Dec. 20, 1955 P. W. WHITE ET AL 2,727,289

BUCKLES

Filed Aug. 4, 1951 2 Sheets-Sheet 1

Fig. 1

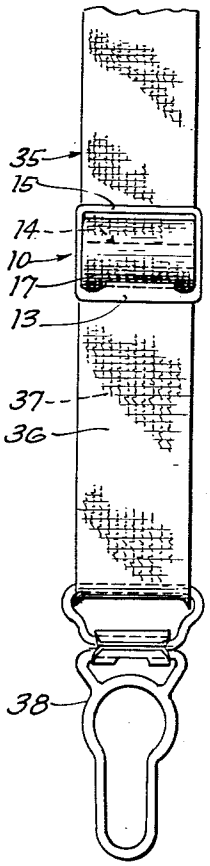


Fig. 2

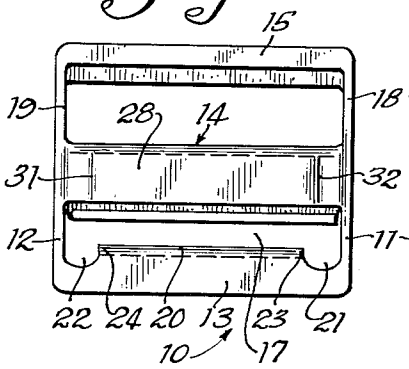


Fig. 3

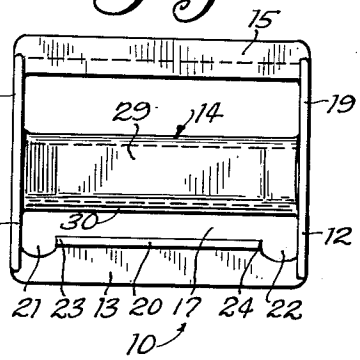


Fig. 4

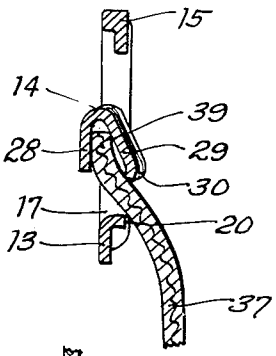


Fig. 5

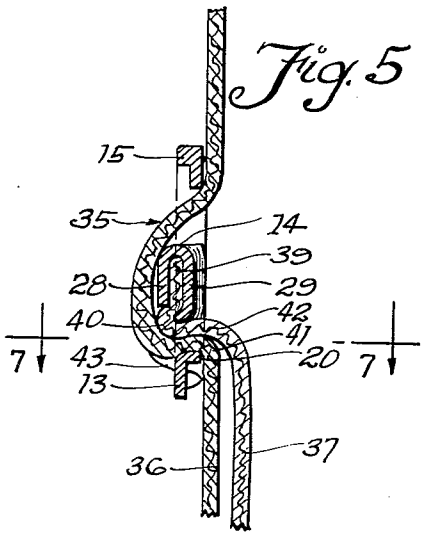


Fig. 6

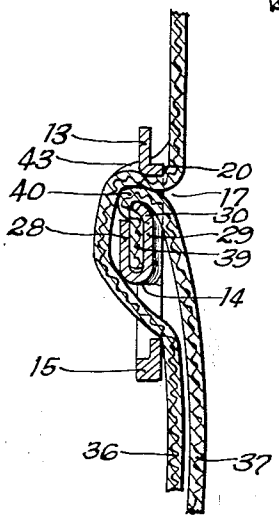
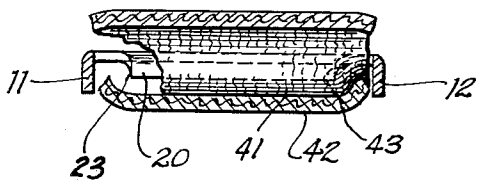


Fig. 7



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BUCKLES

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Fig. 8

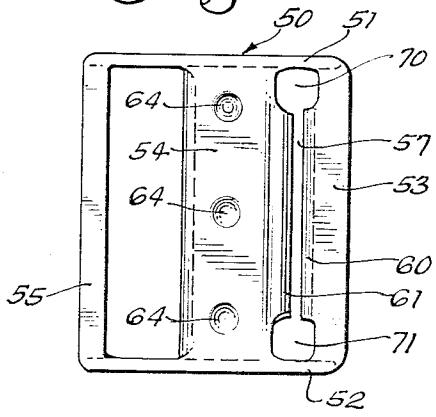


Fig. 9

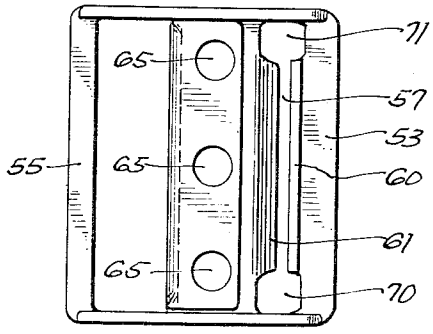


Fig. 12

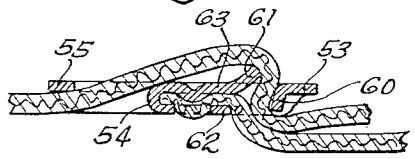


Fig. 10

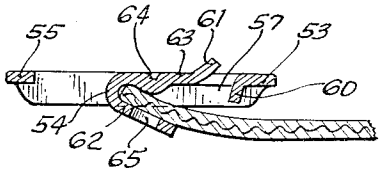


Fig. 11

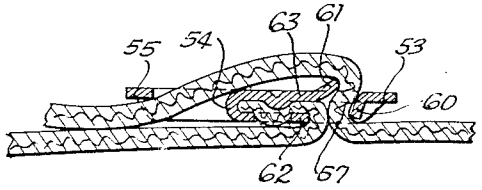
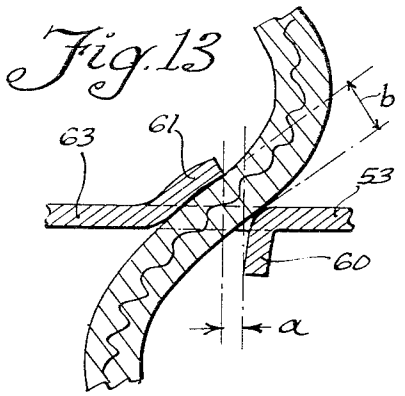


Fig. 13



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United States Patent Office

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BUCKLES

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Application August 4, 1951, Serial No. 240,344

9 Claims. (Cl. 24—200)

This invention relates to buckles, more particularly to one-piece buckles for detachably securing or supporting garments or other articles, and the invention has for an object the provision of a one-piece buckle of this type which is simple, rugged, and reliable, and which may be manufactured at low cost.

Various arrangements have been heretofore proposed in an effort to provide a satisfactory one-piece buckle which is effective to clamp in adjusted positions a strap such, for example, as garter or suspender straps and which may be readily released for easy adjustment. While one-piece buckles heretofore constructed have been found to be sufficiently reliable for many purposes, certain objections have been encountered from the standpoint of manufacture of the buckles in large quantities, particularly with relation to ease in assembling the end of the strap to the buckle frame, from the standpoint of creeping and slipping of the strap particularly when an elastic webbing is used, which becomes more pronounced as the strap becomes worn, and from the standpoint of ease in adjustment of the buckle.

Accordingly, it is a further object of this invention to provide an improved one-piece buckle which is readily formed by a simple sheet metal stamping operation, which is sturdy and reliable, which is simply and easily secured to the end of a strap with a minimum of threading operations and is effective to provide clamping of a strap in adjusted positions without creeping to permit easy adjustment thereof.

According to one aspect of the invention a one-piece buckle frame is provided comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive the running portion of a strap. One of the cross-bars is provided with a clamping portion turned under the upper portion thereof for clamping the end of a strap therebetween and has an edge thereof adjacent said opening extending upwardly out of the main plane of the buckle frame. The other of said cross-bars has an edge thereof adjacent said opening extending downwardly out of the main plane of the buckle, said upturned and downturned edges having recessed end portions defining snubbing corners adapted to engage the outer edge portions of a strap threaded through said opening. The extremities of said upturned and downturned edges have a horizontal spacing substantially less than the thickness of a strap threaded therebetween to force the strap to enter and leave said opening at an obtuse angle relative to the line along which tension is applied to the strap whereby the running portion of the strap is securely clamped so that the buckle does not creep or slip while at the same time the buckle may be readily adjusted.

In accordance with an alternative embodiment of the invention one of the cross-bars is provided with an inturned portion for clamping the end of a strap to the cross-bar and the inturned portion is provided with an upturned edge adjacent said opening, which upturned edge is so positioned that a strap covering said edge

extends above the upper face of the buckle. The other of the cross-bars is provided with a downturned edge adjacent said opening for engagement with the running portion of a strap threaded through the strap receiving opening. The portion of the strap which is adjacent the clamped end thereof extends over the upturned edge of said one cross-bar, through the opening, and over the downturned edge of said other cross-bar to snub the running portion of the strap against said downturned edge when tension is applied to the strap. The downturned edge of said other cross-bar is provided with recessed end portions defining corner portions adapted to engage the outer portions of the strap whereby a powerful snubbing action is produced when tension is applied to the strap so that the running portion of the strap is snubbed over and around the corner portions of the downturned edge of the other cross-bar by the fixed portion of the strap. Furthermore, frictional contact between the running and fixed portions of the strap is provided over the entire distance between the upturned and downturned edges of the frame cross-bars to prevent creeping or slipping of the strap.

For a more complete understanding of the invention reference should now be had to the drawings in which:

Fig. 1 is a front elevational view of a garter strap which has positioned thereon a buckle constructed in accordance with the invention;

Fig. 2 is a front view of the buckle of Fig. 1;

Fig. 3 is a rear view of the buckle of Fig. 1;

Fig. 4 is a longitudinal sectional view of the buckle of Fig. 1 showing the manner in which a strap end is secured therein;

Fig. 5 is a longitudinal sectional view of the buckle of Fig. 1 showing the buckle in clamping position on a strap;

Fig. 6 is a longitudinal sectional view similar to Fig. 5 illustrating an alternative threading arrangement of the buckle of Fig. 2;

Fig. 7 is a sectional view taken along the line 7—7 of Fig. 5 and showing the manner in which the strap is snubbed over the corner edges of the gripping cross-bar of the buckle;

Figs. 8 and 9 are front and rear views, respectively, of a buckle constituting another embodiment of the invention;

Fig. 10 is a longitudinal sectional view of the buckle of Fig. 8 showing the manner in which the end of a strap is clamped therein;

Fig. 11 is a longitudinal sectional view of the buckle of Fig. 8 showing the buckle in clamping position on a strap;

Fig. 12 is a longitudinal sectional view similar to Fig. 11 illustrating an alternative threading arrangement of the buckle of Fig. 8; and

Fig. 13 is a fragmentary sectional view of the buckle of Fig. 8 on a larger scale and showing the details of the gripping and clamping cross-bars thereof.

Referring now to the drawings, and more particularly to Figs. 1 to 7, inclusive, thereof, the invention is shown as comprising a one-piece buckle frame **10** which is preferably formed from sheet metal by a suitable stamping operation and comprises a pair of side-bars **11** and **12** positioned on edge, and a plurality of cross-bars **13**, **14**, and **15**, the side-bars **11** and **12** and the cross-bars **13** and **14** defining a strap receiving opening or slot **17** to receive the running portion of a strap. In the particular form of buckle shown in the drawing, i. e., a garter buckle, the buckle frame **10** is provided with a suitable extension comprising side-bar extensions **18** and **19** and the end bar **15** which is employed as a strap hold-down bar as shown clearly in Figs. 1 and 5.

As shown best in Figs. 2 and 3, the forward cross-bar

13 of the frame 10, which acts as the gripping bar of the buckle, is provided with a downturned edge portion 20 adjacent the opening 17. The end portions of the downturned edge 20 are recessed or notched to provide the end openings 21 and 22 at either end of the slot 17 which define snubbing corners 23 and 24 which are offset inwardly relative to the side-bars 11 and 12 and are adapted to engage the outer edge portions of a strap inserted through the opening 17, as will appear more fully hereinafter. The center or clamping cross-bar 14 of the frame 10 is used to secure the end of a strap to the frame and is provided with a clamping portion 29 which is turned under the upper portion 28 thereof and extends generally parallel thereto, and is adapted to clamp the end of a strap between the portions 28 and 29 of the cross-bar 14. The clamping portion 29 is provided with an upturned edge 30 which is positioned outside the inner edge of the upper portion 28 of the cross-bar 14 and adjacent the strap receiving opening 17. When the end of a strap is clamped between the portions 28 and 29 in the manner to be described in more detail hereinafter the portion of the strap adjacent the clamped end thereof extends over the upturned edge 30 and downwardly through the opening 17.

In order to increase the gripping action of the buckle, and particularly in cases when the buckle frame 10 is quite narrow so that frictional engagement between the overlying portions of the strap is rather small, the cross-bar 14 is positioned slightly above the main plane of the buckle by deforming the portions 28 and 29 thereof upwardly at the points 31 and 32 (Fig. 2) so that substantially the entire length of the cross-bar 14 is positioned above the other cross-bars 13 and 15 of the buckle frame 10.

When used as a garter buckle the frame 10 is clamped on a supporting strap in the manner shown in Fig. 1. Thus, one end of a strap 35 is securely clamped in the cross-bar 14 and extends over the upturned edge 30 thereof, through the opening 17 and under the cross-bar 13, and extends downwardly to form a loop, having a forward side 36 and a rear side 37, which by way of illustration carries a suitable garter fastener 38. The running portion of the strap 35, which forms the forward side 36 of the fastener supporting loop, overlies the rear side 37 thereof and is threaded beneath the gripping bar 13, upwardly through the opening 17, over the cross-bar 14, and under the hold-down bar 15. In this connection it will be understood that the upper end of the running portion of the strap 35 is secured to any suitable supporting means such as a garter belt or the like.

In order to permit one end 39 of the strap 35 to be secured to the cross-bar 14 in a simple and reliable manner and with a minimum of threading operations of the strap, the clamping portion 29 of the cross-bar 14 is initially only partially turned under the upper portion thereof so as to define a V-shaped slot between the portions 28 and 29 into which the end 39 of the strap 35 is inserted in the manner shown in Fig. 4. It will be noted that the upturned edge 30 of the portion 29 is initially positioned below the upper portion 28 to permit the strap end 39 to be inserted directly into the slot between the portions 28 and 29 from the back of the buckle and with a minimum of threading operations of the strap.

With the end 39 of the strap 35 positioned in the slot between the portions 28 and 29, these portions are compressed tightly together by any suitable means such as a stamping machine or the like, so as to deform the clamping portion 29 thereof upwardly to the position shown in Fig. 5 and clamp the strap end 39 therebetween. Preferably, sufficient force is exerted on the portions 28 and 29 in clamping the end of the strap therebetween to compress the end of the strap to substantially one-half its normal thickness, thereby obtaining a secure grip on the end of the strap. Furthermore, due to the relative positioning of the parts of the cross-bar 14 the upturned edge 30 substantially closes the slot formed between the portions 28 and 29 and effectively snubs the strap against the inner edge of the upper portion 28 to increase the grip on the secured end 39 of the strap 35. The upturned edge 30 is positioned between the clamped end of the strap and the opening 17 so that the strap is directed upwardly out of the slot between the portions 28 and 29 and over the upturned edge 30 and the upturned edge 30 is of sufficient height to position the portion 40 of the strap which covers this edge above the upper surface of the cross-bar 14 so that the upturned edge 30 forms a snubbing edge which is covered by the strap and extends upwardly out of the plane of the cross-bar 14.

After the end of the strap has been secured to the cross-bar 14 in the manner described above, the strap is threaded through the member to be supported, such as a garter fastener 38, and is then threaded upwardly through the opening 17, over the cross-bar 14, and under the hold-down bar 15 as illustrated in Fig. 5. In this connection it will be understood that since the strap end is initially inserted into the slot between the portions 28 and 29 from the rear of the buckle it is not necessary to thread the free end of the straps downwardly through the opening 17 thereby avoiding an extra threading operation. The portion 41 of the running portion of the strap is thus positioned between the downturned edge 20 on the cross-bar 13 and the portion 42 of the strap adjacent the fixed end thereof. When tension is applied to the strap the portion 42 distorts the portion 41 thereof over the downturned edge 20 to provide a powerful snubbing action which maintains the buckle in its adjusted position and prevents the buckle from slipping or creeping. In actual practice it has been found that the snubbing action of the portion 42 is sufficiently positive to maintain the buckle in clamped position while tension is exerted only on the inner side 37 of the supporting loop and the buckle will not slip even under this extreme condition, although in normal use the tension is evenly distributed between the two sides of the loop.

As clearly shown in Fig. 7 the snubbing corners 23 and 24, provided at each end of the downturned edge 20, are positioned somewhat inside of the outer edges of the strap so that the outer edge portions of the strap are distorted around the corners 23 and 24 to increase the snubbing action of the buckle. Due to the pliable character of the strap the overlying portion 42 thereof distorts the edge portions, such as the portion 43, around the corners 23 and 24 so that a double snubbing action is provided at each of these corners. It will be understood that the recesses 21 and 22 adjacent the corners 23 and 24 are of sufficient depth to permit the above-described distortion around these corners to increase the snubbing action thereof. The snubbing corners 23 and 24 are preferably sufficiently sharp to provide a positive snubbing action to maintain the buckle in adjustable clamped position. However, these corner portions are sufficiently rounded to permit the position of the buckle to be readily adjusted while tension upon the strap is maintained. In this connection it will be understood that if the corners 23 and 24 are too round, insufficient snubbing action is provided and the buckle will tend to slip somewhat upon repeated applications of tension to the strap.

It will be noted that when the running portion of the strap is threaded through the openings of the buckle in the manner shown in Fig. 5, a substantial area of frictional contact between the fixed and running portions of the strap is attained. Thus, the fixed portion of the strap is in frictional contact with the running portion thereof from a point substantially above the upturned edge 30 to a point beyond the downturned edge 20. Furthermore, by positioning the upturned edge 30 in the manner shown so that the strap portion 40 immediately thereabove is positioned slightly above the upper

surface of the portion **28** of the cross-bar **14**, a further snubbing action is produced by the protruding portion **40** of the strap. The above-described relatively large area of frictional contact between the fixed and running portions of the strap further increases the clamping action of the buckle and prevents slipping or creeping thereof along the strap.

Preferably the upturned edge **30** and the downturned edge **20** are spaced apart horizontally by a distance substantially equal to two thicknesses of the strap **35**. However, due to the above-described area of frictional contact between the fixed and running portions of the strap, this distance may be varied somewhat so that straps having a variety of thicknesses may be employed without any slippage of the buckle. In this connection it will be understood that when the edges **20** and **30** are spaced apart by a distance substantially equal to two thicknesses of the strap, the overlying portions of the strap are in continuous frictional contact even though tension is released from the strap so that the position of the buckle is effectively maintained. The above-described area of frictional contact is further increased by deforming the cross-bar **14** upwardly in the manner described above so that the edges **20** and **30** are spaced apart by a substantial distance in a transverse direction. However, it will be understood that if the buckle is sufficiently wide to provide the desired area of frictional contact, the cross-bar **14** may be positioned in substantially the same plane as the cross-bars **13** and **15**.

Adjustment of the buckle along the running portion of the strap **35** while tension is applied to the strap may be conveniently made by taking hold of the sides of the buckle and moving it either up or down. Furthermore, if it is desired to move the buckle in the upward direction the buckle can be adjusted by merely placing the index finger between the sides **36** and **37** of the supporting loop and pulling upward so that the area of frictional contact is reduced and the buckle slides upwardly along the running portion of the strap.

In the event that a buckle is required which is completely covered on the rear side thereof, the strap may be threaded through the buckle in the manner shown in Fig. 6. Thus, the fixed end **39** of the strap **35** is clamped in the cross-bar **14** and extends back over the under side of the clamping portion **29** thereof to form the under side **37** of the supporting loop, the outer loop portion **36** being threaded under the hold-down cross-bar **15** over the cross-bar **14** and downwardly through the strap receiving slot **17** and is snubbed over the downturned edge **20** of the cross-bar **13** in the manner described above.

In Figs. 8 to 12, inclusive, of the drawings there is illustrated another embodiment of the present invention. In general, the one-piece buckle shown in these figures is similar to the embodiment described above in connection with Figs. 1 to 7, inclusive, and comprises a buckle frame **50** having suitable side-bars **51** and **52** and cross-bars **53** and **54** which define a strap receiving opening or slot **57** therebetween. The gripping cross-bar **53** is provided with a downturned edge **60** which is inclined downwardly at an acute angle relative to the main plane of the buckle, and the cross-bar **54** is provided with an upturned edge **61** which is inclined upwardly at an acute angle relative to the main plane of the buckle. The strap receiving opening **57** is enlarged at the ends thereof by means of the recesses **70** and **71**. The cross-bar **54** is provided with an inturned clamping portion **62** which is used to clamp one end of the strap against the upper portion **63** thereof in a manner generally similar to the buckle described above in connection with Figs. 1 to 7, inclusive.

One end of a strap is clamped between the portions **62** and **63** and there is provided a plurality of indentations **64** in the upper portion **63** of the cross-bar **54** which cooperate with the openings **65** in the clamping portion **62** to deform the portions of the strap positioned therebetween to increase the grip upon the clamped end of the strap. Initially the clamping portion **62** is not completely formed and the end of the strap is inserted between the portions **62** and **63** after which these portions are tightly compressed together so that the indentations **64** enter the adjacent openings **65** and secure the end of the strap in the manner shown in Fig. 11.

Once the end of a strap is secured to the cross-bar **54** the strap is threaded through the buckle in the manner shown in Fig. 11 so that the back side of the cross-bar **54** is completely covered and the running portion of the strap extends over the upturned edge **61** and the downturned edge **60**. As clearly shown in the detailed sectional view of Fig. 13 the extremities of the upturned and downturned edge portions **61** and **60** are spaced apart horizontally by a distance *a* which is substantially less than the thickness of the strap which is threaded through the opening **57**. Furthermore, the minimum spacing *b* between the edge portions **60** and **61** is preferably equal to the normal thickness of the strap so that the strap is in frictional contact with these edge portions as clearly shown in Fig. 13. The extremities of the edge portions **60** and **61** are preferably turned slightly outwardly so that the free end of the strap may be readily inserted through the slot **57**. It will be noted that with the above-described arrangement wherein the snubbing edges **60** and **61** are inclined at an angle to the main plane of the buckle frame and are spaced apart horizontally by a distance substantially less than the thickness of the strap, the running portion of the strap is forced to enter and leave the opening **57** at an angle greater than 90 degrees with respect to the line along which tension is applied to the strap. As a result the strap extends in a reverse curve through the strap receiving slot **57** and the snubbing action of the edges **60** and **61** thereof is substantially increased. Furthermore, by providing the above-described recesses **70** and **71** at the extremities of the slot **57** the corner portions of the snubbing edges **60** and **61** engage the outer edges of the running portion of the strap and when tension is applied to the strap the outer edge portions thereof are turned over the corners of both of the gripping edges **60** and **61** so that the running portion of the strap is snubbed over these edges in its adjusted position. The position of the buckle may be readily adjusted by merely tilting the buckle slightly so as to release the tension on one edge thereof and sliding the buckle along the strap to the desired position.

In the event that a covered buckle is not required the strap may be threaded through the buckle in the manner shown in Fig. 12 so that the fixed end of the strap engages the running portion thereof and provides an increased snubbing action in cooperation with the downturned snubbing edge **60** in a manner similar to that described in detail above in connection with the buckle of Figs. 1 to 7, inclusive.

While particular embodiments of this invention have been shown, it will be understood, of course, that the invention is not limited thereto since many modifications may be made, and it is contemplated, therefore, by the appended claims, to cover any such modifications as fall within the true spirit and scope of this invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive a strap, one of said cross-bars having a clamping portion turned under the upper portion thereof for clamping the end of a strap therebetween and having the edge thereof adjacent said opening extending upwardly therefrom, the other of said cross-bars having the edge thereof adjacent said opening extending downwardly therefrom, said upturned and downturned edges being nar-

rower than a strap threaded through said opening and having recessed end portions defining snubbing corners adapted to engage the strap adjacent the edges thereof, thereby to snub the running portion of the strap over said edges and around said corners when tension is applied to the strap, the width of said opening in the horizontal direction being substantially less than the thickness of a strap threaded therethrough to force the strap to enter and leave said opening at angles greater than ninety degrees with respect to the line along which tension is applied to the strap, thereby to increase the snubbing action of said edges and corners.

2. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive a strap, one of said cross-bars having a clamping portion turned under the upper portion thereof for clamping the end of a strap therebetween and having the edge thereof adjacent said opening extending upwardly therefrom, the other of said cross-bars having the edge thereof adjacent said opening extending downwardly therefrom, said upturned and downturned edges being narrower than a strap threaded through said opening and having recessed end portions defining snubbing corners adapted to engage the strap adjacent the edges thereof, thereby to snub the running portion of the strap over said edges and around said corners when tension is applied to the strap, said upturned and downturned edges having a horizontal spacing substantially less than the thickness of a strap threaded therebetween and having a minimum spacing substantially equal to the thickness of the strap, whereby the strap follows an S-shaped path through said opening and over said edges to increase the snubbing action of said edges and corners.

3. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive a strap, one of said cross-bars having a clamping portion turned under the upper portion thereof for clamping the end of a strap therebetween and having the edge portion thereof adjacent said opening inclined upwardly at an acute angle to the main plane of the buckle, the other of said cross-bars having the edge portion thereof adjacent said opening inclined downwardly at an acute angle to the main plane of the buckle, said edge portions having recessed end portions defining snubbing corners adapted to engage the outer edge portions of a strap threaded through said opening, the extremities of said inclined edge portions having a horizontal spacing substantially less than the thickness of a strap threaded therebetween to force the strap to enter and leave said opening at an obtuse angle relative to the line along which tension is applied to the strap.

4. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive a strap, one of said cross-bars having one edge portion thereof turned under the central portion thereof to clamp the end of a strap and having the other edge portion thereof inclined upwardly at an acute angle to the main plane of the buckle, cooperating means on said central portion and said one edge portion for deforming portions of the clamped end of the strap to increase the clamping action thereof, the other one of said cross-bars having the edge portion thereof adjacent said opening inclined downwardly at an acute angle to the main plane of the buckle, said inclined edge portions having recessed end portions defining snubbing corners adapted to engage the outer edge portions of a strap threaded through said opening, the extremes of said inclined edge portions being spaced apart horizontally by an amount substantially less than the thickness of a strap threaded therebetween to force the strap to enter and leave said opening at an obtuse angle relative to the line along which tension is applied to the strap.

5. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to

receive a strap, one of said cross-bars having one edge thereof inturned to define a slot adapted to receive and clamp therewithin the end of a strap, the inturned portion of said one cross-bar having an upturned edge adjacent the strap exit side of said slot and covered by a strap held therewithin, said other cross-bar having a downturned inner edge for cooperation with the strap covered upturned edge of said one cross-bar to clamp in adjusted positions the free end of a strap threaded through said opening.

6. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive a strap, one of said cross-bars having one edge thereof inturned to define a slot adapted to receive and clampingly secure the end of a strap therewithin, the inturned portion of said one cross-bar having an upturned edge adjacent the strap exit side of said slot and covered by a strap held therewithin, said upturned edge being so positioned that a strap covering said edge extends above the upper face of the buckle, said other cross-bar having a downturned inner edge for cooperation with the strap covered upturned edge of said one cross-bar to clamp in adjusted positions a strap threaded through said opening.

7. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive a strap, one of said cross-bars having a clamping portion turned under the upper portion thereof for clamping the end of a strap therebetween, the other of said cross-bars having a downturned edge adjacent said opening, the portion of said strap adjacent the clamped end thereof covering the side of said one cross-bar adjacent said opening and extending over said downturned edge to snub the running portion of said strap against said downturned edge when the running portion of said strap is threaded through said opening and tension is applied to the strap.

8. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive the running portion of a strap, one of said cross-bars having an inturned portion for clamping one end of a strap to said one cross-bar, said inturned portion having an upturned edge adjacent said opening, the other of said cross-bars having a downturned edge adjacent said opening for engagement with the running portion of a strap threaded through said opening, said downturned edge having a length less than the width of said strap to provide corner portions adapted to engage the edge portions of said strap, the portion of said strap adjacent the clamped end thereof extending over said upturned edge through said opening and over said downturned edge to snub the running portion of said strap against said downturned edge and over said corners when tension is applied to the strap.

9. A one piece buckle, comprising side-bars and cross-bars defining a strap receiving opening therethrough to receive the running portion of a strap, one of said cross-bars having an inturned portion for clamping one end of a strap to said one cross-bar, said inturned portion having an upturned edge adjacent said opening, said upturned edge being so positioned that a strap covering said edge extends above the upper face of said one cross-bar, the other of said cross-bars having a downturned edge adjacent said opening for engagement with the running portion of a strap threaded through said opening, the portion of said strap adjacent the clamped end thereof extending over said upturned edge, through said opening and over said downturned edge to snub the running portion of said strap against said downturned edge and provide frictional contact between the running and fixed portions of said strap over the entire path thereof between said upturned and downturned edges when tension is applied to the strap.

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