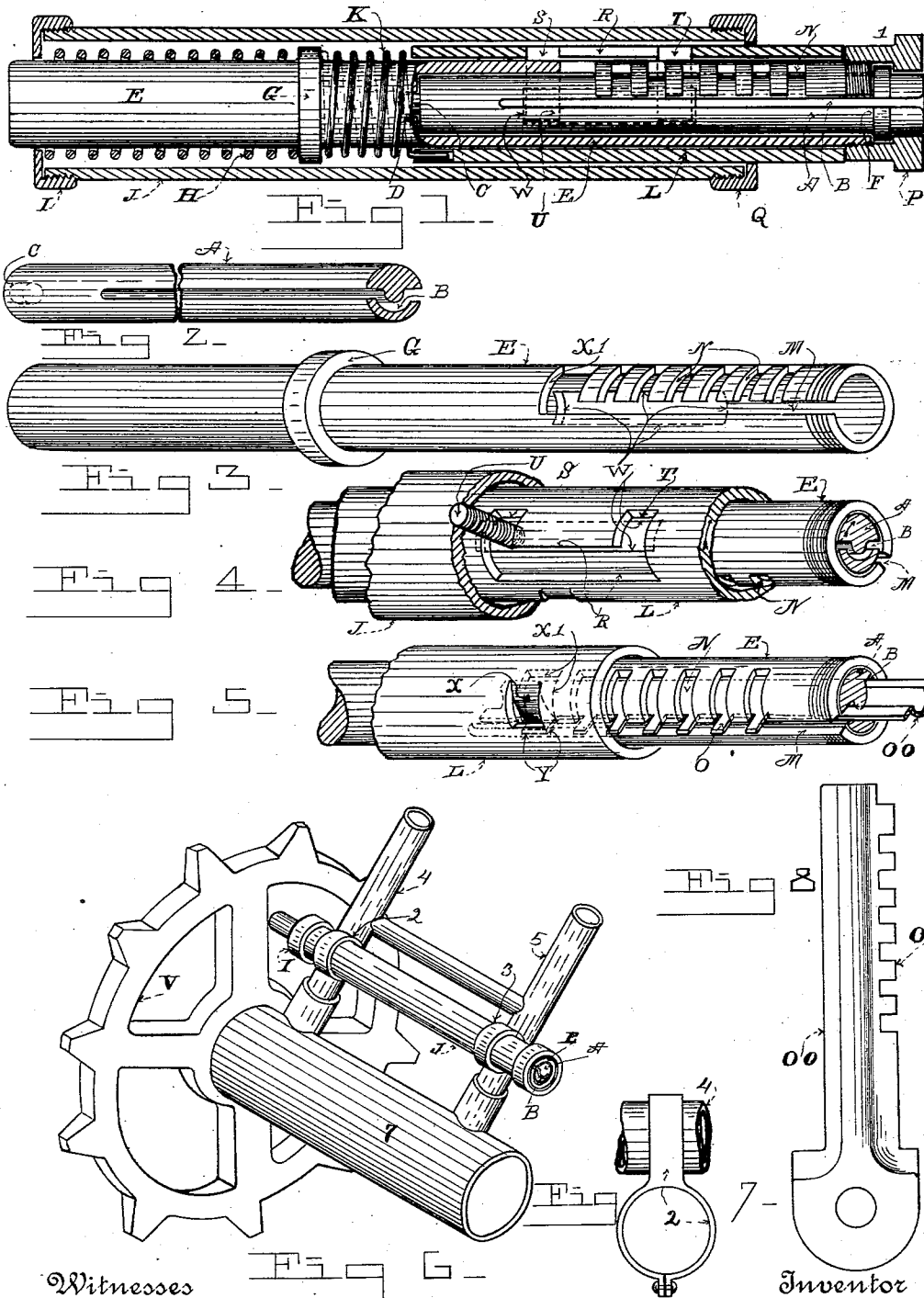


(No Model.)

S. G. KELL.
BICYCLE LOCK.

No. 564,623.

Patented July 28, 1896.



Witnesses

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SAMUEL GILBERT KELL, OF DENVER, COLORADO.

BICYCLE-LOCK.

SPECIFICATION forming part of Letters Patent No. 564,623, dated July 28, 1896.

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To all whom it may concern:

Be it known that I, SAMUEL GILBERT KELL, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Bicycle-Locks; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in locks, and especially to improvements in bicycle-locks; and the objects of my invention are, first, to provide a combination-lock; second, to provide a lock which can be locked without a key; third, to provide a lock which will lock the driving-sprocket of the bicycle; fourth, to provide a strong durable lock, light of weight and of small dimensions, which can be permanently applied to a bicycle in a position where it will not interfere or be in the way of the running parts when not in use. I attain these objects by the mechanism illustrated and described in the accompanying drawings and specification, in which—

Figure 1 represents a longitudinal section through the center of my improved lock. Fig. 2 represents an elevation of the keyway-socket with the front end cut off. Fig. 3 represents a perspective view of the locking-bolt. Fig. 4 represents a perspective view of fragments of the lock arranged in regular order to show one side of the several parts. Fig. 5 represents a similar view of the opposite side of most of the parts of the lock. Fig. 6 represents a perspective view of a fragment of a bicycle-frame, showing the application of my improved lock to it. Fig. 7 represents a view of the clamping-clip which secures the lock to the rear tubes of the bicycle. Fig. 8 represents a plan view of the key.

Similar letters and figures of reference refer to similar parts throughout the several views.

Referring to Fig. 1, A represents the key-socket. It consists of a round rod in which a transverse slot B of contortious form is made. This slot extends from one end of the

socket to within a short distance of the opposite end and forms the keyway. In cross-section this keyway is a space of semicircular form with oppositely-disposed spaces projecting diametrically from its center, while the blade of the key is also given a contortious form in cross-section and is adapted to register with the keyway. Centrally on the inner end of the socket a reduced projection C is turned, which extends into a hole D, drilled in the bottom of the surrounding shell of the locking-bolt E, by which the inner end of the socket is centrally supported and relieved from frictional contact with the internal surface of the shell of the locking-bolt. The front end of the socket is provided with a collar F, which shoulders against the end of the locking-bolt. This locking-bolt E comprises a round bar of metal. At a distance from its locking end a collar G is formed, which acts as an abutment for an expanding coiled spring H, which surrounds the end of said bolt and bears at its opposite end against the cap I of the outer casing J. On the opposite side of the collar G and surrounding the bolt I place a second coiled spring K, which is secured at one end to said collar and at the opposite end to a tumbler-cylinder L. The spring K is adapted to rotatively return and hold said tumbler to its normal position when it has been partially rotated by the key or by the fingers in the act of locking or unlocking the bolt in its locked or unlocked positions relatively to that part of the bicycle which it is adapted to engage, as will be presently described.

The forward end of the locking-bolt is chambered centrally by a drilled hole which extends into it far enough to receive the key-socket above described. A slot M is cut through the shell of the bolt formed by the chamber, into which one edge of the key projects. A plurality of slots N are cut circumferentially through the shell and emerge into the key-slot. These circumferential slots extend about one-quarter around the surface of the bolt. They are adapted and arranged to register with and receive projections O, formed on the key O O. These slots, through the shell of the bolt and the projections on the key, can be arranged at any desired distance apart and each key made to fit its

particular lock. By this means I secure a great many combinations of locks and keys, but only employ one tumbler, which consists of the cylindrical tube L. This tube surrounds freely the locking-bolt E and is held longitudinally in place by the spring K at one end and by the cap P, which is threaded to the end of the locking-bolt, at the opposite end. The body of this cap is turned to the same diameter as the tumbler. It is provided with a head which is adapted to bear against the cap Q of the outer casing. It also extends down to the body of the locking-bolt, and confines the collar F of the key-socket between it and the end of the locking-bolt, thus securing the key-socket in the chamber of the locking-bolt.

In the body of the tumbler I form a longitudinal slot R, (see Figs. 4 and 1,) and at each end of the longitudinal slot two circumferential slots S and T. These circumferential slots extend but a little way on the circumference of the tumbler. They are adapted to receive a pin U, which is threadedly secured to the outer casing J and extends into and through these slots into a slot W, cut through the shell of the locking-bolt, as shown in the fragmentary view in Fig. 4. As this pin is the means by which I secure the several parts in operative relation, I secure it in place against retraction and hide its location by placing a little solder over its end after it is screwed into position.

The slot W of the locking-bolt is arranged approximately opposite its keyways in order to better distribute the metal of the bolt. I also form in another part of the shell of the tumbler an inwardly-extending lip X, which I preferably form by splitting the shell in a semiquadrilateral shape and turning the end of the freed metal inward. I arrange this lip to register with and extend into one of the circumferential slots N or keyways of the locking-bolt, preferably the farthest one, X', from the key entrance, which I make a little wider than the rest. I also make the projection Y of the key which fits into this particular slot wider. The lip X consequently lies in the path of this projection Y of the key, and when the key is inserted to register with its receiving slots and rotated it contacts with this lip and moves the tumbler rotatively with it.

In Fig. 8 I illustrate a plan view of the key O O, and in Fig. 5 a fragmentary perspective view of the key-socket, the locking-bolt, and the tumbler with the key in the key-socket. The key and socket are, however, cut off on a line 1 of Fig. 1 just inside the collar.

J designates a casing which surrounds all the parts. A cap I is threaded to one end, and a similar cap Q is threaded on the opposite end. The cap I fits freely on the tumbler and the cap Q fits freely on the locking-bolt. The pin U operates to confine the key-socket, the locking-bolt, and the tumbler to a reciprocal movement in the outer casing

equal to the length of the longitudinal slot R in the tumbler and slot W in the locking-bolt and the circumferential recesses S and T, which extend from it the extent of the rotative movement of the key-socket and the tumbler. The key-socket rotates on the inside of the locking-bolt, and the tumbler rotates on the outside with the key when it is inserted and rotated, while the locking-bolt is held stationery with the outside casing by the pin U. The outer casing is rigidly secured to the clips 2 and 3, which are adapted to secure the lock by rivets or other suitable means to the two small tubes 4 and 5 of the frame, which extend upward from the hanger 7. I secure the lock close enough to the crank-hanger to allow the locking-bolt to extend between the spokes of the driving-sprocket V or into holes formed in the web of the sprocket if the sprocket has a web instead of spokes, and thus lock it against rotation, as well as the rear wheel. Normally the locking-bolt is held back inside the outside casing (its end projecting but slightly beyond it) by the expansive force of the springs H and J, and the key end of the locking-bolt, with one end of the tumbler, projects forward through the opposite end of the casing, as shown in Fig. 1. The rotative resiliency of the spring K holds the tumbler with a rotative pressure constantly against the pin U at the end of either one of the circumferential recesses S or T. If the locking-bolt is in a position of disuse in the casing, the pin U, as shown, is always in the slot S, as the two springs normally hold and lock it there, as in Fig. 1.

To eject the bolt through the casing and between the spokes of the sprocket and lock it there in that position, it is only necessary to rotate the tumbler with the fingers, which is easy to do, as it projects forward out of the casing in the direction of the arrow 6 in Fig. 6, and in the same direction in Fig. 1, until the longitudinal slot R is moved in axial alinement with the pin. Then push the bolt against the expansion-spring until the pin contacts with the opposite end of the slot R, when the spring K will quickly throw the tumbler toward the pin until the end of the slot T rests against the pin, in which position the two springs hold it. Of course the key can be introduced to turn the tumbler, but it is not necessary, as the tumbler can be turned much quicker with the fingers.

It is not necessary that the key-socket be turned with the tumbler to lock the bolt in operative position, as they are not connected to one another in any way, and while the tumbler is limited by the pin U to a rotative movement equal to the length of the slots S and T, the key-socket can be rotated completely within the chamber of the locking-bolt; but when the bolt is to be unlocked and allowed to spring back into the outer casing the key must be inserted, and the keyway in the key-socket and the longitudinal slot or

keyway M in the locking-bolt must register with one another in order that the key may be introduced, as shown in Fig. 5.

When the projections on the key register with the circumferential keyways in the locking-bolt, (which operate as clear spaces for the projections to work in when the key is rotated,) the last projection Y passes under the introverted lip X, which is held by the pin U and slots S and T to extend only to the edge of the longitudinal keyway in the locking-bolt, and when the key is turned this projection Y contacts with it and turns the tumbler sufficient to turn the slot R again in line with the pin, when the expansive spring H forces the bolt back in the casing until the pin strikes the opposite end of the slot, when it is again in line with the slot S, and the spring K rotates the tumbler back until the end of this slot bears against the pin, when the bolt is again locked in a position of disuse.

My improved lock is especially adapted for use on bicycles, as it is entirely free from exposed nuts and screws, which can easily be removed and the lock displaced. It is also free from small parts, which, when employed in locks in exposed positions, are easily cut with cutting-pliers.

While I have illustrated and described my lock as particularly adapted for use on bicycles, it is obvious that it can be adapted for general use whenever a lock of this character is desired.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bicycle-lock, the combination with the tumbler and the casing, of a locking-bolt having a chamber, a longitudinal slot through the shell of said bolt into said chamber, a plurality of slots extending circumferentially from said longitudinal slot in the said shell, and adapted to be arranged at any desired distance apart and in numerous combinations relatively to each other, a key-socket rotatively secured in the chamber of said locking-bolt, having a diametrically-disposed contortious slot or keyway arranged to register with said longitudinal slot in said locking-bolt, and a key adapted to fit said contortious keyway and to extend into the longitudinal slot in said locking-bolt and adapted to register with and partially rotate in the various combinations of slots of said locking-bolt, substantially as described.

2. The combination with the locking-bolt and the casing, of the tumbler interposed between said casing and locking-bolt and adapted to be partially rotated independent of them, the rotative retracting-spring secured to said bolt and tumbler and adapted to partially rotate said tumbler in one direction of its rotative movement, the expansive spring arranged to move said locking-bolt in one direction of its movement, and the key-socket and key adapted to partially rotate said tum-

bler and unlock said bolt, substantially as described.

3. The combination with the locking-bolt having a chambered keyway, a combination of circumferential slots through the shell of said bolt into said chamber and a longitudinal slot at one end of said circumferential slots, of a key-socket seated in the chamber of said locking-bolt, a key having projections thereon adapted to fit said key-socket and to register with the slots in said locking-bolt, a tumbler surrounding said locking-bolt, a casing surrounding said tumbler, a pin secured in said casing, a longitudinal slot having a circumferential slot at each end in said tumbler through which said pin projects, a spring arranged to hold the slot of said tumbler which surrounds the pin against said pin with a lateral pressure whereby it is normally held in fixed position relative to said locking-bolt, a longitudinal slot in said locking-bolt in which said pin projects whereby it is free to move reciprocally a predetermined distance, but is held against rotative movement, and an introverted lip on said tumbler adapted to extend into one of the circumferential keyways of said locking-bolt and in the path of one or more of the projections of said key, whereby said tumbler may be partially rotated by said key, substantially as described.

4. The combination in a bicycle-lock, of the casing, clips for securing said casing to the frame of the bicycle, the expansive spring, the tumbler, the rotative, retracting spring secured thereto and to said bolt, means for reciprocating said bolt and tumbler a predetermined distance in said casing and a key substantially as described for unlocking the bolt, substantially as described.

5. The combination in a bicycle-lock, of the casing, clips substantially as described secured to said casing and adapted to secure said lock to the bicycle-frame in operative relation to the driving-sprocket, a locking-bolt adapted to be reciprocated in and out of said casing and arranged to be locked in a position to prevent the rotative movement of said sprocket-wheel, a spring for actuating the bolt in one direction, a pin in said casing and a keyway in said bolt for defining the reciprocal movement of said bolt, a tumbler mounted on said bolt arranged to be partially rotated by a key or by the fingers independent of said bolt, a spring for rotatively returning said tumbler to its normal position and means including a key for locking and unlocking said bolt, substantially as described.

6. The combination with the casing, of the locking-bolt having a chamber in one end, the key-socket mounted in said chamber and having a collar near its outer end adapted to rest against the end of said bolt, a cap threaded to said bolt and adapted to inclose said collar, a contortious keyway in said socket comprising a semicircular-shaped space with diametrically-extending spaces radiating in opposite directions from it, a longitudinal slot through

the shell of said bolt registering with said key-
way and a key adapted to fit said contortious
keyway and having one flange wider than the
other and adapted to project into the keyway
5 of said bolt, and a plurality of notches in said
flange arranged at any desired differential dis-
tances apart, and adapted to form a plurality
of projecting fingers adapted to be arranged
at predetermined and varying distances apart,
10 and a similar number of circumferentially-

disposed slots in the shell of said bolt in
which said fingers are adapted to move, as
and for the purpose specified.

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

SAMUEL GILBERT KELL.

Witnesses:

NEWARK L. BURTON,
ALEX. W. MILLER.