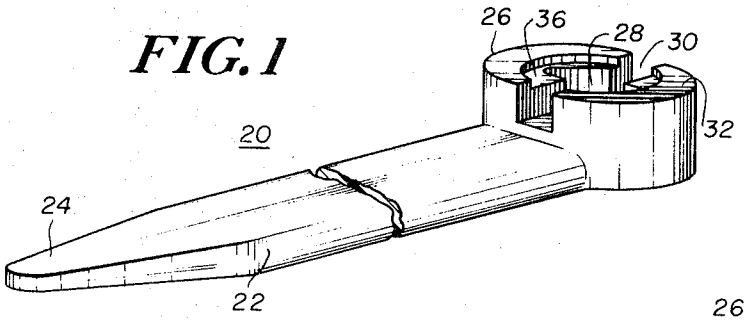
Dec. 22, 1970 S. J. KOHKE 3,548,463

BUNDLING STRAP

Filed Dec. 23, 1968 2 Sheets-Sheet 1

FIG. 1



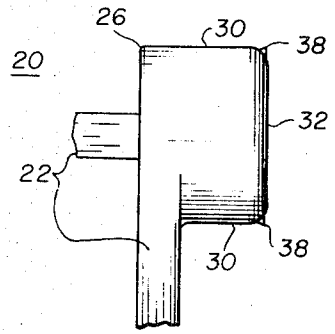


FIG. 3

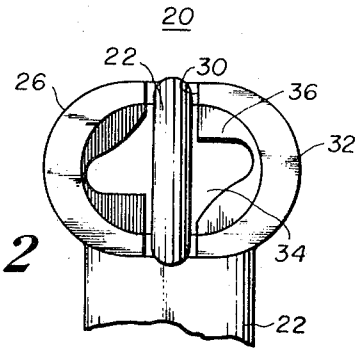


FIG. 2

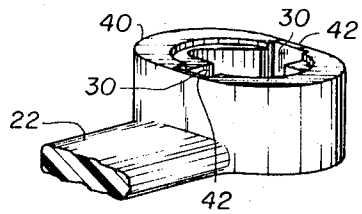


FIG. 4

FIG. 5

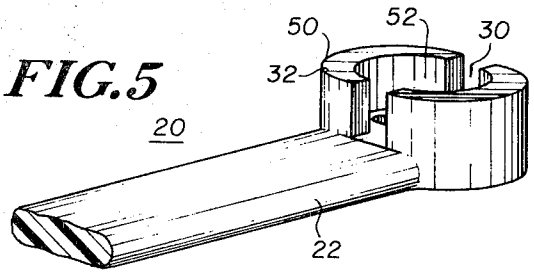
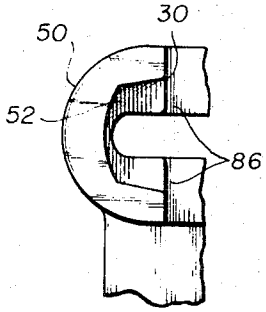


FIG. 6



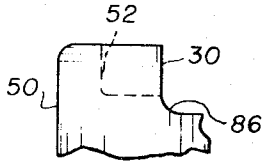


FIG. 7

INVENTOR
STEPHEN J. KOHKE

BY

ATTORNEY

Dec. 22, 1970 S. J. KOHKE 3,548,463

BUNDLING STRAP

Filed Dec. 23, 1968 2 Sheets-Sheet 2

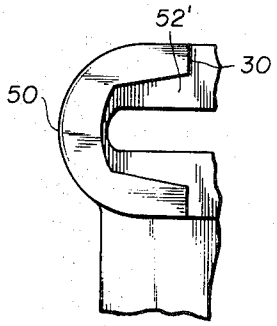


FIG. 8

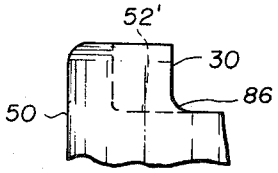


FIG. 9

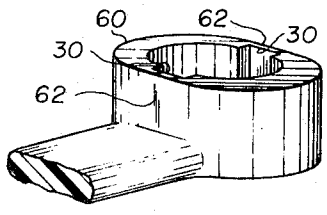


FIG. 10

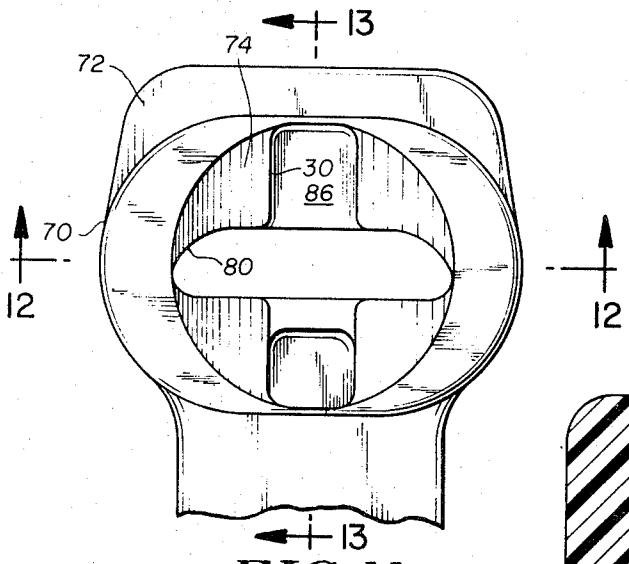


FIG. 11

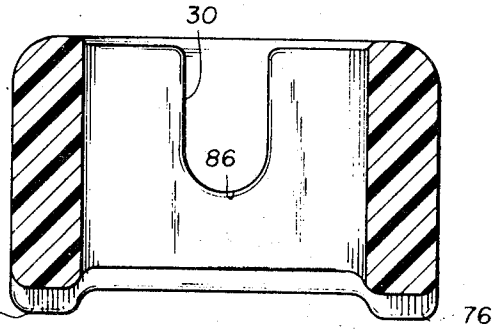


FIG. 12

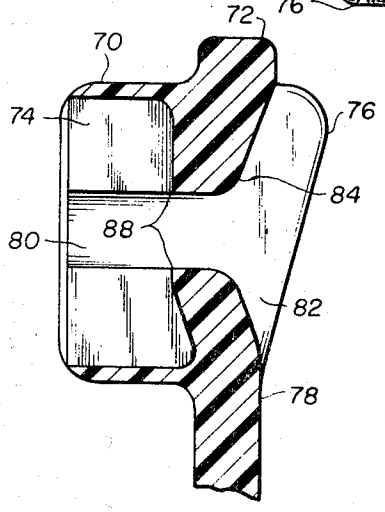


FIG. 13

INVENTOR
STEPHEN J. KOHKE
BY

ATTORNEY

United States Patent Office 3,548,463 Patented Dec. 22, 1970

3,548,463

BUNDLING STRAP

Stephen John Kohke, Bridgewater Township, Somerset County, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J., a corporation of New Jersey

Filed Dec. 23, 1968, Ser. No. 786,197
Int. Cl. B65d 63/00
U.S. Cl. 24—16 11 Claims

ABSTRACT OF THE DISCLOSURE

The invention is directed to improvements in the twist to lock type of article bundling strap providing for increased strength of the head end structure, ease of use and permitting the head end structure to better conform to the shape of the article, or articles, to be bundled. In a first improvement a recess is placed in the end face of the head end member about which locking takes place, to provide for material flow during locking. The recess may be made of a depth to accept the jaw of a twisting tool and permit deflection of the surrounding walls. Strengthening ribs may be placed along the back face and atop the head structure. The entry to the transverse aperture may be tapered at its bottom end to facilitate the entrance of the free tail end portion of the strap therein and at its upper end to permit the head end member to align more closely to the article to be bundled. Additionally, changes in the slope of the walls of the transverse aperture and the rounding of the locking slot bottoms increase the overall pull out strength of the strap when locked.

BACKGROUND OF THE INVENTION

Field of the invention

The invention is directed to the field of bundling one or more articles to form a convenient more easily handled unit. The articles may be a plurality of individual conductors formed into a cable or may be articles such as pipe, hose, rods or any other articles having regular, or irregular, shapes which are to be bundled.

Description of the prior art

In prior art Pat. No. 3,022,557, for Cable Bundling and Supporting Strap, by M. C. Logan, issued on Feb. 27, 1962 and assigned to the assignee of the instant invention, there is disclosed and described a cable bundling strap of the twist to lock type. In such strap, as is shown in FIG. 6 of the cited patent, the tail end portion, after same has been threaded about a plurality of articles to be bundled and inserted through the aperture in the head member, is twisted, or displaced, out of its normal plane to lock the strap against opening. The displaced portion of the strap is then permitted to rest within slots placed in a direction transverse to the aperture through which the strap was initially passed. The tool employed to twist, lock and cut off the excess portion of the strap beyond the head member can only contact the front face of the head member and results in pulling the strap tight to a point beyond the face of the head member and once the severance of the strap and the completion of the locking operation have taken place, the strap is permitted to fall back and seat itself in the slots, thereby decreasing the tension applied by the strap to the plurality of articles being bundled. Additionally, the strap, when fastened about a plurality of articles, will be formed in such a manner that the head end portion thereof will appreciably stand away from the bundle interfering with the easy handling of the bundle and further the sharp ends of the strap which were cut off during the locking operation are left exposed endangering persons using the strap, or cable, during installation.

SUMMARY OF THE INVENTION

The present invention overcomes the difficulties noted above with respect to prior art devices by providing an improved bundling strap of the twist to lock type which is structurally stronger and which increases the pull out strength achieved by such devices. Firstly, a shallow recess may be provided within the head member communicating with the transverse aperture through which the strap body portion is passed. The recess permits the flow of the material of the strap during the twisting to lock operation. As a result, less stresses are applied to the strap and there is less chance of the failure of the strap during the locking operation and increased pull out resistance for the strap once locked. A deeper recess may be provided to permit the jaws of the tool to enter within the head member and permit the strap to be twisted close to its final resting place adjacent the lock retaining slots.

Due to the removal of material to provide the above described recesses, additional structural members are added adjacent the rear entry of the transverse aperture by providing ribs adjacent to the entrance to the transverse aperture and in addition providing a rib at the top of the head member. All provide additional strength to prevent flexure of the head and thus permit dislodging of the locked strap from the head member. Further, the entrance to the transverse aperture at the rear face of the head member, is tapered at its lower end to facilitate and provide a smooth introduction of the free tail end portion of the strap within the transverse aperture. Further, the upper portion of the transverse aperture entrance at the rear face is also tapered to permit the head member to lie closer to the plurality of articles to be bundled. Additionally, the inner surface of the transverse aperture is sloped for greater pull out strength while the lock retaining slots are rounded at their bottom surfaces to provide less sheering of the strap body portion as the same is twisted into locking relationship. It is therefore an object of this invention to provide an improved article bundling strap of the twist to lock type.

It is still another object of this invention to provide an improved article bundling strap of the twist to lock type which will provide a recess for material flow during the twist to lock operation.

It is still another object of this invention to provide a deep recess within the head end member adjacent the transverse aperture through which the strap body portion is passed to permit the strap body portion to be twisted to its locking position adjacent its point of final resting and thereby increasing the pull out strength of the overall strap.

It is still another object of this invention to provide an improved article bunding strap of the twist to lock type having ribs thereon placed to increase the overall strength of the head end member and thus increase the pull out strength of the overall strap.

It is yet another object of this invention to provide an improved article bundling strap of the twist to lock type having tapered entry within the transverse aperture of the head member to facilitate the receipt therein of the free tail end portion of the strap during the placement of the strap about a plurality of articles to be bundled.

It is yet another object of this invention to provide an improved article bundling strap of the twist to lock type having the entrance to the transverse aperture in the head end member tapered to permit the head end member to lie in closer relationship to the articles to be bundled.

It is yet another object of this invention to provide an improved article bundling strap of the twist to lock type wherein the transverse aperture and locking slot are

formed in such a manner as to decrease the stresses upon the body portion as the same is twisted and locked in place within the head end member.

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 principles of the invention, and the best modes which have been contemplated for carrying them out.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a perspective view of a bundling strap constructed in accordance with the concepts of the invention and foreshortened.

FIG. 2 is a plan view of the head member portion of the bundling strap of FIG. 1 showing the position of the strap in the twisted position.

FIG. 3 is a side view of the head member portion of FIG. 2, showing the position of the strap in the lock position.

FIG. 4 is a perspective view of the head member portion of a strap constructed in accordance with a second embodiment.

FIG. 5 is a perspective view of a further embodiment of a bundling strap constructed in accordance with the concepts of the invention.

FIG. 6 is a front plan view of a portion of the head member of the bundling strap of FIG. 5.

FIG. 7 is a top plan view of a portion of the head member of the bundling strap shown in FIG. 6.

FIG. 8 is a front perspective view of a portion of a head member of a bundling strap constructed in accordance with a further embodiment of the invention.

FIG. 9 is a top plan view of the portion of the head member of the bundling strap shown in FIG. 8.

FIG. 10 is a perspective view of the head member portion of a bundling strap constructed in accordance with an additional embodiment.

FIG. 11 is a front plan view of the head member portion of a bundling strap constructed in accordance with a further embodiment.

FIG. 12 is a top plan view, in section, of the head member of the bundling strap of FIG. 11 taken along the line **12—12**.

FIG. 13 is a side elevation, in section, of the head member portion of the bundling strap shown in FIGS. 11 and 12 taken along lines **13—13** in FIG. 11.

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

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Turning now to the FIGS. 1, 2 and 3 there is shown a first embodiment of an article bundling strap **20** constructed in accordance with the concepts of the invention. Article bundling strap **20** has a body portion **22** and a free tail end portion **24**. At the opposite end of the body portion **22** is the head member **26**. A transverse aperture **28** passes through the head end member **26** to permit the installation of the free tail end portion **24** therethrough when wrapped about a plurality of articles to be bundled. Locking slots **30** are provided in the walls of the head member **26** communicating with the transverse aperture **28**. In practice a tool is brought in contact with the front face **32** of the head member **26** and the strap portion is grasped thereby and twisted to lock it against being withdrawn from the head member **26**. Once the twisting and locking operations have been completed the excess portion of the strap body **22** is cut off just beyond the head member **26**. FIG. 2 shows the position of strap body portion **22** after twist but before cutoff of the excess and before the strap body portion **22** has seated into slots **30**.

As can be seen from FIG. 2, it is necessary for the strap body portion **22** to be twisted at a minimum angle of 90° with respect to the normal position of the strap body portion **22** within the transverse aperture **28**. Transitional regions such as **34** exist in the strap body portion **22** as it proceeds from its position within the transverse aperture **28** to the position aligned with the slots **30**. In order to create these transition regions **34** it is necessary for the strap to be stretched and twisted and for there to be a certain flow of material. The front face **32** of the head member **26**, as shown in the prior art device cited above, is flat and provides no area for material flow during the twisting of the strap body portion **22**. As a result, the tool itself is forced away from the face **32** of the head member **26** and the transition is accomplished in the very narrow gap which exists between the tool and the face **32** of the head member **26**. It has been found that this small gap which is created between the tool and the face **32** is generally insufficient to permit a smooth transition of the strap body portion **22** to its locking positions. As a result, the strap body portion **22** may be stretched beyond its yield point and destroyed, or at best, if a locking action takes place, the transition areas **34** are extremely weak or broken thus decreasing the overall pull out strength of the strap **20**. Pull out strength is the resistance of the strap once locked to be withdrawn from locking arrangement within the head member **26**. By including a recess **36** within the face **32** of the head member **26**, a region is provided to permit the flow of the material of the strap body portion **22** as the twist to lock action takes place. As a result, smoother transition area **34** will be created. A more uniform thinning out or flow of material will occur which will increase the overall pull out strength of the locked strap. When sealed in slots **30**, after the excess of strap body portion **22** has been severed, the transitional regions **34** will also be positioned in slots **30**.

As is better seen in FIG. 3, the cutoff portion of the strap body portion **22** extends beyond the outline of the head member **26** as it rests within the slots **30**. In cutoff action, the excess portion of the strap beyond the face **32** provides rough edges **38** which might be injurious to persons handling the bundled articles or to other articles placed in close proximity to the bundling strap **20**. To protect persons using the bundling strap **20**, and also to prevent damage to adjacent articles, head members may be modified as shown in FIG. 4. In FIG. 4 the head member **40** is provided with webs **42** which cover the outside surface of the slots **30**. The webs **42** provide a continuous outer surface for the head member **40** and will contain the rough edges of the body portion **22** within the head member **40**. As a result, a sharp edge as **38**, as shown in FIG. 3, no longer protrudes beyond the head member **40** thus protecting persons or other articles.

Turning now to FIGS. 5 through 7 a further embodiment of an article bundling strap head member is shown. In FIG. 5, head member **50** is provided with a deep recess **52** which extends, as is shown in FIG. 7, almost the full depth of the slot **30**. A tool (not shown) having a correctly formed jaw will be inserted within the recess **52** to permit the twisting of the body portion **22** to lock with respect to the head member **50**. In this arrangement the jaw of the tool, extending within the recess **52** permits a strap body portion **22** to be twisted close to its final resting place so that any tension placed in the articles to be bundled is a result of the tightening of the strap body portion **22** from its position adjacent the face **32** of the head member **26**. As is shown in FIGS. 8 and 9, the recess **52'** can be made to extend to the base of the slot **30** eliminating entirely any repositioning of the locked end of the strap body portion **22** after the locking operation has taken place. Further, the deep recesses **52** and **52'** allow the walls thereabout to be deflected to permit passage of the strap body portion to slots **30**. The walls will spring

back to place once the strap body portion **22** is positioned in the slots, thereby locking the strap.

Turning now to FIG. 10 a head member **60**, similar to the head member **50** of FIG. 5, may be provided with webs **62** closing the slots **30**. The function of webs **62** are the same as that described with respect to the web **42** of FIG. 4.

Turning now to FIGS. 11 through 13, further modifications are shown to the head member to provide for strengthening of the head member to overcome the weakening effects of the recess **36** of FIG. 1 and the recesses **52** and **52'** of FIGS. 5 and 8 respectively. As shown in FIGS. 11 and 13, rib **72** is placed at the top portion of the head member **70** and extends across the entire width of the head member **70** for a portion of its depth as is better seen in FIG. 13. Such rib **72** will aid in retaining the shape of the head member **70** as a result of the removal of the material for the recesses **74**. Additional strengthening of the head member **70** is accomplished by providing a pair of ribs **76**, on the rear face **78** of the head member **70**, the ribs are positioned as is better seen in FIG. 12 to either side of the transverse aperture **80** extending through head member **70** and will prevent distortion of the head member **70** as a result of the twist to lock operation and subsequent application of forces upon the strap which would tend to pull the strap from the head member **70**. At the entrance to the transverse aperture **80**, at the rear face **78**, the lower portion of the entry is tapered as at **82** to facilitate the entrance of the free tail end portion **24** of the strap within the transverse aperture **80**. Additionally, the upper entry to the transverse aperture, at the rear face **78**, is tapered as at **84** to permit the head member **70** to lie as close to the article bundled as is possible thus decreasing the overall height of the head member **70** with respect to the articles bundled after installation. Additionally, the faces of the walls adjacent the transverse aperture **80** are sloped to provide sharp shoulders as at **88** to better bite into and grasp the strap body portion **22** and thus increase the pull out strength of the strap. In addition, the slots **30**, as is shown in FIG. 12, are provided with rounded terminal regions **86** to provide a minimum of stress against the locked strap body portion **22** and thus increase the resistance to pull out.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to the preferred embodiments, it will be understood that various omissions and substitutions and changes of the form and details of the devices illustrated and in their operation may be made by those skilled in the art, without departing from the spirit of the invention.

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

1. In a bundling strap of the type which is locked by displacing a portion thereof out of the plane of the strap; an elongated strap body portion for wrapping about an article; said strap having a free tail portion at a first end thereof and a head member at the second end thereof; said head member having a transverse passage therein for receipt of said strap body portion therethrough; there being at least one slot in a first face of said head member for receipt therein of a portion of said strap body portion when displaced in locking engagement with said head member and there being a recess adjacent said slot, said recess encircling said transverse passage; said recess providing for the receipt of a portion of said strap body portion during the locking displacement thereof.

2. A strap, as defined in claim **1**, wherein said recess is deep.

3. A strap, as defined in claim **2**, wherein the walls of said head member adjacent said recess are thin and are displaced from their original positions as said strap body portion is lockingly displaced and return to their original postions upon completion of the locking displacement whereby a portion of the strap body portion is retained in said slot.

4. A strap, as defined in claim **1**, wherein the end of said slot remote from the first face of said head member is curved.

5. In a bundling strap of the type which is locked by displacing a portion thereof out of the plane of the strap; an elongated strap body portion for wrapping about an article; said strap having a free tail portion at a first end thereof and a head member at the second end thereof; said head member having a transverse passage therein for receipt of said strap body portion therethrough; there being at least one slot in a first face of said head member for receipt therein of a portion of said strap body portion when displaced in locking engagement with said head member and there being a recess adjacent said slot; said recess providing for the receipt of a portion of said strap body portion during the locking displacement thereof, said recess being shallow and providing for the cold flow of the material of the strap during locking displacement thereof.

6. In a bundling strap of the type which is locked by displacing a portion thereof out of the plane of the strap; an elongated strap body portion for wrapping about an article; said strap having a free tail portion at a first end thereof and a head member at the second end thereof; said head member having a transverse passage therein for receipt of said strap body portion therethrough; there being at least one slot in a first face of said head member for receipt therein of a portion of said strap body portion when displaced in locking engagement with said head member and there being a recess adjacent said slot; said recess providing for the receipt of a portion of said strap body portion during the locking displacement thereof, said head member further comprises a web closing said slot whereby the portion of said strap body portion within said slot is retained completely within said head member.

7. In a bundling strap of the type which is locked by displacing a portion thereof out of the plane of the strap; an elongated strap body portion for wrapping about an article; said strap having a free tail portion at a first end thereof and a head member at the second end thereof; said head member having a transverse passage therein for receipt of said strap body portion therethrough; there being at least one slot in a first face of said head member for receipt therein of a portion of said strap body portion when displaced in locking engagement with said head member and there being a recess adjacent said slot; said recess providing for the receipt of a portion of said strap body portion during the locking displacement thereof, there being a first tapered slot in the second face of said head member communicating with said transverse passage; said first tapered slot adjacent the jointure of said head member with said strap body portion to facilitate the entrance of said free tail portion into said transverse passage.

8. In a bundling strap of the type which is locked by displacing a portion thereof out of the plane of the strap; an elongated strap body portion for wrapping about an article; said strap having a free tail portion at a first end thereof and a head member at the second end thereof; said head member having a transverse passage therein for receipt of said strap body portion therethrough; there being at least one slot in a first face of said head member for receipt therein of a portion of said strap body portion when displaced in locking engagement with said head member and there being a recess adjacent said slot; said recess providing for the receipt of a portion of said strap body portion during the locking displacement thereof, there being a first tapered slot in the second face of said head member communicating with said transverse passage; said first tapered slot being remote from the jointure of said head member with said strap body portion whereby said head member may be positioned close

to an article when said strap body portion is wrapped about such article.

9. In a bundling strap of the type which is locked by displacing a portion thereof out of the plane of the strap; an elongated strap body portion for wrapping about an article; said strap having a free tail portion at a first end thereof and a head member at the second end thereof; said head member having a transverse passage therein for receipt of said strap body portion therethrough; there being at least one slot in a first face of said head member for receipt therein of a portion of said strap body portion when displaced in locking engagement with said head member and there being a recess adjacent said slot; said recess providing for the receipt of a portion of said strap body portion during the locking displacement thereof, at least two ribs on the second face of said head member adjacent said transverse passage and extending in the direction of said strap body portion, at least one of said ribs positioned on each side of said transverse passage.

10. In a bundling strap of the type which is locked by displacing a portion thereof out of the plane of the strap; an elongated strap body portion for wrapping about an article; said strap having a free tail portion at a first end thereof and a head member at the second end thereof; said head member having a transverse passage therein for receipt of said strap body portion therethrough; there being at least one slot in a first face of said head member for receipt therein of a portion of said strap

body portion when displaced in locking engagement with said head member and there being a recess adjacent said slot; said recess providing for the receipt of a portion of said strap body portion during the locking displacement thereof, a rib on the top surface of said head member remote from the juncture of said head member with said strap body portion.

11. In a bundling strap of the type which is locked by displacing a portion thereof out of the plane of the strap; an elongated strap body portion for wrapping about an article; said strap having a free tail portion at a first end thereof and a head member at the second end thereof; said head member having a transverse passage therein for receipt of said strap body portion therethrough; there being at least one slot in a first face of said head member for receipt therein of a portion of said strap body portion when displaced in locking engagement with said head member and there being a recess adjacent said slot; said recess providing for the receipt of a portion of said strap body portion during the locking displacement thereof, the inside surfaces of said transverse passage are sloped.

References Cited

UNITED STATES PATENTS

D. 205,659	9/1966	Piasecki	24—16PB
3,022,557	2/1962	Logan	248—74PBX

DONALD A. GRIFFIN, Primary Examiner