W. G. BENTLEY.

TIME INDICATOR.

APPLICATION FILED NOV. 12, 1912.

1,086,268. Patented Feb. 3, 1914.

Fig. 1.

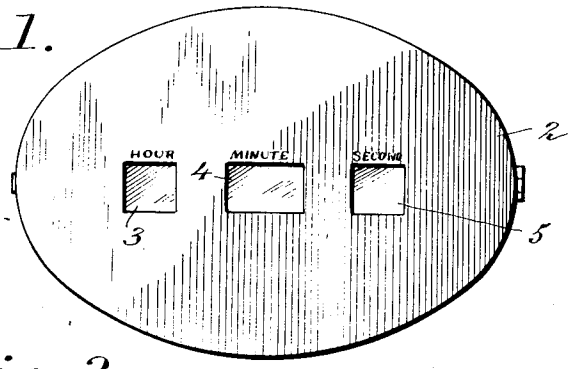


Fig. 2.

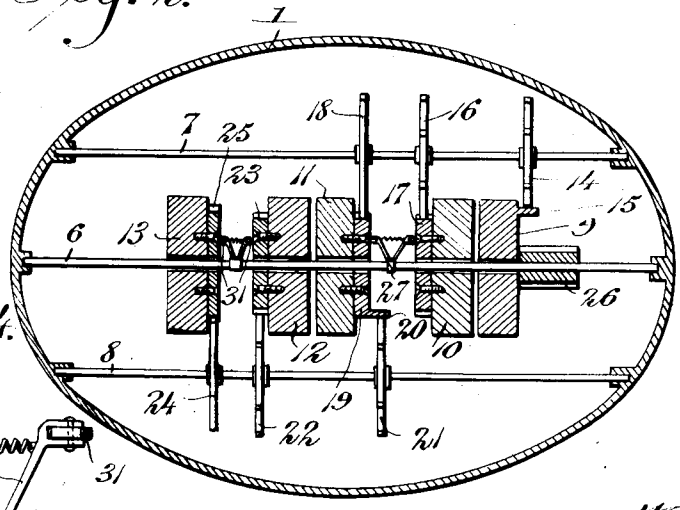


Fig. 4.

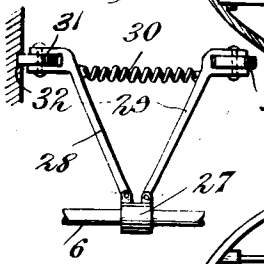
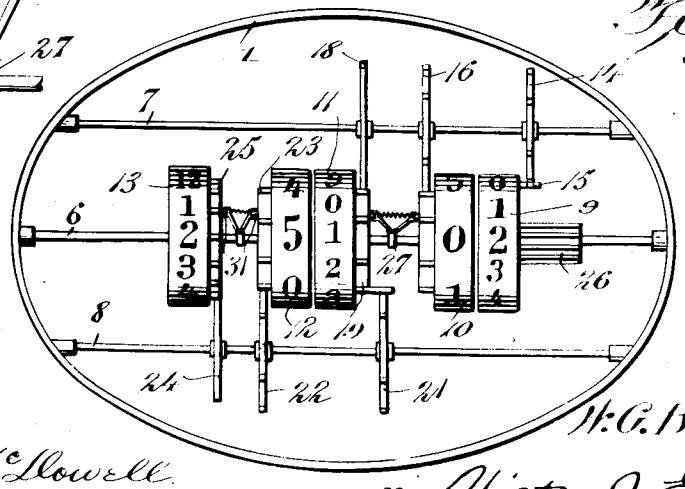


Fig. 3.



Witnesses

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TIME-INDICATOR.

1,086,268. Specification of Letters Patent. Patented Feb. 3, 1914.

Application filed November 12, 1912. Serial No. 730,947.

To all whom it may concern:

Be it known that I, WILLIAM G. BENTLEY, a citizen of the United States, residing at Temple, in the county of Bell and State of Texas, have invented new and useful Improvements in Time-Indicators, of which the following is a specification.

This invention relates generally to an improvement in time indicators and particularly to an indicating apparatus in which the time noting figures are carried upon rotary disks so constructed and arranged as to expose the proper time in hours, minutes and seconds to a face plate.

The main object of the present invention is the provision of a time indicator including a series of step by step rotary disks the control of movement of each disk insuring the proper related movement of the disks to indicate the time.

The invention in its preferred form of details will be described in the following specification, reference being had to the accompanying drawings, in which:—

Figure 1 is a view of elevation of the improved device. Fig. 2 is a longitudinal central sectional view. Fig. 3 is a view similar to Fig. 1 with the face plate removed. Fig. 4 is an enlarged broken elevation illustrating the governing device for preventing overrunning of the disks.

Referring particularly to the accompanying drawings, my improved time piece is mounted in a casing 1 preferably, though not necessarily, of oval-shape having a face plate therein removably closing the casing in any desired manner and formed with a series of openings 3, 4 and 5, respectively, through which the disks indicate the "hour," "minute" and "second" are properly exposed to indicate the proper time.

Within the casing and disposed in approximate vertical alinement are three shafts, a main shaft 6, an upper transverse shaft 7 and a lower transferring shaft 8. On the main shaft 6 adjacent one end thereof is loosely mounted a rotary disk 9 and immediately adjacent the same a second similar rotary disk 10, these two disks constituting the "second" indicating disks. The disk 9 is divided on its peripheral surface into ten divisions and each bears a numeral from 0 to 9 while the disk 9 is divided into six indicating surfaces each bearing a numeral from 0 to 5. Also loosely mounted upon the shaft 6 and spaced longitudinally from the "second" indicating disks are the "minute" indicating disks 11 and 12, the former of which is divided on its peripheral surface into ten indicating spaces numbered from 0 to 9 and the latter divided on its peripheral surface into six indicating spaces numbered from 0 to 5. Also loosely arranged upon the shaft 6 and longitudinally spaced from the "minute" disks is an "hour" disk 13 the peripheral surface of which is divided into twelve indicating spaces numbered from 1 to 12. The openings 3, 4 and 5 in the face of the casing are so positioned that one number only of each disk is exposed.

Fixed upon the upper transferring shaft 7 is a toothed wheel 14 formed peripherally with six teeth equally spaced thereon, and the disk 9 is provided with a single projection 15 arranged to engage successively the teeth of wheel 14, so that on each rotation of the disk 9 the wheel 14 is advanced the distance of one tooth. Also secured upon the upper transferring shaft 7 is a second toothed wheel 16, which is an exact duplicate of wheel 14, is provided with six peripherally disposed teeth and is so positioned upon the shaft 7 that it will engage a toothed wheel 17 secured to the surface of disk 10, said toothed wheel 17 also having six teeth. Therefore, as wheel 16 moves one tooth at each complete rotation of disk 9 it will be obvious that disk 10 will at the same time be moved one-sixth of its circumferential length and as said disk 10 is divided into six indicating spaces each step by step movement of disk 10 will expose the next successive numeral through the opening 4. Secured upon the shaft 7 is another toothed wheel 18 which is properly provided with a single tooth. The wheel 18 is in cooperation with a toothed wheel 19 secured upon the "minute" disk 11, and said toothed wheel 19 has ten teeth so that at each complete rotation of the wheel 18 the disk 11 is turned one-tenth revolution. Secured upon the disk 11 is an additional operating tooth 20 which is designed to engage a toothed wheel 21 fixed upon the lower transferring shaft 8. This toothed wheel 21 has six teeth so that at each complete revolution of disk 11 the wheel 8 is advanced the distance of one tooth. Also secured upon the shaft 8 is another toothed wheel 22 peripherally provided with six teeth and engaged with a toothed wheel 23 secured upon the

"minute" indicating disk 12, the wheel 23 having six teeth so that at each movement of wheel 22 the distance of one tooth the disk 12 is correspondingly moved a distance equal to the distance between the indicating numerals on the peripheral surface thereof.

Secured upon the shaft 8 is a toothed wheel 24 and this wheel 24 is peripherally provided with a single tooth. Said wheel 24 is designed to coöperate with a toothed wheel 25 fixed on the disk 13 which toothed wheel 25 has twelve teeth.

A drive gear 26 is secured on the disk 9 and may be operated by any power such as the usual spring train, electric power weight or any type of device arranged for this purpose.

To assist in maintaining the respective movable disks from overrunning I provide what may be termed a governing device. One of each of said devices is arranged between the toothed wheels 23 and 25 and 17 and 19 thereby governing all of the movable disks beyond that gear directed to the power. The governing device consists of a supporting clip 27 secured upon the main shaft 6 between the toothed wheels referred to, and to the free terminals of each clip there is secured divergent arms 28 and 29. The arms are preferably hingedly or otherwise movably connected with the clip and are pressed apart by a spring 30 which is quite accurate as to its pressing influence, being so regulated as to insure just the proper degree of tension without interfering with the necessary movement of the parts. The terminals of the arms 28 and 29 are provided with minute bearing rollers 31 which are designed to coöperate with appropriate depressions 32 in the surface of the toothed wheels referred to, so that overrunning is prevented and the parts accurately held in the positions to which they may be moved.

The operation of the device will be clearly apparent from the drawings, it being understood that for each complete revolution of disk 9 disk 10 makes a one step movement and that for six complete revolutions of disk 9 disk 11 makes a one step movement. For each complete movement of disk 11 disk 12 makes a step movement while for each complete rotation of disk 12 disk 13 will make a one step movement. It is thus obvious that if the power mechanism is so controlled as to turn disk 9 once in each ten seconds the respective disks will be automatically controlled, thereby an accurate time in the "hour," "minute" and "seconds" will be indicated.

What is claimed is:—

1. A time indicator including a main shaft having a driven "second" disk thereon presenting numerals from 0 to 9, a second "second" disk loosely mounted on the main shaft and carrying numerals from 0 to 5, an upper transferring shaft, a toothed wheel secured thereon, means whereby a complete rotation of the "second" disk imparts a one-sixth of a complete rotation to said toothed wheel, a second tooth wheel on the transferring shaft, connections between said second tooth wheel and the second "second" disk whereby a complete rotation of the second tooth wheel will impart a complete rotation to the second "second" disk, two "minute" disks loosely mounted upon the main shaft, a toothed wheel on the upper transferring shaft and connections between said toothed wheel and the first "minute" disk to impart a one-tenth revolution to the latter in the complete rotation of the former, a second transferring shaft, a toothed disk thereon and connections between the first "minute" disk and said toothed wheel whereby a complete rotation of the first "minute" disk will impart a one-sixth rotation to the toothed wheel, a second toothed wheel on the lower transferring shaft and connections between said tooth wheel and second "minute" disk whereby a complete rotation of said tooth wheel will impart a complete rotation to the second "minute" disk, an "hour" disk loosely mounted upon the main shaft, a toothed wheel fixed upon the lower transferring shaft and connections between said toothed wheel and "hour" disk whereby a complete rotation of said toothed wheel will impart one-twelfth of a complete rotation to the "hour" disk.

2. A time indicator including a main shaft having a driven "second" disk thereon presenting numerals from 0 to 9, a second "second" disk loosely mounted on the main shaft and carrying numerals from 0 to 5, an upper transferring shaft, a toothed wheel secured thereon, means whereby a complete rotation of the "second" disk imparts a one-sixth of a complete rotation to said toothed wheel, a second tooth wheel on the transferring shaft, connections between said second tooth wheel and the second "second" disk, whereby a complete rotation of the second tooth wheel will impart a complete rotation to the second "seconds" disk, two "minute" disks loosely mounted upon the main shaft, a toothed wheel on the upper transferring shaft and connections between said toothed wheel and the first "minute" disk to impart a one-tenth revolution to the latter in the complete rotation of the former, a second transferring shaft, a toothed wheel thereon and connections between the first "minute" disk and said toothed wheel whereby a complete rotation of the first "minute" disk will impart a one-sixth rotation to the toothed wheel, a second toothed wheel on the lower transferring shaft and connections between said tooth wheel and second "minute" disk whereby a complete rotation

of said tooth wheel will impart a complete rotation to the second "minute" disk, an "hour" disk loosely mounted upon the main shaft, a toothed wheel fixed upon the lower transferring shaft and connections between said toothed wheel and "hour" disk whereby a complete rotation of said toothed wheel will impart a one-twelfth rotation to the "hour" disk, and governing devices between the "seconds" and "minute" disks and between the "minute" and "hour" disks to prevent overrunning of the same.

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

WILLIAM G. BENTLEY.

Witnesses:
A. F. BENTLEY,
LENNIE CULP.