To all whom it may concern:

Be it known that I, Chester J. Squires, a citizen of the United States, residing at Galesburg, in the county of Knox and State of Illinois, have invented new and useful Improvements in Push-Key Combination Padlocks of which the following is a specification.

My invention relates to certain new and useful improvements in push-key combination padlocks, the object of which is to provide a padlock that can be locked or unlocked by sight or by touch, in daylight or darkness, without the necessity of carrying a key for that purpose.

I attain these objects by the mechanism illustrated in the accompanying drawing, in which Fig. 1 is a front view of the lock body with a dotted line showing the position of the co-operating member when the lock is assembled. Fig. 2 is a side view of the lock body. Fig. 3 is a front view of the co-operating member. Fig. 4 is a side view of the same. Fig. 5 is a section through line A—B of Fig. 1, assuming that a complete lock has been assembled. Fig. 6 is side view of one of the push keys.

Similar numerals refer to similar parts throughout the several views.

1 is the body of my improved padlock, and consists of two parallel, circular disks spaced apart in axial alignment and securely held in said relation by being made integral with a single shackle arm and thus integral with each other. 2 is a co-operating lock member consisting of a second shackle arm integral with a ring whose outside diameter corresponds with the outside diameter of the disks of body 1 and whose thickness permits it to be inserted between said disks and to be mounted for partial revolution in said relation thereto.

The disks of lock body 1 are provided with radially extending rectangular slotted holes 9 all of identical size and shape, placed at a uniform distance from the disk axis and arranged in an equally spaced circular series, each slot 9 in either of the disks being in exact alignment with a corresponding slot 9 in the other disk.

The ring or lock member 2 is of such depth that, when placed in operative position between the disks of body 1, and with the inner edge of said ring intact, a determined portion, say two-thirds, of the outer end of each slot 9 is thereby closed. However the inner edge of the ring or lock member 2 is not left intact but is provided with a series of notches 3, equal in number to the series of slots 9, and so located that each of said notches 3 registers with a slot 9 when the ends of the two shackle arms are in engagement with each other, the depth of said notches 3 being such as to open up about one-half of the portion of each slot 9, which would be closed by said ring of lock member 2 if left intact or if turned so that notches 3 do not register with slots 9.

The inner edge of the ring of lock member 2 is also provided with notches 4, preferably two in number and located at diametrically opposite parts of said ring. Each of these is placed between adjacent notches 3 and is made of such depth that when a notch 4 is caused to register with slot 9, said slot 9 is opened to its full size. At the same time the other notch 4 will also register with a slot 9 providing a full sized opening at that point.

The shackle arms of body 1 and co-operating lock member 2 being so placed as to permit more than one half of a revolution of member 2 with relation to body 1, it is evident that each of the notches 4 in member 2 may be caused to successively register with half or more of the series of slots 9 in body 1, the two notches 4 thus providing for the opening of all of the slots 9.

Push-keys 6 are provided, one for each slot 9. These keys are all identical. Each key 6 has in one of its edges a notch 7, a portion of which is cut deeper than the remainder leaving a projecting corner 8 in said notch 7.

A spring 5, which may be only a single coil, is placed in the position as shown in Fig. 3, and Fig. 5. It presses against the inner edge of the push-keys, 6, and is used as a means of retaining said keys in the position in which they have been placed.

The assembling of the parts thus described is accomplished as follows:—

Lock member 2 and spring 5, are first inserted between the disks of body 1. They are then so adjusted that each notch 4 registers with a slot 9 of body 1. A push-key 6 is inserted in each of the two continuous openings, thus provided through body 1 and lock member 2, the notched edge of each key 6 being turned outward. The deeper portion
of notch 7 of each key 6, as inserted, is made to register with the space between the disks of body 1, and the depth of said portion of notch 7 having been gauged to permit the passage of the unnotched portion of the inner edge of ring of member 2, said member 2 is then turned until other slots 9 register with notches 4, and keys 6 are inserted as just explained. This is continued until all of slots 9 have been filled with keys 6.

It will be understood that keys 6, when in this position securely retain body 1 and member 2 in operative relation, permitting the ends of their shackle arms to be caused to engage each other or to be drawn apart, and that keys 6 provide a series of bearing points for the ring of member 2, permitting the revolution of said ring with relation to body 1 to the extent allowed by the shackle arms.

After push-keys 6 have been inserted, as explained, the ends of the shackle arms on body 1 and member 2 may be caused to engage each other. With the parts in this relation, any or all of the keys 6 may be shifted causing projecting corner 8 of each key shifted to enter notch 3 in the ring of member 2, effectually locking the entire device.

If all of the push-keys 6 are inserted with the endarest to the deeper portion of notch 7 of each key 6 toward the back of lock body 1, the parts will be unlocked whenever the ends of all the keys 6 are even with the back surface of body 1 and will be locked whenever one or any number of said ends of keys 6 extends beyond said back surface. But this arrangement of keys 6 would make it too easy to unlock, it being merely a question of pushing keys 6 as far as they will go, all in one direction.

But instead of arranging keys 6 in this manner, suppose that, for instance, three of them, say those occupying slots Nos. 2, 5, and 7 are reversed so as to have their ends even with the front as their unlocked position. Then, as will be readily understood, it will be absolutely necessary to know which way to push each key for unlocking.

It is evident that the arrangement of keys 6 may be varied in an indefinite number of times as any one, any two, any three, any four or any five, if there are ten in all, may be set to be pushed in one direction for unlocking, while all the others must be pushed in the opposite direction. This makes it practically impossible for any one, even the most expert, to open the lock without knowing the combination.

The arrangement of the combination of keys 6 may be changed as often as desired. Any one of said keys may be removed whenever the parts are unlocked by pressing on the end of the key to be changed which is even with the surface of lock body 1 and at the same time turning member 2 until the key pressed upon enters a notch 4 of said member 2. That key may then be withdrawn from its slot 9 and replaced in reverse position. If desired, all keys 6 may be withdrawn successively and left out, disconnecting member 2 from body 1.

I have entered into a detailed description of the construction and relative arrangement of the parts comprised in the present and preferred embodiment of my invention in order to impart a full, clear, exact understanding of the said embodiment. I do not desire, however, to be understood as confining myself to the said specific construction and relative arrangement of parts as in the future practice of the invention such changes or modifications may be made, as fairly fall within the scope of my appended claims.

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

1. In a device of the character described, a lock body comprising two parallel circular disks, in axial alignment, spaced apart and held in said relation by shackle arms rigidly attached to a portion of the periphery of both of said disks; a second shackle arm rigidly attached to a portion of the periphery of an internally notched ring, said ring having an outside diameter substantially the same as that of the body disk and being of a thickness to fit revolvably between said disk; there being a circular series of radially extending slots piercing the two disks of the lock body; and in combination with said structure a push key for each of said slots adapted to be slidably inserted therein, each of the said push keys having a notch in its outer edge, a part of each of said notches being cut to a greater depth than the remainder thereof, substantially as described and for the purpose specified.

2. The structure specified in claim 1, each of said push keys being an exact duplicate of each of the others and all being interchangeable and reversible.

3. The structure specified in claim 1, the ring attached to said second shackle arm being made of such internal diameter as to fit loosely around said push keys at the deepest portion of the notches therein provided, substantially as and for the purpose described.

4. The structure specified in claim 3 the notches in said ring being equal in number to the slots in the lock body and registering therewith when the ends of the shackle arms engage each other, said notches being of suitable depth to receive the less deeply notched portion of the push-keys, but not permitting the passage of the heads of said push-keys.

5. The structure specified in claim 4.
said ring being provided with two additional notches in its inner edge, each of said additional notches being between two of the first mentioned ring notches and being of sufficient size to permit the insertion or withdrawal of a push key in any of the body slots with which said additional ring notch is manually caused to register.

6. The structure specified in claim 1, and in combination therewith, a spring enclosed between said body disks and adapted to press outward against the inner edges of said series of push keys and thereby hold them steady for manual operation.

7. In a combination padlock, two shackle members, one mounted on a pair of axially aligned, parallel, circular disks spaced apart; and the other mounted on a ring adapted for limited rotation between said disks: and, in combinative association therewith, a circular series of push keys, mounted in said disks and ring, concentrically with the common axis of same, adapted to prevent the separation of said disks and ring and manually adjustable to serve as an axle for said rotation of the shackle mounted ring or to prevent said rotation.

8. The structure specified in claim 7, and, in combinative association therewith, a spring enclosed between said spaced disks and adapted to hold said push keys steady for manual operation.

9. The structure specified in claim 7, and, in combinative association therewith, means adapted to permit the locking of the shackle mounted ring against said limited rotation and the unlocking of same by manual operation of said push keys.

10. The structure specified in claim 9, said locking and unlocking means consisting of a projecting corner in a notched portion of each push key, said projection being adapted to be manually caused to enter or be withdrawn from a corresponding notch in the inner edge of said shackle mounted ring.

11. The structure specified in claim 10, each of said push keys extending beyond the outer surface of one of said disks when in locking position and beyond the outer surface of the other disk when in unlocking position, the two ends of all push keys being identical in size and shape.

12. The structure specified in claim 11, each of said push keys being reversible and the series of push keys being thereby adapted to permit a large number of permutations.

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

CHESTER J. SQUIRES.

Witnesses:

GLADYS DUNSWORTH,

J. H. LOSEY.