(No Model.)

D. W. BRADLEY.

CLOCK.

No. 305,889. Patented Sept. 30, 1884.

Fig. 1.

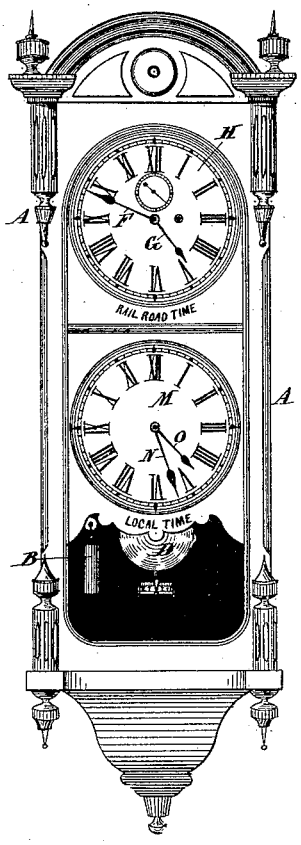


Fig. 2.

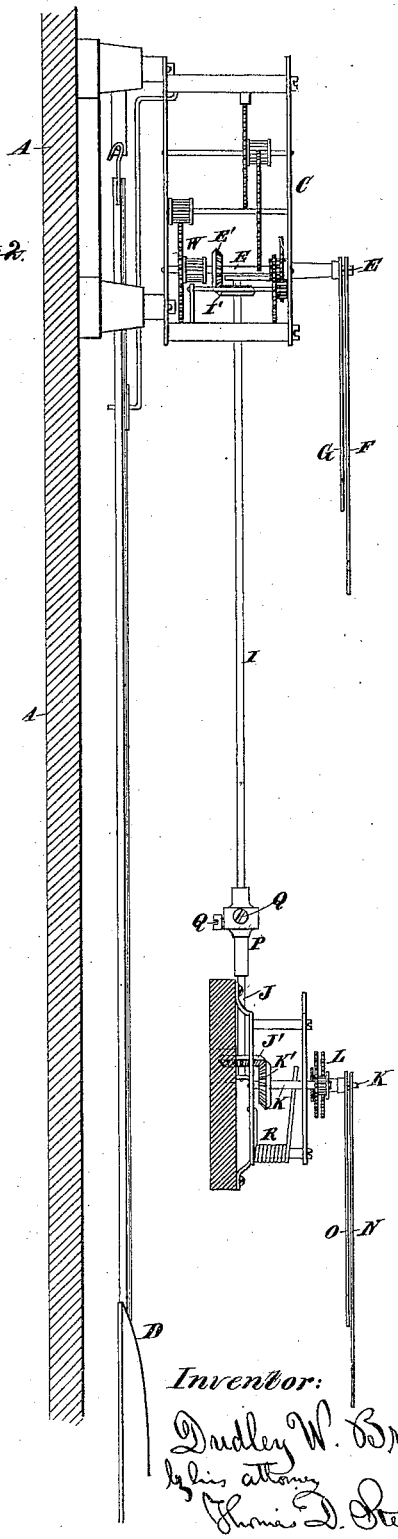
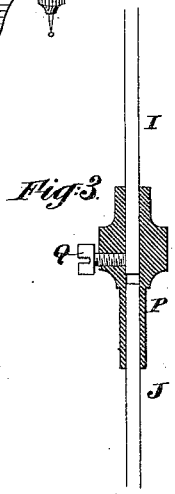


Fig. 3.



Witnesses:
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J. E. Reynier.

Inventor:
Dudley W. Bradley.
by his attorney
Thomas D. Stetson.

UNITED STATES PATENT OFFICE.

DUDLEY W. BRADLEY, OF BROOKLYN, NEW YORK.

CLOCK.

SPECIFICATION forming part of Letters Patent No. 305,889, dated September 30, 1884.

Application filed April 21, 1884. (No model.)

To all whom it may concern:

Be it known that I, DUDLEY W. BRADLEY, of Brooklyn, Kings county, in the State of New York, have invented certain new and useful Improvements in Clocks, of which the following is a specification.

The adoption of uniform time for railroad purposes and for other purposes over a breadth of fifteen degrees of longitude induces considerable variations at many places between the standard time, which may be called "railroad time," and the local time, the latter being determined by the passage of the sun over the meridians of the several places. To clearly establish and announce the exact conditions is particularly important in places which lie contiguous to the line at which the standard time changes, the standard time being a whole hour different on one side of a certain line from the standard time which may be only a mile distant on the other side of that line. I have devised a construction of clock which is adapted to conveniently show the standard time and also the local time. I effect this by two sets of hands worked on two dials arranged to be easily learned beyond a possibility of mistaking one for the other. Both are worked by one set of clock mechanism. The hands on both dials may be "set" or changed by changing the hands on one dial. Also, the hands on either dial may be set independently without changing the others. I provide a slip-joint with tightening means, by which the length of the shaft which connects the works of one set of hands with that of the other may be varied in length within certain limits to allow for imperfect location of the shafts.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a front view showing the clock entire. Fig. 2 is on a larger scale. It shows certain parts in side elevation, partly in section. Fig. 3 is on a still larger scale. It is a central longitudinal section through the slip-joint on the shaft connecting the two sets of hands.

Similar letters of reference indicate like parts in all the figures where they occur.

A is the fixed frame-work of the clock; B, the weight; C, the time mechanism; D, the pendulum; E, the shaft, and F G the minute and hour hands for the railroad time-dial, which is the upper dial, H.

I will designate by the single letter W two gear-wheels, which are fixed firmly together, and are set on the shaft E with a gentle friction, so as to communicate proper motion from the clock mechanism C to such shaft under ordinary conditions, but will allow the shaft to be set any time by forcibly turning it. This frictional connection of the wheels W to the shaft E is the slip-joint of ordinary clock-work.

On the shaft E is firmly fixed a beveled gear-wheel, E′, which engages with a corresponding beveled gear-wheel, I′, on a vertical shaft, I. This latter is connected by a slip-joint with a shaft, J, which is in line therewith. On the latter is a beveled gear-wheel, J′, engaging with a corresponding beveled gear-wheel, K′, on a shaft, K, which carries the minute-hand of the local time-dial M. An ordinary hour-hand gear, sometimes known as "dial-work," L, is mounted on this shaft K, and gives the proper motion from the shaft to a sleeve which carries an hour-hand. The hour-hand G on the upper dial is carried by similar dial-work from the upper shaft, E. The arrangement gives two hands, N O, on the lower dial, and also two hands on the upper dial. The two dials and two sets of hands are represented as exactly alike, but this may be varied. One is directly above the other. The slip-joint connecting the shafts I J is formed by a sleeve, P, soldered or otherwise rigidly fixed on the lower shaft, J, and receiving the upper shaft, I, in line therewith, and confining it by pinching-screws Q Q.

Imperfect workmanship, or changes due to shrinkage or other causes, may require that the shaft K of the lower dial be allowed to work at a greater or less distance from the shaft E of the upper dial. By slacking the screws Q the position of each set of hands may be adjusted independently, and the screws being again tightly set, the shafts I J are rigidly united and operate as one. The gear-wheels W are fitted on the shaft E, with liberty to slip if sufficient force is applied. In setting the upper hands, F G, the shaft E turns by slipping in its junction with the wheels W. The beveled gear-wheel E′ turns

with the hands, and this compels the shafts I J to turn, and correspondingly sets the lower hands, N O. It follows that the hands on both dials can be adjusted by forcibly turning only the minute-hand F of the upper dial. There are cases, as after moving the clock from one station to another, where there is more or less difference between the standard and the local time, or in case of a conventional change of the local time in any place in which it may be desired to set the lower hands without shifting the upper hands. This is effected by a slipping of the shaft K in its junction with the beveled gear-wheel K'.

I propose to make the friction between the shaft K and the gear-wheel K' considerably less than the friction between the upper shaft, E, and the gear-wheel E'. This will allow the lower hands to be set without causing any corresponding changes of the upper hands; but in order to be certain that the upper hands are not moved in effecting such adjustment, it is preferable to firmly hold the upper hands while the lower hands are being adjusted, then on liberating both the clock goes on as before.

R is a friction-spring wound on one of the posts of the lower mechanism and imparting a gentle friction to the shaft K sufficient to prevent any movement of the lower hands by the looseness of the wheels, sometimes known as "lost motion." The friction due to the spring R need not be great, but it should be sufficient to prevent either or both hands of the lower dial from making quick movements to a little distance by gravity, which would otherwise occur when each passes its upper central position. I can, if preferred, make the friction of the connection between the lower shaft, K, and its gear-wheel K', as great as that between the upper shaft, E, and its wheels W, or either may be greater than the other. With any modification in this respect, whenever the hands of one dial are to be set without setting the others, it is well to hold firmly the hands of the other dial to avoid possible disturbing of their positions by the transmission of force through the shafts I J.

I am aware that clocks have been before made with two or more dials operated by a single clock mechanism for the purpose of indicating the days of the month; also that it has been common in church-tower clocks and in other situations to work the hands on two or more dials indicating the same time, driven by a single set of clock mechanism, and all set by a single adjustment. Such I do not claim; but,

Having now fully described my invention, I claim as new and desire to secure by Letters Patent—

In a clock substantially as described, the combination of the two dials H M, two sets of hands, F G and N O, and two slip-joints, as W E and K K', with a single clock mechanism, the two shafts I J, the sleeve P, and set-screw Q, as and for the purposes set forth.

In testimony whereof I have hereunto set my hand, at New York city, New York, this 16th day of April, 1884, in the presence of two subscribing witnesses.

DUDLEY W. BRADLEY.

Witnesses:

WM. C. DEY,

CHARLES R. SEARLE.