L. S. HAZZARD.

CLOCK PENDULUM.

APPLICATION FILED JUNE 5, 1908.

930,664.

Patented Aug. 10, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

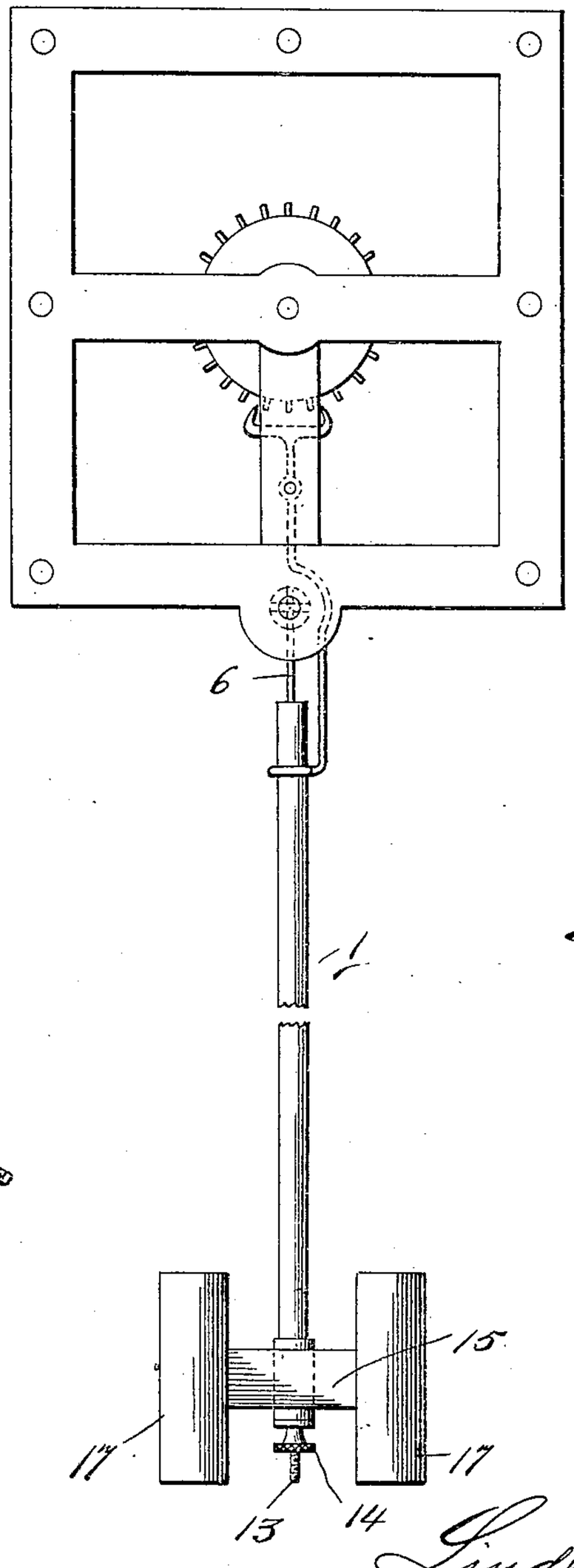

Fig. 8.

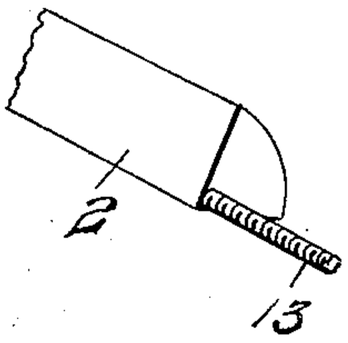

Fig. 9.

Linden S. Hazzard

WITNESSES:

B. M. Offutt

M. E. Moore

INVENTOR.

BY Thos. P. Moore

ATTORNEY.

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

Fig. 2.

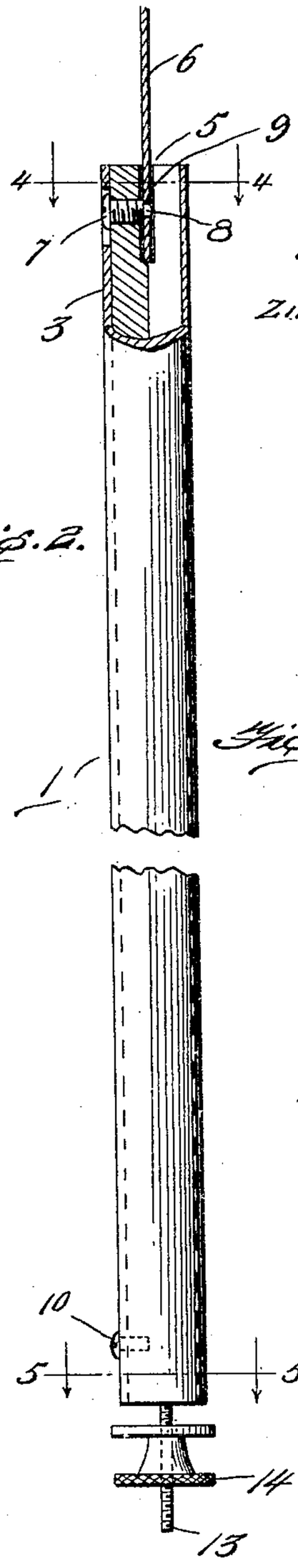


Fig. 3.

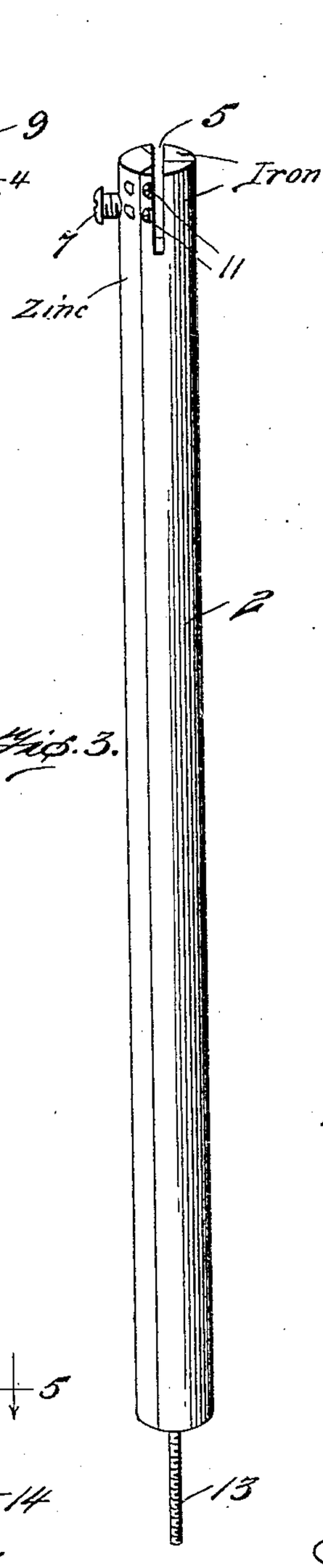


Fig. 4.

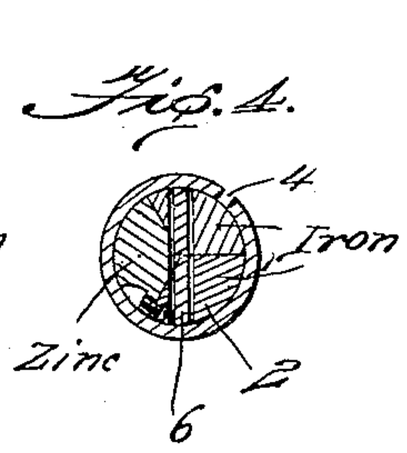


Fig. 5.

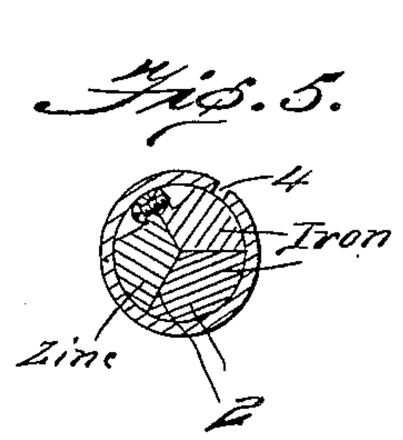


Fig. 6.

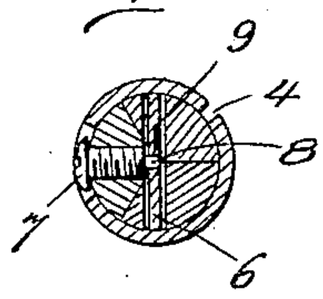
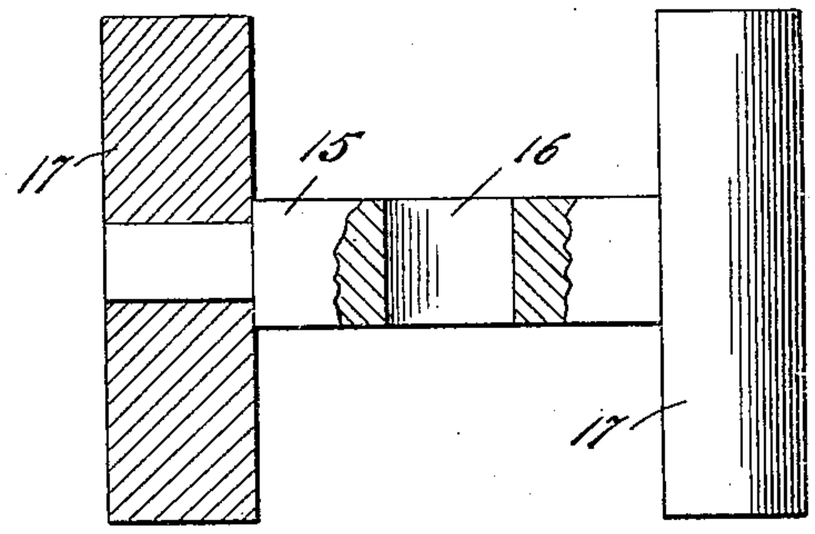


Fig. 7.



WITNESSES:

B. M. Offutt.

M. E. Moore

Lynden S. Hazzard.

INVENTOR.

BY Jno. J. Moore,

ATTORNEY.

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LINDEN S. HAZZARD, OF EAST ORANGE, NEW JERSEY.

CLOCK-PENDULUM.

No. 930,664. Specification of Letters Patent. Patented Aug. 10, 1909.

Application filed June 5, 1908. Serial No. 436,762.

To all whom it may concern:

Be it known that I, LINDEN S. HAZZARD, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Clock-Pendulums, of which the following is a specification.

My invention relates to improvements in clock pendulums, and has for its first and primary object, the provision of a compensating pendulum for clocks and the like instruments which shall be of extremely simple and practical construction and which shall be thoroughly efficient for the purposes intended.

The compensating pendulums in use at the present time, are as a general rule, heavy and cumbersome affairs, and it is one of my aims to produce a device of this sort which while possessing the necessary compensating qualities, shall be of no greater bulk than the ordinary simple pendulum.

It is another one of the objects of my invention to inclose and protect the compensating parts of the pendulum so that they shall be unaffected by dust or other injurious matter.

With the foregoing objects in view and others as shall hereinafter appear, my invention consists substantially of a number of closely related rods possessing different coefficients of expansion, a casing inclosing the rods and confining them as a unit, a weight supported by the pendulum, and means for adjusting the weight.

The invention further consists in certain other novel features of construction, combination and arrangement of parts substantially as disclosed herein and as illustrated in the accompanying drawings, in which:

Figure 1, is a front elevation of my improved pendulum as applied to a clock movement. Fig. 2, is a broken side elevation of the pendulum rod, part being shown in section. Fig. 3, is a perspective view of the parts of the rod assembled, the casing being removed. Fig. 4, is a cross-sectional view on the line 4—4 of Fig. 2. Fig. 5, is a cross-sectional view on the line 5—5 of Fig. 2. Fig. 6, is a cross-sectional view of Fig. 2 taken on a parallel but slightly lower plane than Fig. 4. Fig. 7, is a side elevation of the pendulum bob, part being shown in section. Fig. 8, is a fragmentary perspective view of one of the parts of the pendulum rod with the threaded adjusting portion attached thereto, and, Fig. 9, is a perspective view of one of the weights of the bob.

In the drawings: the numeral 1, designates the pendulum rod as a whole. This rod is made up of three or more segmental bars or rods 2, having angular meeting edges so that the rods will nest together as shown in the cross sectional view to form a single compound structure, over which is slipped a tubular retaining casing or shell 3. Two of the segmental bars are made of iron or soft steel or other similar metal possessing a low coefficient of expansion, while the other bar is made of zinc or a like metal possessing a relatively high coefficient of expansion. When more than three segments are used in making up the rod, the ratio would be approximately the same, the members of lower expansive force being in the majority. The shell which confines and holds the segments as a unit is preferably made of brass and may have an open seam 4, along one side to allow of the more ready assemblage of the parts and to allow for a certain amount of transverse expansion.

A slot 5, is cut in the upper end of the compound rod to receive the pendulum spring 6, and the spring is retained therein by a fastening screw 7, the screw having a reduced end 8, which engages an opening 9, in the spring. This screw is carried by one of the low expansion members and it will be noted that the screw and the spring are so arranged as not to interfere with the independent longitudinal expansive movement of the segments. The other end of the pendulum spring is secured to the clock movement in the usual manner. The lower end of this low expansive member is secured to the lower end of the more highly expansive member either by means of a rivet 10, or other suitable fastening, then after the casing or shell has been slipped over the segments, fastening screws 11, are entered in the alining openings 12, in the upper end of the casing, the more highly expansive member and the last member of low expansive capacity. The alternate ends of the higher and lesser expansive members are thus connected in series, and the last member of low expansive coefficient has a depending threaded end portion 13, upon which the adjusting screw 14, is engaged.

The pendulum bob consists of a supporting bar 15, having a central tubular portion 16, to receive the rod and on the outstanding

ends of the bar are affixed the weights 17, which are preferably cylindrical in shape and arranged parallel to the rod. The weights may be secured to the supporting bar either by means of a mortise and tenon joint or any other suitable connection. It will thus appear that the rod is made up of a strip of metal which is sensitive to changes in temperature, this sensitive strip being connected at opposite ends to other strips which are not so sensitive to changes. The lesser sensitive strips tend to lengthen the pendulum, while the more sensitive strip has a tendency to lengthen the pendulum when a rise in temperature occurs, and the reverse is true when the temperature falls. A compensating effect is therefore had which causes the pendulum rod to remain a constantly uniform length, so that the stroke of the pendulum is uniform and uninfluenced by changes in temperature.

From the foregoing description taken in connection with the drawings, it will be evident that I have produced a thoroughly practical and efficient compensating pendulum and one which accomplishes all the objects herein aimed at.

I claim:

1. A clock pendulum consisting of a series of rods or members of segmental form in cross section adapted to be fitted together to provide a unit of circular or cylindrical form, a case or covering for said unit, a threaded stem depending from the lower portion of the pendulum, a bob adjustably supported on the rod or stem, means for adjusting the bob on the rod or stem, and means for connecting one end of one segment to the clock mechanism.

2. A clock pendulum consisting of a series of rods or members of segmental form fitted together to form a unit of cylindrical shape, screws for fastening the members together, said screws being fitted in seats or countersunk portions to prevent the projection of the heads thereof, a covering for the members and means for connecting the pendulum with the bob and clock mechanism.

In testimony whereof I affix my signature, in presence of two witnesses.

LINDEN S. HAZZARD.

Witnesses:

FRED W. NICHOLSON,

H. D. GOULD.