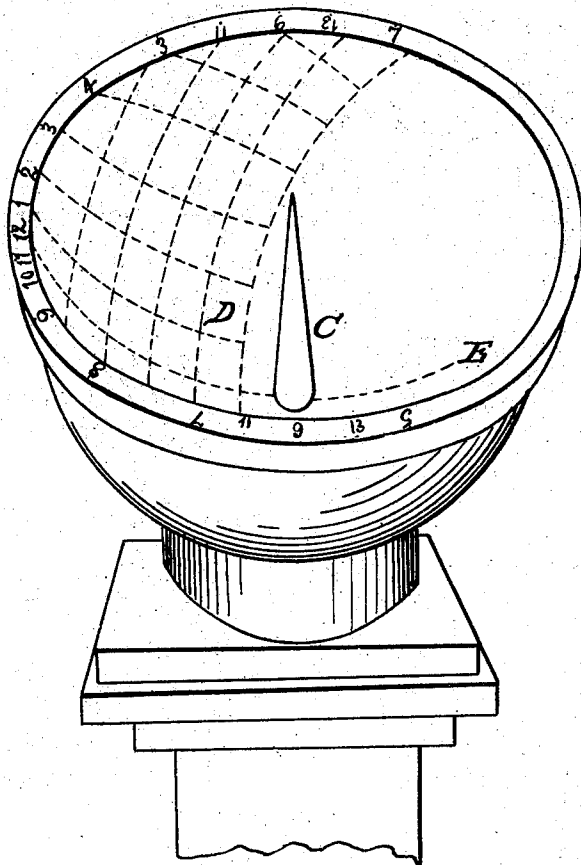


J. P. GARDNER.

Sun Dial.

No. 3,370.

Patented Dec. 5, 1843.



# UNITED STATES PATENT OFFICE.

JAMES P. GARDNER, OF COLUMBIA, TENNESSEE.

## SUN-DIAL.

Specification of Letters Patent No. 3,370, dated December 5, 1843.

*To all whom it may concern:*

Be it known that I, JAMES P. GARDNER, of Columbia, in the county of Maury and State of Tennessee, have invented an Improved Mode of Constructing Sun-Dials, of which the following is a specification.

The drawing marked A, represents a hemispherical dial four inches in diameter, with the sun shining upon it at 2 o'clock p. m.

C, represents a gnomon in a conical shape about one third of an inch in diameter at the bottom and tapering to a point. The gnomon is based in the center of the concave hemisphere and its point is on an exact level with the margin of the dial, so that when the sun rises the shadow made by the point of the gnomon will strike the margin of the dial, on the opposite side, and as the sun rises higher and higher the shadow will sink lower and lower along the side of the dial tracing a regular line with its point from west to east until the setting of the sun when the point of the shadow will strike the margin of the dial in the east.

D, represents the shadow of the gnomon with its point just crossing the line which terminates at figure 2, and it is that figure which denotes the hour of the day when the point of the shadow crosses that line, and so in like manner when the point of the shadow reaches the line which terminates at 3, that figure indicates the hour of the day.

The heavy dotted line commencing at the figure 12, and running through the center of the base of the gnomon and terminating at E represents an exact north and south line passing from the margin of the dial through the center, along the concave surface to the point E.

E represents the south pole, and is the point to which all the north and south lines converge, and the same lines continued north would converge at the north pole.

The line running from figure 7 west represent a line on the surface of the dial running from 7 through and along the concave surface to figure 5 and is the line which will be traced by the point of the gnomon's shadow from figure 5 to figure 7 when the sun rises at 5 o'clock and sets at 7 o'clock. The line running from figure 6 west, repre-

sents a line on the concave surface of the dial which will be traced by the point of the gnomon's shadow when the sun rises at 6 o'clock and sets at 6 o'clock. In like manner as to the line running from figure 5 west &c. The other two lines commencing at figure 13 and 11 and running west are intended to show the length of the days when the point of the gnomon's shadow traces those lines.

The lines which run from figures 12, 1, 2, 3, 4, 5, 6, 7 south all represent lines which are drawn upon the concave surface of the dial from the point E dividing the equinoctial line, running east and west from figure 6 to figure 6, into twelve equal parts, and the figures represent the twelve equal parts or hours into which a day is divided, when the shadow of the gnomon's point traces the equinoctial line. These lines may be increased in number so as to represent half or quarter hours &c.

In laying off or marking the dial the latitude of the place for which the dial is designed must first be ascertained. This is done by a simple calculation, and by the use of the dividers. The dial from which the drawing is made is prepared for the latitude of Washington City. The latitude is found by measuring the number of degrees on the north and south line running from figure 12 through the center of the gnomon's base, commencing the measurement at the center of the gnomon's base and ascertaining the latitude by measuring north the number of degrees which represent the latitude of Washington City. This presents no difficulty as the concave surface of the dial is a perfect hemisphere. Having designated the latitude of the place on the north and south line the next thing is to lay off an equatorial or equinoctial line through this point of latitude. This is a simple process effected by the use of the dividers by setting one foot of the dividers on the north and south lines at a point just as far north of the point designated by letter E as the latitude is north of the gnomon's center.

Having thus laid down the equinoctial line, the next process is to divide this line into as many equal parts as are desired to represent hours or fractions of an hour.

This is done by striking lines with the dividers and in this way the whole dial is completed.

I claim—

- 5 The mode herein described of constructing sun dials that is to say, using therefor a hemispherical cup, having the lines laid off upon its inner surface in the manner de-

scribed, and the gnomon in the center of the cup arising from its bottom all as herein 10 described.

JAMES P. GARDNER.

Witnesses:

WM. V. VOORHIES,  
NATHANIEL BAXTER,  
JOHN W. GILMER.