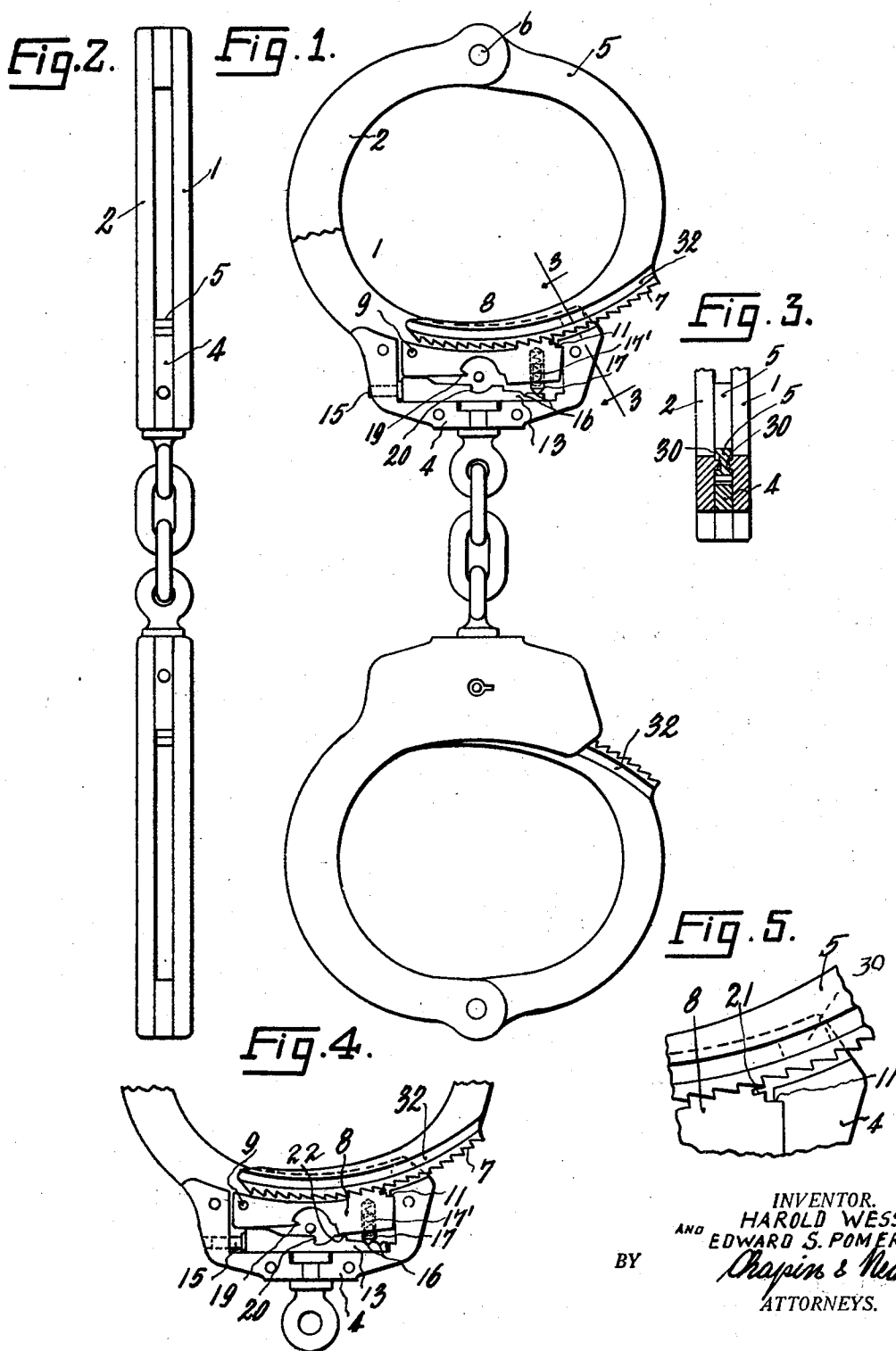


Aug. 23, 1932.

H. WESSON ET AL
POLICE OFFICER'S SHACKLE

1,872,857

Filed April 20, 1931



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POLICE OFFICER'S SHACKLE

Application filed April 20, 1931. Serial No. 531,394.

This invention relates to an improved shackle mechanism such as a handcuff or the like, for police officers' use. It will be disclosed in the form of a handcuff and the mechanism will be readily understood as applicable to thumb cuffs, leg shackles, and articles of that character.

The general type of handcuff to which our improvements relate is that shown in the following issued U. S. Patents: #1,017,955; #1,161,562; #1,157,135; and #1,531,451, which give a fair showing of the prior art. In the development of the prior art up to the present invention the lock mechanism, the lock casing, and associated parts have not been simplified as much as we have found that they can be simplified and without the loss of any useful function. Our invention discloses how the simplified structure can be accomplished, the useful functions of the prior art retained, and a number of useful features and relationship of parts added that are novel and useful in such a structure. The utility of a simpler arrangement of parts is not alone important from an economical manufacturing standpoint but also important in decreasing weight while at the same time rendering the mechanism in a form that will function well under all conditions of use.

A disclosure of the invention will be clear from the accompanying drawing and following description.

Fig. 1 is a plan view of a pair of handcuff shackles; the upper one having the top lock casing plate and part of the double arm broken away to disclose the lock mechanism;

Fig. 2 is a side view of Fig. 1 but with no parts broken away;

Fig. 3 is a sectional view on line 3—3;

Fig. 4 is a detail view of the lock mechanism in double locked position by reason of the bolt being shifted to that position from the position shown in Fig. 1; and

Fig. 5 is a detail view enlarged to better show a feature.

In the handcuff shown, 1 and 2 are parallel arms spaced at one end by the U-shaped lock casing frame 4 and at the other end by the pivoted locking arm 5 swiveled on pin 6. Arm 5 is adapted to turn freely in the form

shown in one direction through a complete revolution. For a certain distance inwardly from its free end it is provided with ratchet teeth on its outer edge, adapted to click by the ratchet pawl 8 when moving clockwise but normally prevented by the pawl from moving in the other direction. This arrangement of locking arms and pawl is much the same as in the prior art patents.

According to the present invention we provide an elongated lock casing and in such a casing we insert an elongated latch member pivoted closely adjacent one end at 9 and provided at the other end with ratchet teeth to engage the teeth of the locking arm 5. The lock casing in its preferred form has an overhanging ledge 11 for engagement by a shoulder on the outer end of the latch to limit its outward spring pressed movement when the arm 5 is not in position to do this. This shoulder or ledge also has another purpose which will be referred to later. Underlying the latch and resting on the bottom of the lock casing is an elongated bolt 13, one end of which is in line with a pusher head having a pin 15 extending into a hole through the side of the lock casing. The outer end of the bolt has two spaced notches 16 on its upper surface adapted to be engaged alternately by a spring pressed pin 17. As shown, this pin extends into a hole in the bottom side of the latch just below the point where the latch teeth are and said pin is backed up by a strong coiled spring under compression tending to push it outwardly all the time.

With the lock parts as shown in Fig. 1, the handcuff is in position to apply it to the wrist. Arm 5 can be rotated clockwise until it is applied to the wrist. Then the latch or ratchet pawl 8 will prevent the arm 5 from unlocking movement as long as it is in toothed engagement with such arm. In this position of the parts (that of Fig. 1) pawl 8 is only spring pressed to locking position.

To supplement the locking function there are provided two separate means to bolt the pawl 8 independently, in locking position. One means is the straight bolt 13 which is readily operable by the officer when he pushes

the pin 15 to the right (in Fig. 1). He can do this by a pin extension on his key or by the end of a match or any pin pusher. Bolt 13 is thus shifted from position in Fig. 1 to that of Fig. 4 where the bolt is shown with a shoulder 22 underlying latch 8 to effectively block any downward movement to release the latch teeth. The other means is the narrow recess or slot 21 in the outer end of the latch arranged in line with the small clearance space between the teeth on arm 5 and the upper surface of the right-hand leg of the U-shaped lock casing frame 4 (Fig. 1) when the latch is in toothed engagement with arm 5. This clearance space is a point of attack for a prisoner or confederate to try to pick open the handcuff lock.

Some officers, in spite of the easily operated safety feature provided by the sliding of bolt 13 to double locked position, may neglect such operation of bolt 13. In such cases attempt may be made to open the handcuff by slipping a flat picking instrument, like a small flat spring, down the said clearance space between the shackle teeth and the lock casing so as to reach the end tooth of latch 8 to press that down. The recess 21 is designed and located to receive such a picking instrument as a keeper recess would receive a bolt. Any instrument that can work its way along the said clearance space in line with recess 21 will be received by said recess and operate to hold the latch 8 in tighter engagement with the shackle teeth.

There are then two means which operate to dog the latch in locked position. Bolt 13 for the officer to use and, if that is forgotten or neglected, recess 21 for the prisoner to unconsciously use when he succeeds in putting a picking instrument into it. Said recess preferably extends through the whole thickness of the latch and after the picking instrument is received by the recess it holds the latch rigid with the lock casing.

Observing Fig. 1 it will be clear that a key may be inserted from outside the casing and if turned first clockwise it will press bolt 13 to unlocked position by contact with shoulder 20. If it is then turned counterclockwise it will press latch 8 to unlocking position by contact with the ledge 19.

The ledge 19 is arranged in a substantially radial direction to the axis of an inserted key. The reason for the particular shape of the latch 8 is this: It is desired to have the latch close the top opening of the lock casing. By pivoting it at one end and extending it to the other end this closure is accomplished. In general form it is like a straight latch or lever. But it is desired to have it operate and function as an angle crank lever. This is accomplished by making the straight lever just deep enough to permit its underside to be cut away for the half turn of a key in the unlocking operation. Then by providing the

small ledge 19 in a substantially radial direction to the key axis and locating it at the end of the half circle turn the bell crank function is accomplished in having a leg (the specially arranged ledge 19) for the key to contact with and lower the latch 8 as a whole.

In this way what is desired for closing the top of the lock casing and for operation is accomplished. The depth of the latch is cut down approximately one-half from what it would be if the ordinary bell crank latch lever were used. By getting all the functions of the latch lever in such a small compass by the described arrangement the needed depth of the lock casing is cut down. This has been done as will be seen from the drawing. Parallel with the latch lever 8 and underlying it is the bolt 13. These two parts 8 and 13 are coordinated with each other and with the space needed for turning the key so as to simplify the manufacture of parts and save important space.

As shown, the lock casing is considerably longer than it is deep. The latch lever 8 is pivoted at one end and extends clear over to the other end. The latch spring 17 is close to the free end of the latch and is preferably a very strong spring so that the pin 17 resting in either notch 16 will be held there with enough force to prevent bolt 13 from being jarred out of the desired position. The ledge 11 cooperating with the shoulder on the latch prevents any particles working down into the lock casing and between the bolt and the end of the casing. Such particles or accumulated dirt would prevent the bolt from being moved to double lock the arm 5.

In Fig. 3 there are shown two blocks 30 positioned exactly at the open ends of arms 1 and 2 above the lock casing. They are much longer than they are high (as indicated by dotted lines of the larger detail view, Fig. 5) so as to give a balanced and effective block engagement with the shoulders of grooves 32 one on each side of arm 5 above the teeth 7. The blocks 30 may be integral ridges of the arms 1 and 2 as indicated in Fig. 3 or, if desired for manufacturing reasons, such blocks may be made separately and pinned in position. This structure acts to prevent the arm 5 being pulled away or sprung so as to separate the teeth 7 from the latch teeth. The arrangement gives added strength to the locking position of the parts.

The features of the structure disclosed have been found important from a manufacturing and structural standpoint.

What we claim as our invention is:

1. In a shackle mechanism of the kind described, a pivoted locking arm having a series of teeth at its free end arranged on an arc with the pivot point as its center, a frame and pivot to carry said arm, a latch arm having its upper edge concentric with said arch and

arranged so as to bring said teeth in very close parallel relation to the top of the latch, toothed means at one end of the latch to successively engage said teeth on the pivoted arm as it swings in one direction and to prevent its swinging in the opposite direction, a pivot in said frame for said latch arm at the end opposite its teeth, said latch arm being substantially straight and much greater in length than it is in depth so as to minimize that movement adjacent its pivot which is necessary for its teeth at the opposite end to engage and disengage the teeth on the locking arm, said latch arm having a substantially semi-circular cut-away portion on its underside about midway of its length to accommodate a key, and at one end of said cut-away portion a small projection extending in a substantially radial direction to the key axis, spring-pressed means to hold said latch arm in yielding position for its teeth to engage the teeth of the locking arm, a lock casing on said frame to enclose the latch arm on all sides except its top edge, said lock casing having a key hole.

2. In a shackle mechanism of the kind described, a pivoted locking arm having a series of teeth at its free end arranged on an arc with the pivot point as its center, a frame and pivot to carry said arm, a latch arm having its upper edge concentric with said arch and arranged so as to bring said teeth in very close parallel relation to the top of the latch, toothed means at one end of the latch to successively engage said teeth on the pivoted arm as it swings in one direction and to prevent its swinging in the opposite direction, a pivot in said frame for said latch arm at the end opposite its teeth, said latch arm being substantially straight and much greater in length than it is in depth so as to minimize that movement adjacent its pivot which is necessary for its teeth at the opposite end to engage and disengage the teeth on the locking arm, said latch arm having a substantially semi-circular cut-away portion on its underside about midway of its length to accommodate a key, and at one end of said cut-away portion a small projection extending in a substantially radial direction to the key axis, spring-pressed means to hold said latch arm in yielding position for its teeth to engage the teeth of the locking arm, a lock casing on said frame to enclose the latch arm on all sides except its top edge, said lock casing having a key hole, and a bolt slidable on the bottom of the lock casing, operable from without the casing to a position to block all movement of the latch arm with a key operable part to shift it out of such position.

3. In a shackle mechanism of the kind described, a rectangular lock casing having a recess for lock mechanism much longer in length than in depth and lock mechanism

within said casing comprising a substantially straight latch arm filling approximately half of said recess and closing its upper side, a straight bolt in the lower half of said recess, said latch arm having a pivot at one upper corner and toothed means on the upper and opposite corner, said bolt being slidable on the bottom of the recess, said latch arm having a substantially semi-circular cut-away portion at its underside about midway of its length to permit a key to turn with its axis about on the level of its underside and a small ledge extending from one end of said cut-away portion for engagement by the key for retracting said latch, all arranged so that the straight latch arm may be operable as a bell crank lever without an arm depending from its lower edge.

4. In a shackle mechanism of the kind described, a lock casing having bottom, side, and end walls forming a recess much longer than it is deep, one of the side walls having a key hole positioned for the key axis to pass substantially through the center of the casing, a latch arm pivoted at one upper corner of the recess and extending across the recess to the other upper corner, with toothed means at the free end of the arm, said arm having a key engageable surface for retracting said latch located between said key axis and said pivot and substantially on the line joining the axis and pivot, a bolt slidable on the bottom of the recess, spring pressure means between the bolt and latch arm tending to separate them, said arm being located above the longitudinal middle plane of the recess and the bolt located below said plane except for a projection of one of such parts across said plane for blocking engagement between the bolt and latch arm when the bolt is in locking position, said bolt having a key engageable surface to slide it out of locking position.

5. In a mechanism of the kind described, a shackle arm with a lock casing at one end having bottom, side, and end walls forming a recess for the lock mechanism much longer than it is deep, one of the side walls having a key hole, a latch arm pivoted at one upper corner and extending across the top opening of the recess to the other upper corner and with toothed means on the upper side at the free end of said arm, said key hole being positioned so that a line drawn from its axis to the pivot of said arm will make small acute angle with the upper side of the latch arm, said arm having an undercut surface on its bottom side for a key way and including a key engageable ledge surface substantially in line with the said pivot and axis for retraction of said latch by the key, a shackle locking arm pivoted to the frame and having teeth at its outer free end adapted to engage the toothed means on the end of the latch arm, spring pressed means

to yieldingly hold the latch arm to tooth engaging position, said mechanism being arranged to permit movement of the locking arm in one direction and prevent it in the other direction until a key engages said ledge surface to depress the latch arm.

6. A mechanism of the kind described comprising a shackle frame having a lock casing at one end permanently closed at the bottom side and end walls, a latch arm pivoted at one upper corner of the casing and extending across the top side of the casing to the other corner, toothed means on the upper side at the free end of the latch arm, means including a spring to yieldingly hold said latch arm for its toothed means to extend slightly above the top side of the casing, a shackle arm pivoted to the frame with teeth on its outer edge to engage said toothed means in spring pressed latch locking relation, and means to bolt the latch arm in rigid locking relation, such means including a bolt within the casing underlying the latch arm and slidable from without the casing into blocking relation to the latch arm and also a bolt receiving recess on the end of the latch arm to receive any lock picking instrument which may be worked through the clearance between the top side of the casing frame adjacent said toothed means and the teeth of the shackle arm when the latch is in spring pressed latch locking relation whereby the latch will be bolted in said relation by such lock picking attempt.

7. A mechanism of the kind described comprising a shackle frame and lock casing, a shackle arm pivoted to the frame and having teeth arranged to pass one side of the lock casing with small clearance, a spring pressed latch having toothed means to engage the teeth of the shackle arm at one corner of the lock casing, said latch arm having a bolt recess below said teeth and opening toward the said clearance space, said recess being adapted when the teeth and the toothed means of the latch are in engagement, to receive a lock picking instrument which may be worked through said clearance and bolt the latch in toothed engagement with the arm so as to foil the lock picking attempt.

8. A handcuff mechanism including a shackle frame having a lock casing at one end and a pivoted shackle arm at the other end adapted to swing from open to closed and locked relation to the frame, open ended arc-shaped grooves extending along each side of the shackle arm over the locking range and rectangular blocks longer than they are deep and located on the inside faces of the side walls of the lock casing at the upper and outer corner and in line with the movements of said grooves and adapted to furnish great

resistance to the prying of the shackle arm away from said lock casing.

9. A mechanism of the kind described comprising a shackle frame and lock casing, said lock casing having rigid closing walls on the bottom, side, and end walls, a latch arm pivoted at one corner of the casing and extending across the top side of the casing to form a yielding closure therefor, spring pressure means in the casing tending to force the latch outwardly at all times, an undercut ledge near the top of the casing end wall on the opposite side from the pivotal point of the latch and a ledge at the outer end side of the latch to cooperate with the ledge on the casing wall to limit the spring pressed outward movement of the latch and by said overlapping ledges to keep out dirt particles from entering the casing at the point where the latch movement is greatest, toothed means at the end and top side of the latch to extend above the adjacent end wall of the lock casing and a shackle locking arm pivoted to the shackle frame with teeth on an arc to engage said toothed means, said teeth having very small clearance to pass by the upper surface of the outer end wall of the lock casing.

In testimony whereof we have affixed our signatures.

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