United States Patent [19]

Van Gompel

[11] **3,770,307**

[45] **Nov. 6, 1973**

[54] **CABLE LOCK AND SEAL DEVICE**

[75] Inventor: **James J. Van Gompel,** Fremont, Ind.

[73] Assignee: **Brammall, Inc.,** Angola, Ind.

[22] Filed: **Sept. 14, 1972**

[21] Appl. No.: **289,121**

[52] **U.S. Cl.** ..... **292/307 R,** 24/126 R, 24/126 B

[51] **Int. Cl.** **B65d 55/06,** F16g 11/04

[58] **Field of Search** ..... 292/307 R, 307 A, 292/307 B, 315, 323, 325, 326; 24/126 B, 126 R, 136 A

[56] **References Cited**

UNITED STATES PATENTS

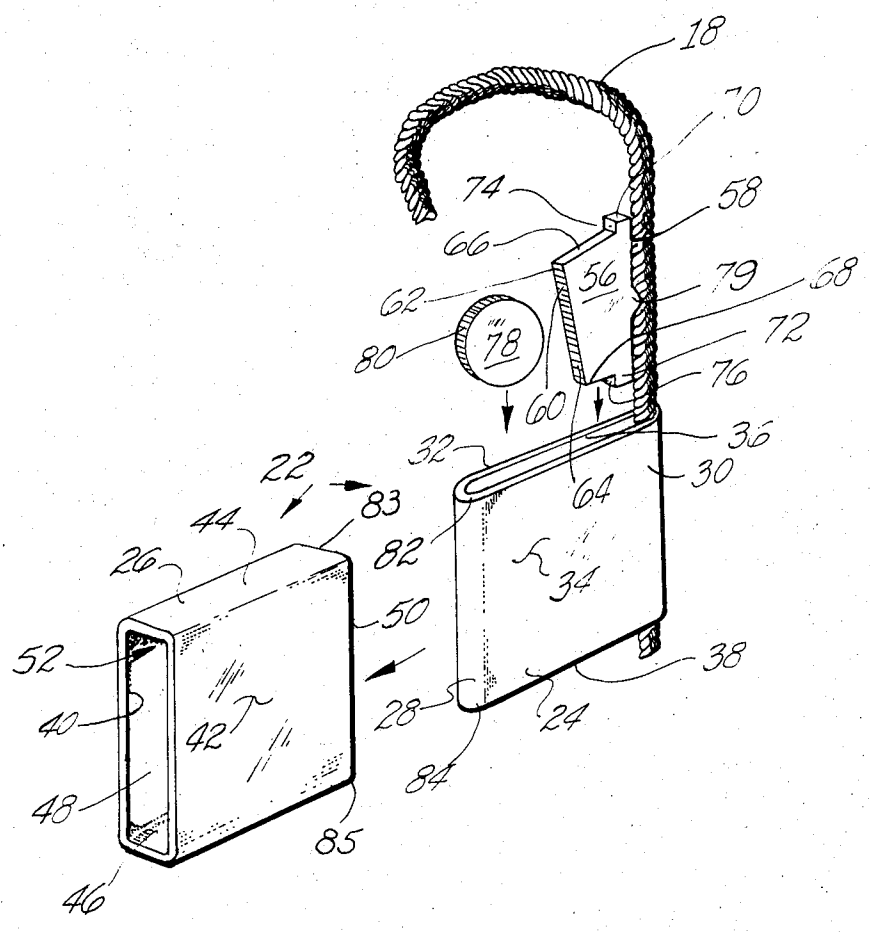
830,565	9/1906	Brown	292/307 R
1,141,257	6/1915	Norton	24/126 R
2,544,086	3/1951	Herrington	24/136 A UX
2,740,654	4/1956	Orschel	292/323

Primary Examiner—Marvin A. Champion
Assistant Examiner—Richard P. Tremblay
Attorney—Harold B. Hood et al.

[57] **ABSTRACT**

A cable lock and seal device which comprises a flexible cable and an enclosure fixedly secured to one end of the cable. A passage extends through the enclosure and is proportioned slidably to receive the distal end portion of the cable therethrough. A wedge element and a disk-shaped jam element are sealed within the enclosure, the wedge element including a ramp surface disposed at a small angle with respect to the passage and laterally spaced apart therefrom. The jam element is frictionally engaged between the ramp surface and cable portion whereby, movement of the cable through the passage in one direction causes movement of the jam element laterally away therefrom and movement of the cable in a direction opposite the aforementioned direction causes movement of the jam element laterally toward the cable to thereby jam the cable between the passage walls and the jam element so as to prevent further movement thereof in that direction.

6 Claims, 5 Drawing Figures



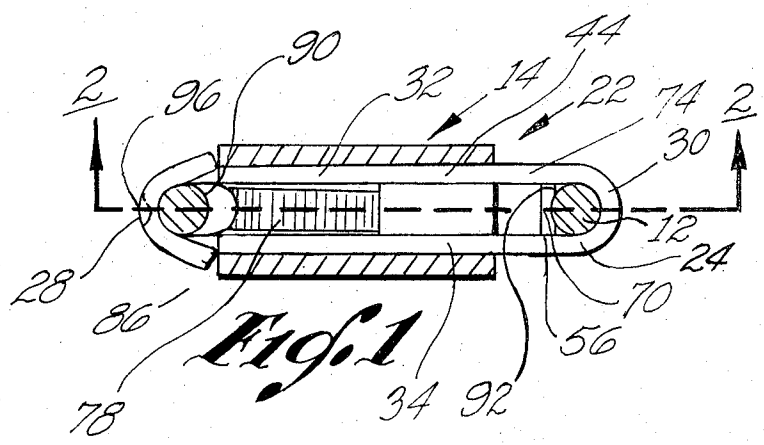


Fig. 1

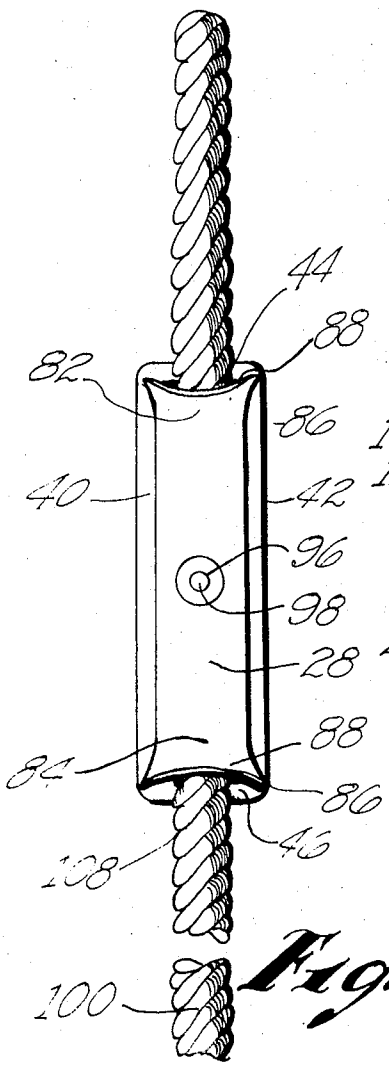


Fig. 3

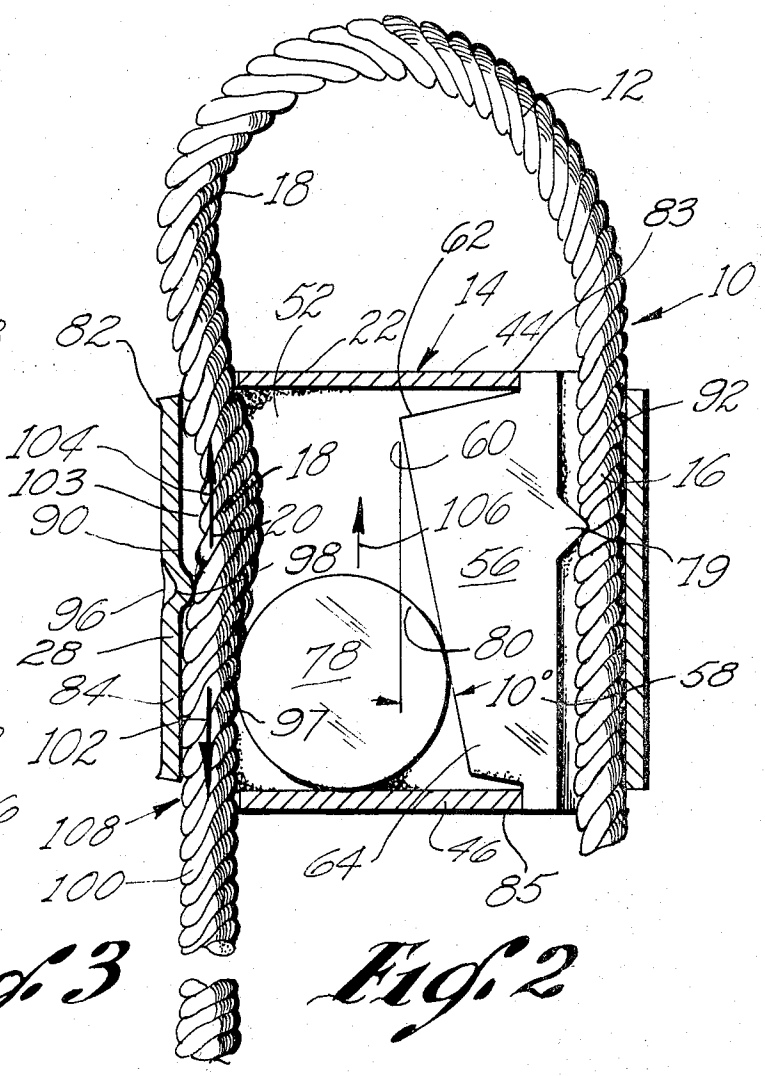


Fig. 2

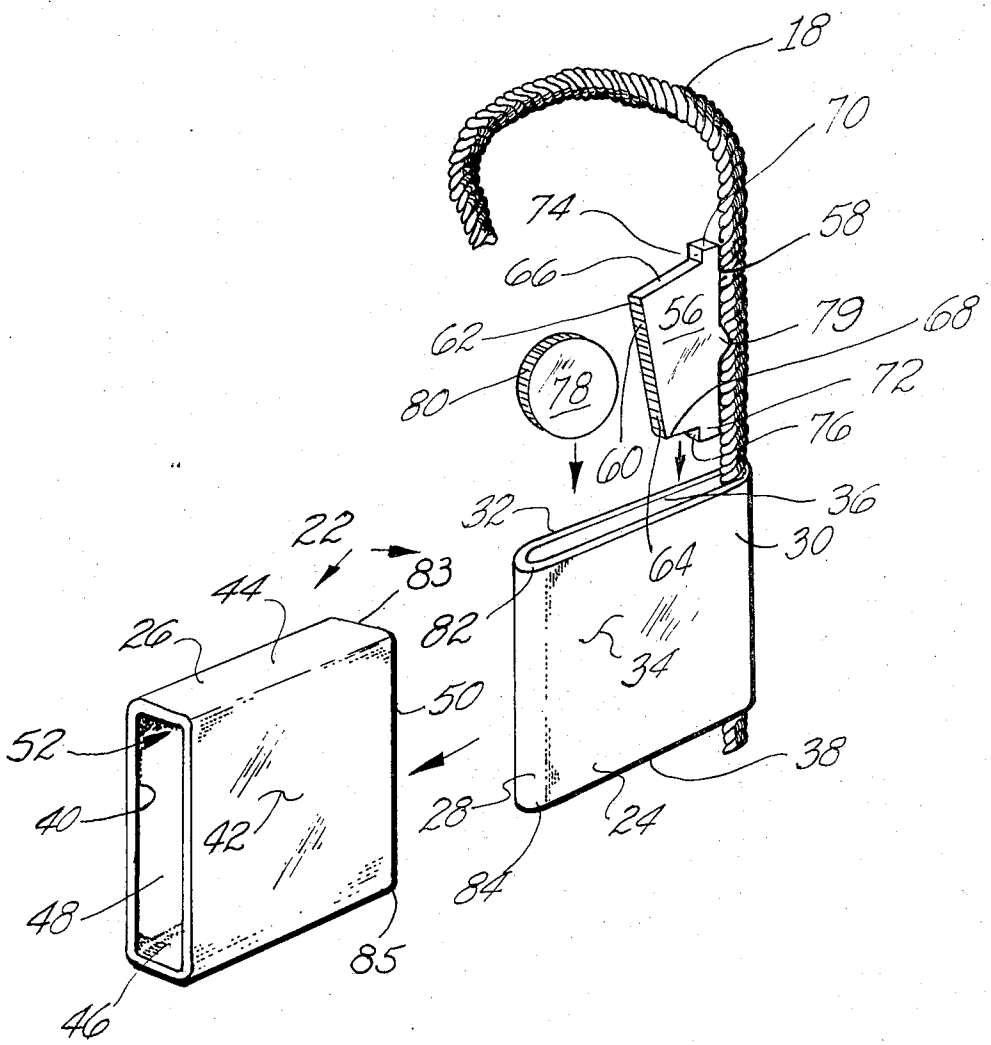

18
70
74
58
66
56
62
79
68
78
80
72
76
60
36
32
64
30
22
83
44
82
26
34
50
52
40
42
38
28
24
48
84
85
46

Fig. 4

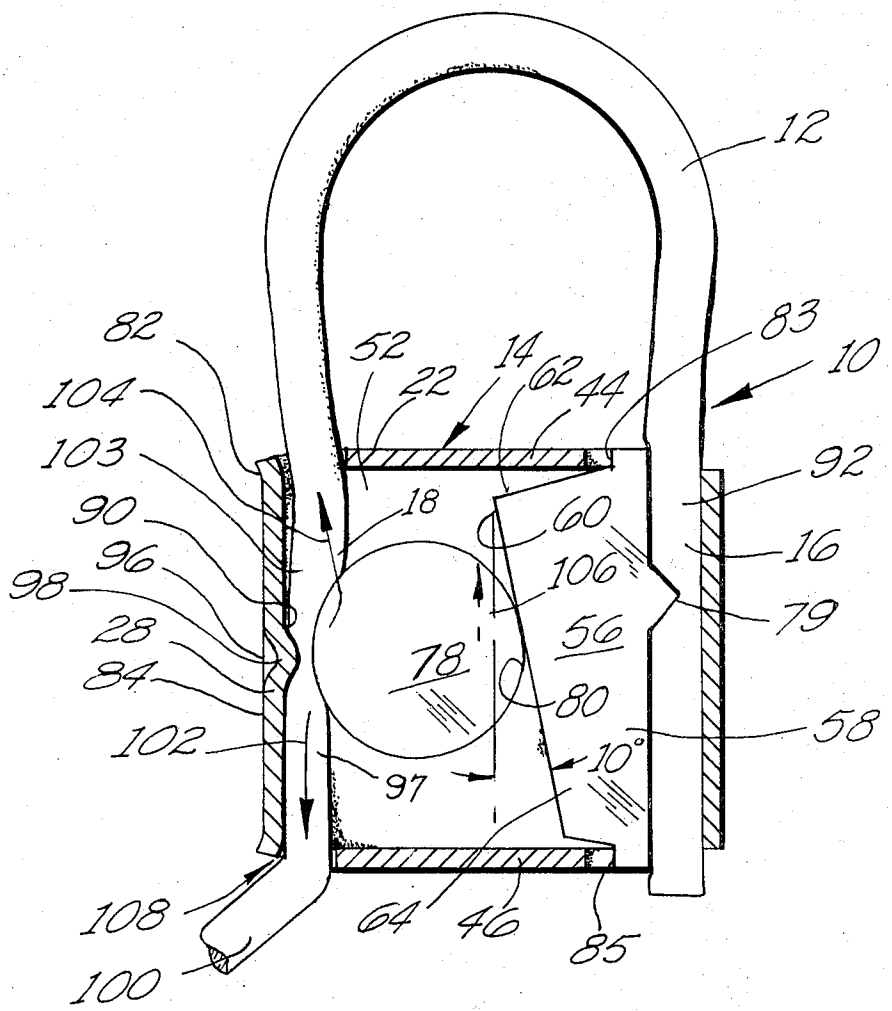

12
82
104
103
90
96
98
28
84
102
108
100
52
22
14
62
44
83
10
92
18
60
16
106
79
56
78
80
58
10°
97
64
46
85

Fig. 5

CABLE LOCK AND SEAL DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to devices for locking and sealing a hasp such as found on a door, and in particular to such a lock and seal device which is ultimately simple in construction which can be affixed to a hasp without the use of special tools, and which cannot be removed without destruction of the device, the latter requiring substantial effort.

2. Description of the Prior Art

Devices for locking and sealing the door hasp of vehicles such as railroad boxcars, semi-trailers, and the like have long been used as a means of insuring the security of the goods contained therein. Typical of such devices is a seal which comprises an elongated wire and a deformable metal block, the wire being passed through the hasp and the ends thereof being secured to the block as by crimping with a suitable tool. Another type of device widely used is the common padlock.

However, these prior art locking and sealing devices have not proven entirely satisfactory by reason of the seal and/or lock being relatively fragile, or easily broken by means of readily available tools such as bolt cutters.

Another prior art seal device is disclosed in U. S. Pat. No. 830,565, issued Sept. 11, 1906 to L. A. Brown. This device, however, incorporates a relatively elaborate and easily opened enclosure.

SUMMARY OF THE INVENTION

The present invention is a lock and seal device which incorporates a flexible element such as a braided steel cable and a self-locking mechanism which includes few and relatively simple parts.

Broadly, the device comprises a flexible cable and an enclosure fixedly secured to one end of the cable. A passage extends through the enclosure and is proportioned to slidably receive the distal portion of the cable therethrough. A wedge element and a disk-shaped jam element are sealed within the enclosure, the wedge element including a ramp surface disposed at a small angle with respect to the passage and laterally spaced apart therefrom. The jam element is disposed between the ramp surface and the distal portion of the cable such that it is frictionally engaged therebetween, whereby, movement of the portion of the cable through the passage in one direction causes movement of the jam element laterally away therefrom and movement of the portion of the cable in a direction opposite the aforementioned direction causes movement of the disk laterally toward the cable portion of the cable to thereby jam the cable portion between the passage and the jam element.

The enclosure includes inner and outer shell portions. The inner shell has parallel spaced-apart side walls and part-cylindrical end walls, the top and bottom ends thereof being open. The outer shell includes parallel spaced-apart side and end walls and open top and bottom walls. The inner shell is slidably received in the outer shell with the end walls thereof extending outwardly from the top and bottom ends of the inner shell, the part-cylindrical walls and the outer shell defining therebetween the aforementioned passage and a second passage, respectively, the proximal end of said cable being clamped in the second passage.

In a specific embodiment of the invention, the ramp surface and jam element have laterally serrated surfaces and the ramp surface is disposed at an angle of less than 10° with respect to the passage whereby the distal portion of the cable is jammed within the passage to a degree whereby the cable cannot be removed from the passage without destroying the enclosure. Further, the cable is braided steel which, because of its strength and resiliency, is substantially more difficult to sever than the fine wire or solid bar elements used in some prior art devices. The lock mechanism of the present invention is self-actuating and the device can be installed without the use of tools.

BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other features and objects of this invention and the manner of attaining them will become more apparent and the invention itself will be best understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a sectional view of the lock and seal device of the invention;

FIG. 2 is a side sectional view of the device taken along the section line 2—2 of FIG. 1;

FIG. 3 is an end plan view of the device;

FIG. 4 is an exploded perspective view of the device shown prior to assembly thereof; and

FIG. 5 is a sectional view of the lock and seal device taken along section line 2—2 of FIG. 1 and showing the device in a locked condition.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, there is shown a lock and seal device **10** which comprises an elongated, flexible cable **12** and a locking mechanism **14** secured to the distal end **16** of cable **12.** Preferably, cable **12** is of braided construction comprising a plurality of helically wound cords **18** with each of cords **18** comprising a multiplicity of strands as at **20.**

Mechanism **14** includes an enclosure **22.** As best seen in FIG. **4,** enclosure **22** includes an inner shell **24** and an outer shell **26.** Inner shell **24** is generally rectangular and elongated having part-cylindrical ends **28, 30,** parallel, spaced-apart side walls **32, 34** and open top and bottom ends **36, 38.** The spacing between side walls **32, 34** is about equal to the diameter of cable **12** whereby cable **12** is slidably received therein adjacent end **30** as shown.

Also best seen in FIG. **4,** outer shell **26** is also generally rectangular having parallel, spaced-apart sides **40, 42** and top and bottom walls **44, 46** and open ends, **48, 50,** shell **26** having an opening **52** therethrough dimensioned to slidably receive shell **24.**

A wedge element **56,** which may be stamped from steel plate, includes an edge wall **58** and an oppositely disposed ramp surface **60** which extends at a small angle with respect to the wall **58** such that surface **60** slopes toward wall **58** from end **62** to end **64** thereof. The opposite ends **66, 68** of element **56** are tapered and a pair of tabs **70, 72** form respective shoulders **74, 76** therewith. A tooth **79** is formed in wall **58** upwardly (as viewed in FIG. **2**) of the center thereof for a purpose to be explained below. Preferably, ramp surface **60** is serrated or rough. These serrations will normally result when a stamping operation is used to form element **56,**

the serrations extending laterally of the ramp surface **60.**

A disk-shaped jam element **78,** which may also be formed by stamping from steel plate, is positioned with its cylindrical surface **80** in rolling engagement with ramp surface **60.** Preferably, surface **80** is also laterally serrated and again this serration may be easily effected by using a stamping operation to form element **78.** Elements **56** and **78** are received within shell **24** in the positions shown in FIG. **1** and outer shell **26** is then slid over shell **24** to the position illustrated in FIGS. **1** through **3.** Initially, when in this latter position, shoulders **74, 76** abuttingly engage edges **83, 85** of shell **26** to thereby retain element **56** in position. Element **78** is trapped between element **56** and wall **28** of shell **24.** It will be observed that jam element **78** is free to move vertically within shell **24** between top and bottom walls **44, 46.**

With shells **24, 26** thus assembled, end **28** of shell **24** is swaged or flared at the ends **82, 84** thereof with the walls **32, 34** being slit as at **86** to form tabs as at **88** which positively lock shell **24** within shell **26.** In this assembled condition, walls **28, 30** of shell **24** define a pair of passages **90, 92.** Further, as part of the swaging operation, element **56** is forced firmly against cable **12** whereby tooth **79** deforms and mechanically engages cable **12** thereby positively securing same against removal from passage **92.**

As best seen in FIGS. **1, 2,** and **3,** wall **28** is indented as at **96,** as by use of a punch, to thereby form indentation **98** which extends inwardly of passage **90.** It will further be observed that passage **90** and element **78** are dimensioned to slidably receive cable **12** therebetween with element **78** simultaneously frictionally engaging cable **12** and ramp surface **60.** It will be observed that element **78** urges the portion **97** of cable **12** between indentation **98** and end **84** against wall **28** while indentation **98** causes the portion **103** of cable **12** between indentation **98** and edge **82** to bow outwardly from wall **28** as shown in FIG. **1.** This, in turn, causes cable **12** to more positively engage element **78** to thereby insure frictional contact therebetween.

In use, assembly **10** is formed with the distal end **100** of cable **12** in a free position, i.e., not received within passage **90.** To lock the seal in place, cable **12** is passed through suitable openings in a hasp assembly (not shown) and end **100** is pushed downwardly through passage **90** as indicated by arrow **102.** As end **100** moves in the direction of arrow **102,** it engages jam element **78** causing the same to move downwardly (as viewed in FIG. **2**). Because ramp surface **60** slopes downwardly away from passage **90** (as viewed in FIG. **2**), element **78** correspondingly moves laterally away from passage **90** thereby permitting end **100** to pass freely downwardly therethrough. Conversely, it will be observed that any effort to move cable end **100** upwardly in the direction indicated by arrow **104** will cause jam element **78** to roll upwardly as indicated by arrow **106** on ramp surface **60.** As element **78** moves upwardly it simultaneously moves laterally toward passage **90.** This movement causes element **78** to jam cable end **100** against end wall **28.** This jamming action positively locks cable end **100** against further movement in the direction of arrow **104.** It will be observed that as element **78** forces against cable end **100,** cable end **100** is deformed by the indentation **98** to thereby further positively lock the cable end **100** from removal.

As best seen in FIG. **5,** the flat surface **80** of element **78** partially flattens cable **12** against indentation **98.** Further, when element **78** is drawn upwardly to its locked position (FIG. **5**), it forces element **56** firmly against cable end **16** partially flattening same. This in turn produces a small separation between tabs **70, 72** and edges **83, 95,** and also causes tooth **79** to more positively engage cable end **16.** Preferably, tooth **79** is formed on edge wall **58** at a point opposite the point of contact between elements **56** and **78** when element **78** is in its locked position as shown in FIG. **5** to maximize this latter engagement.

To further enhance the locking capability of the assembly **10,** cable end **100** may be bent or kinked at a point below passage **90** as at **108,** this kinking being effected by manually bending cable end **100** sharply around end **84** of wall **28.** Because cable **12** is braided, this kinking will cause partial unraveling and therefore enlargement of the cable **12** at point **108.** Correspondingly, any effort to move cable end **100** upwardly in the direction of arrow **104** will cause the enlarged portion of cable end **100** more positively to engage element **78.**

As stated above, the angle of ramp surface **60** is preferably 10° or less with respect to passage **90,** this angle providing sufficient lateral movement of element **78** with respect to passage **90** while simultaneously providing an engagement between element **78** and ramp surface **60** which tends to prevent element **78** from slipping downwardly between surface **60** and cable end **100.** Similarly, the serrated surfaces **60** and **80** provide increased mechanical engagement therebetween and between surface **80** and cable end **100.**

It will be seen that the lock and seal assembly of the present invention requires a minimum of parts. Enclosure **22** can be easily fabricated from short sections of seamless tubing which are subsequently formed into the shells **24, 26** by well known sheet metal forming techniques. Elements **56** and **78** are simple stampings and element **78** is the only moving part in the mechanism. At the same time, the lock and seal assembly has been found to provide a very positive and tamper resistant device. Enclosure **22** is exceptionally strong and cannot be removed without destruction thereof. The use of a braided cable for cable **12** further enhances the tamper proof nature of the mechanism by reason of the braided cable being substantially more difficult to cut than a solid bar, the latter being relatively easily severed by means of a conventional bolt cutter. No keys, crimping tools, or other special tools, are required to affix the assembly **10** to a hasp. Numbering of the assembly for registration of the seals is easily effected by providing appropriate stamped numerals (not shown) on the surface of shell **26.**

While there have been described above the principles of this invention in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation to the scope of the invention.

What is claimed is:

1. A cable lock and seal device comprising a flexible cable, an enclosure fixedly secured to one end of said cable, said enclosure including inner and outer shells, said inner shell having parallel spaced-apart side walls and part-cylindrical end walls, the top and bottom ends thereof being open, said outer shell including parallel spaced-apart side and end walls and open top and bottom ends, said inner shell being slidably received in said

outer shell and having the end walls thereof extending outwardly from the top and bottom ends of said inner shell, said part-cylindrical walls and said outer shell defining therebetween first and second passages, respectively, said cable end being clamped in said second passage, said first passage being proportioned to slidably receive the distal portion of said cable therethrough, a wedge element and a disk-shaped jam element sealed within said enclosure, said wedge element including a ramp surface disposed at a small angle with respect to said second passage and laterally spaced apart therefrom, said jam element being frictionally engaged between said surface and said portion, whereby, movement of said portion through said first passage in one direction causes movement of said jam element laterally away therefrom and movement of said portion in the direction opposite said one direction causes movement of said disk laterally toward said portion to thereby jam said portion within said first passage.

2. The device of claim **1** wherein said surface is generally flat and laterally serrated, said jam member having a cylindrical, laterally serrated surface.

3. The device of claim **1** wherein said cable is braided and has an irregular surface.

4. The device of claim **3** wherein said small angle is equal to or less than 10° with respect to the axis of said passage.

5. The device of claim **4** wherein said first passage includes a wall disposed diametrically opposite said jam element, said wall having an indentation thereon extending inwardly of said passage, said portion engaging and being deformed thereby.

6. The device of claim **5** where said wedge element is received within said inner shell adjacent said second passage and extends between said end walls of said outer shell, said wedge element further including a pair of flanges adjacent the opposite ends thereof, respectively, said flanges abuttingly engaging said end walls, and a passage wall disposed in generally parallel, spaced-apart relationship to said semi-cylindrical wall adjacent said second passage, said passage wall having a tooth means thereon extending inwardly of said second passage for deforming and clampingly engaging said cable end.

* * * * *