

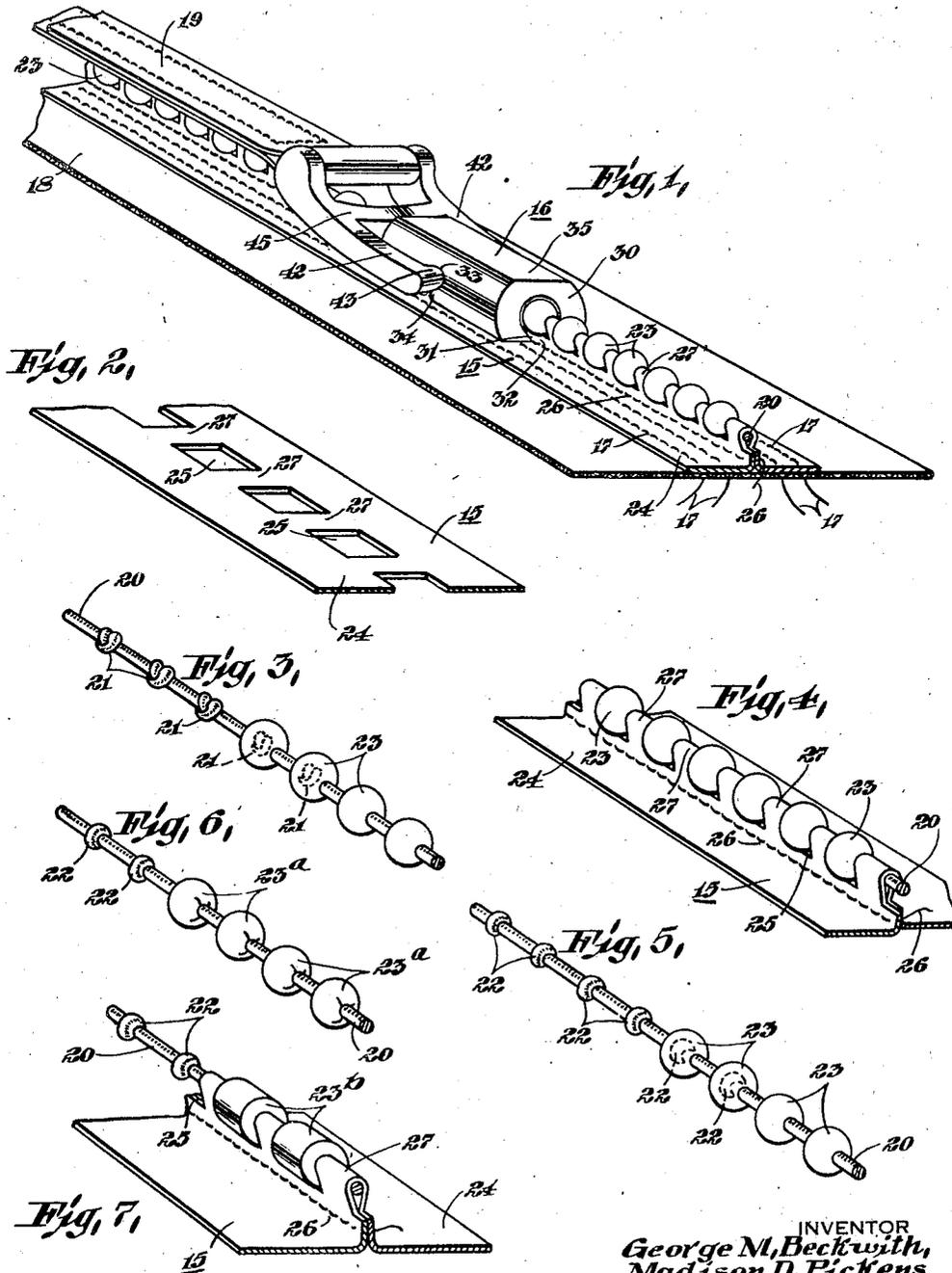
March 7, 1944.

G. M. BECKWITH ET AL

2,343,827

METHOD OF MAKING ADJUSTABLE FASTENING DEVICES

Original Filed March 13, 1942 2 Sheets-Sheet 1



INVENTOR  
*George M. Beckwith,*  
*Madison D. Pickens,*  
BY  
*R. S. Kelley*  
ATTORNEY

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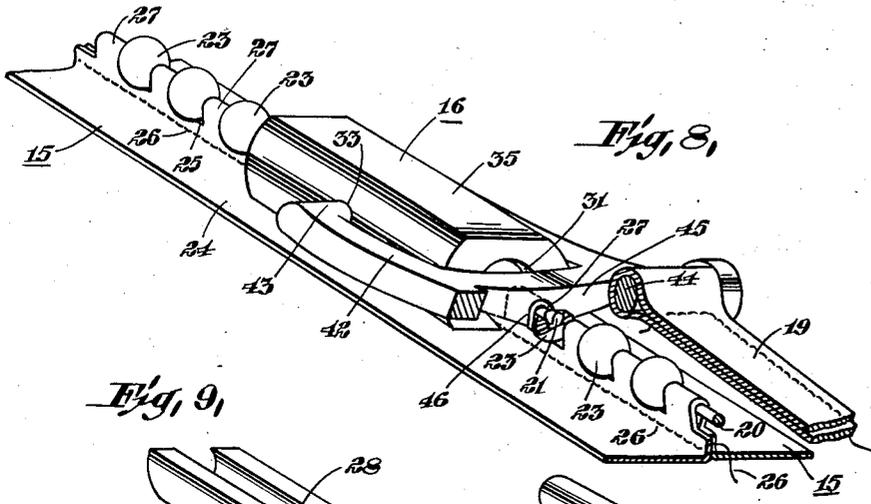


Fig. 9,

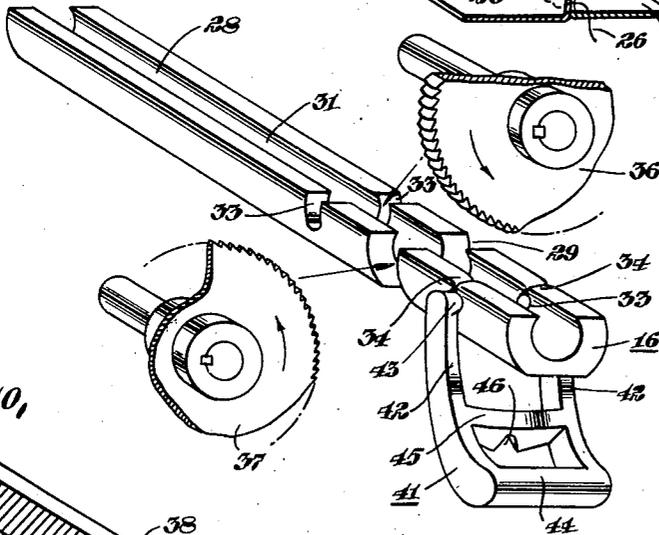


Fig. 10,

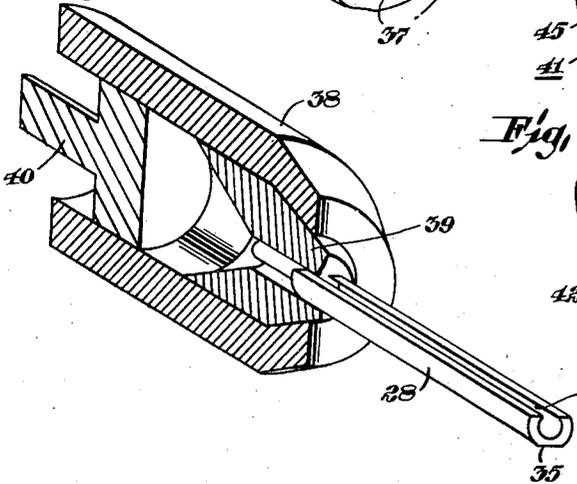
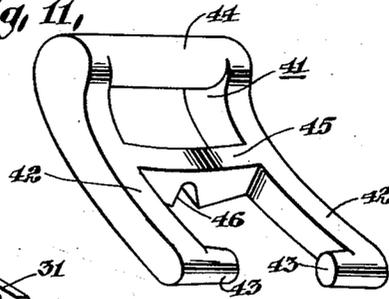


Fig. 11,



INVENTOR  
George M. Beckwith,  
Madison D. Pickens,  
BY  
R. S. Kelley  
ATTORNEY

# UNITED STATES PATENT OFFICE

2,343,827

## METHOD OF MAKING ADJUSTABLE FASTENING DEVICES

George M. Beckwith, New York, N. Y., and Madison D. Pickens, Washington, D. C., assignors to Talon, Inc., a corporation of Pennsylvania

Original application March 13, 1942, Serial No. 434,594. Divided and this application November 23, 1942, Serial No. 466,612

7 Claims. (Cl. 24—206)

This invention relates to the manufacture of adjustable fastening devices and, in particular, to such devices including a track comprising a plurality of spaced stops, abutments, or the like supported in flexible manner and a cooperating slider member slidable with respect to the track and adapted to be locked, selectively, in various predetermined positions against movement longitudinally of said track. This application is a division of our application Serial No. 434,594, filed March 13, 1942, for Adjustable fastening device.

It is an object of this invention to provide a method of making such a fastening device which embodies a new and improved track construction which may be readily and economically produced and wherein assembly of the component parts may be quickly and conveniently accomplished with but little skill.

It is a further object of this invention to provide a new and improved method of making a slider for such devices which embodies a new principle of operation, which is of extreme simplicity, and by which the slider may be cheaply produced and easily assembled.

It is thus the object of this invention to provide new and improved methods of forming and assembling the component parts of such adjustable fastening devices.

These and other objects and advantages of the invention will appear from the following description taken in conjunction with the accompanying drawings which form a part thereof, and will be pointed out in the appended claims.

In the drawings:

Fig. 1 is a fragmentary view, in perspective, of a garment equipped with an adjustable fastening device according to this invention.

Fig. 2 is a fragmentary view of apertured tape forming a part of the track of the fastening device of Fig. 1;

Fig. 3 is a diagrammatic view, in perspective, showing flexible cord equipped with predetermined spaced stop members, another component part of the track of the fastener shown in Fig. 1, and illustrating the manner in which the cast or molded-on stops are secured against longitudinal movement on the cord;

Fig. 4 is a fragmentary perspective view of the track or trackway of the fastening device shown in Figs. 1 and 2;

Fig. 5 is a view similar to Fig. 3 but showing a cord having integral formed-in enlargements over which the stops are secured, the stops being cast or molded on the cord.

Fig. 6 is a view similar to Figs. 3 and 5 but showing stop members formed as hollow beads from sheet material and secured over the enlargements on the cord;

Fig. 7 is a view similar to Fig. 4 but showing a fragment of the track similar to that of Fig. 4 but embodying cylindrical stop members;

Fig. 8 is a fragmentary view, in perspective, of the adjustable fastening device shown in Fig. 1, as seen from a substantially opposite direction;

Fig. 9 is a diagrammatic view in perspective illustrating the manner in which the slider body is formed and the pull member attached thereto;

Fig. 10 is a perspective view illustrating one method of forming the slider body stock of Fig. 10, by extrusion; and

Fig. 11 is a view in perspective of the pull member of the slider shown in Figs. 1, 2 and 10.

The adjustable fastening device illustrated in Figs. 1 and 2 is of the general type illustrated in U. S. Letters Patent No. 1,887,826 granted November 15, 1932, to Noel Statham, inasmuch as it comprises a track or trackway generally designated 15 which is secured to a garment, for instance, or one end of a belt, and which track is adapted slidably to support a slider, generally designated 16, which slider is secured to another part of the garment, or the other end of the belt, and which slider may be selectively adjusted longitudinally of the track and locked in desired position.

More particularly, the track or trackway is of the general type illustrated in U. S. Letters Patent No. 2,245,255, granted June 10, 1941, to George H. C. Corner, wherein the trackway comprises a flexible cord or wire with predetermined spaced stop members secured thereon and supported by a flexible carrier or tape to which it is suitably secured. The stop members support the body of the slider and the spaces therebetween are utilized by means incorporated in the slider to secure the slider against movement longitudinally of the track or trackway.

Referring to the drawings in detail, the track or trackway 15 is secured by rows of stitching 17 to a portion of a garment 18 at one side of a closure or opening, the end 19 of a belt or the like being secured to the slider 16, as shown in Fig. 1. The track or trackway 15 is formed by a flexible stringer such as a cord, wire or the like 20 provided with predetermined spaced knots 21 (Fig. 3) or formed-in lumps or enlargements 22 (Figs. 5, 6 and 7) over which generally spherical stops or abutments 23 are formed, i. e., cast or molded (Figs. 3, 4, 5 and 7), these stop mem-

bers or abutment members being formed of die cast metal or of suitable non-metallic plastic material. Alternatively, the stop or abutment members (23a) may be formed of relatively thin sheet material formed into generally spherical members, clamped over the knots or enlargements, as shown in Fig. 6. Likewise, the stop or abutment members may be of substantially cylindrical form, as shown in Fig. 7, these stop members 23b being securely held on the cord 20 against longitudinal movement by the knots or enlargements in the cord over which they are cast or molded.

The provision of the knots 21, or woven-in lumps or enlargements 22 constitutes an important feature of this invention, inasmuch as the security of attachment of the stop members or abutment members 23, 23a, 23b to the stringer 20 is substantially enhanced thereby. Where, as is illustrated in the aforementioned Corner Patent No. 2,245,255, such stop or abutment members are cast upon smooth cord, the zone of attachment is substantially cylindrical and there is no substantial interlocking connection between the stop or abutment members and the supporting cord. Where, however, knots 21 or enlargements 22 are provided, the zone of attachment is non-cylindrical and more nearly spherical, whereby there is a distinct interlocking relation by means of which the stop members 23 are secured in predeterminedly spaced relation on the cord 20 irrespective of the security of the bond between the material of the stop members 23 and those portions of the cord 20 over which they are attached. In other words, even though the bond between the material of the stop members and the cord be partially or wholly destroyed, nevertheless the predeterminedly spaced relationship of the stop members 23 will not be disturbed.

Likewise, since the textile or other material of the cord is substantially cheaper than the material of the stop members, the volume of stop forming material in a stop of given size is reduced by the presence of the knot 21 or woven-in enlargement 22 and the cost is thus materially reduced. Furthermore, since the shape of knot 21 or enlargement 22 is generally similar to that of stop members 23 (especially after the stop members 23 are formed over them), the thickness of the surrounding stop forming material is substantially more nearly uniform throughout. In other words, this material forms, in effect, a hollow shell or envelope of substantially uniform thickness surrounding the knot 21 or enlargement 22. Since curing of non-metallic plastic materials varies with the thickness thereof and since the outer portions of plastic members, adjacent the surfaces, contain the hardest, toughest and strongest parts of the plastic material, the presence of the knots 21 or enlargements 22 substantially enhances the strength and toughness of the stop members by reducing the thickness of the plastic envelope and making the thickness more nearly uniform throughout, in addition to decreasing the cost.

This cord with formed-in enlargements 22 may, for instance, be formed by using as one or more of the constituents "Seed Yarn," a twisted yarn, wherein one or more systems of threads in a multiple system yarn is intermittently fed at a speed different from that of the others during the twisting operation in order to cause predeterminedly spaced pile-ups appearing as pre-

terminedly spaced lumps or enlargements in the finished cord.

The cord 20 with attached predeterminedly spaced stop members 23, 23a, or 23b, is supported by a carrier comprising a strip of flexible tape 24 provided with a row of centrally disposed, longitudinally spaced apertures 25 through which the stop members 23 are passed when the tape is folded over the cord 20, as shown in Fig. 6, and secured in folded relationship by a row of stitching 26 whereby the portions 27 between the apertures 25 extend over those portions of the cord between the respective spaced stop members 23 flexibly to support the cord 20 and the attached stop members 23.

In order to prevent fraying, the margins of the apertures 25 may be suitably impregnated or otherwise treated with suitable sizing or other material such as one of the well known resins or plastic materials or, alternatively, the tape may be woven in such manner that the apertures 25 are formed in the weave as shown, for instance, in Fig. 6 of Corner Patent No. 2,245,255. However, it is preferred, in the interest of economy, that the carrier shown in Fig. 2 be formed of a textile or other tape or strip into which the apertures 25 are cut by any suitable mechanism such as a rotary cutter, sizing or fray preventing impregnation being applied either before or after the apertures 25 are cut in the tape or strip 24.

The body 30 of the slider 16 is of elongate form provided with a substantially cylindrical channel 31 extending from end to end and opening through a slot 32 at one side, as shown in Figs. 1 and 3. Intermediate its length, the body 30 is provided with a pair of similar transverse slots 33 extending inwardly from the open side of the slider body and adapted to receive and support trunnions of the pull member, as hereinafter described. Optionally, the body is provided with a flattened upper or outer surface 35 for the sake of appearance and compactness. Since the slot 32 is narrower than the diameter of the stop members 23, 23a or 23b, the body 30 when threaded on the track or trackway is slidably maintained thereon by the substantially spherical stop members 23 or 23a (or cylindrical stop members 23b) in the channel 31.

Slider bodies 30 are preferably formed from elongated strip or stock 28 (Fig. 10) cut to appropriate length as at 29 (Fig. 9) by a cut-off device such as rotary saw 37, the notches or slots 33 being applied to each slider body by a slotting device, such as a rotary slotting tool 36, immediately prior to operation of the cut-off device 37. The elongated strip or stock 28 may be formed either of metal or non-metallic plastic material. It may be rolled or cast in the case of metal, or cast or extruded in the case of non-metallic plastic material.

Illustrative apparatus for extruding non-metallic plastic material to form the strip or stock 28 is diagrammatically shown in Fig. 10. This apparatus comprises a press, including a cylinder 38 provided at one end with an extrusion die 39 of appropriate shape to produce the desired section in the strip or stock 28. A piston 40 is slidable in the cylinder 38 toward the die 39 to cause heated plastic material in the cylinder to be extruded through the die 39 and formed into continuous strip or stock 28 of desired predetermined cross section. As shown in Fig. 11, the die is preferably of such shape as to form a strip 28 which is of the exact cross section desired

and which necessitates only the operation of the slotting device 36 to form the slots 33 and of the cut-off device 37 to cut off the strip 28, after slotting, into predetermined desired lengths completely to form the slider body 30.

The pull member, generally designated 41, is shown in Fig. 13. This pull member is constituted by a pair of similar substantially parallel longitudinal leg members 42 provided at their inner ends with oppositely, inwardly directed trunnions 43 which are adapted to be seated in the above described slots 33. At their outer ends these leg members 42 are connected by a bar 44 which is adapted to provide a support for the end of a belt or the like, secured thereto, such as 19 of Figs. 1 and 8. Intermediate the trunnions 43 and bar 44 is a locking member 45 in the form of a cross bar offset from the plane common to the trunnions 43 and bar 44, this locking member being provided at its under side with a notch 46 which is adapted for engagement with any desired portion 27 of the tape overlying the cord 20 between a pair of adjacent stop members 23 to lock the slider 16 against longitudinal movement on the trackway. The dimensions of the notch 46 are preferably such that a slight clamping action is secured. While the form of pull member illustrated is suitable for production as an integral unit by molding or die casting, it is, of course, to be understood that it may be made up of a plurality of pieces secured together in any suitable known manner.

The method of attaching the pull member 41 to the slider body 30 is illustrated in Fig. 9. As shown in Fig. 9, the trunnions 43 of the pull member 41 are placed in the slots 33 after a slider body 30 has been severed from strip or stock 28 and a portion of the slider body adjacent the slot is upset and pressed inwardly of the slot, as shown at 34, in order to secure the pull member pivotally to the slider body 30 and prevent its detachment therefrom. Where strip or stock 28 is formed of metal, the upsetting may be accomplished by impact, or by heat and/or pressure, and where it is formed of non-metallic plastic material it may be accomplished either by the use of a solvent and pressure or by heat and pressure, depending upon whether the non-metallic plastic material of which it is formed is of thermosetting or thermoplastic type.

As may readily be seen from Figs. 1, 2 and 12, the bar 44 is slightly offset upwardly from the locking member 45 and the trunnions 43. Because of this offset, the strip or belt-end 19 is supported in spaced relation upwardly of, or outwardly of the row of stop members 23 in order to prevent contact of the member 19 with the stop members 23 which might affect operation of the locking means. Also, because of this offsetting of the bar 44, the application of tension to a member having the track 15 at one end and the member 19 at the other, will exert a toggle action causing the locking member 45 to be set in locking position between an adjacent pair of stop members 23 to lock the slider 16 against longitudinal movement on the track.

From the above description it will clearly appear that we have provided a new method of manufacturing adjustable fastening devices of the class described with extreme convenience, economy of labor and economy of materials.

It is, of course, to be understood that the above description is merely illustrative and in nowise limiting and that we desire to comprehend

within our invention such modifications as are included within the scope of the appended claims.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a method of forming a flexible track for an adjustable fastener, providing a flexible stringer with predeterminedly spaced enlargements, securing stop members over said enlargements, providing a flexible carrier strip with spaced openings to receive said stop members, aligning said openings with the stop members on said stringer, folding said carrier strip over said stringer and connecting together portions of said carrier strip at opposite sides of said openings.

2. In a method of forming a flexible track for an adjustable fastener, providing a flexible stringer with predeterminedly spaced enlargements, forming stop members over said enlargements, providing a flexible carrier strip with spaced apertures adapted to receive said stop members, aligning said apertures in said carrier strip with the stop members on said stringer, folding said carrier strip over said stringer and connecting together portions of said carrier strip at opposite sides of said apertures.

3. In a method of forming a flexible track for an adjustable fastener, providing a flexible stringer with predeterminedly spaced enlargements, casting stop members of thermoplastic material over said enlargements, providing a flexible carrier tape with spaced apertures adapted to receive said stop members, aligning the apertures in said tape with the stop members on said stringer, folding said tape over said stringer, stitching together portions of said tape at opposite sides of said apertures, folding the free portions of said carrier beyond said stitching outwardly away from one another to a common plane, superposing said free portions on a support and stitching said free portions to said support.

4. In a method of forming a flexible track for an adjustable fastener, providing a flexible cord with predeterminedly spaced knots, molding stop members of non-metallic plastic material over said knots, providing a flexible carrier tape with spaced apertures adapted to receive said stop members, aligning the apertures in said tape with the stop members on said cord, folding said carrier over said cord with the stop members extending through said apertures, stitching together portions of said tape at opposite sides of said apertures to confine said stop members in said apertures and the intervening cord portions in the folds of the tape portions between apertures, folding the free portions of said tape beyond said stitching apart substantially to a common plane, superposing said free portions on a substantially planar flexible support, and stitching down the free portions of said tape to the underlying flexible support.

5. In a method of making bodies of sliders for adjustable fasteners comprising flexible tracks including rows of stop members, with sliders selectively adjustable thereon; forming an elongated continuous strip with a channel of cross section substantially complementary with the transverse cross section of said stops and with a longitudinal slot leading outwardly therefrom, slotting said strip transversely to form trunnion receiving notches substantially perpendicular to said channel, and cutting said strip into predetermined slotted slider body lengths.

6. In a method of making sliders for adjustable fasteners comprising flexible tracks including rows of stop members with sliders selectively adjustable thereon; forming an elongated continuous strip with a channel of cross section substantially complementary with the transverse cross section of said stops and with a longitudinal slot leading outwardly therefrom, slotting said strip transversely to form trunnion body lengths, independently forming pull members each having a pair of trunnions at one end adapted to be rotatably secured in said trunnion receiving notches, placing said trunnions in said notches, and upsetting a portion of each slider body adjacent at least one notch to secure a trunnion therein, permanently to secure said pull members pivotally to said slider bodies.

7. In a method of making sliders for adjustable fasteners comprising flexible tracks including rows of stop members, with sliders selectively ad-

justable thereon; extruding an elongated continuous strip with a channel of cross section substantially complementary with the transverse cross section of said stops and with a longitudinal slot leading outwardly therefrom, slotting said strip transversely at predetermined intervals to form pairs of trunnion receiving notches substantially perpendicular to said channel cutting said strip between slots into predetermined slider body lengths, independently forming pull members each having a pair of trunnions at one end adapted to be rotatably secured in said trunnion receiving notches, seating said trunnions in said notches, and upsetting a portion of the slider body adjacent each notch to confine said trunnions in said notches, permanently to secure said pull member pivotally to said slider body.

GEORGE M. BECKWITH.  
MADISON D. PICKENS.