Nov. 9, 1971 H. B. SMITH 3,618,345

DOUBLE-HINGE HANDCUFF ASSEMBLY

Filed Feb. 9, 1969

FIG. 1

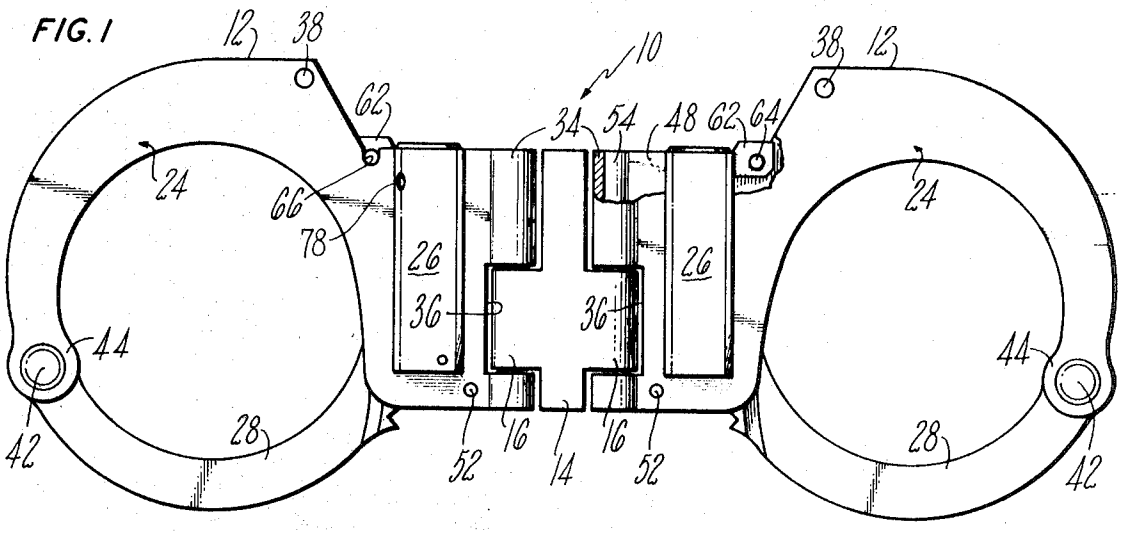
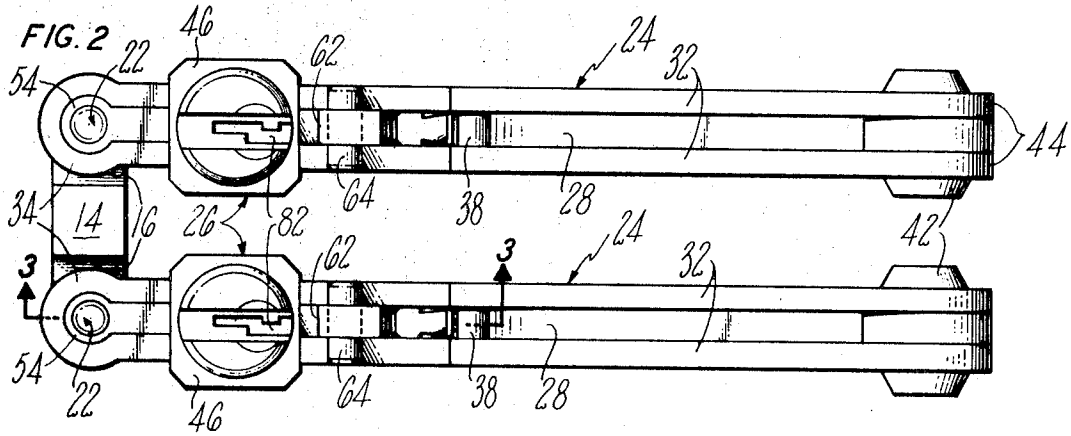


FIG. 2



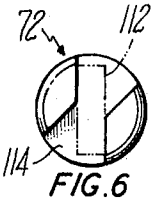
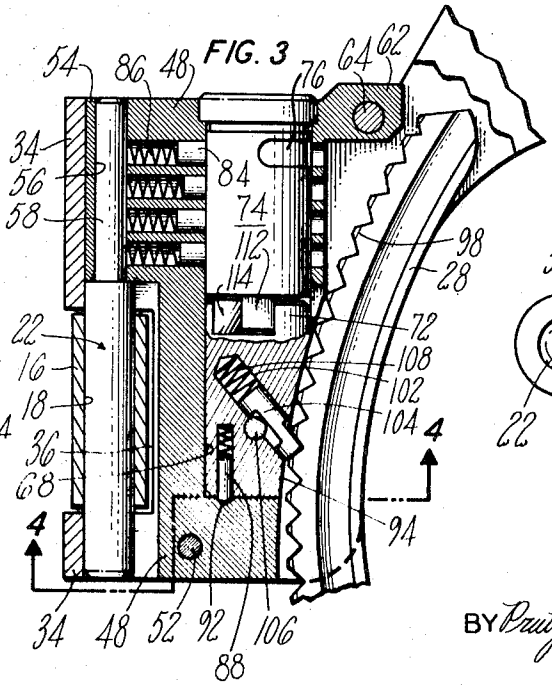


FIG. 6

FIG. 3



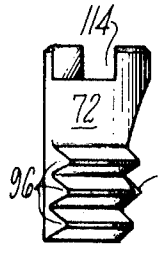


FIG. 5

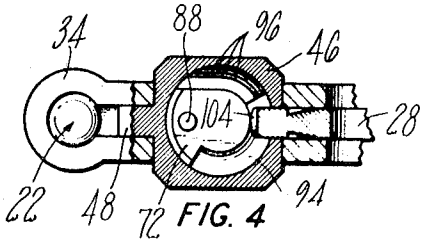


FIG. 4

INVENTOR
HOLLIS B. SMITH

BY Pritzman, Hayes, Kalb and Chilton

ATTORNEYS

United States Patent Office 3,618,345
Patented Nov. 9, 1971

3,618,345

DOUBLE-HINGE HANDCUFF ASSEMBLY

Hollis B. Smith, Island Pond, Vt., assignor to Essex Lock & Manufacturing Company, Inc., Island Pond, Vt.

Filed Feb. 9, 1970, Ser. No. 9,521
Int. Cl. E05b 25/00
U.S. Cl. 70—16 8 Claims

ABSTRACT OF THE DISCLOSURE

A double-hinge handcuff assembly comprises a central hinge block and a pair of substantially identical lockable cuffs pivotally connected to the block. Each cuff is constructed of a folded one-piece sheet metal body member of generally U-shaped, cross-sectional configuration having a pair of spaced confronting side walls and an integral arcuate connecting portion forming a hinge knuckle for connecting the cuff to the hinge block. Each cuff is further provided with a curved shackle movable between open and closed positions and pivotally connected to the side walls for movement therebetween. A lock assembly securely mounted on the confronting wall portions adjacent the hinge connection includes a rotatable key-operated tumbler plug and a shackle lock drum connected thereto by a lost-motion connection. The drum is adapted for coaxial rotation with the plug and includes peripheral locking teeth rotatable into locking engagement with the shackle for retention thereof in its closed position.

SUMMARY OF THE INVENTION

The present invention relates generally to handcuffs or manacles. More particularly, it is concerned with a new and improved handcuff assembly of a type which prevents relative twisting movement between the cuffs.

A primary object of the present invention is to provide a new and improved handcuff assembly of the type described having a folded sheet metal body of compact lightweight construction possessing high strength and durability characteristics and prolonged trouble-free operation.

Another object of the present invention is to provide a new and improved sheet metal handcuff assembly adapted for rapid, facile manufacture and capable of being easily folded into a neat and compact unit for storage or transport. Included in this object is the provision for a double-hinge construction which not only permits folding of the assembly into a compact unit but also prevents angular movement of the cuffs or the application of a relative twisting force therebetween while facilitating ease of carrying, such as on a belt or other support, without undesirable projection of any portion thereof.

Still another object of the present invention is to provide a new and improved handcuff assembly of the type described which utilizes a simplified lock arrangement and design providing high strength to the sheet metal construction of the cuffs.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

These and related objects are accomplished in accordance with the present invention by providing a double-hinge handcuff assembly comprising a central hinge block having a pair of spaced generally parallel bores for receiving pivot pins of separate hinge connections and a pair of substantially identical lockable cuffs pivotally connected to the block by the hinge pins. Each cuff is constructed of a folded one-piece sheet metal body member of generally U-shaped, cross-sectional configuration having a pair of spaced confronting side walls and an integral arcuate fold connecting the side walls and forming a hinge knuckle for pivotally attaching the cuff to the hinge block. Each cuff is further provided with a curved shackle movable between open and closed positions and pivotally connected to the side walls for movement therebetween. A lock assembly for each cuff is securely mounted between the confronting side walls adjacent the hinge connection and includes a rotatable key-operated tumbler plug and a shackle lock drum connected thereto through a lost-motion connection. The drum is adapted for coaxial rotation with the plug and includes peripheral locking teeth rotatable into locking engagement with the shackle for retention thereof in its closed position.

A better understanding of the objects, advantages, features, properties and relationships of the invention will be obtained from the following detailed description and accompanying drawing which set forth an illustrative embodiment and are indicative of the way in which the principle of the invention is employed.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1 is a front elevational view, partially broken away and partially in section, illustrating an unfolded handcuff assembly incorporating the features of the present invention;

FIG. 2 is an enlarged top view of the handcuff assembly of FIG. 1 folded into its compact storage or transport condition;

FIG. 3 is a sectional view of the hinge and lock portion of one of the handcuffs, the view being taken along the line 3—3 of FIG. 2 and illustrating the lock mechanism in its ratcheting position;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 3 showing the bottom of the hinge and lock drum;

FIG. 5 is a side elevational view of the lock drum shown in FIG. 3; and

FIG. 6 is a top view of the lock drum of FIG. 5 depicting in phantom the relative position of the drive lug when the lock is in the ratcheting position illustrated in FIG. 3.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to the drawing in greater detail wherein like reference numerals indicate like parts throughout the several figures, the invention is embodied within a handcuff assembly **10** comprised of a pair of identical handcuffs **12** pivotally mounted in fixed spaced relationship on a central hinge block **14** of cruciform configuration. Each cuff is provided with its own hinge connection to the central block thereby facilitating folding of the cuffs into the substantially parallelized, spaced condition illustrated in FIG. 2. The block **14** is of sufficient width to provide adequate clearance between the parallelized cuffs and permit mounting thereof over a belt or similar support member without causing one of the cuffs to project outwardly. The block includes integral side extensions **16** provided with generally cylindrical bores **18** passing therethrough in spaced parallel relationship to each other. As shown in FIG. 3, the bores **18** are of sufficient size to slidably receive a hinge pin or pintle **22** which passes therethrough and is securely mounted within the individual handcuff. As will be readily appreciated, the dual hinge construction illustrated in the drawing not only provides for neat compact storage but also enables the cuffs to hold the individual wrists in such a manner as to prevent angular or twisting movement therebetween thereby substantially restricting movement of both the hands and arms of the person to whom the handcuffs have been applied.

In the embodiment illustrated, each cuff of the assembly is identical in construction thereby permitting econ-

omy in manufacturing coupled with rugged simplicity of construction. Each cuff is comprised of a double-sided, sheet metal body member **24** hingedly connected to the central hinge block **14** and adapted to securely receive a vertically disposed lock assembly **26** and a generally C-shaped pivotal shackle **28**. The sheet metal cuff body is generally U-shaped in cross section, as best seen in FIG. 2, and includes a pair of flat confronting side walls **32** integrally joined by an arcuate fold **34** forming knuckles for the hinge pin **22** connecting the individual handcuffs to the central block. The fold portion **34** is provided with an enlarged notch **36** for receiving the side extension **16** of the central hinge block and thereby providing a conventional hinge-like construction. The confronting side walls **32** of the body member **24** are disposed in spaced parallel relationship and are maintained therein by both a spacing rivet **38** and a shackle pivot shank **42** joining their free ends **44**. As shown, the shackle **28** is pivotally mounted on shank **42** between the side walls **32** for full circle swinging movement.

The lock assembly **26** for each cuff includes an elongated generally rectangular lock housing **46** provided with a central flange **48** projecting outwardly along one side thereof along its full length and extending below the bottom thereof. The flange is generally equal in thickness to the spacing between the side walls of the cuff body and is confinably retained therebetween by a lock-retaining pin **52** projecting through both side walls **34** and the flange **48** adjacent the bottom of the lock housing. The flange **48** is provided with a pin-receiving extension **54** which is slidably received within the fold portion **34** of the cuff body and is provided with an elongated bore **56** for immovably securing a reduced diameter portion **58** of the pivot pin **22**. The lock housing **46** is further provided with a centrally disposed top tab **62** projecting from the side opposite the extension **54**. The tab **62** carries a dowel **64** which rests in notches **66** in the side walls **32** and cooperates with the lock-retaining pin **52** and extension **54** to immobilize the lock assembly **26** on the cuff body member **32**. An elongated bore **68** extends axially through the lock housing **46** for receiving a shackle lock drum **72** and an overlying cylindrical key plug **74** for driving the drum **72** between its locked, unlocked and ratcheting positions.

The cylindrical plug **74** closes the top opening of the axial bore **68** and encloses the lock drum **72** therein in coaxial alignment therewith. The plug **74** is retained within the bore **68** through the cooperative interengagement between a peripheral notch **76** on the exterior of the plug **74** and a lock pin **78** (see FIG. 1) mounted in the lock housing. The cylindrical plug is further provided with a longitudinally extending central keyway **82** which communicates in a conventional manner with the plurality of tumblers **84** located in the transversely extending tumbler bores **86** provided in the upper portion of the housing **46** and flange **48** for releasably retaining the cylindrical plug in its key receiving and removing orientation illustrated in FIG. 2.

The shackle lock drum **72** is a generally cylindrical member mounted for coaxial movement with the cylindrical plug **74** in response to the driving action thereof. The drum is provided with a spring-biased locating pin **88** which projects from the bottom of the drum and seats within one of two detents **92** provided in the base of the housing's axial bore **68** for locating the shackle lock drum **72** in either its ratcheting or fully locked position. The drum **72** is further provided with a smooth, downwardly tapering outer surface **94** over slightly less than one-half its circumference. The taper of surface **94** conforms to the curvature of the shackle **28** and permits smooth passage thereof past the drum without interference. Immediately adjacent the smooth tapered surface **94** is a tapered stepped peripheral portion of the drum forming a plurality of integral locking teeth **96** over a circumference of approximately 90°. Thus by rotation of the drum **72** clockwise as viewed in FIGS. 3 and 6 (counterclockwise as viewed in FIG. 4) the locking teeth **96** are brought into locking engagement with the tooth segment **98** of the shackle **28** to prevent movement of the shackle in either direction.

The drum **72** is further provided with a transverse bore **102** extending upwardly into the drum at an angle of about 45° to its longitudinal and rotational axis from a position on the smooth tapered surface **94** immediately adjacent the locking teeth **96**. A generally cylindrical pawl **104** is secured within the bore **102** for limited slidable movement by a pin **106** and is biased outwardly by a spring **108** into engagement with the shackle's tooth segment **98**. The engagement between the pawl **104** and the tooth segment **98** prevents counterclockwise movement of the shackle as viewed in FIG. 3. However, the angular orientation of bore **102**, and therefore pawl **104**, permits the pawl to be driven against the bias of its spring **108** by the shackle as the shackle moves in a clockwise direction as viewed in FIG. 3 toward its closed position.

A depending drive lug **112** of rectangular configuration extends downwardly from the plug **74** into the drive notch **114** formed in the top of the shackle locked drum **72**. As best seen in FIG. 6, the notch **114** permits free, nondriving motion of the lug **112** through an angle of approximately 45°. Thus the lug may be moved through a 45° arc in a clockwise direction as viewed in FIG. 6 without imparting corresponding clockwise movement to the shackle lock drum **72**. Thus, insertion of a key into the keyway **82** of the cylindrical plug **74** and rotation of the plug clockwise as viewed in FIG. 2 (counterclockwise as viewed in FIG. 4) through an arc of 45° will impart no movement to the shackle lock drum. However, continued movement of the key in a clockwise direction will release the pawl **104** from the shackle tooth segment **98** and bring the smooth surface **94** into confronting relationship therewith, permitting the shackle **28** to freely slide into a fully opened position. Since the key has been rotated approximately 90° from the key removable position illustrated in FIG. 2, the key must be rotated counterclockwise through an arc of 90° in order to return the lock drum **72** to its ratcheting position illustrated in the drawing. The key may then be removed and the shackle pivoted toward a closed position for retention by the pawl **104**. The shackle, of course, will ratchet past the pawl until the desired closed position is attained. It will, of course, be appreciated that the shackle is designed to permit full 360° rotation about its pivot shank **42**.

In order to lock the shackle against movement in either direction the key must be rotated counterclockwise as viewed in FIG. 2 through an arc of 45° to its fully locked position. This rotation causes driving engagement between the driving lug **112** of the cylindrical plug and the shackle lock drum **72** bringing the locking teeth **96** into fixed locking engagement with the tooth segment **98** of the shackle. The lost-motion connection between the cylindrical plug and the locking drum permits the key to be returned to the key removal position illustrated in FIG. 2 without moving the shackle lock drum out of its fully locked condition. Thus, it can be seen, that by simply rotating the locking drum either clockwise or counterclockwise and returning the keyway to its key removal position the lock can be either fully unlocked for removal of the shackle and returned to its ratcheting position or it can be fully locked and retained in that position, with key removal in both instances.

It is also a feature of the present invention that the teeth in the segment **98** of the shackle have an included tooth angle of 90° thereby providing increased strength and security of locking while at the same time facilitating easy ratcheting of the shackle into its desired closed position.

As can be seen from the foregoing detailed description the present invention provides a simplified double-hinge handcuff design capable of easy and rapid manufacture

from sheet metal without sacrificing strength, durability or ruggedness. The use of sheet metal cuff body members also decreases the weight of the assembly and the double-hinge construction enables compact and neat storage and transport thereof. The lock assembly provides positive multi-tooth locking engagement with the shackle and rapid rotational interengagement coupled with key removal in either a fully locked or ratcheting position.

As will be apparent to persons skilled in the art, various modifications, adaptations and variations of the foregoing specific disclosure can be made without departing from the teachings of the present invention.

I claim:

1. A double-hinge handcuff assembly comprising a central hinge block having a pair of spaced, generally parallel pin-receiving bores forming portions of separate hinge connections and a pair of substantially identical, lockable cuffs hingedly connected to the block at the hinge connections, each cuff having a folded, one-piece, sheet metal cuff body of generally U-shaped cross-sectional configuration comprising spaced confronting side walls and an integral connecting fold portion forming a hinge knuckle, each cuff having a shackle movable between open and closed positions and pivotally connected to the confronting side walls for movement therebetween and each cuff having a lock mounted on said confronting side walls adjacent the fold portion for holding the shackle in a closed position.

2. The handcuff assembly of claim 1 including a hinge pin for each hinge connection passing through a bore in the hinge block and retained within the hinge knuckle of the sheet metal cuff body.

3. The handcuff assembly of claim 1 wherein the fold portion of the cuff body forms a pair of hinge knuckles disposed at opposite ends of a pintle-receiving bore of the hinge block.

4. The handcuff assembly of claim 1 wherein the side walls are secured in spaced parallel relationship and the shackle is pivotally mounted for unobstructed full revolution passage therebetween.

5. The handcuff assembly of claim 1 wherein the lock includes a lock housing traversing said side walls and having an integral mounting flange confinably secured between the said side walls.

6. The handcuff assembly of claim 5 wherein said mounting flange extends into and is retained within the fold portion of the cuff body.

7. The handcuff assembly of claim 1 wherein the lock includes a rotatable tumbler plug and a coaxially movable shackle lock drum having peripheral locking teeth rotatably movable into locking engagement with the shackle for retention thereof in its closed position.

8. The handcuff assembly of claim 1 wherein the lock is rotatable about an axis substantially parallel to the axis of the hinge connection and includes a shackle lock drum having a pawl member permitting movement of the shackle toward a closed position and peripheral locking teeth rotatable into locking engagement with the shackle for retention thereof in its closed positions.

References Cited

UNITED STATES PATENTS

1,775,727	9/1930	Latou	70—16
2,966,787	1/1961	Tompkins	70—16
3,392,554	7/1968	Williamson	70—16

FOREIGN PATENTS

6,808,902	12/1969	Netherlands	70—16
171,637	11/1934	Switzerland	70—16

GEORGE F. MAUTZ, Primary Examiner

E. J. McCARTHY, Assistant Examiner