No. 606,753. Patented July 5, 1898.

E. K. ADAMS.

COMPENSATING PENDULUM.

(Application filed Jan. 10, 1898.)

(No Model.)

Fig. 1

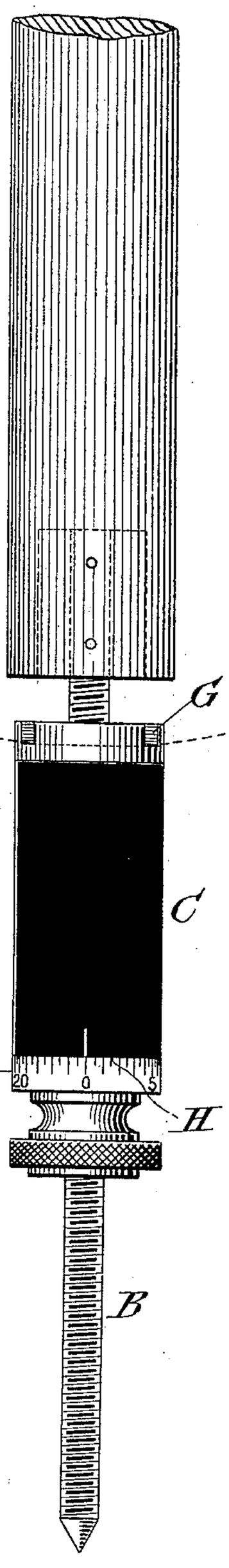
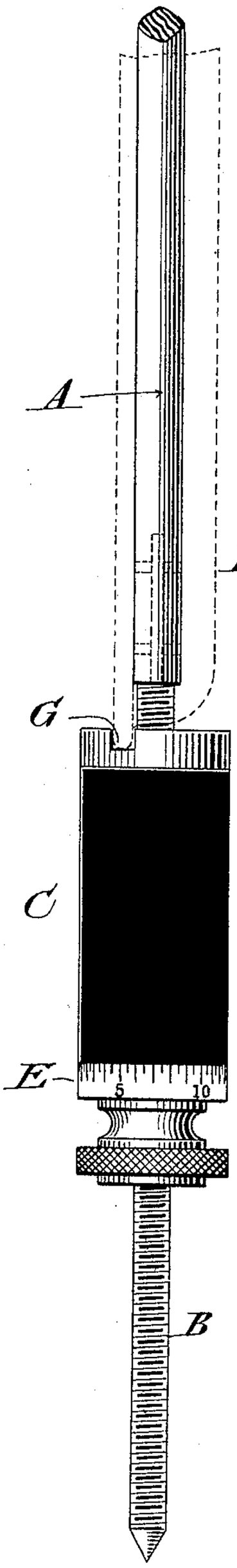


Fig. 2



Witnesses:
G. W. Maxtling
G. B. Lewis

Ernest K. Adams, Inventor
by Kerr, Curtis & Page Attys

UNITED STATES PATENT OFFICE.

ERNEST K. ADAMS, OF NEW YORK, N. Y.

COMPENSATING PENDULUM.

SPECIFICATION forming part of Letters Patent No. 606,753, dated July 5, 1898.

Application filed January 10, 1898. Serial No. 666,202. (No model.)

To all whom it may concern:

Be it known that I, ERNEST K. ADAMS, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Compensating Pendulums, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

The improvement constituting the invention which forms the subject of my present application is a compensating pendulum in which the means for maintaining the effective length of the pendulum uniform under varying temperatures while automatic and very accurate in operation is extremely simple and inexpensive in construction.

In the accompanying drawings I have illustrated the improvement, the figures being side views at right angles of the lower end of a simple pendulum equipped with the compensating device.

A designates the rod or bar of a pendulum, composed, preferably, of wood. In the extremity of the said bar is set a screw-rod B. Surrounding the rod B is a cylinder C, of hard rubber or other substance, of such length and degree of expansibility that its variation in length due to a given difference of temperature is the same as the variation of length of the pendulum as a whole produced by the same difference of temperature. This cylinder rests upon a nut which engages with the screw-rod B and which is adjustable thereon. This nut may be a simple threaded sleeve, or in case a fine adjustment is desired it may have in addition a micrometer-nut E.

The pendulum-bob is represented by the dotted lines F and may be of any proper form or character. It surrounds the rod A or is otherwise connected therewith, so as to be capable of sliding freely along the same, and rests upon and is supported by the cylinder C. A convenient means of connection between the bob and the cylinder C is secured by cutting two notches G in the end of the cylinder in which the edge of the disk F rests. This prevents rotation of the cylinder and facilitates its adjustment, as a fiducial mark H may be made on the cylinder at the edge abutting on the graduated micrometer-nut E.

From the above description it will be evident that the point of connection between the pendulum and the bob is the point on the rod B to which the nut is adjusted and that if the elongation of the pendulum and consequent lowering of this point is compensated for by a corresponding elongation of the cylinder the effective length of the pendulum will remain the same.

The best material for the cylinder which I have found is hard rubber, and in any given case the necessary length of the cylinder or support is readily determined from the sum of the products of the determined lengths of the various parts of the pendulum and their known coefficients of expansion. For example, if a given pendulum is composed of a section a of steel, a section b of cast-brass, a section c of paraffined pine wood, and a brass screw-rod at the bottom, the distance from the end of the wood to the supporting-nut being d, then the necessary length of the hard-rubber cylinder will be found from the equation $a\,i + b\,h + c\,j + d\,i = e\,f$, in which i, h, j, and f are the known coefficients of expansion of steel, cast-brass, paraffined wood, and hard rubber, respectively, and e the length of the cylinder.

In a special case of a seconds-pendulum I have found the value of e to be 5.8 centimeters or 2.25 inches.

The improvement is applicable to simple pendulums generally and constitutes an effective and accurate means of compensation.

What I claim is—

The combination with a pendulum-rod having a threaded extension at its end, of a nut adjustable on said extension, a cylinder of a material such as hard rubber which has a much higher coefficient of expansion than the pendulum as a whole resting on said nut and a bob supported by the cylinder and movable freely on the pendulum-rod, as set forth.

ERNEST K. ADAMS.

Witnesses:

M. LAWSON DYER,

BENJAMIN MILLER.