No. 652,013. Patented June 19, 1900.

C. E. BEACH & H. W. DOUGHTY.

ANNUNCIATOR.

(Application filed June 2, 1897.)

(No Model.)

FIG. 2.

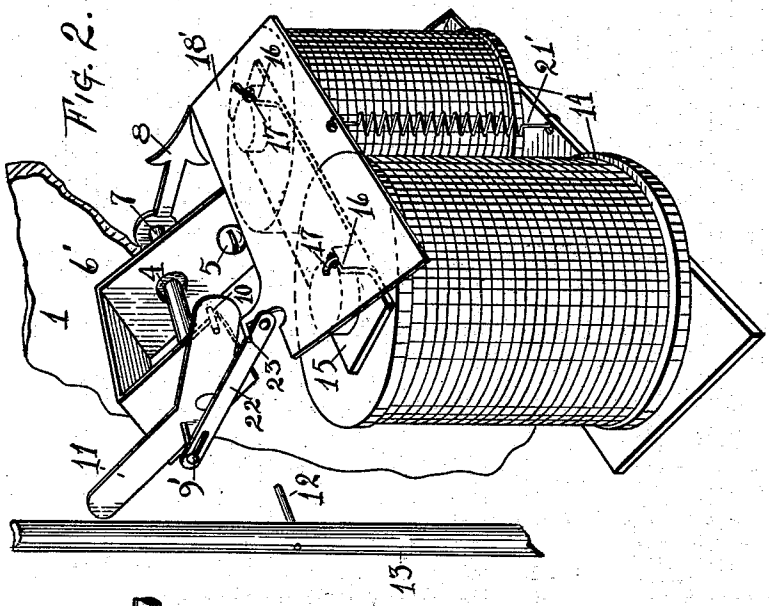


FIG. 3.

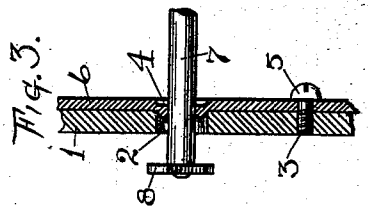
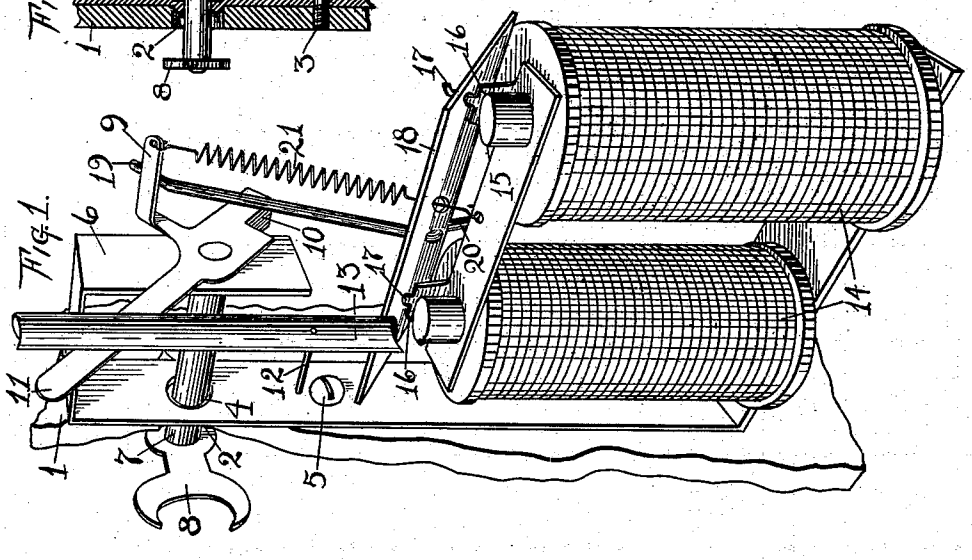


FIG. 1.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CLARENCE E. BEACH AND HERMAN W. DOUGHTY, OF BINGHAMTON, NEW YORK, ASSIGNORS TO THE STAR ELECTRIC COMPANY, OF NEW YORK.

ANNUNCIATOR.

SPECIFICATION forming part of Letters Patent No. 652,013, dated June 19, 1900.

Application filed June 2, 1897. Serial No. 639,184. (No model.)

To all whom it may concern:

Be it known that we, CLARENCE E. BEACH and HERMAN W. DOUGHTY, residing at Binghamton, in the county of Broome and State of New York, have invented a new and useful Annunciator, of which the following is a specification.

Our invention relates to annunciators in which are provided an indicating part capable of assuming a position of indication, but normally remaining in another position; and our invention relates particularly to that class of annunciators in which the indicating part is either controlled, released, or driven by the armature of an electromagnet.

The objects of our invention are to produce an annunciator not affected by either changes in the position of the instrument, mechanical shock or jar, to render it simple and cheap, and such other objects as may be hereinafter specified, and more particularly pointed out in the claims.

In the drawings which accompany and form part of this specification, in which like numerals of reference denote the same part throughout, Figure 1 is a perspective view of a device embodying our invention. Fig. 2 is a perspective view of a device embodying a modified form of our invention. Fig. 3 is a sectional view of the face or dial 1 and frame 6, taken on a line through the center of the openings 2 and 3 and showing the screw 5 and shaft 7 in said openings.

In constructing our invention we provide for each indicator employed a frame of such shape that it may be readily attached to a suitable support and maintain a shaft in proper relation thereto. A shaft supported by the frame has fixed to one of its ends a suitable indicator and to the other end one or more suitable projections, arms, or cranks, all so arranged that the action of gravity will not tend to rotate the shaft, one of said projections being so arranged as to include a portion of the frame in its path, and thereby limit the movement of the shaft. Magnets and their armature are provided, the armature being preferably so supported that the action of gravity will not tend to alter its position. A connection between the armature and the shaft is so arranged that it does or may engage with one of the arms or cranks which are attached to the shaft, and thereby impart a portion of a revolution thereto at certain times. A spring connects with one of the cranks or arms moving with the shaft and is so arranged as to resist the rotation of said shaft from either direction toward a certain point. A common arrangement for returning the shaft to its normal position and the usual numerals or characters to distinguish the various indicators are employed.

The drawings forming part of this specification show modes of constructing annunciators embodying the different features of our invention. However, we do not limit ourselves to the construction shown.

In Figs. 1 and 2 we show the face or dial 1 provided with suitable openings 2 and 3 (see Fig. 3) for the admission of the projection 4 and the screw or rivet 5, respectively. Upon the face or dial 1 we mount one or more of the frames 6, said frames being of suitable shape to permit their properly supporting the various parts of our device. A projection 4, attached to or forming a part of the frame 6, is provided upon the side of said frame and extends a sufficient distance therefrom in the direction of the face or dial 1 to suitably engage therewith when inserted in the opening 2. Through the center of the projection 4 and the point opposite thereto in another portion of the frame 6 we provide openings within which a shaft 7 may freely revolve. On the front end of the shaft 7 we may provide the indicating needle or arrow 8 to move therewith, and on the back end of said shaft 7 we provide a suitable piece or pieces, comprising the crank or pin 9, situated a sufficient distance one side of the axis of the shaft 7, and the projections 10 and 11. The projection 10 extends a sufficient distance in such direction that it may engage with a portion of the frame 6, and thereby limit the movement of the shaft 7. The projection or arm 11 extends a sufficient distance from the shaft 7 that its free end may lie within the path of the projection 12, provided upon the rod 13. The magnets 14 are so attached to the frame 6 as to be situated in suitable re-

lation to the shaft 7. The yoke 15 is attached to the poles of the magnets 14, and is preferably formed in one piece with the shoulders 16 and pins 17, said yoke 15 being constructed of non-magnetic material. The shoulders 16 extend a distance from the face of the yoke 15 about equal to the distance that the poles of the magnets 14 extend above said yoke. The pins 17 extend a distance from the shoulders 16 greater than the thickness of the armature 18. The yoke 15 may be provided with openings for the admission of the poles of the magnets 14, to which said yoke is attached, and the distance from the poles of said magnets to the shoulders 16 should be very slight. The armature 18 is provided with openings through which the pins 17 may pass, and when in position upon said pins 17 the ends of said pins may be bent each away from or toward the other, thereby securing the armature 18 in proper relation to the magnets 14. The openings through the armature 18, provided for the pins 17, should be enlarged on the side of said arm farthest from the magnets 14 to enable said armature to oscillate upon the pins 17 through a sufficient angle. The arms 19 and 20 are securely attached to the armature 18. The arm 19 extends a sufficient distance in the direction of the crank or pin 9 that said crank or pin 9 will lie within the path of the arm 19. The arm 20 is of sufficient length to properly counterbalance the arm 19 and the armature 18, and arms 19 and 20 are so designed that their common center of gravity will lie within the axis around which the armature 18 oscillates upon the shoulders 16 and pins 17. It is also important that the shaft 7, indicating needle or arrow 8, and part comprising projections 9, 10, and 11, should be so designed that the action of gravity upon them will not impart to said shaft 7 a tendency to revolve. The spring 21 is attached at one end to the crank or pin 9, and at the other end to a suitable point of the mechanism to cause said spring to resist any tendency to rotate the shaft 7 while the projection 10 is resting against the frame 6, and when said projection is not resting against the frame 6 the tendency of said spring will be to rotate the shaft 7 in such direction as will soonest bring the projection 10 against a portion of the frame 6.

In the construction shown in Fig. 3 the face or dial 1 is provided, as before, with suitable openings for the admission of the projection 4 and screw or rivet 5. The frame 6′ is of a somewhat-different form in some respects than the frame 6, previously described, to permit it to properly support the various parts of our modified device. The frame 6′ is preferably provided with the projection hereinabove referred to, the shaft 7 being provided with the indicating needle or arrow 8 and projections 10 and 11, as before. However, in place of the crank or pin 9 a crank or pin is provided whose range of motion, though still lying on the side of the shaft 7 farthest from the poles of the magnets 14, bears a different relation to the projections 10 and 11. The magnets 14 are provided and so situated with reference to the shaft 7 that the armature 18′ may suitably influence said shaft. The yoke 15 is provided with the shoulders 16 and pins 17 and is attached to the poles of the magnets. The link 22 connects the free end of the armature 18′ to the crank or pin 9′, the connection between the armature 18′ and link 22 being so arranged that the link 22 may move upon its pivot independently of the motion of the armature 18′ in the direction of the magnets 14, but that its motion in the opposite direction will be restrained by the engagement of the point 23 of the link 22 with that portion of the armature 18′ lying adjacent thereto. The spring 21′ is attached to the armature 18′ at a point that will enable it to tend to hold said armature away from the magnets. The mass of that portion of the armature 18′ extending from the pins 17 away from the link 22 is preferably sufficient to counterbalance that portion of said armature extending in the opposite direction from said pins 17 and the weight of the link 22.

Various modifications of construction, design, arrangement, and additions and omissions of parts may be made in our device, as herein described, without departing from the spirit of our invention.

The operation of our device is as follows: When constructed as shown in Fig. 1 and the different parts are in their normal positions, as shown by the solid lines in said figure, and such parts are maintained in this position by the action of the spring 21 upon the crank 9, should the magnets 14 be energized they will attract the armature 18, thereby causing the arm 19 to engage with and rotate the crank or pin 9 around the shaft 7, thus imparting a portion of a revolution to said shaft and the parts moving therewith, which will cause the needle or arrow 8 to assume a position ordinarily accepted as a position of indication. The action of the spring 21 during the operation just described would be to resist the arm 19 in rotating the shaft 7 and parts moving therewith until said shaft had been rotated such distance that the direction of the pull of said spring 21 will lie across the axis of the shaft 7, after which said spring 21 would assist in or cause the rotation of the shaft 7 until the rotation of said shaft is interrupted by the projection 10 engaging with a portion of the frame 6. It is obvious that taking the movement of the crank or pin 9 as a whole the spring 21 does not appreciably impede the action of the arm 19, for although said spring offers considerable resistance to said arm through a portion of the movement of the crank or pin 9 said spring is either neutral or assisting said arm 19 through the balance of the rotation of the shaft 7, thereby

utilizing the power stored up in overcoming said spring in the operation of the device. If the rod 13 should now be moved in such direction as will bring the projection 12 into engagement with arm 11, the parts may all be returned to their normal position, where they will be securely held by the action of the spring 21.

In the construction shown in Fig. 2 when the parts are in their normal positions and are so maintained by the action of the spring 21 upon the armature 18′ if the magnets 14 are energized their influence upon the armature 18′ will cause it to counteract the spring 21′ and impart a portion of a revolution to the shaft 7 by means of the crank or pin 9′ and link 22. When the armature 18′ now ceases to be attracted by the magnets 14, the spring 21′ will tend to withdraw said armature 18′ from the poles of the magnets 14. In doing this, however, the pull transmitted to the crank or pin 9′ by the link 22 will on account of the hinge connecting said armature and link tend to rotate the crank or pin 9′ in the same direction in which it was rotated by the action of the magnets, thus causing the needle 8 to maintain a position of indication. If the rod 13, carrying the projection 12, be now moved in such direction that the projection 12 will engage with the projection 11, the parts may be returned to their original position, as hereinbefore described.

Having thus described our invention, what we claim is—

1. An indicator, a shaft upon which said indicator is mounted, a supporting-frame in which said shaft is pivoted, a projection moving with the shaft and suitably engaging with said frame, a crank or pin moving with the shaft, a magnet situated adjacent to the crank or pin, an armature mounted in suitable relation to the magnet, an arm carried by the armature and engaging with the crank or pin, and a spring arranged to resist the rotation of the crank or pin at certain times.

2. An indicator, a shaft upon which said indicator is mounted, a projection moving with the shaft and arranged to suitably limit the movement of said shaft, a crank or pin moving with the shaft, a magnet situated adjacent to the crank or pin, an armature mounted in suitable relation to the magnet, an arm carried by the armature and engaging with the crank or pin, and a spring arranged to resist the rotation of the crank or pin at certain times.

3. An indicator, a crank or pin moving with said indicator, a projection moving with said crank or pin and arranged to limit the motion of said indicator, a magnet situated adjacent to the crank or pin, an armature mounted in suitable relation to the magnet, an arm carried by the armature and engaging with the crank or pin, and a spring connected to the crank or pin and so arranged as to resist the rotation of said crank or pin from either of the extreme positions where its movement is limited by the projection toward a point lying between said positions.

4. An indicator, a crank or pin moving with said indicator, a magnet situated adjacent to the crank or pin, a yoke provided with openings through which the poles of the magnet pass, shoulders provided upon said yoke and suitably projecting therefrom, an armature resting upon said shoulders, pins for securing said armature upon the shoulders, an arm carried by the armature and engaging with the crank or pin, and a spring suitably connected to the crank or pin.

5. An indicator, a crank or pin moving with said indicator, a projection moving with said crank or pin and arranged to limit the motion of said indicator, a magnet situated adjacent to the crank or pin, an armature mounted in suitable relation to the magnet, an arm carried by the armature and engaging with the crank or pin, and a projection moving with the crank or pin and arranged to form a means for returning the indicator and parts moving therewith to their normal position after they have been operated by the action of the magnet.

6. The combination with a magnet and its armature, of a yoke or plate, shoulders provided upon said yoke or plate and arranged to form a fulcrum for the armature, and pins projecting from the shoulders and passing through suitable openings in the armature.

7. The combination with a magnet and its armature, of a yoke or plate fitted around the poles of the magnet, shoulders provided upon said yoke or plate and arranged to form a fulcrum for the armature, pins projecting from the shoulders and passing through suitable openings in the armature, the free ends of said pins being so bent as to maintain the armature in proper position upon the shoulders.

8. The combination with a magnet and its armature, of a piece of sheet metal or material so shaped and formed as to provide openings through which the poles of the magnet may pass, shoulders so situated with reference to said openings as to form a fulcrum for the armature, and pins for maintaining the armature in a suitable position upon said shoulders.

9. A magnet; a piece of sheet metal or material suitably secured to the poles of said magnet and so shaped and formed as to provide shoulders suitably situated with reference to the poles of the magnet, and pins extending from said shoulders; and an armature provided with openings through which the pins may pass, said openings being so situated as to bring the armature in proper relation to the poles of the magnet.

10. A magnet, a piece of sheet metal or material suitably secured to the poles of said magnet and so shaped and formed as to provide shoulders suitably situated with reference to the poles of the magnet and pins extending a suitable distance from said shoulders, an armature provided with openings through which

said pins may pass so that the armature may freely rock upon said shoulders and be held in suitable relation to the poles of the magnet, said pins projecting a sufficient distance through the armature so that their free ends may be so bent with relation to each other that they will not permit the armature to become detached from said pins.

In testimony whereof we have hereunto affixed our names, in the presence of two witnesses, this 17th day of May, 1897.

CLARENCE E. BEACH.
HERMAN W. DOUGHTY.

Witnesses:
E. SHANNON,
B. M. KENT.