United States Patent [19]

Hildebrandt

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[45] **July 8, 1975**

[54] **STRAP CLAMP ASSEMBLY**

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[73] Assignee: **The Stanley Works,** New Britain, Conn.

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[21] Appl. No.: **506,427**

[52] **U.S. Cl.** ..... **24/194;** 24/171; 24/196; 24/265 R

[51] **Int. Cl.** **A44b 11/06**

[58] **Field of Search** 24/194, 168, 196

[56] **References Cited**

UNITED STATES PATENTS

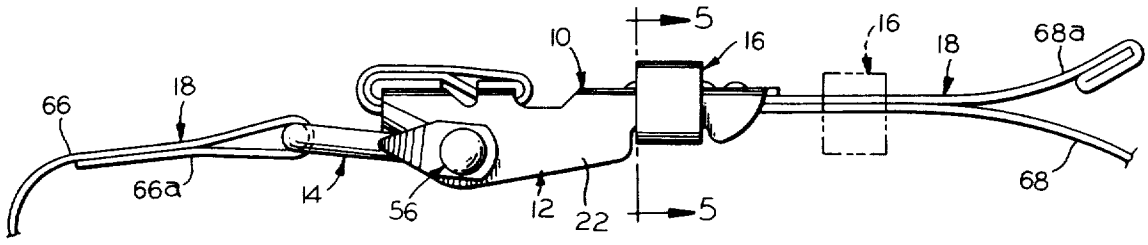
688,503	12/1901	Cross	24/194
1,356,517	10/1920	Curtis	24/194
2,260,378	10/1941	Hoppland	24/194
2,905,994	9/1959	Krasnow	24/182

Primary Examiner—Bernard A. Gelak

[57] **ABSTRACT**

A strap clamp assembly is provided which is particularly suited for employment in a variety of different applications such as for example in fastening loads to automobiles, trailers and trucks, for holding trunk lids down over outsized loads, for clamping pieces to be glued, etc. The strap clamp assembly includes a buckle, a stirrup operatively connected to the buckle, a slide lock cooperatively associated with the buckle, and strap means having suitable gripping means secured at the free ends thereof. The buckle comprises a generally elongated rectangular member having a pair of side flanges depending therefrom on either side thereof operable to give the buckle the configuration of that of an inverted substantially U-shaped member. The stirrup is operatively connected to the buckle at a point spaced inwardly from one end of the latter for pivotal movement between a release position and a locking position relative to the buckle. The strap means is of two-part construction. One part thereof has one end secured to the stirrup for movement therewith and with one gripping member selected from any of a variety of different types thereof affixed to the other end of the aforereferenced one part of the strap means. One end of the other part of the two-part strap means is threadable through a pair of slots provided for this purpose in the elongated rectangular member at a location spaced inwardly of the ends thereof. The other end of the second part of the strip means is provided in a manner similar to the first part with a suitable gripping member configured like that of the first part of the strap means. The slide lock is threaded on the second part of the strap means and is operable when the stirrup is in its locking position to hold the buckle against the strap means thereby preventing the buckle from accidentally untoggling. To enable the slide lock to perform the aforedescribed function, the slide lock is slidable relative to the buckle to a position wherein the slide lock is received in a pair of notches provided for this purpose in opposed relation in the side flanges of the buckle. The slide lock is retained in the latter described position relative to the buckle by virtue of the slide lock's own inherent spring tension, and requires positive action to be taken relative to the slide lock to release the slide lock from its locked position.

9 Claims, 12 Drawing Figures



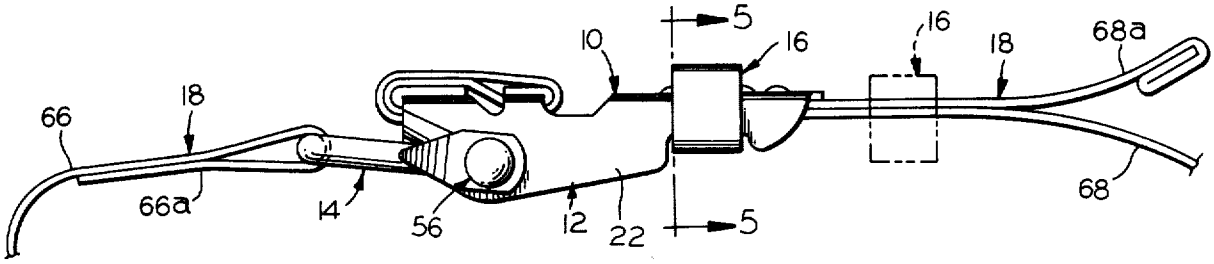


FIG. 1

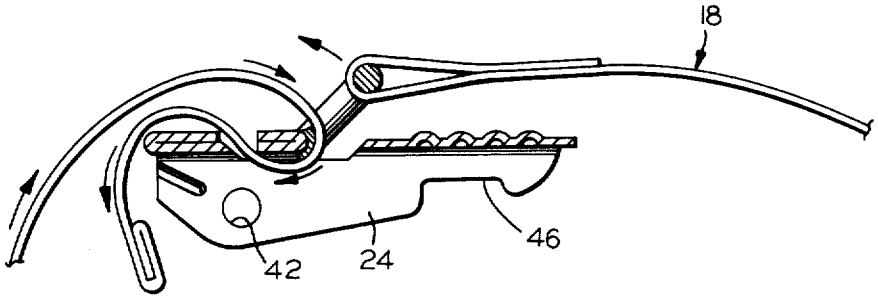


FIG. 2

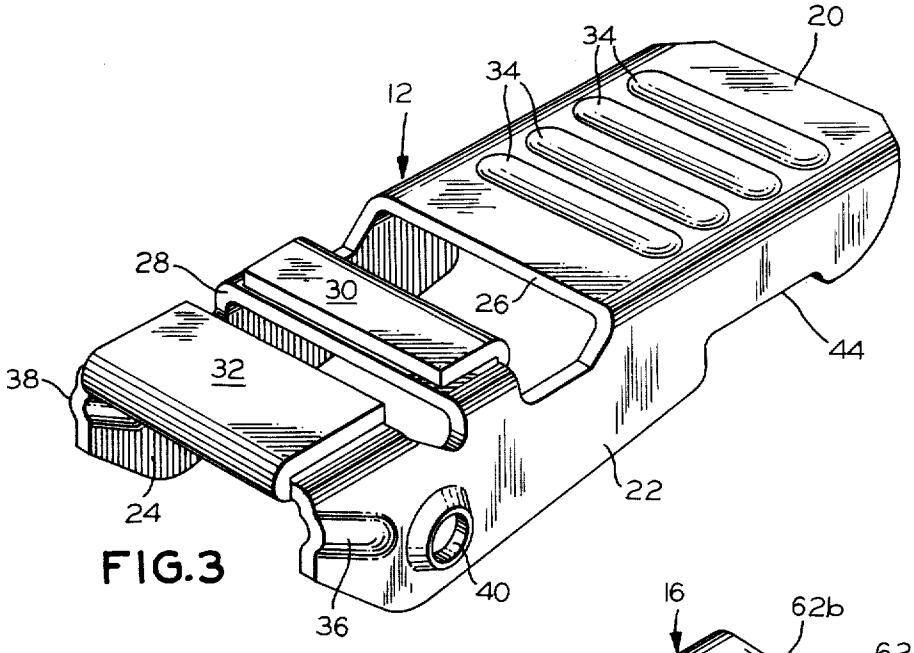


FIG. 3

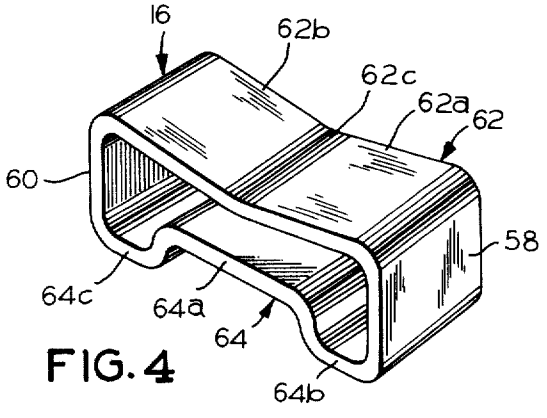


FIG. 4

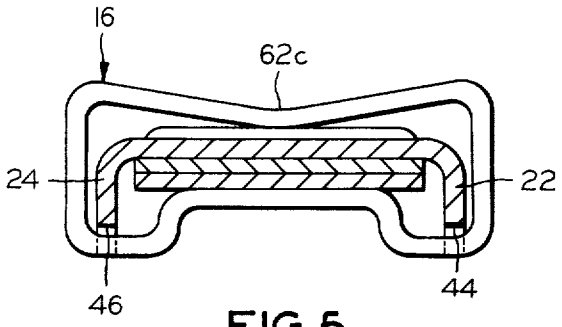


FIG. 5

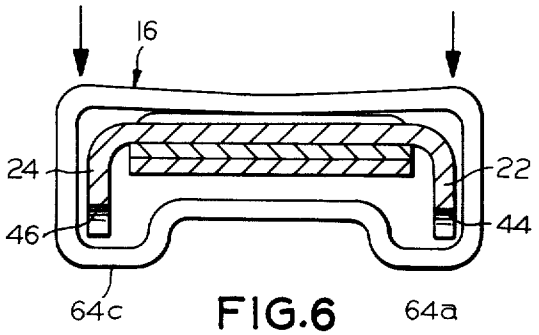


FIG. 6

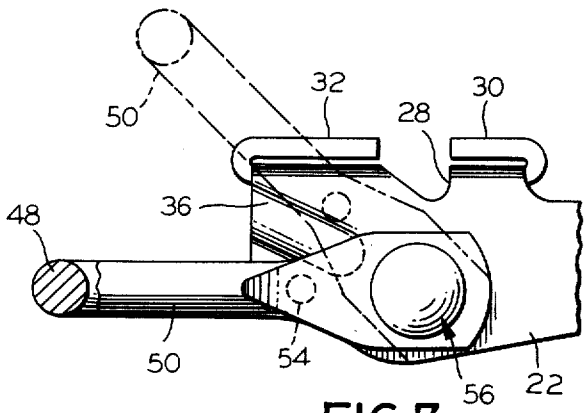


FIG. 7

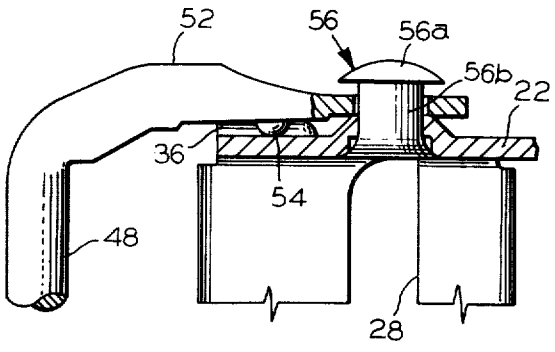


FIG. 8

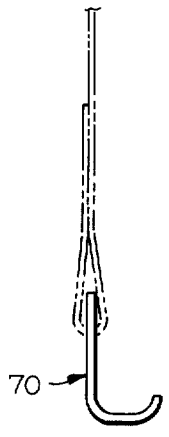


FIG. 9

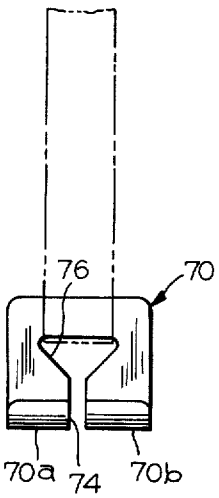


FIG. 10

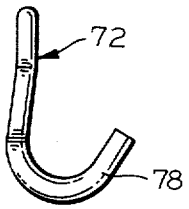


FIG. 11

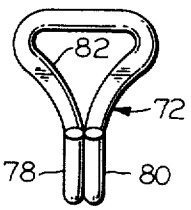


FIG. 12

STRAP CLAMP ASSEMBLY

BACKGROUND OF THE INVENTION

As evidenced by a reference to the prior art, it has long been known to provide clamping systems embodying some form of buckle construction. Such systems are commonly intended to be operable for general use. Included in such general use are the following applications, namely, for fastening loads to automobiles, trailers and trucks, for holding trunk lids down over outsized loads, for clamping pieces to be glued, etc.

One form of buckle clamping system which may be considered to be exemplary of such prior art systems constitutes the subject matter of U.S. Pat. No. **2,825,109.** In the system as described and illustrated in the aforesaid patent, a buckle is utilized which is of two-part construction. One part of the buckle constituting a frame is provided with several cross bars permitting the frame to be secured to the end of a strap. The other part of the buckle constituting a tongue member is pivoted to the frame member and also carries several cross bars to receive the opposite end of the strap. The pivoting of the tongue within the frame to place the tongue in substantially the same plane as the frame tightens the strap into place and the frame and tongue are then locked together with the cross members on the tongue operating to pull the strap taut and more tightly into place over the initial tightness of the strap upon threading into the tongue.

One undesirable characteristic of many of the prior art forms of buckle clamping systems provided heretofore is that they appear to be unsafe under certain circumstances. More specifically, as noted above the buckle used in these systems is an over-center toggle device. Although in many such systems the buckle is provided with a small mechanical detent to keep it in the locked position, this detent is not positive and can wear rapidly, leaving only the tension on the straps to keep the buckle in the locked position. Under certain circumstances where the buckle is not urged up against a flat surface by the tension of the straps, but is located in free air, vibrations, wind gusts or other disturbing influences have been shown to be capable of untoggling the buckle, even though the straps are under considerable average tension. The effect thereof is to leave the strap to loosen and the load to become free. Obviously, such a situation could prove to be quite dangerous.

There have been other approaches employed by the prior art insofar as concerns providing a buckle clamping system with some form of mechanical locking means. To this end, it has been known to utilize a latch hook for tensioning the straps and wherein the latch hook coacts with another portion of the buckle to effect an automatic locking action. In accord with another approach, a buckle is provided with a latch that is operable to latch the buckle clamping system against the accidental unlocking thereof. Moreover, it has been known to provide a buckle clamping system in which a gripping member having a serrated edge is utilized to permit only undirectional movement of the strap. However, none of these approaches has resulted in providing a buckle clamping system which has proven when placed in use to be devoid of one or another undesirable features.

Thus, although the prior art evidences the fact that it has been known heretofore to provide buckle clamping systems with mechanical locking means, it is also known that the devices provided heretofore have not proven to be entirely satisfactory when placed in operation. More specifically, such prior art devices have evidenced a need to make improvements in the nature of the construction thereof. There has therefore existed a need to provide a locking mechanism for a buckle clamping system, particularly of the type wherein a toggle action mode of operation is utilized, which is simple, economical, constructed so that it will not be lost or inadvertently misplaced, and positive in its action. Moreover, it is desirable to provide such a locking mechanism wherein the mechanical advantage is relatively large and very little force is required to prevent accidental untoggling of the buckle. Most importantly, the action of the locking mechanism must be effective to hold the buckle against the strap thereby to prevent the buckle from untoggling.

Accordingly, it is an object of the present invention to provide a novel and improved strap clamp assembly which has general utility.

It is another object of the present invention to provide such a strap clamp assembly which is particularly suited for employment for example in fastening loads to automobiles, trailers and trunks, for holding down trunk lids over outsized loads, for clamping pieces to be glued, etc.

It is still another object of the present invention to provide such a strap clamp assembly wherein a toggle action type of mode of operation is employed.

A further object of the present invention is to provide such a strap clamp assembly which embodies a mechanical locking mechanism which is effective to hold the buckle against the strap thereby to prevent the buckle from untoggling.

A still further object of the present invention is to provide such a strap clamp assembly wherein the mechanical locking mechanism is captivated in the asembly so that it will not be lost or inadvertently misplaced.

Yet another object of the present invention is to provide such a strap clamp assembly wherein the mechanical advantage provided by the mechanical locking mechanism is relatively large so that very little force is required to prevent accidental untoggling of the buckle.

Yet still another object of the present invention is to provide such a strap clamp assembly which is simple in construction, easy to employ, positive in its action, and economical to manufacture.

SUMMARY OF THE INVENTION

It has now been found that the foregoing and related objects can be readily attained in a strap clamp assembly which is particularly suited for employment in a variety of different applications such as among others, for example, in fastening loads to automobiles, trailers and trucks, for holding trunk lids down over outsized loads, for clamping pieces to be glued, etc. The strap clamp assembly includes a buckle, a stirrup operatively connected to the buckle, a slide lock cooperatively associated with the buckle, and strap means having suitable gripping means secured at the free ends thereof. The buckle comprises a generally elongated rectangular member having a pair of side flanges depending therefrom on either side thereof operable to give the buckle the configuration of that of an inverted substantially U-shaped member. The stirrup is operatively connected to the buckle at a point spaced inwardly from one end

of the latter for pivotal movement between a release position and a locking position relative to the buckle. The strap means is of two-part construction with one part being secured to the stirrup and the other part being threadable through a pair of slots provided for this purpose in the buckle. The slide lock is threaded on the second part of the strap means and is operable when the stirrup is in its locking position to hold the buckle against the strap means thereby preventing the buckle from accidentally untoggling.

In accord with the preferred embodiment of the invention, there is provided a protuberance formed on the outer surface of each of the side flanges of the generally elongated rectangular member adjacent one end thereof. Adjoining the latter pair of protuberances, there is also provided in the side flanges of the generally rectangular elongated members a pair of openings. These openings are utilized for purposes of mounting the stirrup to the buckle. More specifically, fastener means are passed through the opposed free ends of the stirrup and are received in the aforesaid pair of openings so that the stirrup is fastened to the buckle for pivotal movement relative thereto. The stirrup has a substantially U-shaped configuration which is defined by a medial portion from the ends of which a pair of arms project outwardly substantially at right angles to the major axis thereof. Each of the arms of the stirrup is provided on the inner surface thereof with a raised portion in the nature of a bump. The aforementioned pair of protuberances are positioned in the path of movement of the arms of the stirrup so as to be engageable by the aforedescribed bumps, provided on the latter. The protuberances on the side flanges of the buckle cooperate with the bumps on the arms of the stirrup whereby through the engagement thereof the movement of the arms relative to the buckle is limited. Namely, with the arms of the stirrup positioned on one side of the protuberances, the stirrup is retained thereat by virtue of the engagement of the protuberances and the bumps. However, by applying a force to the arms of the stirrup the bumps provided on the latter may be made to ride over the protuberances so as to locate the arms of the stirrup on the other side of the protuberances from that whereat they were previously located. The part of the strap means which has one end secured to the stirrup for movement therewith has a gripping means selected from any of a variety of different types thereof affixed to the other end thereof. The other part of the strap means which has one end thereof which is threadable through slots provided therefor in the generally elongated rectangular member is provided at the other end thereof in a manner similar to the first part with a suitable gripping member configured like that of the first part of the strap means. The slide lock consists of a tubular member having one surface thereof which is generally U-shaped. To enable the slide lock to perform its locking function, the slide lock is slidable relative to the buckle to a position wherein the slide lock is received in a pair of notches provided for this purpose in opposed relation in the side flanges of the buckle. The slide lock is retained in the latter described position relative to the buckle by virtue of the slide lock's own inherent spring tension and requires positive action to be taken relative to the slide lock to release the slide lock from its locked position.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a side elevational view of a strap clamp assembly constructed in accordance with the present invention, illustrated in the clamping position;

FIG. **2** is a side elevational view partially in section of a strap clamp assembly constructed in accordance with the present invention, illustrating the manner in which the strap means thereof is cooperatively associated with the buckle and stirrup thereof;

FIG. **3** is a perspective view of an enlarged scale of the buckle of a strap clamp assembly constructed in accordance with the present invention;

FIG. **4** is a perspective view on an enlarged scale of the slide lock of a strap clamp assembly constructed in accordance with the present invention;

FIG. **5** is a cross-sectional view of a strap clamp assembly constructed in accordance with the present invention taken substantially along the line **5—5** in FIG. **1**, illustrating the slide lock in its locking position;

FIG. **6** is a cross-sectional view similar to FIG. **5** of a strap clamp assembly constructed in accordance with the present invention, illustrating the slide lock in its release position;

FIG. **7** is a side elevational view of a portion of a strap clamp assembly constructed in accordance with the present invention, illustrating the manner in which the stirrup is mounted on the buckle;

FIG. **8** is a top plan view partially in section of a strap clamp assembly constructed in accordance with the present invention, illustrating the means by which the stirrup is fastened to the buckle;

FIG. **9** is a side elevational view of one type of gripping means employable with a strap clamp assembly constructed in accordance with the present invention, illustrated attached to one end of a portion of the strap means thereof, the latter being depicted in broken lines;

FIG. **10** is a front view of the gripping means of FIG. **9** constructed in accordance with the present invention;

FIG. **11** is a side elevational view of another type of gripping means employable with a strap clamp assembly constructed in accordance with the present invention; and

FIG. **12** is a front view of the gripping means of FIG. **11** constructed in accordance with the present invention.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

Referring now to FIG. **1** of the drawings, there is illustrated therein a strap clamp assembly, generally designated by reference numeral **10**, constructed in accordance with the present invention. The strap clamp assembly **10** is particularly suited for employment in a variety of different applications such as for example in fastening loads to automobiles, trailers and trucks, for holding trunk lids down over outsized loads, for clamping pieces to be glued, etc. The strap clamp assembly **10** includes a buckle **12**, a stirrup **14** operatively connected to the buckle **12**, a slide lock **16** cooperatively associated with the buckle **23**, and strap means **18**.

As best seen with reference to FIG. **3** of the drawings, the buckle **12** comprises an elongated, generally rectangularly shaped member **20** from which there depends a pair of side flanges **22** and **24**. In accord with the illus-

trated embodiment of the inventive subject matter, the side flanges **22** and **24** are formed integrally with the member **20** and function therewith to provide the buckle **23** with an inverted U-shaped configuration. Continuing with a description of the nature of the construction of the buckle **12**, the latter adjacent one end thereof is provided with a pair of slots **26** and **28** formed in the member **20** in spaced relation relative to each other for a purpose yet to be described. It will be noted with reference to FIGS. **1–3** of the drawings that in accord with one method of forming the slots **24** and **26**, the surface of the member **20** is bent out of the plane thereof and is reversibly bent back upon itself thereby to provide the member **20** adjacent the slots **24** and **26** with a double thickness of material **30** and **32**, respectively, operable to provide additional strength thereto as will be discussed more fully subsequently. The member **20** in spaced relation to the other end thereof is provided with a multiplicity of ribs **34** formed in the otherwise planar surface of the member **20.** The ribs **34** cooperate with the slide lock **16** and the strap means **18** to provide a firmer gripping surface therebetween as will become more apparent when reference is had to the description of the method of employment of the strap clamp assembly **10**, which is to be found set forth hereinbelow. Obviously, a greater or a lesser number of ribs **34** could be provided, if so desired, without departing from the essence of the invention.

Turning next to a consideration of the side flanges **22** and **24**, the latter are each provided adjacent one end thereof with a protuberance **36** and **38**, respectively. The latter protuberances **36** and **38** result from the formation of an indentation in the inner surface of the side flanges **22** and **24**, respectively. It will be noted, particularly with refernce to FIG. **3** of the drawings, that the major axis of each of the protuberances **36** and **38** forms an angle to the major axis of the corresponding side flange **22** and **24**, respectively. In addition, there is provided an opening **40** and **42**, resepctively, in each of the side flanges **22** and **24** of the buckle **12** adjacent to the aforedescribed protuberances **36** and **38.** The opening **40** and **42** in a manner yet to be described are operable for purposes of receiving therein means for mounting the stirrup **14** on the buckle **12.** Completing the description of the nature of the construction of the side flanges **22** and **24**, the latter adjacent to the other end thereof are each provided with a notched area **44** and **46**, respectively. The slide lock **16** is designed to be received within the notched areas **44** and **46** as depicted in FIG. **1** of the drawings whereby when so located therein the slide lock **16** is in its locking position relative to the strap means **18** and the buckle **12.**

Referring now to FIGS. **1**, **7** and **8** of the drawings there is to be found therein a showing of the stirrup **14** which is cooperatively connected to the buckle **12**, and from which an understanding may be had of the nature of the construction of the stirrup **14.** As illustrated therein, the stirrup **14** consists of a substantially U-shaped member which is formed by a medial position **48** and a pair of outwardly extending arms **50** and **52.** The arms **50** and **52** in accord with the illustrated embodiment of the strap clamp assembly **10** are formed integrally with the medial position **48** and project outwardly therefrom so as to form substantially a right angle therewith. The spacing between the arms **50** and **52** is selected so as to be such as to enable the arms **50** and **52** of the stirrup **14** to span the width of the buckle **12**, i.e., the distance measured between the outside surfaces of the side flanges **22** and **24.** On the inner surface of each of the arms **50** and **52** at a point intermediate the ends thereof, there is provided a raised portion **54** and **56**, respectively, configured in the nature of a bump. The latter bumps **54** and **56** in a manner which will be described subsequently cooperate with the previously described protuberances **36** and **38.** More particularly, the protuberances **36** and **38** function as detents relative to the arms **50** and **52** of the stirrup **14.** To this end, the bumps **54** and **56** are suitably located on the arms **50** and **52** of the stirrup **14** so as to be engageable with the corresponding protuberances **36** and **38**, respectively, when the stirrup **14** being mounted on the buckle **12** is moved relative to the latter.

The stirrup **14** is capable of being mounted on the buckle **12** through the use of any suitable conventional form of fastening means commonly found employed for purposes of securing two members together. In accord with the illustrated embodiment of the strap clamp assembly **10**, the fastening means however which has been selected for use for purposes of accomplishing the aforedescribed function comprises a pair of rivet-like members **56.** As best seen with reference to FIG. **8** of the drawings, wherein only one member **56** is depicted, the member **56** is provided with a rounded head **56*a*** and a shaft **56*b*** suitably dimensioned so as to be receivable in the opening **42** provided therefor in the side flange **24** of the buckle **12.** Although not readily visible in the drawings, it is to be understood that the arms **50** and **52** of the stirrup **14** adjacent the free end thereof are each provided with a suitably formed opening through which the aforesaid members **56** are intended to be passed in the manner depicted in FIG. **8** of the drawings.

The method of assembling the stirrup **14** to the buckle **12** is as follows. The stirrup **14** is positioned relative to the buckle **12** so that the arms **50** and **52** of the former span the width of the buckle **12** and with the opening, provided in each of the arms **50** and **52** adjacent the free end thereof for purposes of receiving the members **56**, being aligned with the openings **40** and **42** provided in the side flanges **22** and **24** of the buckle **12.** Thereafter, a member **56** with the head portion **56a** thereof positioned externally of the outer surface of the arms **50** and **52** is made to pass through the openings provided thereof in each of the arms **50** and **52** and then through the corresponding opening **40** and **42** formed for this purpose in the side flanges **22** and **24.** With the member **56** so positioned the free end of the latter is peened or otherwise deformed so as to cause the members **56** to be retained in the openings **40** and **42.** With the stirrup **14** so mounted to the buckle **12**, the former is capable of being pivoted relative to the latter from a clamping position as depicted in FIG. **1** of the drawings to a release position as shown in FIG. **2** of the drawings. The purpose for the movement of the stirrup **14** between the aforedescribed first and second positions relative to the buckle **12** will be found set forth hereinafter in the course of the description of the method of using the strap clamp assembly **10.** It will be noted with reference to FIG. **8** of the drawings that the portion of the side flanges **22** and **24** immediately surrounding the openings **40** and **42**, respectively, is formed in the nature of a boss. The latter is intended to operate in the manner of a bearing surface for the arms **50** and **52.** This is best understood with reference

to FIG. 8 of the drawings wherein there is to be found depicted the relationship which the member **56**, the free end of the arm **52** of the stirrup **14** and the opening **42** formed in the side flange **24** of the buckle **12** bear relative to each other.

With regard to the slide lock **16**, the latter as best understood with reference to FIG. **4** of the drawings comprises a tubular-shaped member having internal dimensions suitably selected so as to enable the slide lock **16** to be threaded along the strap means **18** into a locking position relative to the buckle **12**. More particularly, the slide lock **16** includes a pair of side walls **58** and **60** which are spaced apart by a distance corresponding to the width of the buckle **12**. The side walls **58** and **60** are interconnected by means of a top wall **62** and a bottom wall **64** which, in accord with the illustrated embodiment of the inventive subject matter, are formed integrally therewith. The top wall **62** is inclined inwardly from the edges thereof which are connected to the side walls **58** and **60** so as to form two portions **62***a* and **62***b* which taper towards a point **62***c* and which together function to provide the top wall **62** with a generally V-shaped configuration. The bottom wall **64** embodies an inverted U-shaped configuration. To this end, the bottom wall **64** includes a medial portion **64***a* the opposite sides of which are interconnected by means of laterally extending portions **64***b* and **64***c* to the side walls **58** and **60**, respectively. As best understood with reference to FIG. **5** of the drawings, the spacing between the point **62***c* and the inner surface of the medial portion **64***a* is selected so as to correspond to substantially the thickness of the member **20** as will be described more fully subsequently.

The final component in the strap clamp assembly **10** constructed in accord with the present invention which has yet to be described is the strap means **18**. The strap means **18** is of two-part construction, with each part thereof preferably being constructed from a conventional form of a suitable, strong, durable webbing material. As best understood with reference to FIGS. **1** and **2** of the drawings, the strap means **18** consists of two parts **66** and **68**. The former has one end thereof, designated in the drawings by reference numeral **66***a*, secured to the medial portion **48** of the stirrup **14**. The aforesaid connection may be accomplished as shown in FIG. **1** by passing the end **66***a* of the part **66** of the strap means **18** around the medial portion **48** and between the arms **50** and **52** of the stirrup **14** so as to form a loop with the end **66**a of the part **66**. Thereafter, the aforesaid one end **66***a* of the part **66** is fastened to another portion of the part **66** so as to cause the medial portion **48***a* of the stirrup **14** to be captured therebetween. The means selected for fastening the end **66***a* to another portion of the part **66** may comprise any of the known methods commonly found employed for purposes of securing two pieces of webbing together such as by sewing the pieces together, through the use of heavy duty snaps, etc. The other end of the part **66**, not shown in the drawings in the interest of maintaining clarity of illustration therein, has a gripping means selected from any of a variety of different types thereof affixed thereto. By way of illustration, there are shown in FIGS. **9–12** of the drawings, two types of gripping means which may be employed with the strap means **18**. A detailed description of the nature of the construction thereof will be found set forth subsequently hereinbelow. The other part, i.e., the part **68** of the two-part strap means **18** differs somewhat in construction from the first part **66** thereof which has been described above. More specifically, one end not shown in the drawings in the interest of maintaining clarity of illustration therein, is provided with a gripping means in a manner similar to that described above whereby one end of the part **66** is provided with a gripping means. However, the other end, i.e., the end designated by reference numeral **68** in the drawings, unlike the end **66***a* of the part **66**, is not fastened to any portion of the strap clamp assembly **10**. Rather, the end **68***a* of the part **68** is designed to be threaded through the slots **26** and **28** formed in the buckle **12** in a manner which will be described more fully in connection with the description of the method of employment of the strap clamp assembly **10** which is to be found set forth hereinafter. In accord with the illustrated embodiment thereof, to assist in threading the end **68***a* through the aforedescribed slots **26** and **28** the end **68***a* is preferably rolled upon itself several times as illustrated in FIGS. **1** and **2** of the drawings. For purpose of maintaining the end **68***a* in the aforesaid rolled-up condition, the latter may be sewed together, or secured together through some other method. It is of course to be understood that, if so desired, some other means could be employed for purposes of facilitating the threading of the end **68***a* of the part **68** through the slots **26** and **28** such as by providing the former with a metal tip, etc., without departing from the essence of the invention.

Referring now to FIGS. **9–12** of the drawings, there is depicted therein two types of gripping means **70** and **72** employable with the strap clamp assembly **10**. The gripping means **70** as illustrated in FIGS. **9** and **10** of the drawings consists of a metal member one end of which is bifurcated so as to form two legs **70***a* and **70***b*, which are separated by a slot **74**. The latter slot **74** terminates in a triangular shaped opening **76** suitably dimensioned so as to enable one end of either the part **66** or the part **68** of the strap means **18** to be received therewithin. As depicted in broken lines in FIG. **9** of the drawings, the gripping means **70** may be secured to one end of the part **66** or of the part **68** of the strap means **18** by passing the end thereof through the opening **76** and forming a loop therewith. Thereafter, this loop may be maintained by sewing the end of the corresponding part, i.e., the part **66** or the part **68** to another portion thereof or through the use of some other means. The other gripping means, i.e., gripping means **72** which is shown in FIGS. **11** and **12** of the drawings, consists of a wire-like member which terminates in a pair of ends **78** and **80** which are formed so as to be positioned in juxtaposed relation relative to each other. From the ends **78** and **80** thereof, the two legs of the wire-like member which comprises the gripping means **72** diverge outwardly so as to form an opening **82** therebetween. The latter opening **82** is suitably dimensioned so as to enable one end of either the part **66** or the part **68** to be received therewithin in a manner similar to that of the gripping means **70**. The end of the corresponding part **66** or the part **68** of the strap means **18** which is cooperatively associated with the gripping means **72** may be secured thereto in the same manner as that which has been described hereinabove whereby one end of the strap means **18** is secured to the gripping means **70**.

There will now be set forth a description of the manner in which the initial assembly of the part **68** of the

strap means **18** is accomplished as well as a description of the preferred method of employment of the strap clamp assembly **10.** For purposes of the following description, it will be assumed that stirrup **14** has been assembled to the buckle **12,** that the end **66***a* of the part **66** of the strap means **18** has been secured to the stirrup **14,** and that the strap clamp assembly **10** is in the release position thereof, i.e., the position thereof depicted in FIG. **2** of the drawings. Moreover for purposes of the following description of the initial assembly of the components of the strap clamp assembly **10,** it will be assumed that the gripping means provided at the other end of each of the parts **66** or **68** of the strap means **18** have been positioned in gripping engagement with portions of the load which it is desired to be fastened to some object through the use of strap clamp assembly **10.** Thus, with the components embodied in the strap clamp assembly **10** positioned in the aforedescribed manner, the end **68***a* of the part **68** of the strap means **18** is passed through the slide lock **16.** Thereafter, as schematically depicted by the arrows appearing in FIG. **2** of the drawings, the end **68***a* of the part **68** is passed over the end of the member **20,** through the slot **26,** then back under the member **20** and is thereafter passed through the slot **28.** The part **68** of the strap means **18** is then drawn taut. With the strap means **18** having been drawn taut, the end **68***a* of the part **68** is then passed again through the slide lock **16** so that a double thickness of the part **68** is received in the slide lock **16.** The next step is to pivot the stirrup **14** from the position thereof depicted in FIG. **2** of the drawings into the locking position thereof as shown in FIG. **1.** It will be noted that the aforedescribed action is effective to further increase the tension being exerted by the part **66** and thereby by the entire strap means **18.** The final step is to thread the slide lock **16** from the position thereof depicted in broken lines in FIG. **1** of the drawings to the position thereof depicted in solid lines in the same figure wherein the slide lock **16** is received in the notched area **44** and **46** of the buckle **12.** With the slide lock **16** positioned in the notched areas **44** and **46,** the mechanical advantage provided thereby is relatively large so that very little force is required to prevent accidental untoggling of the buckle **12.** Moreover, as will now be described, it requires a positive act to release the slide lock **16** from its locking position, i.e., to remove the slide lock **16** from the notched areas **44** and **46.** This is because of the fact that by virtue of the V-shaped configuration of the top wall **62** of the slide lock **16,** the latter is inwardly spring biased into engagement with the ribs **34** of the member **20** in the manner illustrated in FIG. **5** of the drawings and with the medial portion **64***a* of the bottom wall **64** of the slide lock **26** pressing the double thickness of the part **68** of the strap means **18** into engagement with the undersurface of the member **20.** It can thus be seen with reference to FIG. **5** of the drawings that the slide lock **16** when positioned in the notched areas **44** and **46** of the buckle **12** is effective to clamp portions of the part **68** of the strap means **18** into engagement with the member **20.** To release the slide lock **16** from the notched areas **44** and **46** of the buckle **12,** it is necessary to apply a force to the top wall **62** of the slide lock **26** at the portions thereof identified by the arrows in FIG. **6** of the drawings. This force is effective to cause the center portion **62***c* of the top wall **62** of the slide lock **26** to be biased out of engagement with the ribs **34** of the member **20.** Consequently, the slide lock **16** may be slid from the solid line position thereof as shown in FIG. **1** of the drawings to the broken line position thereof depicted in the same figure. Thereafter, the strap clamp assembly **10** is released by pivoting the member **20** about the rivet-like members, i.e., pivot pins **56** out of engagement with the part **68** of the strap clamp means **18.** The latter action is commonly found to be sufficient to enable one to free from the load the gripping means which is attached at one end of each of the parts **66** and **68.** In this connection, it is important to note that is has been found that it is rarely necessary to unthread the part **68** from the member **20** to either apply or remove the strap clamp assembly **10.** Consequently, once the part **68** has been threaded through the member **20,** in accord with the preferred method of employing the strap clamp assembly **10** of the present invention, the part **68** is left in engagement with the member **20** and the required movement of the strap means **18** to enable the gripping means attached to the ends of the parts **66** and **68** to be engaged and disengaged from a load is accomplished by pivoting the member **20** about the members **56** between the toggled and the untoggled positions thereof. In this regard, it is important to recognize that when the member **20** is in its toggled, i.e., locked position relative to the part **68,** the latter is shortened by approximately five-eighths inch which is sufficient to cause the desired tension to be applied to the parts **66** and **68** of the strap means **18** and therethrough to the gripping means which are engaged with the load. Also, it should be noted that when the member **20** is in its untoggled, i.e., unlocked position relative to the part **68** that the end **68***a* of the part, i.e., strap **68** is capable of being pulled through the member **20** for purposes of snugging up the parts **66** and **68** of the strap means **18** so that when the member **20** is moved to its toggled position the proper tension is applied to the strap clamp assembly **10.** Obviously however, if one should so desire, it is also possible to utilize the strap clamp assembly **10** of the present invention in such a manner that the part **68** is unthreaded completely from the member **20** for purposes of disengaging the strap clamp assembly **10** from a load.

Although only one embodiment of a strap clamp assembly constructed in accordance with the present invention has been described hereinabove and shown in the drawings, it is to be understood that modifications in the construction thereof may be made thereto by those skilled in the art without departing from the essence of the invention. In this connection, some of the modifications which can be made in the strap clamp assembly **10** have been alluded to hereinabove while others will become readily apparent to those skilled in the art when exposed to the present description and illustration of the construction of the strap clamp assembly **10.** For example, although the buckle **12** and the stirrup **14** are preferably made from a suitable form of metal, it is to be understood that other materials sufficiently strong to be operable for purposes of functioning in the aforedescribed manner in the strap clamp assembly **10** may be substituted therefor without departing from the essence of the invention. Similarly, although the slide lock **16** is preferably made from a suitable type of plastic material, it is also possible without departing from the essence of the invention to form the slide lock **16** from some other material. Also, the straps means **18** may take some form other than webbing, if

so desired, without departing from the essence of the invention. With further regard to the strap means **18**, the embodiment thereof which has been shown in the drawings is of two-part construction. Namely, the strap means **18** consists of the part **66** which has one end thereof secured to the stirrup **14** and the other end thereof equipped with a suitable gripping means, while the part **68** on the other hand also is equipped with a suitable gripping means at one end thereof with the end **68***a* of the part **68** being suitably configured so as to be threadable through the member **20.** This form of strap means **18** particularly when the gripping means consists of hooks as depicted in FIGS. **9–12** of the drawings is especially adapted to be used in connection with car-top carriers, etc., for purposes of securing a load tightly thereon. For such an application, the strap clamp assembly **10** is preferably employed with the part **68** being initially threaded through the member **20.** Thus, the steps which are followed in such a case in utilizing the strap clamp assembly **10** include positioning the strap clamp assembly **10,** with the member **20** in its untoggled position, in juxtaposed relation to the load, and engaging the gripping means with portions of the carrier. Then the slack is taken up by pulling the end **68***a* of the part **68** so that the latter is pulled through the member **20** to the desired extent. Thereafter, the member **20** is moved to its toggles position which is effective to tighten the strap means **18.** The final step is to position the slide lock **16** in the notches **44** and **46** provided therefor in the member **20** to thereby lock the member **20** in its toggled position. To release the strap clamp assembly **10,** the previously described steps are followed in reverse order. However, there are some applications wherein it is desired that the strap clamp assembly **10** be utilized in such a manner that the strap means thereof is operable to completely encircle the load desired to be clamped. For such applications, the strap means which is employed is of one-part construction. Namely, the strap means consists of a single part which is equipped at one end with a suitable gripping means which is capable of being detachably connected to the stirrup **14** of the strap clamp assembly while the other end of the part is configured in a manner similar to the end **68***a* of the part **68** whereby to be capable of being through the member **20** in the same manner as was described previously hereinabove in connection with the description of the part **68.** To employ a strap clamp assembly embodying the latter type of strap means, with one end of the single part which comprises the strap means being threadedly engaged with the member **20,** the other end thereof which is equipped with the gripping means is passed around the load and is hooked to the stirrup **14.** The remaining steps are the same as those performed in utilizing the strap clamp assembly **10** when the strap means **18** is of two-part construction. Namely, the free end of the strap means is pulled so that the strap means is pulled through the member **20** to the desired extent. Thereafter, the member **20** is moved to its toggled position which is effective to apply the desired tension to the strap means. Finally, the slide lock **16** is engaged in the notches **44** and **46** of the member **20.** Thus, here also it can be seen that the strap clamp assembly is capable of being disassociated from the load when the member **20** is in its untoggled position simply by unhooking the gripping means from the stirrup **14** and removing the strap clamp assembly from the load while the other end of the strap means remains threaded in the member **20.**

Thus, it can be seen that the present invention provides a novel and improved strap clamp assembly which has general utility. Moreover, in accord with the present invention a strap clamp assembly has been provided which is particularly suited for employment, for example, in fastening loads to automobiles, trailers and trucks, for holding down trunk lids over outsized loads, for clamping pieces to be glued, etc. The strap clamp assembly of the present invention also is of the type wherein a toggle action type of mode of operation is employed. Furthermore, in accordance with the present invention a strap clamp assembly has been provided which embodies a mechanical locking mechanism which is effective to hold the buckle against the strap thereby to prevent the buckle from untoggling. Also, a strap clamp assembly has been provided in accord with the present invention wherein the mechanical locking mechanism is captivated in the assembly so that it will not be lost or inadvertently misplaced. The strap clamp assembly of the present invention in addition is characterized by the fact that the mechanical advantage as provided by the mechanical locking mechanism is relatively large so that very little force is required to prevent accidental untoggling of the buckle. Finally, in accord with the present invention a strap clamp assembly has been provided which is simple in construction, easy to employ, positive in its action, and economical to manufacture.

Having thus described the invention, I claim:

1. A strap clamp assembly having general utility comprising:

a. a buckle consisting of an elongated member having side flanges depending therefrom on at least two sides thereof, said elongated members having at least a pair of slots formed therein intermediate the ends thereof, said pair of side flanges each having a notched area formed therein intermediate the ends thereof;

b. a stirrup including a medial portion and a pair of arms extending outwardly from opposite ends of said medial portion;

c. mounting means operable for fastening said pair of arms of said stirrup to said side flanges of said buckle to enable said stirrup to pivot relative to said buckle between a release position and a clamping position;

d. strap means operable for gripping an object and including a first portion having one end thereof secured to said stirrup for movement therewith and a second portion having one end thereof receivable in said pair of slots in said buckle for detachably connecting said one end of said second portion of said strap means to said buckle; and

e. a slide lock comprising a tubular member consisting of a first pair of side walls, a second pair of side walls connected to said first pair of side walls and a pair of opposed open walls, one of said first pair of side walls being inclined inwardly from the edges thereof towards the center thereof in the direction of the other of said first pair of side walls, said slide lock being supported on said strap means for movement between a release position wherein said slide lock is positioned in spaced relation to said buckle and a locking position wherein said slide lock is received in said notched areas of said pair of side

flanges of said buckle and said one of said pair of side walls of said slide lock applies a biasing force to said buckle effective when said stirrup is in said clamping position thereof to hold said buckle and said strap means in clamped relation relative to each other so as to thereby prevent the accidental release of the strap clamp assembly.

2. The strap clamp assembly as set forth in claim 1 wherein each of said side flanges of said buckle has a hole formed therein adjacent one end thereof, each of said pair of arms of said stirrup has a hole formed therein adjacent to the free end thereof, and said mounting means comprises a pair of fasteners passed through said hole in each of said pair of arms of said stirrup and received in said hole formed in a corrsponding one of said pair of side flanges of said buckle.

3. The strap clamp assembly as set forth in claim 2 wherein the surface immediately surrounding said hole formed in each of said pair of side flanges of said buckle is operable as a bearing surface for a corresponding one of said pair of arms of said stirrup.

4. The strap clamp assembly as set forth in claim 1 wherein gripping means are secured to the other end of each of said first and second portions of said strap means.

5. The strap clamp assembly as set forth in claim 1 wherein said other of said first pair of side walls of said slide lock includes a center portion extending into the interior of said slide lock and engageable with said strap means when said slide lock is in said locking position thereof, and wherein said slide lock requires an external force to be applied thereto for purposes of releasing said slide lock from said locking position thereof.

6. The strap clamp assembly as set forth in claim 1 further comprising detent means operable to inhibit the movement of said stirrup between said release position and said clamping position thereof, said detent means including a detent formed on the inner surface of each of said pair of arms of said stirrup and a protuberance formed on the external surface of each of said pair of side flanges of said buckle engageable by said detents formed on said pair of arms of said stirrup so as to require a manual force to be applied to said pair of arms of said stirrup to move said stirrup between said release position and said locking position thereof.

7. The strap clamp assembly as set forth in claim 1 wherein said elongated member further includes a multiplicity of ribs formed on the external surface thereof intermediate the ends thereof engageable by said one of said first pair of side walls of said slide lock when said slide lock is in said locking position thereof and cooperable with said one of said first pair of side walls of said slide lock to provide a firm gripping surface therebetween.

8. The strap clamp assembly as set forth in claim 1 wherein said buckle and said stirrup are formed of metal.

9. The strap clamp assembly as set forth in claim 1 wherein said slide lock is formed of plastic, and said strap means consists of webbing.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,893,210
DATED : July 8, 1975
INVENTOR(S) : William J. Hildebrandt

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 12, line 60, after "open" insert -- end --.

Signed and Sealed this

thirtieth Day of *September 1975*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks