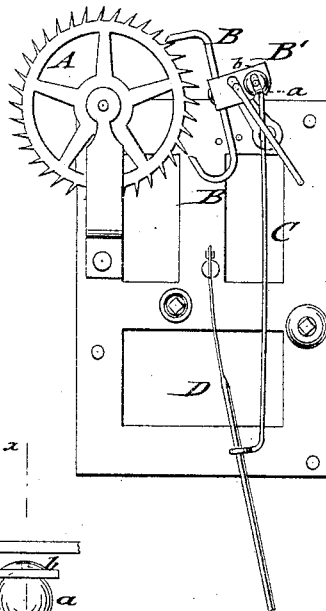


E. DAVIES.  
Crutch for Clock-Pendulums.

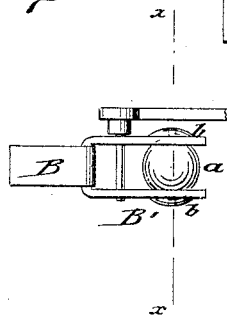
No. 213,811.

Patented April 1, 1879.

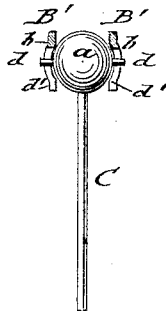
*Fig: 1.*



*Fig: 2.*



*Fig: 3.*



*Witnesses:*

*Fr. Mayer.*

*Otto Reisch.*

*Inventor:*

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*by Paul Goepel*  
*Attorney*

# UNITED STATES PATENT OFFICE.

EDWARD DAVIES, OF BROOKLYN, NEW YORK.

## IMPROVEMENT IN CRUTCHES FOR CLOCK-PENDULUMS.

Specification forming part of Letters Patent No. **213,811**, dated April 1, 1879; application filed October 16, 1878.

*To all whom it may concern:*

Be it known that I, EDWARD DAVIES, of the city of Brooklyn, county of Kings, and State of New York, have invented a new and useful Improvement in Crutches for Clock-Pendulums, of which the following is a specification:

In the accompanying drawings, Figure 1 represents a front elevation of a clock-movement with my improved crutch; and Figs. 2 and 3 are, respectively, a detail top view and a detail vertical transverse section on line *xx*, Fig. 2, of the crutch, shown as connected with the anchor of the escapement.

Similar letters of reference indicate the same parts.

One of the most common and annoying sources of the stopping of clocks is caused by the uneven beat of the pendulum, and the consequent strain of the clutch on the anchor of the escapement, owing to the clock not being supported on a level. This, in common use, is generally remedied by setting the clock to a level by inserting small wedges, which, however, looks unsightly. It has also been attempted to overcome this defect by means of a flexible pivot-connection of crutch and anchor, instead of the rigid attachment of the crutch and anchor; but this jointing has only remedied the unequal beat of the pendulum when the clock was out of level in lateral direction, while it has not obviated the stopping of the clock when the same is out of level toward the front or rear, in which case the pendulum swings in a plane at an angle to the perpendicular axis of the clock.

The object of this invention is to prevent the stopping of a clock, whether the same is out of level toward one side or the other, or toward the front or rear, by means of a simple flexible suspension of the crutch from the anchor, so that the crutch adjusts itself to the pendulum and keeps the clock reliably in beat; and the invention consists of suspending the crutch by a universal joint from the anchor by means of a ball at the end of the crutch, which is guided by pivot-pins in slotted concave cheeks of a spring-socket attached rigidly to the anchor, the socket being ful-

crumed to a fixed arbor of the frame of the clock-movement.

By reference to the drawings, A represents the verge-wheel, and B the anchor, of the escapement of a clock; and C is the crutch, and D the pendulum, of the same. The crutch C is provided at the lower end with the usual fork or loop for engaging the pendulum-wire, but is arranged at the upper end with a ball, *a*, that plays in the concaved cheeks *b* of a spring-socket, B', which latter is rigidly attached to the anchor about midway between the pallets. The concaved cheeks *b* of the spring-socket B' form, with the ball at the end of the crutch, a universal joint that admits the adjustment of the crutch in any direction, so as to adapt itself to any position and beat of the pendulum, whether the clock be in level or out of level.

The ball *a* is guided, by means of pivot-pins *d*, in slots *d'* of the cheeks *b* of the spring-socket, the slots serving to define the extent of forward and backward adjustment of the crutch in following the motion of the pendulum, whatever be the plane in which it may swing, owing to the clock being out of level toward either side or toward the front or rear.

The spring-socket is fulcrumed to a fixed arbor of the clock-frame, and prevented from getting detached therefrom by a pivoted guard-piece that bears on the projecting end of the arbor, so as not to interfere with the free motion of the anchor.

The ball-and-socket connection of anchor and crutch admits the free adjustment of the latter to any position of the pendulum, and prevents thereby, in effective manner, the stopping of the clocks whenever they are supported out of level, so as to render by this simple device the pendulum-clocks in common use more reliable and less exposed to stoppage.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In clocks, the combination of the anchor of the escapement by a universal joint with the crutch of the pendulum, to admit the adjustment of the crutch to any position of the pendulum, substantially as set forth.

2. The combination of the anchor of a clock-escapement, having a spring-socket attached thereto, with a crutch fitted by a ball at its end into the socket of the anchor, substantially as described.

3. The combination, in a clock, of the anchor having a fixed spring-socket, said socket having slotted and concaved cheeks, with a

crutch jointed by a ball with side pivot-pins thereto, substantially as and for the purpose described.

EDWARD DAVIES.

Witnesses:

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