United States Patent [19]

Noorily

[11] **3,712,346**

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[54] **STRAP TIGHTENING AND CUTTING TOOL**

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[73] Assignee: **Thomas and Betts Corporation,** Elizabeth, N.J.

[22] Filed: **March 26, 1971**

[21] Appl. No.: **128,238**

[52] **U.S. Cl.**.....**140/123.6,** 140/93.2

[51] **Int. Cl.**.....**B21f 9/02**

[58] **Field of Search**.....140/93, 93 A, 93.2, 123.5, 140/123.6; 254/51

[56] **References Cited**

UNITED STATES PATENTS

3,344,815 10/1967 Lawson et al. 140/93.2

3,254,680 6/1966 Caveney et al. 140/93.2

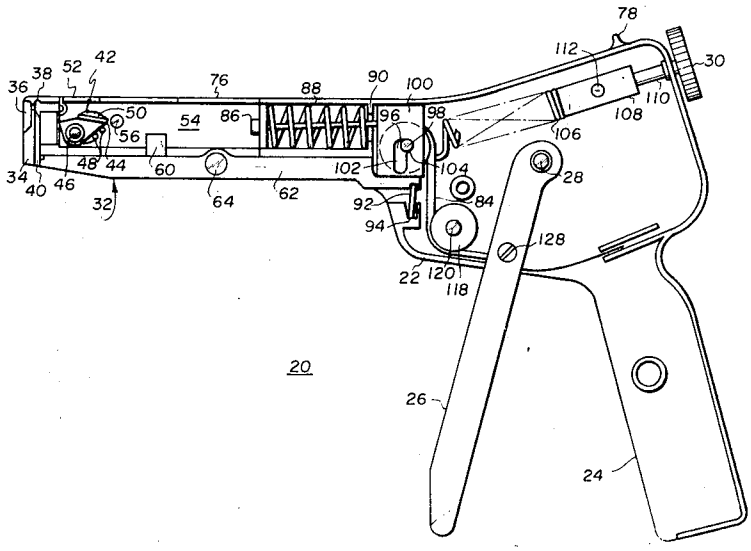
Primary Examiner—Lowell A. Larson

Attorney—David Teschner and Jesse Woldman

[57] **ABSTRACT**

A strap tightening and cutting tool operated by a cable-roller mechanism. The roller is preset by a tensioning mechanism in such a manner as to permit the cable to freely pass over the surface of the roller during the tightening operation. When the tension applied to the strap is equal to the preset tension upon the roller, the roller is displaced from its normal axis by continued movement of the cable to contact and operate a cutoff mechanism.

21 Claims, 15 Drawing Figures



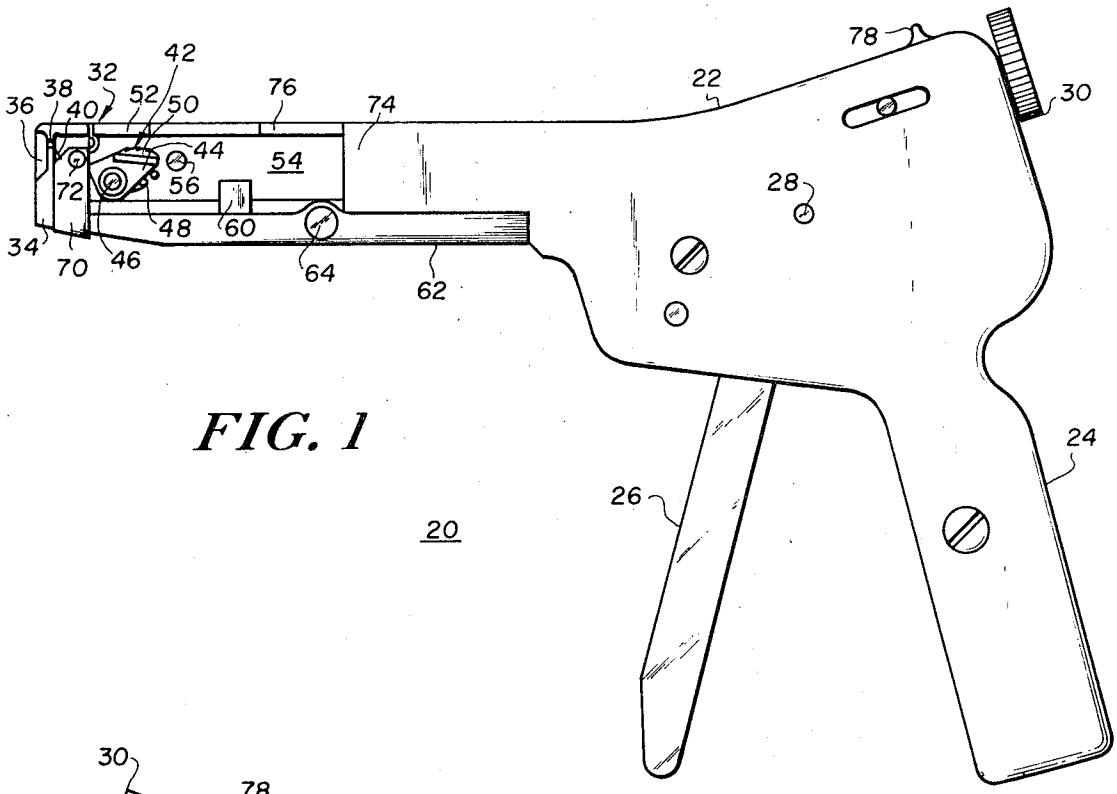


FIG. 1

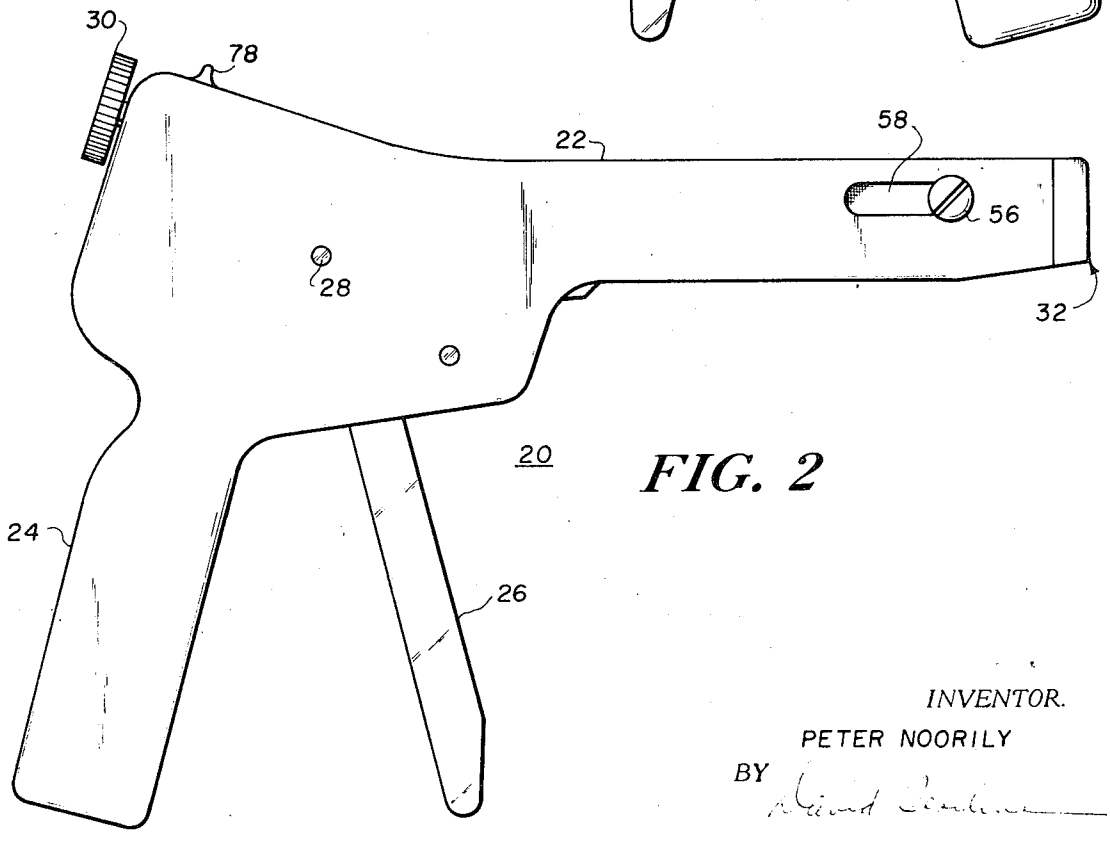


FIG. 2

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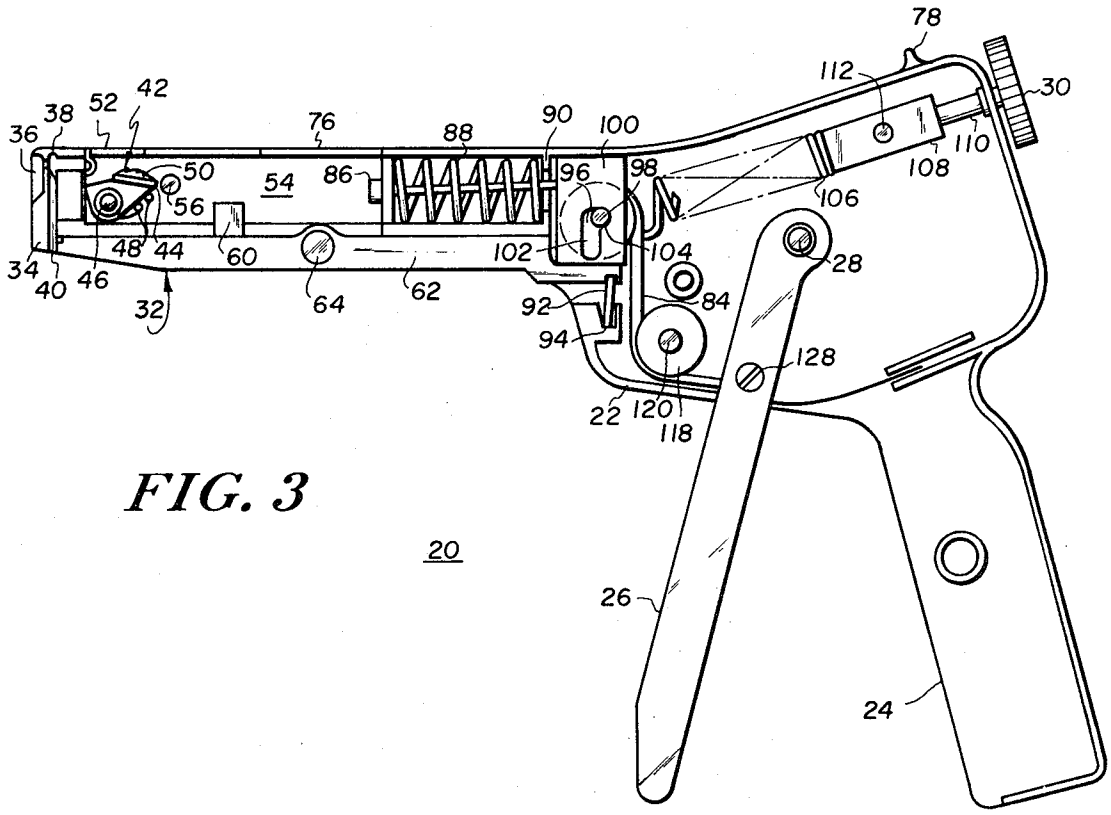
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FIG. 3

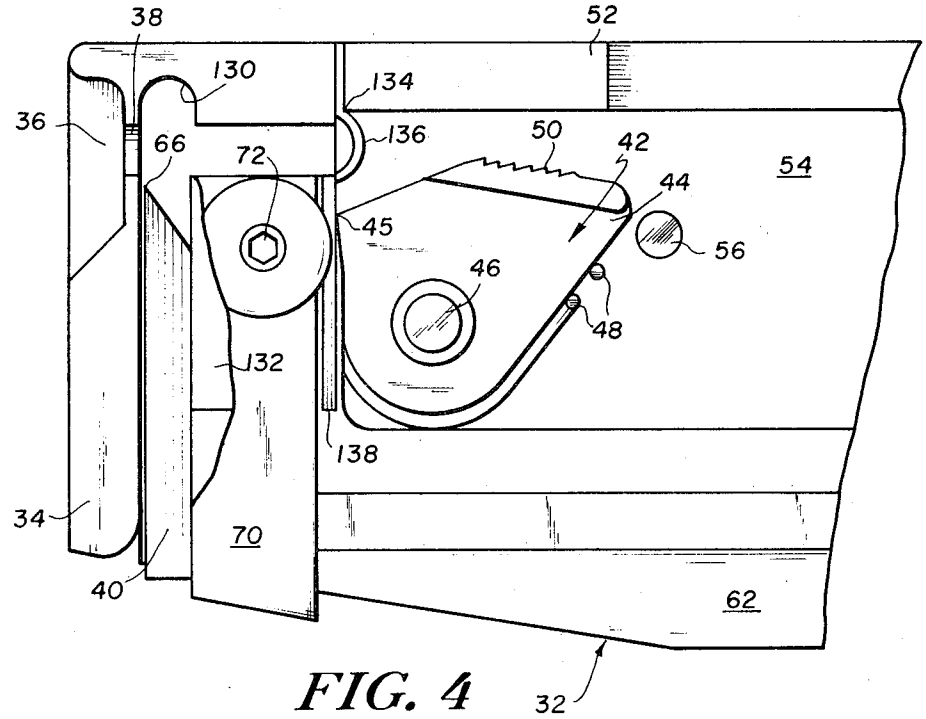
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FIG. 4

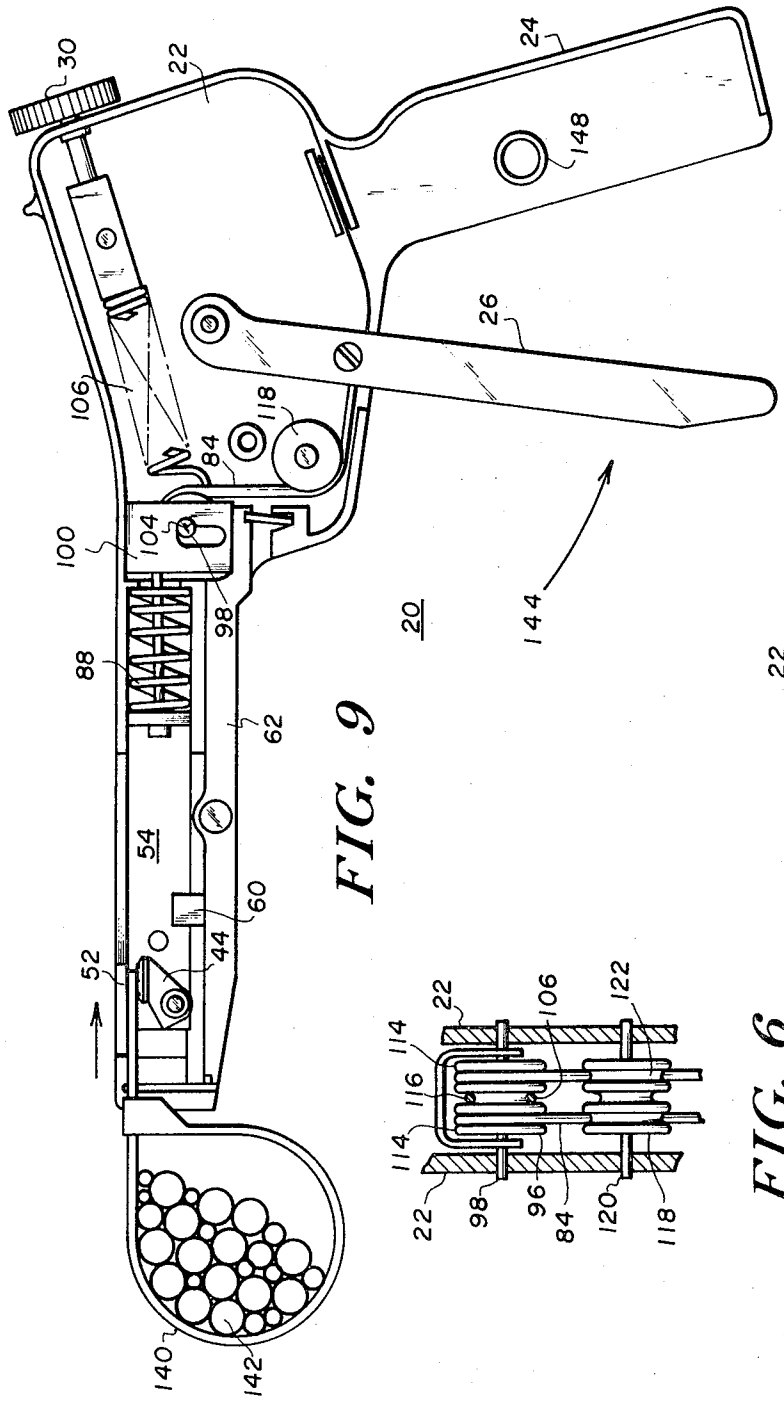

FIG. 9

FIG. 6

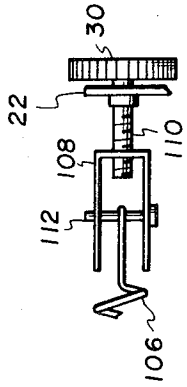

FIG. 8

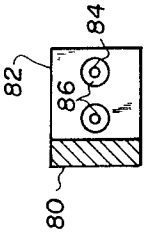

FIG. 5

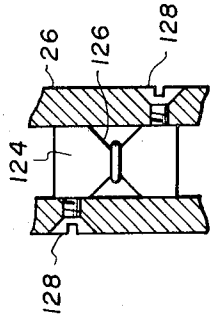

FIG. 7

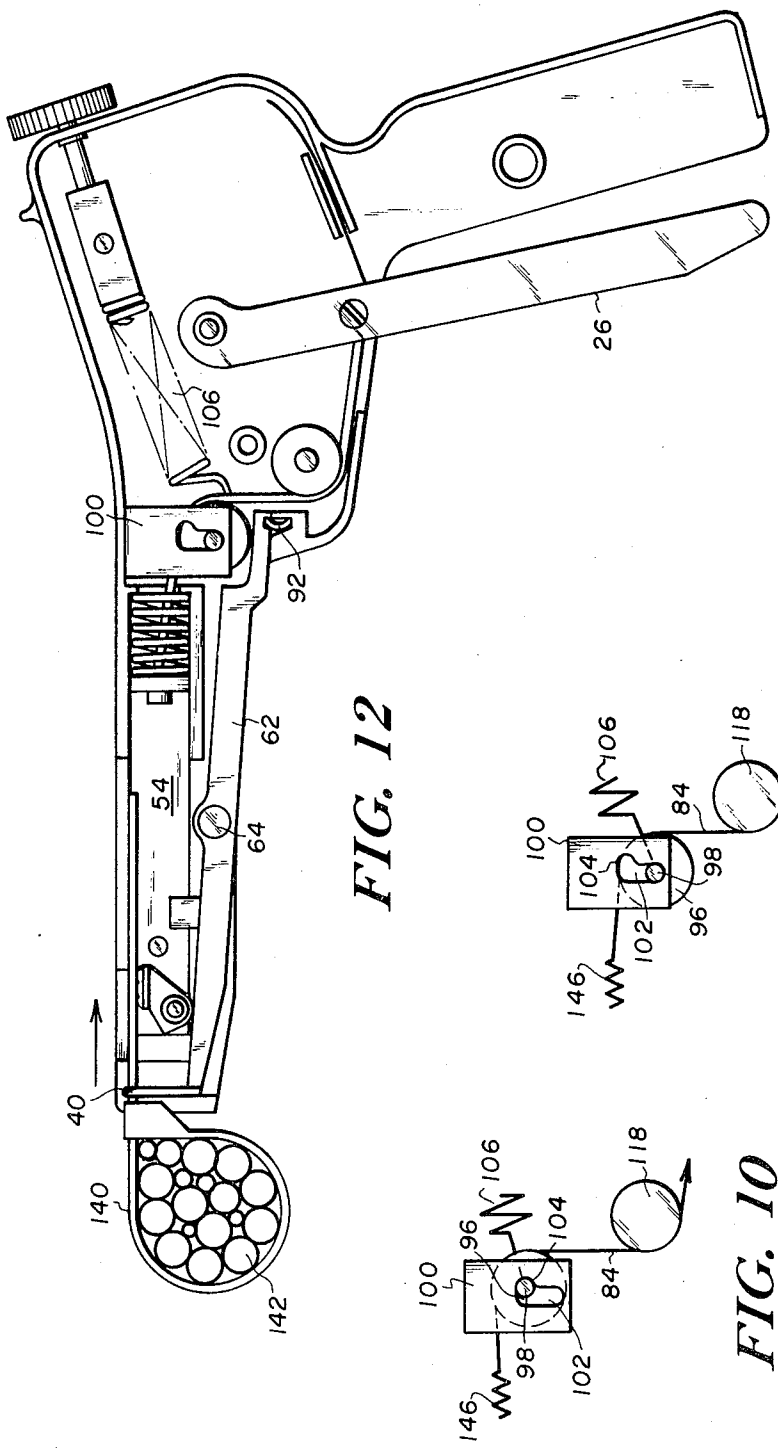

FIG. 12

FIG. 11

FIG. 10

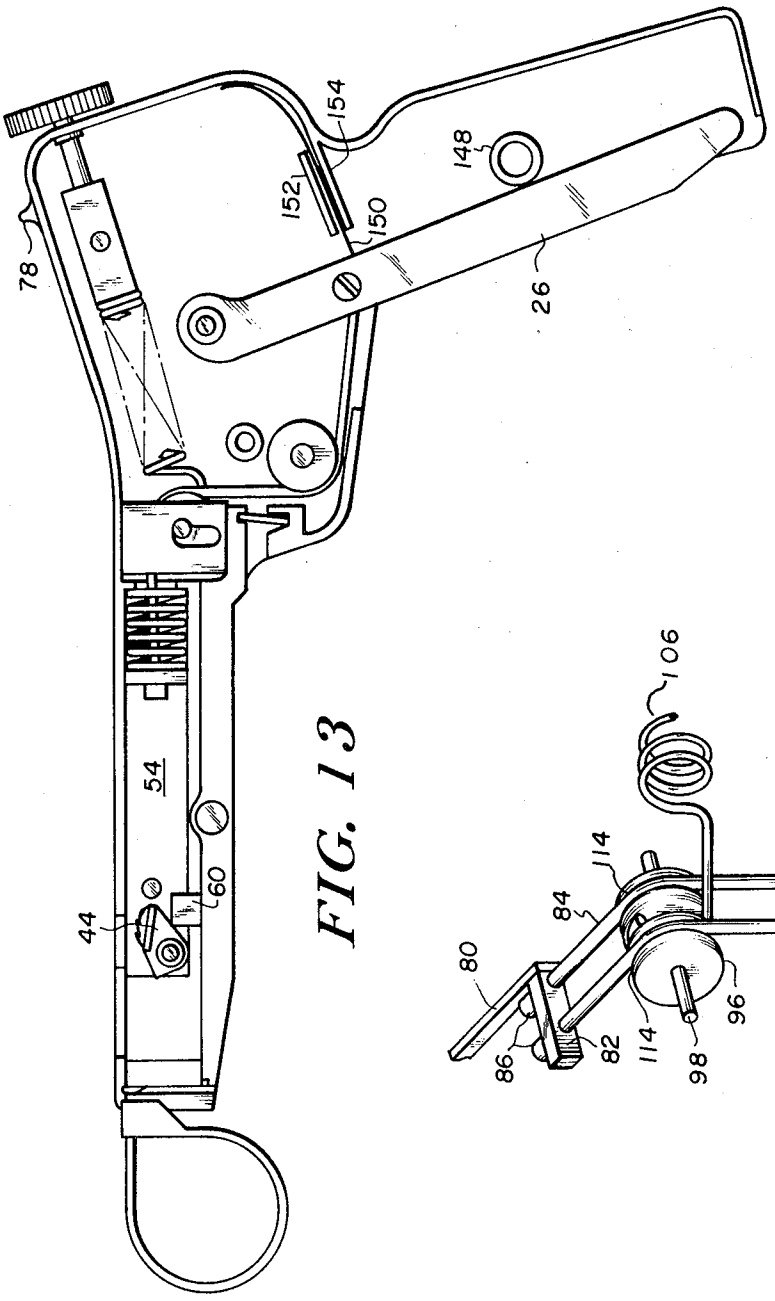

FIG. 13

FIG. 15

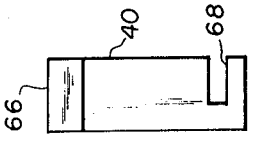

FIG. 14

STRAP TIGHTENING AND CUTTING TOOL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention is directed to the field of bundling discrete articles into bundles such as conductors into cables, rods, tubes or the like into bundles or such articles.

2. Description of the Prior Art

Prior art strap tightening and cutting tools for applying cable bundling straps of the type shown and described in U.S. Pat. No. 3,186,047 issued June 1, 1965, to D. P. Schwester et al. entitled "Self-Clinching Bundling Strap" and assigned to the assignee of the instant invention, is generally shown by U.S. Pat. No. 3,344,815, issued Oct. 3, 1967, to G. R. Lawson et al. entitled "Strap Tightening and Cutting Tool" and owned by the assignee of the instant invention. These devices have the singular disadvantage in that they continue to apply tension to the straps, being brought within the tool, during the time that the cutoff mechanism is operated to cut off the excess of the body portion of the strap beyond the locking head mechanism. As a result of the continuing tightening or tensioning action applied to the strap, additional forces are applied to the articles which are bundled and the strap itself is stretched in the very area of the locking mechanism. Additional tension applied to the bundle may cause destruction of the insulation of the conductors in said bundle and the additional stretching of the strap body portion within the area of the locking mechanism may result in a decrease in the locking forces which are obtainable or may be injurious to the locking operation entirely.

SUMMARY OF THE INVENTION

The present invention overcomes the difficulties noted above with respect to prior art devices as exemplified by the cited Lawson et al. patent by providing a strap tightening and cutoff tool which is able to tighten a strap about a plurality of articles to be bundled up to a desired predetermined tension within the strap and to thereafter cause severance or cutoff of the excess portion of the body of the strap beyond the head without the application of additional tension to the strap during such cutoff operation. This is achieved by a novel cable-roller arrangement between the pawl mechanism used to grasp the body portion of a strap and advance the same into the tool and a movable handle for operating said pawl mechanism and the operating bar for movement of the blade from its normal disengaged position to its severing position. By means of a presetable tensioning mechanism, predetermined tension is applied to the roller equal to the desired tension to be placed upon the cable strap to be tightened. As long as the tension applied to the strap is below the predetermined value preset into the presetting mechanism, the cable will roll over the outer surface of the roller as the movable handle is advanced towards a fixed handle on the tool housing, thereby tightening the strap about the articles to be bundled and applying tension thereto. As soon as the tension within the bundling strap and value of predetermined tension applied to the roller are equal, the cable will no longer be permitted to roll over the outer surface of the roller but will force displacement of the roller from its normal position into contact with the operating lever for the cutoff blade, causing the strap to be severed in a position adjacent the locking head without the application of further tensioning force to the strap during the cutoff operation. It is therefore an object of this invention to provide an improved strap tightening and cutoff tool.

It is another object of this invention to provide a novel strap tightening tool employing a novel cable-roller mechanism.

It is yet another object of this invention to provide an improved strap tightening and cutoff tool which employs a novel cable-roller arrangement.

It is still another object of this invention to provide an improved strap tightening and cutoff tool wherein strap tightening can be terminated according to a predetermined tension value and cutoff of the excess portion of the strap caused without the further application of tensioning forces to the strap.

It is a further object of this invention to provide an improved strap tightening and cutoff tool employing a cable-roller arrangement wherein the cable is permitted to traverse the surface of the roller below a predetermined tension and thereafter cause displacement of the roller in such a manner as to operate the cutoff mechanism.

Other objects and features of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principle of the invention and the best mode which has been contemplated for carrying it out.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a left side elevation of a tool constructed in accordance with the concepts of the invention.

FIG. 2 is a right side elevation of the tool of FIG. 1.

FIG. 3 is a left side elevation of the tool of FIG. 1 with a portion of the protective housing removed in order that the details of the internal mechanism may be better appreciated.

FIG. 4 is an enlarged portion of the nose section of the tool of FIG. 1.

FIG. 5 is a front elevational view, partially in section, of a portion of the pawl assembly of the tool of FIG. 1.

FIG. 6 is a rear elevation, partially in section, of the roller assembly of the tool of FIG. 1.

FIG. 7 is a rear elevation, partially in section, of the cable block.

FIG. 8 is a top plan view, partially in section, of the tension adjustment for the roller assembly.

FIG. 9 is a left side elevation of the tool of FIG. 3 in a partially operated position with a cable bundling strap inserted within the housing and engaged by the pawl mechanism.

FIG. 10 is a schematic representation of the cable-roller assembly during the strap tightening operation.

FIG. 11 is a schematic representation of the cable-roller assembly in the cutting operation.

FIG. 12 is a left side elevation of the tool of FIG. 3 illustrating the cutoff operation.

FIG. 13 is a left side elevation of the tool of FIG. 3 illustrating the position of the various components of the tool when the cutoff operation has been completed.

FIG. 14 is a front elevation of the cutting blade employed with the device of FIG. 1.

FIG. 15 is an isometric view of the cable-roller assembly of the tool of FIG. 1.

Similar elements will be given similar reference characters in each of the respective figures.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to FIGS. 1 and 2, there is illustrated a strap tightening and cutting tool 20 constructed in accordance with the concepts of the invention. Tool 20 has a housing 22 having a handle 24 fixedly coupled thereto. A second movable handle 26 is pivotally coupled by means of pivot pin 28 to the housing 22. In the area of the housing 22 adjacent the fixed handle 24 is a knurled tensioning knob 30. At the end of the housing 22 opposite the tensioning knob 30 in the nose area 32 which contains the strap head positioning plate 34 having therein a recess 36 in the shape of the head of the strap to be tightened and cut off by the tool 20. A passage 38 extends from the recess 36 into the housing 22 of the tool 20. Also in the nose area 32 is a cutoff blade 40 and a pawl assembly 42. Pawl assembly 42 consists of a pawl 44 mounted upon a pivot pin 46 and biased to a given position by means of a spring 48. The upper surface of the pawl 44 has a plurality of teeth 50 thereon and adjacent the teeth 50 is a pawl backup plate 52. As will be better seen in FIG. 9, the body portion of a strap inserted within the housing 22 is entrapped between the pawl backup plate 52 and the pawl 44, urged in that direction by means of the springs 48. Pawl assembly 42 is carried on pawl operating arm 54 which is pinned to the housing 22 by means of a pin 56 which travels in a slot 58 in the housing 22, as is better seen in FIG. 2. The pawl release and stop 60 is carried upon blade actuating arm 62 which is pivotally mounted to the housing 22 by means of pivot pin 64. Blade 40, as is better seen in FIG. 14, has a knife edge 66 at one end and has a slot 68 at the other for receipt therein of a similarly slotted end of the blade actuating arm 62. Blade 40 is retained upon the blade actuating arm 62 by means of a retainer 70 fastened to a blade support block (not visible in FIG. 1) by means of a fastener 72. The portion of the left side of the housing 22 adjacent the pawl assembly 42 is tapered as at 74 in order that the severed body portion of a strap may be deflected outwardly from the tool 20. Tapered portion 74 works well with relatively short lengths of body portion; however, larger portions of the strap body severed from the head portion are permitted to extend along the top of housing 22 and strike a deflector 78 provided upon the top surface of the housing 22, thus preventing the severed portion from striking the operator holding the tool 20.

Referring now to FIG. 3, the internal details of the tool 20 may be better appreciated. The pawl operating arm 54, as may be better appreciated from FIG. 5, consists of a longitudinal arm 80 which extends along the housing 22 in the area of the nose 34 and a transverse plate 82 extending in a transverse direction to the longitudinal arm 80. It is to the transverse plate 82 that the cable 84 is attached by means of the fasteners 86. The back surface of the transverse plate 82, opposite from the surface upon which the fasteners 86 appear, bears upon a return compression spring 88 which is constrained within the housing by means of retaining shoulders 90 formed as a portion of the housing 22. The spring 88 is compressed by the movement of the pawl operating arm 54 to the right of FIG. 3 and will, upon conditions described below, cause a return to the left of the pawl operating arm 54 and, because of the cable 84, will cause the second movable handle 26 to also be removed to the left to a position away from the fixed handle 24. Blade actuating arm 62 is held in the position shown in FIG. 3 by a compression spring 92 mounted between the end of the blade actuating arm 62 and a recess 94 formed in the housing 22. Except during the time that the blade actuating arm 62 is operated to cause the blade 40 to sever the body portion of a bundling strap inserted within the tool 20, compression spring 92 will hold the blade actuating arm 62 in the position of FIG. 3, thus retaining the blade 40 out of contact with the body portion of a bundling strap within the housing 22.

A movable roller 96 mounted upon axle 98 is positioned, guided and supported by support 100 rigidly mounted to housing 22. Support 100 contains a slot 102 and extending therefrom a further detent slot 104. The slot 102 and detent slot 104 are each proportioned to receive and permit the free movement therealong of the axle 98. Roller 96 is maintained with its axle 98 in the detent slot 104 by the tension presetting mechanism which consists of a tension spring 106 and adjustment yoke 108 and a threaded stud 110 connected to the knurled adjustment knob 30. As may be better appreciated from FIG. 8, tension spring 106 is fastened to a pin 112 bridging the bifurcated arms of the yoke 108 which also receives, in a threaded aperture, the threaded stud 110 connected to the knurled adjustment knob 30. As the knurled knob 30 is turned, the stud 110 is caused to advance or retreat from the threaded aperture within the yoke 108, thereby increasing or decreasing the tension upon the tension spring 106. As a result of the tension in the tension spring 106 which is coupled directly to the roller 96, axle 98 of the roller 96 is caused to remain within the detent slot 104. Cable 84 is permitted to pass along the channels 114 provided in the roller 96, as is better seen in FIG. 6. The end of the tension spring 106 is coupled to a further channel 116 located within the roller 96. Cable 84 then passes, as is shown in FIG. 3, toward an idler roller 118 mounted upon a fixed pin 120. Referring to FIG. 6, it should be noted that the cables 84 pass along recesses or grooves 122 so that the cable 84 is properly guided and contained, minimizing any risk of derailment of the cable 84 from the roller 118, as is true with respect to the cable 84 and the channels 114 of the roller 96. Cable 84 then terminates in a block 124, as is shown in FIG. 7, where it fits within a recess 126 formed therein. Block 124 is held in position by fasteners 128 which fasten the block 124 to the movable handle 26. Thus, as can be appreciated from FIG. 15, a single continuous cable 84 extends from a first of the fasteners 86 on the transverse plate 82 of the pawl operating arm 54, through the return spring 88 about the outer surface of the roller 96 within the channel 114 along a channel 122 of the roller 118 and thence within the channel 126 in the block 124 to return again under the roller 118 in the channel 122 over the roller 96 in a further channel 114 then through the return spring 88 to the second fastener 86 on the transverse plate 82.

Such an arrangement, that is by providing a single cable, traversing generally the same path twice, permits a compact design whereby the end of the tension spring **106** can be fastened to the roller **96** intermediate the two cable paths. However, if desired, two individual cable links **84** may be employed and the ends thereof joined at a block-like block **124** but having provisions for clamping the ends of cable links **84**. Alternatively, a band or flat strap may be employed in place of the cable **84** without departing from the spirit of the invention. Further, the block **124** may be provided with fasteners similar to the fasteners **86** shown with respect to the transverse arm so that individual cable lengths can be joined thereto in a manner similar to the joining of the cable **84** at the transverse arm **82**. Also, it is possible to employ but a single cable of suitable strength and dimension.

Referring now to FIG. **4**, the details of the nose area **32** are shown in greater detail. As was stated above, the nose area **32** has a positioning plate **34** with a recess **36** formed therein, in the shape of the head of a cable bundling strap to be inserted within the housing **22** which is to be tightened and cut off by the tool **20**. The passage **38** extends from the recess **36** to permit entry of the body portion of the strap within the tool **20**. Adjacent the positioning plate **34** is a knife **40** having a knife edge **66**. A recess **130** is provided adjacent the knife **40** for receipt therein of the knife edge **66**, to assure that the knife blade **40** may pass completely through a strap passed through the passage **38** into the tool **20**. A blade support block **132** positions and guides the blade **40** with respect to the positioning plate **34**. As was stated above with respect to FIG. **14**, blade **40** has a notch **68** which cooperates with a similar notch in the actuating arm **62** to permit the blade **40** to be returned to its original position as shown in FIG. **1**.

A protrusion **134** is formed on the housing **22** to cooperate with a recess **136** in the pawl operating arm **54** and thus permit alignment between the pawl actuating arm **54** and the housing **22**. More particularly, proper alignment is achieved between the passage **38** in the interspace between the pawl **44** and the pawl backup plate **52**. The spring **48** will tend to rotate the pawl **44** in a counterclockwise direction about the pin **46** and thus cause the body portion of the bundling strap inserted within the passage **38** to be tightly gripped between the teeth **50** of the pawl **44** and the backup plate **52**. During movement of the pawl **44** to the right of FIG. **3**, the strap body portion will be tightly clamped between the pawl **44** and the backup plate **52**. However, on return strokes of the pawl **44** to the left of FIG. **3**, teeth **50** of pawl **44** will be permitted to nonengagingly pass over the surface of the bundling strap so that the pawl **44** may be returned to its initial position as shown in FIG. **4** without in any way causing the bundling strap to be moved out from the tool **20**. Finally, the edge **45** of the pawl **44** will strike the striker plate **138** to assure that the pawl **44** is rotated in the clockwise direction and releases the slight grip it might have upon the bundling strap inserted between the pawl **44** and the backup plate **52**.

Turning now to FIG. **9**, there is shown a plurality of articles **142** bundled by means of a bundling strap **140** whose body portion has been passed through the locking head member thereof and introduced through the positioning plate **34**, and the passage **38** into the interspace between the pawl **44** and the backup plate **52**. Also, the movable handle **26** has been partially operated in a counterclockwise direction as shown by the arrow **144**. As a result of the partial motion of the movable handle **26** towards the fixed handle **24**, the pawl **44** has been caused to rotate and grasp the body portion of the strap **140** and clamp the same against the pawl backup plate **52**. Further, the pawl actuating arm **54** has been moved to the right of FIG. **9**, causing some compression of the return spring **88**. Some tension is applied to the strap **140** as a result of this action; however, it will be assumed for purposes of this figure that the amount of tension applied to the strap **140** is below the value of tension set into the tension adjustment spring **106** as controlled by the knurled adjustment knob **30**. The cable **84** is permitted to move over the roller **96** under the roller **118** without affecting the position of the roller **96**, and axle **98** is maintained in the detent slot **104** of the support **100**. This condition is schematically represented in FIG. **10** wherein the tension placed in the strap **140** is represented by a spring representation **146** to the left of the figure. The tension established by the tension adjustment spring **106** is represented by the spring **106** at the right of FIG. **10**. The cable **84** passes over the roller **96** and under the roller **118** to the movable handle, not shown in the schematic diagram of FIG. **10**. As long as the force in the spring **106** exceeds the force in the spring **146**, axle **98** of roller **96** will be retained in the detent slot **104** of support **100**. Returning to FIG. **9**, the movable handle **26** will continue to be moved in the direction shown by the arrow **144**, thus causing the pulling along of the cable **84** which will continue to pass over the roller **96** without displacing the axle **98** from the detent slot **104** and then compressing the return spring **88** until the tension applied to the strap **140** equals the preset tension of the adjustment spring **106**. This may be achieved in one or more complete strokes of the handle **26**, depending upon the length of the strap **140** and the size of the bundle of articles **142** about which the strap **140** is placed. Assuming that more than a single stroke of the handle **26** is necessary, the operation of handle **26** will continue until handle **26** comes in contact with shock absorbing block **148** which terminates the stroke of the handle **26**. Spring **88** which has been compressed will now, upon the relaxation of forces applied in the movable handle **26**, cause the pawl actuating arm **54** to be displaced to the left of FIG. **9** and will cause the cable **84** to be similarly moved towards the left in FIG. **9**, returning the handle **26** to the position initially shown in FIG. **3**. As a result of the reversed motion of the pawl **44**, the teeth **50** (see FIG. **4**) will disengage from the surface of the bundling strap **140** and will be permitted to move along the surface thereof until the point **45** strikes the striker plate **138** at which point the pawl **44** is fully rotated in a clockwise direction and completely released from contact with the bundling strap **140**. Upon the further application of forces to the movable handle **26**, the operation just described will be repeated. As many strokes as are necessary can be repeated, each time drawing the strap **140** further within the housing **22** of the tool **20** and applying further tension to the strap **140**. As the loop of the strap **140** gets smaller, the portion of the strap body which has been drawn through the head of the strap **140** will be per-

mitted to exit along inclined surface **74** and move along the top of the housing **22**. If the bundle is quite large, and a strap of slightly larger size than the bundle to which it is to be applied is employed, the body portion may remain in the space between the retainer **70** and the tapered portion **74** of the housing **22**.

At some point in the tightening operation, strap **140** will be completely tightened about the bundle of articles **142**, and it will be desirable to cut off the portion of the strap body extending beyond the head of the strap **140** so as to provide a flush cutoff at the face of the head of strap **140** to eliminate the possibility of damage to individuals operating near the cable bundle, to other cables and to provide a neater appearing finished bundle. The manner in which the cutoff operation occurs is schematically shown in FIG. **11**. It will first be assumed that the tension in the cable bundling strap **140** as represented by the spring **146** now equals the tension of the tension adjustment spring **106**, causing the axle **98** of the roller **96** to be displaced from the detent slot **104** into the main slot **102**. The further drawing of the cable **84** in a direction shown by the arrow, that is by the further movement of the movable handle **26** in the direction **144** as shown in FIG. **9**, is translated into downward movement of the axle **98** along the slot **102**, causing the roller **96** to be moved in a downward direction. It should be noted that no further pulling action takes place and thus the pawl operating arm **54** is not advanced further within the tool **20**; rather, the forces applied to the cable **84** are directed to the translation of the roller **96** from the position shown in FIG. **10** to the position shown in FIG. **11**.

Referring now to FIG. **12**, the cutting operation is fully illustrated. Just prior to the handle **26** arriving at the position shown in FIG. **12**, the tension in the strap **140** and the tension in the tension adjusting spring **106** become equal and the axle **98** of the roller **96** will be displaced from detent slot **104** and enter the main slot **102** of the support **100**. The further movement of the handle **26** to the position shown in FIG. **12** will now cause the cable **84** to move the roller **96** downwardly along the slot **102** and cause its outer periphery to contact the rear edge of the blade actuating lever **62**. This will cause compression of the blade actuating lever return spring **92** and will cause the blade actuating lever **62** to pivot about the pin **64**, moving the blade from the position shown in FIG. **9** to the position shown in FIG. **12**, that is, blade **40** will move through the bundling strap body portion and will enter within cavity **130**, thus completely severing the excess body portion of the strap **140** adjacent the head thereof.

When severing of the strap **140** takes place, the restraining forces upon the left hand side of the roller **96** as is shown in FIGS. **10** and **11** is removed. A quick series of events will take place, as is better shown in FIG. **13**. Handle **26** will be permitted to rapidly move to contact with the stop **148** in that the restraint provided by the strap is removed. Since it cannot be forecast where handle **26** will be when cutoff occurs, the handle **26** may travel a long or short distance from the cutoff point to stop **148**. Removal of the tension forces as represented by the spring **146** in FIGS. **10** and **11** will unbalance the forces on roller **96** and therefore the tension of the adjustable tension spring **106** will now cause the axle **98** of the roller **96** to be drawn back into the detent slot **104** of the support **100**. The pawl operating arm **54** is caused to move rapidly to the right of FIG. **13** due to the rapid movement of handle **26** and will cause the pawl **44** to strike the stop **60**, rotating the same in a clockwise direction, releasing its grasp upon the body portion of the strap which it has been holding. Further, the force of rapid movement of the pawl actuating arm **54** after severance and the sudden opening of the pawl **44** will impart to the severed body portion of the strap a force sufficient to throw it out of the tool **20**. In the event that it is a long portion, it will ride along the top portion of the housing **22** until it strikes the deflector **78**, causing it to be deflected sideways from the tool **20** and thus avoiding possible injury to the operator. Further, in the event that the portion of the strap was short, it will be deflected by the tapered portion **74**, as is shown in FIG. **1** off to the side of the tool **20**, thereby also avoiding injury to the operator. A chip protector **150** is coupled to the movable handle **26** and rides in a channel formed by the tabs **152** and **154** formed on the housing **22**. In this manner, the portion behind the movable handle **26** is always protected against the entrance to within the housing **22** of any portions of strap or other debris which may be present when the tool **20** is being employed. The portion between handle **26** and the opening of the housing **22** in which the handle **26** passes, and a head of the handle **26** will be protected from such particles entering the housing **22** by the fingers of the operator employing the tool.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A strap tightening tool comprising: housing means; a first handle rigidly fixed to said housing means; a second handle coupled to said housing means for movement in either of two directions with respect to said first handle; pawl means coupled to said housing means in such manner as to permit movement of said pawl means in either of two opposite colinear directions; said pawl means arranged to engage the body portion of a strap inserted in said housing means and tighten the strap when said pawl means is moved in a first of said two opposite colinear directions and to nonengagingly pass along the body portion of the strap when said pawl means is moved in a second of said two opposite colinear directions; cable means coupled to both said pawl means and said second handle to cause said pawl means to move in said first of said two opposite colinear directions when said second handle is moved in a first direction with respect to said first handle; and return means coupled to said pawl means to move said pawl means in said second of said two opposite colinear directions when said second handle is moved in a second direction with respect to said first handle.

2. A tool, as defined in claim **1**, wherein said return means is coupled to said second handle to move said second handle in said second direction with respect to said first handle as said pawl means is moved in said second of said two opposite colinear directions.

3. A tool, as defined in claim **1**, further comprising roller means coupled to said housing means; said cable means passing over said roller means.

4. A tool, as defined in claim 1, further comprising roller means coupled to said housing means; said cable means passing over said roller means to alter the direction of said cable means between said pawl means and said second handle.

5. A tool, as defined in claim 1, further comprising a first roller coupled to said housing means and a second roller coupled to said housing means; said cable means passing over said first and second rollers to alter the direction of said cable means between said pawl means and said second handle.

6. A tool, as defined in claim 1, wherein said cable means consists of two discrete cable links.

7. A tool, as defined in claim 1, further comprising: a pair of first rollers coupled to said housing means; a pair of second rollers coupled to said housing means; block means coupled to said second handle; said cable means comprising: a first cable link coupled to said pawl means and extending over a first one of said pair of first rollers and a first one of said pair of second rollers and coupled to said block means and a second cable link coupled to said pawl means and extending over the second one of said pair of first rollers and the second one of said pair of second rollers and coupled to said block means.

8. A tool, as defined in claim 1, further comprising: a pair of first rollers coupled to said housing means; a pair of second rollers coupled to said housing means; block means coupled to said second handle; said cable means comprising: a first cable link coupled to said pawl means and extending over a first one of said pair of first rollers and a first one of said pair of second rollers; a second cable link coupled to said pawl means and extending over the second one of said pair of first rollers and the second one of said pair of second rollers; said first and second cable links being coupled to one another at their ends remote from said pawl means and about said block means.

9. A tool, as defined in claim 1, wherein said return means is a compression spring coupled to said pawl means at a first end and to said housing means; said compression spring being compressed when said pawl means is moved in said first of said two opposite colinear directions and expands to move said pawl means in the second of said two opposite colinear directions when said second handle is moved in a second direction with respect to said first handle.

10. A tool, as defined in claim 1, wherein said return means is a compression spring coupled to said pawl means at a first end and to said housing means; said compression spring being compressed when said pawl means is moved in said first of said two opposite colinear directions when said second handle is moved in a first direction with respect to said first handle and expands to move said pawl means in the second of said two opposite colinear directions and said second handle means in said second direction with respect to said first handle when said second handle is released.

11. A tool, as defined in claim 1, further comprising: blade means for severing the body portion of a strap inserted in said housing means; first selectively positionable operating means coupled to said blade means; said operating means being positionable in a first position to hold said blade means out of contact with the body portion of a strap inserted in said housing means and a second position to sever the body portion of a strap inserted in said housing means; presetting means; and second selectively positionable operating means coupled to said cable means and said presetting means; said second selectively positionable operating means taking a first position below the value preset by said presetting means and moving to a second position at and above the value preset by said presetting means to contact and operate said first selectively positionable operating means to said second position to cause said blade means to sever the body portion of a strap inserted into said housing means.

12. A strap tightening and severing tool comprising: housing means; a first handle rigidly fixed to said housing means; a second handle coupled to said housing means for movement in either of two directions with respect to said first handle; pawl means coupled to said housing means in such a manner as to permit movement of said pawl means in either of two opposite colinear directions; said pawl means arranged to engage the body portion of a strap inserted in said housing means, tightening and applying tension to the body portion of a strap when said pawl means is moved in a first of said two opposite colinear directions and to nonengagingly pass along the body portion of the strap when said pawl means is moved in a second of said two opposite colinear directions; cable means coupled between said pawl means and said second handle to cause said pawl means to move in said first of said two opposite colinear directions when said second handle is moved in a first direction with respect to said first handle; blade means to sever the body portion of a strap inserted in said housing means; first operating means coupled to said housing means and at a first end to said blade means to move said blade means from a first position remote from the body portion of a strap to a second position to engage and sever the body portion of a strap; adjustable presetting means for establishing a predetermined tension; second operating means coupled to said cable means and said presetting means; said second operating means capable of moving between a first position out of contact with said first operating means and a second position in contact with said first operating means; said second operating means remaining out of contact with said first operating means as the strap is tensioned until said predetermined tension is reached whereby said cable means moves said second operating means from said first position to said second position contacting said first operating means to move said first operating means to said second position causing said body portion of the strap to be severed.

13. A tool, as defined in claim 12, wherein said first operating means is a lever pivotally mounted to said housing means and further comprising biasing means coupled between a second end of said lever and said housing means to bias said lever to said first position.

14. A tool, as defined in claim 12, wherein said second operating means comprises roller means having an axle therethrough; support means having a slot therein for receipt of the axle of said roller means therein; said slot guiding the movement of said roller means; said support means further having a detent slot communicating with said slot; said detent slot arranged to retain said roller axle; said roller axle maintained in

said detent slot permitting said cable means to pass over said roller means until the tension in a strap equals the predetermined tension established by said presetting means after which continued movement of said cable means in response to said second handle moving in a first direction with respect to said first handle causes said axle to be displaced from said detent slot into said slot moving said roller means into contact with said first operating means.

15. In a strap tightening tool having a reciprocally movable pawl assembly and a bidirectionally movable handle, a pawl assembly drive means comprising: cable means having a first end and a second end; first coupling means coupling said first end of said cable means to said pawl assembly; and second coupling means coupling said second end of said cable means to said movable handle.

16. A pawl assembly drive means, as defined in claim **15**, further comprising: roller means intermediate said pawl assembly and said movable handle.

17. A pawl assembly drive means, as defined in claim **15**, further comprising: first roller means and second roller means; said first and second roller means each being interposed intermediate said pawl assembly and said movable handle.

18. In a strap tightening and severing tool having a pawl assembly for applying tension to a strap placed in such tool, a movable handle for operating such pawl assembly, a severing blade and an operating lever coupled thereto to move said blade into and out of severing engagement with such strap, a severing blade drive means comprising: support means having a slot therein and further having a detent slot communicating therewith; roller means having an axle therethrough; said axle proportioned to fit within said slot and detent slot of said support means; presettable means for establishing a predetermined tension; coupling means coupling said presettable means to said roller means for retaining said axle within said detent slot of said support means until the tension in said strap equals said predetermined tension; the further movement of said movable handle thereafter causing said axle to traverse said slot to cause said roller to contact and move said operating lever whereby said blade is caused to sever the strap.

19. A tool, as defined in claim **12**, wherein said housing means is tapered adjacent said pawl means whereby the severed portion of the body portion of a strap is deflected away from said tool.

20. A tool, as defined in claim **12**, wherein said housing means has a protrusion thereon whereby the severed portion of the body portion of a strap is deflected away from said tool.

21. A tool, as defined in claim **12**, further comprising a slide member coupled to said second handle and movable therewith to selectively seal said housing means in the area intermediate said first and second handles.

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