

UNITED STATES PATENT OFFICE.

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COMBINATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 635,546, dated October 24, 1899.

Application filed October 14, 1898. Serial No. 693,506. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. HOUTS, a citizen of the United States of America, and a resident of Washington, in the District of Columbia, have invented a new and useful Improvement in Combination-Locks, of which the following is a specification.

My invention relates to an improvement in combination-locks; and it consists in the combination, with an endwise-movable bolt having a catch, of a series of cylindrical tumblers having open slots adapted to register with each other and with the catch, and devices to rotate said tumblers, so as to either cause the tumblers to bear against the catch and thereby lock the bolt in position or to cause the said slots in said tumblers to aline with each other and with the said catch and thereby release the said bolt.

My invention further consists in the combination, with an endwise-movable bolt having a catch, of a series of cylindrical tumblers having open slots adapted to register with each other and with the catch, a knob-shaft connected to the bolt and thereby adapted to move the latter, and devices to rotate the tumblers and thereby cause them to either secure or release the bolt.

My invention further consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, which illustrate my improvements, Figure 1 is a horizontal central longitudinal section of a door-lock embodying my improvements. Fig. 2 is a vertical central sectional view of the same, the tumbler-casing being illustrated in side elevation and the lock-case being indicated in outline in dotted lines. Fig. 3 is a detailed perspective view of the outer cylindrical tumbler. Fig. 4 is a similar view of the inner cylindrical tumbler. Fig. 5 is a vertical cross-sectional view taken through the tumbler-casing, the tumblers, and the bolt. Fig. 6 is a detail view of the adjusting-disk on the ends of the tumblers. Fig. 7 is a detail sectional view of the annulus E.

The lock-case A may be of any preferred kind or shape, but in Figs. 1 and 2 is shown as of the mortise door-lock variety. Secured

in the lock-case is a cylindrical casing B, one end of which is closed, as at *b*. A tubular cylindrical tumbler C is disposed in the casing B and adapted to rotate therein, and a similar smaller tumbler D is located within the tumbler C and disposed concentrically with relation thereto, both of said tumblers being secured in the casing and prevented from being moved endwise by an annulus or sleeve E, one end of which is secured in the closed end *b* of the casing, the said annulus being disposed between the tumblers and serving to separate them and also to secure them in position in the casing, the said annulus being formed with annular shoulders *e e'*, which bear against similar shoulders with which the tumblers C D are provided, respectively, and thereby prevent the tumblers from moving endwise or being withdrawn from the casing. Open slots *c*, *d*, and *e²* are made in the tumblers and annulus, respectively, on one side thereof, and the said tumblers being capable of rotation in the casing the said slots may be caused to aline, as will be readily understood, by turning the tumblers to the required positions.

The tumbler C is provided at one end with projecting stop-pins *c'* and the tumbler D is likewise provided with projecting stop-pins *d'*.

A circular adjusting-disk F, which is of the same diameter as the exterior diameter of the casing B, is located against the open end of the latter and is adapted to be turned or rotated thereon, and the said adjusting-disk is provided with concentric stop-slots *f f'*, respectively, for the stops *c' d'* of the tumblers to play in, as shown in Figs. 1 and 6.

The endwise-moving bolt G passes through the center of the series of cylindrical tumblers, the latter being capable of revolution thereon, and the said bolt is provided with a spring-actuated catch *g*, which normally projects from one side of the bolt and which works in a slot *g'* made in the shank of the bolt. One side of the said catch is straight and adapted to bear against and lock the inner ends of the tumblers when the bolt is in the position shown in Fig. 1, so as to prevent the bolt from being moved when the slots in the tumblers are out of alinement with each other; but when the tumblers are turned in

such manner as to cause their slots to aline with each other and with the catch the bolt may be freely moved inward in the lock, the catch moving in the slots in the tumblers.

5 H represents the knob-shaft, which extends transversely through the lock-case and is provided at its extremities with the knobs K. The said knob-shaft passes through a slot *i*,
 10 and is provided with a pinion *h*, which engages rack-teeth *k*, with which one of the sides of the said slot is provided. It follows that by turning the knobs the rack and pinion will cause the bolt to move either to a locking or
 15 unlocking position, as the case may be, when the tumblers are in position with their slots in line with the catch *g*.

L represents thumb-disks, which are free to rotate on the knob-shaft and are connected
 20 to a pair of miter-gears M on the inner sides of the lock-case by means of sleeves *m*, the said thumb-disks and miter-gears being fast to said sleeves. A miter gear-wheel N is revoluble on the bolt G and engages the gears M,
 25 and said gear N is secured to the adjusting-disk F by means of a pair of pins or dowels O, the function of which is to cause the said adjusting-disk to turn with the said gear-wheel. The thumb-disks are provided with
 30 suitable combination-scales, such as are commonly employed in combination-locks, which enable them to be turned by a person knowing the combination in such manner as to cause the slots in the tumblers to aline with
 35 each other and with the catch on the bolt, for the purpose before described, it being understood that the movements of the said thumb-disks are communicated to the said tumblers through the said miter-gears M N.

40 A right-angled slot P is made in the inner portion of the bolt, the ends of which slot are open, and a spring-detent R is provided, which is supported in a guide S and is adjustable or movable in the lock-case, and this detent may
 45 be moved downward by its exterior knob *r* and caused to engage the vertical arm of the

open slot when it is desired to secure the bolt in an unlocked or withdrawn position.

Having thus described my invention, I claim—

1. The combination with the bolt G, having the catch, of the cylindrical casing B secured in the lock-case, the annulus or sleeve E secured in said cylindrical casing, the tubular, cylindrical tumblers C, D, sleeved respectively
 55 upon and within said annulus E and retained against endwise movements while permitted to rotate, said tumblers having the stops *c*, *c'*, respectively, the adjusting-disk F having the annular slots for said stops, and devices
 60 to rotate said disk F, substantially as described.

2. The combination, with the bolt G having the catch *g*, of the series of cylindrical tumblers having open slots adapted to register
 65 with each other and with said catch, said tumblers having the projecting stops at one end, the revoluble adjusting-disk F having the annular slots to receive said stops, and the gears to rotate said disk, substantially as described. 70

3. In a lock, the combination of the bolt having the catch and the rack, the cylindrical tumblers arranged in concentric series and having the slots adapted to aline with the
 75 catch, the knob-shaft having the pinion engaging the rack on said bolt, and the gears on said bolt and knob-shaft, the gear on the said bolt being connected to and adapted to actuate the series of tumblers, and the gears on the said knob-shaft being provided with
 80 exterior thumb-disks whereby they may be rotated, for the purpose set forth substantially as described.

In testimony that I claim the foregoing I hereunto append my signature, at Washington, District of Columbia, this 14th day of
 85 October, 1898, in the presence of two subscribing witnesses.

JOHN R. HOUTS.

Witnesses:

J. W. GARNER,
 S. P. DUFFEY.