# United States Patent

**Balicki**

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## [54] CABLE-TYPE LOCK ASSEMBLY


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[51] **Int. Cl.**.....**E05b 15/16,** E05b 67/06

[58] **Field of Search**.....70/49, 30, 15, 93, 14, 417; 174/102 R, 111; 64/2–4



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[57] **ABSTRACT**

A cable-type lock assembly in the form of an indestructible elongated armored cable having a loop-forming lock housing at one end through which the other end of the cable may be passed so that the lock housing functions as an overlap slip joint and provides a closed retaining loop. By progressively pulling the cable through the locking housing, the loop may be shrunk to a required size while a key operated cylinder lock which is associated with the lock housing functions to retain the latter at selected positions along the free end region of the cable and establish the position of the overlap.


**7 Claims, 8 Drawing Figures**

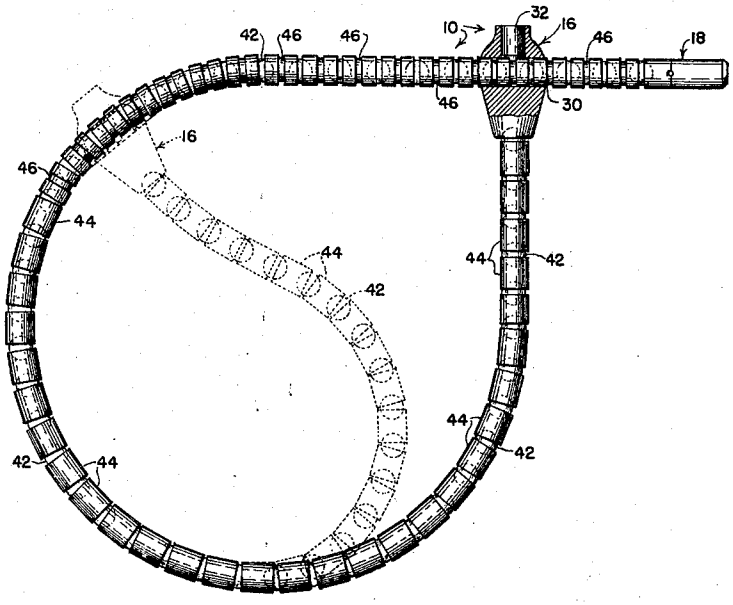


FIG. 1

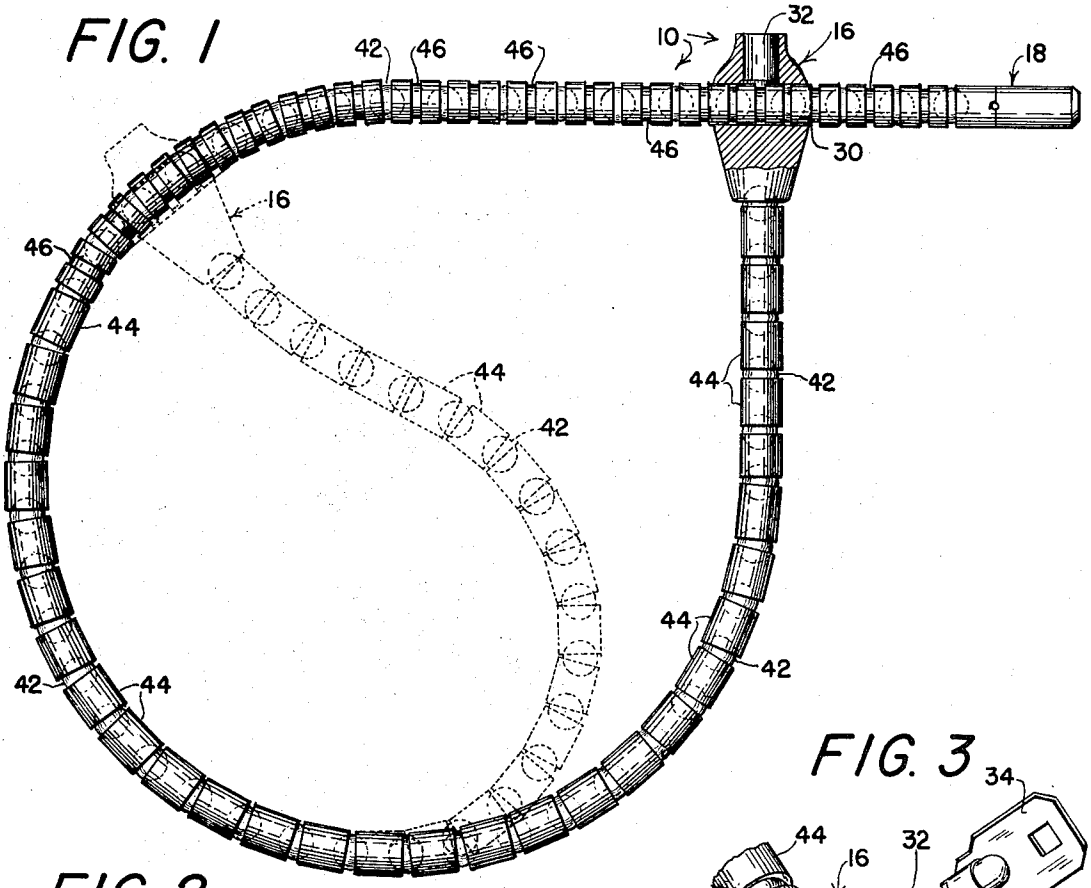



FIG. 3

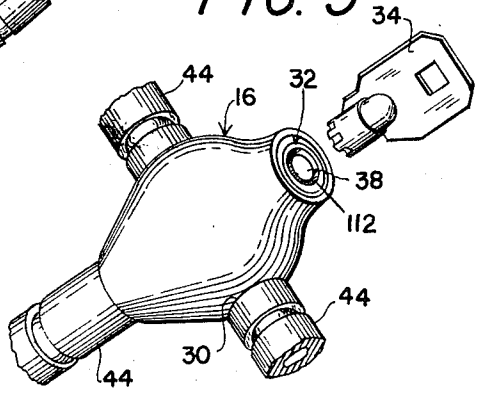
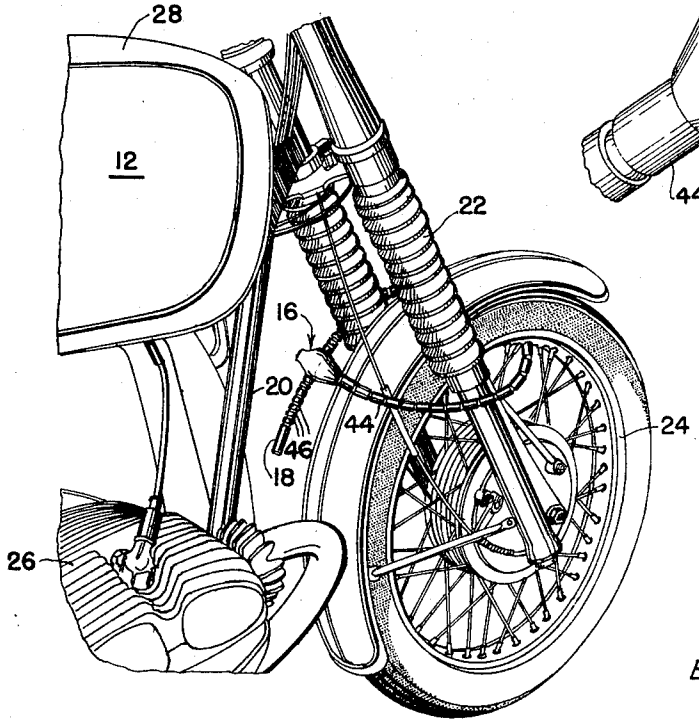



FIG. 2




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FIG. 4

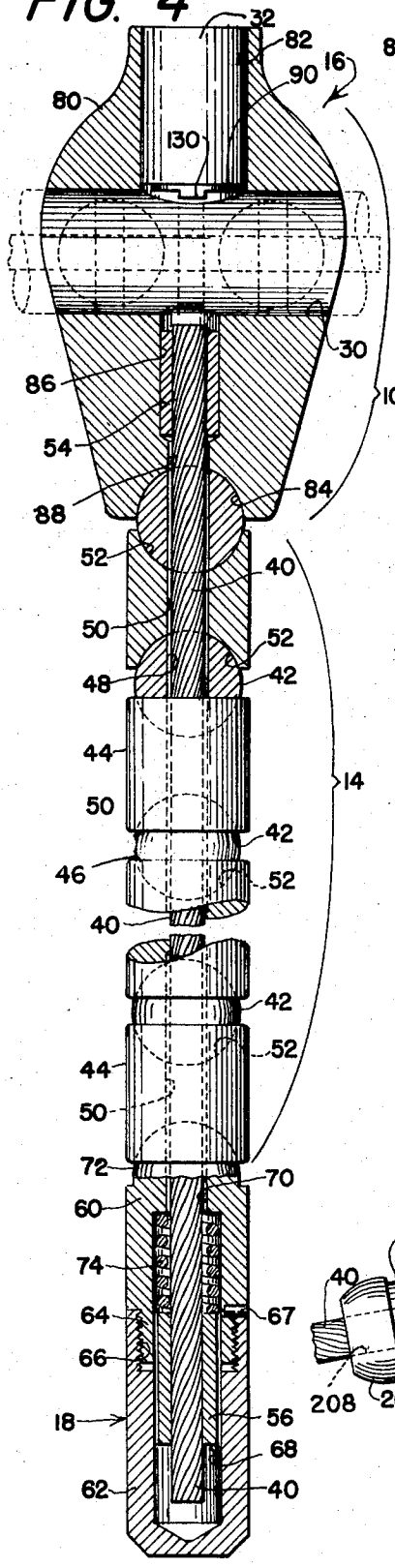



FIG. 5

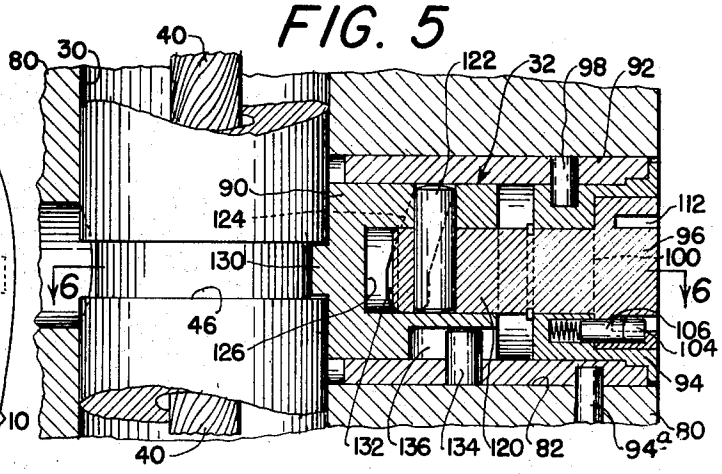



FIG. 6

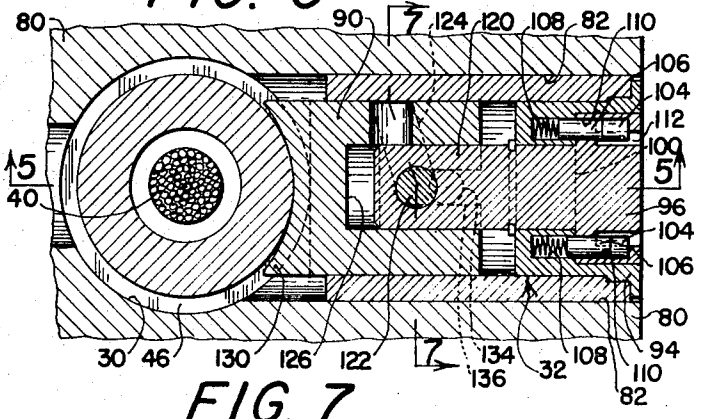



FIG. 7

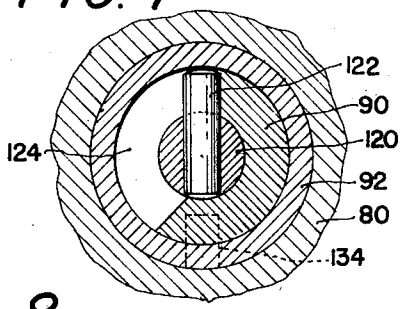
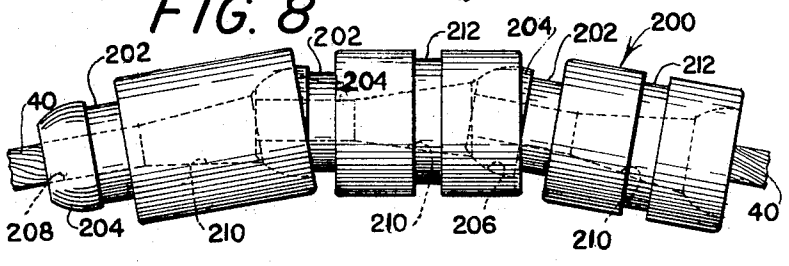



FIG. 8




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# CABLE-TYPE LOCK ASSEMBLY

The improved cable-type lock assembly comprising the present invention is designed primarily for use as a motorcycle lock in order to augment the usual ignition the handlebar locks which come as standard equipment with most motorcycles. The invention is, however, capable of other uses and the cable-type lock assembly of the present invention may be employed for tie-down purposes in connection with a wide variety of wheeled vehicles, sail or motor boats, or other transportable objects too numerous to mention. Irrespective, however, of the particular use to which the invention may be put, the essential features thereof are at all times preserved.

Due to the relatively high cost of motorcycles, as compared to bicycles for example, greater theft precautions are necessary and the conventional hardened steel cable-type padlocks which are currently in use in connection with the prevention of theft of bicycles are not adequate where motorcycles are concerned. Long-handled wire cutters which are capable of severing quarter-inch steel cable, stranded or otherwise, and with comparative ease, are available at most hardware stores. Thus, there have recently been developed various forms of armored cable which are practically indestructible. Such a cable, when used in connection with the prevention of motorcycle theft, usually is provided with heavy-duty eyelets at each end thereof for establishing a fixed size cable loop with the two eyelets being secured together by a heavy-duty padlock. The efficiency of such a motorcycle lock is no greater than that of the particular padlock which is employed for holding the ends of the cable together.

A particular disadvantage of such a conventional cable-type motorcycle lock resides in the fact that the size of the loop is determined by the length of the armored cable which must be relatively long if all sizes of motorcycles are to be accommodated. Usually, such a cable is passed between the wheel spokes, around the wheel rim, and then through the motorcycle frame, and sometimes through some adjacent fixed object such as a post, column, rack, or the like. Invariably, a few extra foot lengths of armored cable are provided to accommodate the "chaining" of the motorcycle to a remote anchor point, but in any event, the excess cable length affords convenient access to the padlock so that it may be oriented for easy insertion of the key or for easy visualization of the combination dial when a combination-type padlock is employed. By the same token, easy padlock access for key insertion affords easy access for theft purposes as, for example, smashing of the padlock by impact blows or hack saw destruction thereof. Furthermore, excess cable length with a consequent large loop size leads to difficulty in cable handling during installation and release of the motorcycle lock.

The present invention is designed to overcome the abovenoted limitation that is attendant upon the construction and use of conventional motorcycle locks, and toward this end, the invention contemplates the provision of a novel cable-type lock assembly wherein one end of the cable is provided with a relatively massive lock housing having formed therein a transverse opening or bore for reception of the other or free end of the cable so that when such other end is inserted into the transverse bore a cable loop is formed. Then, as the free end of the cable is pushed or pulled further



through the bore in the lock housing, the loop is caused progressively to shrink or contract. The lock housing has associated with it a sliding lock bolt which cooperates with annular locking grooves which are provided at spaced regions along the armored cable, the bolt being capable of selective projection into a locking groove in order to determine the size of the loop, while a rotary lock shaft which is associated with a fixedly mounted cylinder lock in the lock housing makes camming engagement with the lock bolt so that the bolt may be withdrawn from the selected locking groove under the control of a key which is capable of actuating the cylinder lock. By such an arrangement, the armored cable may be passed through a motorcycle frame, through a wheel rim, or both, and then through or around an anchoring object such as a post or column and a cable loop produced, after which the loop may be shrunk so as not to contain an excess length of cable, the free end of the cable being accessible for pulling purposes during the loop-shrinking process. The provision of a cable-type motorcycle lock assembly such as has briefly been outlined above and possessing the stated advantages constitutes the principal object of the present invention.

An additional feature of the present invention resides in the provision of a novel form of flexible armored cable, the cable being comprised of sequential sheathe or armor sections which are threaded together on a central stranded steel cable in the manner of a string of beads. In one form of cable, alternate armor sections are in the form of spherical ball members and socket members, respectively, each two cooperating ball and socket members establishing a universal joint between the associated sections with all of the sections being firmly pulled together by the stranded cable on which they are threaded. In this form of the invention, the aforementioned annular locking grooves are formed in alternate armor sections, namely, the socket sections. In a modified form of armored cable, all of the sections are of similar configuration and each section is provided with a ball at one end and a socket at the other end with the sections being fitted together and threaded on the stranded cable so that each ball is received in a respective socket. In this latter form of the invention, the annular locking grooves are provided in consecutive armor sections. The first mentioned form of cable is appreciably more flexible than the second form, but their association in the over-all motorcycle lock assembly and their relation to the key-operated slip joint forming lock housing remains the same.

A further object of the invention is to provide a cable-type lock assembly which is generally of new and improved construction, may be manufactured at a comparatively low cost, and possesses high efficiency.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by the claims at the conclusion hereof.

In the accompanying two sheets of drawings forming a part of this specification, one illustrative form of the invention is disclosed, together with alternate forms of armor cable.

In these drawings:

FIG. 1 is a view partly in plan and partly in section of a cable-type lock assembly embodying the principles of the present invention and showing the same in its looped condition;

FIG. 2 is a fragmentary perspective view showing the lock assembly operatively applied to a motorcycle;

FIG. 3 is a fragmentary perspective view of a portion of the lock assembly, the view being taken in the vicinity of the housing which is employed in connection with the invention;

FIG. 4 is an enlarged fragmentary sectional view, partly in elevation, taken centrally and longitudinally through the motorcycle lock assembly and illustrating, schematically, the locking action of the slip joint forming lock housing;

FIG. 5 is a further enlarged fragmentary sectional view taken substantially centrally and longitudinally through the slip joint forming lock housing and showing the same in a locked condition;

FIG. 6 is a longitudinal sectional view taken on the line 6—6 of FIG. 5;

FIG. 7 is a transverse sectional view taken on the line 7—7 of FIG. 6; and

FIG. 8 is a fragmentary side elevational view of a portion of a modified form of armored cable which is capable of being used in connection with the present motorcycle lock assembly.

Referring now to the drawings in detail and in particular to FIGS. 1 and 2, the motorcycle lock assembly of the present invention is designated in its entirety by the reference numeral 10 and it is shown as being operatively applied to a conventional motorcycle which is fragmentarily shown in FIG. 2 and is designated by the reference numeral 12. Briefly, the motorcycle lock assembly 10 is comprised of a length of armored cable 14 (see FIG. 4), the details of which will be described presently, and on one end of which there is applied a slip joint forming lock housing 16 and on the other end of which there is applied a terminal end member 18. For descriptive purposes herein, the end of the cable to which the lock housing 16 is applied will be termed the "fixed" end, while the other end of the cable to which the end member 18 is applied will be referred to as the "free" end.

The motorcycle 12 is provided with the usual factory equipment such as a frame 20, a steering fork assembly 22, wheels 24, an internal combustion engine 26, and combined saddle and gas tank component 28, only the forward section of the motor cycle being fragmentarily shown. The motorcycle lock assembly 10 may be applied to the motorcycle 12 in various ways for theft prevention purposes, a typical way being to pass the armored cable 14 through the rim of the front wheel 24 and between adjacent wheel spokes and then around a portion of the steering fork assembly 22, after which the free end of the cable is threaded through a transverse bore 30 (see FIGS. 1, 3 and 4) which is provided in the lock housing 16 so as to produce a closed loop which subsequently is shrunk upon the motorcycle by pulling the free end of the cable 14 through the bore 30 until the desired loop span is attained. As will be made clear subsequently, in order to pass the free end of the armored cable 14 through the lock housing 16, it is necessary to operate a cylinder lock 32 which in installed in the lock housing 16, utilizing a proper key 34 (see FIG. 3) to unlock the cylinder lock. After the free end of the armored cable 14 has been pulled through the bore 30 to the desired extent, the lock housing may be securely locked to the medial region of the cable by again manipulating the cylinder lock 32 and withdrawing the key therefrom, all in a manner that will be made clear presently.

Considering now the specific nature of the armored cable 14, and referring particularly to FIGS. 1 and 4 of the drawings, the cable is comprised of a central length of flexible stranded steel cable 40 over which there is threaded a series of tubular sheathe-like armor sections including alternately arranged ball members 42 and socket members 44. The ball members 42 are all identical in configuration while the socket members 44 are substantially identical in configuration, certain of the socket members being provided with circumferential or annular grooves 46 while other such socket members are not grooved although, if desired, all of the socket members 44 be grooved. The purpose of the grooves 46 (see FIG. 1) is to establish a series of locking shoulders for cooperation with a locking bolt which is associated with the cylinder lock 32 in a manner that will be described subsequently.

Each ball member 42 of the armored cable 14 presents an outer spherical surface which is interrupted by a central bore 48 which passes diametrically through the member and through which the stranded steel cable 40 passes, the ball member thus assuming the form of a spherical bead.

Each socket member 44 of the armored cable 14 is in the form of a tube which presents a cylindrical outer surface and is provided with a central bore 50, the socket member thus assuming the form of a tubular or cylindrical bead. At each end of the bore 50 there is formed a semi-spherical socket 52, the curvature of which is conformable to the curvature of the outer surface of an adjacent ball in the alternate arrangement of ball and socket members. The depth of each socket 52 is slightly less than the radius of a ball member 42 so that an intervening ball member between two socket members, when seated within the opposed sockets 52, will present a limited exposed portion of the ball member and will maintain the adjacent socket members slightly spaced apart and thus establish a flexible ball and socket joint between such adjacent socket members. The amount of flexion of which the joint is capable will vary with the depth of the socket 52, but in the illustrated form of armored cable as shown in FIG. 4, a flexion on the order of 135° is possible before the adjacent rim regions of the two socket members 44 meet each other and thus prevent further flexion. The longitudinal extent of the socket members 44 is relatively short, amounting to about 1¼ times the diameter of a ball member 42 and thus the armored cable as a whole is capable of being coiled to loop form with the diameter of the loop being approximately 10 inches on the basis of a ball member of 1½ inches in diameter. Obviously, by varying the depth of the sockets 52 and the longitudinal extent of the socket members 44, the maximum curvature of the loop may be varied.

As will be described in greater detail presently, in order to draw the alternately arranged members 42 and 44 snugly together on the stranded steel cable 40 so that there will be no bead separation, one end of the stranded steel cable is anchored by means of a ferrule 54 (see FIG. 4) in the lock housing 16 against tensional pull-out, while the other end of the stranded steel cable 40 is similarly but yieldingly held by means of a spring-pressed ferrule 56 in the terminal end member 18. The

spring-biased ferrule 56 serves to take up any lost motion which otherwise might exist between adjacent ball and socket members 42 and 44.

The terminal end member 18 is of elongated tubular construction and is comprised of two cup-shaped sections 60 and 62 (see FIG. 4), the section 60 being provided with a reduced externally threaded portion 64 which is threadedly received in an internally threaded socket 66 in the section 62, the two sections thus meeting in rim-to-rim fashion. A drive pin 67 serves to retain the two sections against separation. The sections 60 and 62 thus define an internal space or chamber 68 into which the adjacent end of the stranded steel cable 40 projects, the cable passing through an opening 70 in the end of the section 60. The outer end of the section 60 is formed with a semi-cylindrical protuberance 72 which is somewhat greater than a semi-spherical sector, such protuberance being designed for cooperation with the adjacent socket 52 in the adjacent socket member 44. The ferrule 56 is crimped, swaged, soldered or otherwise firmly secured to the adjacent end of the cable 40 and a helical compression spring 74 which is disposed within the confines of the section 60 serves yieldingly to bias the ferrule and thus place the cable under constant tension so as to preclude the presence of lost motion between adjacent ball and socket members 42 and 44 which are slidably received on the stranded steel cable 40.

Considering now the nature of the lock housing 16 and still referring to FIG. 4, this lock housing includes a generally pear-shaped body 80, the large end of which is provided therein with a cylindrical lock-receiving socket 82 while the small end thereof is provided with a semi-cylindrical socket 84 which is similar to the sockets 52 in the socket members 44 and receives therein one of the endmost ball members 42 in the series of such balls that are threaded on the stranded steel cable 40. The cylindrical lock-receiving socket 82 exists by reason of a vertical or axial bore which is provided in the body 80, and the previously mentioned clamping ferrule 54 is disposed within a counterbore 86 in the body. The previously mentioned transverse bore 30 which slidingly receives the armored cable therethrough intersects both the socket 82 and the counterbore 86. The fixed end of the stranded steel cable 40 projects into the counterbore 86 by way of a second counterbore 88 which, as illustrated in FIG. 4, leads from the small end face of the body 80.

It has been previously stated that the various socket members 44 of the armored cable 14 are substantially identical in construction, but it is to be noted that, as shown in FIG. 1 of the drawings, many of the socket sections 44 extending from the terminal end member 18 are provided with the previously mentioned medially disposed external annular locking grooves 46, the remaining socket members extending to the locking head 16 being devoid of such grooves. The grooves 46 are designed for selective cooperation with a locking bolt 90 (see FIGS. 4, 5 and 6) which constitutes an element of the aforementioned cylinder lock 32. When the locking bolt is projected forwardly from the inner end of the cylinder lock 32, it is capable of entering a selected groove 46 in order securely to lock the lock housing 16 in a fixed axial position along the armored cable 14. When such bolt is withdrawn into the confines of the cylinder lock, the armored cable is released and the lock housing 16 may be slid therealong for either placement or removal purposes.

The cylinder lock 32, except for the locking bolt 90, may be any conventional tumbler type lock regardless of whether the tumblers that are associated therewith extend radially or axially. For illustrative purposes herein, an axial tumbler lock is disclosed.

The details of the cylinder lock 32 are disclosed in FIGS. 5, 6 and 7, but no claim is made herein to any novelty that is associated therewith. Briefly, the lock involves in its general organization an outer cylinder 92 which is press-fitted within the socket 82 in the body 80 of the lock housing 16 and is secured therein by a radial pin 94a. Positioned within the cylinder 92 in coaxial relationship is a two-part barrel assembly including a fixed or nonrotatable part 94 and a rotatable part 96, the fixed part being secured by a radial pin 98 to the outer cylinder 92. The two parts 94 and 96 establish a radial interfacial plane as indicated at 100 in FIGS. 5 and 6. As is conventional in connection with such nonrotatable and rotatable barrel parts, circumferentially spaced split pin tumblers, including driver tumblers 104 and spring-pressed follower tumblers 106, are carried in respective tumbler-receiving bores 108 and 110 in the two parts 94 and 96, respectively, and cooperate with one another in the usual manner of split tumbler operation. An annular keyway 112 (see FIG. 3) is formed in the outer end face of the rotatable part 96 and communicates with the various bores 110 so that upon insertion of the forward circular rim of the key 34 thereinto, proper displacement of the split pin tumblers may be effected to the end that the splits which exist between the mating driver and follower tumblers will move into the interfacial plane 100 and allow the rotatable barrel part 96 to be turned with respect to the non-rotatable barrel part 94 by way of the key 34.

The rotatable barrel part 96 is provided with an inwardly extending lock shaft 120 which carries a radially disposed bolt-actuating pin 122. The outer end region of the pin 122 projects into a helical slot 124 in the locking bolt 90 so that upon turning movement of the rotatable barrel part 96, and consequently, the lock shaft 120, the locking belt will slide axially within the cylinder 92. The locking bolt 90 is generally cylindrical and has formed therein a relatively deep socket 126 into which the inner end of the lock shaft 120 projects. The aforementioned helical slot 124 is formed in the wall of the socket 126 and constitutes a cam slot which cooperates with the bolt-actuating pin 122 so that upon turning of the key 34 in a clockwise direction as viewed in FIG. 3 and in a counterclockwise direction as viewed in FIG. 7, the rotatable barrel part 96, the lock shaft 120 and the pin 122 will rotate bodily as a unit and effect camming engagement with an edge of the helical slot 124 so as to shift the locking bolt 90 to the right as viewed in FIGS. 5 and 6 and cause it to assume an unlocked position. Upon rotation of the key 34 in the opposite direction, the locking bolt 90 will shift in the opposite direction and assume the locked position in which it is illustrated in FIGS. 5 and 6. The locking bolt 90 is formed with a locking flange 130 on its inner end, the flange projecting into the transverse bore 30 as shown in these views when in its left-hand locked position. In the unlocked or right-hand position of the

locking bolt **120**, the locking flange **130** is withdrawn from such bore.

The forward end of the helical slot **124** is provided with a circumferentially extending dwell portion **132** (see FIG. **5**) into which the projecting end of the pin **122** moves when the locking bolt **90** is in its fully locked position, the wall of such dwell portion **132** resisting a reverse camming action by the pin **122** within the slot **124** such as might be encountered in the event that a small quantity of resilient foreign substance would become entrained in one of the annular grooves **46** and wedged against the locking flange **130**, or that the locking head **16** should be subjected to vibration or impact. A pin **134** which is fixedly connected to the outer lock cylinder **92** projects into a longitudinal groove **136** in the bolt **90** and prevents rotation of the latter during the camming action which obtains between the pin **122** and the slot **124** during locking and unlocking of the bolt **90**. It is to be noted that the locking flange **130** is in the form of a flat-sided rib of a width slightly less than the width of the various circumferential grooves **46** which are provided in certain of the socket members **44** as previously described. The inner side of the locking flange **130** is of concave or arcuate configuration as shown in FIG. **6**, the radius of curvature thereof being slightly greater than the radius of curvature of the bottoms of the grooves **46**. By such an arrangement, the locking flange is able to effect locking engagement with the side walls of the adjacent grooves **46** over an area of approximately 90°.

It is not deemed necessary to describe in detail the manner in which the constituent parts of the motorcycle lock **10** are assembled together to produce the completed article. It will be pointed out, however, that after one end of the stranded steel cable **40** has been fixedly secured in the lock housing **16** and the various armor members **42** and **44** threaded on the cable, the terminal end member **18** is applied to the other end of the cable by first threading the cup section **60** over such end of the cable and pushing the same against the previously applied members **42** and **44** until such time as all of the adjacent members are in contiguity and bear hard against each other. At this time, the compression spring **74** is threaded on the adjacent end of the cable **40** and caused to enter the confines of the cup-shaped section **60** while the ferrule **56** is also threaded on the adjacent end of the cable and forced axially into the confines of the section **60** so as to place the spring **74** under compression. The ferrule **56** may then be crimped in position on the cable **40** and released, whereupon all of the ball and socket members **42** and **44** will be maintained in contiguity under the compressional force of the spring **74**, such force tending to place the stranded steel cable **40** under tension. Thereafter, the cup-shaped section **62** may be threaded onto the cup-shaped section **60** and locked in position thereon by means of the drive pin **67**.

In the application of the herein described motorcycle lock assembly **10** to a motorcycle such as the illustrated motorcycle **12**, the elongated armored cable is passed through appropriate openings in the motorcycle frame **20**, the wheel **24**, or both the frame and the wheel and, thereafter, the end member **18** is passed through the transverse bore **30** in the lock housing **16** and the latter is caused to slide on the armored cable **14** to shrink the loop which has thus been established in encircling relationship with respect to the selected portions of the motorcycle **12**. After the desired loop size has been attained, the cylinder lock **32** is manipulated in the manner previously described by inserting the key **34** (see FIG. **3**) into the annular keyway **112** and turning the key in a direction to project the locking bolt **90** forwardly and cause the locking flange **130** to enter the annular groove **46** in the adjacent socket member **44** of the armored cable **14**. The key may then be withdrawn from the cylinder lock keyway **112** and the lock housing will remain fixedly positioned on the armored cable against longitudinal displacement therealong. Unlocking of the motorcycle lock assembly **10** is affected by returning the key **34** to the keyway **112** and rotating the same in an unlocking direction in order to withdraw the locking flange **130** from the adjacent annular groove **46**, after which the lock housing **16** may be slid from the armored cable **14**.

It is to be noted that although the locking bolt **90** is designed primarily for selective cooperation with the grooves **46** which are provided in the socket members **44** of the free end region of the armored cable **14**, this locking bolt is entirely capable of being projected from the cylinder lock **32** and into the annular voids which exist between the opposed circular rims of adjacent socket members **44**. Whereas the grooves **46** are cut on sharp rectangular tolerances, the rim edges of the end faces of the socket sections **44** are chamfered, but nevertheless such chamfering of these edges does not preclude satisfactory interlocking of the locking flange **130** of the locking bolt **90** with the armored cable **14** when such flange projects in between adjacent socket members.

In FIG. **8** there is disclosed a modified form of armored cable which is capable of use in connection with the present motorcycle lock assembly. When so used, the stranded steel cable **40**, the lock housing **16** and the terminal end member **18** remain the same as heretofore described, the only difference being in the use of a different form of cable armor. Instead of employing male ball members **42** and female socket members **44**, all of the armor sections are substantially identical and each is in the form of a tubular body **200** of cylindrical design and presenting male and female end regions. The male end region is in the form of an axially extending reduced post-like section **202** on the outer end of which there is formed a semi-spherical ball fragment **204**, while the female end region is in the form of a semi-spherical socket **206** which is conformable in shape to that of the ball fragment **204**. A straight cylindrical bore **208** extends through the ball fragment **204** and the post-like section **202** and opens into the small end of a frusto-conical counterbore **201**. The large end of such counterbore opens into the semi-spherical socket **206**.

The various tubular bodies **200** are threaded onto the stranded steel cable **40** in end-to-end fashion so that each ball fragment **204** is received in a socket **206** in the next adjacent tubular body **200**. When the cable **40** is placed under tension by reason of assembly of the terminal end member **18** on the free end region of the cable **40**, a universal ball and socket joint is established between each pair of adjacent bodies **200**. The reason for making the counterbores **210** of frusto-conical con-

figuration is to allow freedom of movement of the cable **40** within the tubular bodies **200** during formation of the motorcycle encircling loop when a given motorcycle is to be locked for anti-theft purposes. As is the case in connection with the armored cable of FIG. **1**, certain consecutive tubular bodies **200** are provided with annular locking grooves **212** therearound in the free end region of the cable **40**, these grooves being designed for cooperation with the locking bolt **90** of the lock cylinder **32** in the lock housing **16**. The remaining tubular bodies **200** are devoid of locking grooves.

It will be appreciated that the armored cable of FIG. **8** is somewhat less flexible than is the armored cable of FIG. **1**, but economy of manufacture can be attained by using the modified form of armored cable.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification as various changes in the details of construction may be resorted to without departing from the spirit or scope of the invention. Therefore, only insofar as the invention is particularly pointed out in the accompanying claims is the same to be limited.

Having thus described the invention what I claim as new and desire to secure by letters patent is:

**1**. A lock assembly comprising, in combination, an elongated flexible stranded, steel cable having a fixed end and a free end, a lock housing member secured to said fixed end, an end member secured to said free end, a series of tubular sheathe-like armor sections threadedly received over said cable and bridging the distance between said lock housing and end members, means establishing a ball and socket joint between adjacent armor sections to allow limited flexing of the cable accompanied by corresponding angular displacement between adjacent armor sections, a helical compression spring disposed within one of said members, encircling the cable, and effectively bearing at one end against the cable and at its other end against said one member so as to place the cable under tension and draw adjacent armor sections hard against each other, said lock housing member being formed with a transverse bore therein adapted slidingly to receive therethrough the free end region of the cable together with the adjacent encompassing armor sections in order thereby to produce a closed variable size loop, and releasable key-actuated locking means carried by said lock housing member and including a locking part movable into and out of selective locking engagement with such armor sections as encompass the free end region of the cable when one or more such sections are disposed within said transverse bore.

**2**. A lock assembly as set forth in claim **1** and wherein said compression spring is disposed within said end member.

**3**. A lock assembly as set forth in claim **1** and wherein each socket element presents a generally cylindrical outer surface having a diameter which is approximately equal to the diameter of the transverse bore in said lock housing member.

**4**. A lock assembly as set forth in claim **3** and wherein the depth of said socket-like bearing surfaces is less than the radius of said convex bearing surfaces so that the ball elements serve to maintain the opposed rims of the socket elements in spaced relation to establish an annular void therebetween, and the key-actuated locking means includes a cylinder lock in which said locking bolt is slidable between a locking position wherein it projects selectively into said voids, and an unlocked position wherein it is withdrawn into the cylinder lock.

**5**. A lock assembly as set forth in claim **4** and wherein said locking bolt is slidable in the lock cylinder radially of the cable and the forward end of the bolt is formed with a locking flange which presents a concave relief area for enhancing the extent of projection of the flange into said annular grooves.

**6**. A lock assembly as set forth in claim **1** and wherein said lock housing member is formed with a first reduced counterbore and a second further reduced counterbore, the fixed end of the cable projects through said second counterbore and extends into the first counterbore, and there is a retaining ferrule fixedly secured to said fixed end of the cable within said first counterbore.

**7**. A lock assembly as set forth in claim **6** and wherein said end member is provided with an internal chamber having a cable opening leading thereto, the free end of the cable projects slidingly through said cable opening and into said internal chamber, a second ferrule is fixedly secured to said free end of the cable within the chamber, and said helical compression spring surrounds the free end of the cable and bears at one end against the ferrule and at its other end against the rim region of the cable opening to thus place the cable under tension.

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