(No Model.)

J. M. EDGAR.

INDICATOR LOCK.

No. 458,125. Patented Aug. 18, 1891.

Fig. 11.

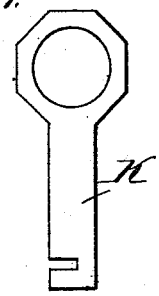


Fig. 1.

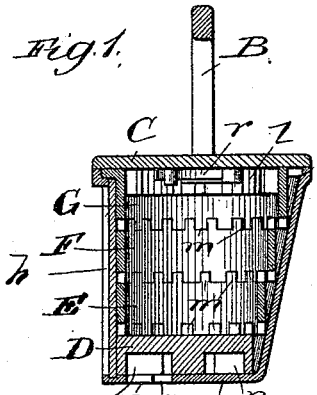


Fig. 2.

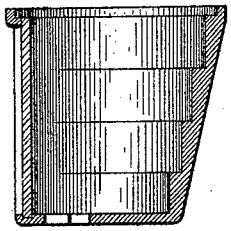


Fig. 5.

Fig. 4.

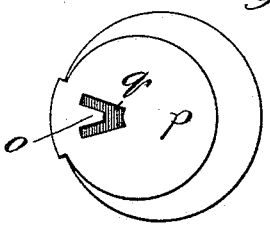
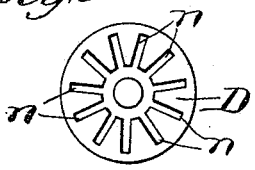


Fig. 3.



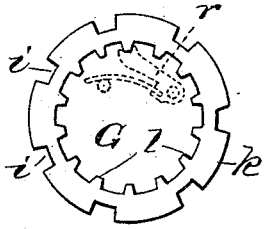


Fig. 6

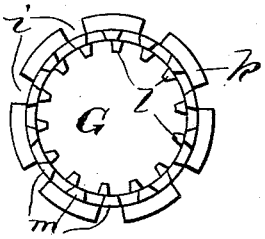


Fig. 8.

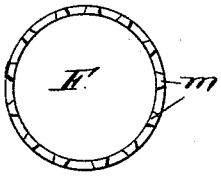


Fig. 7.

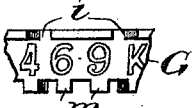


Fig. 9.

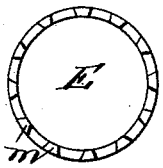


Fig. 12.

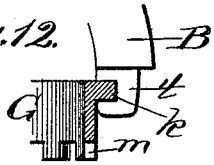
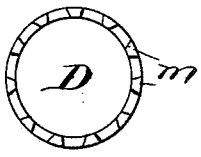


Fig. 10



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By Dyrenforth & Dyrenforth,
Attys.

UNITED STATES PATENT OFFICE.

JOSEPH M. EDGAR, OF KANSAS CITY, MISSOURI, ASSIGNOR TO JOHN Z. RORABACK, OF SAME PLACE.

INDICATOR-LOCK.

SPECIFICATION forming part of Letters Patent No. 458,125, dated August 18, 1891.

Application filed May 6, 1891. Serial No. 391,812. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. EDGAR, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Improvement in Indicator-Locks, of which the following is a specification.

My invention relates to a new mechanism involving as its essential construction circular tumblers of varying diameters, and having differential numbers of teeth extending perpendicularly from or transversely of their peripheries, the tumblers being imposed one upon the other to cause the respectively adjacent teeth to intermesh and one tumbler to overlap the other by reason of their different diameters, or, in other words, to be relatively eccentric, whereby rotation of one of the tumblers will rotate the others, but differentially.

My improvement is especially useful for indicator-locks and the like, and, in fact, I have particularly designed it for application to an indicator-lock, in the nature of a padlock, for use in sealing the doors of freight-cars, mail-pouches, and analogous purposes, wherein the object to be accomplished is that of causing the device to afford its own evidence of tampering by displaying, as the result of such tampering, variation from a predetermined combination of displayed characters.

The more especially intended use for my improvement being as stated, I hereinafter particularly describe it as applied to a car-seal lock, and so illustrate it in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of an indicator-lock constructed in accordance with my improvement. Fig. 2 is a similar view of the case modified as to its interior construction. Fig. 3 is a bottom plan view of the lowermost of the circular tumblers. Fig. 4 is a similar view of the case. Fig. 5 is a top plan view of the uppermost or bolt-locking circular tumbler, showing by dotted lines the spring-dog, which is provided on the cover of the case to prevent back turning of the lock. Fig. 6 is a bottom plan view of the same. Fig. 7 is a view in elevation of a broken portion of the uppermost circular tumbler, showing it as indicative of all the tumblers to be provided on its periphery with characters. Figs. 8 and 9 are plan views of two other tumblers. Fig. 10 is a top plan view of the tumbler represented in Fig. 3. Fig. 11 shows by a view in elevation a key suitable for working the lock. Fig. 12 is a broken sectional view showing the free end of the bolt as it is engaged by the uppermost tumbler.

A is the case, which should taper at least internally to adapt the tumblers of varying diameters hereinafter described to fit it, and, if desired, the case may be provided inside with ledges, as shown in Fig. 2, to afford seats for the tumblers, though such seats are not necessary. The case-cover C carries the spring-dog r on its under side, and a bolt B, pivoted at one end to one side of the case, terminates at its opposite end in a tongue t slotted transversely across its inner edge. I show four tumblers D, E, F, and G, though the number thereof may be increased or diminished according to desire, provided it be not less than two, and while they must be circular they may be mere bands, disks, or annular disks. For the sake of cheapness, lightness, and simplicity, I prefer to provide the tumblers in the form of bands, except the lowermost one D, which should be filled like a disk to prevent insertion through it and through the entire series of any instrument—such as a piece of wire—which would serve as a means for disengaging the dog r in a manner to permit the lock to be turned backward and the predetermined combination to be reassembled after changing it surreptitiously. The tumbler D fits upon the bottom p of the case A, which I provide with a V-shaped opening q, the sides of which should radiate from near the center of the bottom p, and which contains at its wider end a central dividing-tongue o. The tumbler D is formed with radial notches n in its base, which by turning the tumbler may be brought successively into coincidence with the side of the opening q, into which a key K is adapted to be inserted to enter such notch n for turning the tumbler, the recess shown in the end of the key permitting it to pass the tongue o, and thus permit the turning of the key throughout the width of the V-shaped opening. From the upper side

of the tumbler D extend teeth *m* from its periphery, the number thereof being eleven, though there may be more or fewer, and upon the periphery are characters—such as numbers and letters—as indicated on the tumbler G, in Fig. 7, the number of the characters preferably corresponding with the number of teeth. The tumbler E, which is a circular band in form, is of greater diameter than the tumbler D, and is provided with teeth like the latter's teeth, but one more in number, and extending coincidently from opposite edges of its periphery, as many of the teeth at its lower side being adapted to fit the spaces between teeth of the tumbler D as will, in view of the difference in diameter between the two tumblers, coincide with such spaces. The tumbler E is provided with peripheral characters, preferably one for each of the pairs of oppositely-extending teeth and in relative positions to coincide, respectively, with those on the tumbler D. The tumbler F is like the tumbler E, except that it is greater in diameter and has one more pair of the oppositely-extending teeth *m*, the lower of which enter as many spaces between teeth of the tumbler E as coincide with the latter. The tumbler G is greater in diameter than the tumbler F, and has teeth *m* only on its lower edge, one more in number than those on the tumbler F, and as many of which fit in the spaces between the teeth of the tumbler F as coincide therewith in view of the differential diameters of the two tumblers, both of which are provided on their peripheries with suitable characters arranged as are those on the other tumblers described. The annular tumbler G has, furthermore, inner circumferential teeth *l*, to be engaged by the spring-dog *r* on the cover C to prevent backward turning of the lock, and besides it has a circumferential flange *k* about its upper side provided at intervals with recesses *i*. When the tongue end of the bolt B is down, the bolt is locked by the flange *k* of the tumbler G entering the recess in the bolt-tongue *t*, and to unlock the bolt the tumbler G must be turned to bring a recess *i* in its flange coincident with the tongue *t*, when the bolt may be withdrawn. As will be seen on inspection of Fig. 1, the differential diameters of the circular tumblers and the relative arrangement of their teeth *m* cause them to coincide throughout portions constituting mutually differentiating arcs of their circumferences, in which relative positions they are maintained by confinement in the case A, the arrangement being such as to cause the coincidence of the peripheries of the tumblers to be maintained along a perpendicular plane at one side of the case and cause them to successively overlap one another toward the opposite side thereof.

In one side of the case A is a perpendicular opening *h*, which should be glass-covered for the display of the combination.

To use the device, it is set with a predetermined combination of characters displayed at the opening *h* by a relative arrangement of the several tumblers, which also causes the flange *k* of the tumbler G to lock the bolt B. The object of a device of the character of that illustrating my improvement is, as will be understood, to afford evidence of tampering with it by the change in the displayed combination which such tampering would necessarily produce, so that if the object it locks has been opened that fact will be manifested by the resultant change in the lock-combination.

To operate the device to lock or unlock the bolt B, a suitable instrument, as the key K, is inserted into the opening *q* and into a coincident slot *n* in the bottom tumbler D. Then by turning the key the tumbler D is turned, the extent of each such turning being preferably limited by the width of the opening *q* to one tooth *m* and necessitating for each successive tooth a like extent of the turning, withdrawal, and reinsertion of the key. As will be seen, each turn by the key brings a different combination to view at the display-opening, and the recesses *i* in the flange of the tumbler G are such distance apart as to bring one to coincide with the tongue of the bolt to unlock the latter with each two turns of the key. Turning of the lowermost tumbler obviously turns all the others equally; but being of different diameters a complete revolution of the tumbler D will produce only partial revolution of the tumbler E, less of a complete revolution of the tumbler F, and still less of the tumbler G, so that, as will appear quite obvious, not only will each turn of the key present a new combination, but a complete revolution of the tumbler D brings to view a new combination of characters on the several tumblers, which, owing to their relatively differential diameters, are each moved about a center eccentric to that of the actuating-tumbler D.

Though I have described my invention as applied to an indicator-lock and with details of construction especially adapting it for that purpose, I do not wish to be understood as intending to confine it to such particular application, as the generic construction, comprising two or more rotary tumblers confined in longitudinal series and of varying diameters, whereby they relatively overlap and having the differential numbers of teeth intermeshing, as described, is applicable to various mechanical purposes, and I desire, therefore, to be understood as claiming my invention for all purposes to which it is applicable.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination, circular rotary tumblers of varying diameters having differential numbers of teeth extending perpendicularly to their peripheries, the said tumblers being disposed in longitudinal series one upon the other, with several of their respective teeth intermeshing and the tumblers being relatively eccentric and overlapping one another beyond their mutually intermeshing teeth,

and a suitable support holding the tumblers in their relative positions, substantially as described.

2. In combination, a case tapering on its inner side toward one end and provided with a cover, circular rotary tumblers confined in the case of varying diameters and having differential numbers of teeth extending perpendicularly to and characters provided on their peripheries, the said tumblers being imposed one upon the other, with several of their respective teeth intermeshing and the tumblers being eccentric to one another and overlapping beyond their mutually-intermeshing teeth, a bolt adapted to be locked by one of said tumblers, and means for holding the tumblers against reverse rotation, substantially as described.

3. In combination, a case A, tapering on its inner side toward one end and provided with a bolt B, a tumbler D in the base of the case having teeth *m* around its upper edge, a tumbler E, of greater diameter than the tumbler D, and provided with teeth *m*, extending from both edges of its periphery and in greater number than those of the tumbler D, a tumbler F of greater diameter than and having teeth like the tumbler E, but in greater number, a tumbler G of greater diameter than the tumbler F and provided with teeth *m*, extending from the lower edge of its periphery in greater number than those on the tumbler F, and provided with internal teeth *l*, a recessed flange *k* on the tumbler G, and a cover C, carrying a dog *r*, engaging the teeth *l*, the said tumblers being provided peripherally with characters and imposed one upon the other, with portions of their toothed parts intermeshing and eccentric to one another, overlapping beyond their intermeshing toothed portions, substantially as described.

4. In combination, a case A, tapering on its inner side toward one end and provided with a bolt B, with an opening *q* in its base and a display-opening *h*, a tumbler D in the base of the case having teeth *m* around its upper edge and notches *n* in its under side, an annular tumbler E of greater diameter than the tumbler D, and provided with teeth *m*, extending from both edges of its periphery and in greater number than those of the tumbler D, an annular tumbler F of greater diameter than and having teeth like the tumbler E, but in greater number, an annular tumbler G of greater diameter than the tumbler F and provided with teeth *m*, extending from the lower edge of its periphery in greater number than those on the tumbler F, and provided internally with teeth *l*, a recessed flange *k* on the tumbler G, and a cover C, carrying a dog *r*, engaging the teeth *l*, the said tumblers being provided peripherally with characters and imposed one upon the other with portions of their toothed parts intermeshing and eccentric to one another, overlapping beyond their intermeshing toothed portions, substantially as described.

JOSEPH M. EDGAR.

In presence of—
C. L. SEAGRAVES,
E. D. F. BRACKETT.