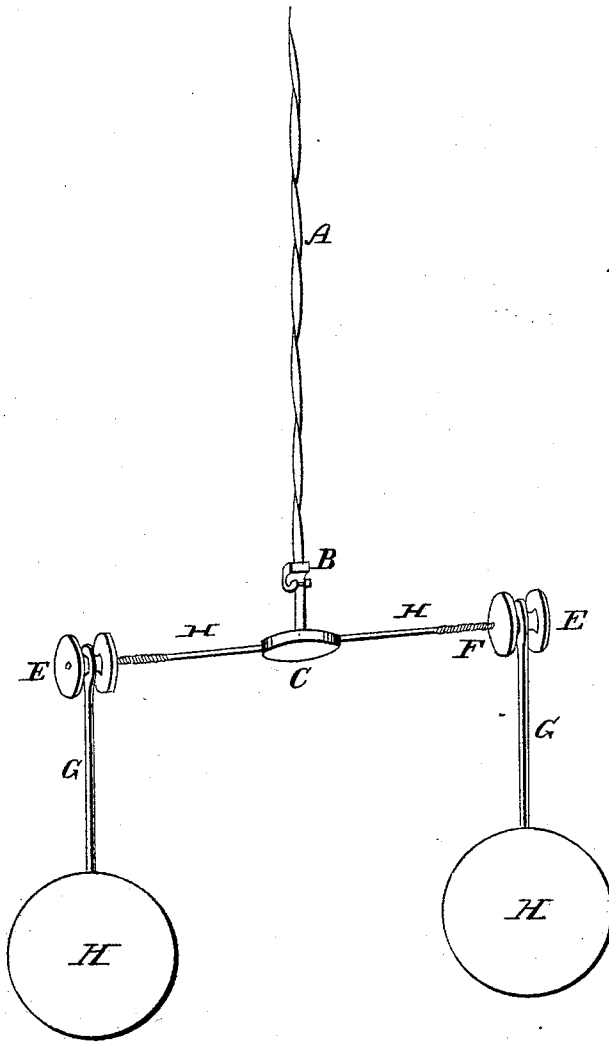


A. D. CRANE.
Clock Pendulum.

No. 12,196.

Patented Jan. 9, 1855.



Inventor
Aaron D. Crane

UNITED STATES PATENT OFFICE.

AARON D. CRANE, OF NEWARK, NEW JERSEY.

TORSION-PENDULUM FOR TIMEPIECES.

Specification of Letters Patent No. 12,196, dated January 9, 1855.

To all whom it may concern:

Be it known that I, AARON D. CRANE, of the city of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in the Construction of Torsion-Pendulums; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making a part of this specification.

The nature of my invention consists in compensating the torsion pendulum invented and patented by me, February the tenth, one thousand eight hundred and forty one, by substituting in the place of the one, weight or ball, then used two or more weights or balls and adjusting them in such a manner as that when revolving they will be freely governed by their centrifugal forces and by their gravity—in such a manner (for example) as that whenever the motion of the pendulum is increased. [This is the case whenever the spring which supports the weights is contracted by cold—the effect of heat is to lessen the elasticity of the spring, and so, to retard the motion of the pendulum, which is proven by an accelerated motion in low temperature, while a high (say 200°) will stop the clock. The less the momentum of the torsion pendulum is, the slower will be its rate.] The weights or balls will be free to swing outward (on the same principle as the balls of the governors of steam engines), so that although the balls are moving faster, yet the circle described by their revolutions, being increased, precisely in the ratio of the increase of their motion, the time in which the vibrations are made will remain in each case precisely the same, thus forming a compensating pendulum of the greatest accuracy and simplicity.

In the figure A, represents the spring; B, the hook attached thereto, from which is

suspended the central piece C, as represented in the figure. Into C, are fitted the arms D, D, having screws cut on their outward ends, upon which are fitted the nuts E, E, F, F. There are only two of these arms, with their pendants and balls represented, but for practical use, six has been found to answer a better purpose. The nuts E, E, F, F, are for the purpose of securing the pendants G, G, in any required position upon the arms D, D. Attached to the pendants are the weights or balls H, H. Upon the nuts E, E, grooves are turned in which—as represented in the figure—are freely suspended the pendants G, G, in such a manner as that whenever the pendulum is in motion the balls H, H, are perfectly free to swing either toward or from the center of their motion, and thus—as before described—accurately to compensate for every variation of their speed, whether occasioned by changes of temperature or by inequalities in the motive power, or movements of the clock itself.

The variations of this pendulum without compensation—from winter to summer temperature—are about four minutes per day—which is more than can well be compensated for by the expansion of different metals—aside from the difficulty of obtaining uniformity by such an arrangement.

What I claim as my invention and desire to secure by Letters-Patent is,

The method of compensating the torsion pendulum by so constructing it—substantially as herein set forth—as that its weights may swing from the center of their motion in the ratio of the increase of their speed—thus making all its vibrations isochronal.

AARON D. CRANE.

Witnesses:

M. G. CRANE,
RANSOM CROSBY.