April 6, 1926. 1,579,333

E. E. NEAL

HANDCUFF LOCK CONSTRUCTION

Filed Sept. 12, 1922

Fig. 1.

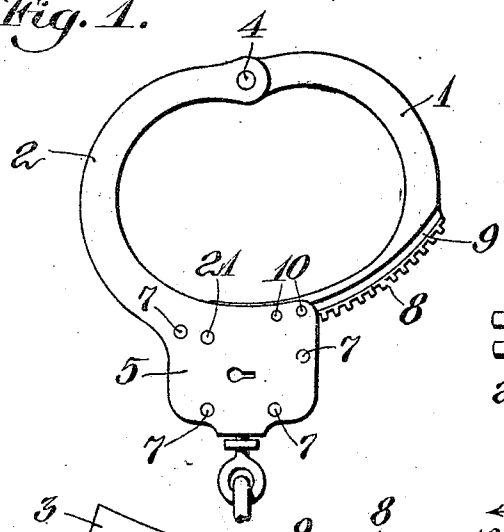


Fig. 2.

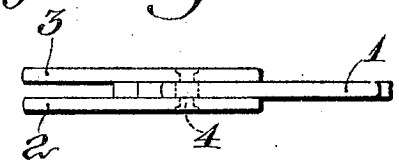


Fig. 4.

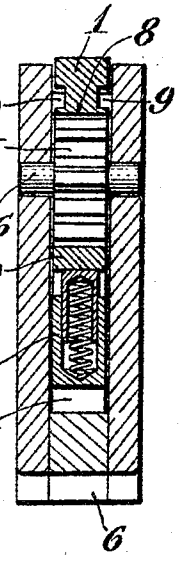
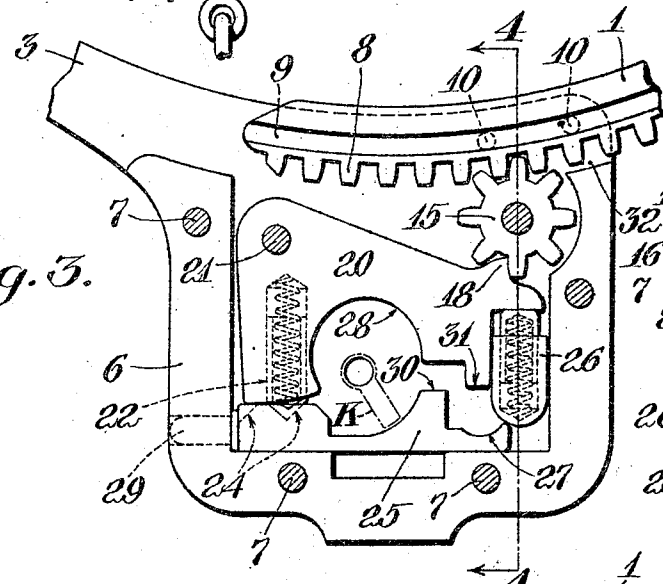


Fig. 3.



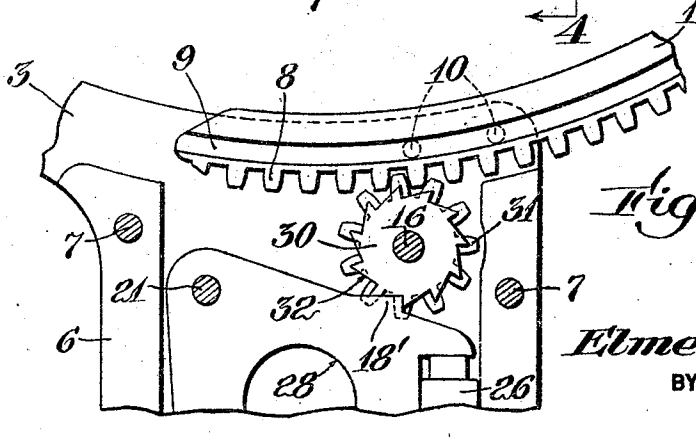


Fig. 5.

INVENTOR
Elmer E. Neal,
BY Chapin & Neal,
ATTORNEYS

Patented Apr. 6, 1926. 1,579,333

UNITED STATES PATENT OFFICE.

ELMER E. NEAL, OF LANGHORNE, PENNSYLVANIA, ASSIGNOR TO PEERLESS HANDCUFF COMPANY, OF SPRINGFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

HANDCUFF-LOCK CONSTRUCTION.

Application filed September 12, 1922. Serial No. 587,723.

To all whom it may concern:

Be it known that I, ELMER E. NEAL, a citizen of the United States, residing at Langhorne, in the county of Bucks and State of Pennsylvania, have invented new and useful Improvements in Handcuff-Lock Construction, of which the following is a specification.

The present invention relates particularly to lock constructions for handcuffs or the like although it is capable of embodiment in lock constructions of other types.

The object of the invention is to improve lock constructions of the general character above indicated for the purpose of positively insuring against any possibility of picking the lock.

To the accomplishment of this object the invention consists in the features of construction and in the combinations and arrangements of parts hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art.

The invention will be explained in connection with the accompanying drawings illustrating what is at present considered to be the preferred form of the invention.

In the drawings:

Fig. 1 is a view, in side elevation, of a handcuff in which the present invention is embodied;

Fig. 2 is a top plan view of the handcuff shown in Fig. 1;

Fig. 3 is a detail side elevational view of a portion of the handcuff shown in Fig. 1, disclosing particularly the locking mechanism, one of the face plates of the lock frame being removed to disclose the working parts;

Fig. 4 is a sectional view taken substantially in the plane indicated by the line 4—4 of Fig. 3; and

Fig. 5 is a view corresponding to a portion of Fig. 3 but showing a modification of the invention.

The present invention is shown as embodied in a lock construction comprising certain operating parts which are similar to corresponding parts disclosed in applicant's copending application, Serial No. 552,254, filed April 13, 1922, and assigned to the Peerless Handcuff Company of Springfield, Massachusetts. Although some of the features are not necessarily limited thereto, the lock construction of the present invention is specifically adapted for use and is claimed in combination with a handcuff of the type shown in the application referred to. Consequently only a brief and general description of the handcuff itself and of the common features of the lock mechanisms will be given, reference being had to said application for a more detailed description, if desired.

Referring to Figs. 1 and 2 of the drawings, the handcuff therein shown comprises a solid rotatable locking arm 1 which is curved to embrace one side of the wrist, and a pair of parallel arms 2 and 3 which support the rotatable arm 1 and are curved to embrace the other side of the wrist. The locking arm 1 is pivoted upon a rivet 4 which joins one pair of corresponding ends of the parallel arms 2 and 3 and holds said arms spaced apart just far enough to allow the arm 1 to swing freely between them. The other pair of corresponding ends of the parallel arms 2 and 3 are enlarged to serve as face plates or covers 5 for a U-shaped lock frame 6 which is held in place by rivets 7 and serves, in conjunction with the face plates 5, to provide a recess within which the lock mechanism is housed. The outer edge of the rotatable arm 1 is toothed, as indicated at 8, the teeth extending for a considerable distance from the free extremity of the arm and being adapted to cooperate with locking mechanism in the described recess. The arm 1 is further provided at each side with a groove 9, these grooves being on arcs struck from the pivot center of the arm 1 and being adapted to receive rigid posts 10 on the face plates 5 which serve to prevent the arm 1 from being pried inwardly when locked.

As heretofore constructed, the teeth on the rotatable arm were ratchet teeth such as shown in the drawings of the application above referred to, and these teeth were adapted to be engaged by similar ratchet teeth on a latch lever constituting part of the locking mechanism, the arrangement of the cooperating teeth on said arm and lever being such as to permit the arm 1 to swing freely in a direction to embrace the wrist but to prevent movement of said arm in the opposite direction such as would tend to release the wrist. In this prior construction

the toothed latch lever which coacts with the ratchet teeth on the pivoted arm to lock the latter is held yieldingly in operative engagement with said teeth and there is a possibility that the lock may be picked by inserting a thin metal piece in the clearance space between the teeth of the rotatable arm and the adjacent end of the lock frame and then manipulating said arm to depress the toothed latch lever until said metal piece can be pushed into engagement with the inclined face of one of the teeth of said lever. Then by pushing the metal piece further inwardly, the locking lever could be entirely freed from engagement with the toothed arm thus unlocking the handcuff.

The present invention is an improvement of the above described prior construction and contemplates the interposition of a non-yielding locking member between the toothed rotatable arm 1 and the yieldable latch lever, said member being constructed and arranged so as effectively to prevent the picking of the lock. This nonyielding locking member consists of a toothed wheel that is rotatable about a fixed axis and is arranged to be operatively engaged both by said arm and by said lever so as to be rotated freely in one direction by the wrist-embracing movement of said arm and to be held against rotation in the opposite direction by means of said yieldable latch lever to prevent a wrist releasing movement of said arm. In the preferred embodiment of the invention illustrated in Figs. 3 and 4, the non-yielding rotatable locking member consists of a pinion 15 which is fast upon a shaft 16 that is journaled in bearings in the face plates 5. The teeth of the pinion 15 are adapted to intermesh with the teeth 8 of the arm 1 and they are also adapted to be engaged by one or more ratchet teeth 18 on the latch lever which is indicated at 20 in Figs. 3 and 4, the latch lever serving to prevent rotation of the pinion 15 in one direction while permitting it to turn freely in the opposite direction. The latch lever 20 and the coacting parts of the locking mechanism not hereinbefore specifically mentioned, are or may be, substantially the same in construction and mode of operation as corresponding parts of the said copending application Serial No. 552,254. These portions of the locking mechanism therefore will not be described in detail herein but a somewhat brief description will be given to facilitate an understanding of the operation of the improved device as a whole.

The latch lever 20, which is shaped as shown in Fig. 3, is pivoted at 21 to the face plates 5 and carries a spring pressed plunger 22 having a projecting end adapted to engage either of two wedge faces 24 in a sliding bolt 25 which controls the lever 20. The lever 20 is also acted upon by a second plunger 26 consisting of two cylinders, slidable one within the other and pressed apart by a spring engaging their closed opposite ends. One end of the plunger 26 is flat to engage a corresponding part of the lever 20 while the opposite end of the plunger 26 is rounded to engage a curved bearing surface 27 on the sliding bolt 25 when said bolt is moved into position to double lock the handcuff as will be later explained.

When the bolt 25 is positioned as shown in Fig. 3, the lever 20 is yieldingly held by the action of the plungers 22 and 26 with the ratchet tooth 18 in holding engagement with the teeth of the pinion 15 so that said pinion cannot turn and consequently the rotatable arm 1 cannot swing and the handcuff is locked. With the bolt 25 in the position shown, the latch lever 20 may be retracted from holding engagement with the teeth of the pinion 15 by turning the key K (Fig. 3) counter-clockwise to cause it to ride over a segmental edge face 28 on the lever 20 so as to rock said lever clockwise. A plunger 29 in one side of the lock frame 6 may be pushed inwardly by the end of a key or other tool, (or even a match) to slide the bolt as far as it will go for the purpose of double locking the handcuff by engagement of a shoulder 30 on the bolt with a shoulder 31 on the lever, as fully explained in the copending application hereinbefore referred to.

It will be understood that when the pinion 15 is locked against rotation by the action of the lever 20 it will be impossible to swing the arm 1 in a direction to release the handcuff from the wrist. It will also be obvious that while a thin strip of metal might be introduced into the clearance space 32 (Fig. 3) between the toothed edge of the arm 1 and the adjacent end of the lock frame 6, it is not possible to force said strip between the intermeshing teeth of said arm and the pinion 15, since the axis of the latter is fixed, and consequently the pinion cannot yield away from the arm 1 as the latch lever is capable of yielding away from the rotatable handcuff arm in the prior construction hereinbefore referred to. The yielding latch lever 20 is inaccessibly located in the housing provided by the lock frame 6 and face plates 5 so that it cannot be reached by any picking tool that may be inserted into the lock casing. A handcuff constructed in accordance with the present invention as herein described is therefore proof in a most effective way against being picked.

In the modification illustrated by Fig. 5, the nonyielding locking member comprises a rotatable wheel 30 having peripheral gear teeth 31 and ratchet teeth 32 which are integrally formed and arranged in different lateral planes, the gear teeth 31 being adapted to intermesh with the teeth 8 of the arm

1, while the ratchet teeth 32 are adapted to be engaged by the ratchet tooth 18′ on the latch lever 20.

While the locking mechanism has been herein illustrated and described as including the sliding bolt 25 which functions to effect the double locking of the handcuff, it should be understood that the use of such a member is not essential to the present invention, and that the construction of the lever 20 and the plungers 24 and 26 may be modified in various ways. It should further be clearly understood that this invention is not in any way limited to the use on the arm 1 and pinion 15 of teeth of the particular shape or type shown as in practice it may be found desirable to modify the form of these teeth more or less. The scope of the invention therefore is to be determined from the appended claims rather than from the foregoing description.

What is claimed is:—

1. The combination in a handcuff of two locking arms, one pivoted to the other and arranged to swing through a complete circle, a member located on the other arm and rotatable about a fixed axis and adapted to be operatively engaged and positively rotated by said first arm during a part of the swinging movement of the latter, a latch normally operating to check the rotation of said member in one direction while allowing it to rotate freely in another direction, thereby locking said first arm against swinging movement in one direction only, and a casing enclosing said member and latch.

2. The combination in a handcuff of two locking arms, one pivoted to the other, and arranged to swing through a complete circle, a toothed wheel located on the other arm and rotatable about a fixed axis, teeth on said first arm adapted to intermesh with the teeth of said wheel to rotate said wheel, and a latch engaging with the teeth of said wheel and operative to check the rotation of the wheel in one direction while allowing it to turn freely in another direction, thereby locking said first arm against swinging movement in one direction only and a casing enclosing said wheel and latch.

3. In a handcuff, the combination of a fixed part, a locking means in said fixed part, and a toothed locking arm pivotally mounted on said fixed part in a manner whereby it may be revolved so as to be brought into or out of operative relation with said locking means by a continuous motion, said locking means comprising a latch, and a toothed wheel rotatable about a fixed axis between said latch and arm, the teeth of said wheel being adapted to intermesh with the teeth of said arm and also being engaged by said latch whereby said wheel and said arm are prevented from moving in one direction while they are permitted to move freely in another direction.

4. In a handcuff, the combination of a fixed part, a locking means in said fixed part, and a toothed locking arm pivotally mounted on said fixed part in a manner whereby it may be revolved so as to be brought into or out of operative relation with said locking means by a continuous motion, said locking means comprising a latch, a pinion interposed between said latch and arm and rotatable about a fixed axis, the teeth of said pinion being adapted to intermesh with the teeth of said arm, and ratchet teeth on said pinion engaged by said latch whereby said pinion and said arm are prevented from moving in one direction while they are permitted to move freely in another direction.

5. A lock construction of the character described comprising, in combination, a movable member having teeth thereon, a toothed wheel for engagement with said member, a spring pressed latch for said wheel automatically operable to permit movement of said wheel in one direction but not in the opposite direction, means manually operable to hold the latch to lock said wheel against any movement and a lock casing to guard said latch within which said wheel is mounted on a fixed axis, and means in said casing providing access by a key to unlock the parts within and additional means to manually operate from without the casing the parts within the casing for a locking operation only.

6. A lock construction of the character described, comprising a movable member having teeth thereon, a toothed wheel for engagement with said member, a latch for said wheel to automatically engage said wheel and prevent its movement in one direction only, a slidable bolt operable to hold said latch to present any movement of said wheel, a lock casing for the latch and bolt within which said wheel is mounted on a fixed axis, said casing having an opening in line with one end of the bolt whereby the latter may be moved to a functioning position.

7. A lock construction of the character described comprising a movable member having teeth thereon, a toothed wheel for engagement with said member, a latch for said wheel to prevent movement of said wheel in one direction only, means movable to position to hold said latch for preventing any movement of said wheel, a casing for containing all the lock parts within its outer surface and providing access for manually positioning said means in addition to the use of a key.

In testimony whereof I have affixed my signature.

ELMER E. NEAL.