

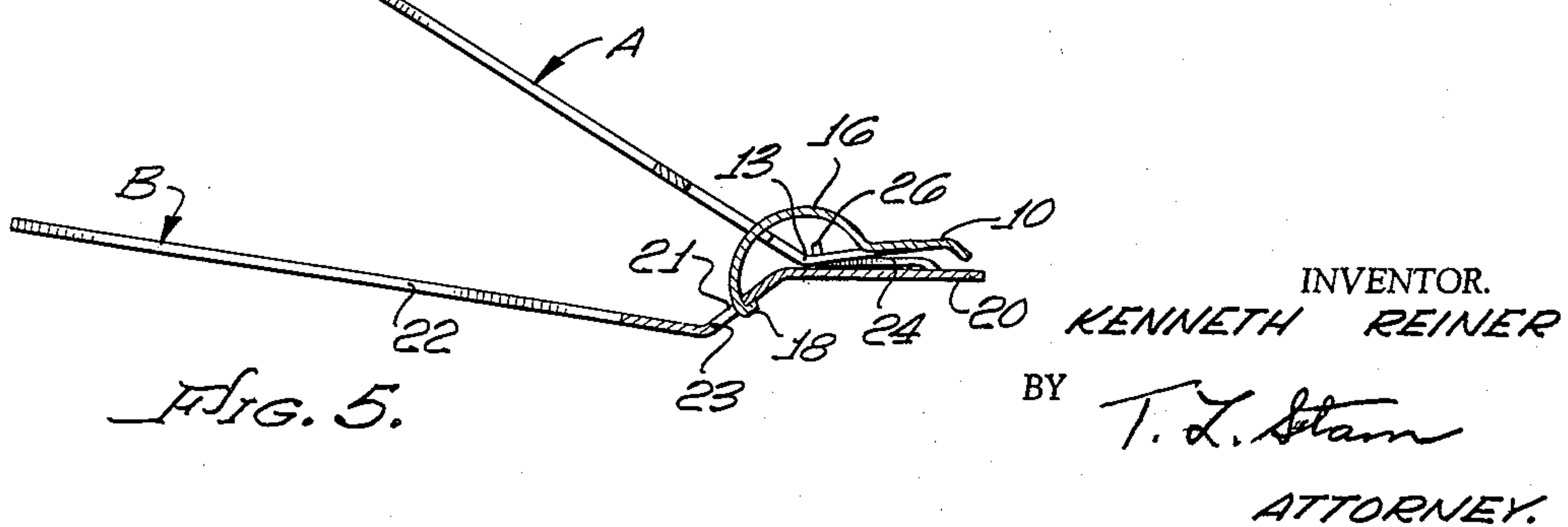
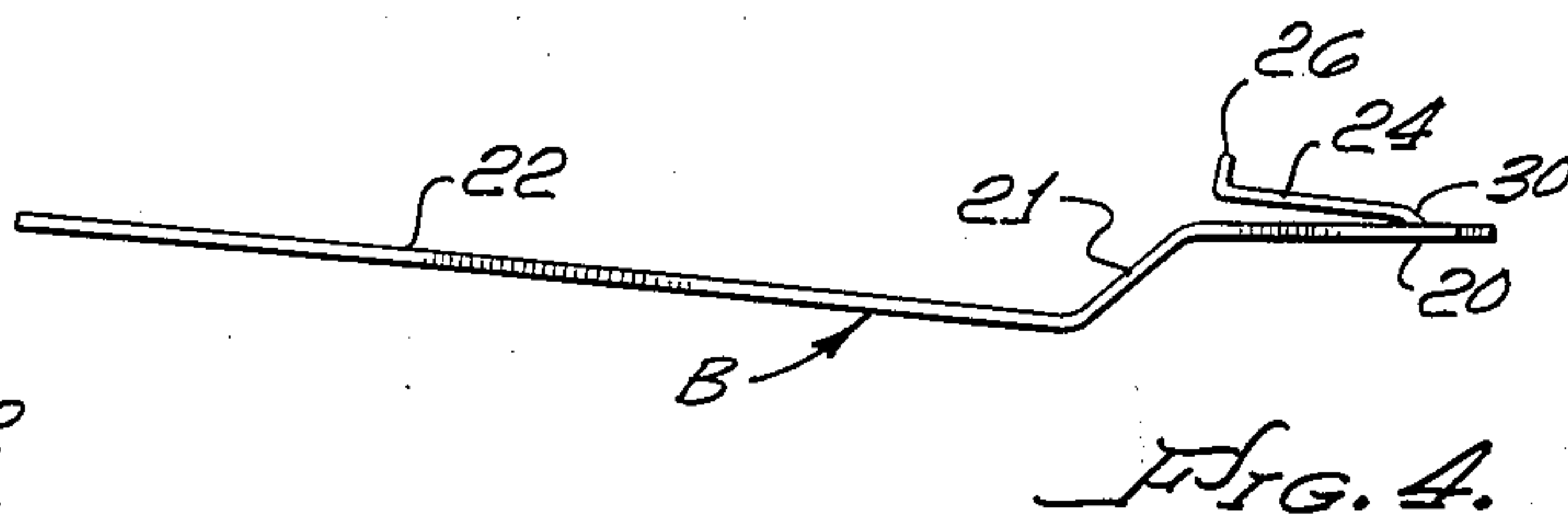
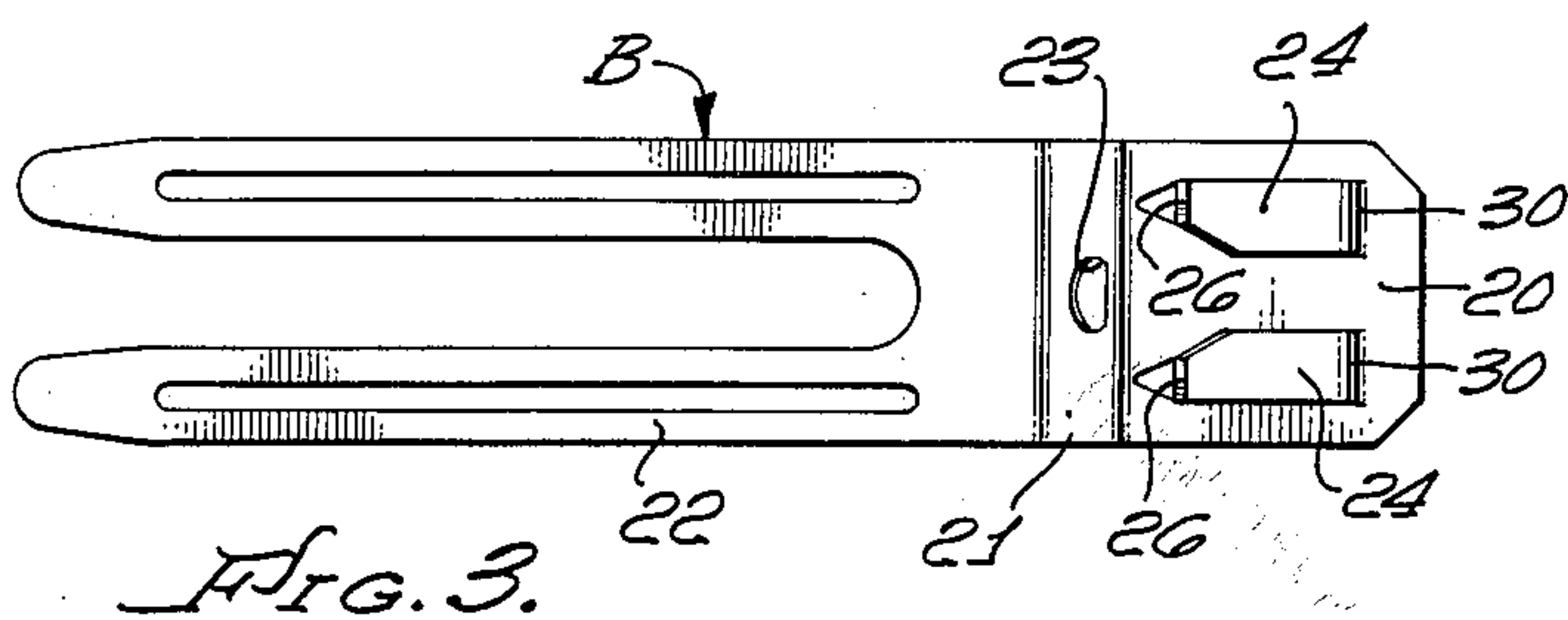
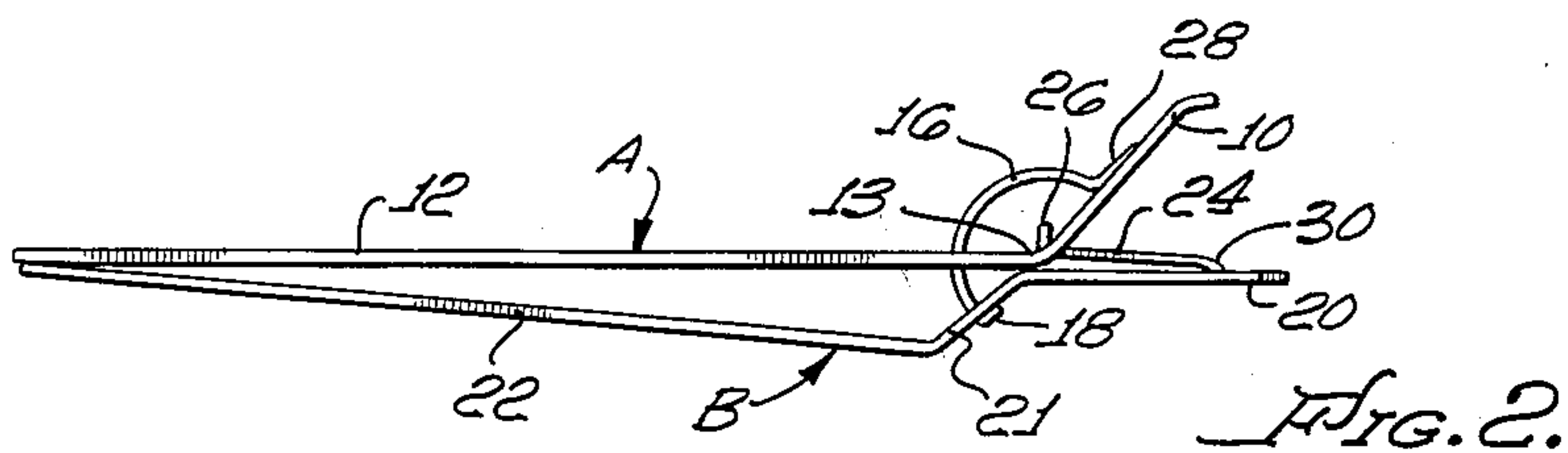
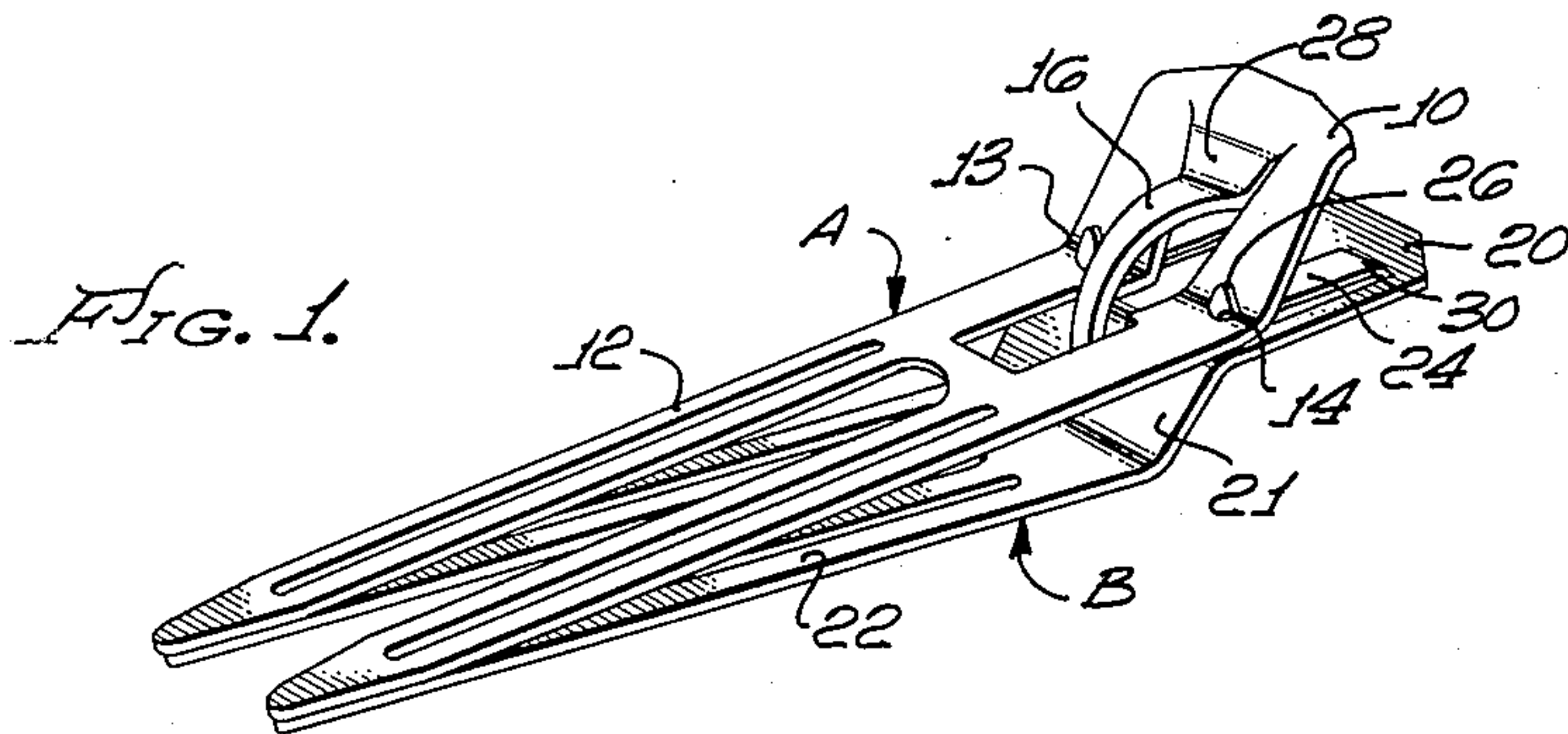
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3,101,725

HAIR CURL CLIP

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3,101,725

HAIR CURL CLIP

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This invention relates to improvements in clamps, and more specifically to improvements in two-piece metal clamps of the type wherein a spring tongue, which is integral with one of the pieces, engages the other piece in such a manner as to urge the clamping portions of the two pieces towards a normally closed position.

Clamps of the type under discussion are obviously of general utility and the present invention is an improvement of such constructions generally. However, for purposes of example and illustration, a clamp of style and design particularly adapted for use as a pin curl clip is described herein and shown in the accompanying drawing. Clamps of this type are extremely popular for hair dressing purposes and a leading example thereof is disclosed in United States Reissue Patent No. 23,163 issued to Kenneth Reiner and Armand Braga on November 1, 1949.

It is characteristic of clamps of the type shown in the aforementioned Reissue Patent No. 23,163 and of other contemporary two piece clamp designs that the spring member is an integral tongue having its root in the handle portion of one of the pieces and extending across the pivot area of the clamp into engagement with the clamping portion of the other clamp piece to bias the clamping portions of the two pieces towards closed position. In some of these the spring tongue also serves to hold the two clamp pieces in assembly either without help from the pivot means (as in the aforementioned reissue patent) or with some mechanical holding assistance from the pivot means. In all cases, however, when a single spring means is utilized, the nature and size of the spring and the degree of deformation required for normal operation of the clamp between the full open and full closed position are such as to present certain difficulties which will be specifically discussed herein and which are minimized by the teachings of the present invention.

In single spring type clamps as described and discussed in the preceding paragraph it is necessarily true that the spring members thereof are deformed and subjected to tension in some proportion to the degree of opening of the clamping portions of the clamps. Since no other spring means is present in such clamps the design of the spring element and the nature of the material used in the formation of the spring and of the clamp are extremely critical because it is essential that the spring be of such design and material that it can provide a suitable amount of clamping pressure and yet not be permanently deformed by operation of the clamp to its full open position. Hence, clamps having only a single integral spring element have been made either of expensive spring steel or of soft metal adapted to be hardened to high elastic limit by complicated and expensive heat treatment procedures. In either case the parts are usually made by mass production methods and handled in bulk between the various operations such as heat treating, coating, and assembly. In such bulk handling, the spring elements, especially in the soft metal state, are necessarily subject to some small amount of deformation since they are generally rather fragile. The resulting variations are such that some of the assembled clamps will have spring elements which may be permanently deformed upon initial use and which may have less than the desired amount of clamping pressure. Hence, expensive quality control pro-

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cedures are necessary to prevent sale of subquality devices.

In the prior art it has been proposed to overcome these difficulties by providing a plurality of spring elements, one on each of the two clamp pieces and to arrange for said spring elements to complement one another in the operation of the clamp so that the tension and amount of deformation is divided between the two spring elements and the danger of reaching critical conditions where the spring elements might be permanently deformed is lessened without reducing the resulting clamping pressure. However, such arrangements in general have involved cooperating spring element constructions wherein the two spring elements or at least one of them have edges or surfaces which scrape or rub against other parts. Such rubbing causes binding of the parts, resulting in varying spring pressures and uneven operation. Moreover, the elements have a tendency to be noisy in operation especially when edge contact exists. Moreover, the rubbing of the elements against one another has a tendency to wear off the finish of the clamp elements thus creating areas where corrosion occurs as well as spoiling the appearance of the clamp. In the special use as a pin curl clip the wearing off of protective finishes or coatings is a matter of great importance since the acid materials used in hair curling compounds can cause rusting of metallic parts and discoloration of the hair.

The present invention provides novel two-piece, all-metal clamp constructions which overcome the disadvantages of prior art clamps of the single spring element type of provision of novel spring and pivot means which give the advantages of plural spring constructions in a manner not subject to the noise and wear difficulties of prior art plural spring clamp types. The novel constructions include arrangements wherein a broad new principle is incorporated in the hinge or pivot area, in that the pivot means on one of the clamp pieces includes or is mounted upon spring means. This arrangement tends not only to augment the effect of the spring tongue on the other clamp piece by forming an extension spring at the end thereof to provide a long spring linkage, but serves also to tend to shorten the effective length of the said spring linkage as the clamp is opened so that the possibility of overstressing the spring parts is greatly lessened. This lessening of the effective length of the spring parts has the further advantage that the force required to open the clamping portions is more uniform throughout the range of movement than was true in the prior art, wherein the force grew progressively greater as the spring or springs were progressively flexed more as the clamp approached its full open position. The above is accomplished by a structural arrangement of the plural spring means which is such that the spring means augment one another in a non-sliding linkage to eliminate the disadvantageous sliding arrangement of the prior art. Moreover, the present invention provides constructions having further advantages in inhibiting the separation of the parts of two-piece clamps.

It is, therefore, an object of the present invention to provide improved two-piece clamp constructions of the type which are normally spring-biased towards a closed clamping position.

Another object of the present invention is to provide novel clamp constructions wherein plural spring means are arranged to augment one another in such a manner that they provide a single long spring linkage.

A further object of the present invention is to provide novel clamp constructions of the class described wherein the effective length of a spring linkage is reduced when the clamp handles are pressed together to open the clamp.

A still further object of the present invention is to pro-

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vide novel clamp constructions characterized in that they have plural spring elements which cooperate with one another in normal operation of the clamp without requiring edge surface contact or sliding contact of the springs with other portions of the clamp.

Yet another object of the present invention is to provide novel pin curl clip constructions which are characterized in that the pressures required to be applied to the handles in opening the clip are relatively constant throughout the operating range.

Still another object of the present invention is to provide novel two-piece clamp constructions wherein the possibility of accidental separation of the parts is substantially lessened and practically obviated.

Still another object of the present invention is to provide novel two-piece spring biased clamps wherein the cooperating pivot areas include spring arrangements which are effective to augment the main spring means of the clamps and to tend to reduce the danger of permanently deforming the said main spring means as the clamp jaws portions are moved to their full position.

These and other objects and the attendant advantages of the present invention will be readily apparent from the following description taken in conjunction with the accompanying drawing which depicts a purely illustrative example of the present invention, wherein like reference characters designate like parts throughout, and in which:

FIGURE 1 is a perspective view of a clamp embodying an illustrative application of the present invention;

FIGURE 2 is a side elevation of the clamp of FIGURE 1;

FIGURE 3 is an enlarged top plan view of the bottom clamp piece of the clamp of FIGURE 1, with the top piece disassembled therefrom;

FIGURE 4 is a side elevation of the bottom clamp piece of FIGURE 3; and

FIGURE 5 is a central sectional view of the clamp of FIGURES 1 and 2, with the clamp in the open position.

Referring now to the drawing, the clamp depicted therein is illustrative of the type under discussion, and embodies the present invention in a pin curl clip design particularly adapted for use as a hair dressing device.

Such pin curl clips generally consist of a pair of superposed elongated pieces comprising the top and bottom members of the clip, respectively, having cooperating or correlated hinge or pivot means and having angularly related superposed handle portions on one side of said means and superposed clamping portions on the other side of said means, whereby the clamping portions are adapted to be separated or brought together by moving the handle portions together or apart, respectively. The general type of clip under discussion is usually provided with spring means adapted to normally bias the clamping portions towards their closed position.

In the specific illustrative example, the top clip member A comprises a handle portion 10 which is angularly related to an integral clamping portion 12.

In view of the angular relationship of the handle and clamping portions the area of juncture between the said portions is a bend radius 13 which serves as a pivot surface or area on which the top member A rocks relative to the bottom member B when the two members are operatively assembled. A pair of sockets, which may be in the form of apertures 14, are provided in the above described pivot area. The top member A is provided with spring means which is preferably in the form of an integral spring tongue 16 struck from the material of the top member. Spring tongue 16 is derived of the material of adjacent areas of said handle and clamping portions and therefore has its root in the handle portion 10 and is of a length such that it extends across the previously described pivot area. Spring tongue 16 may be provided with a flange or hook 18 at its free end as may be best seen in FIGURES 2 and 5 of the drawing.

Bottom clip member B comprises a handle portion 20

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which is angularly related to the next adjacent portion 21 of the clamping portion of the said bottom member. The portion 21 may, in turn, be angularly related to the end portion 22 of the clamping portion, whereby handle portion 20 is roughly parallel to end portions 22, this arrangement providing a substantially parallel spacing of the effective clamping portions of the two clamp members when a curl is held therebetween. It should be noted, however, that bottom member B might be of any elevational shape, such as flat, it being requisite only that the handle portions 10 and 20 be angularly related in the assembled closed position of the clamp.

The angularly related portion 21 of bottom member B is provided with an opening 23, the rearward boundary of which serves as an edge to be engaged by the hook or flange 18 of the spring tongue 16 of top member A when the clamp members are in assembled relationship, as shown in FIGURES 1, 2 and 5 of the drawing.

In the assembled position, as described in the preceding paragraph, the flange 18 of the spring tongue is effective to apply pressure against the bottom or outer side of bottom member B to hold the two clamp members against vertical separation from one another. Lateral displacement of the two members relative to one another at the pivot area is prevented, as in the device disclosed in the drawing of the aforementioned patent (Reissue 23,163) by the provision of spurs 26 on bottom member B and the engagement of such spurs in the sockets 14 in the pivot area of the top member A, this arrangement of correlated means on the two members thus defining the pivot means of the clamp.

It is an important feature of the present invention that the hinge or pivot area of the bottom clamp member B includes a spring means tending to bias the top member A upwardly away from the bottom member B. This upward force is in opposition to the direction of the force exerted by the spring tongue 16. In the particular exemplary modification shown in the drawing, the spring means is provided by a pair of spring arms 24 struck up from the material of the handle portion 20 and extending toward the hinge or pivot area of the clamp. Spring arms 24 are equally spaced laterally of the longitudinal center line of the bottom member B, are disposed above the plane of the top surface of handle portion 20, and have the upwardly turned spurs 26 at their free ends, as shown. The length of the arms 24 and the position of spurs 26 are such that the spurs 26 are engaged in the sockets 14 of the top member when the members are in assembled relationship.

In devices of the general class under discussion the spring tongue is usually prestressed when the parts are assembled so that there is a continuing pressure tending to keep the clamping portions in closed position and to grip material placed between said clamping portions. In the present invention, with the parts in closed position, as in FIGURES 1 and 2 of the drawing, it may be readily seen that manipulation of handle portions 10 and 20 toward one another causes separation of the clamping portions to the position shown in FIGURE 5 against the resilience of spring arms 24 and spring tongue 26. The act of squeezing the handle portions toward one another requires the application of a downward force on the handle portion of the top member and an upward force on the handle portion of the lower member. Therefore, as the opening movement of the clamp begins, the spring arms 24 are gradually depressed toward the main body of the bottom member B, as may be seen by comparison of FIGURES 2 and 5, as the spring tongue 16 is gradually flexed to a new shape and position as the clamp reaches its full open position. Since both the spring arms and the spring tongue are resilient, both have a tendency to exert force tending to restore them to their normal shape and position. These forces augment one another, as a continuous spring linkage, in a direction tending to

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reverse the resilient deformation, that is, in a direction to close the clamp.

The depression of spring arms 24 is also effective to reduce the length of the spring linkage since such depression reduces the straight line distance between the root of the spring tongue 16 (in handle portion 10) and the flanged end 18 of the spring tongue, where it engages the bottom member B. By virtue of this fact the danger of permanent deformation of spring tongue 16, and of the resultant permanent reduction of spring effect which was inherent in prior art devices (as described in the introductory remarks of this specification) is substantially obviated. Accordingly, greater leeway is permissible in spring tongue design so that minor deformations caused by bulk handling do not so affect the finished product as to make it unacceptable for use.

In the above described novel construction it is also obviously true that the shortening of the distance between spring ends caused by downward movement of the spring platform formed by spring arms 24 decreases the amount of pressure required to open the clamp to full open position, to give an easier and more uniform opening movement of the clamp. In this regard, it is pointed out that it is generally true of prior art constructions, whether of single or plural spring type, that the spring pressure increases from the instant of application of opening pressure until the full open position is reached.

Several advantages, previously discussed in part, are inherent in the above described construction. In the first place, it should be noted that the placement of the spur elements of the pivot or hinge arrangement on spring means biased toward the other clamp member is advantageous in that there is a continuing upward pressure tending to keep the spurs 26 fully seated in the sockets or apertures 14. Thus, if for any reason there should be a tendency of top member A to move away from bottom member B at the pivot area the spring means (arms 24) would follow to keep spurs 26 fully seated in contradistinction to similar prior art constructions wherein such relative motion of members A and B tends to move the spurs out of the sockets and cause disassembly of the parts.

Secondly, the above described spring arrangement augments spring tongue 16 to provide an elongated continuous spring linkage wherein the flexure and stresses are divided over a long length of spring material in contradistinction to prior art two spring devices wherein spring edges rubbed or slid relative to one another or to other related clamp parts. Thus, referring to FIGURE 2 of the drawing, the spring linkage of the present invention, starting at the root 28 of spring tongue 16 in the handle 10 of top member A, extends the length of the spring tongue 16 and its end flange 18, through the handle portion 20, the roots 30 of the spring arms 24 to the spurs 26 at the ends of the spring arms. Ideally, the resilience and strength of the spring tongue 16 should match that of the spring linkage can share deflection and stresses as equally as possible since otherwise the weaker of the two would take all of the stresses and be in danger of being overstressed and permanently deformed. It should be noted, however, that the spring arm arrangement of the present invention is advantageous even if the resilience of the spring arms should be considerably weaker than that of the spring tongue since in this case initial forces on the handle portions to open the clamping portions would bottom the spring arms to shorten the effective length of the spring tongue in the remainder of the opening movement of the clamp, thus reducing the danger of permanent deformation of the spring tongue as previously discussed.

In actual practice, it has been determined that the lengthened spring linkage afforded by the spring biased support provided by spring arms 24 reduces the requirements of spring tongue 16 in tensile force and elongation

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to such an extent that it is now possible to manufacture pin curl clips of relatively less resilient materials. Thus, two-piece pin curl clips have, in the past, generally been made of steel, heat-treated after fabrication, and coated or plated with protective material, so that the assembled clip would resist corrosion in use with corrosive hair treating chemicals. The use of non-corrosive metals, such as aluminum, has hitherto been impractical in two-piece pin curl clips and has been accomplished only in more complex, more expensive, and less reliable constructions having three or more pieces and generally including a small steel spring as a separate element. The present invention makes it possible to construct pin curl clips of two pieces and made entirely of aluminum or of other materials having less resilience and hardness than heat-treated steel.

From the above it may be seen that the present invention provides novel clamp constructions which operate in such a manner as to reduce the tendency to overstress the spring means used therein, whereby greater leeway is permissible in design and manufacturing tolerances. It may also be seen that such constructions result in more economical manufacture, in improved operational characteristics, and in the possible use of materials which are less resilient than required in prior art devices of the same general class.

It should be clear that the novel spring pivot arrangement disclosed in this specification would be effective to assist the function of the spring element and reduce the critical nature of the design of said spring element in many spring-biased clamp constructions other than the one specifically disclosed as an example herein, this being particularly true in constructions, wherein the spring element is attached to one of the clamp members and passes through an opening to the outer surface of the other member to perform the dual functions of urging the clamping portions to closed position and urging the members toward one another at the pivot area. Obviously, therefore, many modifications and variations of the present invention are possible within the scope of the present disclosure. Accordingly, it is to be understood that the scope of the present invention is not intended to be limited by the specific exemplary illustrated construction but rather by the language of the appended claims.

What is claimed is:

1. A clamp comprising a pair of superposed elongated members having clamping portions, diverging handle portions and correlated pivot means; one of said members having a resilient integral extension struck from its material and projecting toward said clamping portions into engagement with the other member to exert a force urging the clamping portions toward their closed position and urging the members towards one another in the area of said correlated pivot means, said pivot means including spring means on one of said members extending upwardly therefrom and bearing against the adjacent surface of the other member and resiliently urging said members apart in the said area against the oppositely directed force exerted by said resilient integral extension.

2. A clamp comprising a pair of superposed elongated members having clamping portions, diverging handle portions and correlated pivot means; one of said members having a resilient integral extension struck from its material and having its connection to said member in the handle portion thereof and projecting across said pivot means, said extension extending through an opening in the other of said members into engagement with the outer surface of the clamping portion of the said other of said members to exert a force urging the clamping portions toward their closed position and urging the members towards one another in the area of said correlated pivot means, said pivot means including spring means integral with one of said members and raised therefrom from its surface toward the other member and engaging the adjacent surface of said other member and resiliently urg-

ing said members apart in the said area against the oppositely directed force exerted by said resilient integral extension.

3. A clamp comprising two superposed elongated members extending longitudinally with each other, having integral handles and clamping portions, said members having correlated means integral respectively with said members to form a rocking connection therebetween, said correlated means including socket means on one of said members and spring arms integral with the other of said members and raised upwardly toward the first mentioned member, said spring arms having upwardly directed spurs at the ends thereof, said spurs being received in the said socket means, whereby said spring arms are effective to urge the two members apart at the rocking connection, one of said members having a resilient integral extension struck from its material and extending around the axis of said rocking connection, engaging the other member, constantly urging the clamping portions toward their closed position and constantly urging the members together in the area of said rocking connection.

4. In a spring clamp of the type which comprises a pair of clamp members which rock upon one another at a pivot area, wherein the said pivot area is defined by spur means on one member received in socket means in the other member, and wherein a spring tongue on one of the members is arranged to provide resilient biasing forces tending to urge the clamping portions of said members towards closed position and to urge said spur means into deepest engagement within said socket means; the improvement comprising spring means supporting said spur means, said spring means being bowed in the direction of the said socket means, whereby said spring means and said spring tongue form an elongated spring linkage and cooperates in performing the functions of urging the clamping portions toward closed position and maintaining the clamp members in assembled relationship.

5. A spring clamp according to the improvement described in claim 4, further characterized in that the resilience of the said spring tongue and that of the said spring means is substantially equal.

6. A clamp comprising a pair of superposed elongated members extending longitudinally with each other, having integral handle portions and clamping portions, said members having correlated means including spurs on one of said members and sockets for the spurs on the other member to prevent shifting of the members relatively to each other, and enabling said members to rock upon each other upon an axis, said handle portions diverging from each other and operating when pressed to separate the clamping portions, one of said members having an integral resilient tongue struck from its own material, the root of said tongue being located in the handle portion end of the said one member, said resilient tongue extending across said rocking axis of the two members and having a hook at its end, the other member having an edge to engage said hook, said hook engaging said edge

whereby said resilient tongue constantly urges the clamping portions to a closed position and urges said members toward one another in the area of said spurs and sockets, spring arms struck from the material of the member having said spurs and raised toward the adjacent surface of the other member, said spurs being mounted on said spring arms and contained in said sockets whereby to inhibit removal of the spurs from the sockets and to form an extension spring link with said resilient tongue to share with said tongue in the absorption of deflection and tensile forces incident to the operation of the clamp.

7. A clamp comprising a pair of superposed elongated members having clamping portions, diverging handle portions and correlated pivot means; first resilient means integral with one of said members engaging the other member to urge the members toward one another at the pivot means and to urge the clamping portions toward their closed position; and second resilient means integral with one of said members and raised therefrom toward the adjacent surface of the other member and engaging the other member at the pivot means to hold said members a distance apart from one another at the pivot means in the closed position of the clamp in opposition to the resilient force of said first resilient means; whereby opening movement of said clamping portions caused by forces moving said handle portions angularly toward one another is effective to reduce the said distance between the members at the pivot means to a minimum as the clamp approaches its fully open position.

8. A clamp comprising a pair of superposed elongated members having clamping portions, diverging handle portions and correlated pivot means; first resilient means integral with one of said members engaging the other member to urge the members toward one another at the pivot means and to urge the clamping portions toward their closed position; and second resilient means integral with one of said members and raised therefrom toward the adjacent surface of the other member and engaging the other member at the pivot means to hold said members a distance apart from one another at the pivot means in the closed position of the clamp in opposition to the resilient force of said first resilient means; the relative strengths of said two resilient means being substantially equal whereby the second resilient means is gradually flexed to progressively reduce the distance between the members at the pivot means to a minimum as forces applied to said handle portions move them together to cause opening of the clamping portions.

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