(No Model.)

W. S. SCALES.

CONTROLLING DEVICE FOR CLOCKS.

No. 368,689. Patented Aug. 23, 1887.

Fig: 1.

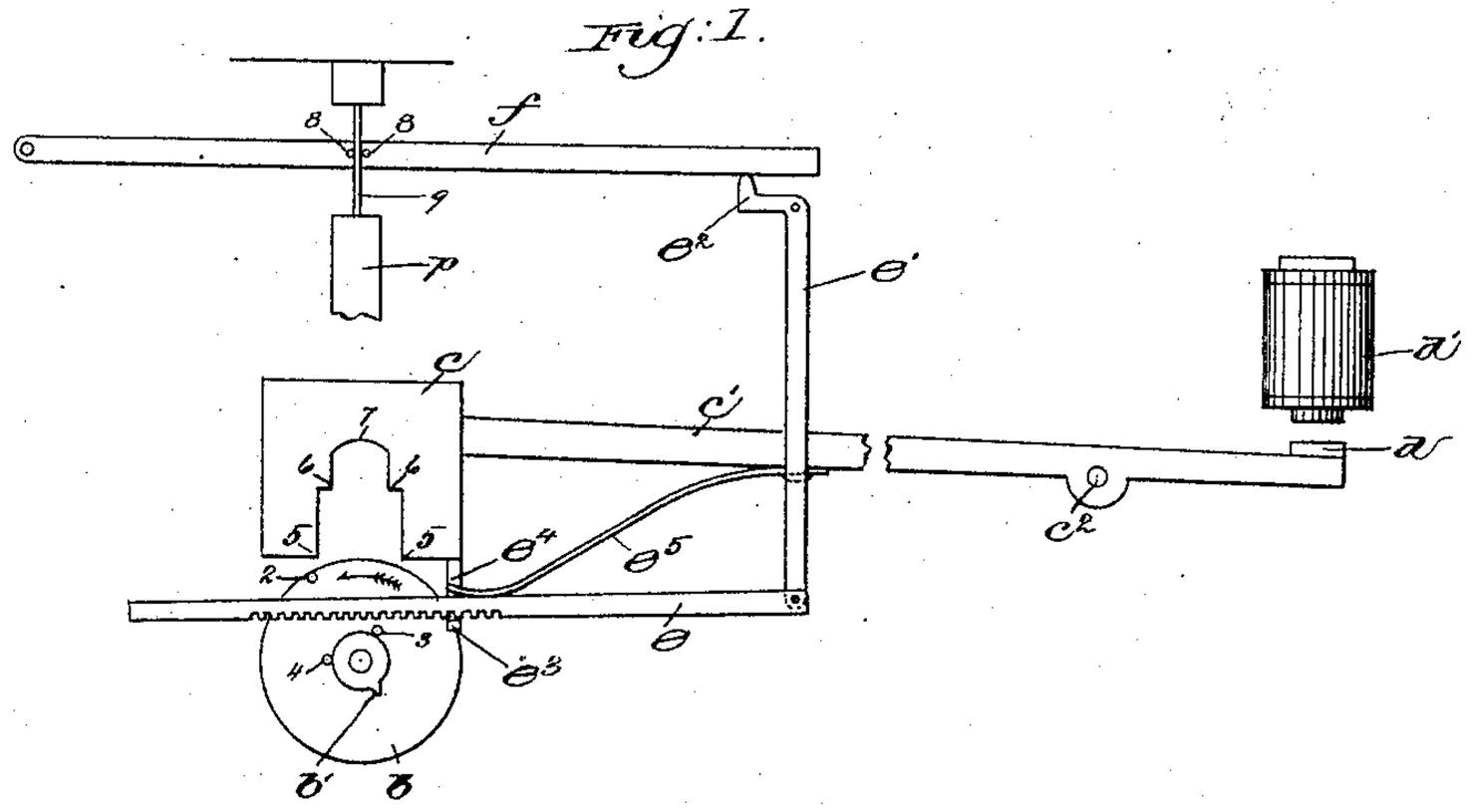


Fig: 2.

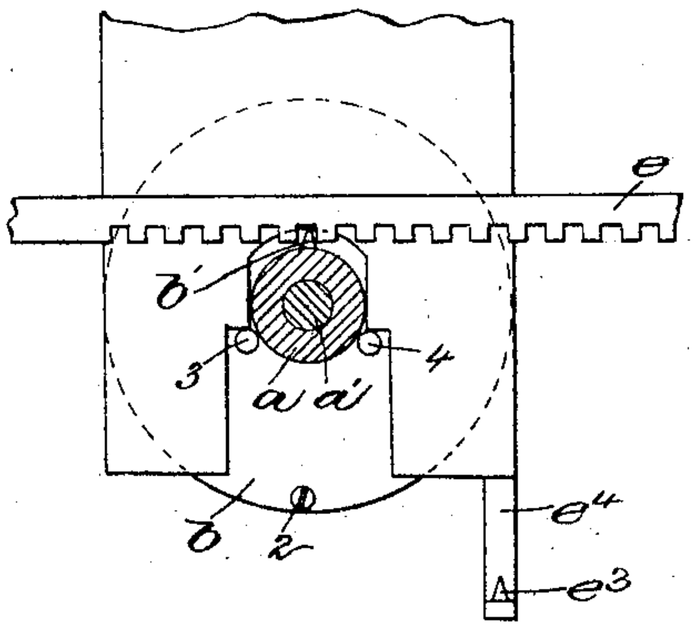


Fig: 3.

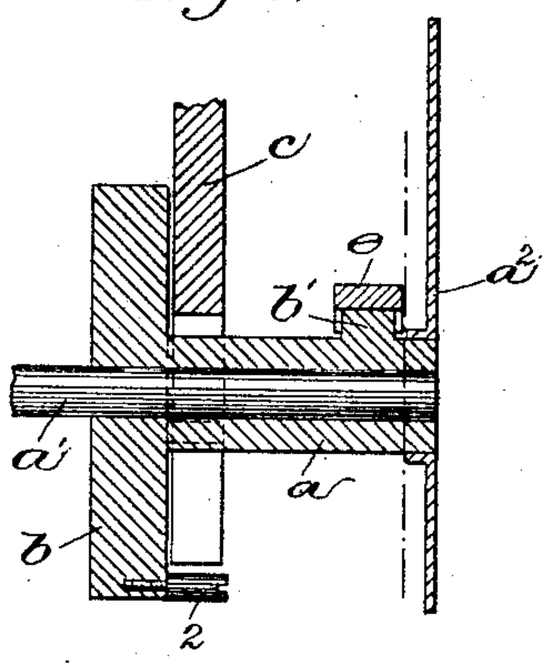


Fig: 4.

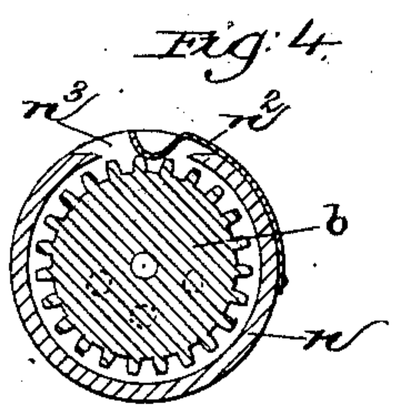
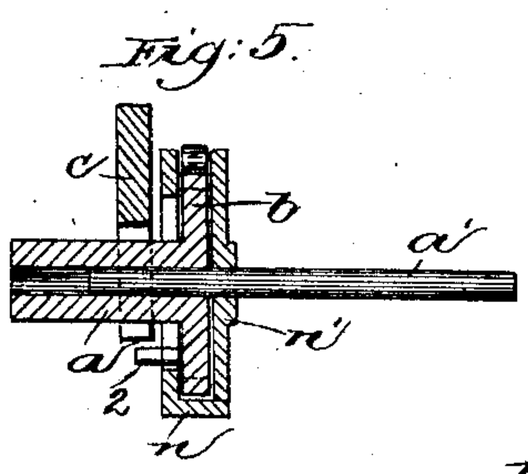


Fig: 5.



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UNITED STATES PATENT OFFICE.

WILLIAM S. SCALES, OF SOMERVILLE, MASSACHUSETTS.

CONTROLLING DEVICE FOR CLOCKS.

SPECIFICATION forming part of Letters Patent No. 368,689, dated August 23, 1887.

Application filed November 15, 1886. Serial No. 218,879. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. SCALES, of Somerville, county of Middlesex, and State of Massachusetts, have invented an Improvement in Controlling Devices for Clocks and other Regulators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In another application filed by me September 2, 1886, Serial No. 212,475, a device was shown especially designed for controlling the speed of clocks and other regulators, such device being so arranged that the hand-setting mechanism, when operated, actuates mechanism for changing the speed of the regulating member of the clock relative to its prior performance.

This invention has for its object to construct an improved controlling device of the class shown and described in the said application.

In accordance with this invention a movable centering device controlled preferably by an electro-magnet is employed, which co-operates with the sleeve carrying the second-hand of the clock, such centering device, when actuated by the magnet, moving said sleeve independent of the rotary motion imparted to it by the motor, thereby setting the said second-hand in a determinate position. Means are also actuated by the said sleeve when it is moved by the centering device, which changes the vibrational length of the regulating member of the motor, increasing or decreasing its speed relative to its prior performance.

The centering device is herein shown as a metal plate cut away upon one side to present several shoulders, and a disk is carried by the second-hand sleeve which is provided with several laterally-projecting pins or studs which are struck successively by the shoulders of the centering device when the latter is moved to set the second-hand. A rack-bar loosely jointed to a pivoted bent lever is normally locked in a fixed position when the centering device is elevated or disengaged from the sleeve, said bent lever by its position determining the vibrational rate of the regulating member of the motor. The rack-bar is moved to move the bent lever by a tooth or spur carried by the second-hand-carrying sleeve, so that when the said sleeve is moved by the centering device independent of its own rotary motion the said tooth or spur will engage the rack-bar and move it in one or the other direction, thereby turning the bent lever on its pivot and changing the vibrational rate of the regulating member.

Figure 1 shows in side elevation a controlling device embodying this invention, together with a portion of a pendulum; Fig. 2, an enlarged view of the controlling device itself in engagement with the sleeve carrying a second-hand of the clock; Fig. 3, a vertical section of the controlling device and second-hand-carrying sleeve, and Figs. 4 and 5 sectional details of the friction devices for the rotary disk.

The sleeve *a*, mounted upon the shaft *a'*, carries the hand a^2, which may be the second-hand of a clock. A disk, *b*, is secured to and carried by the sleeve *a*, such disk having three studs, 2 3 4, projecting laterally from one side at different points of the surface of the disk.

The centering device, consisting of a plate, *c*, herein shown as carried by an arm, *c'*, pivoted at c^2, is cut away at its under side to present two shoulders 5 5 at the lower edge of the plate; also two shoulders 6 6 within the recess formed by cutting the plate to form the shoulders 5 5 and the curved striking or bearing portion 7. The arm *c'*, carrying the centering device, recessed as described, carries at its opposite end the armature *d* of an electro-magnet, *d'*, the latter when energized attracting the armature and moving the lever *c'*, thereby throwing the centering device into engagement with the pins carried by the rotating disk.

By referring to Fig. 1, it being understood the disk *b* is to be continuously rotated, should the impulse be carried to the line, the centering device would descend, the shoulder 5 striking the stud 2 and moving the disk upon the shaft *a'*, independent of its own rotary motion, until the stud 3 is brought into engagement with the shoulder 6, and afterward the stud 4 into engagement with the opposite shoulder 6, as shown in Fig. 2, the said disk *b* being moved in the direction of the arrow, Fig. 1. By this construction of centering device and position

of the studs 2 3 4 the disk *b* may be turned in one or the other direction to nearly a half of a revolution. A rack-bar, *e*, is loosely jointed to one arm *e'* of a bent lever, the opposite arm, e^2, of which lever serves as a support upon which a pivoted arm, *f*, rests, said pivoted arm *f* carrying two studs, 8 8, between which is placed the suspension-spring 9 of a pendulum-rod, *p*.

The rack-bar *e* is locked in fixed position when the centering device is elevated or disengaged from the disk *b* by a tooth or spur, e^3, projecting from an angular frame or support, e^4, rigidly attached to or forming part of the plate *c*, and a flat spring, e^5, attached to the arm *e'* of the bent lever, bears upon the rack-bar *e*, to aid in retaining the same in position. When the centering device descends to center or set the disk *b*, and thereby the sleeve, in a determinate position, the tooth or spur e^3 is disengaged from the rack-bar *e*, permitting said rack-bar to descend and bear upon the sleeve *a*, and if said sleeve is in its correct position when the centering device *c* descends the rack-bar will engage the tooth or spur *b'*, projecting laterally from the sleeve; but if said sleeve is not in its correct position, then the rack-bar will bear directly upon the sleeve, and as the latter is independently rotated by the centering device *c* striking the studs 2 3 4, the tooth *b'* will engage the teeth of the rack-bar and move the said rack-bar in one or the other direction a short distance. By such movement of the rack-bar in one or the other direction the bent lever *e' e²* is turned on its pivot, thereby raising or lowering the bar *f* and changing the vibrational length of the pendulum. It will thus be seen that the devices employed for setting the second-hand of the clock will also actuate mechanism controlling the regulating member of said clock, if the clock is fast or slow at the moment the impulse is carried to the line.

I have herein shown the controlling and actuating devices as especially applicable in connection with clock-setting devices operated to set the second-hand; but it is obvious that the said setting devices may be employed to set the minute-hand, and, furthermore, if desired, a spring or other regulating member may be substituted for the pendulum herein shown.

I also desire it to be understood that the controlling and actuating devices herein shown are also applicable for controlling the speed of other regulators or motors than clocks without departing from this invention.

If desired, the centering device *c* may be carried by a vertically-moving rod or arm preferably controlled by an electro-magnet; also, the said centering device *c* will be somewhat differently shaped if only one pin, as 2 or 3, should be employed.

I have herein shown one tooth, *b'*, carried by the sleeve *a*; but if greater movement is desired for the rack-bar than can be accomplished by the one tooth, several teeth may be employed, thus regulating the clock according to the error.

The disk *b*, carrying the pins or studs 2 3 4, is preferably in practice provided with a series of teeth, as shown in Figs. 4 and 5, said disk turning in a flanged collar, *n*, secured to the shaft *a'*.

An inturned flat spring, n^2, is secured to the flanged collar *n*, the outer end of the said spring passing through an opening, n^3, cut in the flange of said collar and bearing upon the teeth of the disk *b*, thus serving as a friction device.

In Figs. 4 and 5 it will be seen that the pin 2 is placed somewhat farther from the periphery of the disk, so that the said pin may be struck by the centering device *c*, and the disk thereby rotated in the flanged collar.

I claim—

1. In a controlling device for clocks and other regulators, a continuously-moving disk or support and one or more pins or studs carried by it, and a centering device, shaped as described, to move said disk or support independent of its own continuous motion, combined with the regulating member of said clock or motor, and mechanism actuated by said disk or support when moved independently for changing the speed of said regulating member relative to its prior performance, substantially as described.

2. In a controlling device for clocks and other regulators, a rotating disk or support and the pins or studs 2 3 4 carried by it and located at different points upon the disk or support, as described, combined with a centering device having several shoulders, as described, to engage the said pins or studs, whereby the disk or support may be moved nearly half a revolution, substantially as described.

3. In a controlling device for clocks and other regulators, the setting mechanism, consisting of the rotating disk or support and pins or studs carried by it, and a centering device shaped to present several shoulders, as described, combined with the rack-bar, and means to move it in one or the other direction when the disk or support is moved independent of its own motion, substantially as described.

4. In a controlling device for clocks and other regulators, the centering or setting mechanism, substantially as described, combined with a bent lever, *e' e²*, and rack-bar *e*, for moving it, and means for moving the rack-bar only when the centering or setting mechanism is operated, substantially as described.

5. In a controlling device for clocks and other regulators, a setting mechanism, substantially as described, and mechanism for changing the speed of the regulating member of the clock, which is actuated by the setting mechanism, combined with means for locking the actuating mechanism, which changes the speed of the regulating member when the set-

ting mechanism is in its normal position—viz., at rest—substantially as described.

6. The shaft and rotating disk or support having peripheral teeth carried by it and the pins or studs carried by it, the flanged collar *n*, and spring n^2, combined with the centering device for moving the disk or support independent of the rotary motion imparted to it by the shaft, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM S. SCALES.

Witnesses:
BERNICE J. NOYES,
F. CUTTER.