Oct. 3, 1950 J. E. JOHANSON ET AL 2,524,706

SUN CLOCK

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Fig. 1.

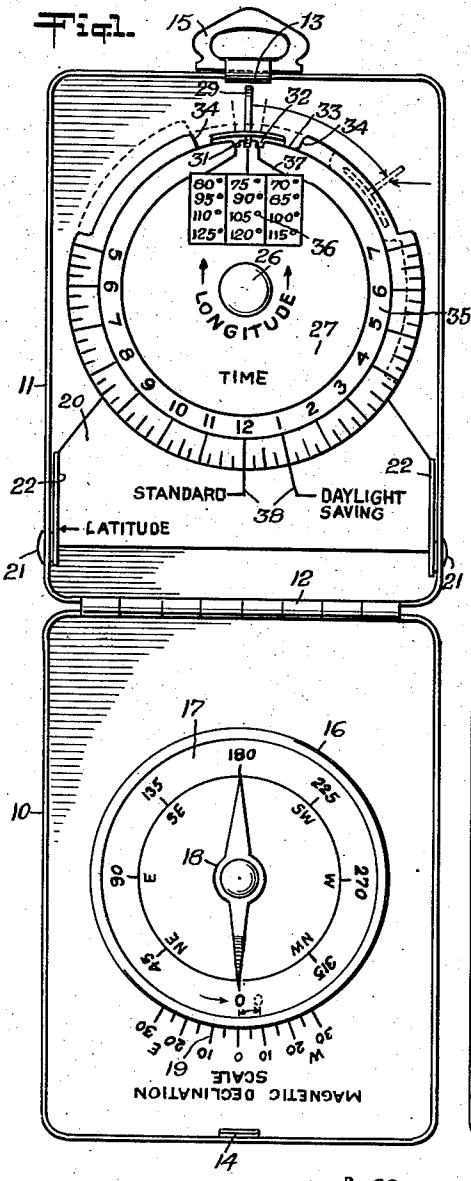


Fig. 2.

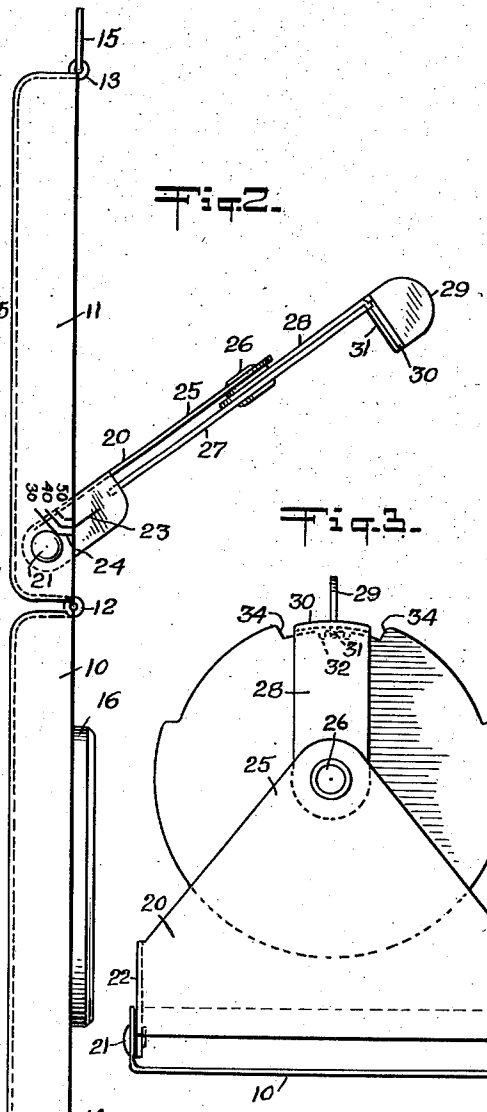


Fig. 3.

Fig. 4.

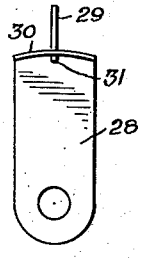
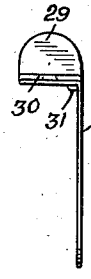


Fig. 5.



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SUN CLOCK

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The present invention relates to new and useful improvements in sun clocks.

An object of the invention is to provide a simple, efficient and easily operated device.

A further object is to provide a device which is made of a relatively few easily manipulable parts, which is comparatively cheap to make, and is housed in a casing so as to be carried around protected against damage like a cigarette case, or lighter or locket.

A still further object is to provide a device which can be manipulated to determine the correct time by a minimum of simple adjustments by any one without any special knowledge of astronomy or mathematics.

Further and more specific objects, features and advantages will more clearly appear from the detailed description hereinafter set forth especially when taken in connection with the accompanying drawings which illustrate a present preferred form which the invention may assume and which form part of the specification.

In brief and general terms, the invention includes a compass disposed on a surface with respect to a declination scale and provided with a rotatable casing which enables the compass scale to be adjusted to position to allow for compass declination at different points.

Another feature includes a rotatable time disk mounted in a pre-determined position with respect to the compass and associated with means whereby it may be disposed at a proper latitude angle with respect to the horizontal.

A still further feature includes a shadow producing means on the time disk which can be adjusted thereon in accordance with various longitudes and which when the disk is turned will permit the shadow to disappear when the means is disposed in a definite position with respect to the sun.

Yet another feature is a time scale on the time disk which when the disk is turned cooperates with fixed marks on the disk support to enable the solar time to be read off at once when the disk is set in a pre-determined position or "no-shadow" position.

The present preferred form which the invention may assume is illustrated in the drawings, of which,

Figure 1 is a plan view of the casing opened up with the main and cover portions lying flat in a common plane;

Figure 2 is a side elevation of the device opened showing the latitude plate raised to a position corresponding to 40 degrees of latitude;

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Figure 3 is a rear elevation of the latitude plate in a raised position;

Figure 4 is a front elevation of the shadow strip; and,

Figure 5 is a side elevation thereof.

Referring now merely to the structure and operation of the preferred form illustrated herein, it will be seen that the device comprises a casing formed of two hinged shallow portions 10 and 11 hinged together at 12. They are adapted normally, when not in use, to be held together by means of co-operative latch elements 13 and 14. A bail 15 is provided to enable the device to be carried on a chain if desired.

The main casing 10 has disposed therein a compass casing 16 containing the usual compass scale 17 and the needle 18 mounted in the usual manner to swing freely under magnetic pull. The casing 16 of the compass, however, is mounted on a pivot alined with the axis of the needle so that it can be rotated about this axis manually with respect to a declination scale 19 disposed on the floor of the main casing 10 and indicating degrees of declination east and west of the zero position. The normal position of the compass casing 16 is such that the zero mark on scale 17 is alined with the zero mark on the declination scale 19. It may be moved therefrom in a manner and for purposes later to be described.

The part of the casing which I will call the cover portion 11, has disposed therein a plate 20 which I call the latitude plate. This plate is pivoted along its bottom portion by rivets 21 to opposite side walls of the cover 11 to pivot around an axis at right angles to the longitudinal line of the portions 10 and 11 when opened as shown in Figure 1. The pivot connection of this plate 20 is tight enough by friction to enable it to be moved up from the flat position to assume an angle to the bottom of the cover portion 11 when desired and to maintain that position. The latitude plate has side flanges 22 adjacent the rivets 21 and the side walls of the cover 11 and one of these as shown in Figure 2 has a mark 23 thereon which as the plate 20 is moved to an angular position will be related in alinement with one or another of several marks 24 suitably formed on the outside of the adjacent side wall of the cover 11. These latter marks are numbered in terms of latitude and when the mark 23 is lined up with one of these marks 24 the plate 20 is angularly disposed at the angle of latitude borne by the mark 24 which in the position shown in Figure 2 is latitude 40 degrees.

From an examination of Figure 3 it will be

seen that the upper portion of the latitude plate 20 is tapered to a narrow end 25 to which a rivet 26 is connected. On this rivet 26 are rotatably mounted a time disk 27 and a shadow strip 28 to the upper end of which and at right angles thereto there is formed a shadow plate 29 which is mounted on the upper bent-over end 30 of the strip 28. A dependent rib 31 on the portion 30 is adapted to lie in spaced notches 32 formed in the periphery 33 of a cut-away portion of the time plate 27 thus providing shoulders 34 which limit in each direction the rotation of the strip 28 with respect to the time plate 27.

The time plate or disk 27 is peripherally provided with a scale of hours 35 which are subdivided into quarter-hour graduations. Below the notches 32 it is also provided with a table 36 comprising spaced rows of numbers representing different degrees of longitude. There are three rows and each is connected by a line 37 to one of the notches 32. The material of the shadow plate 29 and the rib 31 is such that they can be flexed enough to enable the strip 28 to be rotated to place the rib in one or another notch so as to set the plate 29 adjustably with respect to the time disk 27 in accordance with the longitude in which the reading of time is being taken. In explanation of the 15 degree differences in the longitude values tabulated in columns, it is to be noted that the usual 15 degree widths in time zones has been assumed, and that the notches 32 are formed along the periphery 33, spaced so that their centers are 5 degrees apart. On the plate 20 adjacent the bottom of the disk 27 are two lines 38 spaced apart and extending to the scale 35 on the disk. These lines are respectively marked for daylight and standard time, so that when the time disk is set in its final position the time in either of these terms may be read at once. It will be noted particularly from Figures 4 and 5 the shadow plate 29 is extended upright from the bent end 30 of the shadow strip 28 and lies about in the middle of said bent end, and extends at right angles both to the bent end and the strip.

The operation of the device to tell time is extremely easy and requires no particular knowledge beyond a few simple facts, and is as follows:

The device is opened with the main portion 10 and cover portion 11 laid flat or horizontal. This will cause the diametral 12 o'clock axis of the time disk 27 to lie in the normal line of the north-south axis of the compass casing and of scale 17 which normally is disposed with the zero mark of the scale in line with the zero mark of the declination scale 19. Knowing the latitude of the particular location where the time is to be determined, the latitude plate 20 is raised until it is set for that angle by alining the mark 23 on the flange 22 with the latitude marks 24 on the side wall of the cover 11. The shadow strip is adjusted to be set in the notch over the proper column of longitude values for the designated location.

Holding the device in the left hand with the casing opened and horizontal and with the latitude plate and the shadow plate adjusted as above described, the device is turned while flat until the compass needle north seeking end coincides with the zero or north graduation on the scale 17. It is of course to be remembered that the compass casing has been previously turned to set the zero mark of scale 17 opposite the proper graduation on the declination scale for the amount of compass declination calculated for that locality. The longitude and latitude and compass declination may be obtained from regular official tables and may be supplied with the device if desired by having a simple table giving these figures pasted on the floor of the cover 11 back of the latitude plate 20, although this is not shown as being no part of the invention herein.

With the north end of the needle in this position the right hand turns the time plate 27 until the shadow of the plate 29 on the bent end 30 of the strip 28 disappears at which time the time is read from either one of the marks 38 on the latitude plate according to whether it is to be read as standard or daylight saving time. Therefore it is seen that before the sight is taken the compass case and the latitude plate and the shadow plate may be preliminarily adjusted since these factors are known in advance. Then all that the operator has to do is to hold the device horizontal in one hand, turn so that the needle is pointing as stated and then turn the time plate until the shadow disappears.

While the invention has been described in detail and with respect to a present preferred form which the invention may assume, it is not to be limited to such details and form since many changes and modifications may be made in the invention without departing from the spirit and scope of the invention in its broadest aspects. Hence it is desired to cover any and all forms and modifications which may come within the language or scope of any one or more of the appended claims.

What we claim as our invention, is:

1. A sun clock which includes a shallow main casing and a shallow cover casing hinged together and adapted to be moved together when not in use to protect the elements therein, a latitude plate disposed normally flat within the cover casing and pivoted thereto, and adapted to be adjusted around its pivot points at a latitude angle, a rotatable time disk disposed on the latitude plate and having a time scale along its periphery, a shadow strip pivoted around the center of the time disk, the outer end of the strip being bent over the periphery of the time disk, spaced notches in the adjacent periphery of the time disk, a rib on the under face of the bent portion of the strip and adapted to lie in one or another notch as the strip is swung around its pivot, a shadow plate on the bent portion of the trip and disposed at right angles to both the bent portion and the main portion of the strip, said shadow plate adapted to cast a shadow on the bent portion of the strip except when the plane of the shadow plate lies directly in line with the sun.

2. A sun clock which includes a rotatable time disk, means to adjust said disk in a latitude plane, a shadow plate disposed radially of the disk and at right angles to the plane of said disk, a shadow-receiving surface at right angles to the shadow plate and movable therewith, means to adjust the shadow plate angularly with respect to the disk to allow for differences in longitude, and means to latch said plate in the adjusted position, said plate and disk adapted to be moved together to a position wherein the plate casts no shadow on the shadow-receiving surface.

3. A sun clock which includes a rotatable time disk, means to adjust said disk in a latitude plane, a shadow plate disposed radially of the disk and at right angles to the plane of said disk and adjacent the periphery thereof, a shadow-receiving surface at right angles to the shadow plate

and movable therewith, a strip pivoted axially with the disk and supporting the plate, the end of the strip bent over as a flange across the periphery of the disk to form the shadow-receiving surface, means to adjust the strip with respect to the disk, and means to latch the strip to the disk so that they may be moved together.

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