

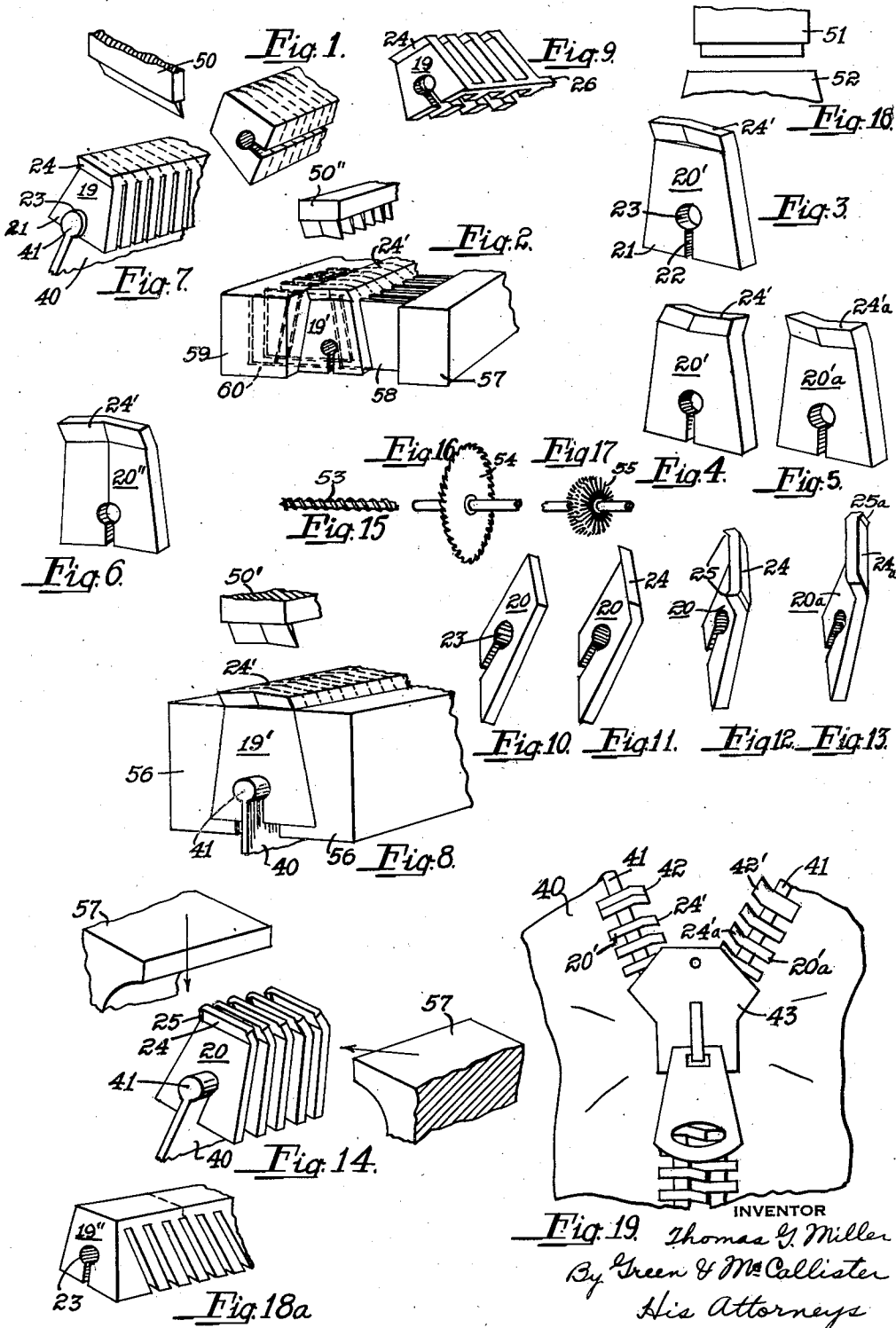
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SLIDE FASTENER AND METHOD OF MAKING IT

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SLIDE FASTENER AND METHOD OF MAKING IT

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22 Claims. (Cl. 29—148)

This invention relates to interlocking slide fastener elements and to methods of producing and/or mounting them. The present disclosure is a continuation in part of my copending application Serial No. 728,555, filed on June 1, 1934, and entitled "Fastener element and methods of producing it."

Previous to the present invention, fastener elements have either been separately formed and mounted on their carriers or have been formed while held in a connected strip relationship, and thence, mounted on their carriers after the latter have been threaded through the elements of a group of strips.

In carrying out the first method, much time is consumed and difficulty encountered in handling, spacing, and mounting the individual elements; in carrying out the second method, it is necessary to provide a group of a plurality of strips of elements and to properly space them with respect to each other before the elements are mounted on carriers.

Attention is also called to the fact that previous to the present invention, it has been impractical to manufacture fastener elements from a heavy bar or block of material. As a result, it is common practice to employ strips and sheets in the manufacture of fastener elements.

And, it has been an object of the present invention to design a type of element which may be formed from bar-like pieces of material while it is being maintained in a connected relationship with respect to adjacent elements.

Another object has been to provide an improved method for forming and/or mounting fastener elements such that a plurality of connected elements may be simultaneously associated with the same longitudinal carrier in the exact spaced relationship desired.

A further object has been the provision of simplified procedure for forming and/or assembling fastener elements.

A still further object has been to design new and improved fastener elements.

These and many other objects of my invention will be apparent from the drawing, claims, and further description thereof.

Figure 1 is a front perspective view of a longitudinal piece from which fastener elements may be provided and illustrates a procedure.

Fig. 2 is a front perspective in elevation showing a method of severing individual elements from a longitudinal piece, such as shown in Fig. 1.

Fig. 3 is a front perspective view and Fig. 4 is a back perspective view in elevation of a fastener element formed by the procedures illustrated in Figs. 1 and 2; Fig. 5 is a front perspective in elevation of a reversed form of this type of fastener element.

Fig. 6 is a front perspective of a modified form of fastener element.

Fig. 7 is a front perspective view in elevation showing a length of transversely-disposed fastener elements which are connected together and mounted in their proper spaced relationship along a length of carrier.

Fig. 8 is a front perspective showing a method of clamping or pressing the elements of the piece upon a carrier and for holding them while severance is accomplished.

Fig. 9 is a front perspective of a longitudinal piece formed into a plurality of transversely-disposed and connected elements.

Figs. 10, 11, and 12 are side perspectives showing steps in forming a modified type of fastener element; Fig. 13 is a side perspective showing a reversed element of this modified type.

Fig. 14 is a front perspective showing a longitudinal group of elements mounted in their proper spaced relationship upon a carrier and also showing a method for turning the side edges of their interlocking portions inwardly.

Figs. 15, 16, 17, and 18 are side views in perspective, somewhat diagrammatically showing apparatus that may be employed in forming suitable elements.

Fig. 18a is a front perspective illustrating a modified method of forming elements from a longitudinal piece.

Fig. 19 is a fragmental plan illustrating fastener elements of the type shown in Figs 3, 4, 5, and 6, or 11, 12, and 13 mounted in place on a carrier and cord assembly.

From the standpoint of facility of treatment and handling and also accuracy in properly spacing and mounting individual fastener elements up suitable cords and/or carriers, it is distinctly advantageous to maintain the elements in a connected relationship as long as possible and to accomplish as many as possible of the forming operations while they are thus maintained.

It will also be apparent, that primarily in view of space and other limitations, it is advantageous to accomplish the forming operations by means of a cutting action. This is especially true when individual elements are being formed transversely or by cross-severance from a longitudinal or bar-like piece of material.

It will be noted that I have designated similar parts in the various embodiments by like numerals, but have distinguished them by prime and double prime suffixes. It will also be noted that I have distinguished the elements to be mounted on one carrier from those to be mounted on an opposite carrier, in other words, opposite interlocking elements, by the suffix "a".

In order to carry out the principles of my invention I have developed a new and simplified form of fastener element 20 which has clamping

legs or jaws 21 and the usual recess 22 terminating in the aperture 23. An interlock or scoop portion 24 lies adjacent the top edge of the element 20 and includes an outwardly extending ledge on one side or face of the element adjacent the apex thereof and an upwardly inclining depressed ledge on the opposite face thereof. In other words, the interlock portion 24 bends inwardly with respect to one transverse face of the element 20 and bends outwardly with respect to the opposite face of the element.

I have designed fastener elements of such an outline that their interlock portions may be produced by the very operation which severs them from a bar, piece, or longitudinal length of adjacent elements 19, see Figs. 1, 2, 7, 8, and 18a.

As shown by the dotted lines of Figure 1, by Figure 2, and by the spacing between the elements of such representative figures as 7, 9, and 18a, a suitable cutting blade of the shear or knife type such as 51 of Fig. 18 (see also 58 of Fig. 2), or of the saw type such as 54, see Fig. 16, is entered upon the piece in the vicinity of what is to constitute the base portion of an element to be severed. A shear or cut is preferably made in a substantially straight line transversely of the base of the piece up to a proposed bottom limit of an interlocking shelf or ledge 24. Later, or simultaneously with the above, a blade, such as 50' of Figure 2, is entered upon the piece in the vicinity of what is to constitute the top portion of the element severed and a shear or cut is then made in a backwardly or forwardly inclined direction to complete the severance of the element 20. The angle of cut accomplished by a straight-edge blade or the cut made by an inclined blade will thus leave a portion adjacent the apex of each element which will serve as an interlock or scoop.

However, the elements are, at first, preferably not completely severed. As shown in Figs. 2, 7, 8, and 18a, the upper portion 24, or as shown in Fig. 9, another portion 26 may be left between elements, in order to connect and support them during certain of the forming and/or treating operations.

As seen in the above-mentioned figures, cuts made along the dotted lines indicated will simultaneously finally sever the elements 20 and form interlocking portions 24 therefor. Thus, the elements 20 may be held in this spaced and connected relationship while they are color-treated, buffed, and/or mounted upon a cord and carrier combination, such as 40-41.

The aperture 23 and the recesses 22 are preferably cut or drilled out prior to a severance of the individual elements 20. It is also advantageous to either provide a rod, bar, or piece 19 whose outer dimensions substantially conform to the desired edge dimensions of the individual elements, or to process the piece to the desired form prior to a complete severance of the individual elements. That is, after a partial severance, the body portions of each element extend transversely of the piece or length of connected elements and the bounding edges of each element lie on the same longitudinal planes as the bounding edges of adjacent elements. The body portions of each connected element, which may be termed the lateral or transverse faces of the bar, lie opposite to the lateral or transverse faces of adjacent elements.

By retaining the individual elements in a connected relationship, I am able to mount a longitudinal length or bar of such elements upon a

single carrier and cord combination 40-41, such as shown in Figs. 7, 8, 14, and 19, by merely inserting the combination, and then, pressing the legs 21 of the elements together to clamp them in place. In Fig. 8 I have shown a form of apparatus suitable for accomplishing the pressing operation which comprises oppositely-positioned pressing bars or members 56. The latter are also preferably employed to support the element combination 19' while a blade such as 50 of Fig. 7, 50' of Fig. 8, or 50'' of Fig. 2, is operated to finally sever the elements, and to thus, form their interlock or scoop portions.

The width or thickness of shear or cut between elements is preferably made to correspond to the spacing desired between elements when mounted on a carrier 40 which is to be employed as one side of a fastener assembly, such as shown in Fig. 19. Thus, a severance along the connecting tops 24 of the elements shown in Figs. 2, 7, and 8 or along the connecting base corners 26 of the elements of Fig. 9 will leave a plurality of individual elements 20 mounted upon a carrier 40 to form one side of an assembly such as shown in Fig. 19. It is thus apparent that in accordance with the procedure enumerated, the individual elements 20 of one piece 19, or of a connected row of elements, form the spaced and adjacent elements of one side of a carrier or stringer assembly. Of course, the elements 20 may be completely severed and then assembled as desired.

If desirable, suitable lug and socket forms of interlock portions may be formed upon opposite side faces of the elements while they are maintained in the above-mentioned spaced and connected relationship, but it is felt that the previously-described procedure for forming interlock or scoop portions can be more easily and effectively carried out, particularly due to the space limitations.

Figs. 1, 2, 7, 8, 9, and 18a illustratively show how blocks or rectangular pieces may be processed to form a plurality of connected elements. Summarizing briefly, in accordance with a preferred procedure, I select a suitable piece of material of bar-like outline, shape its narrow dimensions to substantially conform to the edge outline or perimeter of a desired form of fastener element, drill and/or cut out a suitable aperture and recess longitudinally of the piece or length of material adjacent a side edge thereof (which is to become the base or clamping leg portion of each of a plurality of elements), take a plurality of spaced cuts transversely across the bar (of a width which corresponds to the desired spacing between the elements when mounted on a carrier) while maintaining the elements in a connected relationship by deferring their complete severance, mount the elements as a connected, transversely-extending, longitudinal group upon a suitable carrier and cord assembly, and then, sever each element from adjacent elements.

Although it is preferable to form the interlock or scoop portions of the elements by the last severing operation, yet they may be preliminarily formed and the elements held together by a small connecting lug 26 which may be fragile enough to permit hand breaking, see Fig. 8. Attention is called to the fact that, for the purpose of illustration, the shape, angle of bend, or inclination of the interlock or scoop portions of the elements is somewhat exaggerated. As will appear from a consideration of Figs. 4 and 5 or Figs. 12 and 13 in view of Fig. 19, the fastener elements mounted on one side of an as-

sembly 40 are preferably provided with interlock or scoop portions which have a complementary or reversed outline with respect to the elements mounted on the other side of the assembly. This results in a compact, efficient, and smoothly-operative slide-fastener assembly.

Unless a carrier shield is to be employed, it is desirable to in some way provide interlock or scoop portions 24'-24'a or 25-25a which, unlike those of Figs. 7 and 11, are concave inwardly with respect to their side edges. This is done in order to prevent the elements of an assembly, such as shown in Fig. 19, from sliding off adjacent elements, sidewise thereof.

As shown in Figs. 2 and 8, I contemplate utilizing one or more cutting blades 50' or 50'', which have an inwardly concave and angular shape suitable for directly forming the scoop or interlock portions 24'-24'a, see Figs. 3, 4, and 5, when the elements are being severed. However, as shown in Fig. 14, I also contemplate utilizing angularly-directed distorting or pressing dies 57 for striking ribs on opposite side edges of a plurality of longitudinally and transversely aligned elements 20. In this manner the type of element shown in Fig. 11 may be converted into the type of element shown in Figs. 12 and 13. This operation is preferably accomplished while the elements are either held in a connected group or after they have been mounted upon a suitable cord and carrier combination 40-41.

Figs. 10, 11, 12, and 13 show that elements of the type under consideration may also be made from strip material; Fig. 10 shows an element completely formed except for its scoop; Fig. 11 shows the same element with its top edge bent inwardly to form a scoop 24; Fig. 12 shows the same element completely formed and having the side edges of its scoop portion 24 struck inwardly at 25; and Fig. 13 shows a reverse element 20a having the side edges of its scoop portion 24a struck inwardly at 25a.

Figure 15 shows a drill 53 which may be employed to cut out a longitudinal recess 23 in a bar-like piece 19 and Fig. 17 shows a buffer that may be employed to smooth the elements off, particularly, adjacent their side edges.

In Fig. 2 I have shown apparatus which may be employed to preliminarily semi-sever the elements. It includes a die block 59 having a plurality of openings therethrough which correspond in spacing to the spacing between elements and which correspond in dimension to the blank to be pushed out. A movable gate 59a carries a plurality of punches or knives 58 which are adapted to enter the piece 19' at spaced points along its side edge to partially sever element body portions, and to thus, partially form transversely-extending fastener elements. This apparatus is merely illustrative of a form of mechanism for carrying out my invention.

I have shown a modified procedure in Fig. 18a for forming the type of element shown in Figs. 11, 12, and 13 (or Figs. 3 to 6, inclusive). The inclined cuts are first taken to form the body portions of a plurality of elements, and thence, straight cuts are made to form the scoop or interlock portions; this is the reverse of the methods employed in Figs. 2 and 7.

Fig. 6 illustrates a modified form of element 20' which is the same as the element 20' of Figs. 3 and 4, except that it has an inwardly concave, angularly-shaped body face. As will appear to those skilled in the art, this may be accomplished by making inclined cuts inwardly

from opposite side edges or by utilizing a larger size blade of the type indicated by 50' of Fig. 8 or 50'' of Fig. 2.

The top and/or bottom stops, see Fig. 19, may be of any suitable type. The numerals 42 show two elements 20' moved into abutting relationship to act as a stop and the numeral 42' shows a stop made by skipping a severing position between elements.

I also contemplate the use of a material in forming the elements, whether a metal, a composition, or rubber, etc., that has suitable flexible characteristics. As a result, the connecting lug, such as 26 of Fig. 8, need not be severed at all. That is, a connecting lug and/or lugs may be left between the elements adjacent the carrier and cord (or tape) 40-41 to further strengthen the mounting and to insure that the elements will retain their proper spaced interval with respect to each other; jamming in the operation of the slider 43 becomes practically impossible. Then too, a suitable length of connected elements may be shipped to the clothing or other manufacturer who can break the length in accordance with his requirements, and by a very simple operation, mount the selected length on the material which is to be slider-controlled.

While I have described what I now consider to be preferable procedures for producing interlocking fasteners from longitudinal, bar-like materials, and I have shown what I now consider to be preferable forms of fastener elements to be made by such procedures, it will be apparent to those skilled in the art that the steps described may be modified, some may be omitted, and others added, and that variations in the order of the steps and in the specific types of fastener elements herein described may be made without departing from the spirit and scope of my invention as defined by the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a method of producing fastener elements from a longitudinal piece of material, the steps of severing a substantial portion of a transverse face of an element from the piece to form a body portion, and severing the remainder of the transverse face of the element with a different angle of severance to thereby form an interlock portion.

2. In a method of simultaneously severing and forming a plurality of fastener elements from a longitudinal piece of material, the steps of cutting transversely part-way into the piece at spaced positions therealong to form fastener element body portions, and thence, cutting into the piece at spaced positions therealong at an angle to the previously-mentioned cut portions to thereby form fastener element interlock portions.

3. In a method of producing a plurality of fastener elements from a longitudinal piece of material, the steps of forming a carrier recess longitudinally of the piece to extend inwardly from a base longitudinal edge thereof, partially severing individual elements from the piece to form body portions of the elements while employing a width of severance equal to the desired spacing between adjacent elements when mounted on a carrier, mounting the thus-formed connected line of elements upon a longitudinal carrier, and thence, completing the severing operation.

4. A fastener element having an interlock portion, the interlock portion inclining inwardly upon one face of the element and having side

edges projecting inwardly to prevent sidewise movement of interlocked elements.

5 5. A fastener element having an interlock portion, the interlock portion inclining outwardly with relation to one face of the element and inclining inwardly with relation to an opposite face of the element, each said face having a substantially angular outline which converges substantially centrally of said face.

10 6. A plurality of fastener elements in an interconnected form, each element being connected to adjacent elements by a portion of sufficient flexibility to permit a slider to lock and unlock said elements even although said elements are maintained in an interconnected relationship with respect to each other.

15 7. In a method of producing a plurality of fastener elements from a longitudinal piece of material, the steps of at least partially forming the piece while in a unitary form to correspond to a desired shape of the individual elements, partially severing individual elements from the piece in such a manner that the spacing between the individual elements corresponds to a desired spacing between them when mounted upon a common carrier, thence, holding the elements in such relationship while associating them with a common longitudinal carrier.

20 8. In a method of producing a fastener element from a bar-like piece of material, the steps of cutting into a side of the piece and separating at least a portion of the fastener element from the piece and thereby forming an interlock projection for the fastener element.

25 9. In a method of producing a plurality of fastener elements from a longitudinal piece of material, the steps of forming a carrier recess longitudinally of the piece while the piece is in a unitary form, severing body portions of individual elements from the piece in such a manner that each element has a carrier recess and has a connected relationship with respect to adjacent elements, and mounting the elements as a connected group upon the same carrier assembly.

30 10. A plurality of fastener elements integrally interconnected by portions of the material from which they are formed, each element being spaced from adjacent elements, lateral portions of each element being opposite to lateral portions of adjacent elements, each element having an interlock on lateral portions thereof that is spaced from the interlocks of adjacent elements.

35 11. In a method of manufacturing a pair of interlocking fastener assemblies, the steps of forming and partially separating individual elements from a longitudinally-extending piece of material in such a manner that each element has an interlock portion of substantially the same shape as the other elements, associating a carrier with one group of the elements and associating another carrier with a second group of the elements, and then, associating the first group of elements with the second group of elements without separating the individual elements in such a manner that a slider may be employed to lock and unlock them with respect to each other.

40 12. In a method of making slide fastener elements, the steps of forming a planar interlock portion having an angle with respect to a body portion of the element, and pressing-in opposite sides of such planar portion to form a substantially complete interlock.

45 13. A plurality of fastener elements in an interconnected form, each element having an inter-

lock on a lateral face thereof and also having a carrier-mounting portion, said elements having a spaced-apart relationship and being connected together by an integral flexible portion of sufficient flexibility to permit a slider to lock and unlock said elements even although said elements are maintained in an interconnected relationship with respect to each other.

50 14. A plurality of fastener elements as defined in claim 13 wherein said elements are connected together along carrier-mounting portions thereof.

15 15. A plurality of fastener elements in a longitudinally-extending interconnected bar-like form, said elements having at least partially-formed interlocks extending longitudinally to provide a continuous longitudinal planar side of said form, the body portions of each element having lateral faces extending transversely of the longitudinal length of the interconnected elements.

20 16. A fastener element having body and interlock portions, said interlock portion being divided into two parts, each part inclining inwardly on a plane and converging to meet the other part, the thickness of said element being substantially the same along the plane of inclination of each of said parts.

25 17. A fastener element having a body portion, planar side edges, and an interlock, said interlock extending across from one planar side edge of the elements to another planar side edge thereof and converging angularly in such extending direction.

30 18. In a method of making fastener elements, the steps of providing a piece of material from which an element may be formed, and forming substantially-complete interlocks on opposite faces of an element by separating portions of the piece from other portions thereof.

35 19. In a method of making fastener elements, the steps of providing a piece of material from which an element may be formed, and forming a concave interlock on one element while simultaneously forming a convex interlock on an adjacent element.

40 20. In a method of making fastener elements, the steps of providing a piece of material from which elements may be formed, and simultaneously forming interlocks on adjacent portions of a pair of adjacent elements by severing a lateral portion of one element from a lateral portion of an adjacent element.

45 21. A pair of fastener elements integrally connected together by portions of material from which they are formed, one element being spaced from an adjacent element, and a lateral face portion of each element having an interlock thereon that is opposed to and spaced from an interlock on a lateral face portion of the adjacent element of the pair.

50 22. A plurality of fastener elements in an interconnected form, each element having an interlock on a lateral face thereof and also having a carrier-mounting portion, said elements having a spaced-apart relationship and being connected together by an integral flexible portion of sufficient flexibility to permit a slider to lock and unlock said elements even although said elements are maintained in an interconnected relationship with respect to each other, said flexible portions being of metal material and having a location that permits an interlock of one element to operably engage with respect to an interlock of another element of a carrier assembly.

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The above entitled patent was extended January 1, 1952, under the provisions of the act of June 30, 1950, for 7 years and 174 days from the expiration of the original term thereof.

Commissioner of Patents.