This invention relates to locks and particularly to a portable lock of the padlock type having a flexible and extensible shackle part.

It is an object of the invention to provide a lock of simple inexpensive construction and of relatively small size with a flexible and extensible shackle part capable of encircling large objects.

A further object of the invention is to provide a lock of this kind with means for extending the shackle part, means for securing it in a loop-like form and a single key actuated mechanism for locking it both in its secured position and against variation in its extended length.

Still further and more specific objects and advantages of the invention are made apparent in the following specification wherein reference is made to the accompanying drawings illustrating one form which the invention may assume.

In the drawings:

Fig. 1 is a view in side elevation of a lock embodying the present invention.

Fig. 2 is a sectional view taken on the line II—II of Fig. 1 and showing the lock with the extensible shackle retracted.

Fig. 3 is a sectional view taken on the line III—III of Fig. 4.

Fig. 4 is a section on the line IV—IV of Fig. 1.

Fig. 5 is a fragmentary view showing an end of the shackle part.

Fig. 6 is a similar view showing a modified form of shackle, and

Fig. 7 is a fragmentary view illustrating a modification in the form of the mechanism employed for varying the length of the shackle.

Figs. 1 to 4 show a lock comprising a main case 10. A flat partition 11 within the main case and a curved partition 12 serve to divide the interior of the main case into a shackle compartment 13 and a lock compartment 14. Within the shackle compartment, a shackle 15 shown as a flexible steel tape is wound upon a centrally disposed shaft 16. The free end of the shackle extends outwardly through an opening 17 in the case and carries an enlargement 18 adapted to be received within a notch or recess 19 also formed in the case as shown in Fig. 1.

The shaft 16 which carries the flexible shackle 15 also carries on the opposite side of the partition plate 11 a gear 20. This gear meshes with a gear 21 on a shaft 22. The shaft 22 extends through the side wall of the case and carries a key 23 preferably pivoted to it as shown in order that it may be folded flat against the side of the case when it is not in use.

Manual rotation of the key 23 serves either to extend or retract the flexible shackle 15. Of course the gears 20 and 21 may be eliminated and the key 23 placed directly on the shaft 16. The gears are preferred however to speed the operation of adjusting the length of the shackle.

When it is desired to apply the lock to some article such as a suitcase, the shackle is extended a distance sufficient to encircle the suitcase and its enlarged end 16 is inserted in the socket 19 which opens outwardly through one side of the main case 10 only. Then in order to adjust the shackle until it snugly embraces the article to be locked, the key 23 may be turned to take it in and eliminate any existing slack. To hold the shackle temporarily in its adjusted position, a spring pressed detent 25 may be secured as shown in Figs. 3 and 4 to the inner side of the main case for engagement with the teeth of the gear 20 to prevent rotation of said gear except under the application of force.

In order to prevent unauthorized removal of the lock, it is necessary both to prevent extension of the flexible shackle and to prevent removal of its enlarged end 16 from the socket 19. According to the present invention both of these requirements are accomplished by a single key actuated mechanism. As best illustrated in Fig. 3, the lock compartment 14 contains a cylinder 26 of a conventional lock with a key slot 27 formed therein and exposed as shown in Fig. 1 through the side wall of the main case. The cylinder lock may be of any conventional form and details of its construction are therefore not shown herein. Under control of its key however, the lock serves to rotate a two-armed lever 28 between the dotted line and full lined positions illustrated in Fig. 3. One arm 29 of this lever serves as shown in its full line position to enter a slot in the socket 19 and obstruct the removal of the enlarged part 16 on the end of the shackle therefrom. The other arm 30 of the same lever is pivotally connected to a bolt 31 slidably supported on a pin 32 extending through a slot 33 in the bolt. The end of the bolt 31 is toothed for locking engagement with the teeth of the gear 20 thus to prevent rotation of said gear and consequently prevent adjustment of the length of the shackle when the bolt is in its extended position. The retracted position of the bolt shown in dotted lines frees its toothed end from engagement with the gear 20.

With the construction herein illustrated, a lock
may be provided with a shackle of any desired length so that it may encircle a large bundle or even a large chest of drawers to prevent opening of the drawers. The flexible metal tape of which the shackle is formed is of course readily severed with the use of suitale tools. The function of the lock however is, like most padlocks, not to insure against forcible entry but merely to prevent or to deter casual pilfering. It is possible however, with substantially the construction herein illustrated, to provide a much stronger adjustable shackle which may be in the form either of a flexible steel cable or a chain such as illustrated in Fig. 6. The chain or cable may, if desired, have a spherical enlargement 35 on its end instead of the cylindrical enlargement shown on the flexible tape. In either case, the enlarged end of the flexible shackle may be inserted in the socket 19 and will be locked against removal from said socket by the key controlled arm 29 of the lever 28.

In order to simplify the appearance of the lock, the key 23 employed for extending and retracting the shackle may be eliminated altogether and instead thereof the gear 21 may be a cylinder 36 as shown in Fig. 7 having a key hole preferably also shaped to receive the key employed in the lock cylinder 26. This cylinder may be a dummy to the extent that it need not have the usual locking dogs. With this modification however, the same key employed in the locking part will be available for extending and retracting the shackle and will be removed when the lock is in use.

I claim:
1. In a lock, a casing, a partition dividing the casing into two sections, one of said sections being provided with an exit opening, a central shaft rotatably mounted in said casing and extending through both of said sections thereof, a small gear mounted on said shaft adjacent one end thereof, a drive gear rotatably mounted to one wall of said casing meshing with said small gear, means to rotate said drive gear, a tape secured at one end thereof to said shaft and being wound about said shaft within said casing and extending out of the exit opening, a cylindrical head at the free end of said tape, one arm of which is to close said recess to receive said cylindrical head, a key shaft rotatably mounted in said casing adjacent said recess, a two armed lever mounted on said key shaft adjacent one end thereof and rotatable therewith, one arm of which is to close said recess, a bolt pivotally mounted at the distal end of the second arm of said two armed lever and engaging said small gear when the said one arm of said lever is in position to close said recess, and ratchet means associated with said small gear to prevent overrunning thereof.

2. In a lock, a casing, a main shaft rotatable in said casing, a tape secured at one end thereof to said shaft and being carried by one end of said shaft within said casing, said casing being provided with an exit opening for said tape, a head at the free end of said tape, said casing being provided with a recess to receive said head, a small gear on said main shaft, a drive gear meshing with said small gear rotatably mounted in said casing, means for rotating said drive gear, a ratchet contacting said small gear, a key shaft rotatably mounted in said casing adjacent said recess, a two armed lever affixed to one end of said key shaft one arm of which is to close said recess upon rotation of said key shaft, whereby the free end of said tape may be locked within said recess, a bolt pivotally mounted at the distal end of the second arm of said lever and engaging said small gear when said one arm of said lever is in position of said lever.

3. In a lock, a casing, a main shaft rotatably mounted in said casing, a tape secured at one end thereof to said shaft and being wound about said main shaft adjacent one end thereof, said casing being provided with an exit opening for said tape, a head at the free end of said tape, a small gear mounted on said shaft adjacent the other end thereof, a drive gear rotatably mounted on said casing meshing with said small gear, means for rotating said drive gear, said casing being provided with a recess shaped to receive said head, a key shaft rotatably mounted in said casing adjacent said recess, a two armed lever mounted on one end of said key shaft and movable therewith one arm of which is to close the mouth of said recess, and a bolt pivotally attached to the second arm of said lever, said casing being provided with an exit opening for said tape, a head on the free end of said tape, said casing being provided with a recess shaped to freely receive said head, a key shaft rotatably mounted in said casing adjacent said recess, a two armed lever mounted on one end of said key shaft for rotation therewith one arm of which is adapted to close the head receiving extremity of said recess, a bolt pivotally mounted at the distal end of the second arm of said lever and engaging said rotatable shaft when the one arm of said lever is in position to close the extremity of said recess.

4. In a lock, a casing, a rotatable shaft within said casing, a tape secured at one end thereof to said shaft and being wound on said shaft, said casing having an exit opening for said tape, a head on the free end of said tape, said casing being provided with a recess shaped to freely receive said head, a key shaft rotatably mounted in said casing adjacent said recess, a two armed lever mounted on one end of said key shaft for rotation therewith one arm of which is adapted to close the head receiving extremity of said recess, a bolt pivotally mounted at the distal end of the second arm of said shaft and engaging said rotatable shaft when the one arm of said lever is in position to close said recess.

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