Oct. 22, 1968 J. SCHREIBER 3,406,544

PADLOCK

Filed June 10, 1966

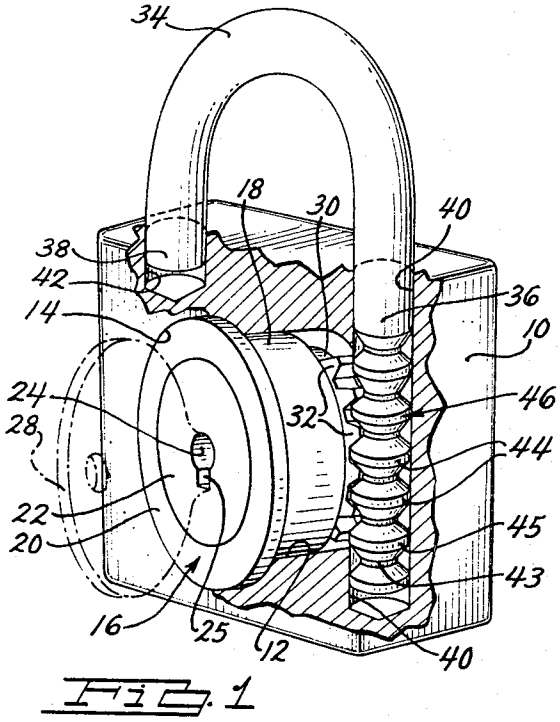


Fig. 1

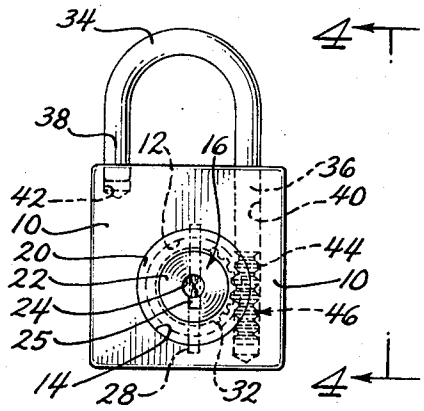


Fig. 2

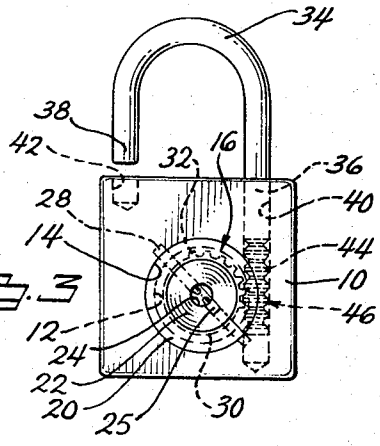


Fig. 3

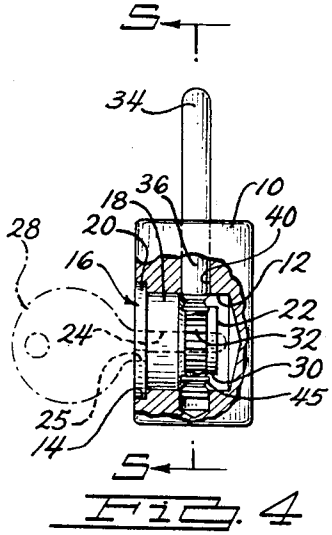


Fig. 4

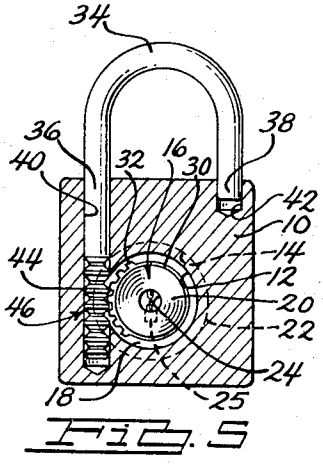


Fig. 5

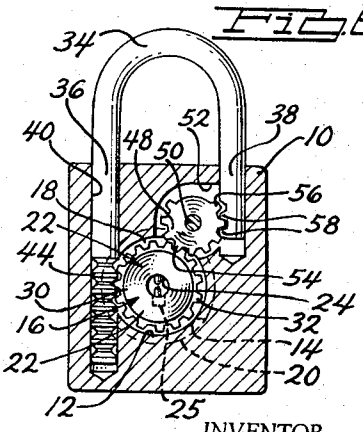


Fig. 6

INVENTOR.
JOSEPH SCHREIBER
BY
Claude A. Patalidis
ATTORNEY

United States Patent Office 3,406,544 Patented Oct. 22, 1968

3,406,544

PADLOCK

Joseph Schreiber, 18507 Forrer, Detroit, Mich. 48235

Filed June 10, 1966, Ser. No. 556,644
6 Claims. (Cl. 70—38)

ABSTRACT OF THE DISCLOSURE

A padlock having a U-shaped shackle provided with a long leg projecting within the body of the padlock. An integral rack disposed proximate the end of the long leg within the body of the padlock has cylindrically shaped teeth which mesh with a gear mounted on the end of the plug of the lock. When the plug is unlocked, the rotation of the plug drives the rack on the end of the shackle leg and opens the padlock.

The present invention relates in general to padlocks, and more particularly to improvements to padlock shackle locking mechanisms.

Padlocks hitherto available are generally cheaply made and fragile. They commonly utilize simplified locks which may be easily picked and their body or housing is often made of an assembly of relatively thin sheet metal which can be rather easily opened. In addition, the shackle latching mechanism is substantially fragile and the shackle may often be pried open or bent open by leverage effected with simple tools such as a screwdriver.

Contrary to previous art padlocks, the present invention provides a safety padlock having a positive locking mechanism cooperating preferably with the longer leg of the shackle and having a practically indestructible massive body. By using a lock according to the principles disclosed in Patent No. 3,167,943, in preference to other more conventional locks, the padlock of the invention provides a substantially pick-proof locking mechanism at a reasonable price.

An object of the invention is, consequently, to provide an improved padlock.

Another object of the invention is to provide a padlock which may not be easily pried open, which is practically indestructible, and which is substantially pick-proof.

A further object of the invention is to provide an improved padlock having a lock operated latching mechanism adapted to cooperate preferably with the longer leg of the padlock shackle, and, in a modified version, providing for a latching mechanism ocoperating with both shackle legs.

Yet another object of the invention is to provide a padlock which is easy to manufacture and which consists only of few parts which may be easily machined and assembled.

Other objects and advantages of the invention will become apparent when the following specification is considered in conjunction with the accompanying drawings, wherein like reference numerals represent like parts, and in which:

FIG. 1 is a perspective view, with portions broken away to show the internal construction, of a preferred embodiment of a padlock according to the present invention;

FIG. 2 is a front elevation view of the padlock of FIG. 1, showing the padlock in closed position;

FIG. 3 is a view similar to FIG. 2, but showing the padlock in an open position;

FIG. 4 is a side elevation view of the padlock of FIGS. 1–3, as seen from line 4—4 of FIG. 2, and with a portion broken away to show the inter construction;

FIG. 5 is a transverse sectional view substantially from line 5—5 of FIG. 4;

FIG. 6 is a view similar to FIG. 5, but showing a modification of a padlock according to the invention.

Referring now to the drawings, and more particularly to FIGS. 1–5 thereof, an example of a preferred embodiment of a padlock according to the principles of the invention comprises a massive parallelipedonal body **10** forming a housing and made preferably of a solid block of steel or like material. A shouldered blind cylindrical bore **12** extends partially laterally across the body and is provided with an overcut **14** on the end thereof where it is open to one of the largest faces of the body **10**.

The cylindrical bore **12** is adapted to receive a lock, designated generally at **16**, the lock configuration illustrated in the drawings conforming generally to the configuration of the short barrel length lock disclosed in U.S. Patent No. 3,167,943, issued in the name of Joseph Schreiber et al., on Feb. 2, 1965, although it is evident that the present invention contemplates using any type of adequate lock as part of the combination forming the padlock of the invention. The lock **16** comprises a stationary housing or barrel **18** having a shouldered end portion **20** adapted to engage the overcut **14** on the end of bore **12**. The lock housing or barrel **18** may be affixed within the bore **12** by any conventional means, although one preferred means consists in press fitting the lock barrel **18** within the bore **12**. The lock **16** comprises a plug **22**, rotatably mounted coaxially within a longitudinal bore in the housing or barrel **18**, the plug **22** being provided with a concentric cylindrical bore **24** adapted to receive the corresponding cylindrical shank **26** of a key **28** capable, in the usual manner, of locking or unlocking plug **22** relatively to housing **18**.

It must be appreciated, however, that in applications where an ordinary lock is used instead of the lock illustrated herein, the configuration of the lock barrel, plug and key slot may be substantially other than hereinbefore described and herein illustrated, without departing from the spirit of the present invention.

The end of plug **22** projecting from the housing or barrel **18** within the padlock body **10** has fixedly mounted thereon a gear wheel **30** provided with a circularly arranged set of gear teeth **32** or, alternately, as shown in the drawing, with a partial sector provided with teeth **32**.

The padlock of the invention is further provided with a substantially U-shaped shackle **34** having two parallely disposed cylindrical legs **36** and **38** of unequal lengths, both capable of engaging appropriate blind cylindrical bores **40** and **42** having parallel axes substantially in a plane perpendicular to the plane of the axis of lock **16**. When the padlock is in the closed locked position of FIGS. 1, 2 and 5, the short shackle leg **38** is engaged within the short bore **42**, as a result of the teeth **32** of geared wheel **30** engaging and meshing with cylindrical tooth-like elements **44** formed proximate the end of the long shackle leg **36** comprising consecutive grooves **43** and shoulders **45** and thus defining a cylindrical rack **46**, the shackle **34** of the padlock being maintained in a closed position as a result of the lock being in a locked state. When the key shank **26** is introduced in the central bore of the plug **22**, thus unlocking the plug with respect to the housing **18**, the plug may be rotated by the key provided with a tab engaging slot **25** to the position illustrated in FIG. 3, thus causing the teeth **32** of the gear wheel **30** which are engaged at all time with the cylindrical teeth **44** of rack **46** proximate the end of the long leg **36** of the shackle, to drive the shackle long leg **36** upwardly, as seen in the drawing, thus permitting the short leg **38** of the shackle to become free from engagement within the bore **42**. Shackle **34** thus occupying the position illustrated in FIG. 3 with respect to the body **10** of the padlock, and because the teeth **44** of rack **46** are cylindrically shaped, the shackle may be rotated to any position wherein the short leg **38** of the shackle does not any longer project over the top face, as seen in the draw-

ings, of body **10**. This permits the shackle short leg **38** to be introduced through the parts to be locked or immobilized by the padlock without interference with the body of the padlock.

When it is sought to close and lock the padlock, the shackle **34** is rotated so that the short leg **38** thereof is substantially aligned above the bore **42**, and key **28** is rotated in the opposite direction, thus rotating plug **22** driving gear wheel **30** and causing the long leg **36** of the shackle to be driven downwardly until the lock is in the locked position of FIGS. 1, 2 and 5, with the short leg **38** of the shackle securedly projecting within the bore **42**.

FIG. 6 represents a modification of a padlock according to the invention, comprising generally a structure similar to the structure of the example of padlock of FIGS. 1–5, but further provided with a freely rotating gear wheel **48** rotatably supported by means such as a pin **50** and disposed in a cavity or pocket **52** formed within the body **10** of the padlock. Gear wheel **48** is provided with a first set of teeth **54** adapted to be driven by teeth **32** of the gear wheel **30** mounted on the end of the lock plug **22**, and with a second set of teeth **56** adapted to engage corresponding rack forming teeth **58** formed on the end of the short leg **38** of the shackle **34**. In this manner when lock **16** is in the locked position shown in FIG. 6 shackle **34** is maintained in a locked position as a result of the teeth **44** of the rack **46** on the end of the shackle long leg **36** engaging the teeth **32** of the gear wheel **30**, and as a result of teeth **56** of gear wheel **48** engaging rack **58** of shackle short leg **48**. When the lock plug **22** is unlocked with respect to the lock housing or barrel **18**, and gear wheel **30** is rotated clockwise as seen in the drawing, free rotating gear wheel **48** is rotated counterclockwise so that its teeth **56** are caused to drive upwardly, as seen in the drawing, the short leg **38** of shackle **34**. It can thus be seen that the modification of the invention shown in FIG. 6 provides not only for latching of the long leg **36** of the padlock shackle but also for latching of the short leg **38** thereof when the padlock is in a closed and locked position.

Having thus described the invention with respect to only illustrative examples of the principles thereof, to which many modifications and changes will readily occur to those skilled in the art, what is claimed as new and falling within the scope of the invention is:

1. A padlock comprising a body, a substantially U-shaped shackle provided with a long leg and a short leg adapted to slidably project within said body, a lock having a housing fixedly mounted in said body and a plug capable of rotating relatively to the said housing when said lock is unlocked, a gear mounted on one end of said plug projecting within said body, and a rack integrally formed on the end of said long leg of the shackle projecting within said body and adapted to be engaged by said gear on the end of the plug, wherein said rack is provided with cylindrically shaped teeth-like elements so as to permit rotation of said long leg around its axis with respect to said body.

2. The padlock of claim **1** wherein the body is made of a solid block of metal provided with cylindrical bores adapted to receive respectively the housing of said lock and both legs of said shackle.

3. The padlock of claim **1** wherein the body is made of a solid block of metal provided with cylindrical bores adapted to receive respectively the housing of said lock and both legs of said shackle.

4. The padlock of claim **1** further comprising a freely rotating gear meshing with said gear on the end of the plug, a rack proximate the end of the short leg of the shackle, said rack being adapted to normally mesh with said free rotating gear when said shackle is in a closed position.

5. A padlock comprising a body made of a massive block of metal, a blind bore in said bore adapted to receive a lock, two parallel blind bores in said body disposed with their axes in a plane substantially at a right angle to the axis of the bore adapted to receive said lock, a shackle substantially U-shaped and provided with a long leg and a short leg, each adapted to be slidably engageable within said last named bores in said body, said lock including a stationary barrel fixedly mounted in said first named bore and a plug rotatably mounted within said barrel coaxially therewith and adapted to be unlocked with respect to said housing by means of an appropriate key, a gear member mounted on the end of said plug projecting within said first named bore, said gear member being rotatably drivable by said plug when unlocked with respect to said barrel, a plurality of alternately disposed annular grooves and shoulder portions proximate the end of the longer leg of said shackle and of a shape adapted to engage the teeth of said gear, whereby said long leg of said shackle projecting within said body is translatable under the action of said gear from a first position causing the short leg of said shackle to engage its appropriate bore in said body to a second position causing said short leg of said shackle to be disengaged from its appropriate bore and so as to permit said longer leg to be rotatable around its axis with respect to said body when in said second position.

6. The padlock of claim **5** further comprising a freely rotating gear member disposed in a cavity in said body and adapted to mesh with said gear on the end of said plug, teeth disposed proximate the end of said short leg of said shackle and adapted to mesh with said free rotating gear when said short leg is engaged within its appropriate bore in said body.

References Cited

UNITED STATES PATENTS

1,222,545	4/1917	Gross	70—38
1,372,020	3/1921	Grimes	70—31
1,572,122	2/1926	Pietrie	70—31

FOREIGN PATENTS

336,965	5/1921	Germany.

MARVIN A. CHAMPION, *Primary Examiner.*

E. J. McCARTHY, *Assistant Examiner.*