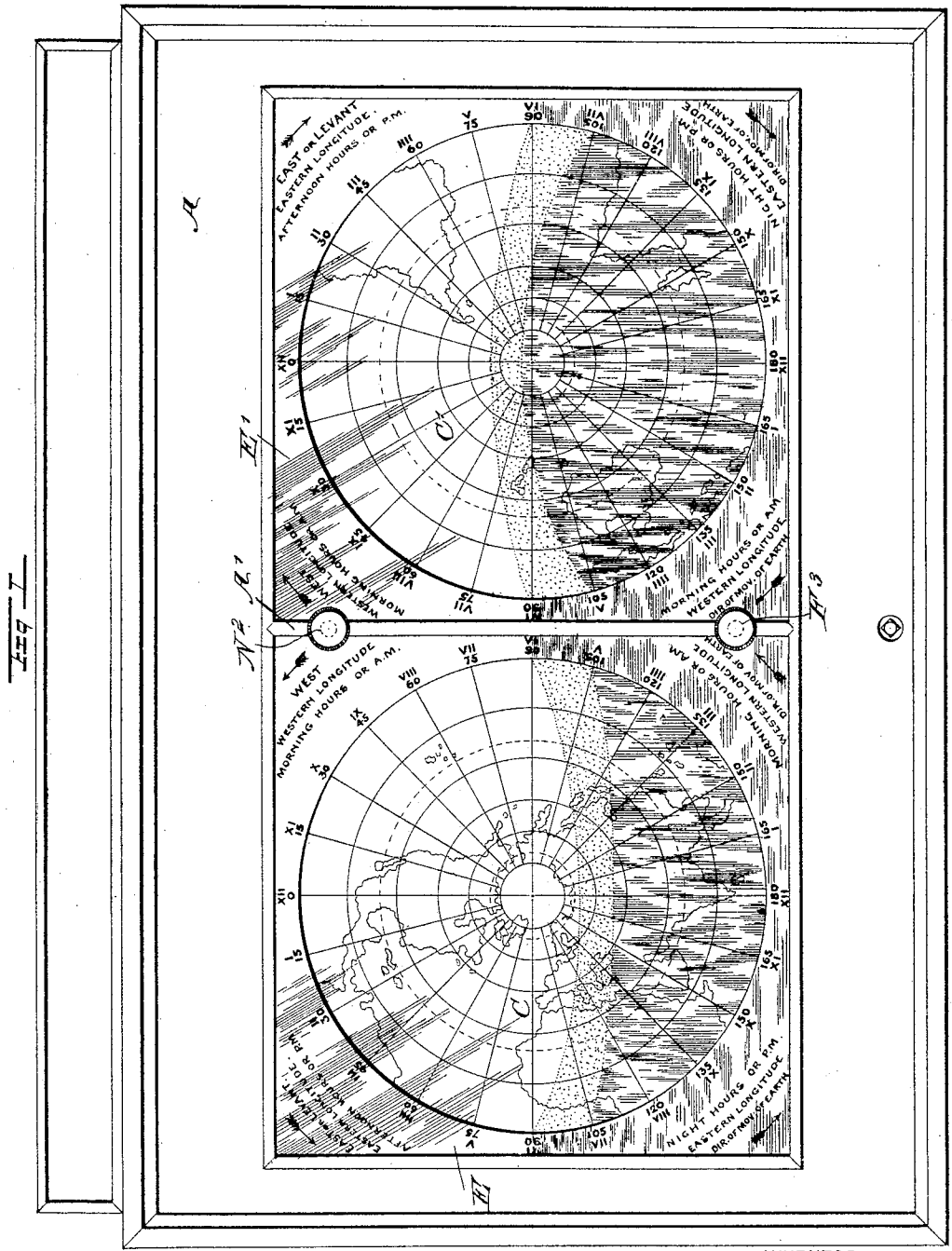
(No Model.)

2 Sheets—Sheet 1.

M. ARRIAGA.

MAP.

No. 536,504. Patented Mar. 26, 1895.



WITNESSES:

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(No Model.)

2 Sheets—Sheet 2.

M. ARRIAGA.

MAP.

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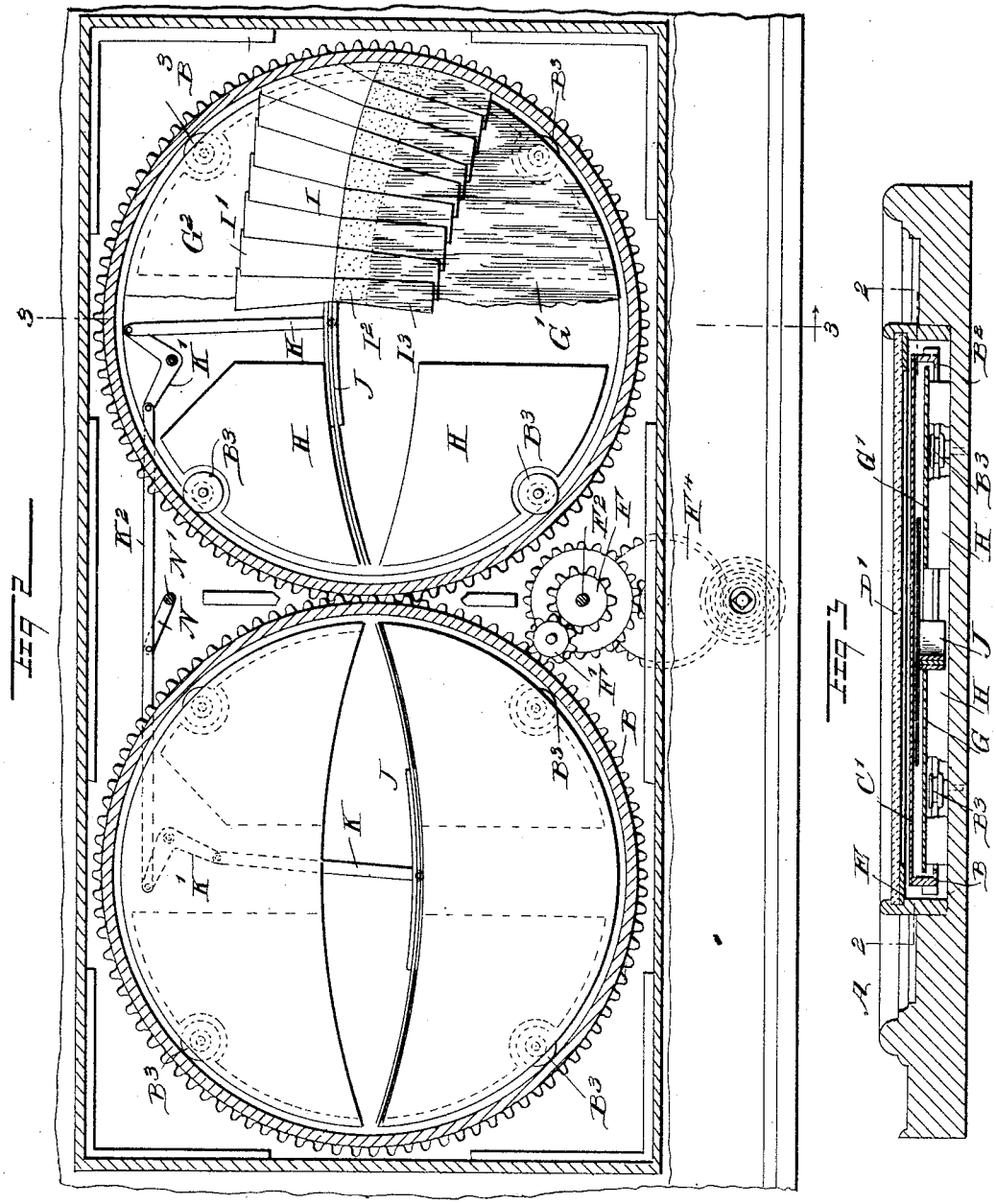

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UNITED STATES PATENT OFFICE.

MIGUEL ARRIAGA, OF MEXICO, MEXICO, ASSIGNOR TO THE COMPAÑIA MEXICANA DE MAPAS HORARIOS SOCIEDAD ANONIMA.

MAP.

SPECIFICATION forming part of Letters Patent No. 536,504, dated March 26, 1895.

Application filed April 25, 1894. Serial No. 508,943. (No specimens.)

To all whom it may concern:

Be it known that I, MIGUEL ARRIAGA, of the city of Mexico, Mexico, have invented a new and Improved Map, of which the following is a full, clear, and exact description.

The invention consists principally of two revoluble disks or hemispheres and fixed universal meridians for the same.

The invention consists of certain parts and details, and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of the improvement. Fig. 2 is a sectional plan view of the same on the line 2—2 of Fig. 3; and Fig. 3 is a transverse section of the same on the line 3—3 of Fig. 2.

The improved map is provided with a suitably constructed casing or frame A, in which are mounted the webless wheels B and B′, in mesh with each other and formed with annular internal flanges B^2, engaged by grooved rollers B^3, journaled in the bottom of the casing A, as is plainly shown in Fig. 3, so that the said gear wheels B and B′ are guided and are thus mounted to revolve within the casing. On the top edges of the gear wheels B and B′ are secured the disks C and C′ respectively, made preferably of a transparent or translucent material and displaying, on their upper faces, a map of the world in two hemispheres; the boreal or northern and the austral or southern. Directly above these two disks are arranged the glass covers D and D′ respectively, set in the casing A, to permit the operator to view the hemispheres located below the same and engraved, printed or otherwise arranged on the disks C and C′. On the under sides of the glass covers D and D′ are engraved, etched or otherwise arranged meridian lines terminating at the edges of the disks on the graduations formed on fixed boards E, E′, secured in the frame A directly under the covers, as is plainly indicated in Fig. 3. The graduations on the boards E, E′, for the meridians on the covers D, D′, commence with zero at the top and then run five degrees to the right and left until the lower point diametrically opposite the zero point indicates 180°. See Fig. 1. Next to this meridian graduation is arranged a time graduation to indicate the hours of the day, as will be readily understood by reference to Fig. 1.

In order to revolve the gear wheels B and B′, and the hemisphere disks C and C′ carried thereby, I provide a small gear wheel F, in mesh with an intermediate gear wheel F′ meshing into one of the gear wheels B, B′, as is shown in Fig. 2. The stem or shaft F^2 of the gear wheel F is journaled in suitable bearings in the frame A, and on the upper end of the said shaft, on top of the frame or casing A, is arranged a button or head F^3, adapted to be taken hold of by the operator, so as to permit of turning the shaft to set the gear wheels F, F′, B, B′, in motion, to revolve the hemispheres simultaneously, so as to bring the same into the desired position. Instead of turning the shaft F^2 by hand a suitable clock work F^4 may be provided and in gear with the said shaft F^2, so as to rotate the disks C C′ once every twenty-four hours to mark or indicate the hours in all points of the earth.

On the upper half of each hemisphere the sun appears to be shining, while the lower half is in shadow, to indicate night, and to represent this I fasten boards G and G′ shaded at their top surfaces, to projections H on the casing A within the wheels B, B′ and under the transparent disks C, C′, respectively, so that the lower part of the hemispheres as viewed from above appears to be in partial darkness, as indicated in Fig. 1. Between these spaces of light and shadow a band I is arranged under each disk C or C′, and above the corresponding board G or G′, and this band I is arranged in folds and formed at its top surface with a light portion I′, a dotted red portion I^2 representing twilight, and a shaded portion I^3 corresponding to the shaded tops of the fixed boards G and G′. This band I is secured on a spring J fitted between oppositely arranged projections H, as is plainly indicated in Fig. 2, the said projections being cut out or curved at opposite faces, as indicated in said Fig. 2.

In order to move the springs J either up or

down, to shift the corresponding band I accordingly, the following device is provided: Each spring J is pivotally connected at or near its middle by a link K with a bell crank lever K′, and the two bell crank levers are pivotally connected with each other by a link K^2 pivotally connected with a crank arm N secured on a vertically disposed shaft N′, journaled in suitable bearings in the casing A and having its upper end provided with a button N^2, adapted to be taken hold of by the operator, so that the operator, by turning the said button, turns the crank shaft N′ whereby a sidewise motion is given to the link K^2, and a swinging motion to the bell crank levers K′, which, by the links K reverse the position of the springs J: that is, up or down, according to the direction in which the button N^2 is turned. By this arrangement the twilight portion of the bands I is shaded up or down to indicate twilight at the proper place, over the hemisphere, as will be readily understood by reference to Fig. 1.

It is understood that when one of the springs J with its band I is moved in an upward direction, the other spring with its band moves downward, thus showing the belt of twilight in the proper position on both hemispheres. It is understood that where the light and dark backgrounds under the disks C and C′ terminate, sunrise and sunset are indicated, and the intervening red space denotes the duration of dawn or twilight.

If it is desired to adjust the map to any particular meridian, the operator turns the button F^3 as above described, so as to turn the hemispheres until the place chosen is beneath the first meridian. In order to find the time in any part of the world, having that of a given place, the operator turns the button F^3 to revolve the hemispheres until the name of the place appears below the hour chosen, then the corresponding time in any part of the world will be shown, as well as where the sun is rising or setting, or whether the place referred to is then in dawn or twilight.

It is understood that all maps of the world as heretofore constructed are arranged with respect to one meridian only, and as each nation bases its gegraphical observations on its meridian, it is necessary to have as many maps as there are nations, in order to utilize them to the best advantage. Globes also present the same difficulty as flat maps, although they have at the equator a graduated circle which can be adjusted to any meridian; but this is inconvenient, as it only shows the longitude clearly at the equator, and even to do this the globe must be turned around, thus making the observation difficult. All geographical work can be reduced to any meridian, by calculations, but this process would only be of value for observations of great accuracy, for astronomy, navigation, &c. Besides the great amount of labor required to obtain these observations they are of almost no value at all for teaching geography or for references which frequently arise, requiring no great accuracy but only the advantage of showing at a glance all places in the world arranged to that particular meridian. The new map above described obviates these difficulties, and with the universal meridian in divisions of fifteen degrees almost all the information desired can be obtained or shown at once. When arranged to any proposed meridian as above described, and by calculating approximately the fifteenth part of the space between the marked degrees, the longitude can be found with hardly a difference of one degree, that is with much greater accuracy than can be obtained with any of the maps or globes now actually in use and having their meridians divided in sections of ten degrees or even fifteen degrees. The universal meridian will be of great service and help in the study of geography, as all observations can be made immediately and without calculation to any meridian.

The inconveniences common to all maps and globes as heretofore constructed with regard to the meridian, are found to a greater extent in connection with the differences of time. The maps of the world adjusted to one meridian do not show the comparison of time in different places, but only show twelve o'clock by their first meridian. In globes the same objections exist, although they have at the equator a circle with marked hours, but they present the same inconveniences in regard to time, as they do to the meridian above described.

The time at any place can be found out by calculation, but only after hard work isolated results are produced without reference to any other part of the world. With the map of the world above described and with the universal meridian and time indicator, a person will be enabled at a glance and without calculation, to find the time at any place on the earth, provided the hour of the one where the observation is to be made is given.

Astronomers, navigators, telegraph operators, railways, schools, &c., will obtain great advantages from the use of this improved map, by being enabled to fix the time in any place in the world without an error of more than four minutes. It will therefore, be seen that the rising and setting of the sun according to the season of the year and the latitude, are indicated by the map. All countries in the world where the sun is rising or setting can be seen at once, and at the same time the hour at any place at the moment of the observation, and the length of day or night according to the season of the year and the latitude, are given.

By the use of the band I the zone of dawn or twilight is accurately indicated, together with the duration of twilight with sufficient accuracy, and the time at that or any other place.

This map can be used in larger size as a universal clock to be placed in towers for the

purpose of marking the universal hour, and in this case the white background H of the upper part of the casing A, and the black one G of the lower part of said casing A, will be made of very thin sheets of india rubber, which will be secured to the circumference by its inner edge and to the springs J so as to obtain an even transparency in both the top and lower surfaces when light is used at night to illuminate the clock.

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

1. A map provided with a revoluble disk, a fixed board to represent the night zone, and a movable band for representing the twilight zone, substantially as described.

2. A map, provided with a day zone and a night zone, and a twilight zone movable relatively thereto, substantially as described.

3. A map comprising two revoluble transparent disks representing hemispheres, and a fixed shaded board below the said disks, substantially as shown and described.

4. A map comprising two revoluble transparent disks representing hemispheres, a fixed shaded board below the said disks, and a movable band, representing twilight, below the said revoluble disks and over the said fixed boards, substantially as shown and described.

5. A map comprising two revoluble transparent disks representing hemispheres, a fixed shaded board below the said disks, a movable band representing twilight, below the said revoluble disks and over the said fixed boards, and means, substantially as described, for imparting motion to the said band in opposite directions, as set forth.

MIGUEL ARRIAGA.

Witnesses:
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MANUEL VALERIO ORTEGA.