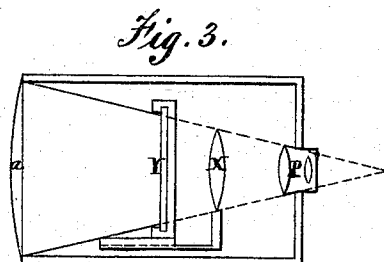
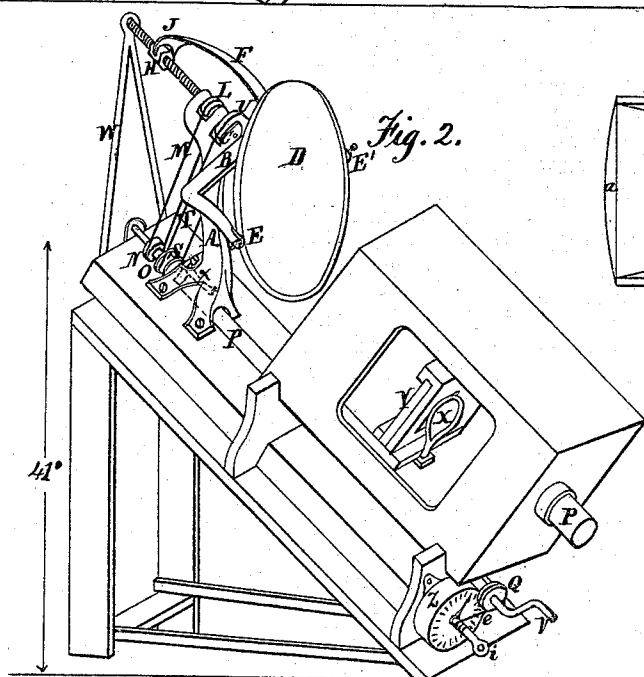
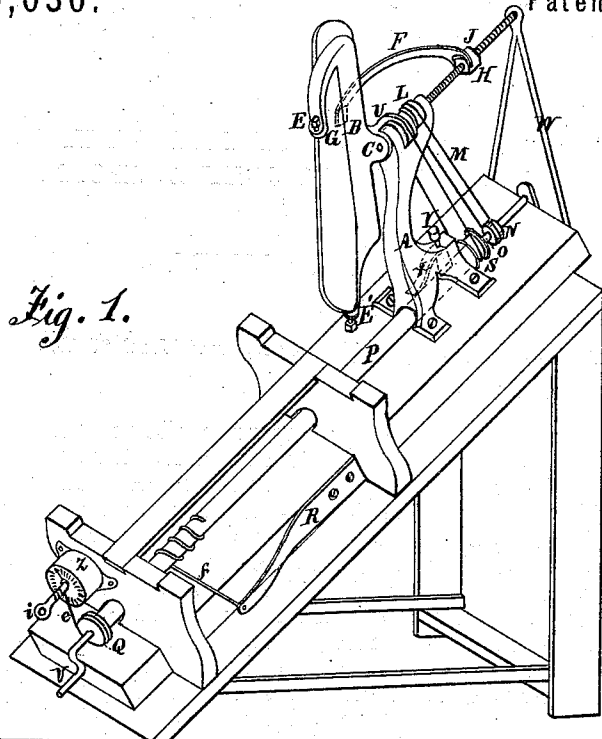


JOSEPH H. DILLE & E. W. POSTON.

Improvement in Solar Cameras.

No. 125,030.

Patented March 26, 1872.



Witnesses.

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JOSEPH H. DILLE AND ELISHA W. POSTON, OF FORT WAYNE, INDIANA,
ASSIGNORS, BY MESNE ASSIGNMENTS, TO JOHN A. SHOAF, OF SAME
PLACE.

IMPROVEMENT IN SOLAR-CAMERAS.

Specification forming part of Letters Patent No. 125,030, dated March 26, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that we, JOSEPH H. DILLE and ELISHA W. POSTON, of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Heliostats; and we do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon, in which like letters refer to like parts in the different figures.

To enable others skilled in the arts to make and use our invention, we will proceed to describe its construction and operation.

Figure 1 is a perspective view of the east side and south end of that portion of the apparatus known as the movement with camera-box detached. Fig. 2 is a perspective view of the west side and south end of same with camera-box attached.

The nature of our invention consists in the arrangement and construction of a series of mechanical devices which will, when in operation, automatically present the surface of a mirror so as to reflect the solar rays, when visible, at all hours of the day and at all seasons of the year in a direction parallel to the axis of the earth. Our invention more particularly relates, first, to a combination of devices which automatically operate the mirror, and present its surface to the solar rays during the day, in relation to the sun's apparent movement from east to west; second, to a combination of devices for the purpose of automatically regulating the movement of the mirror to the northern and southern declinations of the sun.

P represents a main axle, which is positioned so as to extend parallel with the axis of the earth from the interior of the room where it is situated through a suitable aperture in the north wall thereof to the mirror D, which is situated on the outside of the building. This axle is supported in suitable bearings, as seen in the drawing. R represents a spring, which is secured to the frame-work of the apparatus, and is connected to axle P, as seen in Fig. 1, by means of cord *f*. The tension of said

spring imparts, while in operation, a rotary motion to said axle. This rotary motion is regulated by means of a clock-work adjustment, Z, which acts as an escapement, as will be more fully described. D represents a mirror, which is supported in position by means of arms B, to which it is pivoted, as seen at E E I. Arms B are secured at their point of intersection to a rocking axle, C, which is adjusted to a position parallel to the axis of the earth, and so that it can perform only one-half of a revolution. Said pivots E' E' are so positioned as to come in an exact line with the direction of axle C, and their centers must be exactly on a line with the reflecting surface. Said axle receives its motion from axle P by means of wire band T and pulleys U and S, one of which is secured to the outer end of axle P and the other on rocking-axle C, as will be seen in Fig. 1.

The operation of this part of our apparatus is as follows: Mirror D is so adjusted by adjusting-key *i* that its surface will receive the solar rays soon after sunrise and reflect them in the desired direction—that is, in a direction exactly parallel to the earth's axis. In so doing the mirror is revolved to a position having an eastern exposure at the desired angle. This adjustment has the effect to revolve axle P in the necessary direction to wind cord *f* around said axle, as seen in Fig. 1. The apparatus is now ready for operation. The spring R exerts its force on the axle P and causes it to rotate in the desired direction. This motion is imparted to the rocking axle C, which in its movement revolves the mirror, keeping exact pace with the sun from east to west, and continuously presenting, by the aid of a device which will be hereinafter described, its surface to the solar rays at the desired angle. The speed of the movement is adjusted and governed solely by the clock-work Z.

The second part of our invention, consisting of the adjustment of the mirror to the northern and southern declination of the sun, is described as follows: O represents an axle, which passes through hollow axle P, and which is provided with a hand-crank, V, at its inner extremity and a pulley, N, at its outer end. This axle is

used to impart a rotary motion to pulley L on screw-axle K by means of wire band M. Said axle K is also adjusted so as to be parallel to the earth's axis. A right-handed screw is cut on said axle consisting of one hundred and eighty-two and one-half threads, corresponding exactly to the number of days embraced in the period of time occupied by the sun in traversing from its extreme northern to its extreme southern declination—that is, from June 21 to December 21. H represents a nut which is designed to traverse said screw K while the apparatus is in operation. To the upper side of this nut an arm, F, is hinged. Said arm extends to, and is hinged to, back of mirror, as seen in the drawing. The mirror being adjusted so as to reflect the solar rays as desired for August 1 in the morning, then the apparatus is put in motion. The revolving of the mirror during the day also causes nut H to revolve in the same ratio, screw K at the same time remaining stationary. This semi-revolution, so performed by said nut, causes it to traverse said screw toward the mirror, and thus gradually shift the angle of the plane of the mirror to correspond with the exact declination of the sun at every period of time during the entire day. On the succeeding day the mirror may be adjusted by the clock-work, as before described, by revolving the mirror back to face the east; then hand-crank V may then receive exactly one revolution, which will traverse nut H toward the mirror, as before, the space of one thread, a distance which corresponds exactly to the sun's declination for one day; and the mirror is constantly adjusted so as to reflect the solar rays exactly in the

direction that they were reflected on the day previous—that is, parallel with the earth's axis; and the apparatus will work through the day, as before, without further attention. When the sun is at its extreme southern declination—that is, on the 21st of December, the operator may remove right-handed screw K and nut H and substitute a left-hand screw and nut having exactly the same lead. The position of the nut on the screw should be such as would adjust the mirror to the 21st of December. When this is done the operation may be continued daily to the 21st of June, during which time said nut will traverse back over the screw to the point where the first nut started on the other screw, as will be readily understood.

What we claim as new, and desire to secure by Letters Patent, is—

1. Supporting and operating mirror D by the combined means of rocking axle C and arms B, together with nut H, arm F, and screw-axle K, the whole being constructed, regulated, and operated in the manner and for the purpose substantially as described.

2. We claim, as a means of adjusting the position of the mirror for operation from one day to another, the adjusting-key i and axle P having a pulley, S, in combination with the axle O having a pulley, N, the same being arranged, combined, and operated in the manner and for the purpose substantially as described.

JOS. H. DILLE.

ELISHA W. POSTON.

Attest:

W. J. KERR,

H. F. WILLSON.