

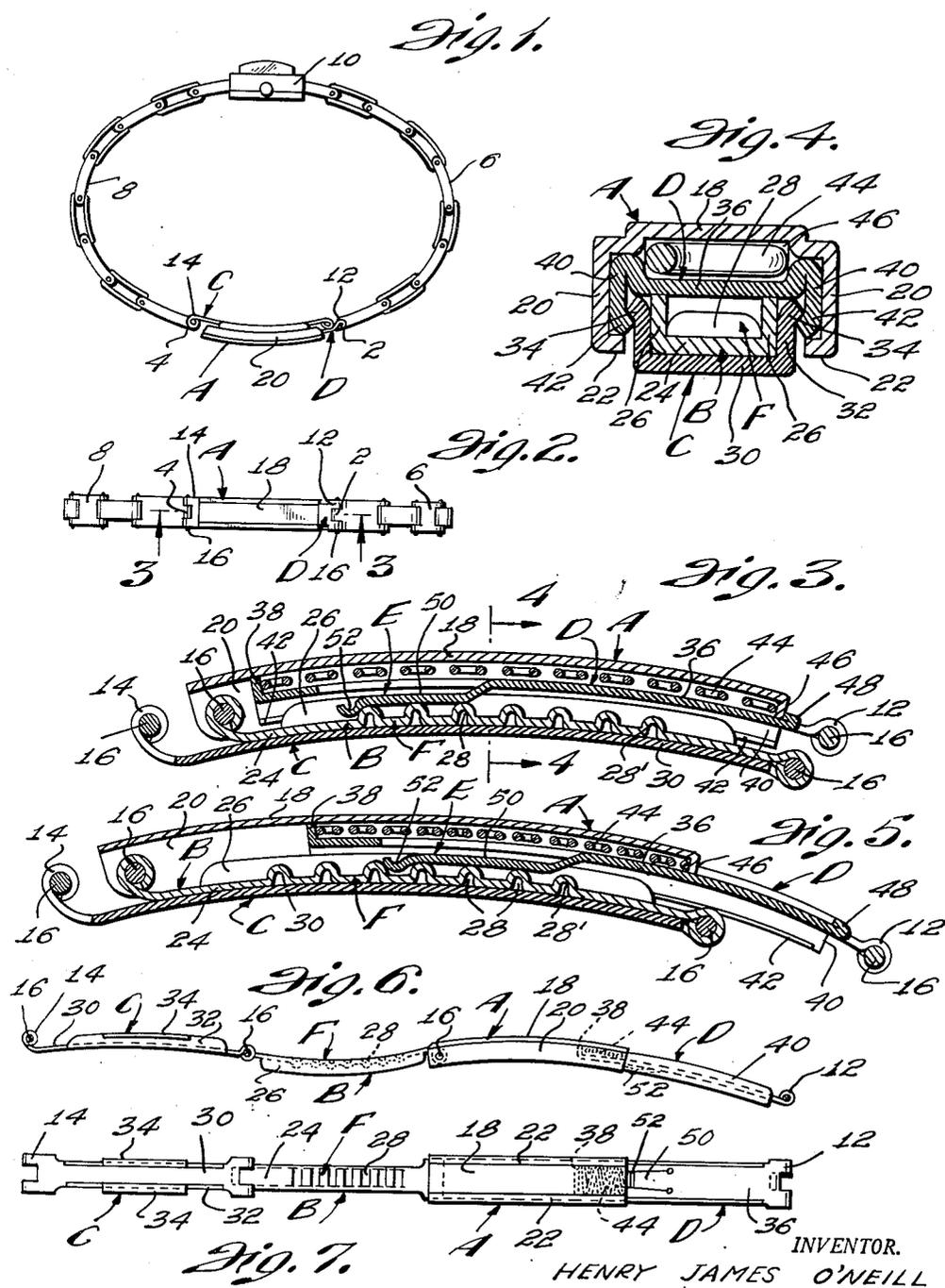
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EXPANDIBLE AND CONTRACTIBLE BUCKLE

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EXPANDIBLE AND CONTRACTIBLE BUCKLE

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This invention relates to an expandable and contractible buckle and in particular to one adapted for use in wrist watch bracelets.

Folding buckles have been employed for many years in wrist watch bracelets and other bracelets of similar type. These buckles are designed to unfold so as to materially increase the circumference of the bracelet in order that the bracelet might be slipped over the hand of the user and, once the bracelet has been properly positioned, to fold so that the bracelet is snugly and comfortably secured on the wrist of the wearer. In order to render the bracelet-buckle combination suitable for use with a variety of sizes of wrists; and in order particularly to make a given bracelet-buckle combination adaptable in a comfortable manner to the wrist of a given user as the circumference of the wrist varies due to temperature changes, activity and so forth, such buckles have in the past been provided with slidable members the position of which, with respect to the buckle proper, may be adjusted within limits. It has been customary to provide for such adjustability by means of a pawl and ratchet arrangement, whereby the slidable member may be slid into contracted position upon the application of force thereto in the direction of desired motion, the ratchet resisting motion in the opposite or expanding direction. These slidable members therefore could be easily slid to a more contracted position but in order for them to be moved to more expanded position, some form of release mechanism had to be actuated, the said actuation including the application of force to the buckle in a direction other than the direction of desired outward motion of the slidable member. Indeed, in many cases it is necessary, in order to expand the buckle, to first unfold it so as to release the slidable member from the pawl and ratchet arrangement and then to reposition the slidable member. This gives rise to marked inconvenience in the manipulation of the buckle to render it most comfortable, at least when the bracelet is to be expanded instead of contracted.

The occasions upon which it is desired to expand the buckle slightly in order to increase the comfort of the wearer thereof are many. Particularly in hot weather, the wrist tends to expand or swell, and a bracelet adjusted for comfort in the morning or when in a cool place will almost invariably need readjustment in an expanded direction by the afternoon, or when going into a warm place. Activity or exertion has a similar effect on the wrist, the increased circulation of the blood apparently causing the wrist

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to expand somewhat. There are, moreover, many occasions when it is desired to move the wrist watch farther up on the arm of the wearer than its normal position. For example, when washing the hands, it is most desirable to move the watch up the arm so as to minimize the possibility of its becoming damaged through being moistened. Similar situations will readily come to mind.

With buckles of the prior art, such adjustment with respect to extensibility is relatively awkward to obtain and in addition various unlocking arrangements of more or less complex construction must be provided if the buckle is not to be completely unfolded in order to achieve limited extensibility.

It is the prime object of the present invention to devise a folding buckle which is readily adjustable both in the direction of contractibility and extensibility by the application of force upon a slidable member solely in the direction of desired motion.

It is a further object of the present invention to devise a bracelet buckle which may be expanded as well as contracted in a simple manner and without the necessity of employing complicated unlocking arrangements to achieve the extensibility.

It is recognized that the prior art discloses folding buckles having slidable members capable of assuming a number of predetermined fixed positions which may be easily contracted, but to applicant's knowledge it has never before been proposed to employ such a buckle which is just as easily extendible nor to devise such a buckle structure which achieves this extensibility without in any way adding to the complexity of the construction thereof.

It has also been proposed in the prior art to employ in folding buckles having slidable members a spring active upon the slidable member so as to resiliently urge it into retracted position within the buckle. By combining such a spring with the expansible and contractible features above set forth in accordance with the teachings of the present invention, there has been produced a bracelet buckle the contractible and particularly the expansible nature of which is adequately controlled so that there is no likelihood of the bracelet being accidentally unfolded or dislodged from the wrist of the wearer.

To the accomplishment of the foregoing objects and such other objects as may hereinafter appear, the present invention relates to the expandable and contractible buckle construction as defined in the appended claims and as described

in this specification, taken together with the accompanying drawings, in which:

Fig. 1 is a side view of a watch bracelet and buckle combination embodying the present invention;

Fig. 2 is a top plan view of the buckle thereof, the buckle being shown in folded and contracted condition;

Fig. 3 is a cross-sectional side view taken along the line 3—3 of Fig. 2;

Fig. 4 is an end cross-sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is a view similar to Fig. 3 but showing the slidable member in partially expanded position;

Fig. 6 is a side view of the buckle in unfolded and fully expanded condition; and

Fig. 7 is a top view of the buckle of Fig. 6.

The buckle of the present invention comprises a plurality of sections foldable upon one another, these sections comprising the top section A, the intermediate section B and the end section C. A member D is mounted on one of the sections, here shown as the top section A, so as to be slidable therein between the contracted position shown in Figs. 1, 2 and 3, and the expanded position shown in Figs. 6 and 7, the member D being capable of taking up a plurality of predetermined fixed intermediate positions, one of which is illustrated in Fig. 5. A positioning structure comprising a detent element E and a detent receiver F are provided, one on the slidable member D and the other on any one of the sections A, B or C. By way of concrete illustration, it is here shown on the intermediate section B, but that is not essential to the invention. The positioning structure is so constructed and arranged as to permit the slidable member D to be moved either in or out of the top section A upon the application of force thereto solely in the direction of desired motion, and this even while the buckle is in folded condition.

As shown in Figs. 1 and 2, the buckle is adapted to connect the free ends 2 and 4 of a pair of flexible bracelet sections 6 and 8, the other ends of which are attached in conventional manner to a watch 10. The free end 2 of the bracelet section 6 is fastened to the projecting end 12 of the slidable member D while the end 4 of the bracelet section 8 is fastened to the projecting end 14 of the end member C. This attachment may be by means of pintle pins 16, similar pins serving to interconnect and pivotally attach the top, intermediate and end sections A, B and C to one another.

As here specifically disclosed, the top section is provided with a top wall 18 which represents the exposed surface of the buckle when in folded condition and which consequently may be suitably ornamented, side walls 20 and inturned side wall ends 22.

The intermediate section B is provided with a bottom wall 24 and may optionally be provided with upturned side walls 26, the side walls serving merely as rigidity imparting members. The bottom wall 24 may be provided with corrugations 28, these corrugations defining the detent receiving surface F. It will be noted from an examination particularly of Figs. 3, 5 and 6 that these corrugations differ from a ratchet surface in that the latter is inclined unequally in both directions so as to permit slidable motion only in one direction, whereas the corrugations 28 are equally inclined in both directions so that slidable motion of the member D may be permitted

equally in two directions, the direction of extensibility and the direction of contractibility.

The end section C is provided with a bottom wall 30, side walls 32, and out-turned side wall ends 34. The sections A, B and C are so proportioned that when the buckle is folded, the intermediate section B is foldable inside the end section C and these two foldable sections are then receivable within the top section A, the out-turned side wall ends 34 of the end section C passing through the inturned side wall ends 22 of the top section A.

The slidable member D comprises a bottom wall 36, an upward projection 38 at the inner end thereof, depending side walls 40, and inturned side wall ends 42. The member D is slidable within the top section A, being retained therein by the top wall 18 and the inturned side wall ends 22 thereof. The top wall 18 of the top section A and the top wall 36 of the slidable member D are spaced from one another and interposed between them is a spring 44 one end of which is active upon the upward projection 38 on the slidable member D and the other end of which is active upon a downturned portion 46 on the top section A, the spring being compressed between the projections 38 and 46 so as constantly to urge the slidable member D into retracted position. A projection 48 may be provided on the slidable member D so as to limit the inward motion of that member (see Fig. 3, in which the inward motion is limited by abutment of the projection 48 on the projection 46).

The slidable member D is provided with a detent element E, here shown in the form of a resilient tongue 50 struck from the bottom wall 36 itself, integrally formed therewith, inclined downwardly with respect thereto, and provided at its extremity with the rounded detent surface 52. This surface 52 is adapted, when the buckle is folded, to engage with the corrugations 28 defining the detent receiving surface F on the intermediate section B so as to retain the slidable member D in any desired one of a plurality of fixed positions. By reason of the fact that the corrugations 28 are equally inclined in both directions, the slidable member D may be moved in either direction, either to contract the buckle or to expand the same, merely by the application of sufficient force thereto to overcome the resilient detent engagement between the detent element E and the detent receiving surface F. Movement of the slidable member D is facilitated by the resiliency of the tongue 50 and by the rounded nature of its detent surface 52. By means of this construction, it will be apparent that a buckle of simple construction has been produced which, after being folded, may either be contracted or expanded, within limits, solely by the application of force thereto in the direction of desired motion and without the necessity of employing any additional structure designed to unlock the positioning structure so as to permit two way motion. Neither is it necessary that the buckle be unfolded before extensibility can be achieved.

The spring 44 performs two primary functions, automatic sizing and accidental expansion preventing. When the bracelet with the buckle unfolded is first placed on the wrist of the wearer, the slidable member D is urged by the spring 44 to contracted position, the unfolding of the buckle itself providing sufficient increase in the circumference of the bracelet to permit it to be slipped over the hand of the user. As the buckle

is folded, the bracelet is tightened against the wrist of the user, thus forcing the slidable member D out to extend from the top section A against the action of the spring 44. When the buckle has been completely folded, it will be apparent that the slidable member D in conjunction with the spring 44 has permitted the buckle to size itself automatically to the wrist of the wearer. This function of the spring 44 has been appreciated before.

The additional primary function which the spring 44 performs in the buckle of the present invention is to prevent accidental extensibility of the bracelet and at the same time permit a quite limited but definite degree of adjustability of the buckle. If the spring 44 were omitted, the only resistance to the extensibility of the slidable member D would be the resilient detent action by the detent element E and the detent receiving surface F. Should the detent element E become weakened through use or should some foreign matter on the detent receiving surface F prevent the proper functioning of the detent, were it not for the spring 44 the buckle might tend to become loose or even completely disengaged. The spring 44 therefore cooperates with the positioning structure to ensure that the buckle and the bracelet will remain on the wrist.

Moreover, as will be noted particularly by reference to Fig. 5, the corrugations 28 are preferably spaced apart from one another a distance somewhat greater than that taken up by the rounded surface 52 of the detent element E. The spring 44, by constantly urging the slidable member D into a retracted position, will always urge the detent element E toward the inner one of the two corrugations 28 between which the detent element E is positioned. Once the buckle has been properly adjusted for a given wrist so as to impart the greatest degree of comfort to the user thereof, in other words, once the slidable member D has been secured in one of its fixed intermediate positions such as the position illustrated in Fig. 5, some small degree of play or resilient expansibility still inheres in the bracelet. Thus, should the wearer bend his wrist so as to expand the same, the spring 44 active upon the slidable member D may be contracted somewhat, the slidable member D thus being permitted to move so as to expand the buckle an amount approximately equivalent to the spacing between the corrugations 28. By this means transitory expansions of the wrist may be comfortably accommodated without in any way destroying the semi-fixed nature of the adjustment or positioning of the slidable member D by means of the detent element E and the detent receiving surface F.

Many methods may be employed to maintain the buckle in folded position. In the structure here disclosed, the inturned side wall ends 42 of the slidable member D project inwardly farther than the inturned side wall ends 22 of the top section A and to a sufficient degree to be engageable beneath the out-turned side wall ends 34 of the bottom member C. When this interengagement occurs (see Fig. 4), the buckle is securely locked in folded position. As will be apparent from Figs. 6 and 7, the out-turned ends 34 of the end section C do not extend the entire length of that member. They are instead so positioned that when the slidable member D is in its fully extended position, the inturned ends 42 thereof no longer engage the out-turned ends 34 of the end section C. When this occurs, the buckle may be unfolded. Until this occurs, the engagement

of the inturned ends 42 with the out-turned ends 34 may positively prevent unfolding. In an optional arrangement, the engagement of the two ends may be such as to permit them to be snapped into engagement at any position of the slidable member D and disengaged by a lifting action on the top section A, the two ends automatically disengaging themselves without the necessity of any such lifting action when the slidable member D is in its fully extended position.

In its preferred form, the length of the out-turned ends 34 of the end section C are so positioned that when the slidable member D has been moved to a position such that the spring 44 causes engagement of the rounded detent surface 52 with the end corrugation 28' (see Fig. 5), engagement between the inturned ends 42 and the out-turned ends 34 still takes place, that engagement being destroyed only when the slidable member D is extended still further, against the tension of spring 44. In this way, accidental unfolding of the buckle is at least to some extent prevented, the spring 44, the slidable member D, detent element E, detent receiving surface F, and the inturned ends 42 and out-turned ends 34 all combining to make it possible to extend the slidable member D to its last detent held position without permitting the buckle to become unfolded, it being necessary to apply additional extending force to the slidable member D to unfold the buckle. Were it not for this preferred but optional spacing of the out-turned edges 34 and were it not for the employment of the spring 44, this could not be achieved.

The buckle structure here described is in the main even more simplified than that of more conventional buckles which permit only contractibility and not expansibility of the buckle. By means of this simplified construction, expansibility may be achieved as simply as contractibility. By including the spring 44 in the construction, not only is the buckle made self-adjusting as it is folded, but a limited degree of resilient expansibility is imparted to the buckle after it has been adjusted so as to take into account and allow for relatively small increases in the size of the wrist. In addition, the spring 44 provides a safety factor mitigating against accidental expansion of the buckle in the event of failure or weakening of the positioning structure including the detent element E and the detent receiving surface F. The accidental unfolding of the buckle is to a large extent positively prevented and in a preferred but optional arrangement, the slidable member D may be extended to its last detent position without permitting the buckle to unfold. All of the parts of the buckle of the present invention may be easily fabricated since they are all formed of sheet metal which may be stamped or pressed to desired shape inexpensively and rapidly.

Even the detent element E and the detent receiving surface F are formed integrally with the slidable member D and the intermediate section B respectively. Assembly problems are minimized, it being necessary only to insert the slidable member D into the open end of the top section A, slide the spring 44 between the walls 18 and 36, and then turn down the projection 46 on the top section A. After that, all that remains is to insert the pintle pins 16 and the buckle is completely assembled. It therefore appears that the buckle of the instant invention is not only as simple as or more simple in construction and assembly than corresponding buckles of the prior

art but it also provides additional features of adjustability and comfort to the wearer which are not present in prior art buckles.

Although the buckle has been here described in a specific form, it will be apparent that many changes may be made in the detailed structure thereof without departing from the spirit of the invention as defined in the following claims.

I claim:

1. An expandable and contractible buckle comprising a top section having a top wall, side walls and inturned side wall ends, an intermediate section having a bottom wall pivoted to said top section, an end section pivoted to said intermediate section and having a bottom wall, side walls and out-turned side wall ends, said intermediate and said end sections being foldable into said top section between said side walls and past said inturned ends, the bottom wall of said intermediate section having a detent receiving surface inclined substantially equally in both directions, a member slidable in said top section and having a bottom wall, an upward projection at the inner end thereof, depending side walls and inturned side wall ends, said ends being engageable under the out-turned side wall ends of said end section except when said slidable member is fully extended from said top section, a spring engaged between said top section and said slidable member and active on the upward projection of said slidable member to urge the same into retracted position, and a resilient detent element projecting from said slidable member and engageable with the detent receiving surface of said intermediate section when said buckle is folded so that said member is movable at will in either direction while said buckle is folded upon the application of force thereto solely in the direction of desired motion.

2. An expandable and contractible buckle comprising a top section having a top wall, side walls and inturned side wall ends, an intermediate section having a bottom wall pivoted to said top section, an end section pivoted to said intermediate section and having a bottom wall, side walls and out-turned side wall ends, said intermediate and said end sections being foldable into said top section between said side walls and past said inturned ends, the bottom wall of said intermediate section having a detent receiving surface inclined substantially equally in both directions, a member slidable in said top section and having a bottom wall, an upward projection at the inner end thereof, depending side walls and inturned side wall ends, said ends being engageable under the out-turned side wall ends of said end section except when said slidable member is fully extended from said top section, a spring engaged between said top section and said slidable member and active upon the upward projection of said slidable member to urge the same into retracted position, and a resilient detent element having a rounded engaging surface projecting from said slidable member and engageable with the detent receiving surface of said intermediate section when said buckle is folded so that said member is movable at will in either direction while said buckle is folded upon the application of force thereto solely in the direction of desired motion.

3. An expandable and contractible buckle comprising a top section having a top wall and side walls, an intermediate section having a bottom wall pivoted to said top section, an end section pivoted to said intermediate section and having

a bottom wall, side walls and out-turned side wall ends, said intermediate and said end sections being foldable into said top section between said side walls, the bottom wall of said intermediate section having a detent receiving surface inclined substantially equally in both directions, a member slidable in said top section and having a bottom wall, depending side walls and inturned side wall ends, said ends being engageable under the out-turned side wall ends of said end section except when said slidable member is fully extended from said top section, a spring active on said slidable member to urge the same into retracted position, and a resilient detent element projecting from said slidable member and engageable with the detent receiving surface of said intermediate section when said buckle is folded so that said member is movable at will in either direction while said buckle is folded upon the application of force thereto solely in the direction of desired motion.

4. An expandable and contractible buckle comprising a top section having a top wall and side walls, an intermediate section having a bottom wall pivoted to said top section, an end section pivoted to said intermediate section and having a bottom wall, side walls and out-turned side wall ends, said intermediate and said end sections being foldable into said top section between said side walls, the bottom wall of said intermediate section having a detent receiving surface inclined substantially equally in both directions, a member slidable in said top section and having a bottom wall, depending side walls and inturned side wall ends, said ends being engageable under the out-turned side wall ends of said end section except when said slidable member is fully extended from said top section, a spring active upon said slidable member to urge the same into retracted position, and a resilient detent element having a rounded engaging surface projecting from said slidable member and engageable with the detent receiving surface of said intermediate section when said buckle is folded so that said member is movable at will in either direction while said buckle is folded upon the application of force thereto solely in the direction of desired motion.

5. An expandable and contractible buckle comprising a top section having a top wall and side walls, an intermediate section having a bottom wall pivoted to said top section, an end section pivoted to said intermediate section and having a bottom wall, side walls and out-turned side wall ends, said intermediate and said end sections being foldable into said top section between said side walls, the bottom wall of said intermediate section having a detent receiving surface inclined substantially equally in both directions, a member slidable in said top section and having a bottom wall, depending side walls and inturned side wall ends, said ends being engageable under the out-turned side wall ends of said end section except when said slidable member is fully extended from said top section, a spring active on said slidable member to urge the same into retracted position, and a resilient detent element projecting from said slidable member and engageable with the detent receiving surface of said intermediate section when said buckle is folded so that said member is movable at will in either direction while said buckle is folded upon the application of force thereto solely in the direction of desired motion, said detent element and said detent receiving surface being so relatively positioned that when said detent element

is in contact with the outer end of said detent receiving surface, urged into said contact by said spring, the inturned side wall ends of said slidable member are still engaged under the out-turned side wall ends of said end section.

6. An expandable and contractible buckle comprising a top section having a top wall and side walls, an intermediate section having a bottom wall pivoted to said top section, an end section pivoted to said intermediate section and having a bottom wall, side walls and out-turned side wall ends, said intermediate and said end sections being foldable into said top section between said side walls, the bottom wall of said intermediate section having a detent receiving surface inclined substantially equally in both directions, a member slidable in said top section and having a bottom wall, depending side walls and inturned side wall ends, said ends being engageable under the out-turned side wall ends of said end section except when said slidable member is fully extended from said top section, a spring active upon said slidable member to urge the same into retracted position, and a resilient detent element having a rounded engaging surface projecting from said slidable member and engageable with the detent receiving surface of said intermediate section when said buckle is folded so that said member is movable at will in either direction while said buckle is folded upon the application of force thereto solely in the direction of desired motion, said detent element and said detent receiving surface being so relatively positioned that when said detent element is in contact with the outer end of said detent receiving surface, urged into said contact by said spring, the inturned side wall ends of said slidable member are still engaged under the out-turned side wall ends of said end section.

7. An expandable and contractible buckle comprising a plurality of sections foldable upon one another, a member slidable in one of said sections, a spring active upon said member to urge it into retracted position within said section, and positioning structure comprising a detent element and a cooperating detent receiver on said member and one of said sections, said member, except when in substantially fully extended position, engaging a section other than the one within which it is slidable so as to maintain said buckle in folded relation, said positioning structure being engageable when said buckle is folded and being so constructed and arranged as to retain said slidable member in any one of a plurality of positions but permit said member to be manually slid in either direction upon the application of force thereto solely in the direction of desired motion, said detent element and said detent receiver being so relatively positioned that when said detent element is in contact with the outer end of said detent receiver, urged into said contact by said spring, said member is still engaged with said section, said spring thus preventing accidental opening of said buckle.

8. An expandable and contractible buckle comprising a plurality of sections foldable upon one another, a member slidable in one of said sections, a spring active upon said member to urge it into retracted position within said section, and positioning structure comprising a detent element and a cooperating detent receiver on said member and one of said sections, said detent receiver being so shaped relative to said detent element as to permit some freedom of movement of said mem-

ber in each of its detented positions, said positioning structure being engageable when said buckle is folded and being so constructed and arranged as to retain said slidable member in any one of a plurality of positions with a limited degree of resilient slidability in said positions but permit said member to be manually slid in either direction beyond said limited degree upon the application of force thereto solely in the direction of desired motion.

9. An expandable and contractible buckle comprising a plurality of sections foldable upon one another, a member slidable in one of said sections, a spring active upon said member to urge it into retracted position within said section, a resilient tongue projecting from said member toward one of said sections, and corrugations in said one of said sections engageable with said tongue so that said member may be fixed in slidable position, said corrugations being substantially equally inclined in both directions so that said member is movable at will in either direction while said buckle is folded upon the application of force thereto solely in the direction of desired motion, said slidable member, except when in substantially fully extended position, engaging a section other than the one in which it is slidable so as to maintain said buckle in folded relationship, said resilient tongue and said corrugations being so relatively positioned that when said tongue is in contact with the outer surface of the outer one of said corrugations, urged into said contact by said spring, said slidable member is still engaged with said other section, said spring thus preventing accidental opening of said buckle.

10. An expandable and contractible buckle comprising a plurality of sections foldable upon one another, a member slidable in one of said sections, a spring active upon said member to urge it into retracted position within said section, a resilient tongue projecting from said member toward one of said sections, said corrugations in said one of said sections engageable with said tongue, said corrugations being so spaced from one another relative to the size of said tongue as to permit some freedom of movement of said tongue between said corrugations, the cooperation between said corrugations and said tongue thus fixing said slidable member in any one of a plurality of positions and permitting said slidable member a limited degree of resilient slidability, said corrugations being substantially equally inclined in both directions so that said member is movable at will in either direction while said buckle is folded upon the application of force thereto solely in the direction of desired motion.

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