

March 31, 1925.

1,531,451

E. E. NEAL

HANDCUFF LOCK CONSTRUCTION

Filed April 13, 1922

2 Sheets-Sheet 1

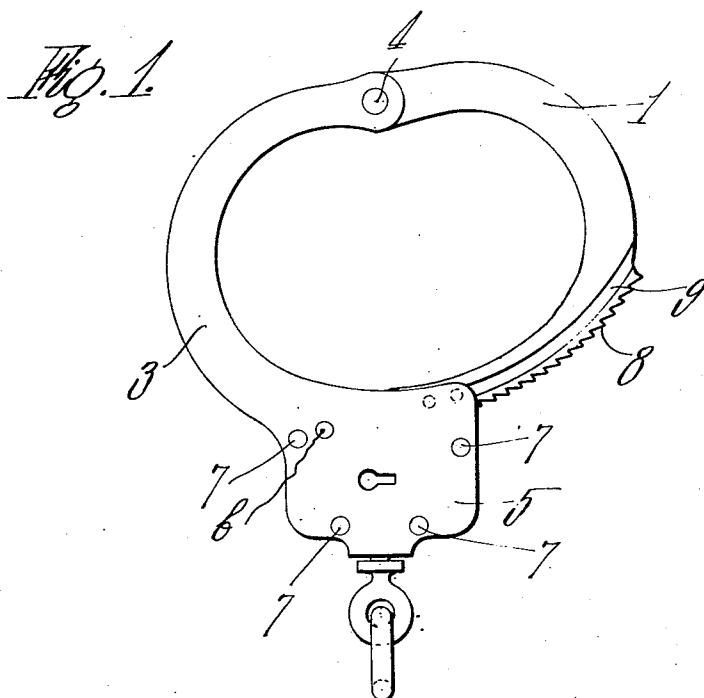
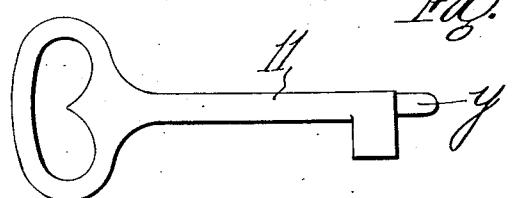
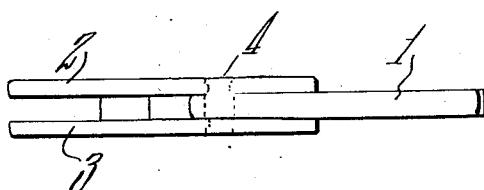


Fig. 2.



INVENTOR

Elmer E. Neal
BY Chapin & Neal
ATTORNEYS

March 31, 1925.

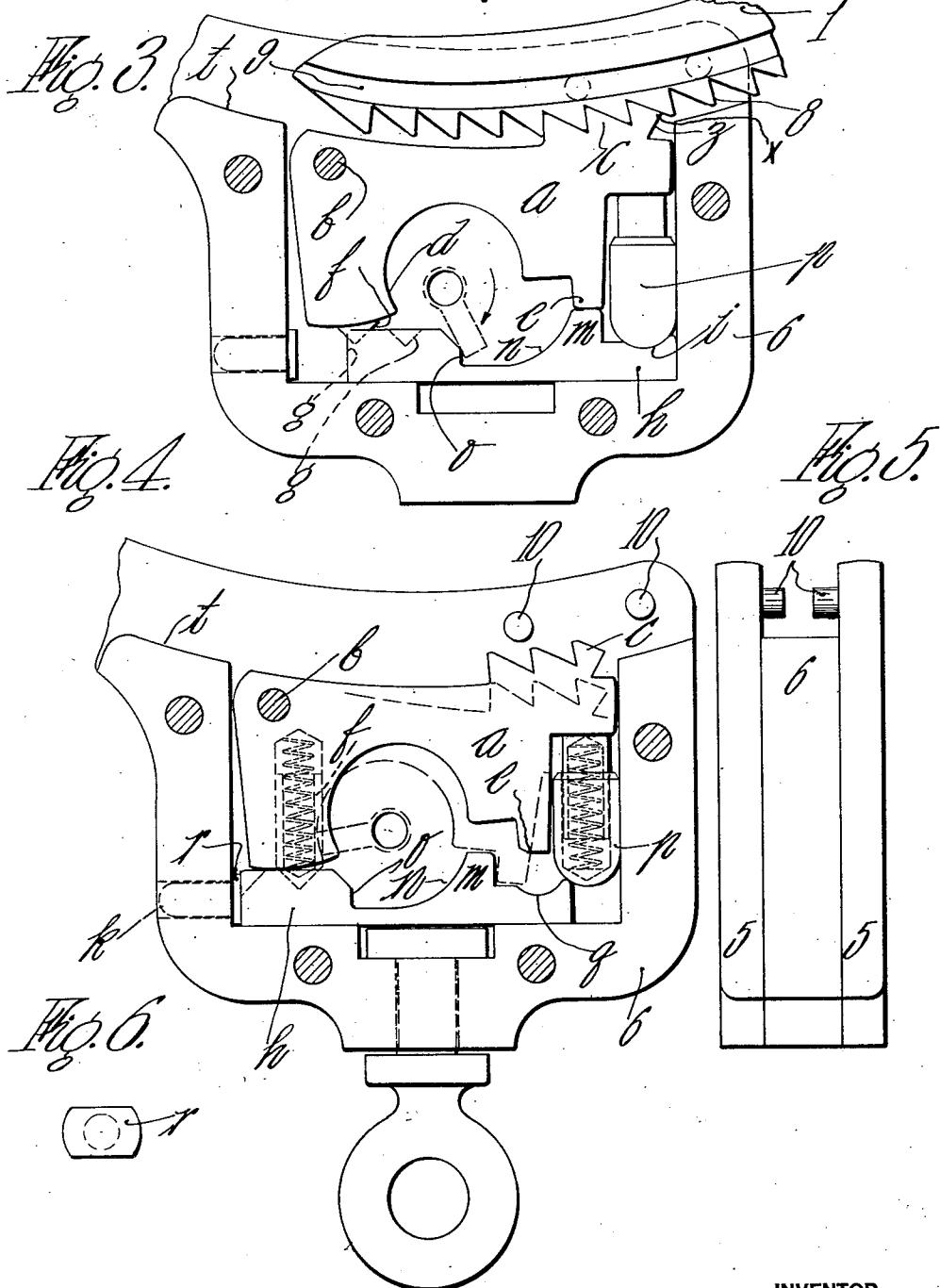
1,531,451

E. E. NEAL

HANDCUFF LOCK CONSTRUCTION

Filed April 13, 1922

2 Sheets-Sheet 2



INVENTOR

Elmer E. Neal
BY *Elmer E. Neal*

ATTORNEYS

Patented Mar. 31, 1925.

1,531,451

UNITED STATES PATENT OFFICE.

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

HANDCUFF-LOCK CONSTRUCTION.

Application filed April 13, 1922. Serial No. 552,254.

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 Constructions, of which the following is a specification.

This invention is an improvement in handcuff lock constructions and lock constructions of analogous character. Objects of the invention are to improve the lock construction for the purpose of lowering its manufacturing cost and increasing its utility. The way in which these and other objects are attained will be shown in the detailed description.

In the drawings:

Fig. 1 is a side view of a handcuff;

Fig. 2 is a top view indicating the kind of structure with which my lock construction is preferably combined;

Fig. 3 is a detail face view of the lock with the parts in double locked position;

Fig. 4 is a like view of the parts in completely unlocked position;

Fig. 5 is a view looking from the right in Fig. 4 but with covering or cheek plates in place against the lock frame;

Fig. 6 is a detail view; and

Fig. 7 is a view of one type of key useful for all lock manipulating purposes.

I have adapted my invention for practical use in a particular type of handcuff and the principles of this type are disclosed in the Carney Patent #1,017,955, granted Feb. 20, 1912. This type of handcuff has been developed as shown in the Wesson Patents 1,161,562 granted Nov. 23, 1915, and 1,157,135 granted Oct. 19, 1915. Without in any way intending to limit my invention as claimed, I have chosen to show it in its preferred embodiment with direct reference to the prior art of which I am aware.

The handcuff is made with a solid rotatable arm 1 which is pivoted on a sturdy rivet 4 (shown dotted in Fig. 2). This rivet joins the ends of two parallel arms 2 and 3 being so constructed as to hold these arms spaced apart at one pair of the corresponding ends thereof and spaced just enough for the arm 1 to pass freely between them. The other pair of corresponding ends on arms 2 and 3 are enlarged to serve as cheek

plates 5 or covers for a U-shaped lock frame or casing 6. The latter is of solid construction held in position between the enlarged ends of arms 2 and 3 by rivets 7, and so as to hold said ends apart as rivet 4 holds the opposite ends. In this construction the frame 6 forms with the cheek plates 5 a sufficiently spacious recess for the lock mechanism. The arms 1, 2, and 3 are arranged as indicated to embrace the wrist. The portion of arm 1 remote from its pivotal connection between arms 2 and 3 is provided at its outer edge with suitable ratchet teeth 8 to cooperate with locking mechanism in the described recess. In addition, the arm 1 has on each side face adjacent the ratchet a rather deep groove 9 the shoulders of which are on arcs struck from the pivot center of arm 1. These grooves are open at the end of the arm 1 and also at points just to the rear of the ratchet teeth 8. The grooves 9 receive the four rigid posts 10 solidly mounted on arms 2 and 3 above and adjacent the point of cooperation between the lock mechanism and ratchet teeth 8.

The general operation of the hand cuff as so far described is one by which arm 1 may continue to be rotated clockwise (Fig. 1) until a wrist or other thing to be grasped is embraced between the arms to prevent further rotation. At this point the lock mechanism within the described recess is designed to cooperate with the ratchet teeth 8 immediately and automatically to prevent a freeing of the wrist by counter-clockwise movement of arm 1 as most desirable at the instant the hand cuff is applied; by manually double locking the arm 1 with the key so it can move neither clockwise or counter-clockwise under any attempt to manipulate the lock; by manually unlocking the arm 1 with the key so it can freely swing open. This general operation is as far as described the same as in the prior art referred to particularly the Wesson patents. The improved lock construction and its improved features of manipulation will now be described with the plan of contrasting its improvement over the old construction.

The new construction in its preferred form embodies a bell crank lever α , pivoted at β , with one end formed on the top with ratchet teeth c and on the bottom with supporting shoulder e while the other end of

the lever a is formed for engagement by the key 11 to swing the bell crank lever counter-clockwise as shown. The top or long arm of the lever a is made to substantially close the top end of the recess or pocket formed by the frame or casing 6 and the cheek plates 5 riveted to the frame 6 but is proportioned to have the necessary but limited swinging movement for the ratchet teeth c to engage the teeth 8 of arm 1 and when held in engagement to lock the arm 1. To control the bell crank I provide a sliding bolt h proportioned for a limited sliding movement on the bottom of the frame 6 and guided by the opposite cheek plates 5. At one end of the bolt h is one wedge surface g and slightly spaced from it a second wedge surface or V recess g . A spring pressed retaining plunger f is mounted in the short arm of crank a to engage either wedge surface g and hold the bolt h in its locking position (Fig. 3) or its retracted position (Fig. 4). In the latter position the spring plunger f has an additional function because due to its position in contact with the bolt h and its mounting at one side of the pivot b , it acts to press lever a so that its teeth c engage teeth 8 or arm 1. Although plunger f in the combination stated will perform its described purpose alone and constitutes one feature of my invention I have shown as a preferred form an additional plunger p located for engagement between the opposite end of bolt h and the outer end of the long arm on crank a . This plunger p consists of two cylinders one slidably in the other and pressed apart by a contained spring engaging the opposite cylinders on their closed ends. One end of the plunger is curved to engage a correspondingly curved bearing surface q adjacent the end of bolt h . The other plunger end is flat to engage a corresponding surface on the shoulder of an undercut surface of the crank arm a . The latter is cut away just enough to provide room for plunger p which is free except as held in its restricted movements by the crank a , the bolt h , and the sides of the frame 6. The top of the bolt h is provided with a shoulder m to engage shoulder e , a curved portion n to permit movement of the key 11, the shoulder o for engagement by the key and a cut away portion between the shoulder o and the top of the bolt to permit the key to turn freely without engagement with the bolt after the crank arm a is turned to completely unlock the handcuff.

The parts are so constructed as described and arranged as more particularly shown in the drawings that the improved operation will be easily understood. In Figure 3 the plungers f and p press bolt h to hold it in the position shown. The handcuff is double locked. In this position shoulder m engages

shoulder e so that there is a solid rigid bar against any movement whatever of crank arm a . Therefore, arm 1 with teeth 8 engaging teeth c is absolutely locked against movement in any direction. As a precaution against prying arm 1 upwardly the four rigid posts 10 in this position engage the shoulders of grooves 9. If the key is inserted (Fig. 1) and turned as indicated in Fig. 3 bolt h will be moved to the left against the pressure of the spring pressed plungers.

When bolt h is in the position of Fig. 4 the spring plungers still bearing on the bolt h hold it in this position against unintentional movement. As an additional important function both plungers as shown (but one might do) hold the crank arm a in the full line position but yieldingly hold it in this position instead of rigidly as the bolt does when it is in the position of Fig. 3. In the Fig. 4 position of the parts therefore, arm 1 is free to repeatedly turn in one direction clockwise as shown but not in the opposite or counter-clockwise direction due to the respectively reverse saw tooth arrangement of the teeth on arm 1 and crank arm a . In this position of the lock mechanism therefore arm 1 may turn until it engages a wrist but no longer because when it does engage the wrist the clockwise movement is stopped. The wrist is thus automatically and instantly locked in the cuff and without the use of the key. This is important because an officer might find it most inconvenient to fuss with a key at the moment of arresting a prisoner disposed to resist. The primary or first locking operation is thus performed with all the convenience to the officer as heretofore, for example by the use of the structure shown in the Wesson patents which has been in wide practical use for several years. The mechanism herein shown by which the said result is accomplished however is comparatively much less complicated and much more certain in its operation even though roughly used.

The operation of double locking the handcuff is desirable to prevent the slight play of the arm 1 when primarily locked possible by the nature of the mechanism for the automatic or primary locking operation. The arm 1 in this position may be moved back and forth to an extent equal to the pitch of the teeth on the arm and latch due to the action of the engaged teeth against each other. This play is an invitation for attempts to manipulate the lock and is of real assistance to a clever manipulator.

The absolute safety is best secured by double locking the handcuff. While this has been accomplished before as in the Wesson patents it has been necessarily done by inserting the key and turning it as in

ordinary locks. The difficulty has been that the arresting officer does not always care to go to this trouble. In addition if the key and the mechanism, due to its delicate prior construction, becomes worn or slightly out of order, they do not work at all or only after considerably fussing.

The new construction does not require the key although it may be conveniently and roughly used for double locking the handcuff. In my construction the bolt *h* is moved from the Figure 4 position to the Figure 3 position by pressing the projecting stem *y* of the key against the end of the plug *k* mounted to slide freely but with a rather close fit in a hole bored for the purpose through frame 6 in line with the end of the bolt *h* remote from shoulder *m*. This plug has an enlarged head *r* to keep it in the desired position for play between the end of the bolt and frame 6.

I have indicated the key end *y* for the purpose of pushing the bolt home by sliding plug *k* inwardly. It should be appreciated however, that the key is not at all necessary, as a match, pencil or any one of many suitable things most convenient and likely to be on the person may be as well used as the key. Once the bolt is shot home the hand cuff is double locked. On account of the simplicity of the operation and its convenience even though the key is lost the officer is most likely to double lock his prisoner. At any event, he will have no excuse for not doing so as he has had heretofore. The key is not necessary for the officer, but may be left at the station as it is only needed for unlocking.

As an additional feature of my construction it will be noted that it accomplishes important advantages of the invention in the Wesson and Pomeroy Patent No. 1,157,135 but in a different way. The handcuff can be all assembled and riveted as by rivets 4 and 7 (Fig. 1) and finished except for the insertion of the lock mechanism in the frame. To insert this the plug *k* is first inserted in its hole from within the recess, the bolt *h* is dropped to the bottom of the frame, the plunger *p* is inserted, the bell crank *a* with plunger *f* within its recess is placed in position, and the bolt *h* slid to the position of Figure 3. In this position the bell crank *a* is supported at three points on the bottom, one of them serving as a rigid support. The top surface of the bell crank is in line with the top surface *t* of the frame 6. These two surfaces may be conveniently held in line by a piece of metal as a temporary second rigid top support. In this position of the parts the pivot *b* is inserted through the cheek plates as a rivet (see Fig. 1) to serve as a single final means for holding the lock mechanism in place as well as a pivot for the bell crank *a*. The latter

serves to close the upper end of the frame or casing opening and the whole arrangement avoids the use of the lock frame or block of said prior patents.

The upper right hand end of the bell crank *a* (Fig. 3) is undercut as at *z* and sufficiently far enough below the top of frame 6 that if a thin steel piece is inserted between arm 1 and the frame 6 it can not get a bearing on the crank *a* to turn it or hold its long end down. The last tooth adjacent the undercut may be cut off as at *w* sufficiently to avoid engagement on top of it by a piece inserted as stated. Unless cut off the rear of this tooth would perhaps serve as a purchase point for a picking tool. The advantage of the new construction at this point will be appreciated by a comparison of it with the corresponding point in said prior patents.

The lock construction described can of course be used in varying relationships without departing from the principles of the invention. The handcuff shown is used generally in pairs as illustrated in the prior art but may be used singly and the lock mechanism may be made up as shown or with equivalent elements of the invention which I now claim.

What I claim is—

1. A lock construction of the character described, comprising in combination, a movable member to be locked, a spring pressed latch automatically operable to permit movement of said member in one direction, but not in the opposite direction past the latch, means manually operable to hold the latch to lock said member against any movement and a lock casing to guard said latch 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.

2. In a handcuff of the kind described, a lock construction comprising a casing, a bolt slidably supported on the bottom of the casing, a spring pressed bell crank latch mounted in the casing, the casing serving as the guide and support for the movements of the latch and bolt, said bolt being constructed to engage the latch and hold it rigidly against any unlocking force.

3. In a handcuff of the kind described, a lock construction comprising a casing, a bolt slidably supported on the bottom of the casing, a latch pivoted within the casing above the bolt and having a depending portion on its outer end adapted for engagement by the bolt to hold it in position.

4. In a handcuff of the kind described, a lock construction comprising a casing, a bolt slidably supported on the bottom of the casing, a bell crank latch pivoted within the casing above the bolt and having a depending arm

with a spring pressed plunger between it and the bolt and a latch arm with a depending portion at its outer end for engagement by the bolt.

5. In a handcuff of the kind described, a lock construction comprising a casing, a bolt slideable on the bottom of the casing, a bell crank latch pivoted within the casing above the bolt and provided with a depending arm for manipulation by a key and a latch arm having a depending portion for engagement by the bolt, a spring pressed plunger mounted to act between the outer end of the latch arm and bolt.

10. 6. In a handcuff of the kind described, a lock construction comprising a casing, a bolt slideable on the bottom of the casing, a bell crank latch pivoted within the casing above the bolt, spring pressed plungers acting between each arm of the crank and each end of the bolt to yieldingly hold the parts in position, depending portions on said latch one for manipulation by a key and the other for engagement by said bolt and a shoulder 25 on the bolt for engagement by a key to move it out of engagement with the outer end of the latch.

7. In a handcuff of the kind described, a lock construction including a casing, a bolt within the casing, said casing being

provided with a hole in line with one end only of the bolt whereby it may be moved in one direction only without the use of a key and a portion on said bolt adapted to be engaged by a key to move it in the opposite 35 direction.

8. A handcuff comprising in combination two parallel spaced arms between which at one pair of ends is pivoted a locking arm adapted to pass between said arms and at the other ends of which are formed side plates for a lock casing, a U frame mounted between said side plates to complete the casing, a bolt at the bottom of said casing, a bell crank latch pivoted within the casing at 40 one upper corner thereof and having a latch arm substantially filling the otherwise open end of the casing with a depending portion for engagement by said bolt, spring pressure means for holding the latch in position, all constructed and arranged for the locking arm to have a freedom of circular movement in one direction only past the latch when in position and to be locked to the latch when the bolt is in engagement with its depending portion.

45

50

55

In testimony whereof I have affixed my signature.

ELMER E. NEAL.