Feb. 12, 1952 R. LAUBLY 2,585,663

SLINGSHOT

Filed April 13, 1948

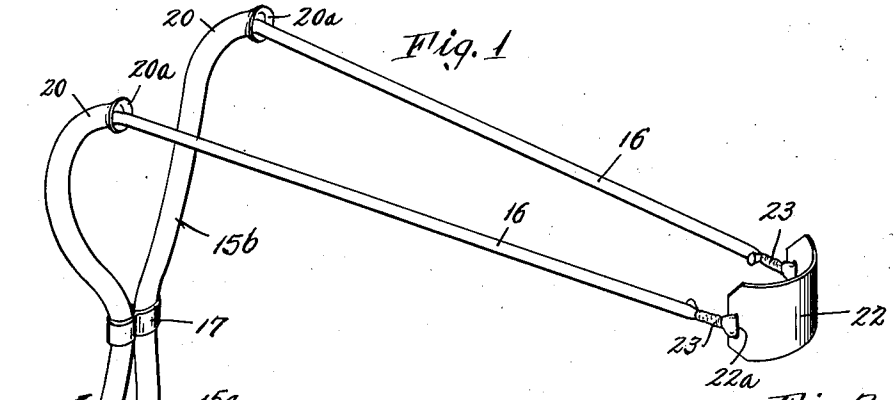


Fig. 1

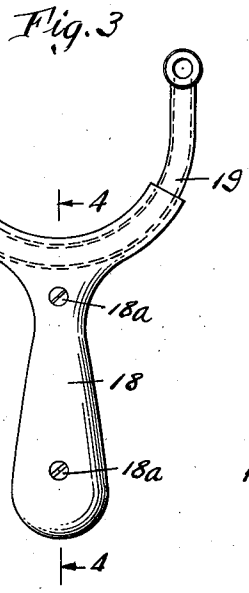


Fig. 3

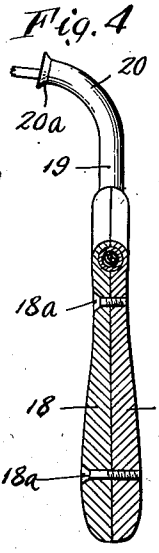


Fig. 4

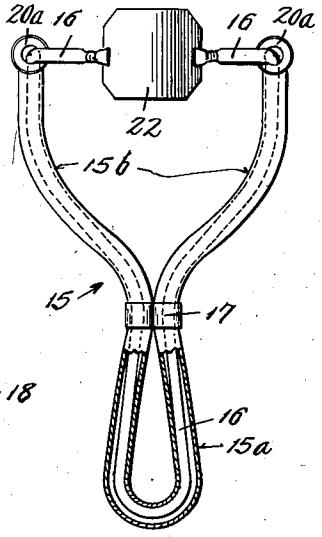


Fig. 2

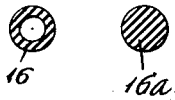


Fig. 5 Fig. 6

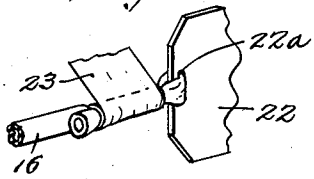


Fig. 9

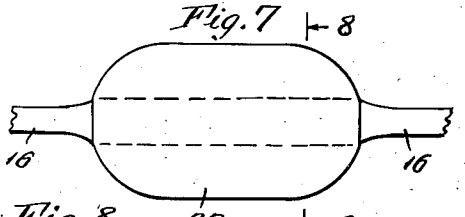


Fig. 7

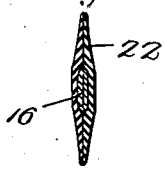


Fig. 8

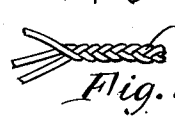


Fig. 11

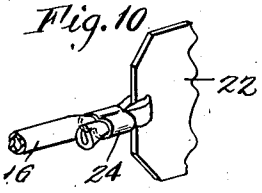


Fig. 10

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SLINGSHOT

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6 Claims. (Cl. 124—20)

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This invention relates to improvements in projectile throwing assemblies, colloquially known as "Slingshot."

Devices of this type generally operate under catapult principles, placing the missile under tension conditions and then releasing the tension suddenly to cause advance of the missile. The practice is well-known and is placed in service in the form of crude hand-made assemblies of youthful days as well as in the more elaborate developments which have been contemplated for the service, the latter, however, seemingly receiving but small commercial standing, possibly due to the expensive nature of the attempted developments.

The present invention is designed to produce an assembly of this type which is simple and reasonably inexpensive, but which is efficient in service, durable in construction, and which presents many of the characteristics of the slingshot of youthful memories. Specifically, the invention presents certain details of construction which enable the assembly to be used with greater accuracy, less danger to the user, and which is of long-life characteristic.

To these and other ends, therefore, the nature of which will be more readily understood as the invention is hereinafter disclosed, said invention consists in the improved constructions and combinations of parts, hereinafter more particularly described in detail, illustrated in the accompanying drawing, and more particularly set forth in the appended claims.

In the accompanying drawings, in which similar reference characters indicate similar parts in each of the views:

Figure 1 is a perspective view showing one form of the assembly;

Fig. 2 is an elevation, partly in section, of the form shown in Fig. 1;

Fig. 3 is a view in elevation showing a modified form of handle element;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a cross-section of one form of elastic element;

Fig. 6 is a cross-sectional view of another form of the elastic element;

Fig. 7 is a detail view in elevation of one form of pouch which may be used;

Fig. 8 is a cross-sectional view taken on line 8—8 of Fig. 7;

Fig. 9 is a detail perspective view showing one way of securing the elastic to the pouch;

Fig. 10 is a similar view of a different form of such connection; and

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Fig. 11 is a view of a modified form of the elastic element.

A slingshot is generally formed with three elements, a rigid handle, a pouch which carries the missile, and the elastic element through which the power is obtained. In the crude hand-made form of youth, the handle was generally a forked stick with strings secured to the ends of the fork, a rubber band for each string, with the pouch secured direct to the bands or connected thereto by additional string sections. In service, the missile was placed in the pouch, grasped by one hand while the other grasped the handle; the pouch was then drawn rearward placing the bands under tension, and then suddenly released to discharge the missile which sped between the forks of the handle. The accuracy of the shot depended partially upon the skill of the user, and partially upon the degree of perfection with which the device was made.

The present invention is an emulation of such crude hand-made structure, but formed in such way as to provide for accuracy in use, relatively long-life, as well as increased power conditions, these results being secured through the particular structure of the slingshot. To obtain accuracy and long-life, the handle is given a particular shape, designed to aid in aiming the structure and to eliminate undue strains. In addition, the elastic means is so arranged as to practically assure equal tension in the two flights which extend from the pouch; in addition, the structure of the elastic means is such as to permit the user to provide a desired tensioning length within convenient arm's-reach and at the same time prevent the stretch from exceeding the elastic limits of the elastic means, thus preventing deterioration through straining the means.

As is well-known, a strip or length of rubber can be stretched and when released will return to normal condition as long as the extent of the stretch does not reach the elastic limit of the rubber of the length. If the limit is reached or exceeded, the strip or length is itself increased so that it does not resume its initial length. Obviously, the greater the length of the rubber strip, the greater becomes the possible length of the stretch, before the elastic limit is reached, since the permissible stretch is generally similar in successive increments of the length of the strip so that as the length is increased by additional increments the totality of permissible stretch is increased correspondingly.

However, while such increased length thus prevents exceeding the elastic limit, the increased length provides the possibility of increased lia-

bility of damage where the assembly is of a type where the length extends into different planes, especially where the change is sudden or sharp. For instance, a bend over which the length extends, if abrupt, can seriously affect the conditions, since the stretch conditions can become localized and thus place a zone of the strip length under stretch conditions which materially or greatly exceed the elastic limit, even to an extent sufficient to snap the strip within such zone. This action is due to the fact that the stretch conditions are not permitted to pass uniformly throughout the length, so that the entire length is not being subjected to similar action and the stretch is not uniform. Under these conditions a restricted zone must provide the totality of stretch desired, thus placing the zone beyond the elastic limit range. Under uniform stretch conditions, there may be a measure of wear present, but it is uniform throughout the length of the part subject to wear; but when the stretch is not uniform, the wear becomes centered on a restricted zone and this, with the abnormal stretch conditions present, can quickly lead to actual breakage.

The present invention is designed to meet these conditions by assuring an adequate length of stretch within the elastic zone without danger of reaching the elastic limits of the zone. This invention also provides for uniform stretch conditions on opposite sides of the line of flight of the missile to assure flight of the missile in a true course. In addition, the structure includes a number of other features which, combined with the above, tend to provide for accuracy in service, as well as a long life to the assemblage.

For the purpose of illustrating the invention two general forms are shown, these differing in details mainly in connection with the handle member of the assemblage. In both of the forms, however, and this is a fundamental of the invention, there is a similarity with respect to the fundamental feature as will be understood from the following description.

In the form shown in Figs. 1 and 2, the handle element is shown in the form of a tubular element **15** bent to provide a handle zone **15***a* and a crotch zone **15***b*, the ends of the element being at the ends of the crotch. While the tubular element is shown as having various bends, all of these are provided in the form of curvatures which merge so that while the tube presents a shaped configuration, the interior of the tube presents no abrupt bends, the effect being that of a continuous and smooth channel from one end to the other.

One of the fundamentals of this construction, common also in the companion form presently described, is the fact that the end zones of the tubular element are projected out of the main general plane of the element, the projection being approximately in the direction of pull of the pouch of the assembly, the projected portions of the element being connected with its main portions by smoothly curved sections avoiding the presence of an abrupt bend. The free open ends of the element thus face in the direction of pull of the pouch. Since the elastic zones extend to such open ends, thus locating the line of flight, it can be understood that the projections provide an aid in aiming the assembly, and provide the additional and important condition that the elastic zones can be elongated during the pulling action without placing any material lateral strain on the material of the zone even when the user varies the line of sight by raising or lowering the pouch, so that strain localization is absent. When the pouch is released, the return of the zone to its normal condition is directly toward such open ends of the crotch zone.

While the elastic zone of this form may be secured to the element in either of several different ways, the preference is to provide an elastic zone formation in the form of a continuous length of elastic element **16**, preferably rubber tubing, the ends of which are secured to the pouch in suitable manner, the elastic element length extending through the interior of the tubular handle element, thus placing the elastic zone as not only exposed beyond the element but also extending into and through the element itself. As is apparent, this provides an elastic element of considerable length and subject to elongation throughout its length; in other words, when pulling on the pouch, the elongation reaches to each of the increments found in such length, and since the tubing is free within the element, the elongation is equal in all of the increments, a condition which assures self-equalizing of the combined zones, the tension on each side of the line of flight being completely equalized, and assuring true flight conditions. Due to the length referred to, the elastic limit of the zone cannot be reached by the activities of a single user, the length of pull required to reach the elastic limit would have to be increased to such an extent as to be beyond arm's length of the user.

If desired, the lower or handle zone **15***a* may be reinforced by suitable clamps **17** to thereby tend to prevent inequality in the position of the crotch ends.

In the form shown in Figs. 3 and 4, the handle is shown as of composite structure as compared with the unitary form of Figs. 1 and 2. For instance, the handle zone may be made up of a pair of sections **18** mated on their opposing faces, with the sections secured together, for instance by screws **18***a*. Portions of the mating face formations include curved recesses which are adapted to receive a tubular element **19** which is arcuately curved lengthwise and which, in position, is designed to produce the crotch zone of the handle. As in the form of Fig. 1, the tubular element **19** is designed to receive the enclosed portion of the elastic zone formation in the continuous form indicated at **16**.

A desirable feature of both of these forms is presented in the form of the end zones of each of the two arms of the crotch zone as above explained. As shown in Figs. 1 and 4, such end zone is in the form of a curved projecting portion **20**, the curvature serving to shift the axis of the open end of the arm through an angle of approximately 90° to the general plane of the handle. In addition to the curvature, the end zone is so related to such general plane as to be projected from such plane in the direction of pull of the pouch of the assemblage in service, and as a result the open ends of the arms face in the direction of such pull. To prevent damage to the element **16**, such open ends of the arms are flared at **20***a* or otherwise prepared so as to avoid the presence of any sharp edges or the like such as could injure the elastic structure.

As a result of this particular arrangement of the crotch zone in both forms, it is apparent that the curvature of the end zone inherently changes the direction of the element **16** from the main

plane of the handle to the direction from which the pull is being exerted, doing this without placing any localizing strain upon the element **16**. Hence, when the pull is being made, it is similar to drawing the element directly from the opening and in alignment with the axis of the opening. This aids in assuring accuracy in the aiming of the assemblage, and in addition, the elongation of the element is free to extend into each of the increments of the element since the curvature effects of the handle prevent the presence of any condition which would tend to localize the point of pulling strain; hence, the entire length of the element **16** is available to provide for the elongation, thus assuring against the possibility of approaching the elastic limits of the element **16**. And when the pouch is released to sped the missile on its flight, the contraction of the exposed flights of the element is in the direction of the open ends of the end zones, while the remainder of the contraction takes place within the handle itself, all without likelihood of damage to the element **16**.

While the use of the continuous element **16** is preferred, in order that the self-equalizing conditions be active, it will be understood that the invention is not limited in this respect. For instance, the element **16** could be arranged for an anchored condition at a mid-point in the direction of length of the handle channel. While the element, in such cases, would still be continuous structurally, it would, in operation, be equivalent to an individual element for each of the two flights, since the elongation of a flight side would then be limited to the half length of the element. Such change would tend to reduce the self-equalizing abilities of the preferred form and limit the action to the flight sides individually. In addition, it would reduce the length to which the elongation could extend and possibly cause a nearer approach to the elastic limit. However, the arrangement would give approximate uniformity of tensile action, since the continuous element **16** would present uniform structural characteristics.

The invention contemplates carrying the conditions just described to a point where the two flights of the elastic zone formation are made individual, structurally as well as operationaly, this being made possible by anchoring the handle ends of the flights within the end zones **20**. Such structure reduces the self-equalization condition and the zone of elongation practically to the exposed flight, and tends to require matching selection of elements to produce uniformity of tensile values in the two flights, while the decrease in length tends to bring the elongation closer to the elastic limit.

Both of these changes are deemed to be within the broader aspects of the present invention, since in each of the changed forms, the shape of the crotch zone of the handle is maintained, the change being simply in the length of the elastic element being employed. However, the greater efficiency is provided by the use of the preferred structure, shown in Figs. 1 to 4, and described in detail above.

The elastic element may be in the form of elastic tubing, as in Fig. 5, but may omit the hollow core zone, as indicated in Fig. 6, the latter presenting a solid form of rubber elastic **16***a*, which may be preferred in some cases.

The elastic element may be secured to the pouch **22** in various ways. For instance, in Fig. 9 the pouch is shown as formed with an end opening **22***a* through which an end of element **16** is passed, and then secured by a wrapping of suitable material such as latex tape **23**. In Fig. 10, the end is secured by a metal clip **24** instead of by tape. In Figs. 7 and 8, the pouch is of composite form, made of vulcanizable material, the elastic element being inserted between plies and vulcanized to form a continuous structure with the pouch. In the general case the pouch may be vulcanized to the element **16** midway between its ends as illustrated in Fig. 7. The assembly **16**, **22** may then have one of its ends passed clear through the tube **15** or **19**, taped or otherwise connected to its other end, and the connected ends drawn back into the tube to its approximate center. It will be understood, of course, that where the element **16** is being assembled at the manufacturing point, it may be threaded through the tube **15** or **19**, and its ends thereafter vulcanized between the plies **22** to form a continuous ring, rather than employing the structure of Fig. 7.

As will be understood, the assemblage thus provided, in either of its forms, provides a device of this type which is neat and attractive in appearance, capable of accurate aiming in service, powerful in action, efficient in operation, durable in construction, and is so formed as to offer little opportunity of becoming snarled, since only the actual flights of the elastic zone are exposed and these provide for linear directions of length. The absence of sharp bends or angles in the handle prevent any tendency of the elastic zone to kink within the handle zone and assures long life to the device, since in the preferred form, the creeping effects produced within the handle by the elongation of the elastic zone do not tend to set up excessive wear due to the absence of abrupt bends which would tend to localize the strains. As a result, the structure is of simple but highly efficient formation and capable of efficient action over extended periods. The simplicity of the structure permits ready substitution of elastic zone elements should gradual wear render substitution essential.

The elastic member may, if desired, be made of a plurality of strands and this may be intertwined to form a braid **16***b* as shown in Fig. 11.

Variations and modifications may be made within the scope of this invention, and portions of the improvements may be used without others.

I claim:

1. A slingshot assemblage comprising a handle element including a crotch formed by a pair of arms, a pouch, and an elastic zone formation connecting the pouch and the arms and with said zone formation presenting elastic flights symmetrically disposed on opposite sides of and spaced from a missile line of flight extending through a mid-zone of the crotch, the handle element being a rigid structure and presenting a hollow smoothly curved channel therethrough between the ends of the arms and internally of the handle element and within which the elastic zone formation flights extend a substantial distance.

2. A slingshot assemblage comprising a handle element including a crotch formed by a pair of arms, a pouch, and an elastic zone formation connecting the pouch and the arms and with said zone formation presenting elastic flights symmetrically disposed on opposite sides of and spaced from a missile line of flight extending through a mid-zone of the crotch, the handle ele-

ment being a rigid structure and presenting a hollow smoothly curved channel therethrough between the ends of the arms to thereby permit the zone formation flights to extend internally of the handle, the elastic zone formation extending throughout the length of such hollow channel in addition to the exposed flights to thereby provide the formation as a continuous elastic zone extending from the pouch to and through the handle element, and back to the pouch.

3. A slingshot assemblage comprising a handle element including a crotch formed by a pair of arms, a pouch, and an elastic zone formation connecting the pouch and the arms and with said zone formation presenting elastic flights symmetrically disposed on opposite sides of and spaced from a missile line of flight extending through a mid-zone of the crotch, the handle element being a rigid structure and presenting a hollow smoothly curved channel therethrough between the ends of the arms to thereby permit the zone formation flights to extend internally of the handle, the elastic zone formation extending throughout the length of such hollow channel in addition to the exposed flights to thereby provide the formation as a continuous elastic zone extending from the pouch to and through the handle element, and back to the pouch, the elastic zone formation being free from localized restraint within the channel to thereby permit tensile self-equalization of the formation material and assure uniformity of tension values in the opposite exposed flights.

4. A slingshot assemblage comprising a handle element including a crotch formed by a pair of arms, a pouch, and an elastic zone formation connecting the pouch and the arms and with said zone formation presenting elastic flights symmetrically disposed on opposite sides of and spaced from a missile line of flight extending through a mid-zone of the crotch, the handle element having a grip in the form of a depending extension of said crotch, said handle element including a tubular portion carried by the grip, forming the crotch arms and presenting a hollow channel through the portion between the open ends of the arms, the zone formation flights extending internally of the handle a substantial distance.

5. A slingshot comprising a piece of tubing bent to form a loop constituting a hand-grip and having its ends bent to form crotch arms, and an elastiic band extending in continuous form through said tubing, issuing from the ends thereof in two lengths, and a pouch secured to the free ends of said lengths.

6. A slingshot comprising a piece of tubing bent to form a loop constituting a hand-grip and having its ends bent to form crotch arms, and a band of tubular rubber extending in continuous form through said tubing, issuing from the ends thereof in two lengths, and a pouch secured to the free ends of said lengths.

RICHARD LAUBLY.

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