(No Model.)

M. V. B. ETHRIDGE.

TIME PIECE DIAL.

No. 393,000. Patented Nov. 20, 1888.

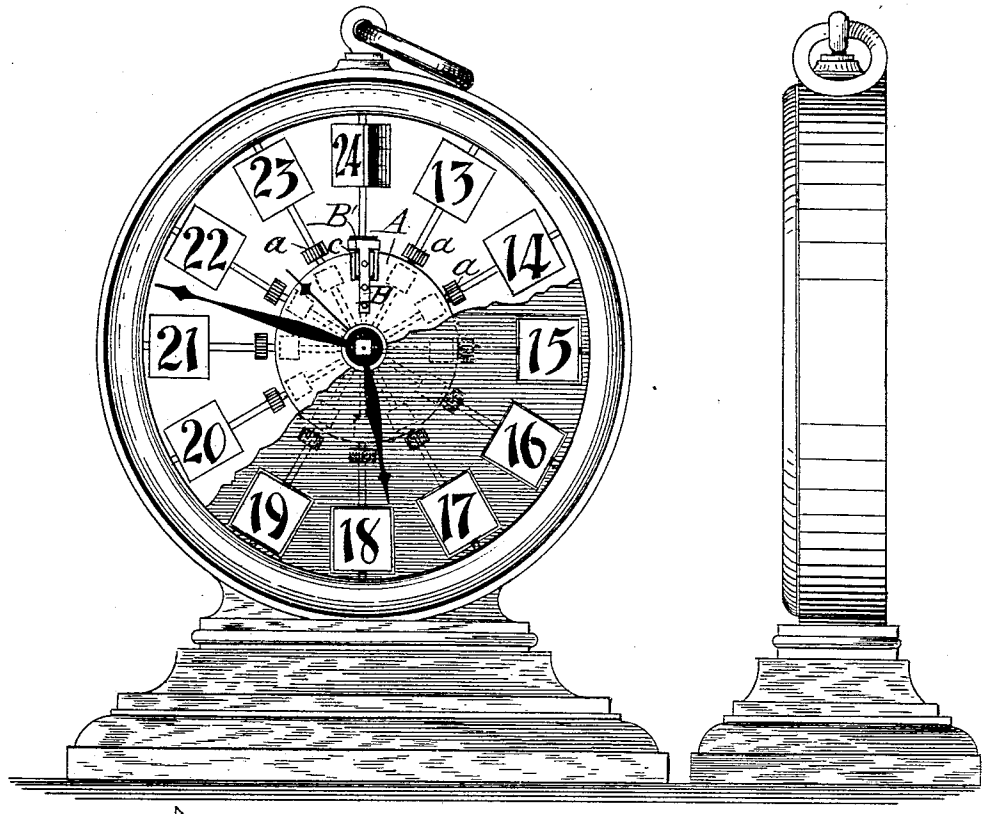

Fig. 1.

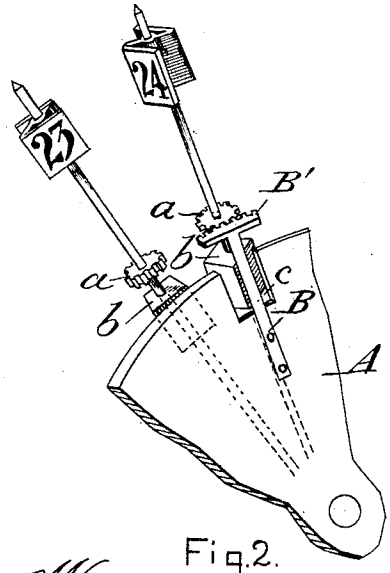

Fig. 2.

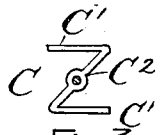

Fig. 3.

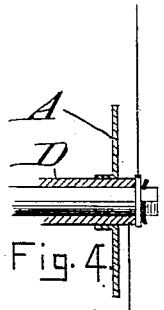

Fig. 4.

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TIME-PIECE DIAL.

SPECIFICATION forming part of Letters Patent No. 393,000, dated November 20, 1888.

Application filed January 18, 1888. Serial No. 261,077. (No model.)

To all whom it may concern:

Be it known that I, MARTIN V. B. ETHRIDGE, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Time-Piece Dials; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention has reference to time-piece dials, and relates especially to that class of time-piece dials wherein the hours of the day, from one to twenty-four, are designated by means of a radial series of intermittently-rotary spindles, each carrying a block, plate, or disk, on the face of which are delineated numerals representing the hours; and the invention consists, essentially, in improved means for imparting a partial rotation to each spindle consecutively during the revolution of the clock-hands, and for steadily holding said spindles in the position to which they may have been turned; also, it consists in a simple and novel construction of the numeral-indicating device which is attached to the spindle-rod; and, furthermore, it comprises certain details in the construction, arrangement, and combination of parts, substantially as will be hereinafter fully described and claimed.

The invention is illustrated in the annexed drawings, in which—

Figure 1 is a face view of a time-piece showing my invention applied thereto, a portion of the dial-face being broken away to expose the shifting spindles within and their actuating mechanism. It also shows an edge view of the time-piece. Fig. 2 is an enlarged detail view of a couple of the spindles and the mechanism which intermittently rotates them and holds them in place. Fig. 3 is a plan view of the Z-shaped numeral-plate carried by the spindle-rod. Fig. 4 is a detail section of the hour-hand sleeve, the disk secured thereto, and the time-piece hands.

Similar letters of reference denote corresponding parts throughout all the figures.

As I have already stated above, the dial to which my present invention is applicable is of the kind having a radial series of rotary spindles, which are provided with numeral blocks, plates, or disks, upon which the hours of the day are delineated. These spindles are suitably journaled at each end, so as to be rotated under the impulse of actuating devices arranged in connection therewith. They are thus caused to present at one time one face to view and at another time another face, so that the numeral indicated on the front face of the block is subject to constant change, in order that the entire time-piece may accomplish the object of its construction, which is to note the time of day throughout the whole of the twenty-four hours by a regularly-increasing series of hour-marks from one to twenty-four.

It is unnecessary to dwell longer upon this general feature of the dial with which my invention is involved. The purpose of this invention is to provide improved means for individually rotating the spindles, and I will now proceed to describe the manner in which the invention is carried into effect.

The spindles which I use are furnished not only with the numeral-plate which indicates the hours, but also with a pinion and a block, which latter is of rectangular cross-section and has parallel faces.

a denotes the pinion. It is located on the spindle-rod at any suitable point, a convenient location being at about half the length of the spindle-rod. The block *b* is secured to the rod somewhere between the pinion and the inner extremity of said rod. Preferably it will be placed close by the pinion, as shown, for a purpose to be hereinafter stated.

Upon the hour-hand sleeve, as D, is firmly secured a circular plate or disk, A. Said disk is firmly secured to the sleeve, so as to revolve therewith. Further, the plate may be of greater or less diameter, as desired. It will, however, be constructed of such size as to permit its circumference to be situated in close coincidence with the outermost edges of the blocks *b*, substantially as is represented in Figs. 1 and 2. This plate A is formed at one point in its circumference with a notch, recess, indentation, or aperture, *c*, preferably square or rectangular in shape, and corresponding somewhat nearly in size with the face of the block *b*.

Variations in the size and shape of the notch *c* may doubtless be employed to a considerable extent, and so, likewise, obvious differences may exist in the structure of the block *b*, the idea of my invention being that the plate A shall be so furnished with a notch that when said plate in its revolutions brings the notch opposite the block the outline of the notch will surround the block, so that the latter may be free to turn without coming in contact with the plate, for it should be premised that the plate A is in close contact with the flat faces of the series of blocks *b*. It will thus be observed that normally the blocks *b*, resting with their faces close to the plate A, cannot move, and hence the spindles cannot revolve, but will be held firm; but when the plate A presents its notch opposite any one of the blocks, then said block will be released and may freely turn if any agency acts thereupon.

A rod or arm, B, is riveted or otherwise fastened firmly to one side of the disk A on a radial line thereof and in such proximity to the notch *c* that it may extend over said notch medially and beyond the circumference of the disk. The outer end of this arm is formed with a segmental gear, B′, extending at right angles to the direction of the arm and adapted to engage the pinions *a*. The length of the segment B′ will be made to correspond with half the length of the circumference of the pinion *a*, so that the engagement of pinion and segment may result in the half-revolution of the pinion, and consequently of the spindle to which it is attached, and the presentation of the opposite side of the numeral-plate to view.

It is evident that if the artisan or user should so desire, the length of the segment may bear a different ratio to the length of the pinion from that here suggested. I do not, therefore, wish to confine myself to having their lengths in the proportion stated, but simply indicate this as a preferable mode of construction.

The operation of turning the spindles by means of my improved mechanism just described will be evident from the description of the construction and relation of the parts without need of further detail. The plate A will hold all the spindles firmly in place and keep them from rotating, except at the times when the notch is brought opposite any one block, which block is thus set free, and the segment is permitted to engage the pinion on the spindle and rotate the same. As the disk A proceeds in its revolutions each spindle will be rotated in turn, and the disk is so fixed to the hour-hand sleeve and the notch so positioned with respect to the hands of the time-piece that the rotation of each spindle will take place after the passage of the hour-hand, so that the proper numeral may be displayed for correctly designating the hour when said hour-hand again passes that point.

My invention includes not only the mechanism for turning and holding the spindles, but also the construction of the numeral-plate which is attached to each spindle. The form of this plate is best shown in Figs. 2 and 3. Here it is seen to be made of a single strip of metal bent into a Z shape.

C denotes this block or numeral-plate. The Z shape causes it to have the opposite parallel members, C′ C′, and the connecting part C^2. The spindle to which the numeral-block is attached passes through the middle portion of the connecting part C^2. The faces C′ C′ bear the hour-marks. This mode of making the numeral-plate is extremely cheap and simple.

In my present invention a dial-plate entire may or may not be used; but when used it must be perforated or provided with slots or openings located in the usual position of the twelve Roman numerals, through which openings numeral-blocks may be visible.

The dial as I have described it may be used in connection with any ordinary clock, watch, or other time-piece, being so connected with the works thereof as to be operative thereby. It may also be arranged so as to be actuated by hand without any connection with the time movement. It may be used with a dummy-clock to serve as an educational model, and in this case the plate A would be provided with means for turning the same by hand.

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

1. In a time-piece dial, a radial series of rotary spindles, in combination with means for turning and holding the same, consisting of a single notched disk and a projecting device thereon adapted to engage and shift the spindles, substantially as described.

2. In a time-piece dial, a radial series of rotary spindles carrying numeral faces, pinions, and blocks, in combination with means for rotating and holding the same, consisting of a single notched disk and a segment-provided arm carried thereby, which is adapted to engage the pinions and shift the spindles, substantially as described.

3. In a time-piece, the combination, with a radial series of rotary spindles, of a disk secured to the hour-hand sleeve and a projecting device on said disk adapted to engage and shift the spindles, substantially in the manner and for the purpose set forth.

4. In a time-piece, the combination, with a series of rotary spindles carrying flat-faced blocks, of a rotative single notched disk which rests in close contact with the faces of said blocks and normally holds them from turning, and a projecting device on said disk adapted to engage and shift the blocks at those intervals when the disk-notch comes opposite said blocks, releasing them from contact with the disk and permitting the spindles to turn, substantially as described.

5. In a time-piece dial, a radial series of rotary spindles carrying numeral devices on the faces of which are delineated the hours of the day, and carrying also pinions and plain-faced blocks, in combination with a rotative disk or

plate and a projecting arm thereon having a segment adapted to engage the pinion and rotate the spindles when a notch on the periphery of the disk comes opposite the plain-faced blocks, all substantially as set forth.

6. In a time-piece dial, a rotary spindle carrying a Z-shaped numeral-block, on the opposite faces of which are delineated two of the twenty-four hours, substantially as set forth.

7. In a time-piece, a radial spindle provided with a Z-shaped numeral-plate, a pinion and a block, in combination with mechanism, substantially such as described and shown, for turning and holding said spindle, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

MARTIN V. B. ETHRIDGE.

Witnesses:

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G. W. TROWBRIDGE.