite side of its axis of vibration, and there the escapement wheel is held in repose until the lever (*i*) with the hollow semi-cylinder, vibrates back to the first position represented by full lines, which permits the tooth to escape from this inner face of the semi-cylinder the next tooth being in turn stopped in the same manner, as before described, by coming in contact with the outer face of the semi-cylinder. I prefer to make the diameter of the semi-cylinder a little less than the space between any two of the teeth of the escapement wheel, say just enough to permit one tooth of the wheel to escape from the inner face of the semi-cylinder before the next tooth is stopped, or brought to the state of repose by the outer surface on the opposite side of the axis of vibration. From the relative position of the escapement wheel and the semi-cylinder it will be seen, that the vibrations of the semi-cylinder, while any one tooth of the escapement rests against it, will not move back the escapement wheel, so that the vibrations are not impeded by the necessity, which usually exists in escapements, of moving back the wheel against the force of the motive power to effect the escapement.

When any one tooth of the wheel escapes from the outer to the inner surface of the semi-cylinder, another tooth gives the impulse to the balance by striking against a pallet on the verge; this turns the balance in the direction of the arrow thereby coiling up the hair spring, which finally arrests and then impels it in the reverse direction. The reciprocating rotary movement of the balance thus given vibrates the lever (*i*) alternately in one, and then in the opposite direction, to effect the escapements of the escapement wheel from the semi-cylinder, and

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030											
Population (millions)	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.0				
GDP (trillion USD)	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0						
Life expectancy (years)	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120			
Urban population (%)	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	100	100	100	100	100	100	100	100	100	100	100	100	100			
Renewable energy (%)	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	100	100	100	100	100	100
CO2 emissions (Gt)	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.5	22.0	22.5	23.0	23.5	24.0	24.5	25.0	25.5	26.0	26.5	27.0	27.5	28.0	28.5	29.0	29.5	30.0	30.5	31.0	31.5	32.0	32.5	33.0	33.5	34.0	34.5	35.0	35.5	36.0	36.5	37.0	37.5	38.0	38.5	39.0	39.5	40.0	

cylinder on the vibrating lever, substantially as described, in combination with the escapement wheel and the balance and verge, as set forth.

5 2. And I also claim in combination with the escapement, substantially such as described, or any equivalent therefor, the em-

ployment of the holding spring, substantially as and for the purpose specified.

WM. H. HAMMOND.

Witnesses:

WM. H. BISHOP,  
ANDREW DE LACY.