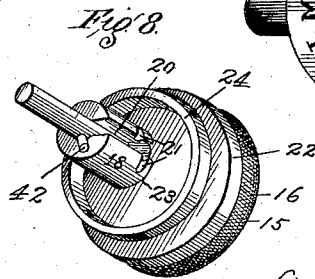
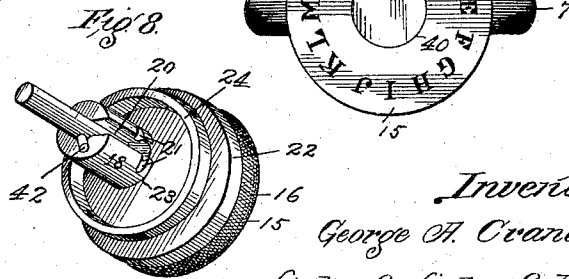
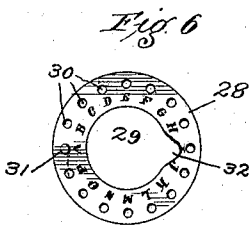
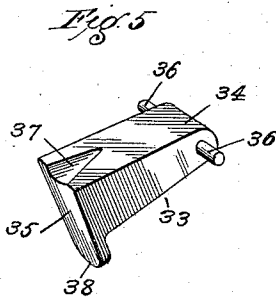
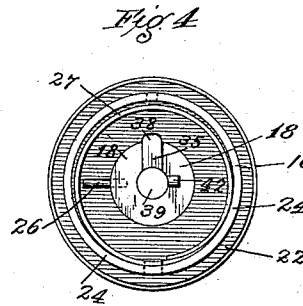
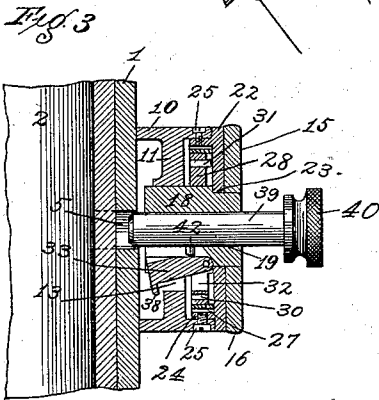
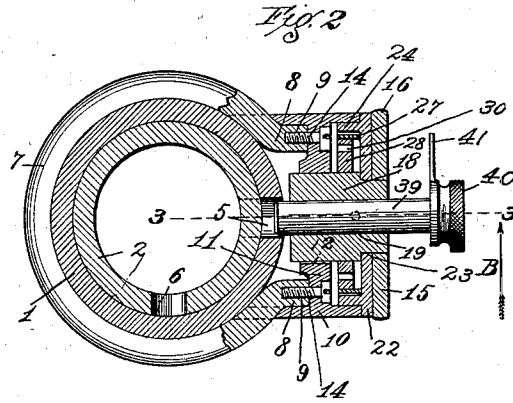
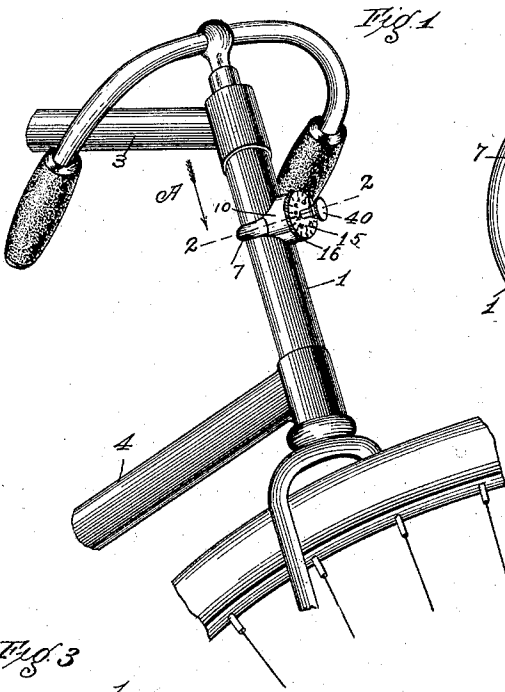


(No Model.)

G. A. CRANCER.
COMBINATION LOCK FOR BICYCLES.

No. 544,909.

Patented Aug. 20, 1895.



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UNITED STATES PATENT OFFICE.

GEORGE A. CRANCER, OF LINCOLN, NEBRASKA.

COMBINATION-LOCK FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 544,909, dated August 20, 1895.

Application filed January 21, 1895. Serial No. 535,612. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. CRANCER, of the city of Lincoln, Lancaster county, State of Nebraska, have invented certain new and useful Improvements in Combination-Locks for Bicycles or Velocipedes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a combination-lock for bicycles or triecycles, and has for its object the providing of improved means for locking the steering-post within the steering-head, whereby the front or steering wheel may be held in direct alignment with the rear wheel or at any desired angle relative to the longitudinal plane of the machine.

The invention consists in the novel construction, combination, and arrangement of parts hereinafter described, and designated in the claim.

In the drawings, Figure 1 is a view in perspective of the steering-head and handles of a bicycle, said steering-head having my improved lock applied thereto. Fig. 2 is a horizontal sectional view taken approximately on the indicated line 2 2 of Fig. 1 and looking in the direction as indicated by the arrow A. Fig. 3 is a vertical sectional view taken approximately on the indicated line 3 3 of Fig. 2 and looking in the direction as indicated by the arrow B, Fig. 2. Fig. 4 is a plan view showing the interior faces of the two outer disks and the locking pin or bolt made use of in carrying out my invention. Fig. 5 is a view in perspective of the tumbler made use of in my improved lock. Fig. 6 is a plan view of a ring constructed with a series of perforations, by means of which the combination of the lock is changed. Fig. 7 is a front elevation of my lock, and Fig. 8 is a view in perspective of the parts shown in Fig. 4.

Referring by numerals to the accompanying drawings, 1 indicates the steering-head of an ordinary bicycle, the same being in the usual tubular form, and operating in said steering-head in the ordinary manner is the tubular steering-post 2. At any suitable point in the steering-head and intermediate the points of attachment of the sections 3 and 4 of the bicycle-frame is formed a circular aperture 5, and in the steering-post 2, in hori-

zontal alignment with said circular aperture 5, is formed a circular aperture 6 of a diameter equal to that of the aperture 5. It is desirable that this circular aperture 6 be so located in the steering-post 2 relative the aperture 5 in the steering-head that said apertures coincide and register only when the steering-post and front wheel of the machine are turned at approximately right angles to the frame and rear wheel of the machine. Sprung upon the steering-head and in the same plane with the apertures 5 and 6 is a ring 7, the ends 8 of which are turned outwardly away from the steering-head 1 and parallel with each other. In these outwardly-turned ends 8 are formed screw-threaded bores or recesses 9.

The frame or casing 10 of my improved lock is in the form of a short cylinder and constructed with a transverse partition 11, in which is a diametrically-arranged aperture 12, from which and extending into the partition is formed a semicircular notch 13. This casing 10 is positioned so that the curved rear edges engage directly upon the steering-head 1, and the rear side of the partition 11 contacts with the outwardly-turned ends 8 of the ring 7. By means of screws 14, passing through said partition and into the screw-threaded apertures 9 in the outwardly-turned ends 8, said casing is rigidly fixed to and held upon the ring 7.

15 indicates a disk, the edge 16 of which is milled, and located upon the face of said disk are a series of characters 17—such as the letters of the alphabet, or numerals. Formed integral with this disk and extending transversely from the diametrical center thereof, is a circular boss or bearing 18. Extending through the diametrical centers of this disk 15 and boss 18 is a bore or passage 19, and located in the boss 18 and communicating with said bore 19 is a slot 20, in the edges of which and at right angles thereto are formed semicircular bearings 21.

22 indicates a disk equal in diameter to the disk 15, provided with the centrally-arranged aperture 23, through which the circular boss 18 passes, and is provided on its face with an annular rim or flange 24. This annular flange 24 is adapted to fit snugly within the forward end of the casing 10. By means of ordinary

screws passing through the front edges of said casing 10 and this flange 24 the disk 22, upon which said flange is formed, is rigidly held upon the face of the casing. I prefer
 5 that these screws 25 be of different sizes, located diametrically opposite each other, the smaller one being at the top and the larger one at the bottom. When the disk 22 has been so positioned and the boss 18 of the disk
 10 15 passed through the centrally-arranged apertures 23 and 12, a pin 26 is rigidly fixed in the boss 18, extends laterally therefrom, and is adapted to engage directly against the inner face of the disk 22 and thus prevent the
 15 accidental withdrawal of the disk 15. Fixed by one end to the inner face of the flange 24 is a circular spring 27, the same extending entirely around the inner face of said flange.

28 indicates a disk provided with a centrally-arranged circular aperture 29 of a diameter that will admit the passage through of the boss 18. Said disk is also provided with a series of apertures 30, the same being indicated or designated by characters—such as
 25 the letters of the alphabet, or numerals.

It is desirable, though not essential, that there be the same number of apertures 30 in the disk 28 as there are indicating-marks 17 upon the face of the dial 15.

30 A pin 31 is adapted to pass through and be located in any one of the apertures 30, and when said pin is in proper position it protrudes a slight distance beyond the rear face of the disk 28. A semicircular notch or cut-away portion 32 extends from the circular aperture 29 a slight distance into the body of the disk 28 and is identical in form and size with the semicircular notch or cut-away portion 13 in the partition 11. This disk 28, by means of
 35 the centrally-arranged aperture 29, is passed over the end of the circular boss 18 and so located within the annular flange 24 as that the circular spring 27, fixed to said flange, will engage the periphery of said disk, and by means
 40 of the friction created by the resiliency of said spring will hold said disk in the proper position. When said disk is properly positioned, the pin 31, passing through one of the apertures 30, will extend beyond the inner
 45 or rear face of said disk and lie directly in the path of travel of the laterally-projecting pin 26.

33 indicates a tumbler slightly wedge-shaped, the base 34 being narrower than the head 35. Formed integral with and projecting laterally from the sides of the base 34 are trunnions 36, that when said tumbler occupies its proper position rest and engage in the bearings 21, formed in the edges of the slot 20 in the boss 18. Formed on the inner face of this tumbler 33 and extending from the center to the head thereof is a concave or circular groove 37. Formed integral with the head 35 of the tumbler 33 and extending laterally
 55 from the outer face thereof is a tongue 38. When this tumbler 33 is properly positioned, the trunnions 36, as heretofore stated, engage

directly in the bearings 21, the body of said tumbler fills the slot 20, the groove 37 on the inner face of said tumbler conforms with the
 70 circumference of the aperture 19 through the boss 18, and the tongue 38 rides directly upon the inner face of the partition 11. By reason of the tumbler 33 being wedge-shaped the base 34 thereof will necessarily be a slight
 75 distance away from the bore or passage 19 through the boss 18.

39 indicates a locking pin or bolt, the same being of such a diameter as that it will work freely in the bore or passage 19 and circular apertures 5 and 6. This locking-bolt is of such a length as that when the steering-post 2 is turned so that the aperture 6 therein registers with the aperture 5 in the steering-head said pin can be passed through said coinciding
 80 apertures. Removably fixed upon the outer end of this locking-bolt 39 is a head 40, the same being constructed with a milled edge. Removably mounted upon the locking-bolt 39 and adjacent this head 40 is a finger or
 90 pointer 41.

Fixed to or formed integral with the body of the locking-bolt 39 and extending laterally therefrom is a lug or pin 42, that, when the locking-bolt is pushed in to its limit of movement and the pointer 41, engages directly upon the face of the disk 15 rides directly upon the inner end of the boss 18 and the face of the head 35 of the tumbler 33, that occupies the slot 20 in said boss 18.
 100

By the construction of the device, as shown and described, it will be seen that the disk 22 and integral flange 24 are held immovable, the disk 15 and integral boss 18 are adapted to be rotated within said immovable disk and the partition 11 of the casing, the disk 28, adapted to be rotated by the engagement of the laterally-projecting pin 26 of the boss 18 against the downwardly-projecting pin 31, and the locking bolt or pin 39 is adapted to
 105 be rotated within the disk 15 and boss 18.

I will now proceed to describe the method of setting a combination for my improved lock.

We will assume that the owner or user of
 115 the lock desires the combination to be "A G M." The pin 31 is located in the aperture marked "A" in the disk 28, the letters or characters on this disk reading from the left to the right and the letters or characters on the
 120 disk 15 reading from the right to the left, or vice versa. The second letter of the combination in each lock always remains the same and is not subject to change, as the location of the slot 20, relative to the numerals or letters
 125 upon the face of the disk 15, determines the second character of the combination. In this instance said slot 20 is so located as that when at its lowermost point in its path of travel and the tumbler 33 carried thereby enters the
 130 notch 13 the letter "G" upon the disk 15 will be the top letter or the one directly opposite the small screw 25. To set the third character of this combination, which in this in-

stance is "M," the operator so positions the disk 15 as that the tumbler 33, carried by the boss 18, will enter the notch 13. The locking bolt or pin 39 is now rotated until the pin 42, carried thereby, is directly opposite the now unoccupied slot 20. Said pin is now withdrawn to its limit of movement, thus necessarily carrying the head 40 and the pointer 41 away from the face of the disk 15. Said head 40 is now loosened and the pointer 41 moved until it registers with the letter "M." Said head 40 is now tightened to hold said pointer 41 in this set position, and the combination "A G M" is set. To lock a bicycle with the lock so set, the steering-post 2 is so turned by means of the handles on the upper end thereof as that the circular aperture 6 in said steering-post registers with the circular aperture 5 in the steering-head. The locking pin or bolt 39 is now pushed forward and the forward end thereof passed through said registering apertures. This movement brings the pin 42 out of the slot 20 and into a plane beyond the end of the boss 18. The pin 42 being thus disengaged, the bolt is rotated a slight distance in either direction. Immediately after this rotation of the bolt the disk 15 is slightly rotated in either direction, and with slightly rotating movement the tumbler 33 will ride up the inclined edges of the coinciding semicircular notches 13 and 32 and recede into the slot 20. As soon as said tumbler passes beyond the notches, it will of course be held within said slot 20, as the inner face of the circular aperture 12 in the partition 11 fits and engages against the periphery of the boss 18. It is essential that the disk 15 be moved far enough in either direction as that the pin 26, carried by the boss 18, engages against the pin 31, projecting from the disk 28, and rotates said disk far enough to throw the semicircular notch 32 therein out of alignment with the semicircular notch 13 in the partition 11. Thus it will be seen how the locking-bolt 39 is held against any lateral movement by any person other than the one holding or knowing the correct combination.

As the semicircular notches 13 and 32 are out of alignment, the tumbler 33 is held within the slot 20, which, together with the end of the boss 18, presents a solid face for the pin 42 on the locking-bolt 39 to engage against in its rotation.

To unlock the device the operator rotates the disk 15 until the character "A" on the outside thereof is at the top of the device and directly opposite the small screw 25, said screw 25 being a guide in correctly positioning the disk on which the characters are located, said screw being directly opposite the semicircular notch 13 in the partition 11.

During this rotation of the disk 15 the pin 26, carried by the boss 18, will engage against the pin 31, that projects through the aperture marked "A" on the disk 28, and by reason of the location of said pin relative the semicircular notch 32 said notch 32 will be brought

into direct alignment with the semicircular notch 13 in the partition 11. This being done, the operator turns the disk 15 in a reverse direction until the letter "G" is at the top and directly opposite the small screw 25. As the slot 20, carrying the tumbler 33, is directly opposite the letter "G," said slot will be brought into direct alignment with the coinciding semicircular notches 32, and the tumbler 33, by reason of its own weight, will drop into said coinciding notches, thus leaving a portion of the slot 20 adjacent the aperture 19 vacant. This being done, the operator rotates the locking bolt or pin 39 by means of the head 40 until the pointer carried by said bolt indicates or registers with the letter M upon the face of the disk 15. This, by the setting of the combination, as previously described, brings the pin 42 into direct alignment with the partially-opened slot 20. The passage for said pin 42 being unobstructed, the bolt 39 is allowed to be withdrawn laterally and from the coinciding apertures 5 and 6, and the unlocking is completed. The steering-post 2 is now free to be turned or guided as may be the desire of the rider of the bicycle.

Should the pin 31 be changed to one of the other apertures 30—for instance, the aperture designated by the letter E—to bring the semicircular notch 32 into alignment with the semicircular notch 13, the disk 15 must be so manipulated as that the letter E will be at the top thereof and in alignment with the small screw 25. This result is obtained by the predetermined positioning of the laterally-projecting pin 26, and for the reason that said aperture, indicated by the letter E, is the same number of apertures to the left of the aperture indicated by the letter A, as is the letter E to the right of the letter A on the disk 15.

It will be plainly seen how, by dispensing with the ring 7 and forming the rear side of the casing flat, the lock may be advantageously used for various purposes other than a bicycle-lock.

A lock of this construction is capable of having its combination changed a great number of times, is very compact, can be locked or unlocked in a very short space of time, and is very efficient and durable.

What I claim is—

The combination, of a suitable shell, means for securing said shell in position upon the object which is to be locked, a fixed transverse partition in said shell, said partition having a circular aperture from which extends a lateral notch or recess, a bearing 18 mounted in the circular aperture of said partition and provided with a tubular bore, a bolt mounted to slide and turn in the bore of said bearing, a knob on the outer end of said bolt, a pointer connected to said bolt exterior of the shell, a graduated plate exterior of said shell and adjacent said pointer, a wedge-shaped tumbler pivotally connected at its outer end to the

said bearing 18 and provided at its free end with a tongue or projection which extends at an angle relative to the body of said tumbler, a pin or projection 42 on said bolt to engage
5 the free end of said tumbler when said tumbler is retracted, and means whereby the relative positions of the pin or projection of the bolt, the said tumbler and the tongue or projection 38 of said tumbler, may be approxi-
10 mated, to permit the free end of said tumbler

to gravitate downward out of the path of said projection carried by the bolt, substantially as herein specified.

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

GEORGE A. CRANCER.

Witnesses:

E. E. LONGAN,
JOHN C. HIGDON.